

# Financial Stability Report

November 2018 | Issue No. 44



BANK OF ENGLAND



On 8 January 2019, Box 5 on page 55 was amended to remove an incorrect statement that the matched repo book that hedge funds operate in aggregate is largely the balance of funds using the repo market either mainly to borrow cash or mainly to borrow bonds.



BANK OF ENGLAND

# Financial Stability Report

Presented to Parliament pursuant to Section 9W(10) of the Bank of England Act 1998 as amended by the Financial Services Act 2012.

November 2018





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

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

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

## The Financial Policy Committee:

Mark Carney, Governor

Jon Cunliffe, Deputy Governor responsible for financial stability

Ben Broadbent, Deputy Governor responsible for monetary policy

Dave Ramsden, Deputy Governor responsible for markets and banking

Sam Woods, Deputy Governor responsible for prudential regulation

Andrew Bailey, Chief Executive of the Financial Conduct Authority

Alex Brazier, Executive Director for Financial Stability Strategy and Risk

Anil Kashyap

Donald Kohn

Richard Sharp

Elisabeth Stehman

Martin Taylor

Charles Roxburgh attends as the Treasury member in a non-voting capacity.

This document, unless otherwise stated, uses data available as at 16 November 2018.

The 'Stress testing the UK banking system: 2018 results' chapter has been produced by Bank staff under the guidance of the FPC and Prudential Regulation Committee (PRC). It sets out the judgements and actions taken by the PRC and FPC that were informed by the test results and analysis.

Annexes 4 and 5 of this *Report*, setting out the individual bank results and supervisory stance with respect to those banks, have been formally approved by the PRC.

The chapter and annexes were finalised on 27 November 2018.

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/2018/november-2018](http://www.bankofengland.co.uk/financial-stability-report/2018/november-2018).

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# Executive summary

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

The 2018 stress test shows the UK banking system is resilient to deep simultaneous recessions in the UK and global economies that are more severe overall than the global financial crisis and that are combined with large falls in asset prices and a separate stress of misconduct costs.

- In the 2018 stress-test scenario, UK GDP falls by 4.7%, the UK unemployment rate rises to 9.5%, UK residential property prices fall by 33% and UK commercial real estate prices fall by 40%. The scenario also includes 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%.
- Major UK banks have continued to strengthen their capital positions. They started the 2018 stress test with an aggregate common equity Tier 1 (CET1) capital ratio nearly three and a half times higher than before the global financial crisis.
- Despite facing loss rates consistent with the global financial crisis, the major UK banks' aggregate CET1 capital ratio after the stress would still be twice its level before the crisis.
- All participating banks remain above their risk-weighted capital and leverage hurdle rates and would be able to continue to meet credit demand from the real economy, even in this very severe stress.
- The 2018 stress test is the first to be conducted under a new accounting standard, International Financial Reporting Standard 9 (IFRS 9). The test results take account of internationally agreed transitional arrangements. The Bank will use these results to assess how best to avoid the interaction of IFRS 9 and the stress test leading to an unwarranted *de facto* increase in capital requirements, as these transitional arrangements are phased out.

Since the EU referendum in 2016, the FPC and other authorities have identified risks of disruption to the financial system that could arise from Brexit and worked to ensure they are addressed. Stress tests and supervisory actions have ensured major UK banks have levels of capital and liquidity to withstand even a severe economic shock that could be associated with a disorderly Brexit. The Government is taking forward the legislation necessary to avoid disruption to financial services provided by EU firms to UK households and businesses. The Bank, other UK authorities and financial companies have engaged in extensive contingency planning.

The FPC has reviewed a disorderly Brexit scenario, with no deal and no transition period, that leads to a severe economic shock. Based on a comparison of this scenario with the stress test, the FPC judges that the UK banking system is strong enough to continue to serve UK households and businesses even in the event of a disorderly Brexit.

- The UK economic scenario in the 2018 stress test of major UK banks was sufficiently severe to encompass the outcomes based on 'worst case' assumptions about the challenges the UK economy could face in the event of a cliff-edge Brexit.

- These worst case assumptions include: the sudden imposition of trade barriers with the EU; loss of existing trade agreements with other countries; severe customs disruption; a sharp increase in the risk premium on UK assets; and negative spillovers to wider UK financial markets.
- Because major UK banks would be resilient to the tougher annual stress test, they would also be resilient to, rather than amplify, this disorderly Brexit scenario.

**Major UK banks have sufficient liquidity to withstand a major market disruption.**

- Since the financial crisis, major UK banks have substantially reduced their reliance on wholesale funding. At group level, they hold more than £1 trillion of high-quality liquid assets. They are able to withstand more than three months of stress in wholesale funding markets.
- As a result of supervisory actions and their own prudent risk management, major banks have aligned the currency of their liquid assets to that of their maturing wholesale funding. They can now withstand many months without access to foreign exchange markets.
- In addition, banks have pre-positioned collateral at the Bank of England that would allow them to borrow a further £300 billion. The Bank is able to lend in all major currencies.

**Most risks of disruption to the financial services that EU firms provide to UK households and businesses have been addressed, including through legislation. Further UK legislation, currently in train, will need to be passed to ensure the legal framework for financial services is fully in place ahead of Brexit.**

- The Bank, other UK authorities and financial companies have engaged in extensive contingency planning.
- Legislative preparations in the UK have progressed further. In November, Parliament passed legislation to allow Temporary Permissions and Recognition Regimes. These will allow UK households and businesses to continue to access financial services provided by EU firms.
- The FPC welcomes the European Commission's recent statement that it is willing to act to ensure that EU counterparties can continue to clear derivatives at UK central counterparties (CCPs) after March 2019. However, without greater clarity on the scope, conditions and timing of the prospective EU action, the contracts that EU members have cleared with UK CCPs would need to be closed out or transferred by March 2019 — a process that would need to begin in December 2018.
- 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 more generally the UK authorities' ability to manage UK financial stability risks.

**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 the risk environment evolves.**

- If an 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 £65 billion of net lending in the past year.
- The FPC judges that, apart from those related to Brexit, domestic risks remain at a standard level overall. Lender risk appetite is strong but, reflecting uncertainty, demand for credit has been muted. Were that uncertainty to fade,

credit demand could rebound significantly and lead to an increase in the riskiness of banks' exposures. Given current accommodative lending conditions, that could require a timely policy response to ensure resilience.

**Leveraged lending to businesses has grown rapidly, both globally and, more recently, in the UK. Strong creditor risk appetite, including for securitisations of leveraged loans, has loosened underwriting standards materially. However, UK banks' holdings of these securitisations are very small and their aggregate exposures to leveraged lending were covered in the Bank's 2018 stress test.**

- The rapid growth in leveraged lending has been driven by increased securitisation activity through collateralised loan obligations (CLOs), as well as demand from investment funds. Given the decline in underwriting standards, investors in leveraged loans are at increasing risk of loss.
- CLOs are held mainly by non-bank investors. Although international banks hold around a third of the outstanding stock of CLOs, UK banks and insurance companies only hold a very small share of the stock.
- Rapid growth of leveraged lending means that higher-risk borrowers account for more of the stock of total UK corporate debt. However, UK banks' domestic corporate lending does not reflect a material shift towards higher-risk borrowers.

**Risks to UK financial stability from global debt vulnerabilities are material. Reflecting that, the FPC incorporated a very severe global stress in the 2018 stress-test scenario.**

- Global financial conditions have continued to tighten since June. Global equity markets have fallen and credit spreads have risen.
- A further deterioration in Italy's financial outlook could result in material spillovers to the euro area and the UK.
- Financial conditions in emerging market economies have shifted from accommodative to tightening. Debt levels in China remain highly elevated. A sharp slowdown in growth in China — possibly as a result of an escalation of trade tensions with the US — would make its elevated debt levels significantly less sustainable.

**The FPC has completed an in-depth assessment of the risks associated with leverage from the use of derivatives in the non-bank financial system. Risks of forced sales to meet derivative margin calls currently appear limited. However, more comprehensive and consistent monitoring by authorities is needed to keep this under review.**

- Non-bank leverage can support financial market functioning, but it can also expose non-banks to greater losses and sudden demands for high-quality collateral, which could result in forced sales of potentially illiquid assets.
- The FPC's assessment focused on the capacity of non-banks in the UK to cover the posting of variation margin on over-the-counter interest rate derivatives. Most non-banks appear to have sufficient liquid assets to meet such calls.
- The Bank will work with other domestic supervisors to enhance the monitoring of these risks. Internationally, the International Organization of Securities Commissions (IOSCO) has issued a consultation paper on how to operationalise the Financial Stability Board's (FSB's) recommendation to develop consistent leverage measures for funds. 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.

# Stress testing the UK banking system: 2018 results<sup>(1)</sup>

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Major UK banks have continued to strengthen their capital positions. They started the 2018 stress test with an aggregate common equity Tier 1 (CET1) capital ratio nearly three and a half times higher than before the global financial crisis.

The test shows the UK banking system is resilient to deep simultaneous recessions in the UK and global economies that are more severe overall than the global financial crisis and that are combined with large falls in asset prices and a separate stress of misconduct costs.

Despite facing loss rates consistent with the global financial crisis, the major UK banks' aggregate CET1 capital ratio after the stress would still be twice its level before the crisis. All participating banks remain above their risk-weighted CET1 capital and Tier 1 leverage hurdle rates and would be able to continue to meet credit demand from the real economy, even in this very severe stress.

The 2018 stress test is the first to be conducted under a new accounting standard, International Financial Reporting Standard 9 (IFRS 9). The test results take account of internationally agreed transitional arrangements. The Bank will use these results to assess how best to avoid the interaction of IFRS 9 and the stress test leading to an unwarranted *de facto* increase in capital requirements, as these transitional arrangements are phased out.

The Bank's 2018 stress test — the annual cyclical scenario (ACS) — covers seven major UK banks and building societies (hereafter referred to as 'banks'), accounting for around 80% of the outstanding stock of PRA-regulated banks' lending to UK households and businesses.<sup>(2)</sup>

A key purpose of the stress test is to measure the resilience of UK banks, and the UK banking system as a whole, to hypothetical adverse scenarios like severe recessions, in order to ensure those banks have sufficient resilience to withstand shocks.

Earlier in 2018, the Bank published a hypothetical stress scenario that was more severe overall than the global financial crisis. The scenario incorporated paths for economic and

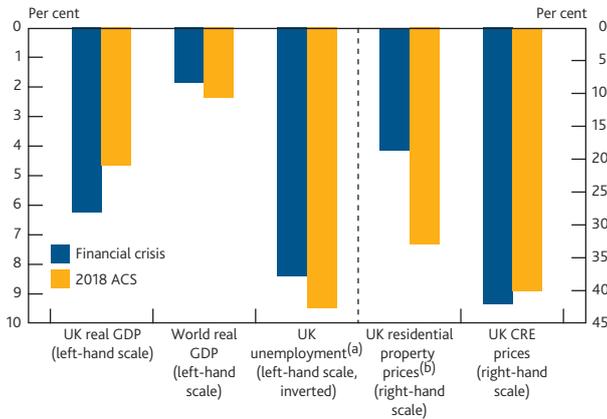
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(1) To derive the projections of bank capital adequacy in the stress scenario, Bank staff used a range of models, sectoral analysis and peer comparison. The judgements by Bank staff in producing the final projections were taken under the guidance of the FPC and the PRC. This chapter sets out the judgements and actions taken by the PRC and FPC that were informed by the test results and analysis. Annexes 4 and 5 of this *Report*, setting out the individual bank results and supervisory stance with respect to those banks, have been formally approved by the PRC.

(2) The seven participating banks and building societies are: Barclays, HSBC, Lloyds Banking Group, Nationwide, The Royal Bank of Scotland Group, Santander UK Group Holdings plc and Standard Chartered. Throughout this chapter the term 'banks' is used to refer to the seven participating banks and building societies.

**Chart A.1 Participating banks are judged against a severe hypothetical stress scenario**

Peak-to-trough falls in key variables: financial crisis and 2018 ACS

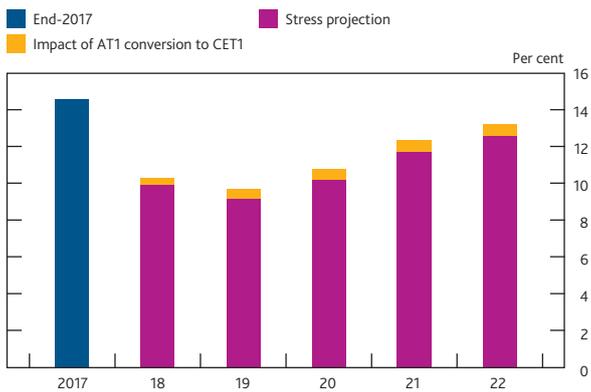


Sources: Halifax house price index by IHS Markit, IMF International Financial Statistics, MSCI Investment Property Databank, Nationwide, Office for National Statistics (ONS) and Bank calculations.

(a) The unemployment bars show the peak level of the Labour Force Survey UK unemployment rate. (b) Financial crisis data are a combination of the quarterly Halifax/Markit and Nationwide house price indices.

**Chart A.2 The aggregate CET1 ratio falls to a low point of 9.2% in the second year of the stress (excluding the impact of AT1 conversion)**

Aggregate CET1 capital ratio in the stress<sup>(a)</sup>

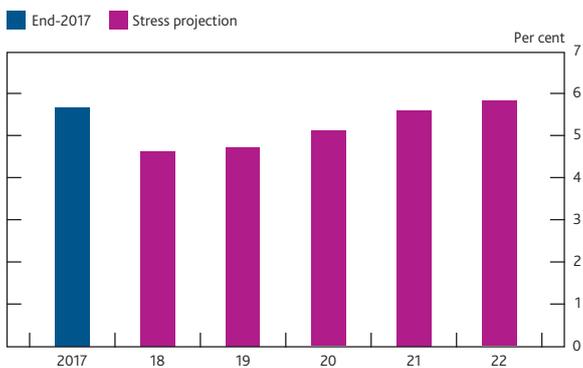


Sources: Participating banks' Stress Testing Data Framework (STDF) data submissions, Bank analysis and calculations.

(a) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets, where these are in line with CRR and the UK implementation of CRD IV via the PRA Rulebook. Projections include the impact of strategic management actions.

**Chart A.3 The aggregate Tier 1 leverage ratio falls to a low point of 4.6% in the first year of the stress**

Aggregate Tier 1 leverage ratio in the stress<sup>(a)</sup>



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

(a) The Tier 1 leverage ratio is Tier 1 capital expressed as a percentage of the leverage exposure measure excluding central bank reserves, in line with the PRA's Policy Statement 21/17. Projections include the impact of strategic management actions.

financial market variables, including GDP, property prices and unemployment (Chart A.1). The stresses applied to these variables were the same as in the 2017 test. The purpose of maintaining the severity of the stress was to allow the Bank to isolate, as far as possible, the impact of a new accounting standard that came into effect on 1 January 2018 (IFRS 9). In addition, the Bank judged the calibration of the scenario remained appropriate for the March 2018 risk environment.

In the stress scenario, on a start-to-stress basis:

- World GDP falls by 2.4%.
- China GDP falls by 1.2%.
- UK GDP falls by 4.7%.
- UK unemployment rises to 9.5%.
- UK residential property prices fall by 33%.
- UK commercial real estate (CRE) prices fall by 40%.
- UK Bank Rate rises to 4%.
- The sterling exchange rate index falls by 27%.

As in previous years, the 2018 stress test includes a traded risk scenario designed to be consistent with the macroeconomic scenario. This shock involves sharp movements in several market prices, broadly resembling those observed during the financial crisis. Stressed projections for misconduct, well beyond current provisions, are also included.

*The test shows the UK banking system to be resilient to a severe stress.*

Stress-test participants' capital ratios have continued to strengthen since the Bank's 2017 stress test. Banks started the 2018 test with an aggregate Tier 1 risk-weighted capital ratio of 17.7%, up from 16.4% at the beginning of the 2017 test.<sup>(3)</sup> The aggregate CET1 and Tier 1 leverage ratios — on which banks are assessed in the stress test — had also risen from 13.4% to 14.5% and from 5.4% to 5.7% respectively. Since the end-2017 balance sheet cut-off for this year's stress test, the aggregate CET1 capital ratio has risen by a further 20 basis points to 14.7% in 2018 Q3.

As set out in March 2018, the results of the 2018 test include internationally agreed transitional arrangements for IFRS 9. These arrangements are designed to help firms adjust to the new accounting standard and will be phased out by 2023. Banks participating in the stress test have been assessed on this basis and the results set out below are consistent with that.

The stress reduces banks' aggregate CET1 capital ratio from its 14.5% start point to a low of 9.2% in the second year of the stress — a 5.4 percentage point fall — before any conversion

(3) Banks have been required to apply IFRS 9 as of the starting date of their first financial year, starting on or after 1 January 2018, as per Section 5 of the 'Stress testing the UK banking system: guidance for participating banks and building societies'. All end-2017 figures in this publication therefore incorporate the 1 January 2018 (transitional) impact of IFRS 9.

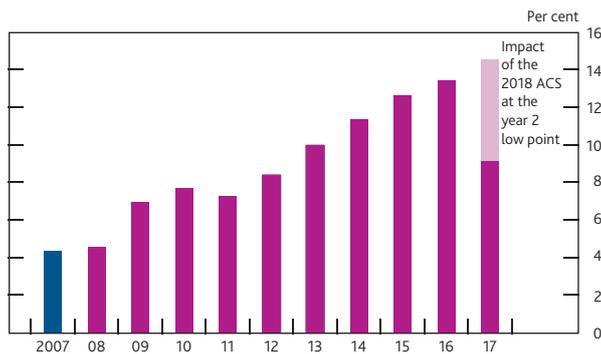
of additional Tier 1 (AT1) capital instruments (**Chart A.2**). The Tier 1 leverage ratio falls by 1 percentage point to a low of 4.6% in the first year of the stress (**Chart A.3**).<sup>(4)</sup>

Some AT1 instruments convert into CET1 in the test. According to the specific contractual terms of banks' AT1 instruments currently in issue, conversion is based on a definition of CET1 that excludes the benefit of transitional arrangements under IFRS 9. As two banks (Barclays and Lloyds Banking Group) see their CET1 ratios fall below 7% in the stress on this non-transitional basis, their AT1 instruments convert into CET1 in the test. This increases the low-point aggregate CET1 ratio in the stress to 9.7% (**Chart A.2**).

Even at the low point of the stress at end-2019, the aggregate CET1 capital ratio is still more than double what it was before the financial crisis (**Chart A.4**). That reflects the strengthening in banks' capital positions over the past decade, with UK banks starting the 2018 test with an aggregate CET1 capital ratio nearly three and a half times higher than prior to the crisis.

**Chart A.4** Even at the low point of the stress the aggregate CET1 ratio is still more than double what it was before the financial crisis

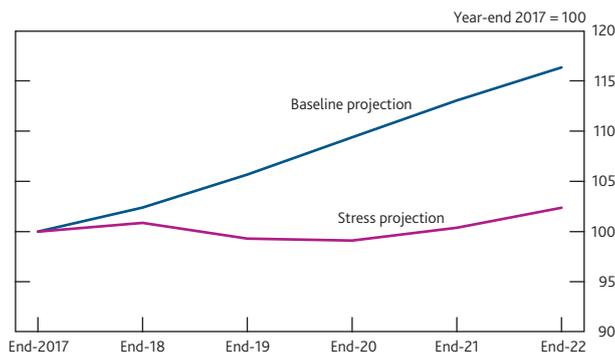
Aggregate CET1 capital ratio of major UK banks since the financial crisis<sup>(a)(b)(c)</sup>



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

- (a) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets. Major UK banks are Barclays, The Co-operative Bank (until 2013), HSBC, Lloyds Banking Group, Nationwide, The Royal Bank of Scotland, Santander UK and Standard Chartered (from 2014). From 2011, data are CET1 capital ratios as reported by banks. Prior to 2011, data are Bank estimates of banks' CET1 ratios.
- (b) Capital figures are year end.
- (c) The impact of the 2018 ACS does not include the conversion of AT1 instruments.

**Chart A.5** Banks continue meet credit demand in the stress  
Projected lending to UK individuals and companies by stress-test participants<sup>(a)</sup>



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

- (a) Companies are defined as private non-financial corporations.

*Banks continue to meet credit demand from the real economy in the stress.*

Banks maintain the supply of credit to UK households and businesses in the stress, with lending to the real economy expanding by around 2% in total over the five years of the scenario (**Chart A.5**). This is in line with the requirements of the test, reflecting an important macroprudential goal of stress testing — namely to help assess whether the banking system is sufficiently capitalised to be able to maintain the supply of credit to the real economy in the face of severe adverse shocks.

*The falls in banks' CET1 and Tier 1 leverage ratios in the stress are driven by a number of factors.*

In the baseline projection (that is, before the stress is applied and which is based on a macroeconomic scenario in line with the Bank's February 2018 Inflation Report forecast), banks use earnings to support expansion of their assets and distributions to shareholders. As a result, the aggregate CET1 ratio in the second year of the baseline is 14.3%, slightly lower than the starting point.

Relative to that baseline, the stress reduces the aggregate CET1 capital ratio by 5.1 percentage points and the Tier 1 leverage ratio by 1.1 percentage points. This compares to falls of 6.0 percentage points and 1.4 percentage points, respectively, in last year's test. The impact of the 2018 stress is smaller primarily because projections for stressed misconduct costs have been reduced. In the 2018 ACS, over five years,

<sup>(4)</sup> Unless otherwise stated, all references to aggregate capital and aggregate stress impacts have been calculated by converting the results of HSBC and Standard Chartered, which both report in US dollars, into pounds sterling at the prevailing exchange rate specified by the Bank of England for the 2018 ACS. For example, aggregates referring to the year 2 CET1 ratio low point are produced using year 2 stress scenario exchange rates.

**Table A.A** Contributions to the shortfall in the aggregate CET1 capital ratio and Tier 1 leverage ratio at the low point of the stress relative to the baseline projection<sup>(a)</sup>

Percentage points (unless otherwise stated)	CET1 ratio <sup>(b)</sup>	Tier 1 leverage ratio <sup>(c)</sup>
End-2017	14.5%	5.7%
<b>Baseline</b> (at CET1 capital/leverage low point) <sup>(d)</sup>	<b>14.3%</b>	<b>5.7%</b>
Impairments	-5.4	-1.4
<i>of which mortgages</i>	-1.2	-0.3
<i>of which consumer credit</i>	-1.5	-0.4
<i>of which lending to businesses</i>	-2.6	-0.7
<i>of which other impairments</i>	-0.1	0.0
Traded risk losses <sup>(e)</sup>	-1.6	-0.6
Risk-weighted assets / leverage exposure <sup>(f)(g)</sup>	-2.5	-0.2
IFRS 9 transitional relief	1.3	0.6
Misconduct costs	-1.0	-0.2
Net interest income	0.7	0.1
Reductions in discretionary distributions in stress <sup>(h)</sup>	2.3	0.4
Expenses and taxes <sup>(i)</sup>	0.6	0.3
Other <sup>(j)</sup>	0.4	0.0
<b>Stress end low point (before AT1 conversion)</b>	<b>9.2%</b>	<b>4.6%</b>
Impact of AT1 conversion	0.5	-
<b>Stress end low point (after AT1 conversion)</b>	<b>9.7%</b>	<b>4.6%</b>

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

- (a) The CET1 ratio aggregate low point is in year 2. The Tier 1 leverage ratio aggregate low point is in year 1.  
 (b) The CET1 ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets (RWAs), where both terms are defined in line with CRR and the UK implementation of CRD IV via the PRA Rulebook.  
 (c) The Tier 1 leverage ratio is Tier 1 capital expressed as a percentage of the leverage exposure measure excluding central bank reserves in line with the PRA's *Policy Statement 21/17*.  
 (d) The baseline low point refers to the equivalent baseline position at the stressed low point.  
 (e) Traded risk losses comprise: market risk losses, counterparty credit risk losses, losses arising from changes in banks' credit and funding valuation adjustments (XVA), prudential valuation adjustments (PVA) and losses on fair value positions not held for trading. This also includes investment banking revenues net of costs.  
 (f) Changes in RWAs impact the CET1 ratio, whereas changes in the leverage exposure measure impact the Tier 1 leverage ratio.  
 (g) The rise in aggregate RWAs is inflated by the large sterling depreciation in the 2018 ACS. However, this depreciation also increases the aggregate value of the CET1 capital that UK banks hold in non-sterling currencies at the start of the test. Netting these two factors together suggests that the underlying impact on the CET1 capital ratio is around -2.5 percentage points. The impact of the aggregate increase in RWAs without taking into account this offsetting increase in the value of CET1 capital is -4.2 percentage points. Similarly, the unadjusted impact of the rise in the aggregate leverage exposure on banks' aggregate leverage ratio is -0.9 percentage points. But accounting for the offsetting effect of changes in the exchange rate on non-sterling capital holdings leaves an impact of -0.2 percentage points.  
 (h) Reductions in discretionary distributions include reductions in dividends, non-contractual variable remuneration and AT1 coupons.  
 (i) Expenses comprise administrative and staff expenses, excluding the non-contractual portion of variable remuneration which is included in reductions in discretionary distributions.  
 (j) Other comprises other profit and loss and other capital movements. Other profit and loss includes share of profit/loss of investment in associates, fees and commissions and other income. Other capital movements include pension assets devaluation, prudential filters, accumulated other comprehensive income, IRB shortfall of credit risk adjustments to expected losses, and actuarial gain/loss from defined-benefit pension schemes.

banks incur around £25 billion of these costs, down from £40 billion in the 2017 ACS. This follows the settlement of some misconduct issues and additional provisions made by banks (see below).

