BANK OF ENGLAND

Financial Policy Committee

Financial Stability Report

July 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.

This document, unless otherwise stated, uses data available as at 1 July 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/july-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.

The 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 risks it could face, including a worst-case disorderly Brexit.

The perceived likelihood of a no-deal Brexit has increased since the start of the year.

- Increased Brexit uncertainties have put additional downward pressure on UK forward interest rates and led to a decline in the sterling exchange rate and an underperformance of UK-focused equities. In markets that are particularly dependent on foreign investors — notably commercial real estate and leveraged lending — investment into the UK was much weaker in 2019 Q1 than in recent years.

The UK banking system remains strong enough to continue to lend through the wide range of UK economic and financial shocks that could be associated with Brexit.

- Actions by businesses and authorities since November have resulted in some improvement in the preparedness of the UK economy for a no-deal Brexit. However, material risks of economic disruption remain.

- The FPC continues to judge that its 2018 stress test of major UK banks was sufficiently severe to encompass the wide range of UK economic and financial shocks that could be associated with Brexit. Overall, the stress scenario was more severe than the global financial crisis.

- Major UK banks demonstrated their resilience to that stress scenario. Since the stress test they have maintained Tier 1 capital levels of around 17% of risk-weighted assets — more than three times higher than before the global financial crisis.

The FPC is maintaining the UK countercyclical capital buffer rate at 1%.

- The underlying vulnerabilities (excluding Brexit) that can amplify economic shocks have not changed materially since November and remain at a standard level overall in the UK. Despite continued signs of strong risk appetite from creditors and lenders, total UK private non-financial sector credit growth has not been rapid and debt-servicing burdens remain low.

- The FPC stands ready to move the UK countercyclical capital buffer (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.

Most risks to UK financial stability from disruption to cross-border financial services in a no-deal Brexit have been mitigated.

- Extensive legislative and other preparations made by UK authorities and firms ahead of March will apply at the end of October. UK households and businesses will be able to use existing and new services from EU financial institutions.

- UK-based firms have made further preparations to be able to serve EU clients since the extension in March. It is important that they continue to do so to reduce further the risks of disruption.

- However, in the absence of further action by EU authorities, some disruption to cross-border financial services is possible. Although such disruption would primarily affect EU households and businesses, it could amplify 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 volatility and asset price changes are to be expected in a disorderly Brexit.

- In a disorderly Brexit, a range of UK asset prices — including the sterling exchange rate, equities, corporate and government debt and bank funding costs — would be expected to adjust sharply, tightening financial conditions for UK households and businesses.

- With over £1 trillion of high-quality liquid assets, major UK banks are able to meet their maturing obligations for many months without accessing wholesale funding or foreign exchange markets. As a further prudent precaution, the Bank of England maintains operations to lend in all major currencies on a weekly basis.

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.

Global risks

The risks to the global outlook have increased during the first half of the year.

- Rising trade tensions have resulted in declining business confidence and pose material downside risks to global output growth.

The impact of these risks would be amplified by continued material underlying vulnerabilities.

- Credit growth in China continues to outpace nominal income growth and debt is more than 200% of GDP. Some emerging market economies with large current account deficits or high levels of debt denominated in foreign currencies remain vulnerable to renewed capital outflows.

- In global financial markets, risk-free interest rates have fallen markedly and are consistent with more pessimistic expectations of economic growth. In contrast, measures of compensation for credit risk in corporate bond and loan markets appear to factor in a relatively benign economic outlook.

- US corporate debt is above pre-crisis levels as a share of GDP and, in part reflecting rapid growth of leveraged lending, the share of debt owed by highly leveraged US companies has reached pre-crisis levels of above 40%.

The core of the UK banking system remains resilient to these global risks.

- Major UK banks were subjected to a severe scenario for the global economy in the 2018 stress test that reflected these underlying vulnerabilities. World GDP contracted by 2.4% over the first year of that scenario and Chinese GDP contracted by 1.2%. Banks were assumed to lose more than 10% of their exposures to large non-investment grade US and UK companies. Major UK banks showed they were resilient to that scenario.

- This test on global exposures was of a severity that encompassed a worst-case scenario for global trade tensions. All implemented and contemplated tariff measures, combined with a severe business confidence shock and a sharp tightening in global financial conditions, could slow global GDP growth materially but would be unlikely to cause the outright fall in global output that banks were tested against.

- 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.

The future of finance

The FPC welcomes the recent van Steenis review on the Future of Finance and the Bank's response.

Payments are currently a focal point for innovation. Consistent with its mandate, the FPC will aim to ensure that systemically important payment systems support financial stability, while allowing competition and innovation in payments to thrive. To do this, the FPC will:

- Assess developments in the scope and nature of regulation for payments and other innovative financial services to ensure the approach reflects their systemic importance.
- Assess risks to the UK financial system associated with the use of tokens and other assets used to facilitate new payment options and appropriate safeguards for their use to maintain financial stability and the supply of finance to the economy.
- Review the Bank's proposals on the appropriate level of access to its payments infrastructure and balance sheet in order to ensure that access supports fully the stability and resilience of the system while also allowing innovation in payments.

In the 2021 biennial exploratory scenario, the Bank will stress test the UK financial system's resilience to the physical and transition risks of climate change. It will gather views on the design of the exercise and, as a first step, will publish a discussion paper in Autumn 2019.

- Financial stability risks from climate change arise both from the physical risks associated with the increased frequency of extreme weather events and from the transition to a carbon-neutral economy.
- This exercise will integrate climate scenarios with macroeconomic and financial system models. It will motivate firms to address data gaps and to develop cutting-edge risk management consistent with a range of possible climate pathways: ranging from early and orderly to late and disruptive.
- The discussion paper will cover issues such as the coverage of the test, the nature of scenarios considered, the appropriate time horizon and disclosure of results. This will allow the Bank to develop the scenarios in consultation with risk specialists from across the financial sector, climate scientists, other industry experts and other informed stakeholder groups.

Tackling vulnerabilities in open-ended funds

Open-ended investment funds globally play an increasing and important role in the provision of finance. The FPC continues to judge that the mismatch between redemption terms and the liquidity of some funds' assets has the potential to become a systemic issue.

- Many funds offer daily redemptions while investing in assets that can take weeks or months to sell in an orderly way. They offer redeeming investors a price linked to the market price of the funds' assets despite having a redemption period much shorter than would be needed to realise those market prices, particularly in stress.
- This can create an incentive for investors to redeem when they expect others to do so. This self-reinforcing dynamic can lead to so many investors rushing to redeem that funds have no choice but to suspend all redemptions. Furthermore, fear of possible suspension reinforces the incentive to redeem.
- In 2015, the FPC highlighted vulnerabilities associated with funds' liquidity mismatch. These go beyond any single market or fund type. Large-scale redemptions from funds could test markets' ability to absorb asset sales, amplifying price moves, transmitting stress to other parts of the financial system, and disrupting the availability of finance in the real economy. Although to date these vulnerabilities have not created financial instability, they could do so under severe stress and are likely to become more important if more funds expand into less liquid assets.

The Bank and the FCA will together assess how funds' redemption terms might be better aligned with the liquidity of their assets in order to minimise financial stability risks without compromising the supply of productive finance.

- This is a global issue. For that reason the FPC supported the Financial Stability Board's 2017 recommendation that funds' assets and investment strategies should be consistent with their redemption terms. However, subsequent work by the International Organization of Securities Commissions did not prescribe how this should be achieved.

- Although funds are not permitted in general to favour one group of investors over another, there are no well-defined requirements for how this should be done. The Bank and FCA review will examine the costs and benefits of aligning redemption terms, including pricing and notice periods, with the typical time it takes to realise market prices for funds' assets in normal and stressed market conditions.

- The review will also assess the effectiveness of measures that are already used to deal with misalignment of redemption terms and asset liquidity, such as swing and fair value pricing and suspensions.

The transition away from Libor

The continued reliance of global financial markets on Libor poses risks to financial stability that can be reduced only through a transition to alternative benchmark rates by end-2021.

There is no justification for firms continuing to increase their exposures to Libor. The pace of market participants' transition efforts now needs to accelerate and the FPC will monitor progress closely.

- The smoothest transition will be one in which market participants: cease new issuance of Libor-linked contracts; identify all existing contracts without appropriate fallback clauses and rectify this to the greatest extent possible; and actively reduce legacy exposures by negotiating their transition to new rates.

- It is not in firms' own interests to have a large stock of legacy contracts that will become subject to significant legal uncertainty beyond 2021. There are advantages to renegotiating contracts to refer to alternative reference rates well in advance of end-2021.

- Well-managed firms are expected to lead the transition. All firms that responded to the PRA's and FCA's *Dear CEO* letter have now appointed a Senior Manager accountable for overseeing the transition.

Exploring the UK financial system's response to a severe liquidity stress

In 2019, the Bank will conduct a biennial exploratory exercise to explore the implications of a severe and broad-based liquidity stress affecting major UK banks simultaneously.

- This exercise will not set new liquidity standards for banks. Banks hold regulatory liquidity buffers that the FPC expects to be used in a stress.

- The exercise will explore how the reactions of banks and authorities to the stress would shape its impact on the broader financial system and the UK economy. It will help to guide the PRA's approach to supervision and the Bank's provision of liquidity in stressed conditions.

- The Bank intends to publish the results of the exploratory exercise in mid-2020.

Resilience of the UK financial system to Brexit

The FPC continues to judge that the core of the UK financial system, including banks, dealers and insurance companies, is resilient to and prepared for the wide range of risks it could face, including a worst-case disorderly Brexit. The perceived likelihood of a no-deal Brexit has increased since the start of the year.

The UK banking system remains strong enough to continue to lend through the wide range of UK economic and financial shocks that could be associated with Brexit. Actions by businesses and authorities since November have resulted in some improvement in the preparedness of the UK economy for a no-deal Brexit. However, material risks of economic disruption remain. The FPC continues to judge that its 2018 stress test of major UK banks was sufficiently severe to encompass a worst-case disorderly Brexit.

Most risks to UK financial stability from disruption to cross-border financial services have been mitigated. The measures put in place by firms and authorities ahead of March will apply at the end of October. Firms have taken further mitigating actions in recent months. It is important that they continue to do so during the extension of the UK's membership of the EU to further reduce the risks of disruption.

In the absence of further actions by EU authorities, some disruption to cross-border financial services is possible. Although such disruption would primarily affect EU households and businesses, it could amplify 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. However, sterling markets have proved able to function effectively through volatile periods.

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 core UK banking system remains strong enough to serve UK households and businesses even through a disorderly Brexit.
In November, the FPC considered a disorderly Brexit scenario. Consistent with the FPC's remit to protect and enhance the resilience of the UK financial system to major shocks, that scenario was underpinned by a set of worst-case assumptions about the challenges the UK economy could face.

Those challenges included the potential for severe disruption at the border arising from a lack of preparedness of border infrastructure, or traders, for the introduction of new customs and regulatory procedures. And the potential for UK exports to be reduced further by the EU not recognising UK product standards.

Material risks of economic disruption remain. But since November, authorities and businesses have taken some steps to improve the preparedness of the real economy for a disorderly Brexit:

- The UK has announced Transitional Simplified Procedures for customs checks at the border and a temporary waiver on security checks.
- The Port of Calais and Eurotunnel announced that they have completed their preparations on French border infrastructure.
- As a first step in preparing for new procedures, some UK traders have begun registering to be able to continue to trade with the EU (and *vice versa*).
- Some firms are in the process of obtaining EU certification for their products.
- Agreements have been signed to roll over existing EU trade deals with the rest of the world representing about 5½% of the UK's total goods trade.

Financial sector preparations have also advanced since November. EU authorities have mitigated risks of material disruption to cleared derivatives markets. UK-based banks have made some progress towards ensuring the continued flow of financial services to all EU counterparties and clients after Brexit. See **Table A.A** below on actions to avoid disruption to financial services.

The FPC continues to judge that its 2018 stress test of major UK banks was sufficiently severe to encompass the range of UK economic shocks that could be associated with Brexit.

The 2018 stress scenario was more severe than the financial crisis. In the stress test, UK GDP fell by 4.7%, the UK unemployment rate rose to 9.5%, UK residential property prices fell by 33% and UK commercial real estate prices fell by 40%. The scenario also included a sudden loss of overseas investor appetite for UK assets, a 27% fall in the sterling exchange rate index and Bank Rate rising to 4%.(1)

As set out in the Resilience of the UK banking sector chapter, the core UK banking system has maintained Tier 1 capital levels of around 17% of risk-weighted assets — more than three times higher than before the global financial crisis. And UK banks' assets do not appear, overall, to have become more risky.

The FPC therefore reaffirms its judgement that the UK banking system is strong enough to continue to serve UK households and businesses through Brexit.

Most risks to UK financial stability that could arise from disruption to cross-border financial services in a no-deal 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 business to support their economic activity. It has since updated its judgements of progress against this checklist on a quarterly basis (**Table A.A**).

The checklist is focused on the risk 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.

The measures put in place by financial services firms and authorities before the extension of the UK's membership of the EU will apply at the end of October.

UK legislation ensures that UK households and businesses will be able to continue to receive services from EU banks, insurers, asset managers and central counterparties.

UK financial institutions continue to take steps to ensure the continued flow of services to EU counterparties and clients, including setting up EU entities from which to provide services. Approximately half of the major UK-based banks' EU clients have now completed the necessary documentation in order to be able to enter into derivatives trades with the banks' EU entities. And firms are putting in place measures to facilitate the continued flow of personal data from EU service providers to the UK.

Firms should use the extension of the UK's membership of the EU to ensure these mitigating actions are completed. This would include making further progress — before the end of October — on the proportion of EU clients which have completed the necessary onboarding processes.

(1) See November 2018 *Financial Stability Report*..

But the private sector alone cannot fully mitigate the risks of disruption. Without action by EU authorities, some disruption to cross-border services is possible. This would primarily affect the EU, but could amplify volatility and spill back to the UK in ways that cannot be fully anticipated or mitigated:

- Absent clarity from some national authorities, banks in some EU countries and their UK counterparty banks will be less able to manage risk from uncleared derivative positions.
- Unless EU clients take timely steps to finalise arrangements to face UK-based banks' EU entities, operational risks remain which could disrupt service provision in the EU.
- Restrictions on flows of personal data from the EU to UK could affect services provided to both EU and UK customers.

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

Significant market volatility is to be expected in a disorderly Brexit. However, sterling markets have proved able to function effectively through volatile periods.

In a disorderly Brexit, a range of UK asset prices — including the sterling exchange rate, equities, corporate and government debt and bank funding costs — would be expected to adjust sharply, tightening financial conditions for UK households and businesses.

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, reducing demand for UK assets.

More generally, the UK faces risks from a reduction in foreign 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.

As demonstrated after the referendum in 2016, sterling markets are able to function effectively through markedly volatile periods.

And major UK banks are able to withstand severe market disruption. They hold over £1 trillion of high-quality liquid assets, enabling them to meet their maturing obligations for many months without any need to access wholesale funding or foreign exchange 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.

Table A.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. 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 Financial Policy Summary in March 2019. **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 will, among other things, allow EU financial services companies 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 (eg parts of the revised Capital Requirements Regulation).
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. The European Commission has provided a temporary and conditional equivalence decision in respect of the UK's regulatory framework for UK central counterparties (CCPs). The European Securities and Markets Authority (ESMA) subsequently announced the recognition of the three UK CCPs until end–March 2020 in a no-deal scenario and agreed the co-operation arrangements to support this with the Bank. This will allow EU counterparties to continue clearing existing trades, and new trades, with UK CCPs. UK CCPs will require clarity over future recognition arrangements well ahead of the expiry of this recognition, in order to avoid the risk that contracts would need to be closed out by March 2020.
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 £61 billion of EU liabilities after Brexit. £56 billion of this liability is expected to be addressed by 31 October 2019. Temporary regimes announced by EU states are expected to further reduce the residual 'at risk' liabilities by over 50%. Some EU countries are implementing national legislation to support affected policyholders. The European Insurance and Occupational Pensions Authority (EIOPA) 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, ESMA 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.

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

	Risk to UK	Risk to EU	
In the absence of actions by EU authorities, some risks remain. Although these issues primarily affect EU households and businesses, they can also be expected to amplify volatility and 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 are making use of the extension of the UK's membership of the EU to continue building the capacity of their EU entities. On average, approximately half of clients of major UK-based banks have completed the necessary documentation to enter into derivatives trades facing 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 at the last minute. 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 £23 trillion of uncleared derivatives contracts between the EU and UK, of which £16 trillion matures after October 2019. 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 does not intend to reciprocate 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. Notably, particular uncertainty remains about the scope of current or proposed legislation in jurisdictions which account for approximately half of the notional value of outstanding contracts.
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 indicated that it does not intend to take 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 clauses into contracts in order to comply with the EU's cross-border personal data transfer rules. The majority of firms intend to rely on these clauses, but these are subject to some legal and operational risk. 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 EU, judgement on which may now be passed soon after the UK's exit from the EU, could impact the validity of these clauses.
Implementation period to allow mitigating actions by firms			Financial institutions need time to complete any necessary restructuring of their operations and repapering of contracts. In November, the European Council endorsed a Withdrawal Agreement that includes an implementation period. If ratified, 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 A.B Other risks of disruption to the provision of 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.

Actions have also been taken to address other potential risks to financial services which, although unlikely to cause financial stability risks with material economic effect, could have been disruptive.	
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 endorsed by an EU CRA. This will mainly affect banks and insurers calculating requirements under the standardised approach/formula. A co-operation agreement exists between ESMA and the FCA and UK CRAs have registered EU entities to endorse UK ratings. ESMA has assessed the legal and supervisory framework for UK CRAs and concluded it meets the conditions for endorsement. However, the decision to endorse ratings lies exclusively with the CRA. The FCA has also issued a statement on the EU legal and supervisory framework, allowing UK CRAs to endorse EU ratings into the UK.
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. 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.
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 can implement other mitigants, including seeking legal opinions to clarify the extent of protections in other jurisdictions or restructuring EEA members' participation to jurisdictions where protections are in place.
However, some issues remain which could restrict EU firms' ability to trade or invest in certain UK assets and* vice versa*, and increase the costs of doing so.	
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 firms' trading 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. The FPC notes the recent expiration of the EU's equivalence determination for Switzerland's trading venues.
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, as well as imposing some restrictions on holdings of non-EU assets. UK legislation, which is aligned with EU rules, would similarly subject UK banks and insurance companies to stricter capital and liquidity 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.

Overview of risks to UK financial stability

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.

The FPC's assessment of risks to financial stability reflects:

- The level of underlying vulnerabilities in the domestic and global economies. These determine the scale of the future challenges the financial system could face in the event of an adverse shock and therefore drive the severity of stress scenarios that the FPC tests the system against.

- The ability of the UK financial system to withstand those potential challenges.

The FPC judges that underlying domestic vulnerabilities, apart from those related to Brexit, remain at a standard level overall and global vulnerabilities remain material. These vulnerabilities were reflected in its 2018 stress test of major UK banks.

Where it identifies specific shocks that could generate challenges for the financial system, the FPC assesses whether those challenges are encompassed by the stress scenarios that major UK banks have already demonstrated their resilience to.

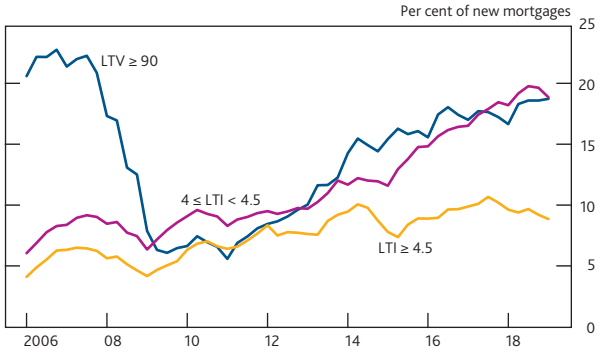
It continues to judge that, as set out in the November 2018 *Report*, the UK economic scenario in the test was sufficiently severe to encompass the wide range of UK economic and financial shocks that could be associated with Brexit. The FPC also judges that the test on global exposures was of a severity that encompassed a worst-case scenario for global trade tensions.

In light of this assessment, the FPC is maintaining the UK countercyclical capital buffer (CCyB) rate at 1%. It stands ready to move the UK CCyB rate in either direction as economic conditions and the overall risk environment evolve.

The FPC also assesses the resilience of market-based finance and developments in financial market infrastructure.

Chart B.1 Mortgage lending terms remain accommodative

Proportion of new owner-occupier mortgages extended at high loan to value (LTV) and loan to income (LTI) ratios[a][b][c]

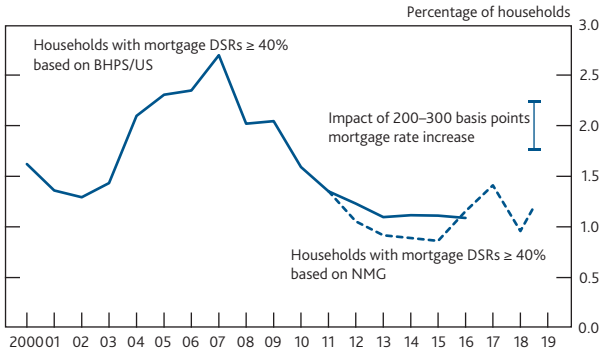


Sources: FCA Product Sales Data and Bank calculations.

(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.

Chart B.2 Debt-servicing costs are low, supported by low interest rates

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



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

(a) Mortgage DSR calculated as total mortgage payments as a percentage of pre-tax income.
(b) The percentage of households with mortgage DSRs of 40% or greater is calculated using the NMG Consulting survey from 2011 onwards. BHPS/US are used from 1991–2011, and are provided as a comparison to the NMG Consulting survey from 2011–16.
(c) A new household income question was introduced in the NMG survey in 2015. Data from 2011 to 2014 surveys have been adjusted based on 2015 data to produce a consistent time series.

The level of underlying vulnerabilities

Domestic lender risk appetite remains strong, particularly in the mortgage market.

Credit conditions are a core element of the overall risk environment. Mortgage price and non-price terms have loosened in recent years, as competition has intensified. The proportion of new mortgage lending at loan to value (LTV) ratios at or above 90% reached a new post-crisis peak of 18.7% in 2019 Q1 (**Chart B.1**). And the proportion of new lending at high loan to income (LTI) ratios — those at or above 4 — remains elevated, though has fallen marginally since mid-2018 (see UK household indebtedness chapter).

But credit growth has not been rapid over the past year…

Annual mortgage credit growth was 3.2% in May 2019, broadly in line with household income growth and significantly below the growth rates seen in the decade prior to the financial crisis. Consumer credit growth slowed to 5.6% in the year to May 2019, down from a peak of almost 11% in late 2016.

UK corporate credit growth has slowed to 4.8% in the year to 2019 Q1 (relative to earnings growth of 3.3%). Within that, debt raised through market-based finance grew by 4.9%. Borrowing from UK banks has picked up from 2.7% at the time of the November *Report*, to 5.2% in May.

…as borrower demand continues to be restrained by Brexit-related uncertainties…

Brexit-related uncertainty may have been one driver of the fall in mortgage demand. Of the respondents to the 2019 H1 NMG Consulting survey, a fifth of those who expect to move house within the next two years have delayed moving in the past 12 months due to Brexit-related uncertainty. Were that uncertainty to fade and lending conditions remained accommodative, borrower demand could rebound significantly and by more than economic growth.

…and debt-servicing burdens remain low, supported by low interest rates.

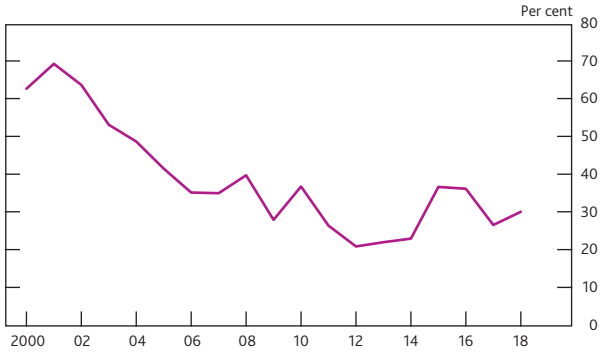
The share of households with a mortgage debt-servicing ratio above 40% — a level above which households are more likely to experience payment difficulties — has remained low at 1%–1.4% over the past year and a half, according to the NMG survey (**Chart B.2**). Mortgage interest rates would have needed to increase by 200–300 basis points for this share to be around its 1997–2006 average of 1.8%. The proportion of debt held by listed firms with interest coverage ratios below 3 also remains low by historical standards (**Chart B.3**).

The UK's reliance on foreign capital inflows makes it vulnerable to a reduction in investor appetite for UK assets.

The UK's large current account deficit widened by 1.1 percentage points to 5.6% in 2019 Q1. The deficit has been financed by substantial gross foreign capital inflows over

Chart B.3 The share of debt owed by firms with low interest coverage ratios is low by historical standards

The share of debt owed by corporates with interest coverage ratios less than 3[a][b]

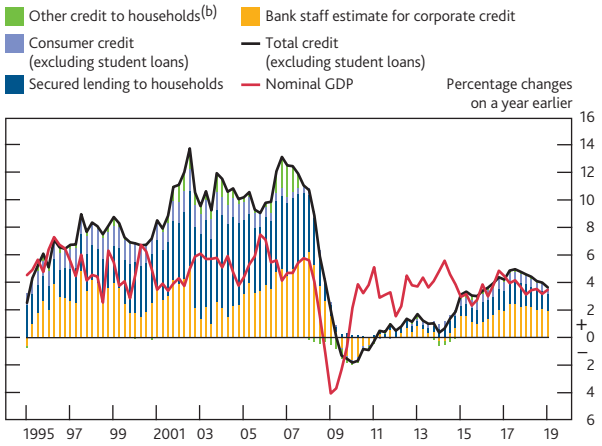


Sources: S&P Capital IQ and Bank calculations.

(a) Interest coverage ratio is calculated as the three-year moving average of earnings before interest and tax as a share of interest expenses.
(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 B.4 Total credit growth has not been rapid

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, 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 the residual of total credit to households and NPISH, less secured and unsecured loans to individuals. The residual comprises of MFI loans to unincorporated businesses (for example sole traders), loans to NPISH and household bills that are due but not yet paid.

recent years, some of which are particularly volatile and short term in nature. This makes the UK vulnerable to a reduction in foreign investor appetite for UK assets, which could lead to a tightening in credit conditions for UK households and businesses (see UK external financing chapter).

The FPC continues to judge that domestic vulnerabilities remain at a standard level overall.

Despite accommodative credit conditions, growth in total UK private non-financial sector credit (excluding student loans) has not been rapid. It decreased marginally to 3.7% in the year to 2019 Q1, broadly in line with nominal GDP growth of 3.5% over that period (**Chart B.4**).

The stock of total private sector non-financial credit relative to GDP has fallen by around 25 percentage points since 2008, but it remains elevated by historical standards (**Chart B.5**). The UK's credit to GDP gap, which measures the difference between the credit to GDP ratio and a simple statistical estimate of its long-term trend, remains significantly negative at -11.6 percentage points.

Taking into account developments across the domestic credit environment, the FPC continues to judge that, apart from those related to Brexit, underlying domestic vulnerabilities remain at a standard level overall.

The perceived likelihood of a no-deal Brexit has increased since the start of the year…

Increased Brexit uncertainties have put additional downward pressure on UK forward interest rates and led to a decline in the sterling exchange rate and underperformance of UK-focused equities. In markets that are particularly dependent on foreign investors — notably commercial real estate (CRE) and leveraged lending — investment into the UK was much weaker in 2019 Q1 than in recent years. Gross flows were 38% of the average quarterly flows in 2018 for CRE and 14% for leveraged loans (**Chart B.6**). The drop in foreign investment in CRE was accompanied by a 0.7% fall in CRE prices (**Chart B.7**).

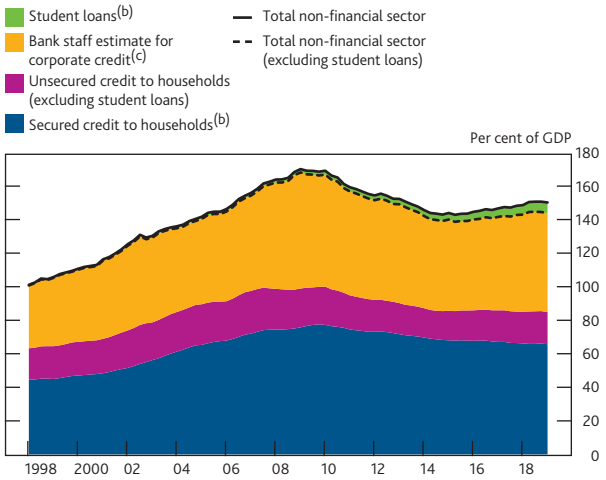
Actions by businesses and authorities since November have resulted in some improvement in the preparedness of the UK economy for a no-deal Brexit. However, material risks of economic disruption remain.

…but the FPC judged the UK economic scenario in the 2018 stress test was sufficiently severe to encompass the wide range of UK economic and financial shocks that could be associated with Brexit.

Reflecting this, and given the underlying vulnerabilities (excluding Brexit) that can amplify economic shocks have not changed materially since November, the FPC continues to judge that the UK economic scenario in the 2018 stress test of major UK banks was sufficiently severe to encompass the wide

Chart B.5 UK private non-financial debt relative to GDP is below its 2008 peak but remains high

Private non-financial sector credit to GDP[a]

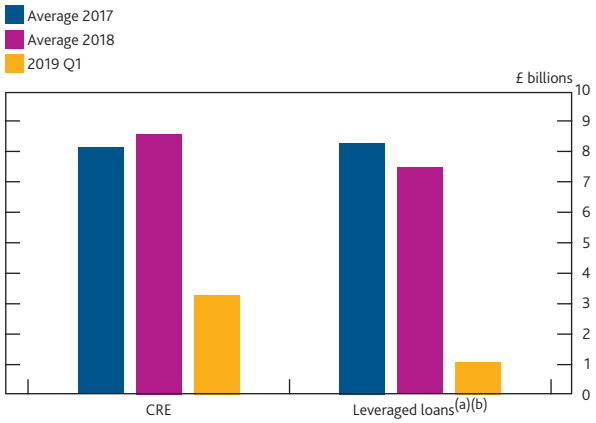


Sources: Association of British Insurers, Bank of England, Cass Commercial Real Estate Lending survey, Deloitte, Eikon from Refinitiv, LCD, an offering of S&P Global Market Intelligence, London Stock Exchange, ONS, Preqin and Bank calculations.