The main drivers of the fall in capital and leverage ratios in the stress are loan impairment charges, traded risk losses, an increase in risk-weighted assets (for the CET1 capital ratio), and stressed misconduct costs. Offsetting part of this is the boost to net interest income as sterling interest rates rise, cuts by banks to discretionary distributions like dividends and variable remuneration, reductions in expenses, and banks paying less tax due to losses incurred during the stress (**Table A.A**).

Further details on the main drivers of the stress impact are set out below.

*Banks incur impairment charges of more than £140 billion over the five years of the stress.*

Large contractions in output combined with falls in asset prices and higher interest rates lead to significant credit impairments in the stress. In total, impairments amount to £143 billion over the five years of the stress, equating to a five-year impairment rate of 4.3%.

Total five-year impairments in the 2018 test are broadly similar to those seen in the 2017 ACS. However, the introduction of the new accounting standard brings forward the recognition of many of these impairments in the stress scenario (see Box 1 for further details). The total UK two-year impairment rate, for example, increases from 3.2% to 3.8% in this year's test.

£115 billion of total impairments occur in the first two years of the test. This reduces the aggregate CET1 ratio by 5.4 percentage points at the peak of the stress (**Chart A.6**).

The earlier recognition of impairments, due to IFRS 9, reduces banks' CET1 ratios by more at the low point than under the old accounting standard. But the IFRS 9 transitional arrangements, according to which the results are assessed, offset some of this effect. The transitional relief operates as an 'add back' to CET1 capital, equivalent to a specified percentage of 'new' provisions made as a result of the introduction of IFRS 9. In the 2018 ACS, this boosts the CET1 ratio at the low point by 1.3 percentage points.

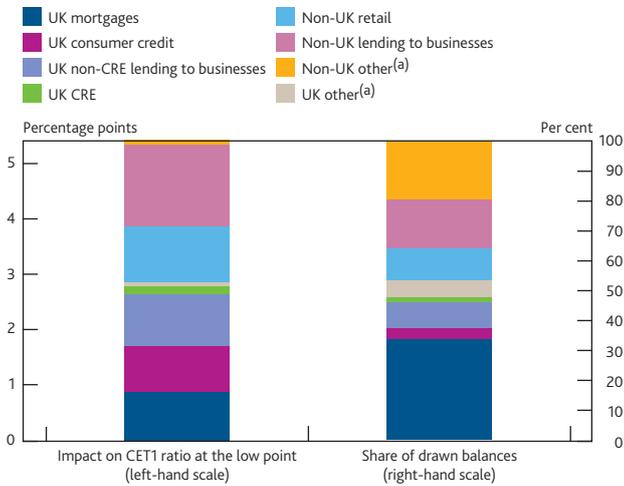
*Around half of total impairments relate to UK lending...*

The riskiness of banks' UK-focused books was little changed between the start of 2017 and the start of 2018.

UK lending impairment charges amount to more than £70 billion in the test and are associated with a cumulative five-year impairment rate of 4.7%. 40% of these impairment

**Chart A.6 Some forms of lending contribute more to impairments than others**

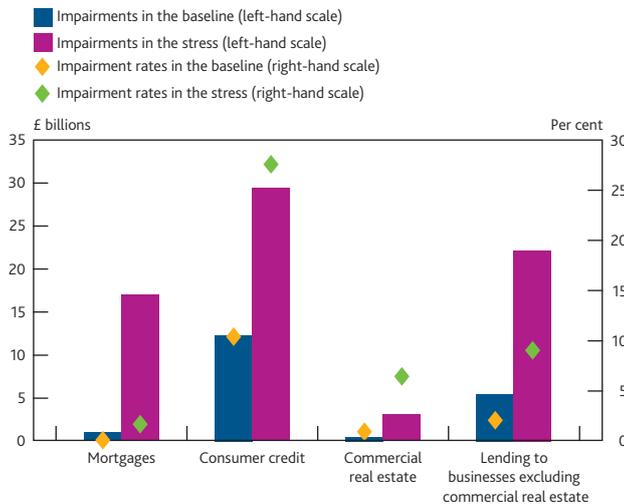
Decomposition of the impact of impairment charges on the aggregate CET1 ratio at the low point of the stress and of banks' initial drawn balances, by lending type



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

(a) Includes lending to sovereigns, financial institutions, housing associations and other *de-minimis* wholesale exposures.

**Chart A.7 The stress leads to material UK impairment charges**  
Aggregate cumulative UK impairments over the five years of the stress<sup>(a)</sup>



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

(a) Cumulative impairment charge rates = (five-year total impairment charge)/(average gross on balance sheet exposure), where the denominator is a simple average of 2017, 2018, 2019, 2020 and 2021 year-end positions.

charges (£29 billion) relate to banks' consumer credit books (Chart A.7), despite these loans accounting for only 7% of the stock of lending. At 27.6%, the five-year impairment rate on consumer credit exposures is 16 times that of mortgages. UK mortgages account for almost two thirds of UK lending but only a quarter of impairments over the five years of the stress (£17 billion) — equating to a much lower stress impairment rate of 1.7%. In the 2017 test, consumer credit losses also totalled £29 billion with a five-year impairment rate of 27.7%. The equivalent figures for mortgage impairments were the same as this year's test, at £17 billion and 1.7% respectively.

Impairments on lending to businesses account for a further one third of UK impairment charges. Participating banks are projected to incur corporate impairments, excluding CRE, of around £22 billion over the five years of the stress, with an impairment rate of 9.0%. Impairments on CRE exposures total just over £3 billion, which translates to a five-year impairment rate of 6.5% (Chart A.7). The loss and impairment rate on CRE lending were slightly higher in the 2017 ACS at £4 billion and 6.9% respectively, while results on non-CRE corporate lending were the same as in this year's test.

*...with non-UK lending accounting for around £70 billion of impairments.*

UK banks start the test with just under half of their total exposures to borrowers outside the United Kingdom. The three most significant areas are Hong Kong and China (13% of total exposures), the euro area (9%) and the United States (7%). Of these, the US has the highest five-year impairment rate for both lending to businesses and individuals, at 7.1% and 20.5% respectively (Chart A.8). The former reflects UK banks' exposure to US companies involved in the oil and gas industry, which are particularly adversely affected by the stress scenario. The latter is driven by the fact that participating banks' lending in the US is weighted towards consumer credit, which typically has higher loss rates than mortgage lending.

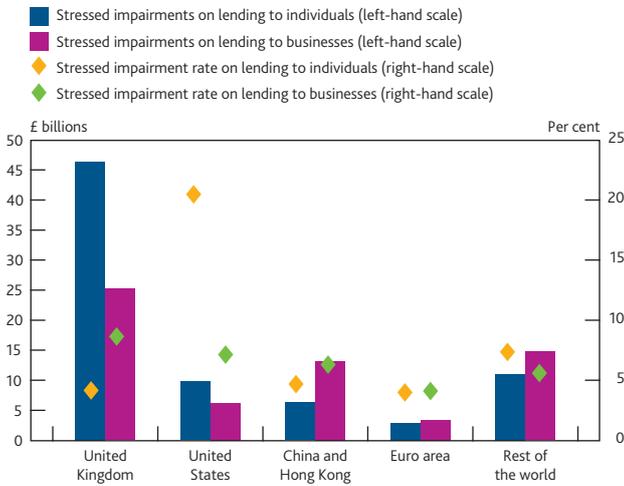
*The results of the test include banks' exposures to leveraged lending.*

The FPC has previously stated its concern about the rapid growth of leveraged lending. For that reason, it has assessed its potential impact on UK banks (see Leveraged lending chapter for further details). The aggregate one-year mark-to-market loss rate on banks' pipeline exposures to leveraged loans that are underwritten but not yet distributed is 22% in the 2018 ACS, generating a loss of £2.8 billion and reducing the aggregate CET1 ratio by 0.2 percentage points.<sup>(5)</sup> This is higher than the 18% loss rate in last year's test, consistent with the deterioration in the quality of issuance at a market-wide level.

(5) Non-investment grade loans are used as a proxy for leveraged loans.

**Chart A.8 Banks incur significant impairment charges in multiple regions**

Aggregate cumulative impairment charges on lending to individuals and businesses over the five years of the stress<sup>(a)(b)</sup>

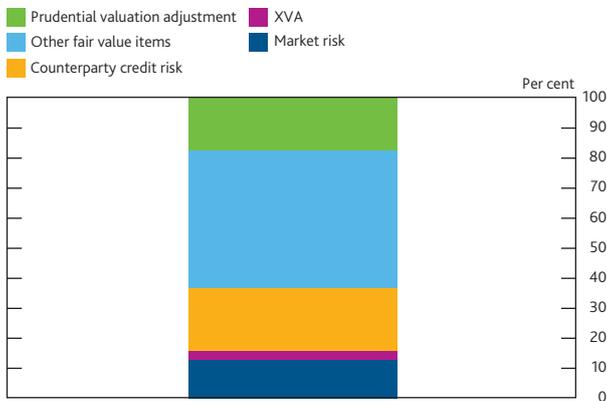


Sources: Participating banks' STDF data submissions, Bank analysis and calculations.

(a) Cumulative impairment charge rates = (five-year total impairment charge)/(average gross on balance sheet exposure), where the denominator is a simple average of 2017, 2018, 2019, 2020, 2021 year-end positions.  
 (b) Data exclude material associates.

**Chart A.9 Traded risk losses are incurred in a variety of ways**

Decomposition of aggregate traded risk losses under the stress scenario in 2018<sup>(a)(b)</sup>



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

(a) Traded risk losses include: market risk losses; counterparty credit risk losses; losses arising from changes in banks' credit and funding valuation adjustments (XVA); prudential valuation adjustments; and losses on fair value positions not held for trading such as bonds held in banks' liquid asset buffers. They exclude investment banking revenues and costs.  
 (b) Nationwide is excluded as it has minimal traded risk exposures.

For non-investment grade corporate loans to large US and UK companies that are held on balance sheet, the estimated cumulative five-year stressed impairment rate is 10.5%. By comparison, the estimated impairment rate in the financial crisis, adjusted for the rising path for interest rates in the ACS, would have been around 6.4% (see **Chart F.10** in the Leveraged lending chapter). This difference is consistent with lower recovery rates than in the financial crisis, due to weakening covenants and other forms of lender protection in loan documentation.

The Bank has also reviewed banks' exposures to large listed UK companies, which have become more highly indebted over the past year. The proportion of debt owed by large listed UK companies with a ratio of net debt to EBITDA greater than four increased from 31% to 38% between the 2017 and 2018 stress tests. But the proportion of stress-test participants' exposures accounted for by these riskier firms has remained stable, at around 13%.

*The traded risk shock results in losses of £27 billion in the first year of the stress.*

Traded risk losses reduce banks' aggregate CET1 ratio by 1.6 percentage points by the low point of the stress in 2019, relative to the baseline. The traded risk element of the scenario included a test of banks' ability to withstand a severe shock to financial market asset prices, the default of several large counterparties. It also covers banks' investment banking revenues and costs projected over the five years of the test.

Traded risk losses are concentrated in the first year of the stress (2018), totalling £27 billion that year. These losses cover fair-valued assets held in both the trading and banking books, including market risk and counterparty credit risk losses and changes in prudential valuation adjustments (**Chart A.9**). Losses begin to unwind in 2019 as asset prices recover.

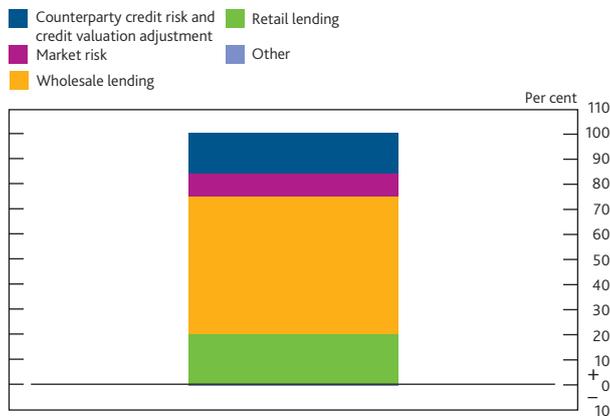
*Increases in banks' leverage exposure measures and risk-weighted assets also reduce banks' Tier 1 leverage and CET1 ratios.*

Banks' aggregate leverage exposure measure rises by around 21% to the Tier 1 leverage ratio low point in 2018. That largely reflects the appreciation of the US dollar in the scenario; excluding that effect, banks' leverage exposures are broadly stable over the same period.

Aggregate total risk-weighted assets (RWAs) rise by 56% by the CET1 low point of the stress in 2019, including the impact of the US dollar appreciation. The deterioration of credit quality in the stress causes credit risk weights to rise from an average of 36% to 53%, while traded risk RWAs double over the same period as a result of deteriorating credit quality, increasing counterparty exposures and more volatile markets. Relative to the baseline, the largest rise overall relates to

### Chart A.10 The increase in RWAs is primarily driven by wholesale lending

Contributions to the increase in risk-weighted assets in the stress relative to the baseline at the low point of the stress<sup>(a)</sup>



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

(a) Other includes structured finance, operational risk and other residual items.

wholesale lending (Chart A.10), of which non-UK wholesale lending accounts for the vast majority of the increase.

### *Stressed misconduct projections continue to weigh on banks' capital.*

Misconduct costs have continued to be a significant headwind to capital accretion for the UK banking system. In 2017, provisions relating to past misconduct totalled around £6 billion, reducing the pre-tax profits of banks by just under one fifth. In aggregate, between 2011 and 2017, participating banks paid out or provisioned for more than £70 billion of misconduct costs.

In addition to these significant misconduct costs already realised and provided for, banks face further potential costs related to past misconduct. Accounting rules require provisions to be raised where an obligation exists only once settlement is considered probable and where a reliable estimate of the amount can be made. As a result, accounting provisions at end-2017 do not cover all potential misconduct costs from 2018 onward.

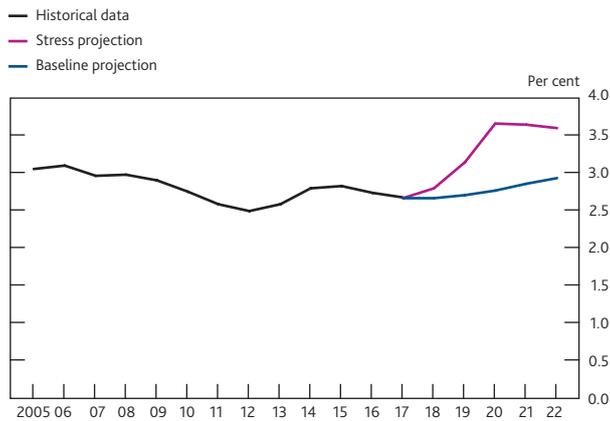
In the 2018 ACS, the aggregate stressed projection for misconduct costs over and above that incurred or provided for at end-2017 is around £25 billion over the five years of the stress. Around £20 billion of these are realised in the first two years of the stress. This stressed projection is substantially lower than the £30 billion of costs projected over the first two years of the 2017 ACS. That reflects provisions taken in 2017 and the fact a number of settlements have been reached on conduct issues over the past year, including with the US Department of Justice on residential mortgage-backed securities.<sup>(6)</sup>

### *The widening of net interest margins in the stress supports net interest income.*

Net interest income is the largest source of income for all banks participating in the 2018 stress test and in 2017 accounted for just under two thirds of banks' aggregate income. Around two thirds of total net interest income is accounted for by sterling.

The assumed rise in Bank Rate to 4% in the stress helps banks to widen the gap between what they are able to earn from interest on loans and what they are required to pay out on deposits. In part that is explained by banks' ability to reinvest their non-interest bearing liabilities (such as current account deposits and equity) in sterling assets on which the return rises through the stress.

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

**Chart A.11 Sterling loan margin widens in the stress**Sterling loan margin in the 2018 ACS<sup>(a)</sup>

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

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

Consistent with that, banks' net interest margin widens in the stress to a greater degree than under the baseline scenario. Sterling loan margin — a measure of the spread between average effective sterling loan and deposit rates — starts the test at 2.66% and rises to 3.14% by the low point of the stress (**Chart A.11**). Despite this rise, however, the level of margins at the two-year capital low point is very slightly lower than in the 2017 test.

Relative to the baseline projection, the change in net interest income across all currencies adds 0.7 percentage points to the aggregate CET1 ratio at the trough of the stress (**Table A.A**).

*Cuts to dividends and discretionary payments help mitigate the impact of the stress.*

In a stress, when a bank falls below a certain level of capital, it is subject to restrictions on the amount it can pay out on things like dividends to investors, variable remuneration (ie bonus pay) to its employees, and other distributions such as AT1 coupons. Before it gets to this stage, a bank can also voluntarily choose to make reductions in these types of payments in order to bolster its capital position.<sup>(7)</sup>

Some of the reductions to distributions seen in the stress test derive from PRA rules and other legal requirements and are mandatory, while others are proposed voluntarily by the banks themselves. Overall, reductions in distributions offset more than two fifths of the fall in the CET1 capital ratio, relative to the baseline (before the conversion of AT1 instruments). This highlights that the flexibility to adjust the level of distributions in a downturn is an important factor in ensuring banks' resilience. Banks' commitment to using that flexibility in a stress, including in relation to variable remuneration, is therefore an important element of the FPC and PRC's judgement about the adequacy of capital levels today.

In the baseline projection, which does not include misconduct costs, participating banks pay out a total of £28.2 billion in ordinary dividends in the first two years, compared with £8.2 billion and £9.9 billion actually paid out in 2016 and 2017. In contrast, they pay out no dividends on ordinary shares during the first two years of the stress (**Table A.B**).<sup>(8)</sup> This retention of £28 billion, relative to the baseline, pushes up the aggregate CET1 ratio by 1.5 percentage points at the two-year CET1 low point of the stress.

**Table A.B Cuts to dividends and other payments help mitigate the impact of the stress**

Dividends, variable remuneration, additional Tier 1 coupons and other distributions in the 2018 ACS

£ billions	Actual 2017	To end-2019 in the baseline	To end-2019 in the stress
Ordinary dividends <sup>(a)</sup>	9.9	28.2	0.2
Variable remuneration <sup>(b)</sup>	5.7	10.9	1.3
AT1 discretionary coupons and other distributions <sup>(c)</sup>	3.5	6.7	2.4

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

(a) Ordinary dividends shown net of scrip payments, and are in respect of the year noted. They are on a foreseeable basis.

(b) Variable remuneration reflects discretionary distributions only (ie upfront cash awards awarded in the current year, paid in the current year only), pre-tax.

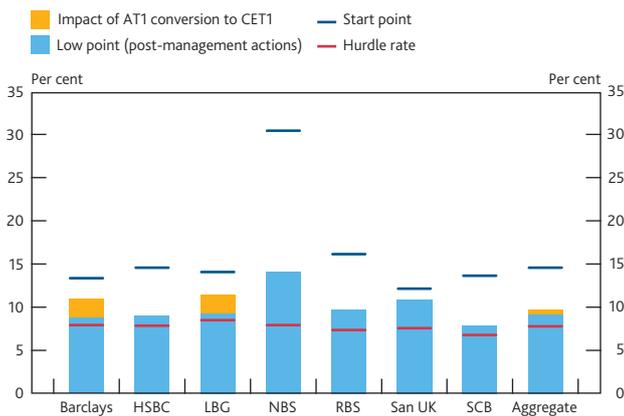
(c) Other distributions includes preference dividends, and other discretionary distributions.

<sup>(7)</sup> To ensure profit distributions do not jeopardise a bank's capital position the Capital Requirements Directive (CRD) IV requires that profit distributions that reduce CET1 capital should be restricted where a bank does not meet its CRD IV combined buffer requirements (the sum of systemic buffers, the countercyclical capital buffer and the capital conservation buffer). For banks that breach their combined buffer requirement, the maximum amount of profit allowed to be distributed is pre-defined and is known as the Maximum Distributable Amount. Banks are also prevented from making such distributions if they would fail to meet their CRD IV combined buffer as a result.

<sup>(8)</sup> Nationwide continues to make distributions on its Core Capital Deferred Shares during the stress. These total £0.2 billion by the low point.

**Chart A.12 All banks clear their CET1 ratio hurdle rate in the stress**

Projected CET1 capital ratios in the stress scenario<sup>(a)(b)(c)</sup>

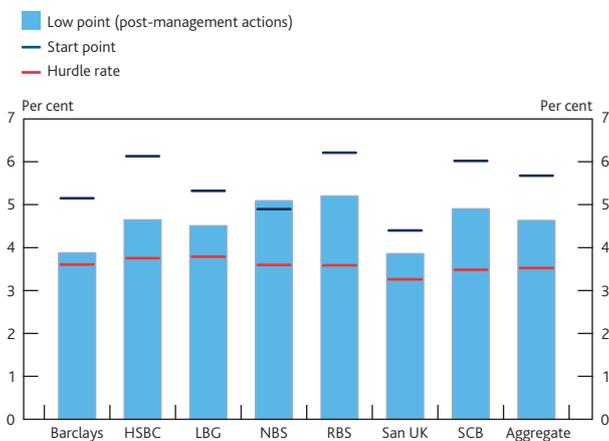


Sources: Participating banks' STDF data submissions, Bank analysis and calculations.

- (a) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of RWAs, where these are in line with CRR and the UK implementation of CRD IV via the PRA Rulebook. Aggregate CET1 capital ratios are calculated by dividing aggregate CET1 capital by aggregate RWAs at the aggregate low point of the stress in 2019.
- (b) The minimum CET1 capital ratios shown in the chart do not necessarily occur in the same year of the stress scenario for all banks. For individual banks, low-point years are based on their post-strategic management actions and CRD IV restrictions, pre-AT1 conversion projections.
- (c) According to the specific contractual terms of banks' AT1 instruments currently in issue, conversion is based on a definition of CET1 that excludes the benefit of transitional arrangements under IFRS 9. As two banks (Barclays and Lloyds Banking Group) see their CET1 ratios fall below 7% in the stress on this non-transitional basis, their AT1 instruments convert into CET1 in the test. This effect is therefore shown in the chart.

**Chart A.13 All banks clear their Tier 1 leverage hurdle rate in the stress**

Projected Tier 1 leverage ratios in the stress scenario<sup>(a)(b)</sup>



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

- (a) The Tier 1 leverage ratio is Tier 1 capital expressed as a percentage of the leverage exposure measure excluding central bank reserves, in line with the PRA's *Policy Statement PS21/17*. Aggregate Tier 1 leverage ratios are calculated by dividing aggregate Tier 1 capital by the aggregate leverage exposure measure at the aggregate low point of the stress in 2018.
- (b) The minimum Tier 1 leverage ratios shown in the chart do not necessarily occur in the same year of the stress scenario for all banks. For individual banks, low-point years are based on their post-strategic management actions and CRD IV restrictions pre-AT1 conversion projections.

Total variable remuneration is also cut from a baseline projection of £10.9 billion to £1.3 billion over the first two years of the stress. This boosts the CET1 capital ratio by 0.5 percentage points. Other distributions, including AT1 discretionary coupons, are reduced from a baseline projection of £6.7 billion to £2.4 billion over the same period. This boosts banks' aggregate CET1 capital ratio by 0.2 percentage points relative to the baseline.

*No bank needs to strengthen its capital position as a result of the stress test.*

Performance in the test is assessed against the Bank's hurdle rate framework, which comprises elements expressed in terms of both risk-weighted CET1 capital and Tier 1 leverage ratios. For the 2018 ACS, the hurdle rate framework has evolved in a number of ways, as set out in Box 2. Each bank's hurdle rates reflect its minimum capital requirements, plus an additional element to reflect its systemic importance, less an adjustment related to the impact of IFRS 9 (see Box 1).

Banks are judged against their hurdle rates based on their capital positions before the conversion of contingent capital instruments such as AT1. This reflects the PRC's policy that capital buffers should be held in CET1 capital.

For illustrative purposes, if individual banks' hurdle rates were aggregated, the banking system as a whole would have cleared its indicative aggregate CET1 capital and Tier 1 leverage hurdle rates by 1.4 percentage points and 1.1 percentage points respectively, before the conversion of AT1 instruments (**Chart A.12** and **Chart A.13**). Even after the severe losses in the test scenario, the participating banks would, in aggregate, have a Tier 1 leverage ratio of 4.6%, and, before the conversion of AT1 instruments, a CET1 capital ratio of 9.2% and a Tier 1 capital ratio of 11.3%.

The results show that no individual bank fell below its hurdle rate. As a result, the PRC judged that no bank was required to take action to improve its capital position as a result of the stress test. Further details of individual banks' results are set out in Annexes 4 and 5.

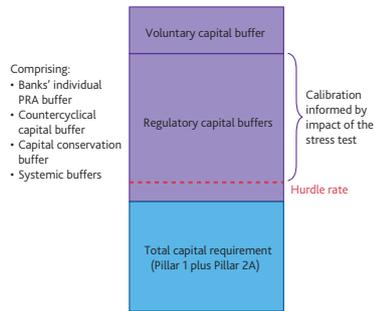
The Bank remains committed to giving banks the full benefit of IFRS 9 transitional arrangements, including in the stress test. The Bank is also publishing each bank's non-transitional IFRS 9 capital low points. These hypothetical low points would only apply when the new accounting standard is fully phased in. This is not due to occur until 2023, by which time banks' balance sheets are likely to have changed. These can be found in Annex 4 alongside the transitional results upon which the test is based.

*Calibration of regulatory capital buffers.*

As set out in the Bank's 'Approach to stress testing the UK banking system', the FPC and PRC use the reduction in CET1

### Figure A.1 Buffers are set so that banks could absorb the impact of the stress and remain above their hurdle rate

How the stress test interacts with the CET1 capital framework for an illustrative bank<sup>(a)</sup>



Source: Bank of England.

(a) The hurdle rate includes banks' minimum capital requirements plus a proportion of their systemic buffers. The effect of the IFRS 9 hurdle rate adjustment (see Box 1) means that different banks will have different amounts of systemic buffers in the hurdle rates against which they will be judged this year. That reflects how IFRS 9 impacts individual banks differently and the constraint that hurdle rates are floored at a bank's minimum capital requirements.

ratios in the stress test to help inform the setting of regulatory capital buffers.

Following the results of the test, and taking account of other developments and other inputs, the FPC first sets the system-wide UK countercyclical capital buffer rate (see Box 3), with the PRC then setting additional bank-specific capital buffers (the 'PRA buffers'). The FPC's and PRC's stated approach is to compare the impact of the stress to overall regulatory capital buffers beyond banks' hurdle rates. If that assessment demonstrates that these buffers are not appropriately calibrated to absorb the impact of the stress and remain above the hurdle rate, the FPC and the PRA may act to adjust regulatory capital buffers (Figure A.1). Conversely, if the assessment shows the current setting of regulatory capital buffers to be more than sufficient, the FPC and the PRA may act to reduce them.

### Qualitative review

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

A key focus of this year's qualitative review was an assessment of participating banks' stress-testing model risk management frameworks. The Bank noted that all banks participating in the 2018 stress test have demonstrated an increased awareness of the need to implement effective model risk management frameworks. Some banks have made good progress against PRA expectations. However, other banks need to make substantial improvements to raise the management of model risk to a standard required for stress testing. In addition, the PRC judged that the Boards of a majority of the banks are yet to have an adequate understanding of limitations in their key stress-testing models. Where material adjustments are applied, banks should consider whether the judgements used are well supported, including through the use of appropriate empirical data or benchmarking analysis.

To build on this review, the PRA will provide feedback to banks detailing areas requiring improvements. The 2015 Stress Testing Approach Document indicated that, in future, more detail might be published of the Bank's observations on good and bad practice arising from the qualitative review. The PRC is minded to include reference to qualitative review outcomes in next year's publication of bank specific assessments. Further consideration will be given to this, in light of the PRA's objectives, in the coming months. As set out in the Bank's 2015 Stress Testing Approach document, findings from the qualitative review could be used to inform the setting of the PRA buffer.

### Box 1 IFRS 9 in the 2018 stress test

The 2018 ACS is the first of the Bank’s annual stress tests to be conducted under a new accounting standard, International Financial Reporting Standard 9 (IFRS 9), which was introduced on 1 January 2018. This box sets out details of the impact of this change on the stress-test results and the Bank’s response to the impact.

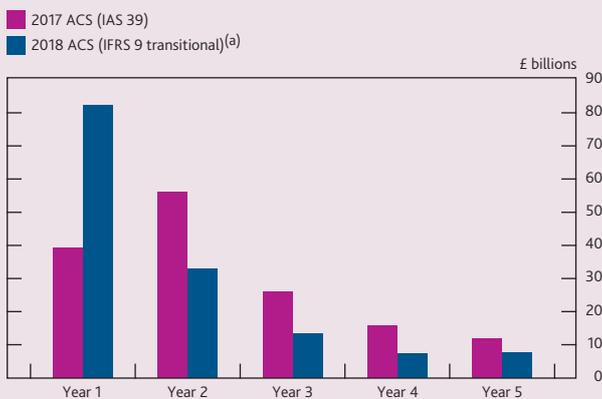
Under IFRS 9, banks provide for expected credit losses on all loans. This differs from the previous accounting standard — IAS 39 — under which credit losses were taken only after there was objective evidence of impairment (such as a loan repayment becoming overdue). The earlier recognition of losses under IFRS 9 should enhance transparency and market confidence in book measures of banks’ capital positions, including in a downturn, thereby supporting financial stability and the safety and soundness of individual firms.

*As expected, a larger share of impairments is recognised earlier in the 2018 ACS under IFRS 9...*

Aggregate credit impairments over the five years of the stress are similar to last year’s test, at over £140 billion. But as expected given the introduction of IFRS 9, timing of the recognition of impairments has changed. This year, around 80% of impairments are recognised in the first two years of the stress, compared with around 64% in the 2017 ACS. That equates to just under £20 billion of additional impairments occurring in the first two years of the stress compared with the previous test (Chart A).

#### Chart A IFRS 9 means impairments are recognised earlier in the stress scenario

Time profile of impairments under IAS 39 and IFRS 9 in the stress



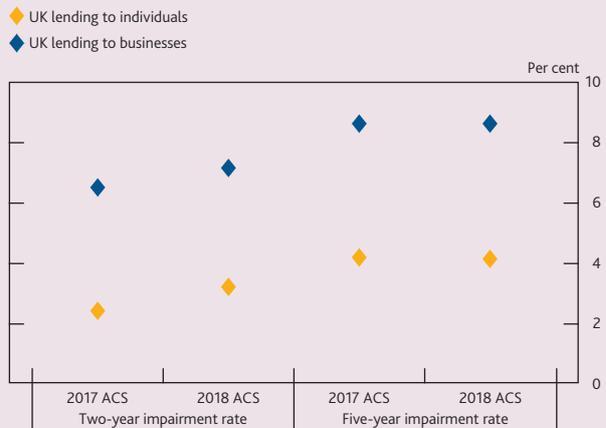
Sources: Participating banks’ STDF data submissions, Bank analysis and calculations.

(a) Transitional relief is calculated as the impact of IFRS 9 on credit losses but is applied directly to capital (ie transitional relief does not affect figures shown in this chart).

Chart B shows what this means for banks’ UK impairment rates for lending to individuals and businesses. While five-year

#### Chart B Two-year UK impairment rates are higher than in the 2017 ACS but five-year impairments are unchanged

Aggregate impairment rates for UK lending to individuals and businesses in the 2017 and 2018 ACS<sup>(a)</sup>



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

(a) Five-year cumulative impairment rates = (five-year total impairment charges) / (average gross on balance sheet exposure), where the denominator is a simple average of 2017, 2018, 2019, 2020 and 2021 year-end positions. For the purposes of aggregation, impairment charges and balance sheet exposures for HSBC and Standard Chartered are converted to sterling using exchange rates consistent with the stress scenario. Two-year cumulative impairment rates are calculated for the first two years of the stress scenario using the same approach.

rates in the two tests are unchanged at 4.2% and 8.6% respectively, the equivalent two-year rates are noticeably higher than in the 2017 ACS, proportionately more so for lending to UK individuals.

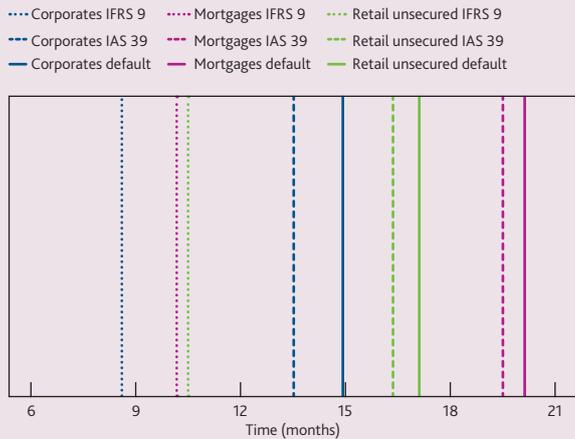
*... which has a greater relative capital impact for banks with a larger share of retail losses than corporate losses.*

This difference in the timing of impairments matters as it means banks’ capital, as measured under IFRS 9, falls more sharply in the early part of the stress, before recovering more rapidly. In the context of the ACS, this has the effect of reducing CET1 capital at the year two low point by more than in the 2017 test. And this impact varies across banks, driven in part by differences in their exposure to retail versus corporate losses.

Under IAS 39, corporate provisions had tended to be recognised much earlier than retail provisions in the stress test (dashed lines in Chart C), in line with the pattern of defaults (solid lines, Chart C). This was in part a function of the stress scenario, which sees GDP, and hence corporate profits, reach a trough in the first year of the stress. Meanwhile the unemployment peak and house price trough, which drive retail losses, occur later in the scenario.

By bringing the recognition of expected losses forward, IFRS 9 brings the timing of loss recognition for retail and wholesale assets closer together (dotted lines, Chart C). As a result, the impact of IFRS 9, in terms of the reduction in CET1 ratios at the year two low point, is generally larger for banks with a greater share of retail losses (Chart D).

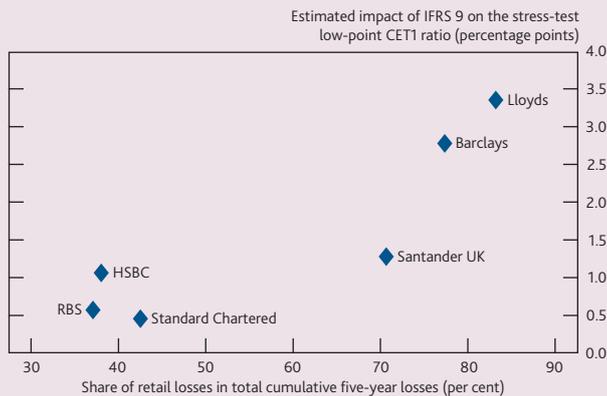
**Chart C Retail losses are recognised much earlier under IFRS 9**  
Average timing of credit defaults and loss recognition under IAS 39 and IFRS 9 across asset classes<sup>(a)</sup>



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

(a) Bank staff estimates based on exposure on the book at the start of the stress scenario, removing the impact of new lending during the scenario.

**Chart D The capital impact of IFRS 9 is larger for banks with a greater share of retail losses**  
The impact of IFRS 9 on low-point CET1 ratios across participating banks<sup>(a)</sup>



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

(a) The impact of IFRS 9 on Nationwide's low-point CET1 ratio differs significantly from other banks participating in the stress test and has been excluded from the chart. This is due to Nationwide's risk-weight model in which regulatory expected loss in stress rises by more than provisions even after the impact of IFRS 9.

The relationship between the impact of IFRS 9 on provisions and the impact of IFRS 9 on capital is not necessarily one-for-one. For example, where banks had one-year regulatory expected losses — as calculated based on their internal risk models — higher than provisions under IAS 39, they will have a capital impact of IFRS 9 smaller than the IFRS 9 impact on provisions. That is because under the capital framework, expected losses in excess of provisions are deducted from capital.

*Banks have been assessed on a transitional IFRS 9 basis in the 2018 ACS.*

Alongside the introduction of IFRS 9, arrangements have been put in place under EU law to offer banks transitional relief as

they adapt to the new standard. These arrangements allow banks to 'add back' to CET1 capital a specified percentage of 'new' provisions made due to the adoption of IFRS 9. These arrangements will be gradually phased out, with 95% of 'IFRS 9-related' provisions being added back to CET1 capital in 2018, falling to 85% in 2019, 70% in 2020, 50% in 2021 and 25% in 2022. Full recognition of IFRS 9 takes effect from 2023.

The Bank has assessed participating banks' results taking account of these transitional arrangements, consistent with the approach set out in [March 2018](#). To ensure transparency the Bank is also publishing each bank's capital low points on a non-transitional basis.

**Table 1** compares the stress-test results with low-point CET1 ratios on a hypothetical non-transitional basis. Further detail on individual bank results can be found in Annex 4.

**Table 1 CET1 ratios at the low points and hurdle rates<sup>(a)(b)</sup>**

**Results of 2018 ACS (transitional IFRS 9 basis)**

	Actual (end-2017) <sup>(c)</sup>	Low point before AT1 conversion	Low point after AT1 conversion	2018 ACS hurdle rate <sup>(d)</sup>
Barclays	13.3	8.9	11.0	7.9
HSBC	14.6	9.1	9.1	7.8
Lloyds Banking Group	14.0	9.3	11.4	8.5
Nationwide	30.4	14.1	14.1	7.9
The Royal Bank of Scotland	16.2	9.7	9.7	7.3
Santander UK	12.2	10.9	10.9	7.5
Standard Chartered	13.6	7.9	7.9	6.7
<b>Aggregate</b>	<b>14.5</b>	<b>9.2</b>	<b>9.7</b>	<b>7.8</b>

**Hypothetical CET1 ratios (with full implementation of IFRS 9)**

	Actual (end-2017) <sup>(c)</sup>	Low point before AT1 conversion	Low point after AT1 conversion	Hurdle rate <sup>(d)</sup>
Barclays	13.0	6.5	8.8	7.0
HSBC	14.5	8.2	8.2	6.6
Lloyds Banking Group	13.8	6.4	8.6	6.9
Nationwide	30.3	14.1	14.1	7.8
The Royal Bank of Scotland	16.2	9.2	9.2	6.9
Santander UK	12.1	9.7	9.7	7.7
Standard Chartered	13.5	7.5	7.5	6.4
<b>Aggregate</b>	<b>14.4</b>	<b>8.2</b>	<b>8.7</b>	<b>6.9</b>

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

- (a) Hurdle rates shown are at the relevant low point. Low-point years may vary on a transitional and non-transitional basis. Non-transitional IFRS 9 hurdle rates are hypothetical. The Bank will review its method for calculating these hurdle rates in future years. For the 2018 ACS results, CET1 low points occur in year 2 for all banks, except Santander UK, whose low point occurs in year 1. Its hurdle rate does not include systemic buffers because these only apply from 2019 onwards. For non-transitional IFRS 9 results, CET1 low points occur in year 1 for Barclays and HSBC, and year 2 for other banks.
- (b) Adjustments have also been applied to banks' Tier 1 leverage ratio hurdle rates.
- (c) End-2017 incorporates the 1 January 2018 (transitional impact of IFRS 9).
- (d) Hurdle rates shown are following the adjustment to take account of the impact of IFRS 9.

**Table 1** also shows CET1 hurdle rates, which have been adjusted for IFRS 9. The hypothetical non-transitional adjustment is calculated taking full account of IFRS 9, but for the hurdle rate used for this year's results, only a proportion of

this total adjustment is applied. This ensures that banks do not benefit twice (ie from both the hurdle rate adjustment and the transitional arrangements). The rationale for this adjustment and the basis upon which it is made are set out below.

Tier 1 leverage hurdle rates have also been adjusted to take account of the impact of IFRS 9 using the same principles as those applied to CET1 hurdle rates.

*The Bank has judged that it is appropriate to adjust stress-test hurdle rates to take account of IFRS 9...*

The FPC's judgement of the necessary level of loss-absorbing capacity for the UK banking system is invariant to accounting standards. It is calibrated so that banks could absorb cumulative losses during a severe stress and continue to provide essential services to the real economy.<sup>(1)</sup> The Bank's stress test is used by the FPC and PRC to ensure that banks have the necessary level of resilience in light of the risk environment.

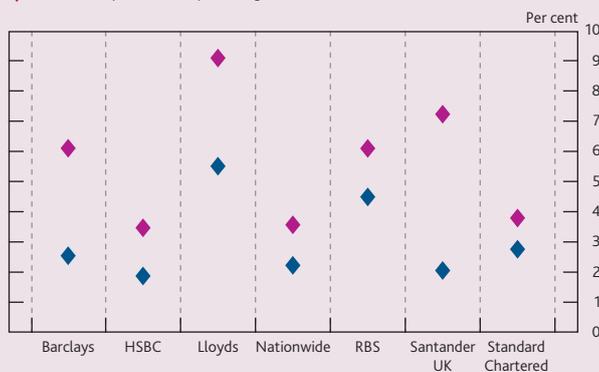
The introduction of IFRS 9 has two related effects on the stress test, which the FPC and PRC will consider when deciding, respectively, the appropriate level of capital for the banking system and individual institutions within it.

First, participating banks have more provisions recorded for expected future losses at the low point of the test than under the old accounting standard. This is reinforced by the Bank's decision that stress-test participants should assume perfect foresight of the stress scenario, removing the possibility that banks assume that they learn about the true severity of the stress only gradually. **Chart E** shows the scale of additional provisions under IFRS 9 for each bank, highlighting how the impact is more pronounced for some.

**Chart E IFRS 9 means banks are making more provisions at the low point**

Banks' provisions at the low point of the stress<sup>(a)(b)</sup>

◆ 2017 ACS — provisions as percentage of RWAs  
◆ 2018 ACS — provisions as percentage of RWAs



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

(a) Chart shows the estimated provisions balances, as a share of RWAs, held in the year in which the CET1 ratio reaches its trough.

(b) 2018 ACS results shown on a non-transitional IFRS 9 basis. The 2017 ACS was conducted on an IAS 39 basis.

Second, as **Table 1** highlights, these additional provisions mean there is generally a greater fall in capital at the low point of the stress under IFRS 9 (comparing the non-transitional low points and results). This is important because the capital buffers set by the FPC and PRC for banks take into account the impact of the stress at the capital low point, and a greater fall in capital to the low point would imply — other things equal — that they would need to maintain higher capital buffers to meet their hurdle rates in the ACS. This is despite the fact that total losses over the course of the stress would be virtually the same under both IFRS 9 and IAS 39.

Other things equal, the more provisions a bank has taken early in the stress test against potential future loan defaults, the less its capital will be vulnerable to depletion later on in the scenario when defaults on those loans occur. And it is appropriate to recognise this when considering the level of capital banks are expected to have in the stress test. Such an approach avoids an unwarranted *de facto* increase in capital requirements as a result of the stress test.

*...subject to two constraints that ensure system-wide resilience is maintained.*

As announced in **March 2018**, the Bank intends to recognise the impact on resilience associated with banks taking more provisions earlier in the stress test under IFRS 9 through downward adjustments to each bank's hurdle rates in the test. In line with the Bank's previous statement, these adjustments are subject to two constraints. First, the effect of the adjustments on system-wide capital requirements is no bigger than the impact in aggregate of the change in accounting standard. And second, no bank is left with a hurdle rate below its minimum CET1 capital (Pillar 1 plus Pillar 2A) and minimum Tier 1 leverage ratio requirements.

There are a number of ways in which such an adjustment could be delivered. For the 2018 test, the Bank's approach is to adjust the hurdle rates for each bank in line with the capital impact arising from those provisions newly made because of the introduction of IFRS 9. This means that banks with relatively larger increases in provisions due to IFRS 9 (as shown by the difference between the blue and magenta diamonds in **Chart E**) will generally benefit from relatively larger adjustments to their hurdle rates (**Table 1**), in recognition of their increased resilience to future defaults on those loans in the stress, for a given capital ratio.

This adjustment is made possible under the FPC and PRC's constraints by the inclusion of systemic buffers in the hurdle rates for the test (see **Box 2**). Banks with high levels of

(1) See Brooke, M, Bush, O, Edwards, R, Ellis, J, Francis, B, Harimohan, R, Neiss, K and Siegert, C (2015), 'Measuring the macroeconomic costs and benefits of higher UK bank capital requirements', *Bank of England Financial Stability Paper No. 35*, December.

additional provisions under IFRS 9 will be able to use more of their systemic buffers in the stress test, which is appropriate given the increased resilience for a given capital ratio conferred by recording those provisions early in the test. In contrast, banks with fewer additional provisions being taken early in the test, and therefore a smaller increase in resilience for a given level of capital, will be expected to maintain more of their systemic buffers in the test. The adjustment will be made both to banks' CET1 capital and Tier 1 leverage ratio hurdle rates.

While the Bank has chosen to take this approach in the 2018 ACS, it will now work on a more enduring treatment that does not rely on comparisons with provisions under the old accounting standard. This will also provide additional time to learn more about the interaction between IFRS 9 and banks' internal regulatory capital models.

At this stage the Bank is considering adopting one of the following two approaches. First, the hurdle rate adjustment could be calibrated to take account of those provisions held in excess of one-year regulatory expected loss, at the low point of the stress. This would mirror the capital framework where, in general, one-year expected losses are assumed to be provisioned for, with any shortfall in provisions being deducted from capital. One issue with this approach is that banks have different internal models that are used to calculate regulatory expected losses.<sup>(2)</sup>

As an alternative, the calibration could be focused on the three stage definitions of IFRS 9: (i) stage one — non-defaulted assets, on which provisions must be made for 12-month expected credit losses; (ii) stage 2 — non-defaulted assets, which have experienced a significant increase in credit risk, on which provisions must be made for lifetime expected credit losses; and (iii) stage 3 — defaulted assets, on which provisions must be made for lifetime expected credit losses.<sup>(3)</sup>

New provisions relating to 'stage 2' assets account for the bulk of the difference in the timing of loss recognition relative to the IAS 39 accounting approach. They could therefore be seen as a proxy for the overall impact of IFRS 9.

The Bank will seek views on the best future approach with relevant stakeholders in 2019, where appropriate, with a view to finalising the approach in next year's stress test.

*Further changes have also been made to the hurdle rate framework this year.*

In addition to the IFRS 9 adjustment outlined above, the hurdle rate framework for the 2018 ACS has evolved in a number of ways relative to last year's test, as highlighted in the '[Stress testing the UK banking system: key elements of the 2018 stress test](#)', published in March 2018. Further details of these are provided in Box 2.

(2) The PRA's *Policy Statement PS13/17* sets an expectation on all firms to replace their existing mortgage RWA models with 'hybrid' models by the end of 2020. This should reduce differences between different banks' risk-weight models.

(3) In this box, references to defaulted assets are synonymous with credit impaired assets and non-defaulted assets are synonymous with non-credit impaired assets.

## Box 2

### Hurdle rate framework for the 2018 ACS

The annual cyclical scenario (ACS) is, among other things, a tool to help the FPC and PRC judge (respectively) the appropriate size of system-wide and individual bank capital buffers. Related to this, the test also assesses whether individual banks have sufficient capital resources to maintain the supply of credit to the economy in a stress. If a bank does not, the PRC may require it to take action to strengthen its capital position.

The level of capital that banks need to maintain in the test is determined by the Bank's hurdle rate framework, which comprises elements expressed both in terms of risk-weighted CET1 capital and Tier 1 leverage ratios.

The hurdle rate framework for the 2018 ACS has evolved in a number of ways relative to last year's test, as explained in the [Key elements of the 2018 stress test](#), published in March 2018. The key changes are:

- The inclusion of systemic buffers in the hurdle rate against which banks are assessed. These are the additional capital buffers systemically important banks are subject to in recognition of the greater impact their failure could have on lending to the real economy and financial stability more generally.
- The fact that this systemic element of the hurdle rate will include buffers to reflect a bank's domestic systemic importance, and not just its global importance.
- A refinement to the calculation of the Pillar 2A element of banks' minimum capital requirements, in order to more accurately reflect the way these requirements would be likely to evolve in a real stress.
- Adjustments to take account of the impact of IFRS 9 under stress.

Further details of these changes are set out below.

#### *The changes relate to the risk-weighted CET1 ratio hurdle rate...*

In previous years, banks participating in the Bank's stress test were assessed against two CET1 benchmarks. The first was a hurdle rate comprising each bank's minimum CET1 capital requirements; that is the sum of the internationally agreed Pillar 1 common minimum standard of 4.5% of risk-weighted assets (RWAs), and any uplift to that minimum capital requirement set by the Prudential Regulation Authority (PRA) (Pillar 2A). The second was a higher 'systemic reference point' that also incorporated global systemic buffers, which global

systemically important banks are required to maintain. For the 2018 test the distinction between a 'hurdle rate' and a 'systemic reference point' has been removed, with all banks now assessed against the higher standard.<sup>(1)</sup>

In addition, in the 2018 ACS, the hurdle rate now explicitly recognises that banks can be systemically important in a domestic context and may warrant higher capital to absorb stress in the same way as global systemically important institutions. From January 2019, the systemic risk buffer (SRB) will take effect in the UK, with the specific aim of increasing the capacity of certain UK systemic banks to absorb stress. As with global systemic buffers, that introduction is reflected in the stress test through the application of uplifts to banks' hurdle rates.<sup>(2)</sup>

The hurdle rate framework used in the 2018 ACS also includes a new approach for the calculation of banks' Pillar 2A capital requirements through the course of the stress test. This is aimed at more accurately reflecting the way Pillar 2A, expressed as a proportion of RWAs, would evolve in a real stress.