(a) Data are all currency and are not seasonally adjusted.
(b) Includes all liabilities of households and NPISH, except for unfunded pension liabilities and financial derivatives associated with NPISH.
(c) Includes private non-financial corporations' loans and debt securities, excluding direct investment loans and loans secured on dwellings.

Chart B.6 Investment into the UK leveraged loans and CRE markets has slowed sharply

Quarterly gross flow of UK CRE overseas investor transactions and UK leveraged loans syndicated abroad



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

(a) Based on public syndication transactions, and excluding private bilateral deals.
(b) Includes loans issued for refinancing purposes, and does not account for repayments of outstanding loans.

range of UK economic and financial shocks that could be associated with Brexit. Because major UK banks were resilient to the tougher 2018 stress test, they would also be resilient to, rather than amplify, these shocks and continue to serve UK households and businesses.

Risks from global debt vulnerabilities remain material.

Credit growth in China continues to outpace nominal income growth and Chinese private non-financial sector debt as a share of GDP has reached 204% in 2018 Q4. Chinese authorities have introduced a number of policies in recent years to improve financial sector regulation and restrain the growth of shadow financing. While nominal GDP growth continued to slow in 2019 Q1, additional measures to increase bank lending — both to offset trade headwinds and to support credit availability to small and medium-sized enterprises — have resulted in a slight pickup in total social financing growth. As a result, financial vulnerabilities remain elevated. A sustained pickup in credit relative to nominal GDP in China could lead to renewed concerns around the sustainability of China's already elevated debt levels.

Some emerging market economies (EMEs) with large current account deficits or high levels of debt denominated in foreign currencies remain vulnerable to renewed capital outflows. A substantial shock to these economies could act as an amplifier to a crystallisation of vulnerabilities in China, exacerbating spillovers to global growth and asset prices.

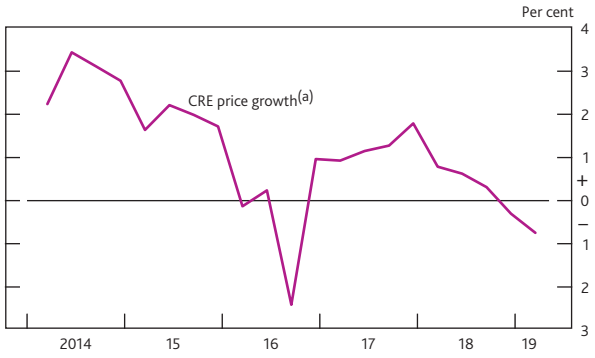
Italy's public sector debt, at over 130% of GDP, is the second highest in the euro area (after Greece). The European Commission and International Monetary Fund forecast that it will increase further over the next five years. The resulting high financing needs leave Italian public finances particularly vulnerable to weaker economic growth prospects or a deterioration in market conditions. About a quarter of Italian government debt is held by Italian banks (excluding their insurance arms), highlighting the continuing potential interlinkages between sovereign risk and bank risk in the financial system.

US corporate debt is above pre-crisis levels as a share of GDP and, in part reflecting rapid growth of leveraged lending, the share of debt owed by highly leveraged US companies has reached pre-crisis levels of above 40%. There are particular risks associated with leveraged loans. Weaker investor protection in leveraged lending, as well as the deterioration in the credit quality of the borrowers, could further increase potential losses in a future stress. However, global gross issuance of leveraged loans has slowed since the November *Report* (see Leveraged lending chapter).

In global financial markets, risk-free rates have fallen and are consistent with more pessimistic expectations of economic growth. For example, US$13 trillion of global

Chart B.7 Commercial real estate (CRE) price growth has been slowing recently

CRE quarterly property price growth

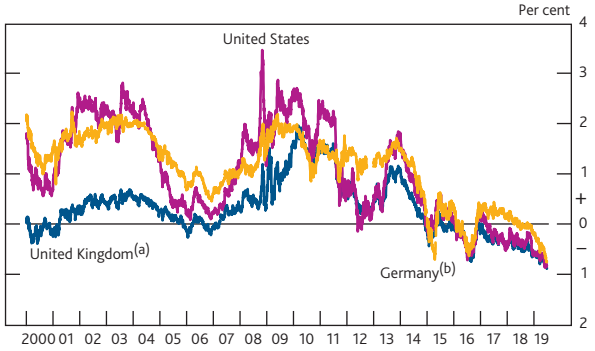


Sources: MSCI Inc. and Bank calculations.

(a) CRE prices takes the quarterly index of MSCI Inc. data. The growth rate is calculated as the quarter-on-quarter percentage change.

Chart B.8 Term premia in government bond markets are very low

Estimates of term premia in ten-year government bond yields

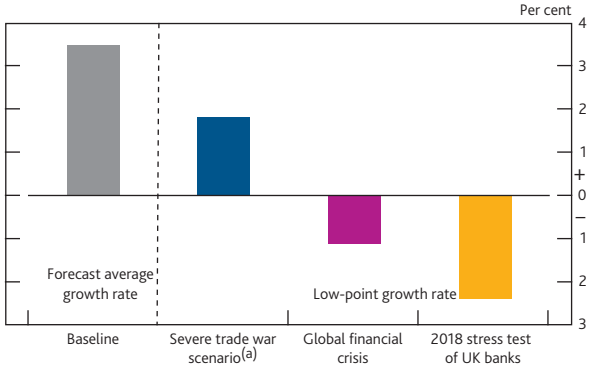


Sources: Bloomberg Finance L.P., Federal Reserve Bank of New York, HM Treasury, Tradeweb and Bank calculations.

(a) Daily term premium estimate is an average from four model outputs: benchmark and survey models from Malik, S and Meldrum, A (2016), 'Evaluating the robustness of UK term structure decompositions using linear regression methods', *Journal of Banking & Finance*; Guimarães, R and Vlieghe, G (2016), 'Monetary policy expectations and long term interest rates', unpublished working paper; and Andreasen, M and Meldrum, A (2015), 'Market beliefs about the UK monetary policy lift-off horizon: a no-arbitrage shadow rate term structure model approach', *Bank of England Staff Working Paper No. 541*.
(b) Based on the model described in Malik, S and Meldrum, A (2016), *op cit*.

Chart B.9 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 *World Economic Outlook* 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.

investment-grade debt are now trading at negative yields. In contrast, some measures of the compensation for risk in fixed-income markets appear to factor in a relatively benign economic outlook for inflation and global growth, and appear inconsistent with the degree of economic policy uncertainty. For example, corporate bond spreads have compressed since the beginning of the year and estimates of term premia on government bond markets are near all-time lows (**Chart B.8**). A sharp downward adjustment in asset prices can affect the financial system and amplify economic shocks by decreasing the value of collateral and increasing the cost of bond or equity issuance, as well as generating losses on assets held in trading portfolios.

The risks to the global outlook have increased during the first half of the year…

Rising trade tensions have resulted in declining business confidence and pose material downside risks to global output growth. The impact of these risks, in turn, would be amplified by continued material underlying global vulnerabilities.

The FPC judges that the likelihood of a highly adverse scenario in which trade tensions become far more pervasive, persistent and damaging than previously expected has risen.

…but the core of the UK banking system remains resilient to these risks.

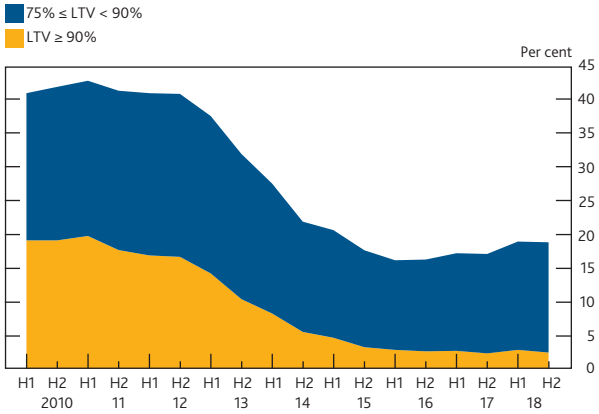
Major UK banks were subjected to a severe scenario for the global economy in the 2018 stress test that reflected underlying vulnerabilities. That scenario included outright falls in PPP-weighted world GDP of 2.4% and in Chinese GDP of 1.2% during the first year of the stress scenario. Banks were assumed to lose more than 10% of their exposures to large non-investment grade US and UK companies. Major UK banks showed they were resilient to that scenario.

The FPC judges that this test on global exposures 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 global 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 coming years (**Chart B.9**).

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.

Chart B.10 The share of the stock of UK mortgages with high LTV ratios has been broadly flat

Share of the stock of mortgage debt by LTV buckets[a][b][c]

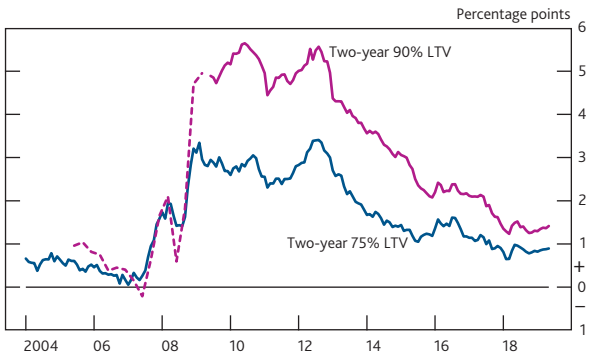


Sources: Bank of England, PRA regulatory returns and Bank calculations.

(a) This series was created by combining different regulatory returns. Definitions of product types will differ slightly between sources. Where possible, data exclude bridging loans, lifetime mortgages and second charge mortgages.
(b) Between 2009–13, LTV data are for Barclays, Co-operative Banking Group, HSBC, Lloyds Banking Group, National Australia Group, Nationwide, RBS, Santander UK, some small residual elements of old Bradford & Bingley and Northern Rock books, and all UK building societies. From 2014 onwards, LTV data cover all UK banks and building societies.
(c) This series shows current LTV.

Chart B.11 Quoted spreads on new mortgage lending are still compressed

Mortgage rates on new owner-occupier two-year fixed-rate mortgages relative to risk-free rates[a][b]



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

(a) Spreads are taken relative to the risk-free rate of the same maturity.
(b) Dashed line is an estimate of the historical 90% LTV spreads, which uses rates reported on new mortgages in the FCA Product Sales Data.

The FPC has included a severe global downturn in its 2019 stress test that is, overall, very slightly more severe than in the 2018 test (see Global debt vulnerabilities chapter).

The sensitivity and resilience of the core banking system to economic shocks

The UK banking system remains well-capitalised and able to support the real economy in a severe macroeconomic stress.

The 2018 stress test demonstrated that the core of 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.

Major UK banks' capital positions have been broadly stable since the November *Report*. The core UK banking system has maintained Tier 1 capital levels of around 17% of risk-weighted assets in 2019 Q1, more than three times higher than before the global financial crisis (see Resilience of the UK banking sector chapter).

UK banks' assets do not appear, overall, to have become more risky since the 2018 stress tests. For example, although lender risk appetite is strong in the mortgage market, the proportion of the stock of mortgages most vulnerable to house price falls — those with LTVs at or above 75% and in particular, within that, those with LTVs at or above 90% — has been broadly flat since end-2017, the balance sheet cut-off date for the 2018 stress test (**Chart B.10**).

Loan margins have been broadly stable in recent years. However, loan margins of UK-focused banks are under pressure due to strong price competition in the UK mortgage market. For example, the additional interest charged on a 90% LTV mortgage compared to a 75% LTV mortgage was 52 basis points in May 2019, compared to a post-crisis average of 163 basis points (**Chart B.11**). Loan margins matter for resilience because they affect banks' capacity to generate income that can replenish capital when they incur losses.

The FPC's 2019 Q2 UK CCyB rate decision

In light of this assessment, the FPC is maintaining the UK countercyclical capital buffer rate at 1%.

An important tool that the FPC uses to ensure the resilience of the UK banking sector to the wide range of risks that it could face is the system-wide countercyclical capital buffer (CCyB). This buffer of capital is intended to vary in line with the prevailing risk environment. 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. This buffer of capital can also be released in a stress, enhancing the ability of the banking system to continue to support the real economy.

The FPC judges that the underlying domestic and global vulnerabilities, and the UK banking system's sensitivity to shocks, are broadly unchanged since its Q1 policy meeting. Therefore the FPC judges that the 2018 stress test remains a comprehensive test of the resilience of the UK banking system and of the adequacy of the 1% UK CCyB rate. In light of this, the FPC decided to maintain the UK CCyB rate at 1% in 2019 Q2. The Committee 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. This would enable banks to use the released buffer to absorb up to £11 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 their capacity to lend to UK households and businesses by around £250 billion. This compares to around £75 billion of net lending in the past year.

In the absence of economic stress, the FPC remains vigilant to developments, particularly in the domestic credit environment. Given current accommodative lending conditions, credit demand could rebound significantly and lead to an increase in the riskiness of banks' exposures. This could require a timely policy response to ensure resilience.

The resilience of market-based finance

Market-based finance — finance raised via the system of markets, non-bank financial institutions and infrastructure — has become increasingly important to the provision of financial services to the UK economy. The FPC therefore also assesses the resilience of market-based finance and developments in financial market infrastructure.

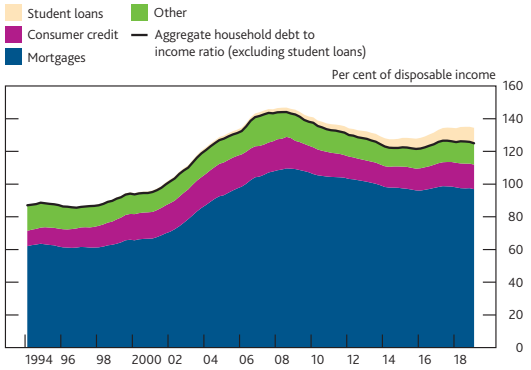
Open-ended investment funds play an increasing and important role in the provision of finance. Many funds offer daily redemptions while investing in assets that can take weeks or months to sell in an orderly way. This can create incentives for investors to rush to redeem when they expect others to do so. This has the potential to become a systemic issue. The FPC continues to support the Financial Stability Board's recommendation that funds' assets and investment strategies should be consistent with their redemption terms. Domestically, the Bank and the FCA will together assess how funds' redemption terms might be better aligned with the liquidity of their assets in order to minimise financial stability risks without compromising the supply of productive finance (see the Resilience of market-based finance and Developments in financial market infrastructure chapters).

UK household indebtedness

UK households have a high level of debt relative to their incomes, and competition in the mortgage market continues to encourage accommodative lending conditions. But the proportion of very highly indebted households remains low; muted demand has constrained mortgage credit growth; and the FPC's mortgage market Recommendations continue to guard against a material deterioration in borrower resilience. Consumer credit lending growth has continued to slow, as lenders have tightened borrowing conditions for credit cards. The 2018 stress test showed that major UK banks can successfully absorb potential losses on household debt in a severe stress scenario.

Chart C.1 UK household debt to income remains high by historical standards

UK household debt to income ratio(a)

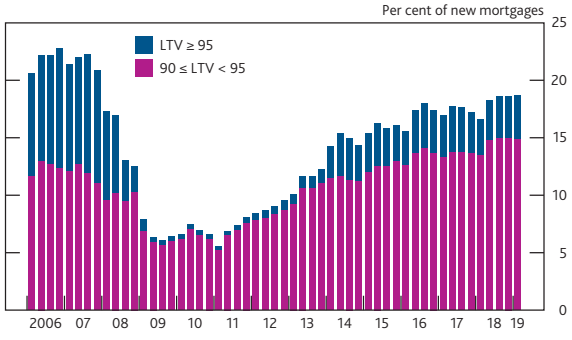


Sources: Bank of England, ONS and Bank calculations.

(a) All data are seasonally adjusted unless otherwise stated. Household sector liabilities as a percentage of four-quarter moving sum of household disposable income. Household disposable income series is adjusted for financial intermediation services indirectly measured (FISIM). Household sector liabilities exclude unfunded pension liabilities and financial derivatives associated with non-profit institutions serving households (NPISH), and are not seasonally adjusted. The stock of outstanding income-contingent student loans has been projected to 2017 Q4 using historical growth rates. Other household sector liabilities include loans to unincorporated businesses (for example, sole traders), loans to NPISH, and household bills that are due but not yet paid.

Chart C.2 Lenders have been increasing the share of mortgages that they lend at high LTVs

Per cent of new mortgages at LTV ratios at or above 90%(a)(b)(c)



Sources: FCA Product Sales Data and Bank calculations.

(a) Chart excludes lifetime 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 second charge lending and buy-to-let mortgages.

UK households have a high level of debt relative to their incomes, but the proportion of very highly indebted households remains low.

In aggregate, UK household debt (excluding student loans) has remained above 120% of incomes since the financial crisis, high compared to historical standards (**Chart C.1**). But the low interest rate environment, combined with a lengthening in mortgage durations, are supporting sustainable debt-servicing costs for households.

The distribution of debt among households is particularly important in monitoring risks to the UK financial system and economy. A large number of highly indebted households can increase the likelihood of sharp cuts in consumption during a stress, which may amplify a downturn and, in turn, the risk of losses to lenders on all forms of lending. And the resilience of lenders could be tested if highly indebted households default on their debt in response to adverse shocks, resulting in losses.

The share of households with a mortgage debt servicing ratio above 40% — a level above which households are much more likely to experience repayment difficulties — has remained low, at 1%–1.4% over the past year and a half, according to the NMG Consulting survey. Mortgage interest rates would have needed to increase by 200–300 basis points for this share to be around its 1997–2006 average of 1.8%.

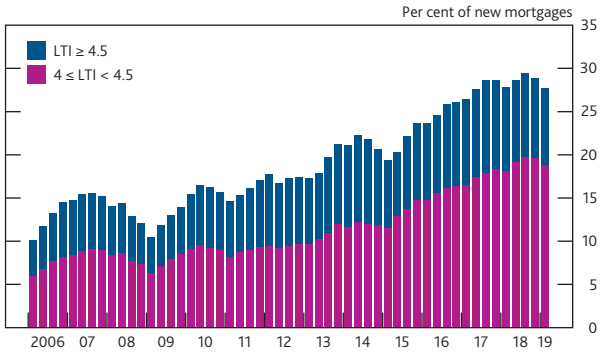
Mortgage lending conditions remain accommodative…

Mortgage price and non-price terms have loosened in recent years, as competition has intensified. The proportion of new mortgage lending at loan to value (LTV) ratios at or above 90% reached a new post-crisis peak of 18.7% in 2019 Q1 (**Chart C.2**). In addition, the proportion of new lending at high loan to income (LTI) ratios — those at or above 4 — remained elevated, though has fallen marginally since mid-2018 (**Chart C.3**).

Mortgage lenders have also been reducing the compensation they demand for the additional risks associated with high-risk mortgages. The additional interest charged on a 90% LTV

Chart C.3 The proportion of lending at high LTI ratios has increased since 2015

Per cent of new mortgages at LTI ratios at or above 4[(a)(b)(c)]

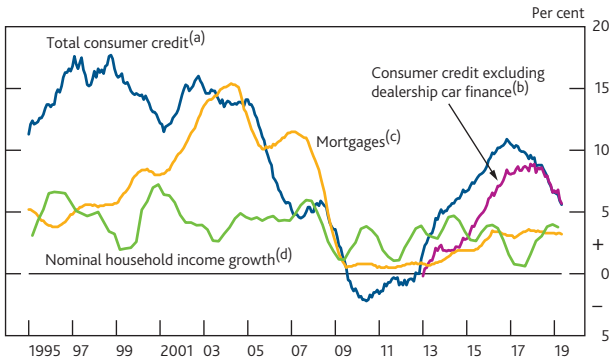


Sources: FCA Product Sales Data and Bank calculations.

(a) LTI ratio calculated as loan value divided by the total reported gross income for all named borrowers. Chart excludes lifetime 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 second charge lending and buy-to-let mortgages.

Chart C.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).

mortgage compared to a 75% LTV mortgage was 52 basis points in May 2019, significantly below its post-crisis average of 163 basis points (**Chart B.11**).

Smaller lenders have increased their market share of higher risk lending. The share of new mortgage lending extended by lenders other than the major UK banks at LTV ratios above 90% increased to 34% in the year to 2019 Q1, an increase of 7 percentage points over the past two years.

…but a range of factors, including Brexit-related uncertainty and affordability constraints, are holding back credit demand.

Despite accommodative conditions, annual mortgage credit growth was 3.2% in May 2019, broadly in line with household incomes and significantly below the growth rates seen in the decade prior to the crisis (**Chart C.4**). And the number of mortgages approved, which can be a leading indicator of lending, has been broadly flat over the past few years.

Brexit-related uncertainty may have been one of the drivers of the fall in mortgage demand. Of the respondents to the 2019 H1 NMG survey, a fifth of those who expect to move house within the next two years have delayed moving in the past year due to Brexit uncertainty. Were that uncertainty to fade, and lending conditions remained accommodative, borrower demand could rebound significantly, and by more than economic growth.

Housing affordability constraints are also likely to have had an effect: the slowdown in house price inflation since 2016 has been most pronounced in areas with higher pre-referendum prices relative to incomes. Policy changes made to the buy-to-let market over 2016–17, such as to stamp duty land tax and mortgage interest tax relief, have also reduced mortgage demand in that segment of the market.

The FPC's actions continue to guard against a material deterioration in both borrower and lender resilience.

The FPC's mortgage market Recommendations guard against the risk of a marked loosening in underwriting standards and a significant increase in the number of highly indebted households. The 2014 LTI flow limit Recommendation restricts the number of mortgages extended at LTI ratios at or above 4.5 to 15% of a lender's new mortgage lending. The FPC's affordability test recommends that mortgage lenders test 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 at origination. These policies limit the risk of sharp cuts in consumption during a stress.

Furthermore, in 2018, major UK lenders were shown to be resilient to mortgage losses in a stress scenario which included a rise in Bank Rate to 4% combined with a large increase in unemployment and a sharp fall in house prices. UK mortgages account for almost two thirds of UK lending, but only a

quarter of impairments in the stress. Lenders will be tested again against a similar scenario in 2019. In addition, around half of the high LTV mortgage lending extended by building societies in 2018 was covered by insurance, known as Mortgage Indemnity Guarantees, guarding against lender losses in the event of borrower default.

Consumer credit growth has continued to slow…

In 2017, the FPC judged that rapid growth in consumer credit could present a risk to lenders if accompanied by weaker underwriting standards. The FPC then acted with the PRC to ensure lenders were able to absorb severe losses on consumer credit. Consumer credit growth slowed to 5.6% in the year to May 2019, from a peak of almost 11% in late 2016 (**Chart C.4**). This slowing flow has caused the growth in households' consumer credit debt relative to incomes to stabilise at around 15%, just below its 1997–2006 average. Recent interventions by the FCA, including a package of remedies to address persistent credit card debt, revision to creditworthiness rules, and reforms to the overdraft market, could further dampen credit growth in the future.(1)

…reflecting a combination of tighter supply conditions for credit cards and muted credit demand.

Lenders responding to the Bank's *Credit Conditions Survey* in 2019 Q1 reported a tightening availability of unsecured credit for the ninth consecutive quarter (**Chart C.5**). The tightening in the supply of consumer credit appears to be mainly concentrated in the credit card market, while terms on personal loans remain accommodative. The average interest-free period offered to new credit card customers on balance transfer offers has been falling since 2017. In contrast, price terms on personal loans have been loosening (**Chart C.6**). Once lenders' low spreads on personal loans between 2004 and 2009 are adjusted for their income from selling payment protection insurance (PPI), it can be seen that spreads are currently similar to those in the lead-up to the financial crisis.

Lenders also reported that demand for unsecured lending was muted (**Chart C.5**). They expected demand to fall in the next three months.

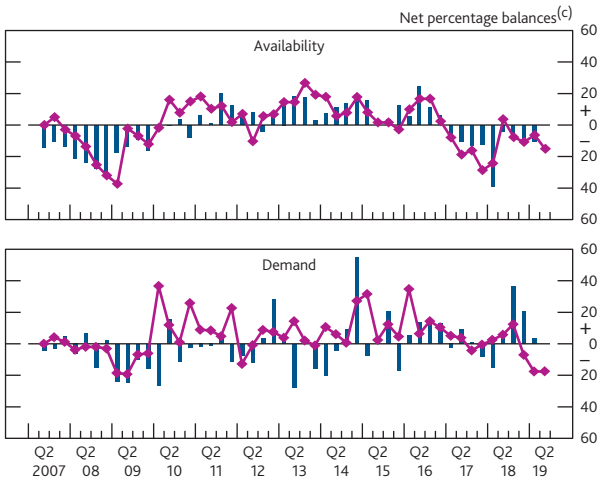
Major UK banks would be resilient to losses on consumer credit even in a severe downturn.

The FPC continues to judge consumer credit to be an important determinant of bank losses in any downturn. Loss rates on consumer credit are far higher than for mortgages, as borrowers are much more likely to default on their consumer credit loans in the face of adverse shocks. And because the majority of consumer credit is unsecured, lenders cannot rely on the value of collateral to cushion their losses. In the 2018 stress test, consumer credit accounted for 40% of losses on banks' UK lending, despite being only 7% of exposures. Major UK lenders were shown to be resilient to this stress in 2018 and will be tested again against a similar scenario in 2019.

(1) See FCA PS18/4, PS18/19 and announcement on proposals to fundamentally reform the way banks charge for overdrafts and protections for other high-cost credit products.

Chart C.5 Lenders reported that demand for unsecured lending has been muted and availability has tightened

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)

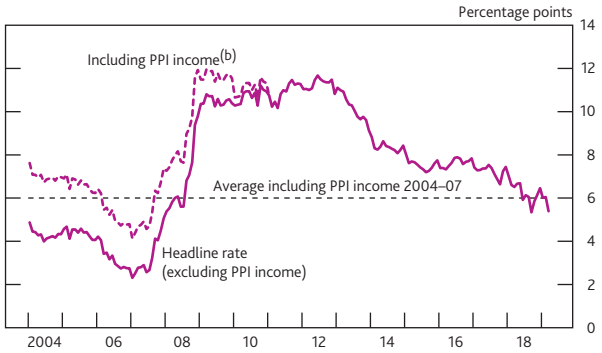


Source: Bank of England *Credit Conditions Survey*.

(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 with 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.

Chart C.6 Spreads on personal loans are similar to their pre-crisis levels

Difference between effective personal loan rates and two-year swap rate(a)



Sources: Bank of England, Competition Commission, FCA and Bank calculations.

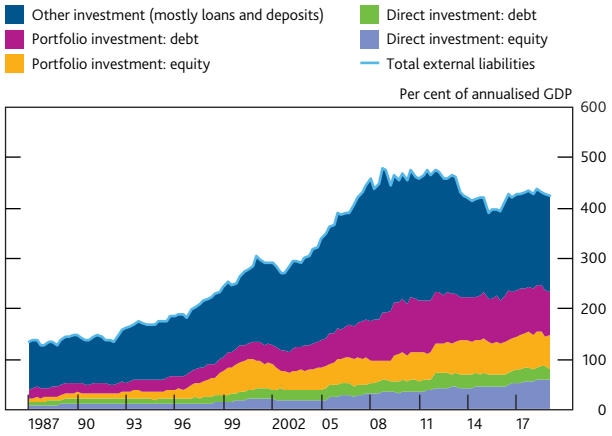
(a) The Bank's effective interest rate series are currently compiled using data from up to 25 UK MFIs, and are sterling-only monthly averages. Spread calculated as the effective rate on new lending fixed for one to five years, minus the two-year swap rate. Data are not seasonally adjusted.
(b) PPI is insurance attached to loans to protect consumers if they are unable to earn income to make repayments, and had the effect of offsetting low margins on personal loans for lenders. Evidence from the Competition Commission suggests that PPI was roughly equivalent to doubling the interest rate over the life of the loan, and that 57% of PPI income was retained by the lender. Data from the Competition Commission and FCA suggest that around half of personal loans had PPI attached in 2004, falling over time.

UK external financing

The UK's large current account deficit has been financed by substantial foreign capital inflows over recent years. This makes the UK vulnerable to a reduction in foreign investor appetite for UK assets, which could lead to a tightening in credit conditions for UK households and businesses. Foreign investor presence is particularly significant in UK commercial real estate and leveraged loan markets. Investor appetite for some UK assets has been sensitive to Brexit developments since the EU referendum. Major UK banks were resilient to external financing risks in the 2018 stress test.

Chart D.1 The UK has a large stock of external liabilities

UK gross external liabilities by type[a]

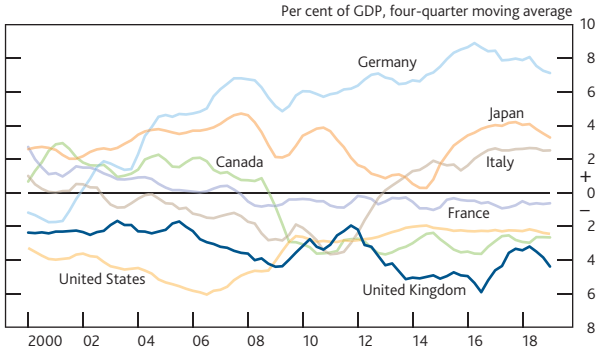


Sources: ONS and Bank calculations.

(a) Derivatives are excluded.

Chart D.2 The UK has the widest current account deficit in the G7

G7 current account balances



Sources: Banca d'Italia, Banque de France, Deutsche Bundesbank, OECD, Key Short-Term Economic Indicators: GDP and Current Account % of GDP, OECD.Stat, accessed on 26 June 2019, ONS and Bank calculations.

The UK has a large stock of assets held by foreign investors…

The UK is one of the most financially open advanced economies in the world and, as such, the behaviour of foreign investors can have a material impact on domestic economic conditions. Foreign investors have significant holdings of UK assets. These 'external liabilities' amounted to 423% of annualised GDP in 2019 Q1 (**Chart D.1**).

…and a large current account deficit, financed by substantial foreign capital inflows.

A current account deficit indicates that national investment is larger than national saving, and therefore must be financed by net borrowing from overseas. The UK's deficit widened to 5.6% of GDP in 2019 Q1. This is large by international standards (**Chart D.2**). Since 2016, the UK has relied on substantial gross capital inflows from foreign investors to fund its current account deficit (**Chart D.3**). This is in contrast to 2012–15, when the deficit was financed by UK investors selling overseas assets at a faster rate than foreign investors were selling UK assets.

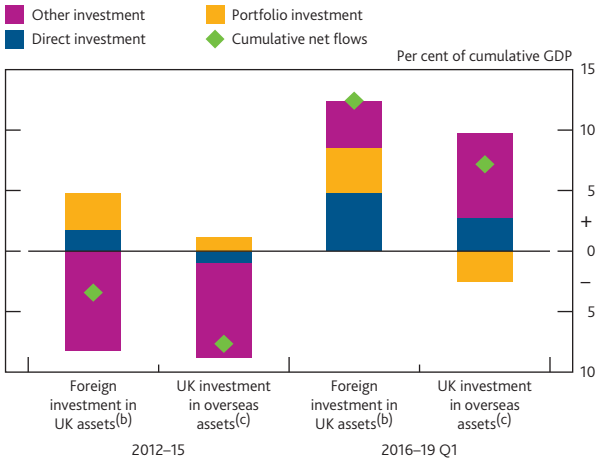
Direct and portfolio investment saw consistent gross inflows from foreign investors in recent years, which reversed in 2019 Q1. This reversal might reflect investor appetite in the lead-up to the original deadline for the UK's withdrawal from the EU. Outflows from these categories in Q1 were offset by positive 'other investment' flows, which include loans and deposits to banks. 'Other investment' accounts for 45% of the stock of external liabilities (**Chart D.1**). The flows can be volatile and short term in nature, subjecting them to refinancing risk (**Chart D.4**). There were large withdrawals of this form of investment by foreign investors in 2018 Q2 and Q3 before positive inflows returned in Q4 and 2019 Q1.

This makes the UK vulnerable to a reduction in foreign investor appetite.

Sharp falls in foreign investor appetite for UK assets could lead to falls in UK asset prices and a tightening in domestic credit conditions. This could be triggered, for example, by perceptions of weaker or more uncertain UK long-term growth prospects or

Chart D.3 Since 2016, net capital inflows to the UK have been positive

Cumulative inward and outward capital flows since 2012[a]

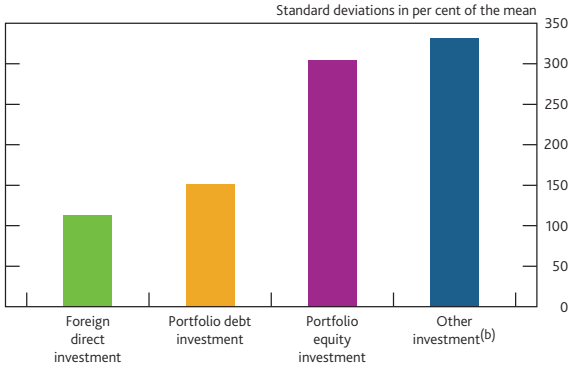


Sources: ONS and Bank calculations.

(a) Financing flows for reserves and derivatives are excluded.
(b) Net acquisition of foreign liabilities by UK residents.
(c) Net acquisition of foreign assets by UK residents.

Chart D.4 Flows in the 'other investment' category are very volatile

Coefficient of variation of quarterly inward investment in per cent of GDP for G7 countries 1996–2018[a]

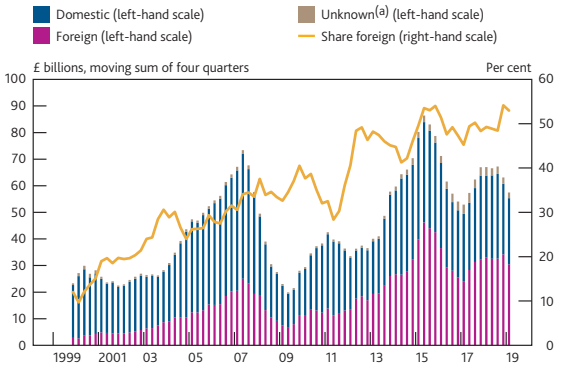


Sources: Eikon from Refinitiv, IMF IFS, OECD, Key Short-Term Economic Indicators: GDP, OECD.Stat, accessed on 1 July 2019 and Bank calculations.

(a) The chart shows the coefficient of variation of each type of inward investment flow in per cent of GDP averaged across G7 countries.
(b) 'Other investment' consists mostly of loans and deposits.

Chart D.5 Foreign investors make up a large proportion of UK CRE transactions

UK CRE transactions, moving sum of four quarters



Sources: Property Market Analysis LLP and Bank calculations.

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

a significant change in the global risk environment. Looking ahead, the ease with which the current account deficit is financed will be influenced by the credibility of the UK macroeconomic policy framework and its continuing openness to trade and investment.

Foreign investor presence is particularly significant in UK commercial real estate (CRE) and UK leveraged loan markets.

In the year to 2019 Q1, overseas buyers accounted for over 50% of the value of UK CRE transactions (**Chart D.5**). In the leveraged lending market, 76% of gross issuance by UK private non-financial corporations was syndicated abroad in the year to 2019 Q1. Overall, sales of UK-owned CRE to foreign investors and UK leveraged loans syndicated abroad totalled £17 billion in the year to 2019 Q1, equivalent to 19% of the size of the cumulative current account deficit over that period. During a period of heightened Brexit uncertainty in 2019 Q1, flows from foreign investors into both sectors were far weaker than in previous years. Gross flows were 38% of the average quarterly flows in 2018 for CRE and 14% for leveraged loans (**Chart B.6**).

Given their share in transaction values, foreign investors' decisions are likely to be an important determinant of UK CRE prices. Prices continue to appear stretched, particularly in central London markets (**Chart D.6**), where foreign investors are most prevalent, at 67% of transaction values. The fall in foreign investment in 2019 Q1 accompanied a 0.7% fall in CRE prices. CRE is widely used as collateral for corporate borrowing, so a downturn in CRE valuations could affect the real economy by reducing companies' access to funding.(1)

Investor appetite for some UK assets has been sensitive to Brexit developments since the EU referendum.

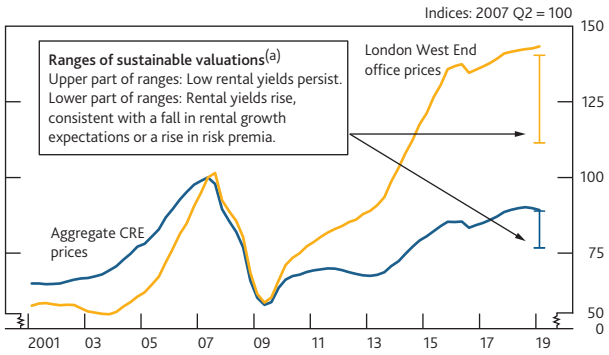
There is evidence of reduced investor appetite for UK-focused equities since the referendum. Estimates of equity risk premia for FTSE All-Share companies have risen since 2016, whereas the S&P 500 and Euro Stoxx indices have fallen (**Chart D.7**). And the proportion of respondents to the Bank of America Merrill Lynch Global Fund Manager survey that are net underweight UK equities was 28% in May 2019, compared to its average of 13% since 1999.

Sterling has been sensitive to Brexit developments. Following the March extension to the negotiation period for the UK's withdrawal from the EU, implied volatilities from sterling options — measures of perceived risk around the exchange rate — fell sharply. And movements in the cost of insuring against a fall in sterling relative to a rise suggest that the weight placed on a future depreciation also fell. More recently, however, as the perceived likelihood of a no-deal Brexit has risen, both of these measures have partly retraced those

(1) Bahaj, S, Foulis, A and Pinter, G (2016), 'The residential collateral channel', *Centre for Macroeconomics Discussion Paper CFM-DP2016-07*.

Chart D.6 UK CRE prices look stretched based on ranges of sustainable valuations

Commercial real estate prices in the UK and ranges of sustainable valuations

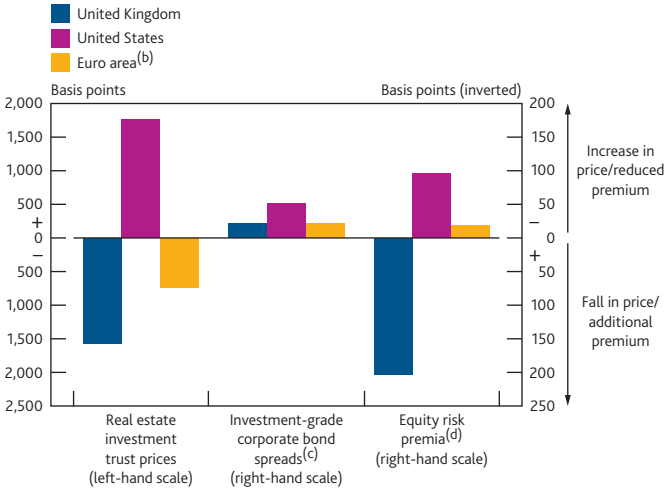


Sources: Bloomberg Finance L.P., Investment Property Forum, MSCI Inc. and Bank calculations.

(a) Sustainable valuations are estimated using an investment valuation approach and are based on an assumption that property is held for five years. The valuation is the sum of rental and sale proceeds discounted using the appropriate gilt yield plus a risk premium. Expected value at the time of sale is based on Investment Property Forum Consensus forecasts of future rental growth. The range of sustainable valuations is estimated by varying assumptions about the rental yield at the time of the sale: either rental yields remain at their current levels (at the upper end of the sustainable valuations range), or rental yields revert to their 15-year historical average (at the lower end). For more details, see Crosby, N and Hughes, C (2011), 'The basis of valuations for secured commercial property lending in the UK', *Journal of European Real Estate Research*.

Chart D.7 Since 2016, some UK assets have traded at a discount compared to international assets

Changes 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*, S&P Global Market Intelligence, Tradeweb and Bank calculations.

(a) Data to 1 July 2019.
(b) The euro-area real estate investment trust price series is for Europe excluding the UK.
(c) 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.
(d) As implied by a dividend discount model. Equity risk premia are estimated for the FTSE All-Share, S&P 500 and Euro Stoxx indices.

moves. In addition, implied volatilities for options maturing after the negotiation deadline, 31 October, have risen. The sterling exchange rate index is currently trading 15% below its level at the start of 2016.

There are also potential signs that Brexit uncertainty is affecting the CRE market. Since the start of 2016, the UK real estate investment trust (REIT) price index has underperformed its US equivalent (**Chart D.7**). This underperformance worsened since the November *Report*, consistent with falling UK CRE prices during this period. UK REITs' average price to book ratios — which compare the market value of shareholders' equity with the accounting, or 'book', value of that equity — are currently 0.86 and have ranged between 0.67 and 0.90 since the start of 2016. Values below one may indicate investor concerns that REIT assets are overvalued, or that they have poor or uncertain future profit prospects.

The impact of Brexit on investor appetite towards UK corporate bonds has been more mixed. The spreads on high-yield sterling corporate bonds have been higher than those in US dollars, with heightened volatility in this discount ahead of the original Article 50 deadline of 29 March. 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 (**Chart D.7**).

Risks from currency mismatch are mitigated because UK residents hold more foreign currency assets than liabilities.

Currency mismatches between the assets and liabilities of UK residents can amplify risks associated with a withdrawal of external capital flows. In aggregate, UK residents hold more foreign currency assets than liabilities. As a result, the depreciation in sterling since 2016 has increased the value of external assets relative to liabilities, leading to a material improvement in the United Kingdom's net foreign asset position. This helps mitigate the currency risks associated with currency depreciation.

Major UK banks were resilient to external financing risks in the 2018 stress test, and will be tested again in 2019.

Overall, direct risks to UK banks from the UK's external financing position appear limited. Banks have strong foreign currency liquidity positions. Furthermore, the more exposed they are to refinancing risk, the greater the liquidity buffer they are required to have in place. And in contrast to the decade prior to the crisis, the UK banking sector is now a net lender to the rest of the world, limiting risks posed from an external funding stress or currency depreciation.

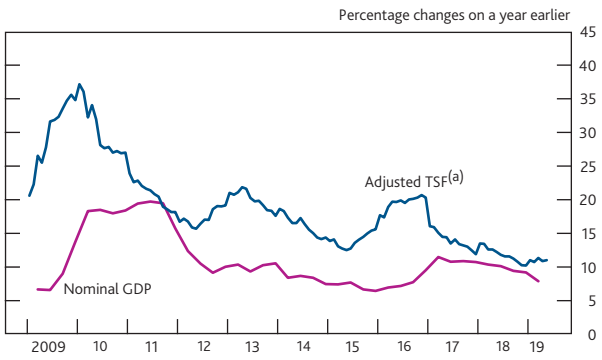
The 2018 stress-test scenario incorporated a sudden increase in the rate of return investors demand for holding sterling assets. This included a 27% fall in sterling and a 40% fall in UK CRE prices. Major UK banks will be tested again against a similar scenario in 2019.

Global debt vulnerabilities

Risks to UK financial stability from global debt vulnerabilities remain material. Credit growth in China continues to outpace nominal income growth and private non-financial sector debt is more than 200% of GDP. Emerging market economies (EMEs) remain vulnerable to renewed capital outflows, and the growth in open-ended investment fund flows to EMEs could amplify market illiquidity and increase spillovers to the global economy. The sustainability of Italian government debt and the associated health of Italian banks remain prominent vulnerabilities in the euro area. Corporate indebtedness is also high in several advanced economies. Reflecting these vulnerabilities, the FPC has incorporated a global scenario in the 2019 annual cyclical stress test that is very slightly more severe than in 2018. Rising trade tensions have resulted in declining business confidence and pose material downside risks to global output growth. The FPC judges that the 2018 stress test of global exposures was of a severity that encompassed a worst-case scenario for global trade tensions.

Chart E.1 Lending growth in China picked up in 2019 Q1 after easing through 2018

Growth of total social financing (TSF) and nominal GDP



Sources: CEIC Data Company Ltd and Bank calculations.

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

Risks to UK financial stability from global debt vulnerabilities remain material.

Global 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, testing banks' resilience to UK economic downturns.

Credit growth in China continues to outpace nominal income growth and private non-financial sector debt is more than 200% of GDP.

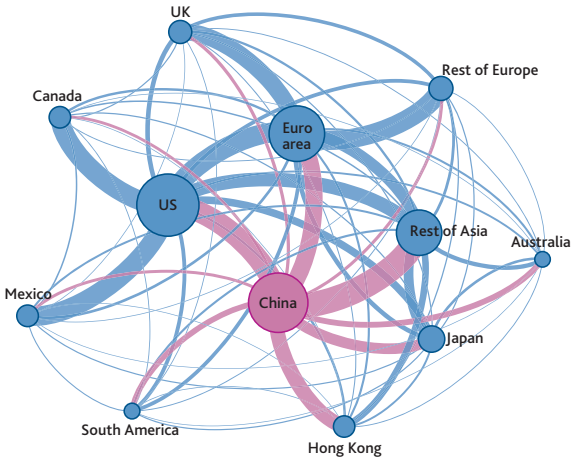
Chinese private non-financial sector debt as a share of GDP was 204% in 2018 Q4, having risen nearly 90 percentage points since 2008. Such rapid rises in credit have, historically, preceded financial crises in several other countries.

Chinese authorities have introduced a number of policies in recent years to improve financial sector regulation and restrain the growth of shadow financing (credit intermediation outside the regular banking system). Partly because of these actions, annual growth in total social financing (TSF) eased during 2018 (**Chart E.1**), and private sector debt relative to GDP started to stabilise.

However, Chinese authorities face an ongoing trade-off between offsetting any economic headwinds and managing financial vulnerabilities, and efforts to reduce credit growth may not be sustained if GDP growth were to slow more than anticipated. Indeed, while nominal GDP growth continued to

Chart E.2 China is deeply embedded in international trade networks

Network of global goods trade, 2018[a]

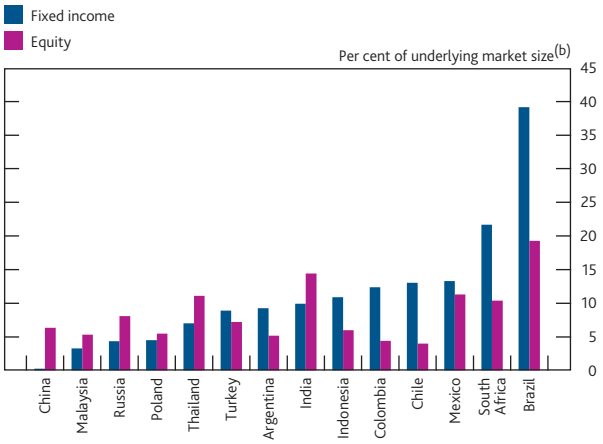


Sources: IMF Direction of Trade Statistics and Bank calculations.

(a) Line thickness is proportional to total goods trade between regions. Circle size is proportional to regions' total goods trade with the other regions shown in the chart. Pink lines denote direct trade links with China. Data based on nominal 2018 US dollars.

Chart E.3 Open-ended investment funds (OEIFs) hold a significant share of debt issued by some emerging market economies

OEIF holdings[a]



Sources: BIS (Debt securities statistics), Morningstar, The World Federation of Exchanges Ltd and Bank calculations.

(a) For a sample of 74,799 open-ended funds and exchange-traded funds accounting for 86% of total fund assets under management covered in Morningstar.
(b) OEIF assets under management, expressed in current prices as of May 2019 scaled using latest available market size data: May 2019 for equity market capitalisation and December 2018 for face value of debt outstanding.

slow in 2019 Q1, additional measures to increase bank lending — both to offset trade headwinds and to support credit availability to small and medium-sized enterprises — have resulted in a slight pickup in TSF growth.

A sustained pickup in credit relative to nominal GDP — possibly as a result of intensifying trade tensions — could lead to renewed concerns around the sustainability of China's already elevated debt levels. Any crystallisation of these risks would impact on global growth more broadly, as China is deeply embedded in international trade networks (**Chart E.2**) and accounts for a large share of global demand for commodities. It could also contribute to a tightening in global financial conditions, if investors grow more concerned about broader risks as a result. And it could also affect UK financial stability because UK banks have significant direct exposures to China and Hong Kong, representing 214% of their common equity Tier 1 (CET1) capital.

Emerging market economies remain vulnerable to renewed capital outflows.

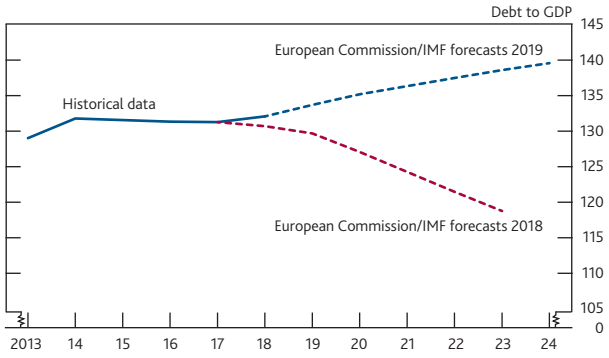
Turkey and Argentina, the two countries most affected by market turbulence in 2018, faced renewed market pressures in March and April, albeit with limited spillovers to other emerging market economies (EMEs). Nevertheless, EMEs with large current account deficits or high levels of debt denominated in foreign currencies remain vulnerable to renewed capital outflows, which could be triggered by a reassessment of global growth prospects.

Direct financial links between the UK and non-China EMEs are unlikely to pose a material risk to UK financial stability on their own. UK banks' direct exposures to non-China EMEs total 143% of CET1, around half the size of their exposures to the US or the euro area. But a substantial shock to these economies could act as an amplifier to a crystallisation of vulnerabilities in China, exacerbating spillovers to global growth and asset prices. For instance, investment fund flows now account for around one third of total portfolio flows to EMEs (up from around one tenth pre-crisis).[1] Many open-ended investment funds, which are significant investors in some emerging market equity and debt markets (**Chart E.3**), offer investors the ability to redeem their funds on a daily basis, potentially forcing a fund to sell its underlying assets when market liquidity is poor. This liquidity mismatch could both amplify price movements in those EMEs and increase spillovers to other markets (see Resilience of market-based finance chapter).

(1) See Carney, M (2019), 'Pull, push, pipes: sustainable capital flows for a new world order'.

Chart E.4 High levels of government debt leave Italy vulnerable to economic shocks

Projections for government debt in Italy[a]

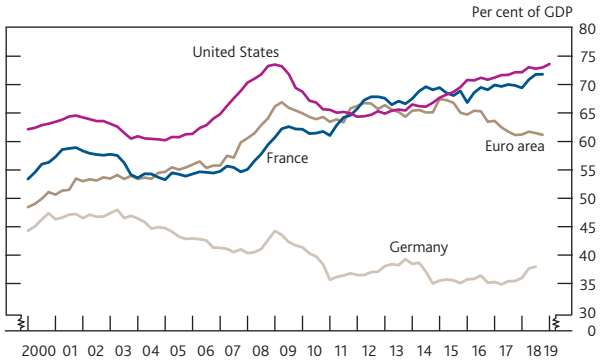


Sources: European Commission Forecasts (Spring 2018 and Spring 2019), IMF *World Economic Outlook* (*WEO*) (April 2018 and April 2019) and Bank calculations.

(a) Government debt as defined under Maastricht criteria. European Commission forecasts are used for the first two years of the forecast horizon, and a combination of IMF and European Commission assumptions are used thereafter.

Chart E.5 Corporate indebtedness is high in US and France

Private non-financial corporate debt to GDP[a]

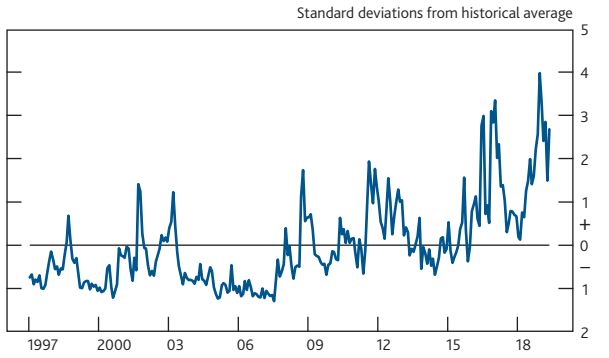


Sources: Eikon from Refinitiv and Bank calculations.

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

Chart E.6 Global economic policy uncertainty is elevated

Global economic policy uncertainty index[a]



Sources: Baker, S R, Bloom, N and Davis, S J (2016), 'Measuring economic policy uncertainty', *Quarterly Journal of Economics*; Davis, S J (2016), 'An index of global economic policy uncertainty', *Macroeconomic Review*; www.PolicyUncertainty.com and Bank calculations.

(a) The Global Economic Policy Uncertainty (EPU) Index is a GDP-weighted average of national EPU indices for 21 countries: Australia, Brazil, Canada, Chile, China, Colombia, France, Germany, Greece, India, Ireland, Italy, Japan, Mexico, the Netherlands, Russia, South Korea, Spain, Sweden, the United Kingdom and the United States. National EPU indices reflect the relative frequency of own-country newspaper articles that contain a trio of terms pertaining to the economy, policy and uncertainty.

The sustainability of Italian government debt and the associated health of the Italian banking sector remain prominent vulnerabilities in the euro area.

Italy's public sector debt, at over 130% of GDP, is the second highest in the euro area (after Greece). The European Commission and IMF forecast that this will increase further over the next five years (**Chart E.4**). The resulting high financing needs leave Italian public finances particularly vulnerable to weaker economic growth prospects or a deterioration in market conditions. During May, renewed uncertainty surrounding the Italian coalition government contributed to a widening of the Italian sovereign spread to German bunds of around 30 basis points.

About a quarter of Italian government debt is held by Italian banks (excluding their insurance arms), highlighting the continuing potential interlinkages between sovereign risk and bank risk in the financial system. Stress in the Italian public debt market could lead to an increase in banks' funding costs that, if passed on to Italian households and businesses, could cause a rise in non-performing loans (NPLs). Italian NPLs are already high at 8% of total loans, compared to 3.7% for the euro area as a whole.

Although direct UK banking exposures to Italy account for only around 11% of their CET1 capital, a further deterioration in Italy's financial outlook could result in material spillovers to the euro area and UK. UK bank exposures to the euro area as a whole are 235% of their CET1 capital.

Corporate indebtedness is high in several advanced economies.

Vulnerabilities associated with the US corporate sector remain material. US corporate debt is above pre-crisis levels as a share of GDP (**Chart E.5**), and there are particular risks associated with leveraged loans (see Leveraged lending chapter). Overall, UK banks' exposures to the United States account for 310% of their CET1 capital.

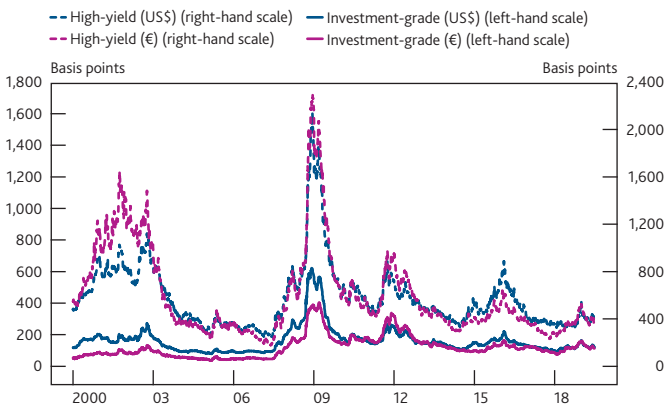
French corporate sector debt represents 72% of GDP, a historical high (**Chart E.5**) and around 440% of earnings. The French authorities have set exposure limits on the amount of lending systemically important French institutions can provide to large and highly indebted companies in France. UK banks' exposures to France account for 89% of their CET1 capital.

Valuation of some global assets appear inconsistent with the degree of economic policy uncertainty.

In global financial markets, risk-free rates have fallen markedly and are consistent with more pessimistic expectations of economic growth. In contract, some measures of the compensation for risk in fixed income markets appear to factor in a relatively benign outlook for inflation and global growth, and appear inconsistent with the degree of economic policy uncertainty (**Chart E.6**). For example, corporate bond spreads have compressed since the beginning of the year (**Chart E.7**)

Chart E.7 Corporate bond spreads remain compressed

Euro and US dollar corporate bond spreads[a]



Sources: ICE/BofAML and Bank calculations.

(a) Option-adjusted spreads. The US dollar series refers to US dollar-denominated bonds issued in the US domestic market, while the euro series refers to bonds issued in eurobond markets in euro.

and estimates of term premia of government bond markets are near all-time lows (**Chart B.8** in Overview of risks to UK financial stability chapter). Measures of equity market implied volatility, such as the VIX, also remain low relative to historical averages.

A sharp downward adjustment in asset prices can affect the financial system and amplify economic shocks by decreasing the value of collateral and increasing the cost of bond or equity issuance, as well as generating losses on assets held in trading portfolios.

Reflecting these vulnerabilities, the FPC has incorporated a severe global downturn in its 2019 stress test.

The FPC continues to assess UK banks' resilience to risks from global debt vulnerabilities in its annual stress test. UK banks were resilient to the 2018 stress test, which incorporated a synchronised global downturn in output growth. The global scenario in the 2019 annual cyclical stress test is, overall, very slightly more severe than in 2018.

The risk of a more protracted global slowdown remains as trade tensions have intensified.

Rising trade tensions have resulted in declining business confidence and pose material downside risks to global output growth.

The FPC judges that the 2018 stress test of global exposures was of a severity that encompassed a worst-case scenario for global trade tensions (see Overview of risks to UK financial stability chapter).

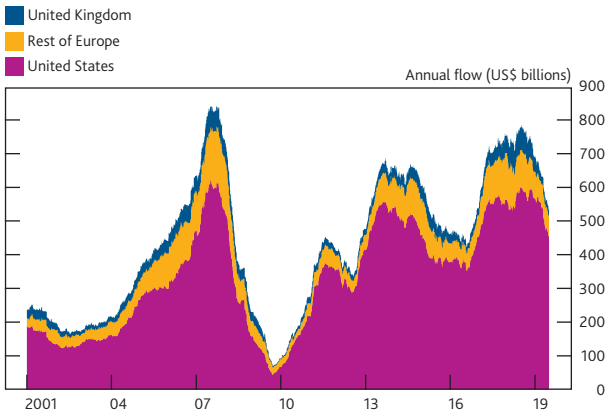
Leveraged lending

The market for leveraged loans has been growing rapidly in recent years. Lending conditions remain accommodative and investors may not have been compensated for the risks they are taking. The growth of leveraged loans and lower-rated corporate bonds has contributed to higher corporate leverage. Highly leveraged companies have been shown to amplify downturns in the real economy.

Globally, banks account for more than half of the financial system's exposure to leveraged loans. But UK banks' exposures to leveraged loans remain small generally relative to the overall market and the size of their capital base. These exposures will be tested again in the 2019 stress test.

Non-bank investors also have significant holdings of leveraged loans. Leveraged loan holdings by open-ended investment funds are significantly higher than pre-crisis, and large-scale redemptions during stress could amplify price falls. In a stress, the leveraged loan and high-yield corporate bond markets may not be sufficiently liquid to meet demand from borrowers, potentially restricting corporates from accessing funds.