Pillar 2A is a bank-specific minimum capital requirement applied to cover a range of risks not (or not adequately) captured in the Pillar 1 requirements. In previous tests, an individual bank's Pillar 2A requirements have been projected to rise in line with their total RWAs. However, in practice, many of the risks reflected in Pillar 2A, such as pension risk, are not directly related to the size of a bank's total RWAs.

Since the publication of the [Key elements of the 2018 stress test](#) in March 2018, the PRA has [set out](#) details of the refined approach it will take to calculating Pillar 2A in the stress test. This new approach means that each Pillar 2A risk component either scales with a simple, appropriate metric or remains as a fixed add-on throughout the test. For example, Pillar 2A requirements for operational risk will scale with total assets, which rise by less than total RWAs. The net effect of these changes is that the projected Pillar 2A requirement, as a percentage of RWAs factored into banks' stress-test hurdle rates is likely to fall through the test.

The final change to the hurdle rate framework reflects the introduction of new accounting standard IFRS 9. To recognise that banks take more provisions earlier in the stress test, and the impact of this on their resilience to future loan defaults, the FPC and PRC, for their respective remits, have agreed to

(1) From January 2019, all stress-test participants are subject to either global or domestic systemic buffers.

(2) In July 2018 the PRA set out [details](#) of how these uplifts would be calculated. The PRA has assumed the following SRB rates for the SRB institutions: Barclays 1%; HSBC 1%; Lloyds Banking Group 2.5%; Nationwide 1%; RBS 1.5%; and Santander UK 1%. These are assumed rates for concurrent stress-test purposes only. Actual SRB rates for affected firms will be determined and published for the first time in 2019.

adjust banks' hurdle rates. The IFRS 9 adjustment applied to banks' hurdle rates in this year's test is scaled to take account of the capital relief banks will already receive under IFRS 9 transitional arrangements. Further details of the Bank's approach this year — as well as next steps on this issue — are set out in Box 1.

*...and the Tier 1 leverage ratio hurdle rate.*

As in previous years, participating banks will also be assessed against a Tier 1 leverage ratio hurdle rate. Reflecting the changes above, the leverage ratio hurdle rate for the 2018 stress test will incorporate the 3.25% minimum leverage ratio and additional leverage ratio buffers that reflect banks' systemic importance — including for banks subject to an SRB to reflect their domestic systemic importance.

Tier 1 leverage hurdle rates have also been adjusted to take account of the impact of IFRS 9 using the same principles as those applied to CET1 hurdle rates.

*The interaction of systemic buffers and the IFRS 9 adjustment will have implications for banks' hurdle rates.*

The interaction of the changes to hurdle rates relating to systemic buffers and IFRS 9 means that different banks will be able to use different amounts of their respective systemic buffers in their hurdle rates for the 2018 ACS, reflecting the differential impact of IFRS 9 across banks. Those differences will become more marked as IFRS 9 transitional arrangements are phased out over time. **Table 1** shows both the hurdle rates that apply to the 2018 ACS stress results and hypothetical non-transitional hurdle rates.

**Table 1** Participating banks' minimum requirements and hurdle rates at the low point of the test on a transitional and hypothetical non-transitional IFRS 9 basis<sup>(a)(b)</sup>

	CET1 ratio minimum requirements and hurdle rates <sup>(c)(d)</sup>			
	Minimum requirements (year 0)	Minimum requirements (low-point year)	Hurdle rate Pre IFRS 9 adjustment	Hurdle rate Post IFRS 9 adjustment
<b>2018 ACS</b>				
Barclays	7.1	6.8	8.3	7.9
HSBC	6.2	6.0	8.0	7.8
Lloyds Banking Group	7.2	6.9	9.0	8.5
Nationwide	8.7	6.9	7.9	7.9
The Royal Bank of Scotland	6.6	6.1	7.4	7.3
Santander UK	7.4	7.5	7.5	7.5
Standard Chartered	6.1	5.8	6.8	6.7
<b>Aggregate</b>	<b>6.6</b>	<b>6.3</b>	<b>8.0</b>	<b>7.8</b>
<b>Hypothetical non-transitional IFRS 9 basis</b>				
Barclays	7.1	7.0	8.1	7.0
HSBC	6.2	6.1	7.6	6.6
Lloyds Banking Group	7.2	6.9	9.0	6.9
Nationwide	8.7	6.9	7.9	7.8
The Royal Bank of Scotland	6.6	6.1	7.4	6.9
Santander UK	7.4	7.7	8.6	7.7
Standard Chartered	6.1	5.8	6.8	6.4
<b>Aggregate</b>	<b>6.6</b>	<b>6.3</b>	<b>8.0</b>	<b>6.9</b>
	Tier 1 leverage ratio minimum requirements and hurdle rates <sup>(e)(f)</sup>			
	Minimum requirements (year 0)	Minimum requirements (low-point year)	Hurdle rate Pre IFRS 9 adjustment	Hurdle rate Post IFRS 9 adjustment
<b>2018 ACS</b>				
Barclays	3.25	3.25	3.64	3.61
HSBC	3.25	3.25	3.78	3.75
Lloyds Banking Group	3.25	3.25	3.98	3.79
Nationwide	3.25	3.25	3.60	3.60
The Royal Bank of Scotland	3.25	3.25	3.73	3.59
Santander UK	3.25	3.25	3.57	3.26
Standard Chartered	3.25	3.25	3.60	3.48
<b>Aggregate</b>	<b>3.25</b>	<b>3.25</b>	<b>3.59</b>	<b>3.52</b>
<b>Hypothetical non-transitional IFRS 9 basis</b>				
Barclays	3.25	3.25	3.64	3.25
HSBC	3.25	3.25	3.78	3.34
Lloyds Banking Group	3.25	3.25	3.98	3.25
Nationwide	3.25	3.25	3.60	3.58
The Royal Bank of Scotland	3.25	3.25	3.51	3.25
Santander UK	3.25	3.25	3.57	3.25
Standard Chartered	3.25	3.25	3.51	3.25
<b>Aggregate</b>	<b>3.25</b>	<b>3.25</b>	<b>3.59</b>	<b>3.28</b>

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

- (a) Adjusted hurdle rates are floored at banks' minimum requirements. Non-transitional hurdle rates are hypothetical. The Bank will review its method for calculating these hurdle rates in future years.  
 (b) Hurdle rates shown are those that correspond to CET1 and leverage ratio stressed low points respectively.  
 (c) For the 2018 ACS results CET1 low points occur in year 2 for all banks, except Santander UK, whose low point occurs in year 1.  
 (d) For non-transitional IFRS 9 results, CET1 low points occur in year 1 for Barclays and HSBC, and year 2 for other banks.  
 (e) For transitional Tier 1 leverage ratio results, Barclays and HSBC have their low point in year 1, Lloyds and Nationwide in year 2, RBS and Standard Chartered in year 3, and Santander UK in year 4.  
 (f) For non-transitional IFRS 9 results, Tier 1 leverage ratio low points occur in year 1 for all firms except Lloyds, Nationwide and Santander UK, whose occur in year 2.

# Resilience of the UK financial system to Brexit

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Since the EU referendum in 2016 the FPC and other authorities have identified risks of disruption to the financial system that could arise from Brexit and worked to ensure they are addressed. The Bank, other UK authorities and financial companies have engaged in extensive contingency planning.

Stress tests and supervisory actions have ensured major UK banks have levels of capital and liquidity to withstand even a severe economic shock that could be associated with a disorderly Brexit.

The FPC has reviewed a disorderly Brexit scenario, with no deal and no transition period, that leads to a severe economic shock. The UK economic scenario in the 2018 stress test of major UK banks was sufficiently severe to encompass the economic shock in the disorderly Brexit scenario. Based on this, the FPC judges that the UK banking system is strong enough to continue to serve UK households and businesses even in the event of a disorderly Brexit.

Since the financial crisis, major UK banks have substantially reduced their reliance on wholesale funding. At group level, they hold more than £1 trillion of high-quality liquid assets. Combined with banks' own prudent risk management, this liquidity means that the major UK banks are in the position of being able to meet their maturing obligations for many months without any need to access wholesale funding or foreign exchange markets.

In addition, banks can currently access £300 billion of liquidity through the Bank of England's regular facilities. The Bank is able to lend in all major currencies.

In a disorderly Brexit, some market volatility would be expected. As demonstrated after the EU referendum in 2016, sterling markets are able to function effectively through markedly volatile periods. The strength of the core financial system, including banks, dealers and insurance companies supports the markets on which the economy relies.

Legislative preparations in the UK have progressed to avoid disruption to financial services provided by EU firms to UK households and businesses. Further UK legislation, currently in train, will need to be passed to ensure the legal framework for financial services is fully in place ahead of Brexit.

The FPC welcomes the European Commission's recent statement that it is willing to act to ensure that EU counterparties can continue to clear derivatives at UK central counterparties (CCPs) after March 2019. However, without greater clarity on the scope, conditions and timing of the prospective EU action, the contracts that EU members have cleared with UK CCPs would need to be closed out or transferred by March 2019 — a process that would need to begin in December 2018.

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 more generally the UK authorities' ability to manage UK financial stability risks.

Consistent with its statutory duties, the FPC has identified risks of disruption to the financial system that could arise from Brexit so that preparations can be made and actions taken to mitigate them.

The FPC is focused on outcomes that would have the greatest potential impact on financial stability. In that context, the FPC has considered the particular risks that could arise if the UK's relationship with the EU were to move abruptly to default World Trade Organisation (WTO) rules without an implementation period.

Such a scenario could affect the ability of the financial system to serve UK households and businesses through:

- macroeconomic shocks that could generate credit losses for banks and test the capacity of the UK banking system to continue to lend;
- a significant re-pricing in financial markets that could test market functioning and the resilience of market-based finance, and create trading losses for banks; and
- disruption to provision of financial services across the UK-EU border.

The first part of this chapter describes a macroeconomic scenario underpinned by 'worst-case' assumptions for a disorderly Brexit.

**Alongside this Report, the Bank has published a full report describing its analysis of the potential implications of Brexit for the Bank's statutory objectives, in response to a request from the Treasury Committee of the House of Commons. This includes a more detailed description of the assumptions, empirical studies and models used in compiling this and other Brexit scenarios.**

### Macroeconomic scenario for a disorderly Brexit

To maintain consistent provision of financial services to the real economy, UK banks must be able to absorb the impact on their balance sheets of any adverse economic shocks that may arise from Brexit.

To assess their ability to do this, the FPC has compared the scenario that major UK banks were tested against in the annual stress test (see Stress testing the UK banking system: 2018 results chapter) with a disorderly Brexit scenario.

As summarised in **Figure B.1**, the disorderly Brexit scenario for the UK economy is underpinned by assumptions about the challenges the economy could face. Established empirical economic relationships are used to calibrate the impact of those assumptions. **The scenario is then produced using the**

**Bank of England's suite of macroeconomic models.** This ensures that the paths for output, employment, interest rates and property prices in the scenario are both internally consistent and consistent with the underpinning assumptions and empirical relationships.

### *The scenario is underpinned by worst case assumptions.*

The challenges the UK economy could face in the event the UK leaves the EU with no deal and no transition period would depend crucially on political decisions by the EU and UK authorities and on the degree of preparation by firms and critical infrastructure before Brexit.

Consistent with its remit to protect and enhance the resilience of the financial system to major shocks, however unlikely they may be, the scenario used by the FPC is underpinned by 'worst-case' assumptions about the challenges the UK economy could face. **The disorderly Brexit scenario is therefore not a forecast for the economy in the event that the UK leaves the EU with no deal and no transition period.**

The assumptions underpinning the disorderly Brexit scenario are summarised in **Table B.A**. A less severe variant of the scenario — labelled 'Disruptive Brexit' — is also described. This variant excludes four of the most severe assumptions in order to illustrate the magnitude of their effects.

The assumptions underpinning both scenarios are:

- **Tariffs and other barriers to trade between the UK and EU are introduced suddenly.**

The EU applies its Common Customs Tariff (CCT) to goods imported from the UK. The UK Government has stated that, if the UK leaves the EU with no agreement or transition period, the UK will apply its own duty rates to imports from the EU and that these will be published before Brexit. The scenario assumes that the UK establishes tariffs equivalent to the EU's CCT. New customs checks, including checks on compliance with rules of origin requirements, also raise the costs of trade.

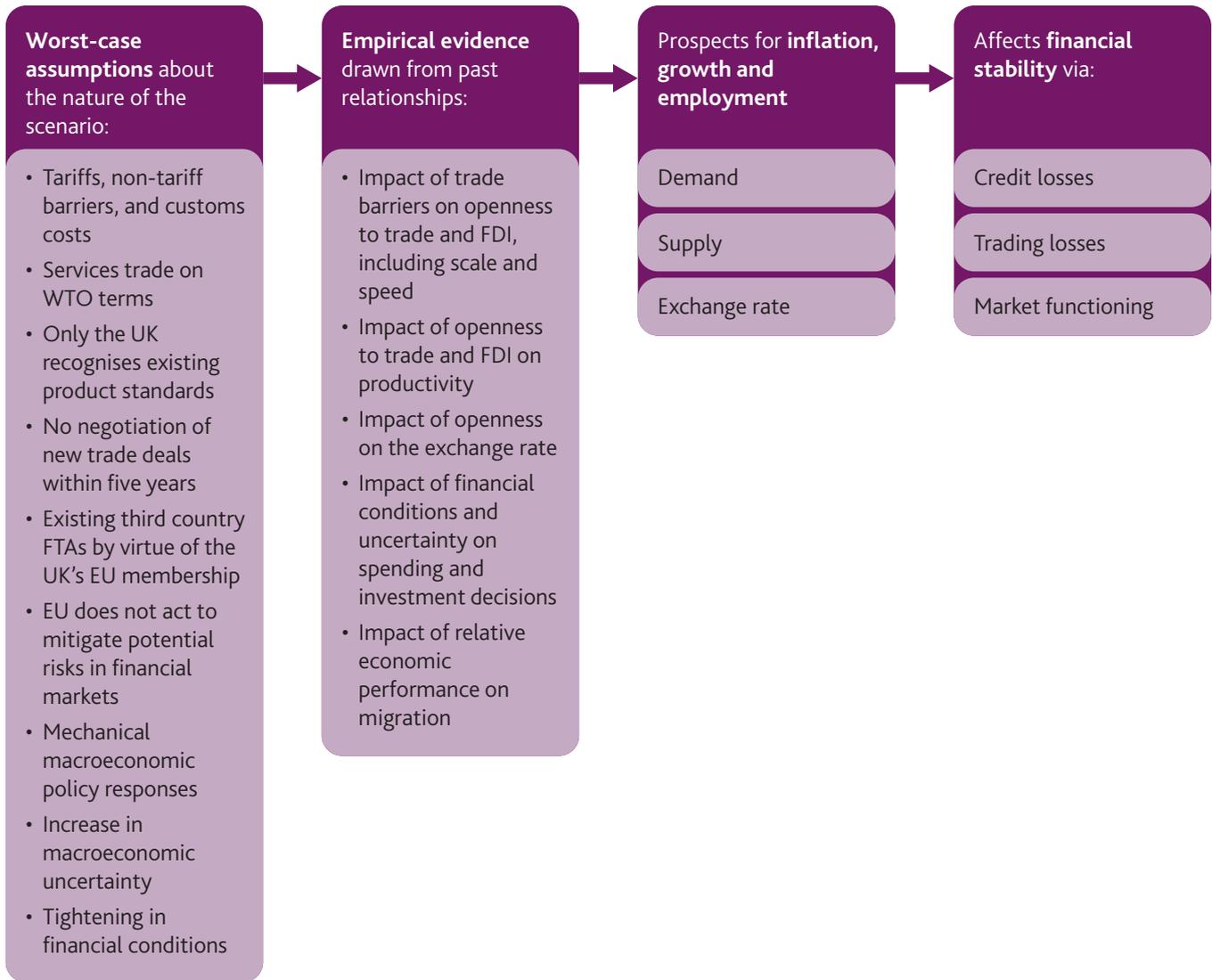
Trade in services reverts to WTO terms, mutual recognition of professional qualifications are lost and the financial sector loses 'passporting' rights.

- **While the UK recognises EU product standards, the EU does not reciprocate.**

UK exports are further reduced in the near term because existing products made in the UK need go through the process to be recertified for sale in the EU.

In line with recent UK Government announcements, the UK is assumed to recognise existing product standards for

**Figure B.1** Building a disorderly Brexit scenario



Source: Bank of England.

EU imports.<sup>(1)</sup> However, the EU is not assumed to reciprocate because only 15% of imports to the EU originate from the UK, compared to 52% of the UK's imports that originate from the EU.

- **No new trade deals are implemented within a five-year period.**
- **Economic uncertainty increases and financial conditions tighten.**

A composite measure of economic uncertainty, which is related to household and business spending, is assumed to increase.

This is associated with a rise in the term premium component of government bond yields. Financial conditions facing

households and businesses tighten as economic uncertainty increases and economic prospects weaken.

- **The EU does not take action to address remaining risks of disruption to derivative markets.**

Without action by the EU, banks in both the EU and the UK face challenges in managing risks using derivatives. Banks are unable to adjust terms on uncleared derivatives and the market for cleared derivatives fragments. (See **Table B.C.**) This reinforces the tightening of financial conditions.

- **Macroeconomic policy responds in line with its objectives.**

Automatic fiscal stabilisers (such as higher spending on benefits and lower tax receipts) are assumed to operate as

(1) See 'Trading goods regulated under the 'New Approach' if there's no Brexit deal', 13 September 2018.

**Table B.A Assumptions underpinning the disruptive and disorderly Brexit scenarios**

Assumption		Disruptive	Disorderly
Trading arrangements	Tariffs	EU applies Common Customs Tariff. UK applies symmetric tariffs.	
	Customs barriers	Customs checks on UK-EU trade introduced.	
	Other goods barriers	UK recognises EU standards. EU does not reciprocate. Regulatory checks required for new and existing product lines.	
	Services barriers	Revert to WTO terms. Financial services lose passporting rights. Broadcasting rights lost. Increased costs for transport services as firms require EU license.	
	Trade deals	No new trade deals implemented before 2023. UK retains access to existing trade agreements between EU and third countries.	No new trade deals implemented before 2023. UK loses access to existing trade agreements between EU and third countries.
Preparedness for new trading arrangements		Some delays at the border associated with re-certification of products.	Severe disruption at the border reflecting customs checks.
Macroeconomic policy	Monetary policy responds mechanically to balance deviations of inflation from target and output relative to potential. Bank Rate rises to 1¾%.		Monetary policy responds mechanically to balance deviations of inflation from target and output relative to potential. Bank Rate rises to 5½%.
	Automatic fiscal stabilisers operate. No discretionary changes in tax or spending policy. Countercyclical capital buffer rate cut from 1% to 0%.		
Financial conditions		Financial conditions tighten due to weaker and more uncertain economic conditions. EU does not take action to address remaining risks in derivative markets. Interest rates on loans to households and businesses rise by 150 basis points more than Bank Rate. There is a 50 basis point increase in the term premium on gilts.	Financial conditions tighten due to weaker and more uncertain economic conditions. EU does not take action to address remaining risks in derivative markets. Negative spillovers to other UK markets. Interest rates on loans to households and businesses rise by 250 basis points more than Bank Rate. Uncertainty about institutional credibility leads to pronounced increase in risk premia on sterling assets.
Macroeconomic uncertainty		Index rises by 1½ standard deviations from current levels, a similar rise to that seen around the EU referendum.	Index rises by 2 standard deviations from current levels, to a level only exceeded during the financial crisis.

output and incomes fall, but no discretionary reductions of spending or changes in tax rates are assumed.

The UK countercyclical capital buffer rate is assumed to be cut by the FPC to 0%. By signalling the usability of all capital buffers, this is assumed to avoid any tightening in credit conditions that might otherwise arise if banks were to try to preserve their capital positions.

Consistent with its remit to meet the 2% inflation target, and in a way that helps to sustain growth and employment, the Monetary Policy Committee has stated that the implications of Brexit for the appropriate path of monetary policy would depend on the balance of their effects on demand, supply and the exchange rate, as well as the evolution of inflation expectations.

In the scenario, monetary policy reacts mechanically to balance deviations of inflation from target and output relative to potential.

*The following additional assumptions underpin the disorderly scenario but are not included in the disruptive variant:*

- **The UK loses existing trade agreements that it currently has with non-EU countries through membership of the EU.**

These agreements would not automatically apply to the UK after Brexit and require bilateral negotiation by governments.

In the disorderly Brexit scenario, it is assumed that bilateral agreements are not reached. This reduces trade with these jurisdictions. Around 10% of total UK exports are sent to countries covered by such free trade agreements. These include European Free Trade Area (EFTA) countries and a range of other important export destinations, such as South Korea and Turkey.

- **The UK's border infrastructure is assumed to be unable to cope smoothly with new customs requirements for some time.**

Consistent with the 'worst-case' nature of the underpinning assumptions, UK trade falls initially by an additional 15% beyond the long-run level implied by new trade arrangements, until new border infrastructure and processes are established. Delays at the border are also associated with some disruption to transport services.

This disruption at the border results in a sharp fall in productivity. Supply chains are disrupted and economic activity falls. Potential output per employee falls by nearly 5% in the short term.

Further details of preparedness for new customs checks are provided in Chapter 2 of the Bank's report to the Treasury Committee, published alongside this *Report*.

- **Uncertainty about institutional credibility results in a pronounced increase in the return investors demand for holding sterling assets.**

A composite measure of economic uncertainty rises to a level exceeded only once in the past 30 years, during the global financial crisis.

In addition to the normal economic effects of heightened uncertainty, the scenario assumes that uncertainty about the UK's macroeconomic framework and institutional credibility results in a fall in investor appetite for sterling assets.

The UK is reliant on inflows of foreign capital to finance its current account deficit — the gap between investment and domestic saving. This currently stands at 3.9% of GDP. To continue to finance this deficit, the returns to foreign investors are assumed to have to rise.

In the disorderly Brexit scenario, the term premium on UK government bond yields rises by 100 basis points. And as the sterling risk premium increases, sterling depreciates to overshoot its long-run equilibrium level.

- **There are spillovers to other UK financial markets, leading to a further tightening of financial conditions**

Investors are assumed to respond to rising corporate bond yields (falling prices) and falling property prices by selling these assets, putting further downward pressure on prices.

These effects could be more severe than in the past, reflecting the increased importance in bond markets of open-ended funds offering short-term redemptions, and the higher share of buy-to-let properties in the stock of housing.

The result is a further tightening of credit conditions for those borrowers who rely on corporate debt markets or who use property as collateral to secure lending. Spreads between investment grade corporate bond yields and risk free rates rise by 300 basis points.

Overall, in the disorderly scenario, borrowing costs facing households and firms rise by 250 basis points more than risk-free rates.

*The economic impact of the underpinning assumptions are modelled using established empirical economic relationships, including those between economic openness and trade and productivity.*

Empirical relationships between economic openness and trade and productivity have been established during decades of gradual trade liberalisation. In a disorderly Brexit, the UK's openness to trade will decline abruptly. This is a unique situation in recent history. There are no broad-based empirical studies of the effects of trade de-integration, and it is unprecedented for an advanced economy to withdraw from a trade agreement as deep and complex as the EU.

In the absence of precedent, the scenario assumes that the effects of trade integration observed over the past would be reversed. In practice, the economic effect of a sudden de-integration is unlikely to be simply equal but opposite to that of gradual integration. So, consistent with creating a scenario for a disorderly Brexit underpinned by 'worst-case' assumptions, the scenario assumes that the costs of de-integration come in somewhat faster than the benefits of integration have in the past.

The primary relationships on which the scenario is constructed are described in more detail in the Bank's report to the Treasury Committee. In summary, those relationships are:

- **Trade barriers and volumes of trade and foreign direct investment**

Numerous empirical studies show how trade between two countries tends to be higher when there is a short geographical distance between them, and when they can trade goods and services freely. Studies also show that countries joining the EU in the recent past experienced a reduction in trade costs from simpler customs procedures.

This relationship drives a 15% fall in the UK's total trade volumes in the scenario as the ability to trade freely is removed. Around a fifth of the fall in trade arises from higher tariff barriers, and the remainder from non-tariff barriers, including customs checks on rules of origin, which raise the cost of exporting.

Trade barriers are also related empirically to foreign direct investment (FDI). This relationship means that inflows of new FDI are assumed to be around 20% weaker by 2023 in the scenario.

#### • Openness and productive potential

A wide range of studies and Bank of England analysis show that lower levels of trade and openness in an economy are associated with reduced productivity.

Additional trade frictions reduce efficiency and businesses pay more to import high-quality intermediate imports. Lower FDI further affects UK firms' ability to access expertise from overseas.

This relationship drives a fall in productivity growth in the scenario as trade volumes fall.

#### • Relative economic conditions and net migration

Net inward migration usually responds to developments in economic activity and incomes in the UK relative to those overseas. This relationship drives a fall in net inward migration in the scenario as UK real incomes fall relative to those elsewhere.