Chart F.1 The leveraged loan market has been growing rapidly in recent years, although it has slowed since its peak in 2018
Twelve-month rolling global gross issuance of leveraged loans(a)



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

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

The leveraged loan market has been growing rapidly…

Gross issuance of leveraged loans (typically loans to non-investment grade firms that are highly indebted or are owned by a private equity sponsor) reached a post-crisis high in early 2018, but has slowed since then, especially in the UK (**Chart F.1**). A significant proportion of that issuance has been used for refinancing. Bank staff estimate that the global stock of leveraged loans has reached an all-time high at US$3.2 trillion and now represents around 11% of total advanced-economy credit to non-financial companies.(1)

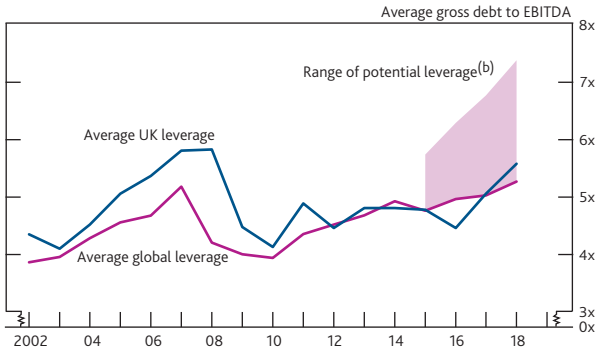
…accompanied by accommodative lending conditions…

The share of new leveraged loan issuance with no maintenance covenants has more than tripled since 2007, and remains close to record highs globally at almost 60% in 2019. Other traditional investor protections in loan terms have also been relaxed (such as restrictions on borrowers' ability to transfer collateral beyond the reach of the lender), potentially increasing losses to lenders in the event of default. Borrowers are also increasingly indebted globally, with the average reported debt to EBITDA(2) ratio of the borrowers issuing new

(1) There is no commonly accepted definition of leveraged loans. Given data availability, this estimate is based on a definition that includes loans with a private equity sponsor or with a sub-investment grade rating. The global stock of leveraged loans is commonly cited to be US$1.3 trillion; the stock of loans included in the S&P leveraged loan index. Bank staff use a broader measure that takes account of institutional loans not in the S&P index, as well as amortising term loans, and both drawn and undrawn revolving credit facilities (RCFs), increasing the estimated stock of global leveraged loans outstanding. The US$3.2 trillion estimate includes US$0.9 trillion of RCFs. The US$0.4 trillion of undrawn RCFs within this figure are excluded when calculating the estimate as a percentage of total advanced economy (US, euro area and UK) credit to non-financial companies, in order for the two series to be comparable.
(2) Earnings before interest, tax, depreciation and amortisation.

Chart F.2 The average leverage of issuers has reached pre-crisis levels globally and could be even higher than reported

Average leverage of global and UK issuers for new leveraged loans[a]

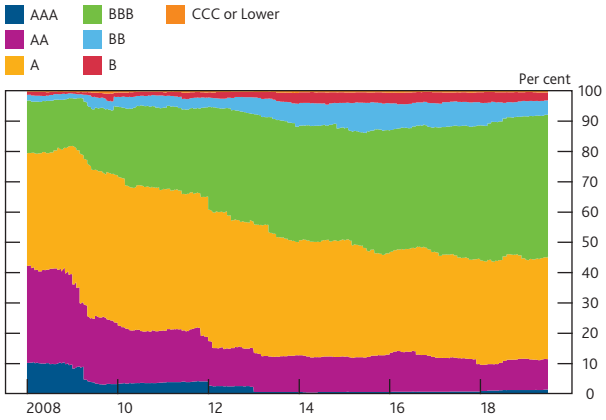


Sources: Covenant Review, LCD, an offering of S&P Global Market Intelligence and Bank calculations.

(a) Granular data on add-backs only available from 2015.
(b) The greater the proportion of add-backs which are not realised, the higher the actual leverage will be relative to the reported leverage. The top range assumes none of the add-backs are realised. The bottom of the range assumes all of the add-backs are realised.

Chart F.3 The share of BBB-rated corporate bonds has reached record highs

Distribution of credit ratings within the sterling corporate bond market[a]

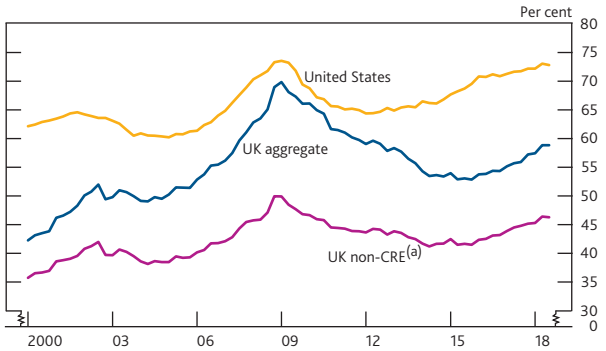


Sources: ICE/BofAML and Bank calculations.

(a) The chart shows the distribution of credit ratings, as measured by market value, of the ICE/BofAML sterling corporate bond index. This index can be used as a representative measure of the sterling corporate bond market. However, the index may not capture all sterling corporate bonds and alternative indices may contain different rating distributions.

Chart F.4 Corporate leverage has been rising

US and UK private non-financial corporate gross debt to GDP



Sources: Association of British Insurers, Bank of England, Cass Commercial Real Estate Lending survey, Deloitte, Eikon from Refinitiv, Federal Reserve Board, 'Financial Accounts of the United States', LCD, an offering of S&P Global Market Intelligence, London Stock Exchange, ONS, Preqin, US Bureau of Economic Analysis and Bank calculations.

(a) The UK non-CRE series excludes estimated debt of issuers undertaking real estate activities or development of buildings. For some forms of debt, this issuer description information is not available (i) at sufficient granularity or for (ii) parts of the date range shown in the chart. In these instances, we use the best available proxy for the proportion of debt which is related to commercial real estate.

leveraged loans around levels observed in 2007. There has been growing use of adjustments ('add-backs') to how earnings are calculated at the point a loan is made, which could further understate leverage (**Chart F.2**).[3] Add-backs and subsequent borrowing are typically not captured in public measures of leverage and if included leverage is likely to be above 2007 levels. For example, PRA supervisory data indicate that the share of new lending with leverage above seven times would increase from 18% to 28% if these were included.

…but investors may not have been compensated for the risks they are taking.

Bank staff estimate that the loss rate for leveraged loans during the financial crisis was almost twice the loss rate on loans to large businesses overall.[4] Weaker investor protection and the deterioration in the credit quality of the borrowers could further increase loss rates in a future stress. But while spreads on leveraged loans increased toward the end of 2018, they remain close to post-crisis lows.

Aggregate lending to higher-risk businesses through leveraged loans and lower-rated corporate bonds has been growing…

Aggregate lending to higher-risk businesses through issuance of high-yield bonds and leveraged lending now accounts for 18% of total advanced-economy corporate debt. And the share of corporate bonds that are the lowest investment-grade rating (BBB) has reached record highs across advanced economies. In the sterling corporate bond market the share increased from 16% in 2008 to 47% at end-June 2019 (**Chart F.3**). Together with leveraged loans and high-yield bonds, these riskier forms of debt now account for around 38% of advanced-economy corporate debt, up from 35% in 2017.

…contributing to higher corporate leverage.

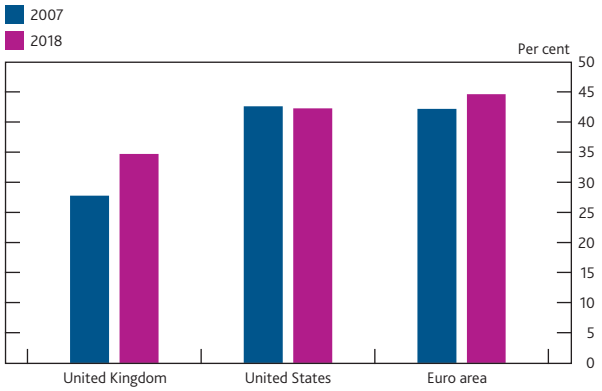
Corporate debt has grown faster than GDP in many advanced economies for several years (see Global debt vulnerabilities chapter). In the US, gross corporate debt as a share of GDP is now above pre-crisis levels in 2019 Q1 (**Chart F.4**). In the UK, while total corporate indebtedness remains around 2007 levels, the leverage of UK companies outside the commercial real estate (CRE) sector has increased to a level that is above 2007 levels.

The share of corporate debt owed by highly leveraged companies is now similar to, or higher than, levels seen in 2007 across major advanced economies. For example, the proportion of corporate debt owed by listed UK companies with a ratio of net debt to EBITDA greater than four increased to 35% in 2018, compared to 28% in 2007 (**Chart F.5**). While debt affordability has improved given the current low level of global interest rates, these companies may be vulnerable if interest rates were to rise significantly.

(3) These adjustments assume potential future earnings improvements are realised, which may further overstate EBITDA and, therefore, understate leverage.
(4) These are estimated five-year loss rates based on observed default rates during the global financial crisis. The recovery rate assumption is in line with the historical average recovery rate for first lien loans.

Chart F.5 The share of corporate debt owed by highly leveraged companies is now similar to, or higher than, levels seen in 2007 across major advanced economies

The proportion of debt by listed UK, US and euro-area companies with a ratio of net debt to EBITDA greater than four[(a)(b)]

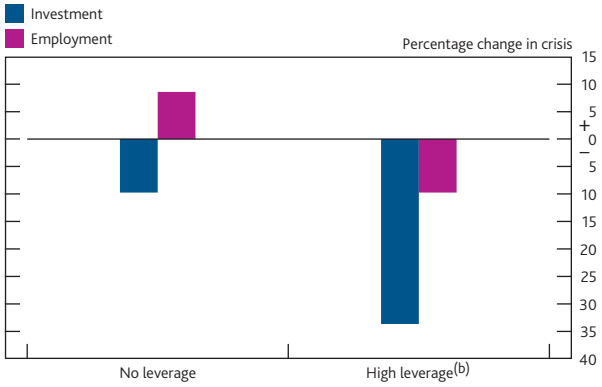


Sources: S&P Capital IQ and Bank calculations.

(a) Net debt to EBITDA is defined as debt net of cash and cash equivalents divided by the three-year moving average of earnings before interest, tax, depreciation and amortisation.
(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 F.6 Highly indebted companies cut investment and employment more during economic downturns

Change in investment and employment in the financial crisis for firms with high leverage ratios relative to unleveraged firms[(a)]



Sources: S&P Capital IQ and Bank calculations.

(a) Percentage change reflects the average log change in investment and employment between 2007 and 2009.
(b) High leverage companies are those with debt/EBITDA ratio higher than four in 2006.

Highly leveraged companies have been shown to amplify downturns in the real economy.

Higher corporate leverage could amplify economic downturns. A recent Bank study based on cross-country data shows that growth in the corporate debt to GDP ratio is associated with deeper recessions.[(5)] And firm-level data suggest that, in the global financial crisis, highly leveraged companies cut investment and employment more than unleveraged companies (**Chart F.6**).

Global banks have exposures to more than half of the financial system's exposure to leveraged loans.

Banks originate leveraged loans, a large share of which they distribute to non-bank investors including to collateralised loan obligations (CLOs) for securitisation (see Box 1). In total, banks retain exposures to over half of the leveraged loan market through loans that they have originated but not yet distributed ('pipeline exposures'), loans they choose to retain on their balance sheets and CLO holdings (**Chart F.7**).

Banks' loan book exposures are mainly through revolving credit facilities (effectively overdrafts) and, to a lesser extent, holdings of term loans. Together they account for around 47% of the total leveraged loan market. Banks' exposures through holdings of typically senior tranches of CLOs account for around 9% of the total leveraged loan market.

Many banks also have indirect exposures via facilities to credit and private equity funds which invest in leveraged businesses. Some banks also offer warehousing facilities, which are loans to CLO managers to finance the setting up of their CLOs.

Total direct and indirect exposures for some international banks active in this market are significant. For a sample of global systemically important banks (G-SIBs) active in this market, their exposure is on average around 75% of common equity Tier 1 (CET1) capital. Banks could face the risk of credit and mark-to-market losses on these exposures.

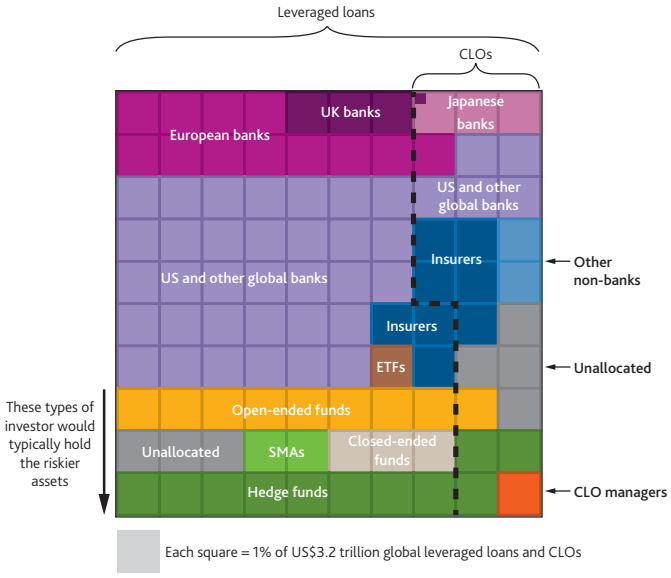
UK banks' aggregate exposures to leveraged lending were covered in the Bank's 2018 stress test.

UK banks only account for around 3% of the total leveraged loan market, and less than 1% of the global stock of CLOs (**Chart F.7**). Across the UK banking system, various exposures to leveraged loans totalled around 43% of CET1 capital at 2018 Q2. The resilience of major UK banks to potential losses through these exposures to leveraged loans was tested as part of the 2018 stress test. Aggregate losses on holdings of CLOs, pipeline exposures and non-investment grade loans to large UK and US companies that are held on balance sheet totalled £9.1 billion. This accounted for 0.4 percentage points of the 5.4 percentage point fall in the aggregate CET1 capital ratio in the test.

(5) Bridges, J, Jackson, C and McGregor, D (2017), 'Down in the slumps: the role of credit in five decades of recessions', *Bank of England Staff Working Paper No. 659*.

Chart F.7 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)(e)(f)(g)(h)



Sources: Association for Financial Markets in Europe (AFME), Bloomberg Finance L.P., European Central Bank (ECB), FCA Alternative Investment Fund Managers Directive (AIFMD), LCD, an offering of S&P Global Market Intelligence, Morningstar, National Association of Insurance Commissioners (NAIC), Securities and Exchange Commission (SEC), Securities Industry and Financial Markets Association (SIFMA), asset management public disclosures, bank public disclosures, pension fund public disclosures, private supervisory data, Solvency II submissions and Bank calculations.

(a) One square = 1% of US$3.2 trillion global leveraged lending market, data as of end-2018.
(b) Estimates of the total stock are based on Bloomberg's definition of leveraged loans. Given the lack of a consistent definition of leveraged lending, there is uncertainty over the total stock of outstanding leveraged loans. This chart uses a broadly defined market, which includes revolving credit facilities, amortising term loans and smaller less liquid bullet term loans.
(c) Revolving credit facilities and amortising term loans are allocated to banks given that they are typically the holders of these facilities.
(d) Complete data are not available for some non-banks, and so values have been estimated based on partial data. The grey segment marks the areas of most uncertainty.
(e) For hedge fund holdings of leveraged loans and CLOs we scale up holdings reported to UK authorities by non-EEA managed alternative investment funds to reflect the size of the global hedge fund universe. This means these estimates are particularly uncertain.
(f) A separately managed account (SMA) is a product offered by asset managers to large institutional clients like pension funds and insurers for example.
(g) Data for insurers largely refers to US entities. A proportion of holdings are through products that are offered by insurers to outside investors.
(h) Pipeline exposures held by banks are not included.

The FPC and PRC continue to monitor closely the underwriting standards of UK banks originating leveraged loans. The resilience of major UK banks to potential losses through various exposures to leveraged loans will be tested again as part of the 2019 stress test.

Non-bank investors hold significant proportions of outstanding leveraged loans, but the extent to which they can absorb losses in a stress, without affecting market prices, remains unclear.

Bank staff estimate that non-bank investors, including pension funds, insurers and investment funds, hold around 40% of the total global leveraged loan market (**Chart F.7**). Around a quarter of these holdings are through CLOs. Investment funds typically hold the riskier tranches, which could suffer significant losses in a stress (see Box 1).

Leveraged loan holdings by open-ended funds are significantly higher than in the period before the financial crisis. Open-ended funds are estimated to have held less than US$20 billion of leveraged loans in 2007, compared with around US$250 billion now. It is unclear how quickly these loans could be sold in a period of stress, without affecting market prices, meaning some funds could face liquidity mismatch. As a result, large-scale redemptions from open-ended funds could amplify price falls.

In a stress, the high-yield corporate bond market may not be sufficiently liquid to meet demand from borrowers, potentially restricting corporates from accessing funds.

In principle, companies could seek to issue high-yield bonds if the leveraged loan market closed. In practice, any disruption to one market is likely to affect the other and the markets are not completely substitutable.(6)

In addition, the rapid and significant increase in the share of BBB-rated bonds in the past few years has left a large volume of securities that could drop to a sub-investment grade rating in the event of a negative economic shock. Some investors may be forced to sell in these circumstances if, for example, their mandate prevents them from holding high-yield bonds. These selling pressures could exceed investors' and dealers' capacity to absorb them. This could further dampen market liquidity and restrict corporates from accessing funds.

The FPC will continue to assess the risks posed by leveraged lending.

The FPC will continue to review how pockets of corporate indebtedness in the UK, and the increasing role of non-bank lenders globally, could pose risks to UK financial stability. The Bank will also work together with international regulators to understand better how the leveraged loan market might behave under stress.

(6) For instance, among other reasons, loans are higher in the capital structure than bonds and investors may be constrained by their mandates.

Box 1
Financial stability risks from collateralised loan obligations

An important driver of the growth in the leveraged lending market has been increased securitisation activity.

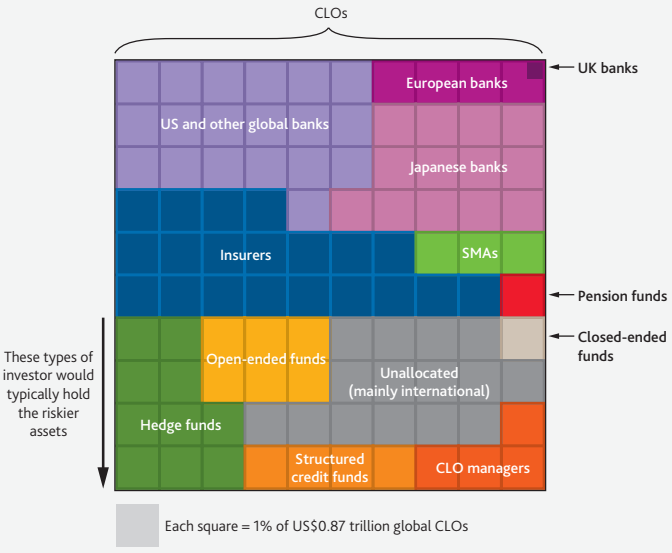
Collateralised loan obligations (CLOs), a form of securitisation, are complex assets that in a downturn could result in losses for investors, particularly if there was a reassessment of the riskiness of the underlying loans. The November 2018 *Report* compared the leveraged lending and the pre-crisis subprime mortgage markets. While there were similarities in the deterioration of the quality of the underlying loans, CLO structures are more robust and financed by more stable sources than the securitisation market for subprime mortgages. This box expands on that analysis.

Global banks hold more than a third of outstanding CLOs.

Based on indicative estimates of CLO holdings by different investors derived from a range of public and regulatory data, Bank staff estimate that international banks, in particular US and Japanese banks, hold one third of the stock of global CLOs (**Chart A**). Banks typically hold the senior (or higher investment grade) tranches of CLOs. Around two thirds of global CLOs are held by non-bank investors, who typically hold the riskier tranches.

Chart A International banks remain important investors in CLOs

Estimated holdings of CLOs by global investors(a)(b)(c)(d)(e)(f)(g)



Sources: Association for Financial Markets in Europe (AFME), FCA Alternative Investment Fund Managers Directive (AIFMD), LCD, an offering of S&P Global Market Intelligence, Morningstar, National Association of Insurance Commissioners (NAIC), Securities and Exchange Commission (SEC), Securities Industry and Financial Markets Association (SIFMA), asset management public disclosures, bank public disclosures, pension fund public disclosures, private supervisory data, Solvency II submissions and Bank calculations.

(a) One square = 1% of US$0.87 trillion global CLO market, data as of end-2018. This is based on a broadly defined market, which includes middle market and SME CLOs.
(b) Chart compiled on a best-efforts basis. Largely based on data in the public domain; some entities' holdings may be underestimated.
(c) Complete data are not available for some non-banks, and so values have been estimated based on partial data. The grey segment marks the areas of most uncertainty. This likely includes pension funds, sovereign wealth funds and Asian investors other than Japanese banks.
(d) Some entities also report holdings of synthetic CLOs or other types of corporate debt securitisation. These have been removed on a best-efforts basis.
(e) A separately managed account (SMA) is a product offered by asset managers to large institutional clients like pension funds and insurers for example.
(f) UK bank holdings account for 0.2% of global CLO holdings.
(g) Data for insurers largely refers to US entities. A proportion of holdings are through products that are offered by insurers to outside investors. The quality of insurer holdings is unclear; market intelligence suggests that some insurance companies will invest in the riskiest CLO tranches.

Changes in market practices have strengthened the resilience of the CLO market...

CLOs are funded by more stable sources compared with pre-crisis mortgage-backed securities, which were often financed through short-term wholesale finance via conduits and structured investment vehicles. CLOs have strengthened their built-in protection mechanisms that are designed to protect senior tranches from losses. And there is less risk-taking through complex derivative products or more complex securitisations structures.

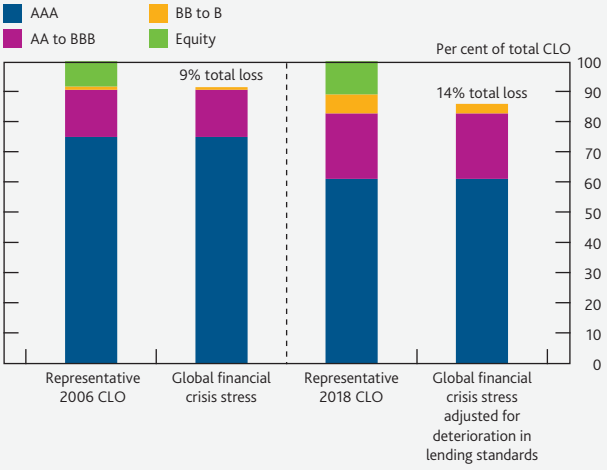
Regulatory changes have helped to improve transparency via disclosure requirements and EU risk retention rules ensure CLO managers in Europe are better incentivised to ensure the credit quality of the CLOs they issue.

...but the recent deterioration in lending standards means that losses on CLOs would probably be higher in a stress now...

Reflecting the recent deterioration in lending standards, the loans held by CLOs are likely to have a higher loss given default than those originated prior to the financial crisis. Bank staff estimate that a representative CLO issued in 2006 would have incurred losses of 9% during the financial crisis. This could increase to 14% for a representative CLO issued in 2018 (**Chart B**).

Chart B There is now stronger credit protection for senior tranches of CLOs

Share of equity, mezzanine and AAA-rated tranches of CLOs issued in 2006 and 2018 and stressed losses(a)(b)(c)



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

(a) This analysis is based on a small sample of representative CLOs issued in 2006 and 2018.
(b) Scenarios assume loan defaults in line with the global financial crisis, adjusting for the credit quality of the collateral that CLOs hold in each year. Recovery rates are adjusted downwards by 20 percentage points to account for weaker underwriting standards on loans issued in 2018.
(c) Losses show total principal shortfall relative to baseline scenarios with no losses on loan portfolio.

…although the impact on holders of AAA tranches of CLOs would be reduced by a significant increase in the level of subordination.

The increased level of subordination for senior tranches of CLOs means that there is stronger credit protection for these tranches. Both the equity and mezzanine tranches of CLOs have increased by around 25% in size since 2006. The size of AAA-rated tranches fell from 70% of total CLO liabilities in 2006 to 63% in 2018 (**Chart B**).

Bank staff estimate that even after applying a higher loss rate to account for deterioration in lending standards, holders of investment-grade tranches rated BBB or above in a representative 2018 CLO would not incur losses in a stress that resembled the financial crisis (**Chart B**). And it would take a loss rate more than twice as severe as the financial crisis for AAA tranches to incur losses.

Investors could still experience sizable mark-to-market losses on CLO holdings in a stress…

While CLOs only suffered modest credit losses during the crisis, they experienced large price swings, resulting in mark-to-market losses for banks. For example, AAA-rated tranches saw a 20% fall in market value, despite almost meeting all their scheduled cash flows. The 2019 stress test includes price paths for leveraged loan indices and AAA-rated tranches of CLOs of similar magnitude to those seen in the financial crisis.

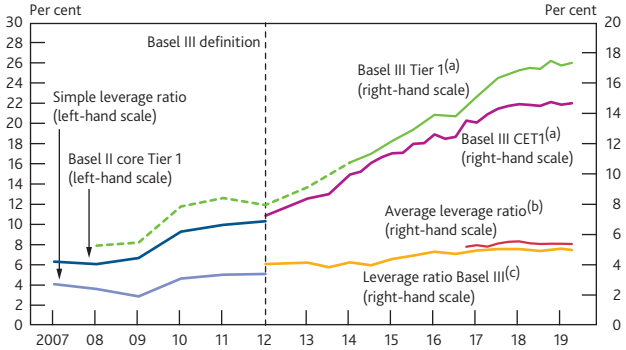
…and bank capital requirements could increase.

A CLO tranche could also be downgraded in a stress when its ability to withstand losses is reduced even if it does not incur any losses, exposing banks to a potential increase in capital requirements for these holdings.

Resilience of the UK banking sector

The UK banking system remains well capitalised and able to support the real economy in a severe macroeconomic stress. UK banks' profitability has improved over the past two years, but potential headwinds remain, including from price competition in the UK mortgage market. Their asset quality remains stable. UK banks' liquidity positions are strong, and the resilience of major UK banks' funding structures has also improved significantly since the financial crisis.

Chart G.1 The UK banking system remains well capitalised
Tier 1, CET1 and leverage ratios for the major banks



Sources: PRA regulatory returns, published accounts and Bank calculations.

(a) From 2014, the 'Basel III Tier 1 capital ratio' is calculated as Tier 1 capital over risk-weighted assets. The CET1 element within Tier 1 and RWAs are according to the CRD IV definition as implemented in the United Kingdom. The additional Tier 1 element within Tier 1 excludes grandfathered instruments and other transitional adjustments. Prior to 2014, the chart shows Bank estimates; preference shares are used as a proxy for additional Tier 1 capital. The peer group includes Barclays, HSBC, Lloyds Banking Group, Nationwide, RBS, Santander UK and The Co-operative Bank. From 2018, Basel III Tier 1 capital ratios reflect IFRS 9 transitional arrangements as agreed in European law.
(b) Leverage ratio with central bank reserves excluded from the exposure measure. Based on end of the period figures up until end-2016 and quarterly averages thereafter. The peer group includes Barclays, HSBC, Lloyds Banking Group, Nationwide, RBS and Santander UK. From 2018, the ratio reflects IFRS 9 transitional arrangements as agreed in European law.
(c) The Basel III leverage ratio corresponds to aggregate Tier 1 capital over the leverage ratio exposure. Up to 2013, Tier 1 capital includes grandfathered capital instruments and the exposure measure is based on the Basel 2010 definition. From 2014 H1, Tier 1 capital excludes grandfathered capital instruments. The exposure measure is based on the Basel 2014 definition for 2014 and the CRR definition from 2015 onwards. The peer group is the same as in (a) above. From 2018, the Basel III leverage ratio reflects IFRS 9 transitional arrangements as agreed in European law.

The UK banking system remains well capitalised and able to support the real economy in a severe macroeconomic stress.
Major UK banks' capital positions have been broadly stable since the November *Report* (**Chart G.1**), when the results of the 2018 stress test showed the UK banking system to be capitalised to support the real economy in a severe macroeconomic stress.(1) The aggregate Tier 1 capital ratio of major UK banks who participated in the stress test was 17.1% of risk-weighted assets (RWAs) in 2019 Q1, more than three times higher than before the global financial crisis.

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 increase the share of their earnings that they distribute to shareholders. Over the past three years major UK banks have, in aggregate, distributed more capital than they have generated, while still maintaining stable capital ratios — in part facilitated by falls in their risk-weighted assets.

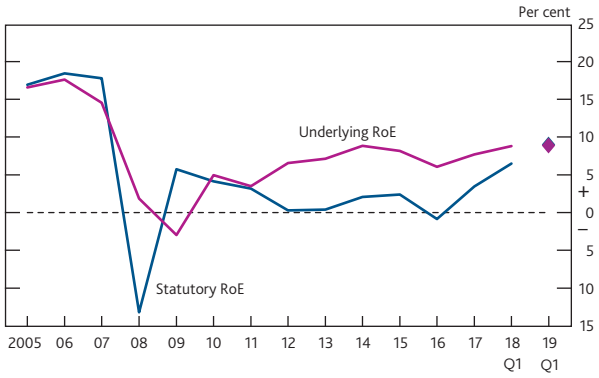
Major UK banks' average leverage ratio — a measure of bank capital that does not vary by the riskiness of assets — was 5.4% in 2019 Q1, roughly double what it was in 2007, when estimated on a consistent basis.(2)

UK banks' profitability has improved over the past two years, reinforcing their ability to withstand losses in a stress…
UK banks' profitability influences their ability to rebuild capital following a shock while also maintaining credit supply. In aggregate, major UK banks reported a 'statutory' return on equity (RoE) — the RoE actually achieved — of 6.5% in 2018, a 3 percentage point increase from 2017 (**Chart G.2**). This increase mainly reflected significant reductions in banks' restructuring costs. 'Underlying' RoE, which strips out misconduct costs and one-time charges, also improved, driven by an increase in non-interest income and a reduction in impairment charges.

(1) The results of the Bank's 2019 concurrent stress test — details of which were set out in March 2019 — will be published in December.
(2) The leverage ratio is calculated based on banks' aggregate Tier 1 capital as a proportion of total exposures, excluding central bank reserves.

Chart G.2 UK banks' profitability has improved over the past two years

Major UK banks' statutory and underlying return on equity(a)(b)(c)(d)

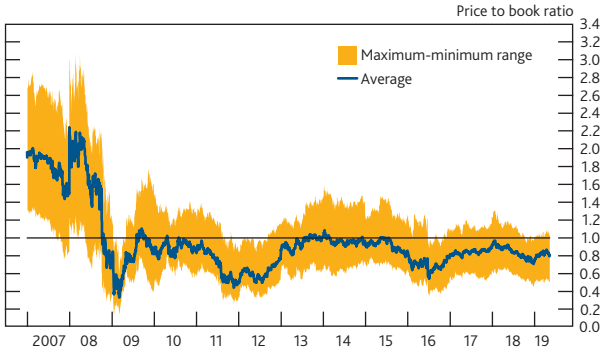


Sources: Published accounts and Bank calculations.

(a) Weighted average by shareholders' equity.
(b) Statutory RoE is defined as net income attributable to shareholders divided by average shareholders' equity. Underlying RoE strips out misconduct costs as well as one-time charges such as restructuring costs.
(c) Major UK banks are Barclays, HSBC, Lloyds Banking Group and RBS.
(d) Diamonds show annualised quarterly results for 2019 Q1 and are not directly comparable to full-year results.

Chart G.3 UK banks' price to book ratios remain low

UK banks' average price to book ratio (a)(b)(c)(d)



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

(a) UK banks are Barclays, HSBC, Lloyds Banking Group and RBS.
(b) Relates the share price with the book, or accounting, value of shareholders' equity per share.
(c) HSBC's price to book ratio is adjusted for currency movements.
(d) The underlying data have been sourced from Thomson Reuters Datastream up to 2013, and from Bloomberg from 2014 onwards.

Chart G.4 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.

UK banks provisioned a further £6.5 billion for misconduct issues in 2018, and have reached settlements on a number of conduct issues. The FPC expects additional stressed misconduct costs to be materially lower in future, provided no new significant issues emerge and there are no material upwards revisions to existing issues. Lower misconduct costs also contributed to a further improvement in major UK banks' statutory RoE in 2019 Q1 (**Chart G.2**).

UK banks' price to book ratios, which compare the market value of shareholders' equity in the bank with the accounting value of that equity, are little changed since the November *Report* and remain below one for most major UK banks (**Chart G.3**). Their market valuations remain consistent with the relationship internationally between price to book ratios and expected returns on equity (**Chart G.4**)

…but potential headwinds to profitability remain, including from price competition in the UK mortgage market.

Major UK banks' aggregate loan margin,(3) the net interest banks earn per unit of lending (whether in the UK or overseas), has been broadly stable in recent years. However, loan margins of UK-focused banks are under pressure due to strong price competition in the UK mortgage market (see UK household indebtedness chapter). A more competitive banking sector can bring benefits to consumers and businesses, but may have implications for banks' resilience because it affects their capacity to generate income that can replenish capital when they incur losses. Evidence suggests that larger UK banks are competing most aggressively on price in the mortgage market. But smaller banks are also playing an important role in new lending to households overall. In the 12 months to end-May, smaller UK banks — that account for nearly a quarter of the outstanding stock of household lending — delivered over 40% of the new lending to UK households.

UK banks' asset quality remains stable.

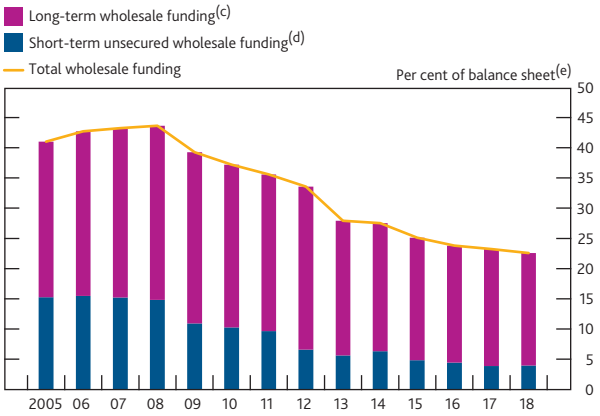
The asset quality of UK banks' balance sheets influences the potential losses they would face following a given economic shock, and remains stable. The risk appetite of lenders in the UK mortgage market has been strong in recent years, with the proportion of new mortgage lending at loan to value (LTV) ratios above 90% reaching a post-crisis peak in 2019 Q1, and the proportion of high loan to income (LTI) lending also remaining elevated. However, the proportion of the stock of UK banks' mortgages that is most vulnerable to house price falls — those with LTVs above 75% — has been broadly flat in recent years. House price growth and borrower repayments over that period have offset the increased share of new lending at high LTVs. And UK banks' unsecured lending to households has continued to slow (see UK household indebtedness chapter).

UK banks' exposures to the commercial real estate (CRE) sector have fallen significantly since the crisis, with the stock of

(3) This measure includes interest made on all activities — such as lending and holding of securities — minus the interest they pay on deposits and other sources of funding.

Chart G.5 UK banks have become less reliant on wholesale funding

UK banks' short-term and long-term wholesale funding[a][b]

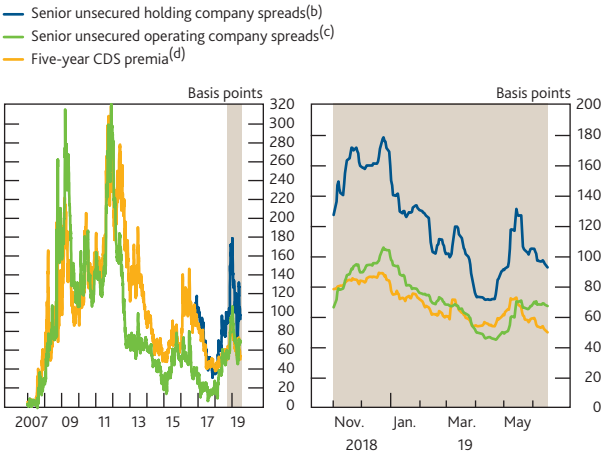


Sources: Published accounts and Bank calculations.

(a) Wholesale funding comprises deposits by banks, debt securities and subordinated liabilities but excludes repo. Where underlying data are not published the previous figures have been used.
(b) Major UK banks peer group. Sample includes National Australia Bank between 2005 and 2015 H1.
(c) Residual contractual maturity of greater than three months.
(d) Residual contractual maturity of less than three months. Short-term repo funding has been broadly stable at less than 10% of the balance sheet for the period covered.
(e) Excludes derivatives and liabilities to customers under investment and insurance contracts.

Chart G.6 UK banks' funding costs have fluctuated substantially since the November *Report*

UK banks' indicative long-term funding spreads[a]



Sources: Bloomberg Finance L.P., IHS Markit and Bank calculations.

(a) UK banks are Barclays, HSBC, Lloyds Banking Group and RBS.
(b) Constant-maturity unweighted average of secondary market spreads to mid-swaps for the major UK lenders' five-year euro-denominated senior unsecured bonds issued by the holding company or a suitable proxy when unavailable.
(c) Constant-maturity unweighted average of secondary market spreads to mid-swaps for the major UK lenders' five-year euro-denominated senior unsecured bonds issued by the operating company or a suitable proxy when unavailable.
(d) Unweighted average of five-year euro-denominated senior CDS premia for the major UK lenders.

UK banks' CRE lending having halved in value over that period. The proportion of CRE loans with LTVs above 80% represented around 4% of the total CRE exposures of UK banks participating in the 2018 stress test, unchanged from end-2017. Their lending to non-investment grade corporates also remain unchanged, at around 40% of their total corporate lending at end-2018. UK banks' exposures to the leveraged lending market remain small in aggregate (see Leveraged lending chapter).

UK banks' liquidity positions remain strong…

At a group level, major UK banks held more than £1 trillion of high-quality liquid assets at end-May, more than four times the level they held before the financial crisis. This means that they more than meet the Liquidity Coverage Ratio standard, which measures a bank's liquid assets as a proportion of the net outflows it might face over a severe 30-day stress, as well as supervisory add-ons for any risk not captured or fully captured by this standard.

The 2019 biennial exploratory scenario will examine the implications of a severe and broad-based liquidity stress affecting major UK banks simultaneously. This exercise will explore how the reactions of banks and authorities to the stress would shape its impact on the broader financial system and the UK economy (see The 2019 and 2021 biennial exploratory scenarios chapter).

…and the resilience of major UK banks' funding structures has also improved significantly since the financial crisis.

At a group level, major UK banks' use of short-term wholesale funding, excluding repo, as a proportion of total funding, has fallen to 4% from around 15% in 2007 (**Chart G.5**). Their customer funding gap — the difference between customer deposits and loans — has fallen from a peak of around £914 billion at end-2008 to a surplus of £238 billion at end-2018. Moreover, because of supervisory actions and their prudential risk management, major UK banks can meet their maturing obligations for many months without access to foreign exchange markets. UK banks have also pre-positioned collateral at the Bank of England such that they can access over £300 billion of additional funding through the Bank's regular facilities.

UK banks' funding costs have fluctuated substantially since the November *Report* (**Chart G.6**), driven largely by macroeconomic developments, including the outlook for Brexit. These movements in banks' funding costs have had limited impact on mortgage rates and business lending rates. While banks have historically used wholesale unsecured debt as a benchmark measure for their marginal source of funding, the importance of wholesale unsecured funding spreads in loan pricing is likely to have fallen given the increase in the share of deposit funding relative to wholesale funding.[4]

(4) See February 2019 *Inflation Report*, Box 1.

Resilience of market-based finance

Market-based finance has become more important to UK non-financial businesses since the financial crisis, accounting for all the net increase in their debt finance since 2008. This growth has diversified the supply of finance to the economy. Market-based finance relies on the behaviour of a range of intermediaries and investors that, together, determine how smoothly markets function. This chapter contains the summary of the FPC's latest assessment of the resilience of market-based finance, including a progress update on conclusions from past in-depth assessments in this area, with a particular focus on open-ended funds.

Open-ended funds globally play an increasing and important role in the provision of finance. Many offer daily redemptions while investing in assets that can take weeks or months to sell in an orderly way. This liquidity mismatch can create an incentive for investors to redeem when they expect others to do so, resulting in forced asset sales. These asset sales could test markets' ability to absorb them, amplifying price moves, transmitting stress to other parts of the system, and disrupting the availability of finance in the real economy. The FPC continues to judge that the mismatch between redemption terms and the liquidity of some funds' assets has the potential to become a systemic issue.

The FPC highlighted vulnerabilities associated with funds' liquidity mismatch in 2015. Further evidence has emerged that these go beyond any single market or fund type. For example, funds investing in global corporate bonds and leveraged loans faced significant redemptions in late 2018. Similarly, UK commercial real estate funds experienced heightened outflows in late 2018 and early 2019, partly related to uncertainty about Brexit.

Given the potential vulnerabilities and the global nature of asset management, the FPC supported the Financial Stability Board's 2017 recommendation that funds' assets and investment strategies should be consistent with their redemption terms. Subsequently, the International Organization of Securities Commissions updated its liquidity recommendations, including around appropriate fund design. However, these recommendations did not prescribe how this should be achieved. Implementation was left to the national authorities and funds themselves.

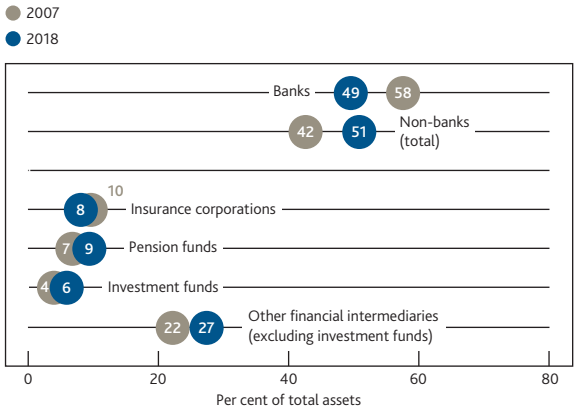
The Bank and FCA will examine the costs and benefits of aligning redemption terms, including pricing and notice periods, with the typical time it takes to realise market prices for funds' assets in normal and stressed market conditions. The review will also assess the effectiveness of measures that are already used to deal with misalignment of redemption terms and asset liquidity, such as swing and fair value pricing and suspensions.

Market-based finance is crucially important for the provision of financial services to the UK economy.

Market-based finance represents the system of markets, non-bank financial institutions and infrastructure that complements the banking system in providing finance and other intermediation services. The non-bank financial system has grown significantly since the financial crisis and now accounts for around half of financial sector assets, both in the UK (**Chart H.1**) and globally.

Chart H.1 The non-bank financial system has grown over the past decade

Share of UK financial sector assets by subsector(a)(b)(c)(d)



Sources: The Association for Financial Markets in Europe, Bank of England, Bloomberg Finance L.P., FCA, Morningstar, ONS, published accounts and Bank calculations.

(a) Investment funds also includes money market funds, hedge funds and real estate investment trusts.
(b) Other financial intermediaries consists of broker-dealers, holding companies, structured finance vehicles, non-bank mortgage lenders, central counterparties (CCPs), finance companies and financial auxiliaries.
(c) Bank estimate for pension funds in 2018 is based on a sample of firms. Bank estimates for CCPs in 2018 and non-bank mortgage lenders in 2007 are based on total assets in 2017 and 2008 respectively.
(d) The Bank is continuing to work with the ONS to address data gaps in the non-bank financial sector. As part of this work, the ONS has published experimental statistics that provide more detail on the size of certain types of non-banks within the 'other financial intermediaries' subsector.

Market-based finance has been crucially important for UK non-financial businesses, helping to diversify the supply of finance. Following the crisis, when lending by banks was subdued, market-based lending to UK non-financial businesses grew, helping to support the economy. It has accounted for all the net increase in their debt finance since 2008 (**Chart H.2**).

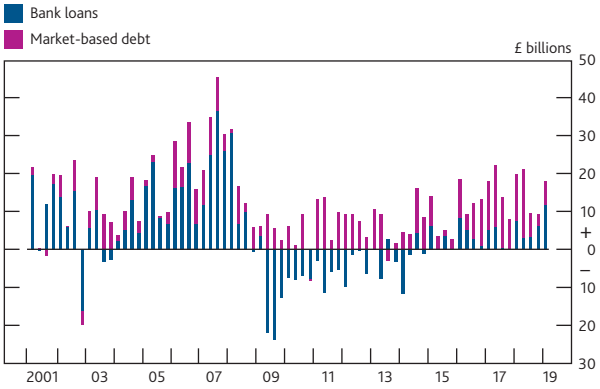
Some aspects of market-based finance that had contributed to the global financial crisis, such as opaque structured finance vehicles, have since declined in size. However, given the growth and evolution of other forms of market-based finance, continued monitoring for emerging risks is crucial.

The resilience of financial markets reflects the extent to which they can absorb, rather than amplify, shocks.

The resilience of market-based finance relies on the behaviour of a range of intermediaries and investors that, together, determine how smoothly markets function. Resilient markets absorb rather than amplify shocks and thus continue to support the UK economy in bad times as well as good. Businesses' ability to raise debt finance depends on the

Chart H.2 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, 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.

efficient functioning of primary capital markets, which in turn is supported by the liquidity of secondary markets, where securities already issued trade. If financial markets lack resilience — for example, if they lack sufficient liquidity — 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.

As demonstrated after the UK's referendum on EU membership in 2016, sterling markets are able to function effectively through markedly volatile periods.

Open-ended funds globally play an increasing and important role in some markets.

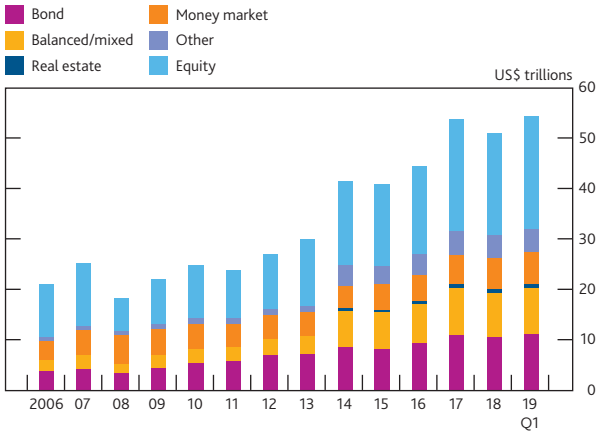
Total assets managed by open-ended funds worldwide have more than doubled following the global financial crisis, to around US$55 trillion (**Chart H.3**). And open-ended funds play an increasing and important role in some markets. For example, Bank estimates of their share of the sterling corporate bond markets has increased to 13% in 2018, from 8% in 2006.(1)

Many of these funds offer short-term — usually daily — redemptions to investors. For some funds, this matches the ability to sell the assets held by the fund; for example where these are highly liquid equities. However, more than US$30 trillion of global 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.(2)

(1) Estimate based on sterling corporate bond funds (open-ended and exchange-traded funds) total net assets as a share of all outstanding sterling corporate bonds.
(2) 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*.

Chart H.3 Total assets of open-ended funds have more than doubled since 2008

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.

The mismatch between the liquidity of a fund's assets and its redemption terms can create incentives for investors to withdraw funds ahead of other investors.

When fund managers sell assets, they should sell a representative slice of the fund, and not the more liquid assets first, to ensure remaining investors are treated fairly. When a fund is experiencing net outflows, it may need to sell those assets in a shorter time period than is needed to realise their market prices. If redeeming investors are offered the market price of their fund holding, but the fund must sell the assets at a lower price, this can create an incentive to redeem ahead of others.

Although funds are not permitted in general to favour one group of investors over another, there are no well-defined requirements for how this should be done. If there is material uncertainty about the valuation of a significant proportion of the fund's assets, that uncertainty will be reflected in the unit price of the fund. That creates the potential for investors to be treated unfairly. In particular, funds can use measures such as swing or fair value pricing[3] to adjust the price received by redeeming investors, but they may not always be implemented in a way that fully internalises the gap between redemption term and asset liquidity. As these problems emerge, the initial redemptions raise the incentives of the remaining investors to also withdraw (before any offsetting steps are taken by the fund). This self-reinforcing dynamic can lead to so many investors rushing to redeem that funds have no choice but to suspend all redemptions. Furthermore, the fear of possible suspension reinforces the incentive to redeem.

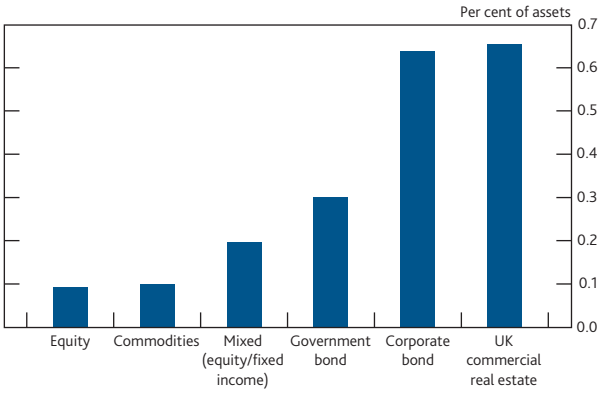
This problem may also be compounded if investors anticipate that fund share prices may be 'stale', ie not yet factoring in the latest information with further adjustment to come once assets are sold, possibly at a large discount.

And risks could be further exacerbated if the use of suspension or other liquidity management tools in one fund led to concerns about the liquidity of other open-ended funds.

Consistent with this, the Bank has found that investors in funds investing in less liquid assets, such as commercial real estate (CRE) and corporate bonds, can be more sensitive to asset price moves (**Chart H.4**). Similarly, Bank estimates show that in response to falls in asset prices, redemptions from emerging market economies (EME) bond funds are five times larger than those from EME equity funds, which in turn are twice as large as redemptions from advanced-economy equity funds.[4]

Chart H.4 Corporate bond funds see redemptions that are much more sensitive to price moves than equity funds

Fund redemptions following 1% fall in asset value[a]



Sources: Morningstar and Bank calculations.

(a) Procyclicality estimates reflect monthly redemptions from European open-ended investment funds in response to a 1% loss incurred over the previous month. Estimates are produced using panel regression methodology and monthly data covering 2005–15. Work is currently under way to update these estimates.

Large-scale redemptions from funds could result in sales of illiquid assets that may exceed the ability of dealers and other investors to absorb them.

In turn, large-scale redemptions from funds could result in sales of illiquid assets that may exceed the ability of dealers and other investors to absorb them, amplifying price moves, transmitting stress to other parts of the financial system, and disrupting the availability of finance to the real economy.

The Bank is continuing to develop models to explore how open-ended funds, hedge funds, dealers, insurance companies, unit-linked funds and pension funds might, through responding separately to their incentives and constraints, together amplify or dampen market shocks.[5]

(3) For research on swing pricing and investors' redemption see, for example, Jin, D, Kacperczyk, M, Kahraman, B and Suntheim, F (2019), 'Swing pricing and fragility in open-end mutual funds', *FCA Occasional Paper No. 48*; Lewrick, U and Schanz, J (2017), 'Is the price right? Swing pricing and investor redemptions', *BIS Working Papers No. 664*.

(4) For more details on liquidity mismatch in open-ended EME funds, see Carney, M (2019), 'Pull, push, pipes: sustainable capital flows for a new world order'.

(5) For more details on this work, see Aikman, D, Chichkanov, P, Douglas, G, Georgiev, Y, Howat, J and King, B (2019), 'System-wide stress simulation', *Bank of England Staff Working Paper series*, forthcoming.

This work has initially focused on the corporate bond markets. In 2017, a pilot simulation found that under a severe but plausible set of assumptions, investor redemptions could result in material increases in spreads in the corporate bond market. And investor redemptions one third higher than those observed during the crisis could be sufficient to overwhelm the capacity of dealers to absorb those sales, resulting in market dysfunction.(6)

The FPC highlighted vulnerabilities associated with funds' liquidity mismatch in 2015, and underscored the importance of international work in this area.

The FPC conducted an in-depth assessment of open-ended funds in 2015 and highlighted vulnerabilities associated with liquidity mismatch in these funds. The FPC has therefore underscored the importance of international work via the Financial Stability Board (FSB) in relation to asset management activities.

The FSB has since developed recommendations to address structural vulnerabilities related to asset management activities, focused on liquidity mismatch and leverage, which the FPC has supported. In particular, the FPC highlighted that one of the key recommendations was that funds' investment strategies should be consistent with their redemption terms. To operationalise the FSB's liquidity mismatch recommendations, the International Organization of Securities Commissions (IOSCO) published recommendations on liquidity risk management in February 2018. As IOSCO notes, given the implementation of the recommendations may vary from jurisdiction to jurisdiction, depending on local conditions and circumstances, there is some discretion left to national authorities. IOSCO and the FSB will assess implementation in due course. Effective implementation will be crucial to addressing liquidity mismatch.

Multiple recent episodes across a range of markets have further illustrated liquidity mismatch in some open-ended funds.

In the global corporate bond markets, funds faced significant outflows during the period of financial market volatility at the end of 2018, when credit spreads widened. And market contacts noted some deterioration in liquidity conditions across a range of markets, including the corporate bond markets. In the market for sterling corporate bonds issued by UK companies, market dealers were net buyers and absorbed the majority of net sales by investment funds in late 2018 and early 2019, which probably supported market functioning in this episode.

Similarly, in December 2018, as leveraged loan prices fell in global markets, investors in open-ended leveraged loan funds redeemed US$37 billion of around US$200 billion invested in these funds.

UK CRE funds faced significant redemption requests in the period around the UK's referendum on EU membership in June 2016. As described in the November 2018 *Report*, six CRE funds suspended redemptions and nine funds adjusted the prices that redeeming investors could receive to account for asset price movements or uncertainty. UK CRE funds also saw significant redemptions in late 2018 and early 2019, partly related to uncertainty about Brexit.

The suspension of LF Woodford Equity Income Fund on 3 June 2019, while not systemic in nature, illustrated potential liquidity mismatch in an equity UCITS fund, a type of open-ended fund. UCITS regulations specify that no more than 10% of the fund's net asset value may be invested in unlisted securities.(7) Following a very significant redemption request from a single investor, which came after about two years of sustained net outflows, and combined with other demands on liquidity, the fund had to suspend. This was to avoid the risk of having to sell assets quickly, below market value, against the interest of remaining investors. Outflows from another open-ended fund managed by Woodford Investment Management were probably aggravated due to this event, but there was no wider impact.

While these episodes did not have consequences for financial stability, they illustrate that liquidity mismatch in funds is a vulnerability that goes beyond any single market or fund type. This vulnerability could create financial instability under severe stress and is likely to become more important if more funds expand into less liquid assets.

The Bank and FCA will examine the costs and benefits of aligning redemption terms with the typical time it takes to realise market prices for funds' assets.

The FPC continues to support the FSB's recommendation that funds' assets and investment strategies should be consistent with their redemption terms. Such alignment would directly address the structural cause of liquidity mismatch and help prevent problems from arising in the first place, rather than mitigating problems as they crystallise.

Domestically, the FCA has an ongoing review of liquidity mismatch in open-ended funds. The FCA published a consultation paper in October 2018 proposing reforms to open-ended funds investing in illiquid assets, such as CRE. In drafting the proposals, the FCA took into consideration the IOSCO recommendations on liquidity risk management. The FCA will also take account of any lessons learned from the

(6) Baranova, Y, Coen, J, Lowe, P, Noss, J and Silvestri, L (2017), 'Simulating stress across the financial system: the resilience of corporate bond markets and the role of investment funds', *Bank of England Financial Stability Paper No. 42*.

(7) The FCA's rules governing Undertakings for Collective Investment in Transferable Securities (UCITS) schemes derive from the EU UCITS Directive and are contained within the Collective Investment Schemes sourcebook of the FCA Handbook. For more details on the suspension of LF Woodford Equity Income Fund, see 'Letter to Rt Hon. Nicky Morgan MP, Chair of the Treasury Committee on LF Woodford Equity Income Fund' from Andrew Bailey, Chief Executive of the Financial Conduct Authority.

suspension of LF Woodford Equity Income Fund before publishing the reforms.

The Bank and the FCA will also examine the costs and benefits of aligning redemption terms, including pricing and notice periods, with the typical time it takes to realise market prices for funds' assets in normal and stressed market conditions. The review will also assess the effectiveness of measures that are already used to deal with misalignment of redemption terms and asset liquidity, such as swing and fair value pricing and suspensions. The FPC will review progress and provide an update in due course.

In contrast to open-ended funds, the majority of exchange-traded funds do not appear to present material financial stability risks.

Exchange-traded funds (ETFs), most of which passively track the performance of an index or portfolio, are a low-cost way to invest in diversified strategies. Unlike open-ended funds, ETFs can be traded on secondary markets. In a stress this means that, although they could be traded at a discount, the underlying assets should not be subject to fire sale pressure to the same extent. The FPC has judged that the majority of ETFs do not appear to present material financial stability risks but will keep the risks in this sector under review as part of its regular annual assessment (see Box 2).

Measuring leverage is key to monitoring and addressing risks from investment funds…

Funds can gain leverage by borrowing, including from banks. This has the potential to increase the volume of sales — and hence risks to market liquidity — that occur from a given level of investor redemptions. Funds can also gain leverage through their use of derivatives. Such 'synthetic' leverage can be used to reduce risk via the hedging of exposures, but can also be used to increase exposure as part of more complex investment strategies.

…and international progress on the FPC's conclusions in this area will depend on the results of IOSCO's consultation.

Following its in-depth assessment of open-ended funds in 2015, the FPC judged risks from financial, or 'balance sheet', leverage to be contained. However, the FPC noted the lack of standardised measures of synthetic leverage reported consistently across funds, which prevented the FPC from making a holistic assessment of risks in this area. Therefore, the FPC supported the FSB's initiative to assess leverage in investment funds.

As set out in the November 2018 *Report*, the FPC considers that, in order to monitor the potential financial stability risks from fund leverage, supervisors need information on funds': (i) use of borrowing and derivatives; (ii) potential losses across their whole portfolios; and (iii) potential liquidity demands, relative to available liquid assets, either from collateral calls on their derivatives and repo, or from their short-term borrowing not being rolled over. **Table H.A** sets out possible ways of measuring these items.

IOSCO has issued a consultation paper on operationalising the FSB recommendation on the development of consistent leverage measures for funds in November 2018. The proposals set out in IOSCO's consultation paper leave considerable discretion to national regulators, and therefore make it unlikely that a globally consistent set of measures will be implemented. As set out in the November 2018 *Report*, **the FPC considers that for IOSCO 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

Table H.A Measuring financial stability risks from leverage in investment funds and hedge funds[(a)]

Information that supervisors need	Possible measures
Use of borrowing and derivatives (derivatives can be used to create 'synthetic' leverage, by changing the exposure to risks).	Comparing a fund's gross notional exposure (sum of the market value of assets and the notional amounts of derivatives) to its net asset value can be a good indicator of whether borrowing or derivatives are being used.
Potential losses across funds' whole portfolios.	Value-at-Risk (VaR) on a fund's whole portfolio can measure potential losses, and some funds do report VaR to their supervisors. However, EU guidelines allow for VaRs to be calibrated using a one-year window of historical observations. This could underestimate funds' potential losses if recent financial market volatility has been low. A longer window than one year, and the inclusion of a stress period, would mitigate this, as in international standards on initial margin calculations.
Potential liquidity demands (either from collateral calls on funds' derivatives and repo, or from their short-term borrowing not being rolled over) relative to available liquid assets.	A good metric for how large potential variation margin calls could be is the initial margin required from a non-bank by its counterparties (it will be mandatory for non-banks to post initial margin on new derivatives trades by 2020). International standards require initial margin to be sufficient to cover extreme but plausible estimates of potential variation margin calls. In addition to measures of potential outflows related to derivatives, reporting by funds of the residual maturity breakdown of their outstanding borrowing would be informative of their potential vulnerability to rollover risk.

(a) For more details on these measures, see the November 2018 *Financial Stability Report*.

borrowing or derivatives, but also the potential losses and liquidity demands those funds could face. This would enable effective global risk assessment and support supervisors' decision-making.

The FPC has agreed that it might be beneficial in future to consider domestic collection of these types of measures. The FPC's previous work on the appropriate measures could be used as a basis for that. The Bank is also working with other domestic supervisors — the PRA and The Pensions Regulator — to enhance the monitoring of the potential liquidity demands and losses generated by non-bank leverage.

Some FPC conclusions to improve the resilience of market-based finance have made significant advances, but progress on other conclusions is at risk of stalling or has already stalled.

The FPC has also reviewed progress against its conclusions from its other previous in-depth assessments. These conclusions relate to both domestic and international policy initiatives. In addition to open-ended funds and leverage in the non-bank financial system, past in-depth assessments covered: market liquidity; insurance companies; and post-crisis reforms to derivatives markets. Some FPC conclusions to improve the resilience of market-based finance have made significant advances. Progress on other conclusions, however, is at risk of stalling or has already stalled (**Table H.B**).