*The disorderly Brexit scenario contains significant falls in output and the supply capacity of the UK economy...*

In the disorderly Brexit scenario, on which the FPC has focused, UK trade declines sharply, as trade barriers are introduced, the EU does not recognise UK product standards and there is disruption at the border.

Trade barriers mean imports also fall. The reduction in UK imports affects the EU economy, reducing activity there. That further spills back to demand for UK exports.

In addition, the fall in trade weighs on productivity growth and therefore real household incomes. The sterling equilibrium exchange rate also falls. The pronounced increase in the risk

premium on sterling assets causes some overshooting of the new long-run level. Overall, the exchange rate depreciates by 25%, to less than parity against the US dollar.

The fall in the exchange rate dampens some of the fall in net exports, but it also pushes up the price of imported goods and services, adding to the effect of new tariffs on those prices. This reinforces the squeeze on real incomes and consumer spending.

Weak current and future income growth, higher uncertainty and tighter financial conditions, all weigh on consumer spending and business investment.

Overall, GDP falls by 8% from its level in 2019 Q1 (see Table B.B).

The fall in economic activity is reflected in a mix of higher unemployment, lower labour supply and lower productivity. Border disruption affects the supply capacity of the economy, reducing productivity in the near term and dampening the effect of lower output on employment.

As economic conditions deteriorate, net migration falls from a net inflow of 250,000 per year to a net outflow of 100,000 people per year. This reduces labour supply.

These reductions in supply capacity mean that, although output falls by more than it did in the financial crisis, unemployment rises by less than it did then, peaking at a rate of 7½%.

The composition of UK output shifts towards the production of goods and services that are currently imported. This results in a degree of mismatch between the skills of the available supply of labour and the skills demanded by employers. Through this channel, the structural unemployment rate — the rate that in the long run is consistent with steady wage growth — rises by around ½ percentage point.

This means that the margin of domestic slack widens by much less than the fall in output, mitigating downward pressure on

**Table B.B Comparison of disruptive and disorderly Brexit scenarios with the 2018 stress test scenario and global financial crisis**

	Peak to trough change (%)			Unemployment rate (%)	Peak		Average over three years Bank Rate (%)
	GDP	House prices	Commercial property prices		Inflation rate (%)	Bank Rate (%)	
Disruptive	-3	-14	-27	5¾	4¼	1¾	1½
Disorderly	-8	-30	-48	7½	6½	5½	4
Bank of England 2018 stress test	-4¾	-33	-40	9½	5	4	3¼
Global financial crisis <sup>(a)</sup>	-6¼	-17	-42	8	4¾	5¼	2

Sources: Bank of England, MSCI Inc., ONS and Bank calculations.

(a) Global financial crisis average from 2008 to 2010.

domestically generated inflation. The sharp fall in sterling, alongside the imposition of tariffs on EU imports, pushes up costs of imports and overall CPI inflation picks up to peak at 6½%.

This creates a challenging trade-off between economic activity and inflation. In order to bring inflation back to the 2% target, Bank Rate rises sharply, peaking at 5½%, and averages 4% over the first three years of the scenario.

The weakness of output and incomes, alongside rising interest rates and a pronounced tightening of financial conditions, results in sharp falls in some asset prices. Residential property prices fall by 30% and commercial property prices fall by 48%.

...which are smaller in the disruptive variant.

In the disruptive Brexit variant of the scenario, the absence of border disruption and financial market disruption mean output falls by somewhat less than in the disorderly Brexit. It falls by 3% from its level in 2019 Q1.

Productivity growth slows. Consistent with relative economic performance, net inward migration falls to 30,000 per year. And structural unemployment rises. But the erosion of potential supply is much smaller than in the disorderly Brexit scenario.

The exchange rate depreciates by 15% to around \$1.10 against the dollar. Imported inflation rises by less than in the disorderly Brexit scenario and inflation peaks at 4¼%. Faced with a less challenging trade-off between activity and inflation, Bank Rate averages only 1½% over the first three years.

Financial conditions tighten, albeit by somewhat less than in the disorderly Brexit scenario. The effects of this tightening, along with the reduction in activity and incomes, are falls in residential property prices of 14% and in commercial property prices of 27%.

### Resilience of major banks to a disorderly Brexit

The 2018 ACS stress test shows that the UK banking system is resilient to deep simultaneous recessions in the UK and global economies, large falls in asset prices and a separate stress of misconduct costs. Participating banks would be able to continue to meet the demand for credit from the UK real economy, even in this very severe stress.

To assess UK banks’ resilience to a disorderly Brexit, the FPC has reviewed the disorderly Brexit scenario against the ACS stress test.

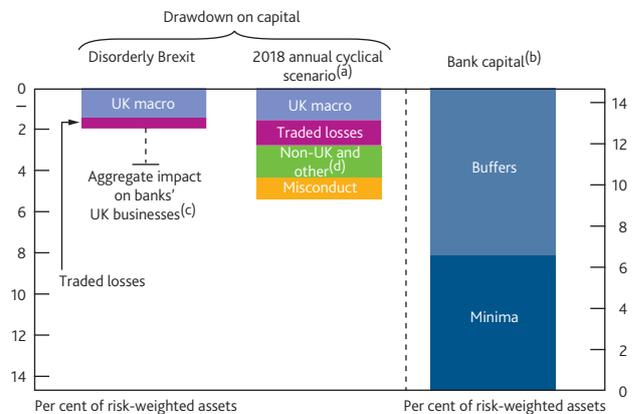
The FPC judges that the UK economic scenario in the 2018 stress test of major UK banks was sufficiently severe to encompass the disorderly Brexit scenario.

In the ACS stress test, UK GDP falls by 4.7%, the UK unemployment rate rises to 9.5%, UK residential property prices fall by 33% and UK commercial real estate prices fall by 40%. The scenario also includes 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% (Table B.B).

The large reductions in productivity and labour supply in the disorderly Brexit scenario mean that, although output in that scenario falls by more than in the ACS stress test, the rise in unemployment is smaller. The differences between the scenarios would be broadly offsetting in terms of their impact on banks.

Chart B.1 compares the impact of the two scenarios on banks’ capital ratios. The total impact of the disorderly Brexit macroeconomic scenario on major UK banks is to reduce their aggregate CET1 capital ratio by around 1.5 percentage points. That is in line with the aggregate impact of the UK macroeconomic shock in the 2018 stress test.

Chart B.1 Comparison of the impact of the disorderly Brexit scenario and 2018 ACS on major UK banks’ capital ratios



Source: Participating banks’ STDF data submissions, PRA regulatory returns, published accounts, Bank analysis and calculations.

- (a) The CET1 impact for the ACS is before the conversion of AT1 instruments.
- (b) Defined as total aggregate CET1 capital as a proportion of risk-weighted assets.
- (c) Average impact on banks’ UK businesses calculated by scaling the aggregate impact of the disorderly Brexit scenario based on groups’ aggregate ratio of global to UK business. This estimates the impact of the scenario as a proportion of groups’ aggregate UK RWAs.
- (d) Non-UK is computed as a residual in this chart. It includes global elements in the same category as the UK macro-economic impact.

In addition, the disorderly Brexit scenario includes sharp adjustments in UK financial markets. Term premia on gilts rise by 100 basis points, and UK equity prices fall by 23%, with bigger falls for UK-focused companies. Investment grade corporate bond spreads rise by almost 300 basis points. Overall, these market adjustments lead to losses on trading books that add a further 0.5 percentage points to the impact on the major UK banks’ aggregate CET1 capital ratio.

The 2018 stress test also included a severe UK financial market stress with sterling investment grade corporate bond spreads widening by 280 basis points and UK equity prices falling by up to 45%. In addition, it included a severe global market stress, meaning that, overall, losses on trading books in the stress test reduced the major UK banks' aggregate CET1 capital ratio by 1.2 percentage points, relative to the start of the stress.

*Overall, the ACS stress test was a tougher test for banks than the disorderly Brexit scenario.*

The aggregate impact of the disorderly Brexit scenario, and of the UK macroeconomic element of the ACS, on banks' capital appears limited. In part, that reflects the geographic diversification of major UK banks. In aggregate, only around half of their exposures are to the UK.

This diversification increases the resilience of the system as a whole to country-specific shocks, such as that in the disorderly Brexit scenario. In other words, a large proportion of the capital UK banks hold is to absorb losses incurred in other jurisdictions. As a result, the impact of losses incurred only in the UK is relatively small when compared to the overall level of capital.

It follows that banks which are more UK focused will see a greater impact of the disorderly Brexit scenario on their capital ratios than the aggregate impact. For example, the average effect of the disorderly Brexit scenario on banks' UK businesses in isolation would be to reduce aggregate CET1 capital ratio by around 4 percentage points. This is shown in **Chart B.1**.

The same holds for the impact of the UK economic shock in the stress test. However, unlike the disorderly Brexit scenario, the stress test also included a severe global recession and global market shock. So differences in the geographic composition of banks' exposures mattered less for their relative performance. The aggregate impact on banks' capital of the UK and global macroeconomic and market shocks in the stress test was 4.4 percentage points.

The stress test also included a separate stress of misconduct redress costs. Taken together, this brings the total impact of the ACS to 5.4 percentage points.

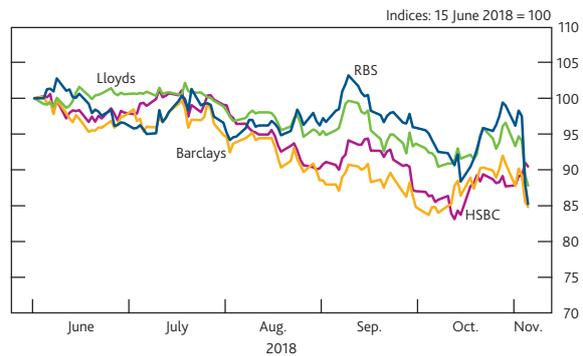
*Because they would be resilient to the tougher annual stress test, the FPC judges that major UK banks would also be resilient to, rather than amplify, the disorderly Brexit scenario.*

With an aggregate Tier 1 capital ratio of 17.3%<sup>(2)</sup> of risk-weighted assets and an aggregate common equity Tier 1 ratio of 14.7%, banks have buffers of capital above their minimum requirements well in excess of the impact of the stress test scenario and further in excess of the effect of the disorderly Brexit scenario (**Chart B.1**).

*Recent developments in bank share prices reflect revisions to expectations of, and uncertainty about, their earnings.*

Since the last Report, bank equity prices across the UK, US and euro area have fallen. US and euro-area bank equity prices have fallen by 3% and 13.5% respectively. The average equity price of major UK banks has fallen by 13%. Banks with UK-focused business models were especially impacted following the announcement that the UK Government and European Commission had concluded negotiations on a Withdrawal Agreement (**Chart B.2**).

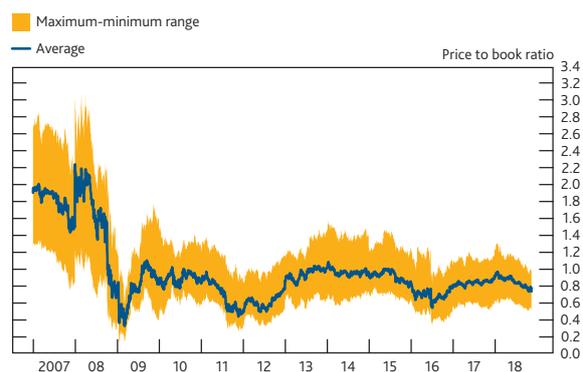
**Chart B.2 Bank equity prices have fallen since June**  
Major UK banks' equity prices since June 2018



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

Major UK banks' price to book ratios — which compare the market value of shareholders' equity in the bank with the accounting, or 'book', value of that equity — have been low since the crisis (**Chart B.3**). And they have fallen further in recent months reflecting movements in bank equity prices.

**Chart B.3 Price to book ratios have been low since the crisis**  
UK banks' average price to book ratio<sup>(a)(b)(c)(d)</sup>



Sources: Bloomberg Finance L.P., Datastream 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.

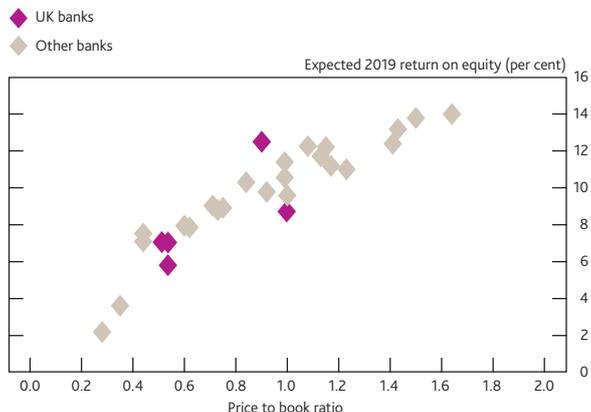
The FPC continues to judge that UK banks' low price to book ratios are consistent with market concerns over expected future profitability rather than concerns about existing asset

<sup>(2)</sup> Tier 1 capital on a Capital Requirements Regulation (CRR) end-point basis, including application of IFRS 9 transitional arrangements. The Tier 1 capital ratio on a CRR transitional basis is 18.0%.

quality. Their market valuations remain consistent with the relationship internationally between price to book ratios and expected future returns on equity (Chart B.4).

**Chart B.4 There is a positive correlation between banks' price to book ratios and expected returns on equity**

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



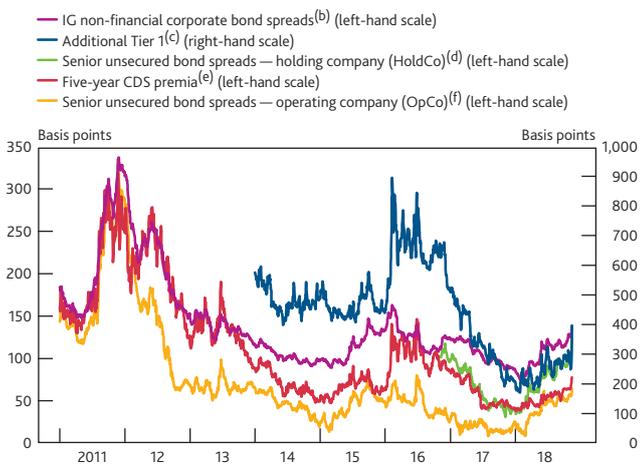
Sources: Bloomberg Finance L.P., Datastream from Refinitiv and Bank calculations.

- (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.

Other market indicators corroborate this judgement. If this trend were caused by deteriorating asset quality, bank funding costs should reflect that. However, market indicators of bank credit risk, including spreads between yields on AT1 capital instruments and risk-free rates and credit default swap (CDS) premia, remain within the range they have occupied over the past two years (Chart B.5).

**Chart B.5 Bank funding costs reflect their resilience**

UK banks' indicative long-term funding spreads<sup>(a)</sup>



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

- (a) UK banks are Barclays, HSBC, Lloyds Banking Group and RBS.
- (b) Option-adjusted spreads. Refers to non-financial euro-denominated investment-grade corporate bonds issued in Eurobond or euro member domestic markets.
- (c) Simple average of secondary market spreads over government bonds.
- (d) 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.
- (e) Unweighted average of five-year euro-denominated senior CDS premia for the major UK lenders.
- (f) 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.

Although spreads between yields on banks' long-term debt and risk free rates have risen to their highest level in two years, this is also the case for non-financial investment grade corporate debt. While 2018 has seen the highest bank debt issuance in the past five years, bank debt has not underperformed corporate debt more generally. Rising corporate debt spreads in general are reflective of reduced investor risk appetite after a period of very strong appetite (see Overview of risks to UK financial stability chapter).

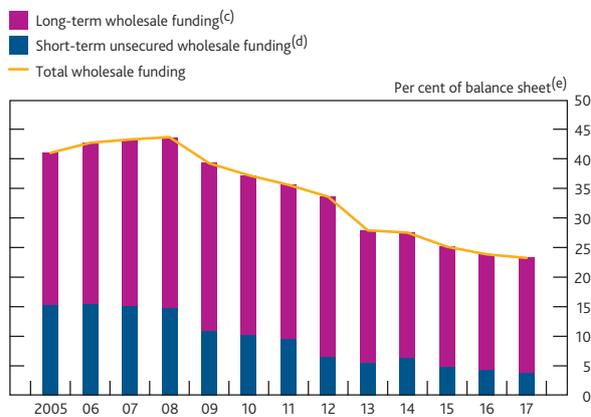
*Major UK banks have sufficient liquidity to withstand a major disruption in financial markets.*

Any disruption in financial markets in a disorderly Brexit could place pressure on banks' ability to continue to fund their business and provide financial services to the UK real economy. The FPC has therefore reviewed the resilience of banks' funding and liquidity positions.

The resilience of major UK banks' funding structures has improved significantly since the financial crisis. For example, major UK banks' short-term wholesale funding, as a proportion of total funding, has fallen to 3.8% from 15.2% in 2007 (Chart B.6). And banks have brought forward the issuance of some of their long-term funding into 2018, reducing risks of funding disruption around Brexit.

**Chart B.6 UK banks' reliance on wholesale funding has fallen**

UK banks' short-term and long-term wholesale funding<sup>(a)(b)</sup>



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.

At a group level, major UK banks hold more than £1 trillion of high-quality liquid assets. On a consistent basis, this is more than four times the level they held before the financial crisis.

This means 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. In aggregate, major UK banking groups have 50% more liquid assets than needed to meet this standard.

Their holdings of liquid assets are sufficient to withstand more than three months of stress in wholesale funding markets.

As a result of supervisory actions and their own prudent risk management, major UK banks have aligned the currency of their liquid assets with that of their maturing wholesale funding. They can now withstand many months without access to foreign exchange markets.

In addition, UK banks have also pre-positioned collateral at the Bank of England such that they could access around £300 billion of additional funding through the Bank's regular facilities. The Bank is able to provide substantial liquidity in all major currencies.

### Market functioning and resilience of market-based finance

*Some market volatility is to be expected in a disorderly Brexit but markets functioned well during volatility following the EU referendum.*

As noted in the July 2016 *Report*, markets generally functioned well following the UK's referendum on EU membership, despite sharp price movements. In the period immediately following the referendum (23 June-1 July), the sterling exchange rate index fell by 9%, the average equity price of UK-focused companies fell by 10%, and sterling investment-grade and high-yield corporate bond spreads rose by 18 and 100 basis points respectively.

Following the referendum, activity in some dealer-intermediated markets, including corporate and UK government bond markets, was subdued, but orderly. And repo markets proved resilient. At the same time, electronically traded markets (such as foreign exchange and equity markets) were resilient to extremely high volumes of transactions compared to normal levels.

*The UK authorities have undertaken extensive contingency planning.*

The Bank of England, alongside other domestic authorities and financial companies themselves, has put extensive contingency plans in place to support institutional resilience and market functioning during any period of heightened uncertainty.

*Some markets could be vulnerable to large-scale redemptions from open-ended funds. Authorities are monitoring this closely.*

The functioning of some markets could be tested by high demand for liquidity, including from open-ended investment funds. Some of these funds offer short-term redemptions to investors while investing in less liquid assets. As a result, large-scale redemptions could lead to fire sales of those assets, unless fund managers use their liquidity management tools, such as suspensions.

These potential dynamics were illustrated in the period around the UK's referendum on EU membership in June 2016. While this episode did not have consequences for financial stability, open-ended funds invested in UK commercial real estate (CRE) experienced increased redemptions. Funds were able to use their existing tools to manage these outflows; six CRE funds suspended redemptions and nine funds adjusted the prices that redeeming investors could receive to account for asset price movements or uncertainty.

Given these vulnerabilities, the FCA is monitoring the level of investor net flows and cash positions of UK-domiciled daily-dealing property funds and has undertaken contingency planning with managers of the largest funds invested in these inherently illiquid CRE assets. For the longer term, the FCA is consulting on proposals to enhance the existing liquidity management tools for open-ended funds invested in inherently illiquid assets.

*But market functioning should be supported by the resilience of dealers...*

Dealers play a central role in intermediating between buyers and sellers in many important markets, such as fixed-income markets. These markets rely on dealers being willing and able to 'warehouse' assets to avoid market prices and functioning being affected in the event of large-scale asset sales. However, in a market stress, dealers can be exposed to significant losses if sudden fire sales of assets drive down market prices.

Post-crisis reforms have made dealers much stronger, reducing the probability that market-making losses could lead to their distress or failure. For example, the aggregate leverage ratio of the world's largest dealers stands at 6.3% in 2018; more than double what it was in 2007 when estimated on a consistent basis.

Dealers also appear to be further adapting their businesses to the post-crisis regulatory regime. Consistent with this, there has been some improvement in headline indicators of market liquidity: since June 2018, sterling investment grade corporate bond bid-ask spreads have fallen by around 6% to 91 basis points.

There have also been signs of some improvement in gilt repo market functioning. For example, asset managers borrowing cash in gilt repo markets have experienced lower spreads over the past two years. Consistent with this, the volume of outstanding gilt repo and reverse repo has increased by 25% since January 2017.

*...and insurers are also sufficiently resilient to be able to support markets in stress.*

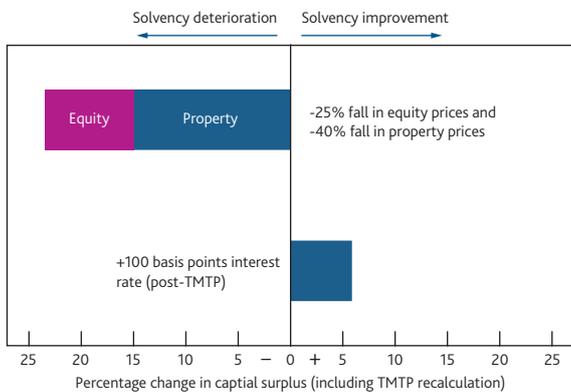
Life insurers hold £1.8 trillion in investment and cash assets, as at 2018 Q2, out of £2 trillion held by insurers in total. Their behaviour has the potential both to amplify and dampen

market shocks. Their resilience to stress is therefore integral to the resilience of markets.

The largest life insurers have an aggregate surplus of capital above their regulatory requirements of £44.5 billion; 62% more than their regulatory requirements.

Chart B.7 shows Bank estimates of the sensitivity of aggregate UK life insurer capital surpluses to movements in key market variables impacted in the disorderly Brexit scenario. Sharp falls in property and equity prices like those in the disorderly Brexit scenario would cause life insurers' aggregate capital positions to deteriorate materially, but they would remain well above regulatory requirements.

**Chart B.7 Insurers are resilient to key market variables**  
Selected aggregated market risk sensitivities for UK life insurers at year-end 2017



Sources: Aggregated UK life insurers market risk sensitivity submissions and Bank calculations.

A widening of credit spreads would, in aggregate, have a small impact on capital positions, partly because of the insulating effect under Solvency II of the 'Matching Adjustment', which cushions capital impacts by enabling firms to look through the impact of short-term market movements on assets when valuing liabilities. Furthermore, if interest rates were to rise, as they do in the disorderly Brexit scenario, it would generally improve their capital positions — in part due to the impact of the Solvency II risk margin.<sup>(3)</sup> However, this may be partially offset by any recalculation of 'transitional measures on technical provisions' (TMTPs).<sup>(4)</sup>

**Risks of disruption to cross-border financial services**

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

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.

*In the UK, significant progress continues to be made towards mitigating the risks of disruption to cross-border financial services. Further legislation needs to be passed.*

Legislative preparations in the UK have progressed further. In November, Parliament passed legislation to allow Temporary Permissions and Recognition Regimes. These will allow UK households and businesses to continue to access financial services provided by EU firms. As such, risks of disruption in the UK have decreased and are now judged to be low in many areas.

The UK Government is taking forward further legislation to mitigate the risks of disruption. That legislation needs to be passed by Parliament prior to Brexit to be effective. This includes changes to domestic legislation to ensure the regulatory framework is workable when the UK is no longer a member of the EU.

*EU authorities have taken few mitigating actions, relying instead on actions by the private sector.*

The European Commission recently announced that it does not intend to take action to mitigate risks to the continuity of uncleared OTC derivative and insurance contracts, or to the cross-border flow of personal data. However, financial companies alone cannot solve these issues before March.

While some countries are legislating to mitigate some of these risks at a national level, there may be some disruption to the financial services provided by UK institutions to EU households and businesses. The absence of action by EU authorities to mitigate risks in uncleared OTC derivatives and personal data could also result in some disruption for UK households and businesses.