The FPC has been closely monitoring 'fast markets', including risks from flash episodes, risks to firms using algorithmic trading and the importance of principal trading firms for market functioning.

The FPC will continue to monitor 'fast markets' closely, in particular the risks posed by flash episodes becoming more frequent and of market dysfunction being longer-lasting in any future episode (see Box 3).

Several regulatory reforms have come into effect since November.

The FPC has considered changes to the regulatory perimeter and regulatory reforms which have come into effect since November. These reforms included, for example:

- The Senior Managers and Certification Regime (SM&CR), previously applicable only to all dual-regulated deposit-taking firms and dual-regulated investment firms, was applied to all dual-regulated insurers from December 2018, and will be applied to all other solo FCA-regulated firms from December 2019. The SM&CR aims to support a change in culture at all levels in firms through a clear identification and allocation of responsibilities to individuals responsible for running them. Relatedly, the FPC notes that there is a strong case for extending the SM&CR to financial market infrastructures (see Developments in financial market infrastructure chapter).

- The EU Securitisation Regulation is effective from January 2019; this strengthens requirements for all European securitisation and creates a specific framework to identify securitisations that are simple, transparent and standardised.

The FPC welcomes these changes.

Furthermore, with the UK's withdrawal from the EU, directly applicable EU law will cease to apply and will be brought into UK law with appropriate modifications. And the regulatory landscape may then undergo significant further changes due to EU withdrawal. Irrespective of the particular form of the UK's future relationship with the EU, and consistent with its statutory responsibility, the FPC will remain committed to the implementation of robust prudential standards in the UK (see Resilience of the UK financial system to Brexit chapter).

The FPC also welcomes the FCA's *Annual Perimeter Report* published in June 2019. The *Report* focuses on areas where FCA perimeter issues are most likely to cause harm to UK consumers and markets. For example, the narrowing boundary between the provision of mostly unregulated technical infrastructure and the provision of regulated activities, such as payment or banking services.

The FPC has not recommended any changes to the regulatory perimeter at this stage.

Table H.B Progress update on previous in-depth assessments by the FPC

In-depth assessment	Policy conclusions	Progress since the November 2018 *Report*
Recently completed policy initiatives		
Market liquidity (July 2016 *Report*)	• Key dealer-intermediated markets, including some corporate bond and repo markets, saw reduced liquidity — partly due to post-crisis regulation of dealers. • International leverage ratio standards should be amended to minimise their impact on the liquidity of these markets without lowering resilience.	• The FPC welcomes the recent decisions from the Basel Committee on Banking Supervision (BCBS), which will support market liquidity, without lowering resilience. Specifically, the BCBS: – revised the leverage ratio to allow margin received from a client to offset the exposure amounts of client-cleared derivatives, reducing the capital cost of client clearing to leverage-constrained dealers; and – revised leverage ratio disclosure requirements to curb leverage ratio window dressing (whereby banks adjust their balance sheets around reporting dates). Banks will be required to disclose their leverage ratios based on the quarter-end and average values of securities financing transactions. A comparison of the two sets of values will allow market participants to better assess banks' actual leverage throughout the reporting period. In the UK, banks subject to the UK leverage ratio framework are already required to report and disclose average leverage ratios (eg using averages of exposure amounts based on daily or month-end values) to address this.
Ongoing policy initiatives		
Insurance companies (November 2016 *Report*)	• The International Capital Standards (ICS) for insurers should avoid incentives to invest procyclically, whereby they may amplify market movements.	• The Bank is engaged in the International Association of Insurance Supervisors' work to develop ICS for insurers. The Bank is working to avoid a design which creates unnecessary procyclicality, volatility or unwarranted increase in the regulatory burden on firms.
Non-bank leverage (November 2018 *Report*)	• Non-bank leverage can support financial market functioning, but it can also expose non-banks to greater losses and sudden demands for liquidity, which can give rise to financial stability risks. • The Bank will work with other domestic supervisors to enhance risk monitoring.	• In March 2019, the PRA published a draft supervisory statement on 'Liquidity risk management for insurers'. The statement sets out the PRA's expectations as to how insurers might go about managing liquidity risk, including risks through margining requirements for derivative positions. • The Bank is also working with The Pensions Regulator to enhance the monitoring of possible systemic risks from pension funds' use of derivatives and repo.
Derivatives (November 2017 *Report*)	• Post-crisis reforms have made the financial system more dependent on central counterparties (CCPs) in order to reduce systemic risk. • Reforms have also made the CCPs themselves more resilient, although it is important that authorities globally finalise and implement standards for CCP resolution.	• The FSB is working on providing additional guidance on the resolution of CCPs. This follows a discussion paper published in November 2018 on the adequacy of financial resources to support CCP resolution and the treatment of CCP equity in resolution.
Investment funds (December 2015 *Report*)	• Some open-ended funds can have liquidity mismatch, offering short-term redemptions while holding less liquid assets. Investors' and fund managers' procyclical behaviour could amplify shocks. • The FPC supports the FSB's recommendations to address structural vulnerabilities from asset management activities, focused on liquidity mismatch. • Funds should be incorporated into the Bank's system-wide stress simulation initiative.	• To operationalise the FSB's liquidity mismatch recommendations, the International Organization of Securities Commissions (IOSCO) published recommendations on liquidity risk management and good practices in February 2018. These recommendations did not prescribe how to achieve the alignment between funds' assets and their investment strategies, with implementation likely to vary from jurisdiction to jurisdiction. • The FCA has an ongoing review of liquidity mismatch in open-ended funds. The Bank and FCA will examine the costs and benefits of aligning redemption terms, including pricing and notice periods, with the typical time it takes to realise market prices for funds' assets in normal and stressed market conditions. The review will also assess the effectiveness of measures that are already used to deal with misalignment of redemption terms and asset liquidity, such as swing and fair value pricing and suspensions. The FPC will review progress and provide an update in due course. • The Bank continues to develop system-wide stress simulations, which incorporate investment funds. A forthcoming staff working paper will set out the design and key features of the Bank's model.

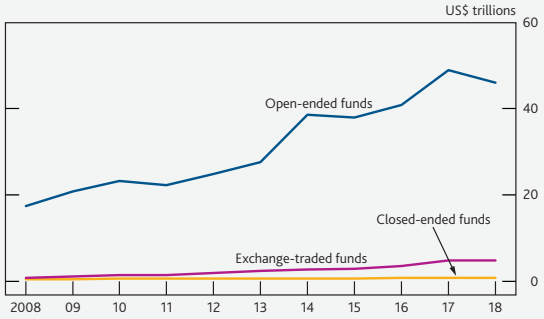
In-depth assessment	Policy conclusions	Progress since the November 2018 *Report*
Policy initiatives where progress has been slow or is unlikely to be sufficient		
Investment funds (December 2015 *Report*) **Non-bank leverage** (November 2018 *Report*)	• Data gaps around leverage prevent holistic risk assessment. • The FPC supports the FSB's recommendations to address structural vulnerabilities from asset management activities, focused on leverage. • To monitor the potential financial stability risks from fund leverage supervisors need information on funds': (i) use of borrowing and derivatives; (ii) potential losses across their whole portfolios; and (iii) potential liquidity demands.	• IOSCO is considering responses to its consultation paper on how to operationalise the FSB recommendation to develop consistent leverage measures for funds. The proposals set out in IOSCO's consultation paper leave considerable discretion to national regulators, and therefore make it unlikely that a globally consistent set of measures will be implemented. For IOSCO to deliver the objective of the FSB recommendation, the FPC considers that a core set of measures will need to be consistent globally and enable effective monitoring of the potential losses and liquidity demands funds could face. • The FPC has agreed that it may be beneficial in future to consider domestic collection of these types of measures. The FPC's previous work on the appropriate measures could be used as a basis for that.
Insurance companies (November 2016 *Report*)	• Under its current design, the 'risk margin' could, in future, encourage insurance companies to reinforce falls (rises) in risk-free interest rates by switching into (out of) low-risk assets. • Limiting sensitivity of the 'risk margin' to changes in risk-free interest rates would have macroprudential benefits.	• The FPC continues to believe that reform of the Solvency II 'risk margin' would have macroprudential benefits. The PRA is keeping its position on Solvency II under review. However given uncertainty about the UK's future relationship with the EU in relation to financial services, the PRA does not see a durable way to implement a change with sufficient certainty for firms to rely on. The European Commission is due to review Solvency II by 2021.
Derivatives (November 2017 *Report*)	• Transaction-level trade repository (TR) data have increased the transparency of OTC derivatives markets to authorities, but reforms to transparency have further to go.	• Progress on aggregating TR data across countries has stalled following the G20 commitments to reform derivative markets made in 2009. Significant progress has been made internationally in removing legal barriers to sharing TR data as well as in developing international data standards and related governance arrangements to support the implementation, maintenance and oversight of those standards for TR data. However, no international work is currently under way to decide on how a cross-border data aggregation mechanism should work in practice to provide a global view of derivatives markets. Data quality would also need to be assessed ahead of any aggregation. The FSB may give consideration to the potential development of a global aggregation mechanism in 2020.

Box 2
Developments in exchange-traded funds

An exchange-traded fund (ETF) is a type of investment fund whose shares trade in secondary markets on exchanges. Because most ETFs passively track the performance of an index or portfolio, they are a low-cost way to invest in diversified strategies. ETFs' assets under management have grown sixfold over the past decade, reflecting fund inflows and rising valuations. Inflows to ETFs have continued since November. However, ETFs are only a tenth of the total size of open-ended funds (**Chart A**).

Chart A Global exchange-traded funds are growing fast but remain small compared to open-ended funds

Global assets under management of different types of funds[a]



Sources: Morningstar and European Fund and Asset Management Association.

(a) Open-ended funds are presented including funds of funds but excluding exchange-traded funds.

ETFs contribute to the provision of finance to the economy, and can provide a valuable source of liquidity. Some ETFs may also pose risks, including from:

(i) **procyclical behaviour**. In particular, those ETFs that invest in less liquid assets (eg emerging market assets or corporate bonds) while offering redemptions in cash can give rise to liquidity mismatch, and as a result, ETF investors may be more inclined to sell when asset prices fall, thereby amplifying stress. However, unlike open-ended funds, ETFs can be traded on secondary markets. In stress this means that, although they could trade at a discount to their net asset value, the underlying assets should not be subject to direct fire sale pressure to the same extent.

In addition, a small proportion of ETFs, which use inherently procyclical strategies, such as short positions and leverage, will automatically sell when prices fall, so amplifying stress. However, the total universe of these leveraged ETFs is small, representing 1.4% of total ETF assets under management (**Chart B**).

(ii) **impaired liquidity in the ETF market in a stress**, which would be of particular concern if market participants were reliant on ETFs for liquidity. However, banks and investment firms cannot hold ETFs as part of their regulatory liquidity buffers; and regulatory data indicate that ETF holdings of insurers and corporate bond funds represent on average less than 1% of their assets.[1]

In the June 2011 *Report*, the interim FPC highlighted that '**synthetic ETFs**', which use derivative contracts to replicate the performance of their index, may also contribute to the build-up of systemic risk. If there were concerns about the solvency of the derivative counterparty, this could present the risk of a run on the ETF. However, this risk has now been largely addressed by the 2014 European Securities and Markets Authority's Guidelines requiring sufficient, liquid collateral. And synthetic ETFs have shrunk as a proportion of the ETF market, to below 5%.

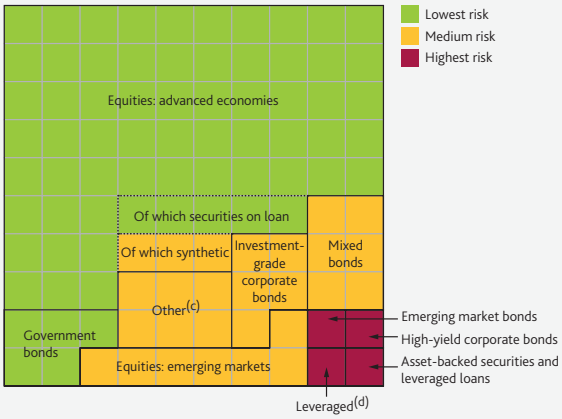
The Bank and FCA are closely engaged in international work on ETFs. IOSCO is currently performing a review of its 2013 Principles for regulation of ETFs.

Overall, ETFs that could pose financial stability risks if they grew further — those with less liquid underlying assets, those that use leverage or other procyclical strategies, and synthetic ETFs — account for only around one third of the ETF market (**Chart B**). And the entire ETF market remains small relative to open-ended funds.

The FPC has therefore judged that the majority of ETFs do not appear to present material financial stability risks, but will keep the risks in this sector under review as part of its regular annual assessment.

Chart B The majority of ETFs do not appear to present material financial stability risks

Indicative representation of the ETF universe[a][b]



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

(a) One square = 1% of ~US$5 trillion global ETF market, data as at June 2019.
(b) All categories except emerging market (EM) equities and EM bonds exclude EM ETFs; and all categories except leveraged ETFs exclude leveraged ETFs.
(c) 'Other' comprises primarily currency and commodity ETFs; exchange-traded money market funds (mainly Chinese); cross-asset class ETFs; preference share ETFs; and convertible bond ETFs. It also includes unlevered volatility-linked and property-linked ETFs (though these are small sectors).
(d) All leveraged ETFs (mainly equity-focused).

(1) These figures are based on 2018 PRA data for insurers and 2016 FCA data for corporate bond funds.

Box 3
Developments in fast markets

The proportion of electronic trading in financial markets has increased substantially over recent decades, particularly in markets with more standardised products. As explained in the November 2017 *Report*, this has allowed for greater transparency around market prices, as well as for more automated, or algorithmic, trading — some of which takes place at very high frequencies. Markets where these trends have progressed furthest — such as spot foreign exchange, equities and some derivatives markets — can be thought of as 'fast markets'.

Internationally, the BIS Markets Committee has led work on understanding fast markets and released a report last year on monitoring them.(1)

Fast markets bring some important benefits to financial market resilience, for example, by placing less reliance on the warehousing of risk by dealers. But fast markets can also pose risks, including due to:

(i) The potential for 'flash episodes'

Flash episodes are large and rapid changes in the price of an asset that do not coincide with — or in some cases substantially overshoot — changes in economic fundamentals, before typically retracing those moves shortly afterwards. Flash episodes continue to occur in fast markets, most notably in spot foreign exchange markets (eg in the spot Japanese yen market on 3 January 2019).(2) **Table 1** details key flash episodes over the past decade.

Flash episodes have not, as yet, had financial stability consequences. But there remains a risk that they become significantly more frequent, or have greater impacts on market participants, particularly in less regulated markets such as spot foreign exchange markets. For example, the occurrence of a flash event could interact with aspects of financial market infrastructure, such as benchmark fixings in spot foreign exchange markets, or a margin call related to equity or derivative markets. The resulting impact on the recorded values of a range of assets could risk mechanically prompting further sales and price falls. The impact may be larger if a flash episode were to amplify price moves following an unexpected change in fundamentals, as highlighted by the turbulence following the Swiss franc episode in January 2015.(3) Such scenarios could directly impact businesses which rely on stable foreign exchange markets.

Table 1 Key flash episodes over the past decade

Year	Asset class	Markets	Price move	Duration (minutes)(a)
2010	Equities	S&P 500	-6%	5
2011	FX	USD/JPY	-4%	4
2014	Bonds	US Treasuries	+37bps	5
2015	FX	EUR/CHF	-41%	20
2015	FX	NZD/JPY	-10%	10
2015	FX	USD/EUR	-2%	4
2016	FX	ZAR/USD	-9%	15
2016	FX	GBP/USD	-9%	1
2017	Bond futures	French OAT	-11bps	1
2018	FX	ZAR/USD	-9%	1
2019	FX	USD/JPY	-4%	4

Sources: Bank for International Settlements, Bank Underground, Bloomberg Finance L.P., Cielinska, O, Joseph, A, Shreyas, U, Tanner, J and Vasios, M (2017), 'Gauging market dynamics using trade repository data: the case of the Swiss franc de-pegging', *Bank of England Financial Stability Paper No. 41*, *Financial Times*, International Monetary Fund, MarketFactory, Inc., Nanex, Reserve Bank of Australia, Securities and Exchange Commission and Bank calculations.

(a) Duration of flash episode defined as the approximate time span in which the price moves from the prevailing price to a new low (or high) price.

(ii) Risks to firms using automated and algorithmic trading

Algorithmic trading at large financial firms introduces new complexities that require appropriate risk management. It may also give rise to large intraday positions, which are not typically reflected in prudential capital frameworks.

The FPC supports the PRA's 2018 supervisory statement and the FCA's compliance report on algorithmic trading. These publications help improve the resilience of firms to risks from algorithmic trading by outlining supervisory expectations, in particular on risk management and governance of algorithms.

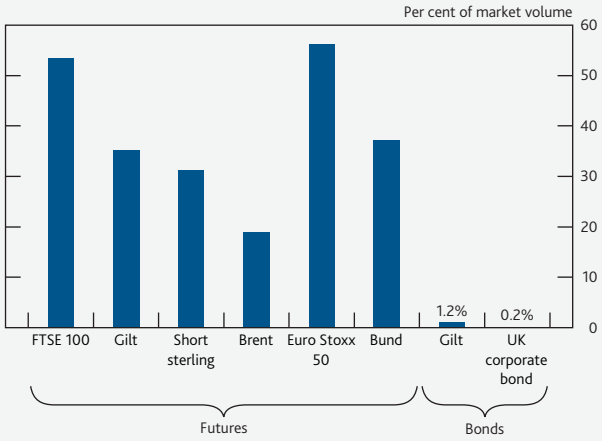
(iii) A concentration in critical 'nodes' of the provision of market access for short-term liquidity providers

Principal trading firms (PTFs) are becoming increasingly prevalent participants in fast markets. PTFs are a diverse set of smaller, non-bank firms that typically deploy automated trading strategies on electronic trading venues, often at much faster speeds than other market participants. PTFs have become substantial short-term liquidity providers in fast markets, though are not the only participants to do so. For example, they account for around 53% of gross trading volume in the FTSE 100 index futures market, and around 35%

(1) See 'Monitoring of fast-paced electronic markets', BIS, September 2018.
(2) On 3 January 2019, around the opening of the Asian trading session, the Japanese yen appreciated around 4% against the US dollar over a few minutes. This 'flash' event quickly cascaded across a number of other markets, including the Australian dollar. Prices and market liquidity then recovered within a few minutes. For more details on this event, see 'The recent Japanese yen flash event' in the *Reserve Bank of Australia Statement on Monetary Policy*, February 2019.
(3) On 15 January 2015, the Swiss National Bank abandoned its exchange rate floor against the euro, resulting in a 30% appreciation of the Swiss franc against the euro in 20 minutes. For a discussion of the 'Swiss franc' episode, see the December 2015 *Report* and Breedon, F, Chen, L, Ranaldo, A and Vause, N (2018), 'Judgement Day: algorithmic trading around the Swiss franc cap removal', *Bank of England Staff Working Paper No. 711*.

Chart A Principal trading firms account for a significant proportion of trading volumes in some markets

Principal trading firms' share of market volume in different markets[a][b]



Sources: Trade Repositories — DTCC Derivatives Repository Ltd., ICE Trade Vault Europe Ltd., Regis-TR S.A., and UnaVista Limited Trade Repositories; Bloomberg Finance L.P., FCA transaction (MiFID II) data and Bank calculations.

(a) Average share of total market volume for October and November 2018.
(b) Long gilt futures shown for the period 1 October 2018 to 23 November 2018 to avoid the futures contract roll.

in the long gilt futures market.[4][5] But they are much less active in cash gilt and sterling UK corporate bond markets, where they only account for around 1% and 0.2% of gross trading volumes respectively (**Chart A**).[6]

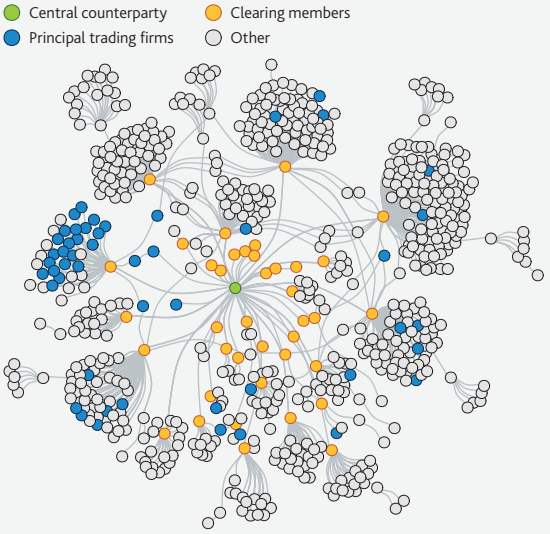
Most PTFs are reliant on the banking sector to provide services such as clearing and financing. Such business involves substantial, and increasing, fixed costs, serving as a barrier to entry. Supervisory and market intelligence, as well as Trade Repository derivatives data suggest that servicing of PTF activity is concentrated in a small set of banks. This has led to a concentration of 'nodes' of clearing services. For example, **Chart B** shows the concentration of clearing provision to PTFs in the FTSE 100 futures clearing network.

This concentration increases the risk of short-term disruption to market liquidity in the event of failure or paralysis (eg from operational disruption) of one of these nodes.

However, the concentration of clearing relationships does not currently appear to pose a significant risk to UK financial stability. PTF trading volume is less concentrated in critical nodes across several markets — some of the larger PTFs use different clearers or are themselves clearing members. Other market participants, such as dealers and asset managers, could continue to trade and provide short-term liquidity. Moreover, most PTFs have secondary clearing arrangements that reduce the time it takes to switch clearing services to another clearer, limiting the likely duration of any disruption.[7] In such an event, markets that are less reliant on PTFs to match buyers and sellers, including the UK corporate bond and gilt markets, would also largely be unaffected.

Chart B Many principal trading firms are reliant on the banking sector

FTSE 100 futures clearing network[a][b]



Sources: DTCC Derivatives Repository Ltd., ICE Trade Vault Europe Ltd., Regis-TR S.A., UnaVista Limited Trade Repositories and Bank calculations.

(a) Shown unscaled for 20 November 2018. Each node represents a single legal entity and the links between them represent clearing relationships between entities.
(b) Where PTFs are also members of the clearing house, they have been shown as PTFs.

The FPC will continue to monitor 'fast markets' closely, in particular the risks posed by flash episodes becoming more frequent and of market dysfunction being longer-lasting in any future episode.

(4) Based on average share of total market volume for Trade Repository derivatives data covering October and November 2018 for FTSE 100 index futures, and 1 October 2018 to 23 November 2018 for long gilt futures market.
(5) For more details on the role of PTFs in futures markets, see Fett, N and Haynes, R (2017), 'The futures trading landscape'.
(6) Based on average share of total market volume for FCA transaction (MiFID II) data covering October and November 2018.
(7) Based on FCA supervisory intelligence.

Developments in financial market infrastructure

Banks and other financial institutions rely upon financial market infrastructure to ensure the provision of financial services. For example, payment and settlement systems provide the main mechanism for paying for goods, services and financial assets. And central counterparties (CCPs) sit between the buyers and sellers of financial contracts, providing assurance that the obligations of those contracts will be fulfilled. It is therefore vital that financial market infrastructure providers (FMIs) maintain the highest standards of resilience and that the regulatory authorities have appropriate tools to identify and mitigate potential risks to the critical services provided by FMIs.

The payments industry is currently a focal point for innovation, with new ways of paying for goods and services emerging, both for online payments and at point of sale. Increased demand for digital payments has encouraged new and established technology companies to enter the payments industry. These changes offer opportunities, including wider access to financial services, lower costs and greater competition.

Consistent with its mandate, the FPC will aim to ensure that systemically important payment systems support financial stability, while also allowing competition and innovation in payments to thrive.

Payment systems supervised by the Bank are upgrading or replacing the IT infrastructure used to process and settle payments. This aims to strengthen their operational resilience and improve their ability to adapt to developments in the payments industry. The transition to new infrastructure offers benefits, including exploiting new technology that is easier to update in response to evolving risks, such as potential cyber-attacks. The transition also involves operational risks, which requires careful management.

Post-crisis reforms have encouraged central clearing, which has significant benefits for efficiency and financial stability. For example, multilateral netting of derivative exposures by CCPs reduces the aggregate amount of counterparty credit risk in the derivatives network. However, the increased systemic importance of CCPs that provide these benefits internationally necessitates effective cross-border co-operation between supervisory authorities.

FMIs' governance arrangements and risk culture should reflect fully the vital services they provide to the financial system and the economy. Thus, the FPC notes that there is a strong case for extending the Senior Managers and Certification Regime to FMIs. This would help the Bank to ensure that individuals in key positions of influence within FMIs have suitable skills, experience and understanding of the systemic importance of FMIs.

Robust financial market infrastructure is essential for the provision of financial services.

Banks and other financial institutions rely upon financial market infrastructure providers (FMIs) to ensure the provision of financial services. FMIs are hubs through which networks of businesses and individuals transact with each other every day. For example:

- **payment systems** allow funds to be transferred between businesses and individuals and they are used for many day-to-day transactions, such as withdrawing cash from a cash machine, using cards in stores, receiving salary payments or making online payments;

- **central securities depositories** keep records of ownership of individual securities, such as a share in a publicly listed company. They also facilitate the transfer of ownership of these securities in a safe and efficient manner; and

- **central counterparties** (CCPs) sit between the buyers and sellers of financial contracts, providing assurance that the obligations of those contracts will be fulfilled. When a buyer and seller agree that a financial contract will be centrally cleared, the CCP sits between them. Instead of holding the contract with each other, the buyer and seller each hold their side of the contract with the CCP instead. Collateral is placed with the CCP in case either party fails to meet their side of the contract so that the CCP can use that collateral to make good on the contract. Thus, CCPs help financial markets to channel savings into investment and disperse risk more effectively.

Disruption at an FMI has the potential to impair the consistent supply of financial services to households and businesses. The impact may be direct, for example an operational problem at a payment system; or indirect, for example if a CCP allocates losses resulting from a member default to other members in a way that weakens their own resilience.

Financial firms also increasingly rely upon third-party providers of services such as shared virtual data storage and processing capabilities ('cloud' technology).

Payments are a focal point of innovation.

Payments are currently a focal point for innovation, with new ways of paying for goods and services emerging, both for online payments and at point of sale. The recent van Steenis review on the Future of Finance describes the declining role of cash and the parallel growth of mobile payments for everyday purchases (see Box 4). Most consumer payments today are routed through card networks such as Visa; UK Finance data show that the volume of debit card transactions overtook cash payments for the first time in 2017. One in six people now use digital wallets, enabling seamless payments with smartphones and in online marketplaces. Contactless payments are replacing cash for small transactions; they now represent one in five payments in the UK.

Much innovation has been focused on ways to initiate payments, offering new ways to instruct a payment to be made, but using existing infrastructure (such as the card network) to transfer the money. These services include non-bank payment services providers (NBPSPs), such as authorised payment and e-money institutions. There are over 1,000 of these types of firms authorised by the FCA in the UK. Innovation in payment initiation may be further enabled by the Open Banking initiative. There is also significant interest in the potential for development of 'direct to account' payment services. These would enable instant 'peer-to-peer' payments and at point of sale, transfer of funds directly to the retailer's account. This could enable choice and may offer more competitive pricing. Similar schemes such as 'Swish' in Sweden, and 'iDeal' in the Netherlands have been successful in building scale and offer an alternative to the use of debit and credit cards.

Additionally, innovators are seeking to create new infrastructure to make payments, sometimes seeking to combine them with initiation services such as mobile wallets. 'Stablecoins' are an area of significant attention at present. These 'coins' or 'tokens' seek to offer a digital payment instrument which retains a reliable value through a variety of techniques, including establishing financial reserves to back the obligations. This is in contrast to some 'crypto-assets' such as Bitcoin, which display very high volatility. There are over 50 stablecoins on the market, and many are yet to prove that they are in fact, 'stable'.

Increased demand for digital payments has encouraged technology companies to enter the payments industry.

Increased demand for digital payments has encouraged new and established technology companies to enter the payments industry.

New entrants have, in the main, sought to earn revenue by 'unbundling' the transaction chain in a manner that reduces costs to merchants. Some online retailers and social media companies have also integrated payment mechanisms into their platforms. And a group of technology, e-commerce, payments and venture capital companies recently announced their intention to develop a new payments infrastructure based on an international 'stablecoin', known as Libra, which could be exchanged between users on messaging platforms and with participating retailers.

The FPC aims to allow competition and innovation in payments to thrive…

These innovations have the potential to reduce the cost and increase the speed of making and receiving payments, especially across borders. They may also enhance financial

inclusion by widening access to financial services. And they can support financial stability by offering greater diversity of payment methods and underlying infrastructure.

To support private innovation and to empower competition, the Bank has extended access to its real-time gross settlement system (RTGS), which processes over £650 billion of payments every day on average. Since 2017, certain NBPSPs have been able to settle payments in RTGS without needing to rely on a bank for access. Six NBPSPs currently hold accounts in RTGS, with several more in the pipeline. The Bank has, and will continue to, collaborate with other central banks to explore ways in which payment systems can interact and potentially be synchronised to reduce frictions in cross-border payments.

As set out in the Bank's response to the van Steenis review, the Bank will continue to foster innovation and competition in payments. In particular, the FPC welcomes the Bank's announcement that it will fully engage in HM Treasury's review of the payments landscape to support choice, competition and resilience and to ensure that regulation and infrastructure keeps pace with innovation. The FPC also supports the planned consultation on the appropriate level of access to the Bank's payments infrastructure and balance sheet, including necessary safeguards.

…while ensuring that payments systems support financial stability.

The FPC aims to ensure innovation in the payments industry does not compromise its resilience — to ensure critical payment services are available to UK households and businesses in bad times as well as good.

New ways of initiating a payment and managing personal finances have made the payment chain more complex, with potentially multiple actors and interactions. Some of these businesses are unregulated, while others are regulated by one or more authorities across the Bank, PRA, FCA and the Payment Systems Regulator. It has become increasingly difficult, within the current framework, for any one of these authorities to assess risks across the overall payments network. Where innovators are seeking to develop new payment methods and infrastructures, the Bank will be vigilant to the potential impacts on the stability of the financial system.