*Without greater clarity on prospective EU action, the contracts EU members have with UK central counterparties (CCPs) will need to be closed out or transferred by March 2019.*

EU clearing members have OTC derivative contracts with UK CCPs with a gross notional value of £60 trillion, of which £45 trillion will mature after March 2019.<sup>(5)</sup> Uncertainty about EU clearing members' ability to meet obligations on these contracts could threaten the safe operation of CCPs. UK CCPs

(3) The Solvency II risk margin is a provision that increases the value of a firm's liabilities to facilitate their transfer to another insurer should the business fail. As noted in previous Reports, it is very sensitive to prevailing risk-free interest rates.  
 (4) TMTPs offset the impact of the risk margin on insurance liabilities written before the introduction of Solvency II. In May 2016, the PRA set out the scope for firms to recalculate their transitional measures in response to the market environment.  
 (5) The FPC October statement reported that the Bank's latest estimate of the total notional amount of cleared OTC derivatives contracts that could be affected by continuity risk was £69 trillion, £41 trillion of which matured after March 2019. Since that number was published the Bank has been notified of a reporting error relating to short-maturity cleared derivatives trades by an external party. The total notional amount, as reported in October, has therefore been adjusted to £64 trillion whilst the £41 trillion estimate was not affected. The issue which led to the reporting error has now been addressed.

would also face legal risk for continuing to provide services to EU clearing members.

The FPC welcomes the European Commission's recent statement that it is willing to act to ensure that EU counterparties can continue to clear derivatives at UK central counterparties (CCPs) after March 2019.<sup>(6)</sup>

However, without greater clarity on the scope, conditions and timing of the prospective EU action, the contracts that EU members have cleared with UK CCPs would need to be closed out or transferred by March 2019 — a process that would need to begin in December 2018.

*The FPC also continues to monitor a range of other risks that could cause some, albeit less material, disruption to activity if they are not mitigated.*

The FPC's checklist includes the risks of disruption to important financial services used by households and businesses that would have the most material effect on economic activity. Additional risks that the FPC is monitoring are set out in **Table B.D**.

*The FPC will remain committed to the implementation of robust prudential standards in the UK.*

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. 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 more generally the UK authorities' ability to manage UK financial stability risks.

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(6) 'Preparing for the withdrawal of the United Kingdom from the European Union on 30 March 2019: a Contingency Action Plan', 13 November 2018.

## Table B.C 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.<sup>(a)</sup>

Risks of disruption are categorised as **low**, **medium** or **high**. Arrows reflect developments since October. **Blue text** is news since the FPC's previously published checklist in the Statement from the FPC's Policy meeting on 3 October 2018.

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 financial services.

### Legal frameworks

	Risk to UK 	Risk to EU 
<b>Ensure a UK legal and regulatory framework is in place</b>		
<b>Implementation period to allow mitigating actions by firms</b>		

The EU (Withdrawal) Act has come into force. HM Treasury plans to take forward around 60 pieces of secondary legislation for financial services before March. Sixteen statutory instruments are particularly important to mitigate risks of disruption to users of financial services. **As of 26 November, four of these have become law, including the temporary regimes to allow EU banks, insurers and CCPs to serve UK customers.**

Timelines remain tight to take forward the remaining secondary legislation. **An additional seven of the 16 statutory instruments have been published or are progressing through Parliament, but the other five instruments, including legislation to give regulators' temporary transitional powers and to create a contractual continuity regime, have not been published.**

Financial institutions will need time to obtain necessary regulatory permissions and complete any necessary restructuring of their operations and re-papering of contracts.

**The UK Government and European Commission have completed negotiations on a Withdrawal Agreement that includes an implementation period. If agreed, such an implementation period would reduce all of the risks set out in the FPC's checklist.**

### Preserving the continuity of outstanding cross-border contracts

	Risk to UK 	Risk to EU 
<b>Insurance contracts</b>		

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.

EU or member state rules may prevent UK insurance companies collecting premiums from, or paying claims to, their 38 million policyholders in the EU. **The European Commission has indicated it will not mitigate this risk at the EU level. While some countries are legislating to mitigate this risk at a national level, it is unclear how comprehensive these actions will be by March.** Most UK insurance companies are making good progress in restructuring their business in order to serve their EU customers after Brexit. However, even if all current plans are delivered successfully, at least 9 million EU policyholders will remain at risk. Given the volume of restructuring and the process of court approval of plans, there are also material execution risks.

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

## Preserving the continuity of outstanding cross-border contracts

	Risk to UK 	Risk to EU 	
<b>OTC derivative contracts (uncleared)</b>			<p>In the absence of action, certain 'lifecycle'<sup>(b)</sup> events could not be performed on cross-border derivative contracts after Brexit. This could affect uncleared derivative contracts between the EU and the UK with a total notional value of £28 trillion, of which an increasing share (£18 trillion) matures after March 2019.</p> <p>The UK government has legislated to ensure that these lifecycle events can continue to be performed after Brexit on derivative contracts that UK clients (such as non-financial companies) have with EU banks.</p> <p>However, national rules in some EU member states may prevent EU clients and banks from performing certain lifecycle events on derivative contracts that they have with UK banks. The European Commission has indicated it will not mitigate this risk at the EU level. While some countries are legislating to mitigate this risk at a national level, it is unclear how comprehensive these actions will be by March.</p> <p>This could compromise the ability of derivative users to manage risks and may therefore lead to large-scale terminations in stress. This could amplify any stress around the UK's exit from the EU, contributing to a tightening in financial conditions in a disruptive Brexit (as included in the FPC's disorderly Brexit scenario).</p>
<b>OTC derivative contracts (cleared)</b>			<p>The UK government has legislated to ensure that UK businesses can continue to use clearing services provided by EU-based clearing houses.</p> <p>Under EU law, after March 2019 EU clearing members would be acting unlawfully if they accessed clearing services from UK central counterparties (CCPs), and UK CCPs would not be permitted to provide such services, unless they were recognised by the European Securities and Markets Authority (ESMA).</p> <p>The FPC welcomes the recent statement from the European Commission regarding its willingness to act in respect of cleared derivatives to allow UK CCPs to be recognised — on a temporary and conditional basis — by ESMA in a no deal scenario. ESMA has announced that it is now engaging with UK CCPs on this.</p> <p>However, without greater clarity on the scope, conditions and timing of the prospective EU action, CCPs and their members cannot determine whether the Commission's proposal fully removes the legal risks they face. As a result, the derivatives contracts EU clearing members have cleared with UK CCPs would need to be closed out or transferred by the end of March 2019. That process would be necessary to ensure the safe operation of UK CCPs beyond that date. It would need to begin in December 2018 in order to mitigate the risk of material market disruption and respect CCP rulebooks.</p> <p>The ECB estimates that EU-based firms clear 90% of their interest rate swaps in the UK. Overall, EU-based firms have OTC derivative contracts with a notional value of £60 trillion at UK CCPs, an increasing share (£45 trillion) of which matures after March 2019. The movement of a large volume of contracts in a short time frame would be costly to, and disrupt the derivatives positions of, EU businesses and could strain capacity in the derivatives market. In addition, fragmentation of central clearing would raise costs for EU businesses. Industry estimates suggest that every single basis point increase in the cost of clearing interest rate swaps alone could cost EU businesses around €22 billion per year.</p>

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

## Avoiding disruption to availability of new financial services

	Risk to UK 	Risk to EU 	
<b>Clearing services</b>			<p>The UK government has legislated to ensure that UK businesses can continue to use clearing services provided by EU-based clearing houses.</p> <p>The European Commission has indicated that it is willing, in a no deal scenario, to act in respect of cleared derivatives that would allow UK CCPs to be recognised by ESMA. This would, in principle, allow EU counterparties to clear new trades with UK CCPs, but further information is required on the scope, conditions and timing of the prospective action. If UK CCPs are not recognised after Brexit, EU counterparties would need to make new arrangements with other CCPs. This creates material risks of disruption to those EU counterparties.</p>
<b>Banking services</b>			<p>The UK government has legislated to ensure that UK households and businesses can continue to be served by EU-based banks after Brexit.</p> <p>EU or member state rules may prevent EU customers from accessing UK-based banks, on which they currently rely for around half of their wholesale banking services. Major UK-based banks are in the processes of transferring their EU clients to 25 new (or expanding) subsidiaries in the EU. Nineteen of these have now been authorised. But other risks, such as the operational readiness of these new entities or restrictions on firms' ability to service legacy business which remains in the UK entity, might still cause some disruption to EU households and businesses.</p>
<b>Asset management</b>			<p>The UK government has legislated for EU asset management firms to continue operating in the UK after exit. Further legislation will provide a temporary permissions regime for EU investment funds to continue marketing in the UK.</p> <p>EU rules allow asset managers to delegate the management of their assets to entities outside the EEA when a co-operation agreement is in place between the authorities. The European Commission has publicly encouraged European Supervisory Authorities to prepare such agreements with the UK. In the absence of a co-operation agreement, there is a risk of changes to asset managers' businesses that could be disruptive.</p>
<b>Personal data</b>			<p>The UK government has announced its intention to continue to allow the free flow of personal data from the UK to the EU. Once in effect, this would reduce disruption to UK households' and businesses' use of EU financial service providers.</p> <p>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. This may restrict EU households and businesses from continuing to access UK financial service providers. UK households and businesses may also be affected due to the two-way data transfers required to access certain financial services. Although companies can add clauses into contracts in order to comply with the EU's cross-border personal data transfer rules, these are subject to some legal and operational risk.</p>

**Table B.D 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.

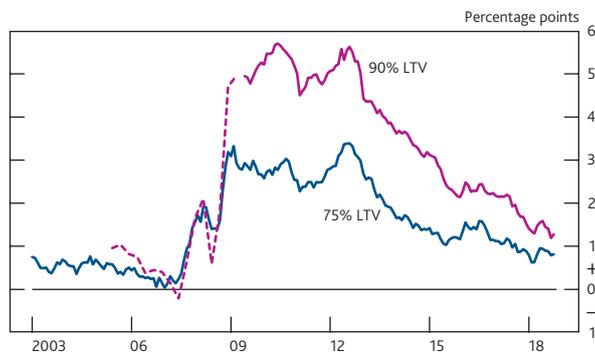
Risk to financial stability	Mitigating factors
<b>Credit Rating Agencies (CRAs)</b>	
<p>EU rules will prevent some banks and insurance companies in the EU from using ratings issued by UK CRAs to calculate prudential requirements, unless those ratings are endorsed by an EU CRA.</p> <p>Before any UK ratings can be endorsed, ESMA will need to agree a co-operation agreement with the FCA and assess the regulation of UK CRAs to be at least as stringent as that of EU CRAs.</p> <p>In the absence of endorsement, EU banks and insurance companies could be discouraged from holding securities that are rated only by UK CRAs.</p> <p>This issue will also apply in reverse to the ability of UK banks and insurance companies to rely on ratings issued by EU CRAs.</p>	<p>This issue will mainly affect banks and insurers calculating requirements under the standardised approach/standard formula.</p> <p>Sovereign-issued securities are often rated by both UK and EU CRAs, so may be less likely to be affected.</p> <p>The UK CRA Regulation (CRAR) will contain a transition regime to allow continued regulatory use of ratings issued before exit by EU CRAs which are registered or apply for registration in the UK for 12 months.</p> <p>The EU regime provides for a similar transition to allow continued regulatory use of ratings issued only by a UK CRA whose registration is withdrawn, for a period of three months, extendable by a further three months.</p> <p>UK CRAs are advanced in registering entities in the EU that could then endorse ratings issued by their UK entity.</p> <p>ESMA recently noted its intention to have a Memorandum of Understanding with the FCA in place before Brexit. The UK's CRAR Statutory Instrument will align the UK's regulation with EU regulation and enable ESMA to assess the UK regime.</p>
<b>Settlement finality protection for financial market infrastructure</b>	
<p>After the UK exits the EU, UK financial market infrastructure firms (FMIs) such as clearing houses and payment systems will no longer automatically benefit from EU settlement finality protection.</p> <p>They may no longer be protected against payments or transfers being revoked, or collateral being clawed back, in the event that an EU member enters insolvency.</p> <p>Member states that have not implemented local protections (see opposite) account for up to 25% of the members of UK FMIs.</p>	<p>Some EU member states (including Belgium, Germany and Denmark) have national legislation that provides protection for financial market infrastructure in non-EU countries. Others are in the process of introducing such legislation, but the timing and coverage is uncertain.</p> <p>UK FMIs can work with their EU members to restructure memberships so that membership is through entities in member states that have settlement finality protections in place for third countries.</p> <p>The UK government intends to legislate to grant settlement finality protection to EU FMIs with UK members.</p>
<b>Access to euro payment systems</b>	
<p>UK banks will need to maintain access to TARGET2 to use it to make high-value euro payments, including between UK and EU accounts. Major UK banks make on average 23,000 payments totalling £73 billion each day through this system.</p> <p>The UK banks will want to maintain access to the Single Euro Payments Area (SEPA) so customers of UK payment service providers can use it to make lower value euro payments, such as: bank transfers between businesses, mortgage and salary payments.</p>	<p>UK banks intend to access TARGET2 through their EU branches or subsidiaries, or correspondent relationships with other banks.</p> <p>The European Payments Council can grant SEPA access (subject to non-objection from the European Commission).</p> <p>UK Finance (the trade association for UK banking and financial services) has made an application to maintain UK participation in SEPA. As a result of the on-shoring of EU legislation, legislation relevant to SEPA membership will be maintained. The on-shoring approach is designed to maximise the prospect of the UK maintaining access to SEPA.</p> <p>If UK banks were unable to participate in SEPA, euro payments between UK and EU accounts could be made in high value systems such as TARGET2, though this would be more costly, and may in some cases take longer to process.</p>
<b>Ability of EU firms to trade on UK trading venues</b>	
<p>The EU's Trading Obligation requires 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 a reciprocal trading obligation when it leaves the EU.</p> <p>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. For EU firms to access these liquidity pools for securities caught by the Trading Obligation, UK trading venues will need to be found equivalent.</p>	<p>Firms and venues are taking action to ensure they can trade securities in both the EU and UK and other equivalent jurisdictions.</p> <p>However, the process of adjustment might pose operational risks, which could disrupt trading. And it would fragment liquidity across jurisdictions and venues, which may particularly impact EU firms' trading given their reliance on UK liquidity pools.</p> <p>The EU and UK could deem each other's regulatory frameworks as equivalent, thereby mitigating risks of disruption.</p>

Risk to financial stability	Mitigating factors
Increased prudential requirements	
<p>EU regulations for banks and insurance companies subject their non-EU exposures (which will include their holdings of UK securities) to higher capital and liquidity requirements.</p> <p>UK legislation (as aligned with EU rules) would subject UK banks and insurance companies to higher capital and liquidity requirements on non-UK exposures.</p>	<p>The direct impact on EU banks and insurance companies is likely to be small.</p> <p>The UK government has committed to give UK regulators the power to delay the impact. This legislation needs to be passed but, once in effect, would mitigate the risk.</p>

# Overview of risks to UK financial stability

The FPC judges that, apart from those related to Brexit, domestic risks remain at a standard level overall. Lender risk appetite is strong, particularly in the mortgage market. But, reflecting uncertainty, demand for credit has been muted. Mortgage lending growth has been modest. Consumer credit lending growth has also slowed recently, consistent with some tightening in credit conditions. In corporate credit markets, risk appetite had been strong, particularly in leveraged lending. In recent months, there have been signs that creditor risk appetite in financial markets has begun to decrease, consistent with some moderation in global activity growth and a pickup in trade tensions. Overall, aggregate credit growth in the UK has slowed. 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 the risk environment evolves. The FPC judges that risks from global debt vulnerabilities remain material.

**Chart C.1** Quoted spreads on new mortgage lending have continued to narrow, especially for higher-risk loans  
Mortgage rates on new owner-occupier two-year fixed-rate mortgages relative to risk-free rates<sup>(a)(b)</sup>



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

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

*Lender risk appetite is strong, particularly in the mortgage market.* Mortgage lending spreads have fallen substantially over the past few years (**Chart C.1**). The additional interest rate charged on a 90% LTV mortgage compared to a 75% LTV mortgage was 46 basis points in October 2018, close to the post-crisis low of 40 basis points seen the previous month. This reduces the compensation lenders receive for the additional risk associated with higher LTV lending. Meanwhile, the share of new mortgages with LTI ratios between 4.0 and 4.5 reached 19.2% in 2018 Q2, a historical high.

*But mortgage lending has grown only modestly over the past year, likely reflecting weak demand.*

Despite this strengthening of risk appetite by lenders, mortgage lending growth in the 12 months to September 2018 was 3.2%, broadly in line with household disposable income growth. Credit growth has remained stable at around this level over the past two years, as have mortgage approvals. This reflects restrained borrower demand, driven by a squeeze in real incomes, property tax changes and slightly lower consumer confidence, in part due to uncertainties related to Brexit. Were that uncertainty to fade, borrower demand could rebound significantly.

*Consumer credit lending growth has slowed recently, consistent with some tightening in credit conditions.*

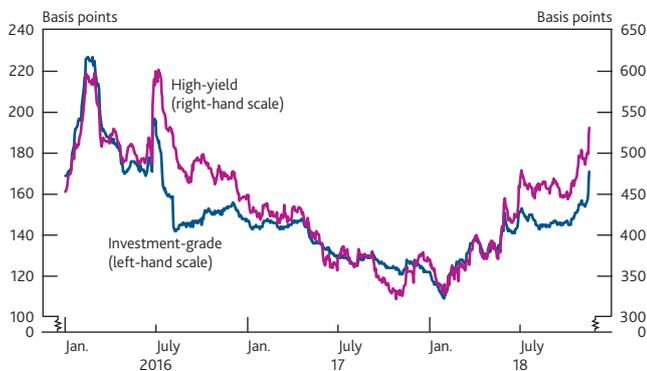
Consumer credit grew by 7.7% in the 12 months to September 2018, down from a peak of 10.9% in November 2016. This recent slowdown is consistent with lenders' responses to the *Credit Conditions Survey*, who have reported tightening in the availability of consumer credit since 2017.

*In corporate credit markets, risk appetite had been strong, particularly in the leveraged lending market...*

Over the past few years, financial conditions in advanced economies have been accommodative relative to historical averages. This has created the conditions for rapid growth of non-bank finance for companies over the past few years, especially through leveraged loans. Issuance in the global leveraged lending market reached a record high in 2017. This growth has been accompanied by increased securitisation activity through collateralised loan obligations (CLOs), as well as demand from investment funds. Given the decline in underwriting standards, investors in leveraged loans are at increasing risk of loss. CLOs are held mainly by non-bank investors. Although international banks hold around a third of the outstanding stock of CLOs, UK banks only account for a very small share of the stock, and their exposures to leveraged lending were covered in the Bank's 2018 stress test (see Leveraged lending chapter).

**Chart C.2 Creditor risk appetite in financial markets has fallen over 2018**

**Sterling investment-grade and high-yield corporate bond spreads<sup>(a)(b)</sup>**



Sources: ICE/BofAML and Bank calculations.

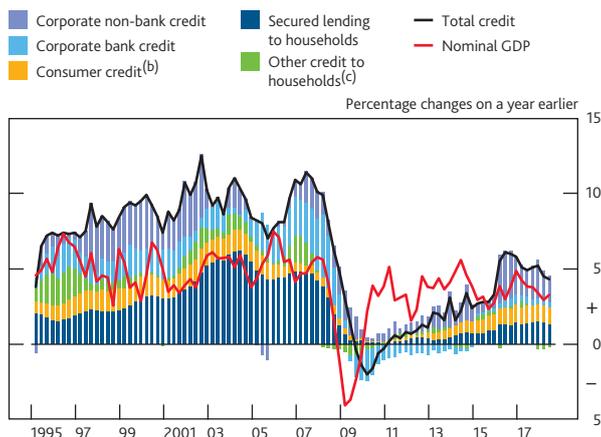
- (a) The series refers to sterling-denominated investment-grade and below investment-grade corporate bonds issued in the eurobond or UK domestic market.
- (b) Option-adjusted spreads.

*...but Brexit uncertainty has resulted in restrained demand, limiting corporate credit growth.*

Reports from the Bank's Agents suggest that some companies are becoming more uncertain about the outlook, and credit demand appears to have been dampened by Brexit uncertainty more generally. Overall UK corporate credit growth was 5.2% in the year to 2018 Q2. Within that, there has been greater growth in corporate debt issuance, with market-based finance growing by 7.3%. However, borrowing from UK banks has been subdued, rising by just 2.7%. Growth in lending to small and medium-sized enterprises is slower than for larger companies. Overall, this has limited the increase in corporate leverage.

**Chart C.3 Domestic credit growth is modest, and only a little faster than nominal GDP growth**

**Nominal GDP and contributions to total private non-financial sector credit growth<sup>(a)</sup>**



Sources: ONS 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' (PNFCs) loans and debt securities, excluding direct investment loans and loans secured on dwellings. Data are all currency and are not seasonally adjusted.
- (b) Includes student loans. As student loans are only available annually on a financial-year basis, periods after 2017 Q1 are estimated as total unsecured loans to households and NPISH, less monetary financial institutions' (MFIs) sterling loans to unincorporated businesses and the not-for-profit sector component.
- (c) 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.

*In recent months there have been signs that creditor risk appetite in financial markets has begun to decrease.*

There has been some increase in the cost of borrowing in UK debt markets and a fall in UK equity prices over the course of the year. For example, in November, sterling investment-grade and high-yield corporate bond spreads reached their highest levels of the year (Chart C.2). And the VIX, a measure of implied US equity volatility, has also increased from its very low levels in September. These moves have been driven in part by a global reduction in risk appetite and tightening financial conditions, consistent with some moderation in global activity growth and a pickup in trade tensions (see Global debt vulnerabilities chapter).

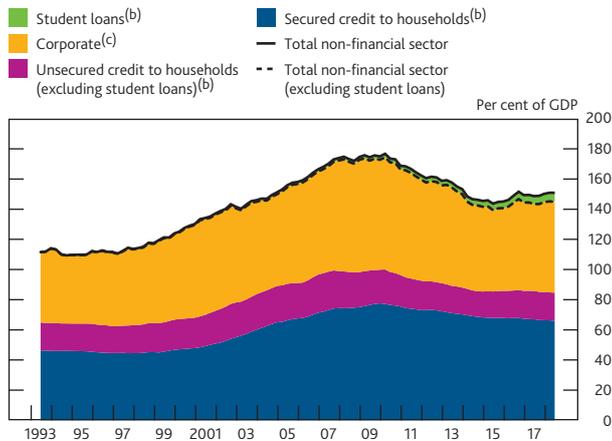
*The FPC continues to judge that, apart from those related to Brexit, domestic risks remain at a standard level overall.*

In aggregate, growth in total private non-financial sector credit (excluding student loans) has been modest. It slowed slightly to 3.9% in the year to 2018 Q2, slightly faster than nominal GDP growth of 3.2% (Chart C.3).

The stock of total credit relative to GDP has fallen by over 30 percentage points since 2008. But it remains elevated by historical standards (Chart C.4). Debt-servicing burdens for households and businesses remain low, supported by current low

**Chart C.4 UK private non-financial debt relative to GDP is below its 2008 peak but remains high**

Components of private non-financial sector debt to GDP<sup>(a)</sup>



Sources: ONS and Bank calculations.

- (a) Data are all currency and are not seasonally adjusted.
- (b) The household secured, unsecured and student loans series include all liabilities of households and NPISH, except for unfunded pension liabilities and financial derivatives associated with NPISH.
- (c) Includes PNFCS' loans and debt securities, excluding direct investment loans and loans secured on dwellings.

interest rates. The share of households who spend more than 40% of their income on servicing mortgage debt, also remains close to historical lows. With all other factors held equal, mortgage interest rates would need to increase by almost 300 basis points for this share to reach its 1997–2006 average of 1.8%.

The UK's credit to GDP gap, which measures the difference between the ratio of credit to GDP and a simple statistical estimate of its long-term trend, remains significantly negative, at -12 percentage points.<sup>(1)</sup>

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

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

The FPC first set a UK countercyclical capital buffer (CCyB) rate of 1% in November 2017 and it comes into effect on 28 November 2018. The FPC stands ready to move the UK CCyB rate in either direction as the risk environment evolves (see the UK CCyB rate decision box).

*Risks from global debt vulnerabilities remain material.*

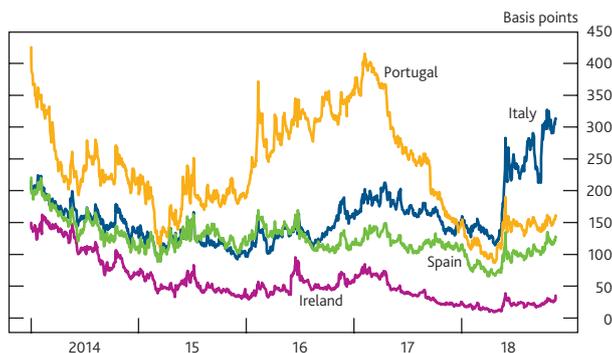
Since the June 2018 Report, global financial conditions have responded to the ongoing normalisation of US monetary policy and continued to tighten. Global equity markets have fallen and credit spreads have risen. Emerging market economies (EMEs) have been particularly affected. Market pressures have been most acute for Turkey and Argentina, but other EMEs remain vulnerable to a more widespread reduction in risk appetite. Tighter financial conditions increase risks in those EMEs with high external debt levels relative to GDP, particularly those with government or corporate debt denominated in US dollars.

In China, private non-financial sector debt remains high, at 213% of GDP. The imposition of trade barriers by the US and China does not itself pose a material risk to UK financial stability. But a slowdown in growth in China — for example, caused by an escalation of trade tensions with the US — would make its elevated debt levels significantly less sustainable. Reflecting these risks, the FPC incorporated a very severe global stress in the 2018 stress test.

Following market tensions in May, Italian government bond yields rose again in October, to their highest levels since the start of 2014 (Chart C.5). This underlines the vulnerabilities created by high public sector debt and interlinkages between banks and sovereigns in a currency union. A further deterioration in Italy's financial outlook could result in material spillovers to the euro area and UK (see Global debt vulnerabilities chapter).

**Chart C.5 Italian government bond spreads rose to their highest levels since 2014**

Spreads of government bonds of selected euro-area countries to German bunds<sup>(a)</sup>



Sources: Datastream from Refinitiv and Bank calculations.

- (a) Ten-year government bond spreads over German bunds.

(1) This indicator has been strongly correlated with past financial crises. But as the FPC has previously noted, the long-term trend on which it is based currently gives undue weight to the rapid build-up in credit prior to the global financial crisis, which proved to be unsustainable.

### Box 3

## The FPC's 2018 Q4 UK countercyclical capital buffer rate decision

Banks are required to hold capital in the form of buffers which can be used to absorb losses during an economic downturn, enabling them to continue lending to the economy. Without these buffers, banks are more likely to cut back lending in the face of losses, making any downturn worse.

Major UK banks must maintain capital to meet a 'capital conservation buffer' of 2.5% of risk-weighted assets from 2019 and, depending on their systemic importance, an additional systemic buffer ranging from 1%–2.5% of risk-weighted assets. The FPC can supplement these buffers for all banks when risks are building up — and thereby increase their capacity to absorb losses without cutting lending — by raising the UK countercyclical capital buffer (CCyB) rate.

**The FPC is maintaining the UK CCyB rate at 1%.** It first set this rate in November 2017 and it comes into effect on 28 November 2018.

The FPC's decision reflects its judgement that domestic risks, apart from those related to Brexit, remain at a standard level overall. Credit growth has been modest with domestic credit having grown only slightly faster than nominal GDP over the past two years. Moreover, debt levels relative to incomes, though high, remain well below their pre-crisis levels and debt-servicing burdens are low. This decision is consistent with the FPC's published strategy that it expects to set a UK CCyB rate in the region of 1% in a standard domestic risk environment.

The FPC also uses the results of the annual cyclical scenario (ACS) to inform its decision. The 2018 ACS showed that the riskiness of banks' UK assets had not changed overall since the 2017 ACS: loss rates over the stress period were broadly unchanged (see Stress testing the UK banking system: 2018 results chapter).

The FPC continues to judge that economic risks associated with Brexit do not warrant additional capital buffers for banks (see Resilience of the UK financial system to Brexit chapter). The 2018 ACS showed that banks' existing capital buffers are sufficient to absorb the impact of the stress scenario on their balance sheets. The UK economic scenario in that stress test was sufficiently severe to encompass the outcomes based on 'worst case' assumptions about the challenges the UK economy could face in the event of a cliff-edge Brexit. The stress scenario also included deep simultaneous recessions in the UK and global economies that are more severe than the global crisis and that are combined with large falls in asset

prices and a separate stress of misconduct costs. The FPC therefore judges that the UK banking system is strong enough to continue to serve UK households and businesses even in the event of a disorderly Brexit.

The FPC stands ready to move the UK CCyB rate in either direction as the risk environment evolves.

If an 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. Relative to the counterfactual where these losses might lead banks to restrict lending to ensure they can meet a 1% UK CCyB rate, the release could preserve their capacity to lend to UK households and businesses by around £250 billion. This compares to £65 billion of net lending in the past year, so the released capital could sustain this level of net lending for several years. The release of the UK CCyB rate would be consistent with the FPC's firm intention that all elements of banks' regulatory capital buffers can be used to absorb losses, reducing banks' incentives to cut lending to the real economy in a stress.

In the absence of economic stress, the FPC remains vigilant to developments in the domestic credit environment.

There are signs that lender risk appetite is strong and credit supply conditions are accommodative. This has not translated into materially greater riskiness of the financial environment because demand for credit has, at the same time, been muted. This could reflect Brexit-related uncertainty. Were that uncertainty to fade, credit demand could rebound significantly and lead to an increase in the riskiness of banks' exposures. Given current accommodative lending conditions, that could require a timely policy response to ensure resilience.

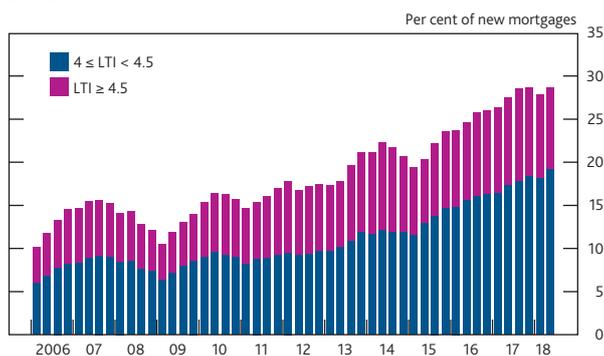
The FPC will continue to review the setting of the UK CCyB rate as economic conditions and the overall risk environment evolve.

# UK household indebtedness

The level of UK household debt relative to incomes remains lower than its 2008 peak but high by historical standards. Banks' risk appetite for lending to mortgage borrowers remains strong. However, mortgage lending has grown only modestly over the past year, reflecting weak demand. And the share of households with high mortgage debt-servicing ratios is close to historical lows. Consumer credit lending growth has slowed recently, consistent with some tightening in credit conditions. The 2018 stress test showed that UK banks can successfully absorb potential losses on mortgage lending and consumer credit in a severe stress scenario.

**Chart D.1** The proportion of lending at LTI ratios at or above 4 has increased since 2015

Proportion of new owner-occupier mortgages extended at different LTI ratios<sup>(a)(b)(c)</sup>

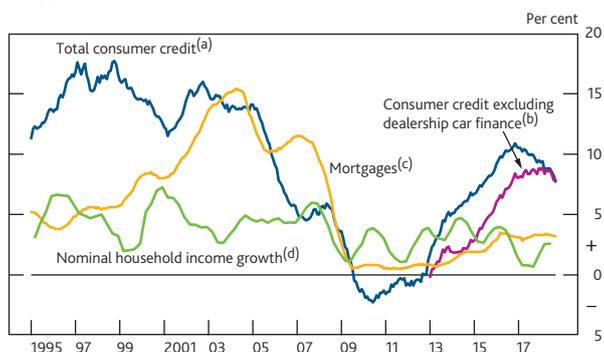


Sources: FCA Product Sales Database and Bank calculations.

- (a) The Product Sales Database 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 D.2** Mortgage lending 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).

*The level of UK household debt relative to incomes has fallen since the financial crisis but remains high.*

UK household debt (excluding student loans) amounts to 125% of household incomes, materially below its peak of 144% in 2008 but high historically. A high level of debt can pose risks by increasing potential losses to lenders. It can also increase the likelihood of sharp cuts in consumption, especially by highly indebted households, which may amplify a downturn and, in turn, the risk of losses to lenders on all forms of lending.<sup>(1)</sup>

*Banks' risk appetite for mortgage lending remains strong...*

Mortgage price and non-price terms have loosened in recent years as competition has intensified. While the share of lending with loan to income (LTI) ratios at or above 4.5 fell slightly to 9.4% in 2018 Q2 — below the FPC's flow limit<sup>(2)</sup> — the share of new mortgages with LTI ratios between 4.0 and 4.5 reached 19.2%, a historical high (Chart D.1). The share of advertised products available to finance a 90% loan to value (LTV) mortgage increased from 13.8% in September 2015 to a post-crisis peak of 17.3% in September 2018. The proportion of new mortgage lending at LTV ratios at or above 90% was 17.8% in 2018 Q2, up from 16.3% in 2015 Q2. And the additional interest rate charged on a 90% LTV mortgage compared to a 75% LTV mortgage — a measure of the compensation lenders receive for risk — was 46 basis points in October 2018, compared to 139 basis points in 2015 (Chart C.1 in Overview of risks to UK financial stability chapter).

*...but mortgage lending has grown only modestly over the past year, reflecting weak demand.*

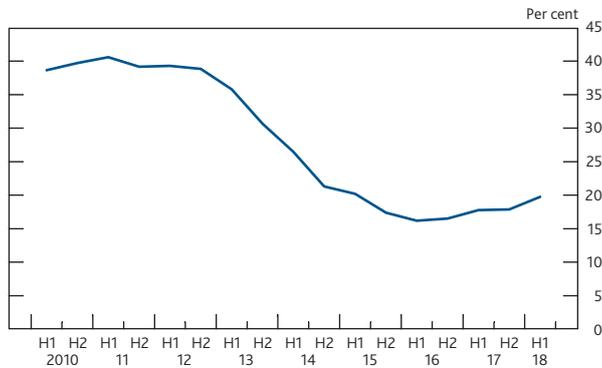
Mortgage lending grew 3.2% in the 12 months to September 2018, broadly in line with household disposable income growth (Chart D.2). This modest growth reflects weakness in demand — particularly concentrated in London and the South East — driven by the squeeze in real incomes,

(1) As set out in more detail in the [June 2017 Report](#).

(2) The FPC's 2014 LTI flow limit Recommendation restricts the proportion of mortgages extended at LTI ratios at or above 4.5 to 15% of a lender's new mortgage lending.

### Chart D.3 The share of the stock of UK mortgages with LTV ratios at or above 75% has been increasing a little since 2016

Share of the stock of owner-occupier mortgages for UK lenders with LTV ratios at or above 75%<sup>(a)(b)(c)</sup>



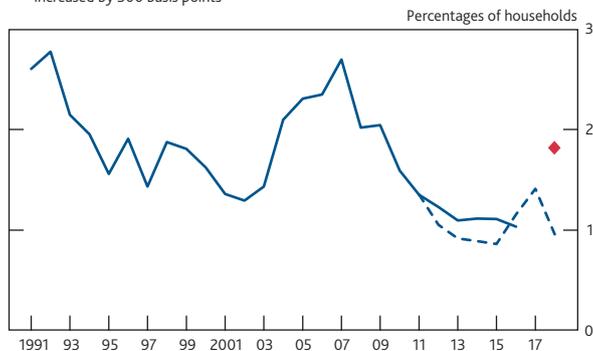
Sources: PRA regulatory returns and Bank calculations.

- (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 ratios (ie updated for repayments and house price changes since the loan was originated).

### Chart D.4 The proportion of households with high mortgage DSRs has fallen and remains low

Percentage of households with mortgage DSRs of 40% or greater<sup>(a)(b)(c)</sup>

- Households with mortgage DSR  $\geq$  40% (BHPS/US)
- - Households with mortgage DSR  $\geq$  40% (NMG)
- ◆ Households with mortgage DSR  $\geq$  40% if mortgage rates increased by 300 basis points



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.

property tax changes and slightly lower consumer confidence, in part due to uncertainties related to Brexit. Were that uncertainty to fade, borrower demand could rebound significantly.

*The stock of mortgage debt has become a little riskier, though the share of households with high mortgage debt-servicing ratios (DSRs) is close to historical lows.*

Reflecting strong lender risk appetite and slowing house price growth, the share of the stock of owner-occupier mortgages with LTV ratios at or above 75% has increased since 2016 (Chart D.3). This increases the risk of losses to lenders, since there is less collateral available if the borrower defaults.

At the same time, however, the share of households with mortgage DSRs of at least 40%<sup>(3)</sup> fell to 1% in 2018 H2 (Chart D.4). With all other factors held equal, mortgage interest rates would need to increase by almost 300 basis points for the share to reach its 1997–2006 average of 1.8%.

*Consumer credit lending growth has slowed recently, consistent with some tightening in credit conditions.*

Consumer credit grew by 7.7% in the 12 months to September 2018 (Chart D.2), slowing from a peak of 10.9% in November 2016. During 2017, the slowing in consumer credit reflected the completion of a structural shift towards households purchasing more cars using dealership car finance.<sup>(4)</sup> The more recent slowdown is consistent with some tightening in supply across consumer credit products. Lenders responding to the *Credit Conditions Survey* have reported tightening in the availability of consumer credit since 2017.

*The FPC's mortgage market Recommendations guard against a material deterioration in borrower resilience...*

The FPC's LTI flow limit and affordability test<sup>(5)</sup> Recommendations guard against a significant increase in the number of highly indebted households. In August 2018, Bank Rate increased by 0.25 percentage points. To the extent that this was passed through to lenders' reversion rates, it would also be expected to pass through to their stressed interest rates for assessing mortgage affordability, under the FPC's Recommendation. The FPC previously stated it would review the calibration of its Recommendations when Bank Rate rises to a level close to 1%.

*...and the 2018 stress test showed UK banks are resilient to losses on mortgage and consumer credit in a severe downturn.*

The Bank's 2018 stress-test scenario included a rise in interest rates combined with a large increase in unemployment and sharp fall in house prices (see *Stress testing the UK banking system: 2018 results chapter*).

(3) Historical evidence suggests that households with DSRs above 40% are materially more likely to experience payment difficulties.

(4) For further detail, see the box on pages 16–17 of the *November 2017 Inflation Report*.

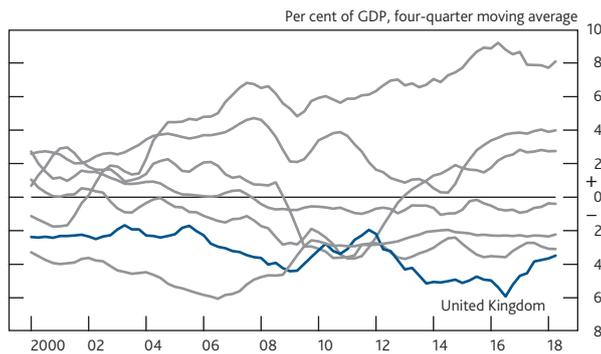
(5) The FPC recommends to lenders that, before extending a mortgage, they test whether borrowers could still afford it if the reversion rate at origination were to be 3 percentage points higher at any point over the first five years of the loan.

# UK external financing

Investment in UK assets by foreign investors has increased over recent years, financing the UK's current account deficit. This reliance on cross-border capital flows 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 investors have a particularly large presence in the UK commercial real estate and leveraged loan markets. There is little evidence of a reduction in risk appetite for gilts or sterling corporate bonds since the EU referendum, but appetite towards UK equities and sterling has been affected. Major UK banks were resilient to the external financing risks in the 2018 stress test.

**Chart E.1** The UK has the widest current account deficit in the G7

G7 current account balances<sup>(a)</sup>

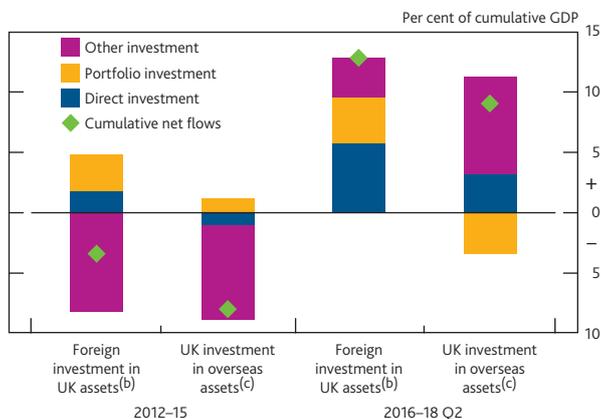


Sources: OECD, Key Short-Term Economic Indicators: Current Account % of GDP, OECD.Stat, accessed on 20 October 2018. <https://stats.oecd.org/Index.aspx?QueryId=67094>.

(a) G7 countries are: Canada, France, Germany, Italy, Japan, UK and US.

**Chart E.2** Capital inflows to the UK have increased over the past two years

Cumulative inward and outward capital flows since 2012<sup>(a)</sup>



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.

*The UK has a large stock of assets held by foreign investors, along with a material current account deficit.*

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. Overseas residents have significant holdings of UK assets, amounting to 431% of annualised GDP in 2018 Q2.

This position reflects substantial inward capital flows in recent decades, which have — in part — been used to finance the UK's current account deficit. The deficit has shrunk in recent years, standing at 3.9% of annualised GDP in 2018 Q2, though it remains high by international standards (**Chart E.1**).

*There have been substantial foreign capital inflows in the past two years, affecting various sectors...*

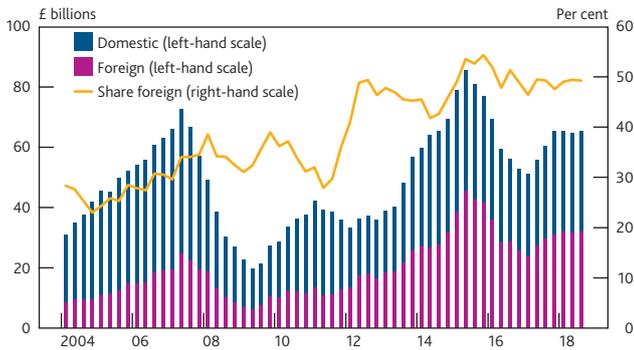
Over the period 2012–15, the current account deficit was financed by UK investors selling overseas assets at a faster rate than foreign investors were selling UK assets. However, this position has reversed since 2016, and foreign inflows have been substantial (**Chart E.2**).

A material share of these inflows since 2016 has been in the 'other investment' category (**Chart E.2**). This includes inflows of loans and deposits to banks, which can be short term in nature and hence subject to refinancing risk. Unlike the period before the crisis, though, the UK banking system currently has more foreign assets than foreign liabilities.

In the UK commercial real estate (CRE) market, foreign investors, notably from the United States and Asia, accounted for nearly 50% of transactions, and 71% of London transactions, in the 12 months to 2018 Q3 (**Chart E.3**). The leveraged loan market is also particularly reliant on cross-border investment. 85% of the total gross issuance of leveraged loans by UK non-financial companies was syndicated abroad in 2017, a record level. This share increased to 94% in the year to November 2018 (**Chart E.4**).

**Chart E.3 Foreign investors make up a large proportion of UK CRE transactions**

UK CRE transactions, moving sum of four quarters<sup>(a)</sup>

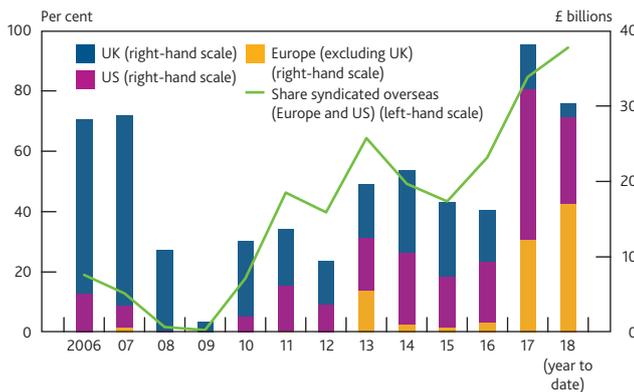


Sources: The Property Archive and Bank calculations.

(a) The Property Archive data are subject to amendment and no warranty is given with reference to the accuracy, reliability or content of any information provided.

**Chart E.4 A record level of UK leveraged loans were syndicated abroad in 2017**

Gross issuance of leveraged loans by UK private non-financial corporations syndicated in the US and Europe<sup>(a)(b)(c)</sup>



Sources: Bank of England, LCD, an offering of S&P Global Market Intelligence 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.  
 (c) The 2018 data include gross issuance from January to 16 November 2018.

**Chart E.5 The decline in the risk reversal suggests that the weight on sterling depreciating further has risen during 2018**  
 Six-month sterling-US dollar risk reversals and implied volatility



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

(a) 25-delta risk reversal. Risk reversals show the difference between the prices of insuring against equal-sized rises and falls in the exchange rate. Negative risk reversals mean that it is more expensive to insure against currency depreciations than appreciations.

...leaving UK borrowers vulnerable to a reduction in foreign investor appetite for UK assets.

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 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.

*There is mixed evidence as to investor appetite for UK assets since the EU referendum.*

The compensation that investors demand for holding longer-maturity sterling assets (the ‘term premium’) remains below its historical average and has moved in line with those for other advanced economies since 2016. And while sterling investment-grade corporate bond spreads have risen since the beginning of the year, they are only slightly above their historical averages and are at similar levels to those seen at the beginning of 2016.

However, estimates of equity risk premia for an index of UK-focused companies — those for which at least 70% of revenue is earned in the UK — have increased since the EU referendum, in contrast to falls in equity risk premia for the S&P 500 and Euro Stoxx indices. And the Bank of America Merrill Lynch Global Fund Manager survey reported in November 2018 that 27% of respondents were underweight UK equities, compared to an average of 12% since 1999.

Implied volatilities from sterling options — measures of perceived risk around the exchange rate — have also risen since the *June 2018 Report* (Chart E.5). And movements in the cost of insuring against a fall in sterling relative to a rise — known as the risk reversal — suggest that the weight market participants are placing on a future depreciation has also risen.

*Major UK banks were resilient to the external financing risks in the 2018 stress test.*

In the event of a material reduction in foreign investors’ appetite for UK assets, there are several factors mitigating risks to the UK banking system and the broader economy. UK banks have strong liquidity positions, including on a foreign currency basis. And at an aggregate level, UK residents hold more foreign currency assets than liabilities. This mitigates the economic risks associated with currency depreciation.

The FPC is vigilant to the risks posed by the UK’s external financing position, and has assessed the resilience of banks against a scenario consistent with a sudden increase in the rate of return investors demand for holding sterling assets and a large fall in sterling (see Stress testing the UK banking system: 2018 results chapter).

# Leveraged lending

The global and UK markets for leveraged loans (typically loans to non-investment grade firms that are highly indebted or are owned by a private equity sponsor) have grown rapidly in recent years. This reflects strong creditor risk appetite and a marked loosening of underwriting standards. This growth has contributed to a pickup in aggregate corporate indebtedness, particularly in the US. The rapid growth in leveraged lending has been driven by increased securitisation activity through collateralised loan obligations (CLOs) as well as demand from investment funds.

Given the loosening of underwriting standards, investors in leveraged loans — including through CLOs — are at increasing risk of loss. CLOs are held mainly by non-bank investors, although international banks are estimated to hold around a third of the outstanding stock, mainly the less risky tranches. UK banks, in contrast, only have small holdings of CLOs and their domestic corporate lending has not shifted materially towards higher-risk borrowers. UK banks' exposures to leveraged lending were tested in the 2018 stress test.

**Chart F.1 Leveraged loan issuance has reached pre-crisis levels**  
Twelve-month rolling global and UK gross issuance of leveraged loans<sup>(a)(b)</sup>



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

- (a) Based on leveraged loan transactions tracked by LCD, covering both institutional and pro-rata facilities (including amortising term loans and revolving credit facilities). It excludes private bilateral deals and facilities that are not syndicated.  
 (b) Gross issuance refers to total issuance, including for refinancing purposes. It does not subtract repayments of outstanding loans.

*The global leveraged lending market has been growing rapidly in recent years...*

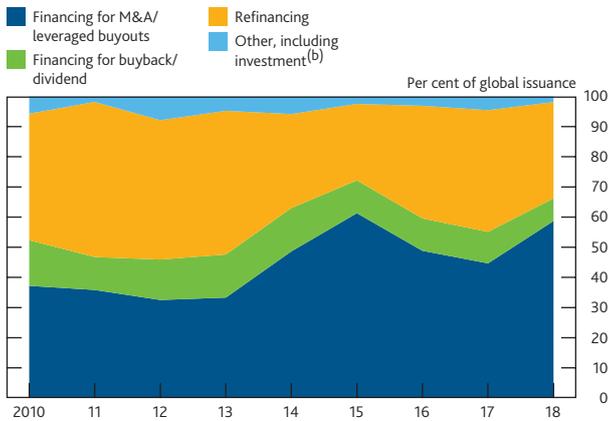
Gross issuance of leveraged loans (typically loans to non-investment grade firms that are highly indebted or are owned by a private equity sponsor) has reached pre-crisis levels, both globally and in the UK (Chart F.1). While a significant proportion of that issuance has been used for refinancing, 'new money' issuance has also increased to its highest level since the global financial crisis. Most of these proceeds have been used to engineer changes in the liability structure of the corporate sector to optimise returns, rather than to fund new investment (Chart F.2). And, globally, the majority of these loans have financed US borrowers.

There is no consistent definition of leveraged loans — meaning it is difficult to estimate the size of the market with precision. The outstanding stock of leveraged loans that would typically be distributed by banks to non-bank institutional investors is estimated to be around US\$1.8 trillion.<sup>(1)</sup> This figure rises to US\$2.2 trillion once loans that would typically be held by banks themselves are included. And it would rise further if revolving credit facilities provided by banks were also included.

(1) This estimate of the total stock is based on Bloomberg's definition of leveraged loans. Relative to other estimates (including the most cited US\$1.3 trillion), it is more likely to also include smaller, middle-market deals and loans that are less widely syndicated. See Chart A in Box 4.