To keep ahead of new risks, the FPC will continue using its annual review of financial stability risks and regulation beyond the core banking sector to evaluate changes in the shape of the financial system, including from the emergence of new payment providers and infrastructure. The FPC will take this into account in its reviews of the regulatory perimeter (the boundary between regulated and non-regulated activities in the UK financial system).

The FPC will monitor, assess and, if necessary, make Recommendations on the overall financial stability implications of developments in payments.

Consistent with its mandate, the FPC will aim to ensure that systemically important payment systems support financial stability, while allowing competition and innovation in payments to thrive. To do this, the FPC will:

1. Assess developments in the scope and nature of regulation for payments and other innovative financial services to ensure the approach reflects their systemic importance.

2. Assess risks to the financial system associated with the use of tokens and other assets used to facilitate new payment options and appropriate safeguards for their use to maintain financial stability and the supply of finance to the economy. This includes how the potential for widespread adoption of new payments methods and innovative financial services might affect the supply of credit to the wider economy and the dynamics of bank funding in stress.

3. Review the Bank's proposals on the appropriate level of access to its payments infrastructure and balance sheet in order to ensure that access supports fully the stability and resilience of the system while also allowing innovation in payments.

Payment systems supervised by the Bank are upgrading or replacing the IT infrastructure, aiming to improve resilience and agility.

Payment systems already supervised by the Bank are taking steps to replace or upgrade the IT infrastructure used to process and settle payments. This includes the Bank's development of a new RTGS infrastructure as well as Pay.UK's New Payments Architecture (NPA) for retail payments. The NPA will in due course replace the infrastructure underpinning the current Bacs and Faster Payment services, and aims also to facilitate competition and innovation in services that would operate across these payment rails.

Both programmes aim to strengthen operational resilience as well as allow wholesale and retail payment systems to adapt more flexibly to developments in the wider payments industry. This includes exploiting new technology that is easier to update in response to evolving risks, such as potential cyber-attacks.

Payment systems and their users need robust plans to manage the associated transition risks.

While the new RTGS and NPA infrastructure will not be delivered for a number of years, it is important that the affected payment systems and their users develop — at an early stage — robust plans for mitigating the inherent transition risks. This should include careful choreography of

respective launch dates and other key milestones. The Bank will review these plans closely.

The FPC's pilot cyber stress test will focus on the financial system's ability to restore payment services.

Financial services firms and FMIs need to be resilient to a threat of cyber-attacks in order to ensure the stable provision of financial services. In June 2018, the FPC agreed it would set 'impact tolerances' for how quickly critical financial firms must be able to restore vital financial services following a severe but plausible cyber-incident. The Bank will use regular cyber stress tests to test firms' ability to meet these 'impact tolerances' in these scenarios.

In February, the FPC agreed that the exploratory pilot exercise in 2019 will focus on a hypothetical stress scenario that assumed firms' systems supporting their payments were unavailable and there was uncertainty about whether and how the issue could be resolved. The FPC expects the financial system to restore critical payments in this scenario by the end of the value date.

Although the FPC recognises that firms will not be able to meet its 'impact tolerance' in the most extreme circumstances, the pilot exercise will still allow the FPC to explore the financial stability implications of longer disruptions to payment services. It will also provide valuable information for finalising the impact tolerances to be used in future cyber stress tests that follow the pilot.

The Bank is engaging with firms to arrange appropriate and proportionate coverage of the pilot exercise ahead of its launch in the summer. The FPC will publish thematic insights yielded by the pilot exercise, but will not disclose the precise details of the test or of the results from this exercise.

Work is under way to realise fully the financial stability benefits of direct delivery of CHAPS.

The main UK retail payment systems use the RTGS service to settle obligations between their direct participants. This infrastructure also underpins CHAPS, the UK's system for high-value payments (eg money market transactions and house purchases) as well as cash settlement of CREST securities transactions. And CHAPS also settles time-critical payments to and from certain FMIs, such as CCPs.

Since November 2017, the Bank has been responsible for operating the CHAPS system and the RTGS infrastructure.(1) The Bank, in its role as FMI supervisor, has continued to supervise CHAPS to the same high standard as other systemically important payments systems in the UK. The Bank, as CHAPS operator, has strengthened the governance arrangements that support operation of CHAPS and established a risk management framework for the system that draws on expertise from across the Bank. The Bank has also increased its engagement with PRA supervisors to encourage improved risk management by the direct participants in CHAPS. This is part of a wider programme of work to strengthen the Bank's capability to manage risk on an end-to-end basis and realise fully the benefits of direct delivery of CHAPS.

Post-crisis reforms have encouraged central clearing, which has significant benefits for financial stability…

Promoting greater central clearing in OTC derivatives markets has been a key aspect of post-crisis reforms, in order to make the network more resilient under stress. Multilateral netting of derivative exposures by CCPs reduces the aggregate amount of counterparty credit risk in the derivatives network. This is particularly the case where trades are cleared through a single CCP rather than fragmented across multiple CCPs. Reduced aggregate risk results in lower collateral requirements, so there are strong economic incentives for clearing to concentrate in a small number of global CCPs, often with members located in multiple jurisdictions. A diverse membership base also strengthens CCP resilience through better diversification of risk.

…and requires effective cross-border co-operation between supervisory authorities.

The FPC highlighted the increased systemic importance of CCPs as part of its in-depth assessment of the financial stability risks from derivatives markets in 2017. Post-crisis reforms have made the financial system more dependent on CCPs in order to reduce systemic risk. And reforms have also made the CCPs themselves more resilient. This work has continued. In particular, the Financial Stability Board is working on providing additional guidance on the resolution of CCPs (see Resilience of market-based finance chapter).

A number of CCPs provide their services, and deliver the associated benefits to efficiency and financial stability, across multiple markets and currencies. As a result, their activities are important to the objectives and mandates of authorities in a range of countries. Some of the largest of these internationally active CCPs are located in the UK and, by virtue of their cross-border activity, are licenced by supervisory authorities outside the UK as well as being supervised by the Bank. Recognising this, the Bank takes an international perspective to its supervision of UK FMIs, including CCPs.(2) The Bank chairs supervisory colleges that allow authorities from other jurisdictions to obtain information on and contribute towards the Bank's supervision of UK CCPs in an efficient and co-ordinated manner. These arrangements are in line with international standards for supervisory co-operation on FMIs.

(1) Prior to November 2017, a private company had operated CHAPS using the RTGS infrastructure provided by the Bank — a structure that was unusual internationally and hindered certain aspects of risk management. The rationale for the shift to 'direct delivery' is outlined more fully in the June 2017 *Financial Stability Report*.

(2) See 'The Bank of England's supervision of financial market infrastructures — Annual Report (For the period 21 February 2018 — 14 February 2019)'.

Effective supervisory co-operation is necessary to ensure that internationally active CCPs are subject to clear, certain and co-ordinated regulatory requirements and actions that, for example, do not conflict or overlap. This is particularly important in a crisis management scenario.

These issues are particularly significant for UK CCPs as the UK leaves the EU.
As discussed in previous *Reports*, uncertainty about UK CCPs' regulatory status in the EU after Brexit has been a significant source of financial stability risk.

Steps taken by the European Commission and the European Securities and Markets Authority (ESMA) since the November 2018 *Report* have removed the immediate risk that UK CCPs would not be able to continue clearing for EU counterparties in the event that the UK were to leave the EU without a deal. These steps allow for temporary recognition of UK CCPs after EU law ceases to apply in the UK and until March 2020. They address one of the most important financial stability risks associated with the UK's withdrawal from the EU (see The resilience of the UK financial system to Brexit chapter). However, further action, such as extending temporary recognition, will be necessary if arrangements for permanent recognition are not ready by March 2020.

Going forward, permanent recognition is expected to be granted under new EU legislation. Elements of the legislation yet to be agreed create a new source of uncertainty for UK CCPs, which will need to be resolved prior to them being granted permanent recognition.

Governance arrangements of financial market infrastructure providers should promote responsible decisions.
Because disruption at an FMI has the potential to impair the consistent supply of financial services to households and businesses, it is vital that FMIs maintain the highest standards of resilience. To that end, FMIs' governance arrangements and risk culture should reflect fully the vital services they provide to the financial system and the economy. In particular, FMIs should not place commercial interests ahead of prudent risk management. This is especially the case where FMIs operate on a for-profit basis.

Thus, governance reviews are an important part of the Bank's supervisory approach to FMIs. These reviews examine, among other things, the effectiveness of FMIs' Boards of Directors as well as the independence of key control functions and arrangements for taking account of the interests of members and other users.

The FPC notes also that there is a strong case for extending the Senior Managers and Certification Regime, which currently applies to banks, insurers and some other financial firms, to FMIs. This would help the Bank to ensure that individuals in key influence positions within FMIs have suitable skills, experience and understanding of the systemic importance of FMIs.

Financial firms' use of third-party cloud service provision can improve their resilience…
Financial firms increasingly rely upon third-party providers of services such as shared virtual data storage and processing capabilities ('cloud' technology) in order to provide financial services. This is an example of third-party service provision outside the financial regulatory perimeter. As noted in the van Steenis review on the Future of Finance the adoption of cloud technologies by financial services firms can speed up innovation, enable use of the best analytical tools, increase competition and build operational resilience.

…but involves risks that need to be managed.
However, there are risks associated with third-party provision of such services, which financial firms need to manage. For example, the market is at present highly concentrated among a few cloud service providers, therefore disruption at one provider — for example due to a cyber-attack or operational outage — could interfere with the provision of vital services by several firms.

As firms' usage of third-party cloud service provision is evolving, regulators are updating their guidance. The European Banking Authority issued Guidelines on outsourcing in February 2019. These replace and expand on the Recommendations for outsourcing to the cloud service providers that had applied from July 2018. The PRA will publish a supervisory statement for consultation before the end of 2019, describing its modernised policy framework on outsourcing arrangements. As set out in the Bank's response to the van Steenis review, this will include a focus on cloud technology and set out conditions that can help give firms assurance on its use. And the FPC will review the provision of cloud services to the financial sector in the second half of 2019.

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. There is no justification for firms continuing to increase their exposures to Libor. The pace of market participants' transition efforts now needs to accelerate and the FPC will monitor progress closely. Box 5 updates the FPC's assessment in light of recent developments.

Box 4
The van Steenis review on the Future of Finance and the Bank's response

In 2018, the Governor of the Bank of England appointed Huw van Steenis to lead a review on the Future of Finance and help identify how the Bank might evolve to support it.

The van Steenis review on the Future of Finance

The van Steenis review was published on 20 June 2019. It considered the major trends shaping the future of finance and made a list of recommendations for the Bank and others to consider. These were wide-ranging and covered nine areas:

1. Shape tomorrow's payment system.
2. Enable innovation through modern financial infrastructure.
3. Support the data economy through standards and protocols.
4. Champion global standards for finance.
5. Promote the smooth transition to a low-carbon economy.
6. Adapt to the needs of a changing demographic.
7. Safeguard the financial system from evolving risks.
8. Enhance protection against cyber-risks.
9. Embrace digital regulation.

The Bank's response

The Bank's response to the van Steenis review was also published on 20 June 2019. It focused on areas where the Bank could have greatest impact on the UK economy and financial system. The FPC welcomes the review and the Bank's response. The areas of greatest relevance to the FPC are summarised below.

Evolving risks

The Bank will make a strategic pivot in its approach to horizon scanning and monitoring the regulatory perimeter as we move away from the post-crisis era, to focus more on financial innovation and evolutions in the financial system. Across the Bank, continued close monitoring of developments and analysis of such innovations will take into account new opportunities and benefits to the financial system as well as the possibility of new risks.

Payments are currently a focal point for innovation, with new ways of paying for goods and services emerging, both for online payments and at point of sale. Consistent with its mandate, the FPC will aim to ensure that systemically important payment systems support financial stability, while allowing competition and innovation in payments to thrive (see Developments in financial market infrastructure chapter).

Cyber-risk

Recognising that, through the FPC, the UK has a world-leading cyber-penetration testing regime, the next step is to consider how firms recover from a cyber-incident. The FPC will conduct a pilot cyber stress test in 2019, which will explore a hypothetical stress scenario that assumes the systems supporting payments services are unavailable (see Developments in financial market infrastructure chapter).

Cloud adoption in the financial system

Building on its contribution to the European Banking Authority's guidelines on outsourcing, the Bank will publish a supervisory statement for consultation before the end of 2019, describing the Prudential Regulation Authority's modernised policy framework on outsourcing arrangements, including a focus on cloud technology, and setting out conditions that can help give firms assurance on its use. And it will continue to work with firms to manage the risks associated with cloud outsourcing, including concentration risk and lack of substitutability; and to understand any tipping points for systemic risks from wider adoption. The FPC will review the provision of cloud services to the financial sector in 2019 H2 (see Developments in financial market infrastructure chapter).

Climate-related risks

The Bank will conduct a climate stress test for selected financial institutions in 2021, to help mainstream climate risk management. It will publish a discussion paper in the autumn of 2019 to facilitate scenario design (see The 2019 and 2021 biennial exploratory scenarios chapter). The Bank will continue to encourage UK financial institutions and companies to provide better information on climate-related risks and opportunities, consistent with the recommendations by the Task Force for Climate-related Financial Disclosures. The Bank expects that by 2022 all listed companies and large asset owners will be disclosing this information.

SME finance

Building on the principles of Open Banking, the Bank will help small businesses harness the power of their data by developing the concept of a portable credit file, to give greater access to more diverse and competitive financing options, including for global trade. It will respond to the Government's Smart Data Review with recommendations for how data standards and technology can promote an open platform for finance and deliver greater choice and keener pricing for businesses and individuals. And it will champion the Legal Entity Identifier (LEI) as a globally recognised and unique identifier for all businesses in the UK, including integrating the LEI in the Bank's new Real-Time Gross Settlement service and mandating its use in payment messages.

Box 5
Progress on the transition away from Libor

In June 2018, the FPC agreed it would continue to monitor progress on the risks associated with financial markets' ongoing reliance on Libor, one of the predominant interest reference rate benchmarks used in financial markets.

These risks are driven by: the lack of clarity on the legal position of Libor referencing contracts should it become unavailable; the scale of contracts in which Libor is still used as a reference rate; and the fact that Libor is not only embedded in firms' assets and liabilities, but is also widely used in risk management and valuation infrastructure.

These risks will only be reduced through a transition to alternative rates by end-2021, when Libor is expected to be discontinued. While there has been positive progress in establishing alternative risk-free rates (RFRs), many new contracts still reference Libor.

There is no justification for firms continuing to increase their exposures to Libor. The pace of market participants' transition efforts now needs to accelerate and the FPC will monitor progress closely.

Securing an orderly transition

The diagram below summarises the main steps required from market participants and the authorities to deliver an orderly transition:

Step 1	Stabilise existing rates to secure the transition period
Step 2	Establish the foundations for new markets in risk-free rates
Step 3	Build liquidity in new markets and stem the flow of new issuance on unstable rates
Step 4	Conversion of pre-existing contracts where possible
Step 5	Agreement and implementation of market-wide fallbacks

Libor has been temporarily stabilised through the FCA's voluntary agreement with the panel of banks that have agreed to continue to submit the information that Libor is based on until the end of 2021. However, the fundamental vulnerabilities in Libor remain and firms must prepare for its discontinuation before this agreement ends.

National working groups have established the foundations for new markets in alternative rates, having selected preferred RFRs across all five Libor currencies.(1) By October 2019 all of these rates will be in full live production.

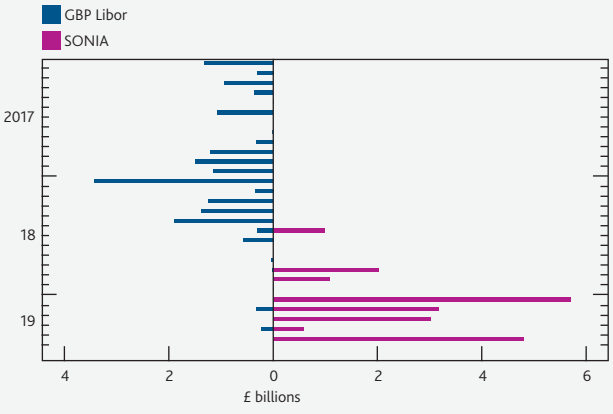
Progress on building liquidity in new markets and stemming the flow of new issuance is mixed across currencies and products. Important steps towards building liquidity in RFRs are being taken. But the pace of transition is not yet fast enough and there is further to go to deliver an orderly transition across global markets.

In sterling, products linked to the preferred RFR, SONIA, have now been established in all key segments across cash and derivative markets, providing the necessary building blocks for a decisive shift away from Libor. Progress includes:

- The proportion of cleared sterling swaps referencing SONIA reached over 45% during the first half of 2019.(2) Traded notional in cleared sterling SONIA swaps for the first five months of this year totalled nearly £20 trillion.
- Over £18 billion of SONIA-linked floating-rate notes (FRNs) have been issued to date in 2019 with maturities beyond 2021, compared to £4 billion over the whole of 2018. Libor-linked sterling FRN issuance beyond 2021 has now all but ceased (**Chart A**).

Chart A Libor-linked sterling floating-rate note issuance beyond 2021 has now all but ceased

Benchmark interest rates for floating-rate note issuance with maturities beyond 2021



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

(1) Libor is produced for five currencies CHF, EUR, GBP, JPY and USD.
(2) Source: LCH data, six-month average by notional.

- £7.6 billion of publicly distributed SONIA-linked asset-backed securitisation deals were completed in the first half of 2019 and at least one UK bank has announced it has completed a SONIA-linked loan.
- Liquidity and open interest in SONIA futures are growing steadily; five SONIA futures contracts are now traded, with monthly volumes approximately doubling since October 2018.
- On 15 May 2019 the Working Group on Sterling Risk-Free Reference Rates published a statement on the adoption of SONIA and three benchmark administrators have confirmed that they are working to develop a forward-looking term SONIA reference rate.(3)

Financial institutions that operate in the UK are exposed to risk not just from GBP Libor but also from contracts linked to other Libor currencies. For example, UK banks have significant exposure to USD Libor-linked contracts that have similar vulnerabilities, and pose the same risks, as those linked to GBP Libor.

- In 2017 the secured overnight financing rate (SOFR) was chosen by the Alternative Reference Rate Committee (ARRC)(4) as its preferred RFR. Liquidity in SOFR has continued to build, with around US$7 trillion of notional issuance across cash and derivative products since its launch in April 2018, but remains a small percentage of the overall USD market.(5)
- There were around 80 SOFR-linked cash securities issuances in 2019 Q1 accounting for 24% of all USD FRN proceeds across corporates, government entities and financial institutions.(6)

International co-ordination is central to driving transition forward. In June, the Financial Stability Board's Official Sector Steering Group published a user's guide to overnight RFRs, setting out how these can be used in cash market products, which have hitherto tended to use forward-looking term rates.

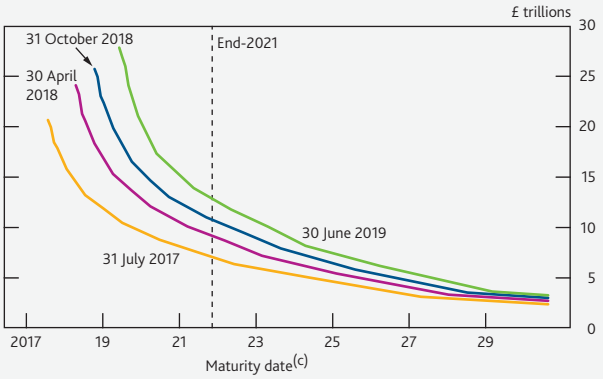
Despite the progress in establishing RFR-linked products and in building liquidity in these new markets, many new contracts maturing beyond 2021 continue to reference Libor. In loan markets, Libor-linked lending remains normal practice and many new long-dated derivative contracts continue to reference Libor. For example, the stock of cleared sterling Libor swap contracts maturing beyond 2021 continues to grow (**Chart B**).

It is not in firms' own interest to have a large stock of legacy contracts that will become subject to significant legal uncertainty beyond 2021.

There are significant advantages to renegotiating legacy contracts, under mutually agreed terms, to refer to alternative reference rates.

Chart B The stock of cleared derivatives contracts referencing GBP Libor beyond end-2021 continues to grow

Roll-off of outstanding notional for cleared GBP Libor derivatives(a)(b)



Source: Bank estimates based on LCH data provided to the FCA.

(a) Includes gross notional outstanding of all interest rate derivatives with a GBP Libor-linked floating leg, cleared at LCH Ltd excluding inflation swaps.
(b) 31 July 2017, 30 April 2018, 31 October 2018 and 30 June 2019 refer to observation dates for roll-off profile. The chart presumes no new trades are transacted after the observation dates.
(c) Maturity date calculated based on residual maturity of trades at dates specified in (b). Previously published data subject to minor revisions due to methodology improvements since the November 2018 *Financial Stability Report*.

In June 2019, a GBP bond issuer became the first to switch an existing Libor-linked bond to reference compounded SONIA. A number of firms have also moved to SONIA from GBP Libor as the reference rate for their corporate treasury functions. These actions by individual market participants need to become much more widely adopted and replicated across the market.

Where possible, firms will want to convert contracts ahead of Libor becoming unavailable. However, there may be cases where this is not possible. In these cases adopting contractual fallback provisions that contracts will revert to in the case that Libor becomes unavailable or is deemed 'unrepresentative' will be an important step to reduce the risks that firms are exposed to.

In December 2018 the International Swaps and Derivatives Association (ISDA) announced the results of its initial market consultation on the design of fallback mechanisms for derivatives using GBP Libor and certain other benchmarks.(7) There are a number of other ISDA consultations planned during 2019, some of which are already under way, to finalise plans for these fallbacks across most major currencies.(8) This is an important step, but to be effective market participants will need to work with ISDA to finalise the proposed documentation and adopt it once available. Similar approaches will be required across other asset classes.

(3) See 'Statement on behalf of the Working Group on Sterling Risk-Free Reference Rates Progress on adoption of risk-free rates in sterling markets'.
(4) The ARRC is a group of private market participants working to transition from USD Libor to its recommended alternative SOFR.
(5) SOFR: A year in review.
(6) Source: Refinitiv.
(7) See ISDA Publishes Final Results of Benchmark Fallbacks Consultation.
(8) See ISDA Publishes Two Consultations on Benchmark Fallbacks.

PRA and FCA supervisory expectations

In order to seek assurance that regulated firms understand the risks associated with transition, the FCA and PRA wrote to CEOs of major banks and insurers supervised in the UK in September 2018, asking for details of the preparations and actions they are taking. Supervisors have now responded to the individual firms involved, and a set of thematic observations from this work has been published, describing areas of good practice for all firms to consider.(9)

Firms' responses highlighted much of the good work under way but also demonstrated a substantial degree of variability in the extent of readiness for dealing with transition and the associated risks. PRA and FCA supervisors will be working closely with firms to ensure that the best practices identified are widely adopted.

The FPC welcomes the fact that the PRA and the FCA have indicated that firms should plan based on the likely cessation of Libor at end-2021. The smoothest transition will be one where market participants minimise the extent of remaining Libor exposure at end-2021 by: ceasing new issuance of Libor-linked contracts; identifying all existing contracts without appropriate fallback clauses and rectifying this to the greatest extent possible; and, actively reducing legacy exposures by negotiating their transition to new rates.

Well-managed firms are expected to lead the transition. All of the firms that responded to the *Dear CEO* letter have now appointed a Senior Manager accountable for overseeing the transition. PRA and FCA supervisors will follow progress on transition efforts with each of these accountable Senior Managers to ensure individual firms are on track to mitigate their risks ahead of 2021.

(9) See Bank of England, 'Firms' preparations for transition from London InterBank Offered Rate (LIBOR) to risk-free rates (RFRs): Key themes, good practice, and next steps'.

The 2019 and 2021 biennial exploratory scenarios

The Bank of England uses exploratory scenarios to complement its annual cyclical stress tests by exploring a range of risks that may not be neatly linked to prevailing economic or financial conditions. The Bank aims to run these exercises every other year. These exercises inform assessments of how the financial system might respond if risks were to crystallise. In doing so, they can help the Bank and financial institutions to prepare for possible future challenges.

In 2019, the Bank will conduct a biennial exploratory exercise to explore the implications of a severe and broad-based liquidity stress affecting major UK banks simultaneously. This exercise will not set new liquidity standards for banks. Banks hold regulatory liquidity buffers that the FPC expects to be used in a stress bringing liquidity coverage ratios below 100%. The exercise will explore how the reactions of banks and authorities to the stress would shape its impact on the broader financial system and the UK economy. The Bank intends to publish the results of the exploratory exercise in mid-2020.

In the 2021 biennial exploratory scenario, the Bank will explore the UK financial system's resilience to the physical and transition risks of climate change. This exercise will fully integrate climate scenarios with macroeconomic and financial system models. It will motivate firms to address data gaps and to develop cutting-edge risk management consistent with a range of possible climate pathways. The Bank will publish a discussion paper in the autumn on issues such as the coverage of the test, the nature of scenarios considered, the appropriate time horizon and disclosure of results. This will allow the Bank to develop the scenarios in consultation with risk specialists from across the financial sector, climate scientists, other industry experts and other informed stakeholder groups.

The biennial exploratory scenario is a flexible tool used to explore a range of risks that may not be neatly linked to prevailing economic or financial conditions.

The Bank runs regular stress tests to help assess the resilience of the UK financial system and individual institutions to shocks. There are two types of exercise within the Bank's concurrent stress-testing framework: the annual cyclical scenario (ACS), and the biennial exploratory scenario (BES).

The aim of the ACS is to ensure that major UK banks are adequately capitalised to continue lending to the real economy in a severe macroeconomic stress. The sizes of the shocks to different sectors and economies are adjusted each year to deliver a similar stressed outcome, unless the FPC's assessment of underlying vulnerabilities suggests a stress could be more or less severe than previously factored in. In contrast, the BES allows the FPC and PRC to explore a wide range of risks, including longer-term challenges to banks' business models that may not be neatly linked to prevailing economic or financial conditions. For example, the 2017 BES explored risks from fintech and low interest rates; the 2019 BES will explore a liquidity stress; and the 2021 BES will explore climate-related risks.

The BES is a tool to enhance participants' strategic thinking on how to manage different risks. It is also intended to build a better understanding among financial institutions, regulators and the public about how banks and the broader financial system might react under different scenarios.

Policy proposals from the BES are tailored to each exercise. Unlike in the ACS, individual banks' quantitative results are not tied directly to actions they are required to take. Instead, banks' submissions may inform the FPC's approach to system-wide policy issues, the PRC's approach to supervisory policy and guide further work between participants and supervisors to address any issues highlighted.

There are no fixed criteria for participation in the BES: while the participants in the 2017 BES were the same major UK banks who participate in the ACS, future tests may include other banks or non-bank participants where that is necessary to explore an issue fully.

The Bank gained several insights from the 2017 BES.
In 2017, the Bank's first BES examined major UK banks' strategic responses to an extended low growth, low interest rate environment. The scenario also featured increasing competitive pressures in retail banking as the use of financial technology (fintech) rose.

The 2017 BES helped to develop the Bank's understanding of the risks covered and informed several avenues of further work. Supervisors engaged with banks on the issues raised. And the Bank launched projects on fintech and the Future of Finance, building on insights from the exercise.

Running the 2017 BES also uncovered lessons about how best to design these exercises, for example around data collection and the types of guidelines given to participants. The Bank has applied these in designing the 2019 BES.(1)

The 2019 biennial exploratory scenario: exploring the implications of a severe and broad-based liquidity shock

The 2019 BES will explore the implications of a severe and broad-based liquidity stress affecting major UK banks simultaneously.
It will explore how the reactions of banks and authorities to the stress would shape its impact on the broader financial system and the UK economy.

The Bank already monitors banks' resilience to liquidity risks closely, with the PRA's regulatory framework designed to ensure that individual banks have an appropriate degree of resilience to liquidity stress. The BES will complement that work. It will not set new liquidity standards for banks. Banks hold regulatory liquidity buffers that the FPC expects to be used in a stress. Rather, it is to explore implications of responses to a stress that affects all the major UK banks at the same time. Running a concurrent scenario will enable policymakers to analyse the plausibility and effectiveness of individual banks' potential responses to a liquidity stress in the context of other banks' responses.

Headline results will include measures of aggregate bank liquidity resilience, but the individual banks' results will not be used to set regulatory liquidity guidance. This is in contrast to the ACS, which focuses in part on individual banks' capital measures under stress and informs the setting of capital buffers.

The banks taking part in the exercise will be the same firms involved in the 2019 ACS.(2) Participants will be asked to submit projections on a group basis, and on a UK ring-fenced and non ring-fenced bank basis, where applicable.

The high-level aim is to improve understanding of potential responses to a liquidity stress and the implications of those responses.
The 2019 BES has four high-level objectives.

First, to assess the extent to which banks' collective responses to a significant loss of liquidity could amplify the stress. This could happen, for example, if banks choose to reduce the amount they lend to the UK economy, or if they sell assets in sufficient volumes that it leads to significant falls in asset prices.

Second, to understand whether there are barriers to banks using their liquid asset buffers in stress. The PRA requires banks to hold liquid asset buffers that are designed to be used in a stress. The BES will allow the Bank to explore whether in practice, there are barriers (real or perceived) to their usability. This will help inform the FPC and PRC's view on the UK financial system's vulnerability to a liquidity stress in the banking system.

Third, to improve public understanding about the role of the Bank in mitigating liquidity risk to the UK financial system. The BES will help to raise awareness of how the Bank's liquidity facilities — which include the ability to lend to banks in all major currencies — operate in a liquidity stress, and how they interact with the PRA's regulatory framework.

Fourth, to understand banks' possible demands on the Bank's liquidity insurance facilities in stress, as well as the risks the Bank itself would be exposed to through providing that liquidity. The Bank has made significant changes to its liquidity insurance facilities since the financial crisis, with the aim of making them more open, flexible and responsive. The BES will enhance understanding of how banks will use the facilities, and thereby continue to inform the design of the framework.

The set of stresses incorporated into the scenario will be broad.
Reflecting the fact that banks face a broad range of liquidity risks, there is no single driver of the scenario in the 2019 BES. In the scenario, significant proportions of household, corporate and financial institution deposits are withdrawn from participating banks. These deposits remain in the system. Absent any management actions, a majority would go to deposit-takers not participating in the BES, as these institutions are assumed to be unaffected by the stress. And a

(1) For more information on lessons from the 2017 BES and how these are being taken forward, see 'Evaluation of the Bank of England's approach to concurrent stress testing'.
(2) Barclays, HSBC, Lloyds Banking Group, Nationwide, RBS, Santander UK and Standard Chartered.

Table I.A Indicative Liquidity Coverage Ratio outflow rates for UK banks

Liquidity risk	LCR outflow types	LCR outflow factors
Retail deposit outflows	Stable retail deposits	5%
	Less-stable retail deposits	10%–20%
Corporate and financial institution deposit outflows	Operational deposits	5%–25%
	Non-operational corporate deposits	20%–40%
	Non-operational financial institution deposits	100%
Unsecured wholesale liabilities outflows	Debt securities issued by the bank, maturing within 30 days	100%
Secured wholesale funding outflows	Outflows due to loss of secured funding	0%–100% depending on collateral quality and counterparty
Collateral outflows	Collateral outflows on derivative positions due to increased market volatility	The largest absolute net 30-day collateral flow realised during the past 24 months
Downgrade outflows	Contractual outflows due to three-notch credit rating downgrade	100%
Committed undrawn credit	Committed credit facilities to corporates	10%–30%
	Committed credit facilities to financial customers	40%–100%

Sources: Annex V (24) of final technical standard amending EU regulation 680/2014 and EU Commission delegated regulation (EU) 2015/61.

proportion of deposits might ultimately be passed back to participating banks. If this was in the form of financial deposits with higher expected roll-off rates, this would have little impact on banks' regulatory liquidity positions. While the likelihood that all major UK banks suffer a simultaneous liquidity stress is remote, the assumption of simultaneity is intended to provide system-wide insights from the exercise.

Liquidity also drains from participants as a result of increasing collateral requirements, banks' credit ratings being downgraded, and committed credit lines being drawn.

The magnitude of the liquidity outflows largely correspond to the set of stresses that determine the size of banks' regulatory liquidity buffers.

The stress calibration largely reflects the stresses underlying banks' existing regulatory liquidity standards.

Under the PRA's prudential liquidity framework, in normal times, banks are required to hold:

(a) Enough cash and liquid assets, largely comprising high-quality sovereign and corporate bonds (collectively known as high-quality liquid assets (HQLA)) to meet liquidity needs over a 30-day stress period. The magnitude of stressed outflows and inflows during that period is defined under internationally agreed Liquidity Coverage Ratio (LCR) rules. **Table I.A** summarises the headline sources of liquidity outflows in the stress underlying the LCR metric.

(b) Enough HQLA to cover additional liquidity needs arising from risks not covered, or not fully covered, by the LCR, such as the potential need for cash to cover payments intraday, or to post more initial margin as part of derivatives transactions. The magnitude of this additional liquidity guidance, referred to as Pillar 2, varies between banks, and is not disclosed.

Systemically important banking groups are required to disclose their average LCRs, which they do on a quarterly basis. The BES should help improve PRA and FPC understanding of the influence disclosure requirements have on banks' responses to a liquidity stress.

The 2019 BES will also differ from the stress underlying the LCR in two ways.

The scenario features an instantaneous 5% reduction in average gilt prices — implying an approximate 60 basis point rise in 10-year gilt yields — and a 5 percentage point rise in the haircuts demanded when using gilts as collateral. These movements are motivated by assuming a UK sovereign credit rating downgrade, and are very large in the context of historical daily moves. They are also combined with a reduction in the willingness of bilateral gilt repo lenders to deal with participating banks, leading to a halving of the cash available to them via this market.

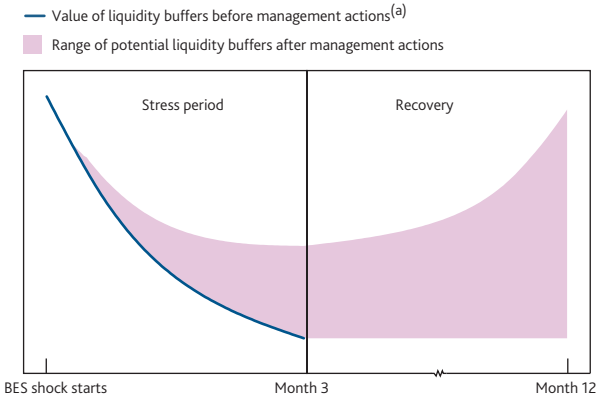
Banks also lose their access to the foreign exchange swaps market for a period of two weeks. This follows a two-week period at the start of the stress in which using the market becomes increasingly expensive for participants.

This constellation of shocks occurs over a three-month period in the scenario. After that, stressed outflows cease and wholesale funding market access normalises. This recovery period lasts for nine months (**Chart I.1**).

Banks are not expected to become illiquid in the stress, in part because their current liquidity positions are strong…

The Bank does not expect participating institutions to completely exhaust their HQLA in the stress. In part, that is because major UK banks' current liquidity positions are strong. At a group level, major UK banks held more than £1 trillion of high-quality liquid assets at end-April, more than four times

Chart I.1 Illustrative path for participating banks' liquidity buffers in the stress with potential uplift from management actions



(a) Illustration of the impact the stress could have on the value of liquidity buffers without mitigating actions that participants might take.

the level they held before the financial crisis. Major UK banking groups are also able to meet their maturing obligations for many months without access to foreign exchange markets (see Resilience of the UK banking sector chapter).

…and in part because they will be able to submit a range of management responses to the stress.

To improve their liquidity positions and eventually return their buffers to guidance levels post-stress, banks will need to submit management actions in the scenario.

Banks will have a broad range of options to generate liquidity. For example, firms could opt to sell or repo assets in financial markets to generate cash. The volume of potential cash generated would depend on the impact of the stress on the price of the asset in question, and scenario assumptions around conditions in repo markets.

Banks may also seek to use the Bank of England's liquidity insurance facilities to generate liquidity, drawing down pre-positioned collateral in some cases. Banks will be guided to base their initial assumptions about these facilities on the Bank's published material covering the Sterling Monetary Framework.(3)

Banks will be permitted to include management actions such as rebuilding deposits by increasing deposit rates paid, and cutting credit provision to households, businesses and other banks.

The Bank will judge the plausibility of, and potential spillovers from, those management responses.

The Bank will analyse the plausibility of management actions proposed by banks in the stress. This analysis will be based on banks' assumptions around the volume of liquidity generated and the probable size of losses that would be associated with each action. In a real stress, banks would have an incentive to minimise losses, subject to meeting their liquidity needs. So if banks submit management actions which would lead to very large losses, these may be judged less plausible.

Banks' reactions to the stress may have spillovers to other participants, so the Bank will also take into account other participants' responses when assessing the plausibility of management actions. For example, it would be unlikely that banks could attract a material volume of new deposits during the stress without a large increase in deposit rates paid, relative to unaffected deposit-takers. But if all participants raised the interest rates they paid, this management action would attract fewer deposits and generate less liquidity than banks might expect.

The Bank will also assess the potential impact of banks' responses to the stress on relevant financial markets and on lending to the UK economy.

One significant innovation for the 2019 BES is that the Bank intends to run the exercise with two sequential rounds of submissions from participants.

This decision reflects:

(i) The potential spillovers between participants' responses described above.

(ii) A desire to incorporate the Bank, FPC and PRA's responses — given banks' initial reactions — in the information available to participants when forming their projections.

Organising the exercise in this way should ensure that participants' responses to the stress are as realistic and coherent in aggregate as possible.

In the first round, banks will submit their projections based on initial scenario paths and assumptions, including around the functioning of the Bank's liquidity insurance facilities.

In the second round the Bank may update guidelines around market functioning and market price paths, as well as potentially providing additional information about the availability of the Bank's liquidity facilities. Meanwhile, the PRA will decide what supervisory communication would be appropriate in the scenario, given banks' initial responses.

The Bank intends to publish the results of the 2019 BES in mid-2020.

The Bank intends to publish the results of the exploratory exercise in mid-2020, alongside the *Financial Stability Report*. The Bank does not intend to disclose individual banks' results, or specify what supervisory feedback on any issues identified was provided to individual banks. The Bank will, however, disclose the information necessary to explain the aggregate results of the BES.

(3) See The Sterling Monetary Framework.

The 2021 biennial exploratory scenario: exploring the UK financial system's resilience to the financial risks of climate change

Climate change entails financial risks relevant to the Bank's objectives…

Climate change presents financial risks that are relevant to the Bank's objectives because of their impact on individual firms and the UK financial system. The Intergovernmental Panel on Climate Change has warned that rises in global average temperatures since pre-industrial times have reached 1°C, and will probably exceed 1.5°C soon, absent material action. Thus, the window for an orderly transition to a carbon-neutral economy is finite and closing. Internationally, over 190 countries have committed to put measures in place to limit the global temperature rise to 'well below 2°C'.(4) The UK Government is targeting a 100% reduction in net emissions by 2050.

Climate change presents financial risks via two main channels:

- **Physical risks**: from increasing severity and frequency of climate and weather-related events, such as heatwaves, floods, droughts and sea-level rise. These events could directly impair property and other asset values; and reduce the income and creditworthiness of borrowers.

- **Transition risks**: from the adjustment towards a carbon-neutral economy, which would require significant structural changes to climate policy, technology and consumer preferences. These changes could prompt a reassessment of a wide range of asset values, a rise in energy prices, and a fall in income and creditworthiness of some borrowers.

In turn, these risks may entail credit losses for lenders, market losses for investors and underwriting losses for insurers.

Transition to a carbon-neutral economy also presents some opportunities for the financial sector. For example, the financing of investments in energy efficiency of buildings, renewable energy and low-carbon transportation.

…presenting a unique set of challenges.

Physical and transition risks from climate change are interrelated. Continued emissions will lead to rising temperatures, which increase risks from the physical impacts of climate change. Limiting these impacts requires substantial emissions reductions, which increase transition risks. As a result, climate change presents unique challenges:

- **The impact is far-reaching in breadth and magnitude**: climate change risks will affect all agents in the economy, across all sectors and geographies. The risks will probably be correlated and their impact non-linear and irreversible.

- **The risks are foreseeable**: while the exact outcome is uncertain, there is a level of certainty that some combination of physical and transition risks will crystallise.

- **The magnitude of the future impact is dependent on actions today**: this includes actions by governments, businesses, households and financial firms.

The impact of climate change on the financial system could be material.

Data, research and models on the impact of climate change on the financial system are still limited, but early studies suggest that it could be material.

The physical risks of climate change are already affecting UK financial firms. Since the 1980s, the number of registered weather-related insurance loss events — events resulting in property, infrastructure and/or structural damage in the affected regions — has tripled. This has contributed to a rise in losses for the global insurance sector.(5)

UK banks are also exposed to physical risks, for example if the value of loan collateral is not insured against weather risk. Around 10% of the value of mortgage exposures in England is on properties in flood risk zones.(6) Some UK banks also have large direct exposures to regions that are particularly vulnerable to the physical risks from climate change such as South and South-East Asia.

Transition to a carbon-neutral economy may result in reduced profitability in many sectors and companies, prompting a potentially sharp repricing of assets. This could impact investors and lenders. Some assets may become 'stranded' — if emissions reduction targets reduce their usability — leading to asset price falls. For example, according to estimates by the International Energy Agency, if global warming is to be limited to 'well below 2°C', close to 80% of remaining coal reserves, 50% of oil reserves and 40% of gas reserves would become unburnable, absent advances in technology.(7) The UN's Environment Finance Initiative estimates that, in a transition to a low-carbon economy, climate-related risks could affect up to 15% of the value of a representative global market portfolio.(8) Second-round effects could result in much higher losses.(9)

(4) The Paris Agreement falls within the United Nations Framework Convention on Climate Change. It was agreed in 2015 at the 21st Conference of the Parties. Each signatory must make financial flows consistent with a path to low greenhouse gas emissions.
(5) Munich Reinsurance Company (2018), 'A stormy year — natural disasters in 2017', Geo Risks Research, NatCatSERVICE.
(6) In particular, according to Met Office (2018), by 2100, in parts of the UK sea levels could rise by up to 70cm in a 'low emissions scenario', and by up to 115cm in a 'high emissions scenario', relative to their 1981–2000 levels.
(7) See IEA and IRENA (2017), 'Perspectives for the Energy Transition'. The estimates are for a scenario compatible with limiting the rise in global mean temperature to 2°C by 2100 with a probability of 66%, as a way of contributing to the 'well below 2°C' target of the Paris Agreement.
(8) At the portfolio level, transition opportunities may offset about two thirds of these losses. UNEP Finance Initiative (2019), 'Changing course'.
(9) Battiston, S, Mandel, A, Monasterolo, I, Schütze, F and Visentin, G (2017), 'A climate stress-test of the financial system'.

In addition, emission-intensive sectors, such as transport, agriculture and heavy industry, could face a sharp increase in carbon taxes or input costs, reducing their profitability. Loan exposures to fossil fuel producers, energy utilities and emission-intensive sectors amount to around 70% of the major UK banks' common equity Tier 1 (CET1) capital. For UK insurers, around 12% of equity and 8% of corporate bond portfolio exposures are in 'high carbon' technologies, according to research by Bank staff.

The Bank is working with central banks, supervisors, firms and technical experts to respond to climate-related financial risks.
The Bank's response to climate-related financial risks has two core elements motivated by its statutory objectives.(10) The first involves promoting the safety and soundness of the firms that it regulates, by enhancing firms' approach to managing the financial risks from climate change. To that end, the PRA set out its expectations in a supervisory statement in April 2019. The PRA has also established a Climate Financial Risk Forum (CFRF), co-chaired with the FCA. It aims to build capacity and share best practice across industry to advance financial sector responses to the financial risks from climate change.

The second element of the Bank's response concerns the FPC's aim to ensure that the UK financial system serves UK households and businesses in bad times as well as good. The physical and transition risks of climate change have the potential to impose losses on banks, insurers and other financial market participants. These risks may also prompt changes to financial institutions' business models over the longer term. Thus, the FPC considers the system-wide financial risks from climate change.

Supporting these two core elements, the Bank is also engaged internationally. For example, it is a founding member of the Network for Greening the Financial System (NGFS), a coalition of central banks and supervisors. And the Bank has actively supported the Financial Stability Board's Task Force on Climate-related Financial Disclosures. In 2017, the Task Force released its recommendations, providing a framework for companies and other organisations to develop more effective climate-related financial disclosures through their existing processes. The Bank will disclose an assessment of how it manages its climate-related financial risks in the 2019/20 *Annual Report*.(11)

Scenario analysis is important for assessing risks from climate change.
Measuring risks from climate change to individual firms and the financial system is complex. It involves assessing the effect of many possible climate pathways — with different physical and transition effects — over several decades. Using past data alone will not be a good predictor of future risks. Thus, the PRA supervisory statement set out expectations that firms use scenario analysis to inform their assessment of climate-related risks and strategy. Scenario analysis is one of the workstreams established by the CFRF to help firms learn from each other. And the NGFS plans to set out voluntary guidelines for how central banks can use scenario analysis to assess system-wide financial risks from climate change.(12)

The FPC and PRA will therefore explore the UK financial system's resilience to the financial risks of climate change in the 2021 BES.
In June 2019, the Bank announced that the 2021 BES will test the resilience of the UK financial system to the physical and transition risks associated with different possible climate pathways. This follows a recommendation in the review on the Future of Finance that the Bank undertake an exploratory exercise on climate-related financial risks (see Box 4).

Different types of climate-related risks crystallise under different scenarios. The 2021 BES will integrate climate scenarios with macroeconomic and financial system models. The exercise will motivate firms to address data gaps and to develop cutting-edge risk management consistent with a range of possible climate pathways: ranging from early and orderly to late and disruptive.

Given that climate change affects all parts of the financial system, and has the potential to generate important spillovers across sectors, there may be benefits to extending coverage of the climate BES beyond the banks that participated in the 2017 BES.

The Bank's 2019 market-wide insurance stress tests include climate-related physical and transition risk scenarios. The FPC and PRA will consider the results of this exercise when designing the scenarios.

The FPC and PRA will issue a public discussion paper in the autumn to gather views on the key design specifications of the 2021 BES. The discussion paper will cover issues such as the coverage of the test, the nature of scenarios considered, the appropriate time horizon and disclosure of results. This will allow the Bank to develop the scenarios in consultation with risk specialists from across the financial sector, climate scientists, other industry experts, and other informed stakeholder groups such as the NGFS and CFRF.

(10) On 2 July 2019, HM Treasury announced that its next remit and recommendations letter to the FPC will reflect the need for the FPC to consider the COP21 Paris Agreement when performing its duties. Likewise, HM Treasury will ensure there is a similar provision in its next Letter of Recommendations to the PRA and FCA.
(11) For more details on the Bank's ongoing work to assess and respond to climate-related financial risks see 'Climate change'.
(12) See NGFS First comprehensive report (2019), 'A call for action. Climate change as a source of financial risk'.

Annex 1: Previous 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 November 2018 *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 4 July to set the UK CCyB rate at 1%. This rate is reviewed on a quarterly basis.

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 June 2017 and decided not to amend the calibration. The explanation for this is set out in the June 2017 *Financial Stability 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.

Other FPC activities since the previous *Report*

At its meeting on 4 July 2019, the FPC considered a recommendation from the European Systemic Risk Board (ESRB) for relevant authorities to reciprocate a group-level large exposure limit of 5% in respect of the exposures of their systemically important banks to highly indebted French-resident non-financial corporations, imposed in France by the Haut Conseil de stabilité financière.

Reciprocation would be in line with the FPC's previously stated intention of reciprocating foreign non-CCyB macroprudential capital actions where appropriate, recognising both the likely benefits to UK financial stability and to maintain consistency with its approach to reciprocating foreign CCyB rates.

The FPC noted that while currently no UK banks met the materiality threshold set out by the ESRB, banks could do so in the future due to ordinary fluctuations of business. Reciprocation would ensure compliance with the ESRB regime. The FPC noted the measure, through targeting corporate indebtedness, was related to leveraged lending. The FPC has previously identified the rapid growth of leveraged lending globally as a risk to UK financial stability. Consistent with these factors, the FPC was supportive of HM Treasury reciprocating this measure.

The FPC also considered a recommendation from the ESRB for relevant authorities to reciprocate a risk-weight floor imposed by the Swedish Finansinspektionen targeting Swedish mortgage exposures. The FPC decided no action was necessary at this time as no UK credit institution had material exposures to Swedish mortgages and further, all were a long way from the ESRB threshold. The Committee will keep this under review.

At its meeting on 26 February 2019, the FPC agreed that from 2020, the annual cyclical scenario (ACS) should assess the ring-fenced subgroups of existing ACS participant banks on a stand-alone basis.

On 5 December 2018, the FPC sent the Chancellor a letter responding to his remit and recommendations letter, which the FPC had received on 29 October.

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 1 July 2019)
Non-bank balance sheet stretch[d]						
1 Credit to GDP[e]						
Ratio	121.2%	162.8%	86.8%	176.7%	150.8%	149.8% (2019 Q1)
Gap	7.3%	9.1%	-28.7%	21.0%	-12.7%	-11.6% (2019 Q1)
2 Private non-financial sector credit growth[f]	9.8%	9.2%	-2.0%	23.9%	4.2%	3.9% (2019 Q1)
3 Net foreign asset position to GDP[g]	4.0%	-6.3%	-28.4%	21.4%	-11.1%	-9.1% (2019 Q1)
4 Gross external debt to GDP[h]	181.5%	316.7%	113.5%	401.3%	309.4%	301.2% (2019 Q1)
of which bank debt to GDP	*119.9%*	*193.7%*	*77.8%*	*265.2%*	*173.3%*	*171.2% (2019 Q1)*
5 Current account balance to GDP[i]	-1.9%	-3.0%	-6.7%	0.6%	-3.4%	-5.6% (2019 Q1)
Conditions and terms in markets						
6 Long-term real interest rate[j]	1.4%	1.2%	-2.5%	2.2%	-1.6%	-2.4% (1 July 2019)
7 VIX[k]	19.1	12.8	9.8	65.5	13.8	15.9 (1 July 2019)
8 Global corporate bond spreads[l]	84 bps	84 bps	74 bps	482 bps	118 bps	134 bps (1 July 2019)
9 Spreads on new UK lending						
Household[m]	480 bps	352 bps	284 bps	845 bps	610 bps	631 bps (Apr. 2019)
Corporate[n]	104 bps	97 bps	82 bps	392 bps	217 bps	235 bps (Dec. 2018)
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.	14.6%	14.7% (2019 Q1)
11 Leverage ratio[r]						
Simple	4.7%	4.1%	2.9%	6.9%	6.9%	6.8% (2018 H2)
Basel III (2014 proposal)	n.a.	n.a.	n.a.	n.a.	5.0%	5.1% (2018 H2)
12 Average risk weights[s]	53.6%	46.4%	31.3%	65.4%	32.0%	31.6% (2018 H2)
13 Return on assets before tax[t]	1.0%	1.1%	-0.2%	1.5%	0.6%	0.7% (2018 H2)
14 Loan to deposit ratio[u]	114.5%	132.4%	92.3%	133.3%	93.9%	92.4% (2018 H2)
15 Short-term wholesale funding ratio[v]	n.a.	22.8%	8.4%	24.9%	10.0%	9.9% (2018 H2)
of which excluding repo funding	*n.a.*	*15.5%*	*3.9%*	*15.5%*	*3.9%*	*3.9% (2018 H2)*
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 Q1: AU, CN, DE, FR, JP, KR, NL, SG, TW, US		In 2019 Q1: AU, CA, FR, JP, SG, TW
17 CDS premia[y]	12 bps	8 bps	6 bps	298 bps	48 bps	42 bps (1 June 2019)
18 Bank equity measures						
Price to book ratio[z]	2.13	1.94	0.50	2.86	0.91	0.79 (1 June 2019)
Market-based leverage ratio[aa]	9.7%	7.8%	1.9%	15.7%	5.5%	4.8% (1 June 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 1 July 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.	14.6%	14.7% (2019 Q1)
2 Leverage ratio[r]						
Simple	4.7%	4.1%	2.9%	6.9%	6.9%	6.8% (2018 H2)
Basel III (2014 proposal)	n.a.	n.a.	n.a.	n.a.	5.0%	5.1% (2018 H2)
3 Average mortgage risk weights[ab]	n.a.	n.a.	11.3%	22.4%	11.6%	11.5% (2018 H2)
UK average mortgage risk weights[ac]	n.a.	n.a.	9.5%	15.8%	9.9%	9.5% (2018 H2)
4 Balance sheet interconnectedness[ad]						
Intra-financial lending growth[ae]	12.0%	13.0%	-29.8%	45.5%	-16.9%	-14.3% (2018 H2)
Intra-financial borrowing growth[af]	14.1%	13.7%	-21.5%	29.5%	1.6%	7.6% (2018 H2)
Derivatives growth (notional)[ag]	37.7%	34.2%	-25.9%	52.0%	-5.7%	18.2% (2018 H2)
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 Q1: CA, FR, HK, JP, SG, US	In 2019 Q1: CA, HK, JP
Non-bank balance sheet stretch[d]						
6 Credit growth						
Household[ai]	10.6%	10.7%	-0.7%	21.6%	4.3%	3.7% (2019 Q1)
Commercial real estate[aj]	15.3%	18.5%	-9.7%	59.8%	-1.5%	3.4% (2019 Q1)
7 Household debt to income ratio[ak]	98.3%	139.0%	77.3%	146.8%	134.2%	134.5% (2019 Q1)
8 PNFC debt to profit ratio[al]	264.3%	356.1%	157.7%	422.6%	322.4%	314.5% (2019 Q1)
9 NBFI debt to GDP ratio (excluding insurance companies and pension funds)[am]	54.8%	128.4%	13.7%	172.5%	124.0%	120.9% (2019 Q1)
Conditions and terms in markets						
10 Real estate valuations						
Residential price to rent ratio[an]	100.0	151.3	68.5	162.4	154.3	155.0 (2019 Q1)
Commercial prime market yields[ao]	5.4%	4.1%	3.7%	7.1%	3.8%	3.7% (2019 Q1)
Commercial secondary market yields[ao]	8.6%	5.6%	5.1%	10.2%	6.0%	6.0% (2019 Q1)
11 Real estate lending terms						
Residential mortgage LTV ratio (mean above the median)[ap]	90.6%	90.6%	81.6%	90.8%	87.3%	88.1% (2019 Q1)
Residential mortgage LTI ratio (mean above the median)[ap]	3.8	3.8	3.6	4.2	4.2	4.2 (2019 Q1)
Commercial real estate mortgage LTV (average maximum)[aq]	77.6%	78.3%	57.0%	79.6%	57.0%	57.1% (2018 H2)
12 Spreads on new UK lending						
Residential mortgage[ar]	80 bps	51 bps	35 bps	369 bps	100 bps	108 bps (Apr. 2019)
Commercial real estate[as]	137 bps	135 bps	119 bps	422 bps	255 bps	274 bps (2018 Q4)

* 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) Measure of market expectations of 30-day volatility. Conveyed by S&P 500 stock index option prices (22-day moving average). 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 (2018 full year). 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 (2018 full year). 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 (2018 full year). 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 (2018 full year). 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 (2018 full year). 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 2018 H2. 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 2018 H2. 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 2018 H2. 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. Non seasonally adjusted. Quarterly data. Data cover lending in both sterling and foreign currency from 1998 Q4. 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. Series starts in 2002. 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 1 July 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%	87.3%	88.1% (2019 Q1)
Owner-occupier mortgage LTI ratio (mean above the median)[d]	3.8	3.8	3.6	4.2	4.2	4.2 (2019 Q1)
Buy-to-let mortgage LTV ratio (mean)[e]	n.a.	n.a.	55.0%	75.4%	55.8%	57.4% (2019 Q1)
2 Household credit growth[f]	10.6%	10.7%	-0.7%	21.6%	4.3%	3.7% (2019 Q1)
3 Household debt to income ratio[g]	98.3%	139.0%	77.3%	146.8%	134.2%	134.5% (2019 Q1)
of which: mortgages[h]	*68.7%*	*101.3%*	*49.3%*	*109.6%*	*98.0%*	*96.9% (2019 Q1)*
of which: owner-occupier mortgages[i]	*77.7%*	*92.8%*	*64.8%*	*96.9%*	*81.0%*	*80.0% (2019 Q1)*
Conditions and terms in markets						
4 Approvals of loans secured on dwellings[j]	97,927	119,045	26,351	132,434	65,092	65,409 (May 2019)
5 Housing transactions[k]	129,508	139,039	51,660	221,978	101,220	89,810 (May 2019)
Advances to homemovers[l]	48,954	58,901	14,080	93,500	23,920	25,280 (Apr. 2019)
% interest only[m]	53.3%	31.0%	1.8%	81.3%	2.3%	2.1% (Apr. 2019)
Advances to first-time buyers[l]	39,167	33,406	8,430	55,800	25,370	27,370 (Apr. 2019)
% interest only[m]	52.1%	23.9%	0.1%	87.9%	0.1%	0.2% (Apr. 2019)
Advances to buy-to-let purchasers[l]	10,128	14,113	3,600	29,100	5,100	5,100 (Apr. 2019)
% interest only[n]	n.a.	n.a.	50.0%	74.3%	72.3%	73.5% (2019 Q1)
6 House price growth[o]	1.7%	2.2%	-5.8%	6.6%	0.7%	0.0% (Apr. 2019)
7 House price to household disposable income ratio[p]	2.9	4.3	2.1	4.6	4.6	4.5 (2019 Q1)
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	51 bps	35 bps	369 bps	100 bps	108 bps (Apr. 2019)
Difference between the spread on high and low LTV residential mortgage lending[r]	18 bps	25 bps	1 bps	293 bps	64 bps	49 bps (Apr. 2019)
Buy-to-let mortgages[s]	n.a.	n.a.	61 bps	397 bps	185 bps	188 bps (2019 Q1)

(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 monthly £ value series from 2005 onwards. Data prior to 2005 back-projects the UK HPI monthly £ 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.

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.
ARRC – Alternative Reference Rate Committee.
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.
CEO – chief executive officer.
CET1 – common equity Tier 1.
CFRF – Climate Financial Risk Forum.
CLO – collateralised loan obligation.
CRD IV – Capital Requirements Directive.
CRE – commercial real estate.
CRR – Capital Requirements Regulation.
DSR – debt-servicing ratio.
DTI – debt to income.
EBITDA – earnings before interest, tax, depreciation and amortisation.
ECB – European Central Bank.
EEA – European Economic Area.
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.
FMI – financial market infrastructure.
FPC – Financial Policy Committee.
FRN – floating-rate note.
FSB – Financial Stability Board.
FTSE – Financial Times Stock Exchange.
G7 – Canada, France, Germany, Italy, Japan, the United Kingdom and the United States.
G-SIB – global systemically important bank.
HMRC – Her Majesty's Revenue and Customs.
HQLA – high-quality liquid asset.
ICE/BofAML – Intercontinental Exchange/Bank of America Merrill Lynch.
ICS – International Capital Standards.
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.
MFI – monetary financial institution.
MiFID – Markets in Financial Instruments Directive.
MSCI – Morgan Stanley Capital International Inc.
NBFI – non-bank financial institution.
NBPSP – non-bank payment services provider.
NGFS – Network for Greening the Financial System.
NPA – New Payments Architecture.
NPISH – non-profit institutions serving households.
NPL – non-performing loan.
OECD – Organisation for Economic Co-operation and Development.
ONS – Office for National Statistics.
OTC – over the counter.
PNFC – private non-financial corporation.
PPP – purchasing power parity.
PRA – Prudential Regulation Authority.
PRC – Prudential Regulation Committee.
PTF – principal trading firm.
RBS – Royal Bank of Scotland.
RCF – revolving credit facility.
REIT – real estate investment trust.
RFR – risk-free rate.
RoE – return on equity.
RTGS – real-time gross settlement.
RWA – risk-weighted asset.
SM&CR – Senior Managers and Certification Regime.
SME – small and medium-sized enterprise.
S&P – Standard & Poor's.
TR – trade repository.
TSF – total social financing.
UCITS – undertakings for collective investment in transferable securities.
VaR – Value-at-Risk.
WEO – IMF *World Economic Outlook*.