**Chart F.2 Most of the proceeds have been used for purposes other than to fund investment**

Purpose of leveraged loan issuance globally<sup>(a)</sup>

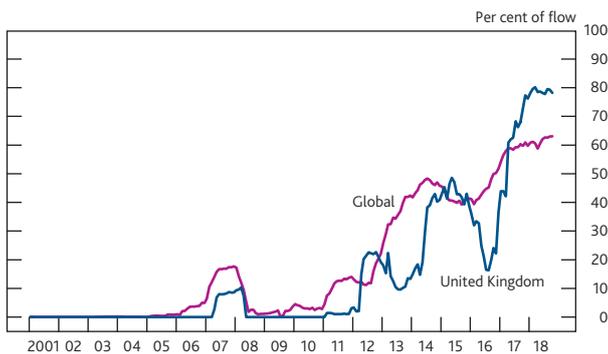


Sources: LCD, an offering of S&P Global Market Intelligence and Bank calculations.

(a) Annual gross issuance of leveraged loans split by deal purpose.  
 (b) 'Other' includes general corporate purpose, capital expenditure and bankruptcy-related finance.

**Chart F.3 The share of covenant-lite leveraged loan issuance has reached record highs**

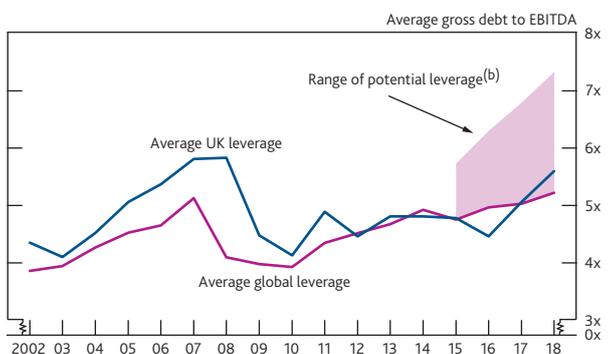
Share of covenant-lite leveraged loan issuance globally and in the UK



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

**Chart F.4 The average leverage of issuers has reached pre-crisis levels and could be even higher than reported**

Average leverage of global and UK issuers for new leveraged loans<sup>(a)</sup>



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.

...accompanied by a marked loosening of underwriting standards.

The pickup in issuance of leveraged loans at the global level reflects strong creditor risk appetite and loosening underwriting standards. The share of so-called 'covenant-lite' loans — where investors do not require borrowers to maintain certain financial ratios — has reached record highs (Chart F.3). Other traditional investor protections in loan documentation (such as restrictions on borrowers' ability to transfer collateral beyond the reach of the lender) have also been relaxed, potentially increasing losses to lenders in the event of default.

Borrowers are also increasingly indebted. The average leverage of borrowers has reached pre-crisis levels globally and a similar trend is evident in the UK (Chart F.4). The proportion of leveraged loans issued to firms globally with debt to EBITDA<sup>(2)</sup> ratios at, or above, six picked up to around 27% in the year to 2018 Q3, the highest proportion since 2007.

There has been growing use of adjustments to how earnings are calculated at the point a loan is made (Chart F.4). These adjustments involve 'add-backs' that assume potential future earnings improvements (eg efficiency gains) are realised.<sup>(3)</sup> These add-backs are uncertain, both in the magnitude of realised earnings gains and the horizon over which they could occur. So they may overstate EBITDA and, therefore, understate leverage.

During the recent period of weakening underwriting standards, credit spreads on leveraged loans have fallen significantly. Investors have not been demanding additional compensation for the growing risks.

The scale, growth and deterioration of underwriting standards of leveraged lending in recent years share similar trends with the US subprime mortgage market before the crisis. But there are also important differences between these markets, which matter for the ultimate risks to UK financial stability (see Box 4).

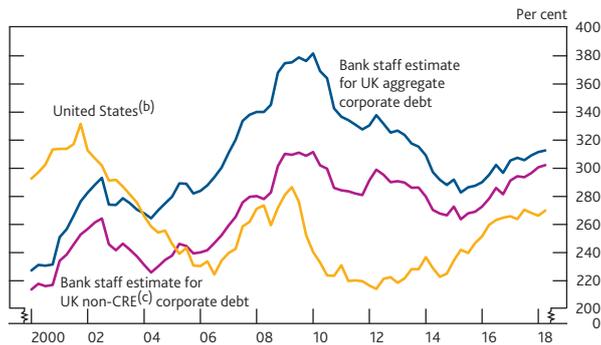
*The growth in leveraged lending has contributed to a pickup in aggregate corporate leverage.*

In the US, gross corporate debt has increased from 234% of annual earnings in 2015 Q1 to 270% in 2018 Q2, close to 2007 levels (Chart F.5). In the UK, while total corporate indebtedness remains below pre-crisis levels, leverage of UK companies outside the commercial real estate (CRE) sector has increased to a level that is now above its pre-crisis level.

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

(2) Earnings before interest, tax, depreciation and amortisation.  
 (3) EBITDA in leverage calculations can be increased by assuming future earnings improvements (so-called EBITDA 'add-backs'). Add-backs include amounts corresponding to expected earnings improvements via synergies, cost savings and revenue enhancements typically arising out of M&A transactions or leveraged buyouts.

**Chart F.5 Corporate leverage has been rising**  
US and UK private non-financial corporate gross debt to earnings<sup>(a)</sup>

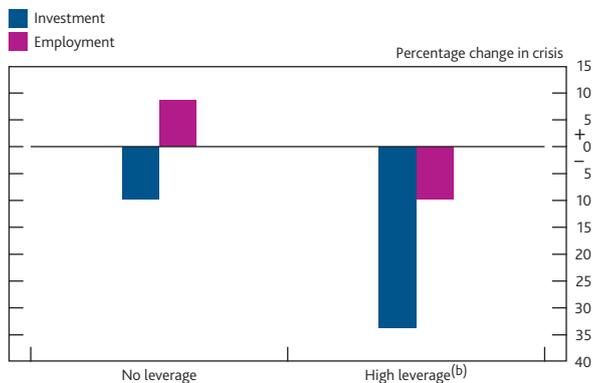


Sources: Association of British Insurers, Bank of England, Cass Commercial Real Estate Lending survey, Datastream from Refinitiv, Deals Business Intelligence from Refinitiv, Deloitte, Federal Reserve Board, 'Financial Accounts of the United States', LCD, an offering of S&P Global Market Intelligence,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

- (a) Gross debt to earnings is calculated as gross debt as a percentage of a four-quarter moving sum of gross operating surplus. Gross operating surplus is adjusted for financial intermediation services indirectly measured (FISIM).
- (b) US debt excludes certain small and medium-sized enterprise debt.
- (c) 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 (ii) for 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.

**Chart F.6 Highly indebted companies cut investment and employment more than unleveraged companies in the global financial crisis**

Change in investment and employment in the financial crisis for unleveraged companies and companies with high leverage ratios<sup>(a)</sup>



Sources: S&P Global Market Intelligence 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 net debt/EBITDA ratio higher than four in 2006.

deeper recessions.<sup>(4)</sup> And firm-level data suggest that, in the global financial crisis, highly indebted companies cut investment and employment more than unleveraged companies (**Chart F.6**).

*Leveraged lending growth has been driven by increased securitisation activity...*

A key driver of growth in the leveraged lending market has been increased securitisation activity through collateralised loan obligations (CLOs). Gross issuance of CLOs globally reached a record level in 2017 of around US\$350 billion, and the strong growth continued in 2018.<sup>(5)</sup> While there is some uncertainty over the ultimate investors in leveraged loans, Bank staff estimate that around 45% of leveraged loans that are typically distributed to non-bank institutional investors are held through CLOs (**Chart F.7**).

CLOs issue their own securities to finance their investment in leveraged loans. So gauging ultimate exposures to the risks stemming from the leveraged loan market requires 'looking through' to the final investors.

Based on a range of public and regulatory data, Bank staff have put together an indicative estimate of CLO holdings by different investors. This suggests that around two thirds of global CLOs are held by non-bank investors, including pension funds, insurers and investment funds<sup>(6)</sup> (**Chart F.8**).

International banks, particularly US and Japanese banks, hold the remaining one third of the stock of global CLOs (typically the less risky tranches).

Despite improvements since the crisis, CLOs remain complex assets (see Box 4) that, in a downturn, could result in losses for investors in CLOs, particularly if there were to be a reassessment of the riskiness and correlation of the underlying loans.

*...as well as demand from investment funds...*

Investment funds also hold leveraged loans directly (**Chart F.7**). Bank staff estimate that investment funds account for around 25% of leveraged loans typically held by non-bank institutional investors.

Leveraged loan holdings by open-ended funds, in particular, 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 to around US\$200 billion now.

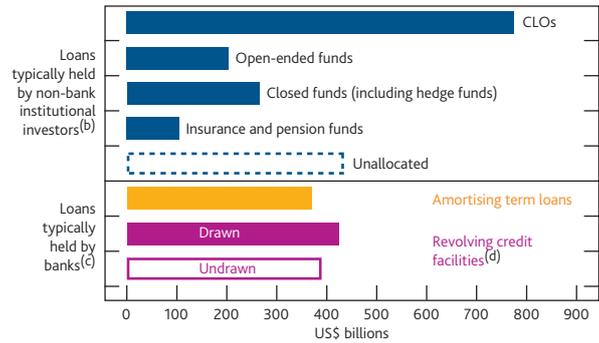
Some open-ended investment funds that invest in leveraged loans also offer redemption terms to investors that are

(4) 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*.

(5) The vast majority of CLOs' underlying assets are leveraged loans.

(6) UK insurance companies also hold a very small share of CLOs, accounting for around 1% of the global stock.

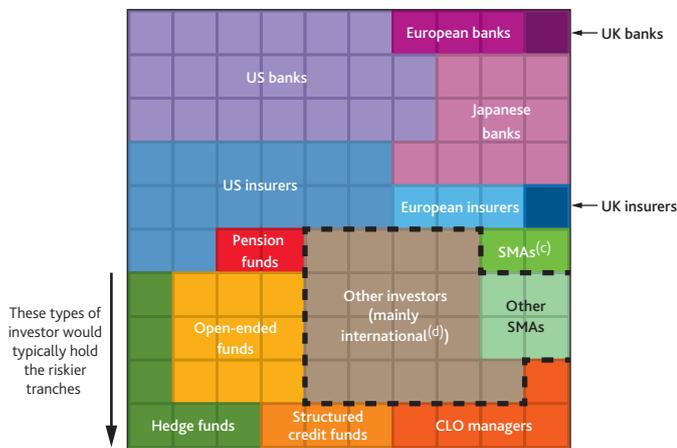
**Chart F.7 Leveraged lending growth has been driven by increased securitisation activity as well as demand from investment funds**  
 Indicative estimated holdings of leveraged loans by global investors<sup>(a)</sup>



Sources: BarclayHedge, Bloomberg Finance L.P., FCA Alternative Investment Fund Managers Directive (AIFMD), LCD, an offering of S&P Global Market Intelligence, National Association of Insurance Commissioners and Bank calculations.

- (a) Estimates of the total stock are based on Bloomberg’s definition of leveraged loans. Given the lack of consistent definition of leveraged lending, there is uncertainty over the total stock of outstanding leveraged loans.
- (b) For the loans that are typically distributed to non-bank institutional investors, the allocation across investors is based on ‘bottom-up’ estimates of leveraged loan holdings from a range of sources. Hence, there is a significant proportion of institutional loans that are unallocated. In practice, banks may hold some of these institutional loans.
- (c) For the loans that are typically held by banks, the allocation is based on the total outstanding value of non-institutional term loans (typically amortising) and revolving credit facilities, and assumes that these are mainly held by banks. Banks often use credit protection to hedge these risks. In practice, some of these credit facilities may also be held by institutional investors.
- (d) Undrawn revolving credit facilities refers to the known amount available, over and above the amount that has already been drawn by borrowers.

**Chart F.8 CLOs are held mainly by non-bank investors, although international banks are estimated to hold around a third of the outstanding stock**  
 Indicative estimated holdings of CLOs by global investors<sup>(a)(b)</sup>



Sources: BarclayHedge, Bloomberg Finance L.P., FCA Alternative Investment Fund Managers Directive (AIFMD), Firm public disclosures, LCD, an offering of S&P Global Market Intelligence, Morningstar, National Association of Insurance Commissioners, Securities Industry and Financial Markets Association, Solvency II submissions and Bank calculations.

- (a) 1 square = 1% of ~US\$750 billion global CLO market.
- (b) Where available, individual estimates of CLO holdings have been provided as of 2017 Q4. Where 2017 Q4 data were unavailable, the latest data have been used. Where available data did not give a complete picture, additional data sources were used to supplement specific investor holdings on a best-efforts basis. The dashed segment marks the areas of most uncertainty.
- (c) SMAs (separately managed accounts) are accounts managed by professional investment firms on behalf of clients (eg pension funds) where each portfolio is bespoke for the specific account holder.
- (d) Other investors comprise primarily Asian investors other than Japanese banks.

shorter-term than the time it would take to sell the loans. The redemption period for these open-ended funds is typically around 30 days, although some offer daily dealing. In some cases, the underlying loans could take longer to settle even under normal market conditions.<sup>(7)</sup> It is unclear how quickly these loans could be sold in a period of stress, without affecting market prices. As a result, large-scale redemptions from open-ended funds could amplify price falls.

*... while banks retain exposures to leveraged loan borrowers through other types of credit facilities.*

Banks’ exposures through other types of credit facilities are less risky compared to the loans distributed to non-bank institutional investors due to stronger covenants, their seniority, and/or their repayment structure. These exposures are mainly in the form of revolving credit facilities — effectively overdraft facilities to the borrowers. To a lesser extent, banks retain exposures to these borrowers through holdings of amortising term loans (Chart F.7).

*UK banks have limited exposures to CLOs...*

UK banks have a small amount of CLO holdings in their treasury portfolios. These exposures account for only around 1% of the global stock of CLOs and around 1.5% of major UK banks’ common equity Tier 1 (CET1) capital.

*... but are exposed to risks from leveraged loans that they have originated but not yet distributed...*

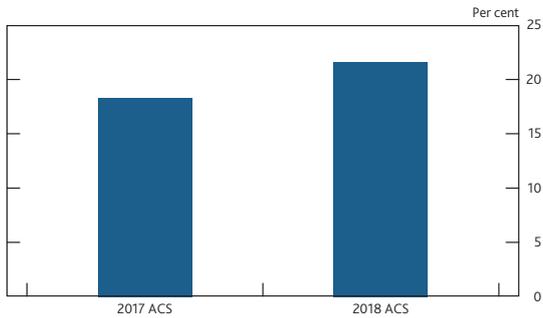
UK banks originate leveraged loans, a large share of which they distribute.<sup>(8)</sup> Over 2018, the average monthly exposure to leveraged loans that major UK banks had originated but not yet distributed was around £16 billion, representing 7.2% of their CET1 capital.

These pipeline exposures have been captured in the 2018 stress test. The aggregate one-year mark-to-market loss rate on major UK banks’ pipeline exposures to leveraged loans is 22% in the 2018 ACS, generating a loss of £2.8 billion and reducing the aggregate CET1 ratio by 0.2 percentage points (Chart F.9).<sup>(9)</sup> This loss rate is at the top of the estimated range of losses that banks would incur if leveraged loan prices were to fall by as much as they did in the global financial crisis.<sup>(10)</sup> And it is higher than the 18% loss rate in the 2017 stress test, resulting in around a £0.2 billion increase in

- (7) Average secondary market clearing times in the loan market are around 40 days in Europe, but 13 days in the US. And there is substantial variation around these averages.
- (8) The sample includes: Barclays, HSBC, Lloyds Banking Group, Standard Chartered and The Royal Bank of Scotland Group. Leveraged loans are defined using firms’ internal definitions which are largely based on corporate loans which satisfy the following criteria: (i) non-investment grade credit rating; and (ii) the borrower is either owned by a private equity firm or is highly indebted (with the debt to EBITDA ratio above four). These exposures exclude loans to small and medium-sized enterprises and commercial real estate loans.
- (9) Non-investment grade loans are used as a proxy for leveraged loans.
- (10) For the comparison to the global financial crisis, estimated losses are constructed by applying the most severe 12-month mark-to-market leveraged loan price falls observed in that period. The top end of the estimated range assumes that banks cannot distribute these loans, though losses are mitigated through existing hedges as well as flexing their pricing and fees.

**Chart F.9 Stressed loss rates on pipeline exposures to leveraged loans have increased in the 2018 ACS**

Loss rates on non-investment grade pipeline exposures<sup>(a)</sup>

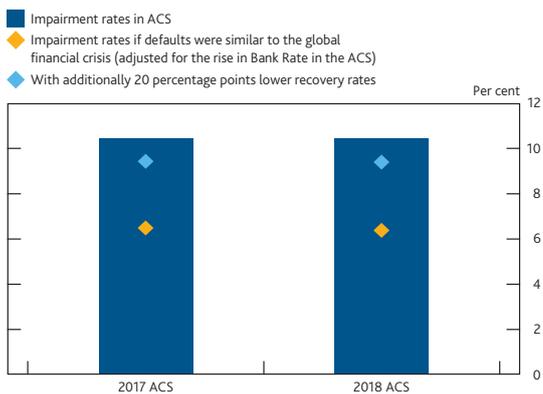


Sources: Stress-testing submissions and Bank calculations.

(a) The stress test provides a path for a widening in credit spreads, which is used to project losses on loans that are underwritten but not yet distributed. Loss rates are calculated as losses adjusted for hedges, pricing flexes and fees as a percentage of nominal value.

**Chart F.10 Stressed loss rates on non-investment grade loans held on balance sheet in the 2018 ACS are consistent with lower recovery rates than in the financial crisis**

Estimated impairment rates on UK and US non-investment grade large corporates held on balance sheet<sup>(a)(b)(c)</sup>

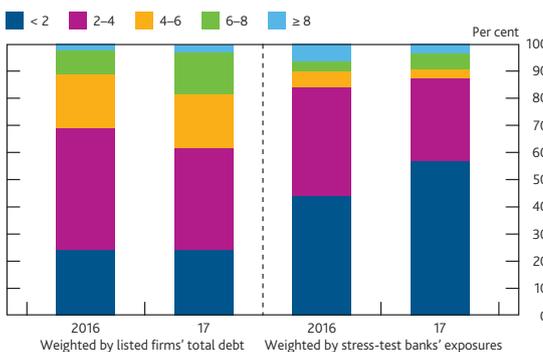


Sources: Moody's, Stress-testing submissions and Bank calculations.

(a) Impairment rates calculated as five-year cumulative impairment charges over drawn and undrawn committed exposures.  
 (b) The yellow and blue diamonds apply probabilities of default and recovery rates observed for rated corporates in 2008–12 to banks' current exposures. These are adjusted for an expected increase in impairment from a rise in Bank Rate in the stress-test scenario. The blue diamonds additionally assume a 20 percentage points lower recovery rate than in the crisis to capture potential additional losses from weakening investor protection on leveraged loans.  
 (c) Losses on UK and US large corporate lending are allocated between investment and non-investment grade using UK banks' internal credit grades.

**Chart F.11 The distribution of debt among large, listed UK companies has deteriorated, but this debt has not been provided by major UK banks**

Distribution of net debt to EBITDA among largest, listed UK firms<sup>(a)</sup>



Sources: Bureau van Dijk, Global Legal Entity Identifier Foundation, Stress-testing submissions, S&P Global Market Intelligence and Bank calculations.

(a) Top 500 largest non-financial corporates by revenue outside of real estate and oil & gas. Bank exposures are on a drawn-balance basis.

losses. This is consistent with the deterioration in the quality of issuance at a market-wide level.

*...as well as through revolving credit facilities and holdings of term loans.*

UK banks also retain exposures in the form of revolving credit facilities, and to a lesser extent, holdings of term loans. These credit exposures totalled around £75 billion as at 2018 Q2, representing around 8.4% of their total non-CRE corporate exposures and 34% of CET1 capital. Of this, slightly under £60 billion is to US and UK borrowers.

The resilience of major UK banks to potential losses on revolving credit facilities and holdings of term loans has also been tested as part of the 2018 ACS. For non-investment grade loans to large US and UK companies that are held on balance sheet, the estimated cumulative five-year stressed impairment rate is 10.5%. By comparison, the estimated impairment rate in the financial crisis, adjusted for the rising path for interest rates in the ACS, would have been around 6.4% (Chart F.10). This difference is consistent with lower recovery rates than in the financial crisis, due to weakening covenants and other forms of lender protection in loan documentation. This generates around £6 billion over the five years of the stress (compared to total non-CRE corporate losses of £57 billion), equivalent to around 0.4 percentage points of CET1.

The Bank has also reviewed banks' exposures to large listed UK companies, which have become more highly indebted over the past year. The proportion of debt owed by large listed UK companies with a ratio of net debt to EBITDA greater than four increased from 31% to 38% between the 2017 and 2018 stress tests. But the proportion of stress-test participants' exposures accounted for by these riskier firms has remained stable, at around 13% (Chart F.11). Major UK banks have not been the main providers of debt to these companies.

The FPC and PRC continue to monitor closely the underwriting standards of UK banks originating leveraged loans. 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.

## Box 4

### Comparing the leveraged lending and US subprime mortgage markets

Rapid growth of aggregate private debt — and any skewing of this debt towards riskier borrowers — may pose risks to financial stability and economic growth. These risks were demonstrated following the very fast growth of US subprime mortgage lending in the run-up to the global financial crisis.<sup>(1)</sup> This box shows that the scale, growth and deterioration of underwriting standards of leveraged lending in recent years has similarities to the pre-crisis US subprime mortgage market. However, there are differences between the funding and regulation of their respective securitisation markets — including in terms of the links between these markets and the core banking system — that mitigate some of the risks to financial stability from leveraged lending by comparison.

*Global leveraged lending is growing at rates — and has reached a scale — comparable to US subprime mortgages on the eve of the global financial crisis.*

Over the past year, global leveraged lending has grown by around 15% compared with an estimated 16% growth for the US subprime market in 2006. There is no consistent definition of leveraged loans — meaning it is difficult to estimate the size of the market with precision. 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. A broader measure takes account of institutional loans not in the S&P index, as well as amortising term loans, increasing the estimated stock of global leveraged loans outstanding in 2018 to US\$2.2 trillion<sup>(2)</sup> (Chart A). This represents 9% of total advanced-economy credit to non-financial companies; compared with the stock of US subprime mortgages in 2006 (US\$1.1 trillion), which made up to 13% of the total stock of US mortgages.

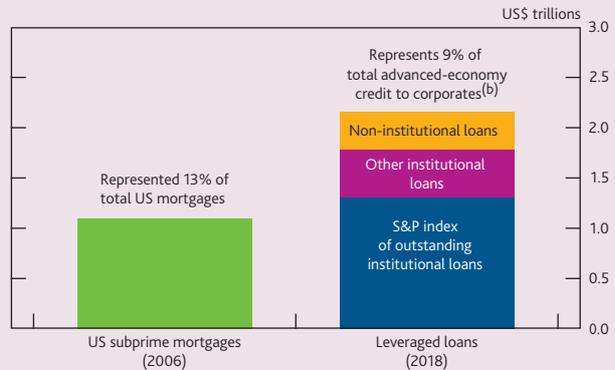
*Lending practices in the leveraged loan market have deteriorated over time, in a similar way to the US subprime market.*

In recent years, looser underwriting standards in the leveraged loan market have eroded traditional safeguards, such as maintenance covenants<sup>(3)</sup> — similar to the experience of US subprime mortgages. For example, around 60% of global leveraged loans were issued without maintenance covenants (so-called 'cov-lite') in 2018 (Table 1), compared with around 40% in mid-2016. And around 40% of US subprime mortgages in 2006 were issued without full documentation of borrowers' incomes, compared with 30% in 2001.

*The proportion of securitisation is less for leveraged loans than it was for subprime mortgages.*

Investor demand for leveraged loan securitisations has helped fuel demand for the underlying loans, but to a lesser extent than was true for subprime mortgages.

**Chart A** The adjusted stock of leveraged loans in 2018 is larger than the stock of US subprime mortgages in 2006; but compared to their relevant overall markets they are similar  
Outstanding stock of US subprime mortgages (2006) and global leveraged loans (2018)<sup>(a)</sup>



Sources: Association of British Insurers, Bank of England, Bloomberg Finance L.P., Cass Commercial Real Estate Lending survey, Datastream from Refinitiv, Deals Business Intelligence from Refinitiv, Deloitte, ECB, Federal Reserve Bank of New York, Federal Reserve Board, 'Financial Accounts of the United States', LCD, an offering of S&P Global Market Intelligence, London Stock Exchange, New York Fed Consumer Credit Panel, ONS, Pinto, E (2010), 'Sizing total exposure to subprime and Alt-A loans in US first mortgage market as of 6.30.08', Memorandum for Financial Crisis Inquiry Commission, Preqin, US Bureau of Economic Analysis and Bank calculations.

- (a) Given the lack of consistent definition of leveraged lending, there is uncertainty over the total stock of outstanding leveraged loans. The commonly cited S&P index captures liquid, institutional loans. In this chart this estimate of the total stock is based on Bloomberg's definition of leveraged loans. Relative to other estimates, it is more likely to cover smaller, middle-market deals and loans that are less widely syndicated. This estimate excludes the value of drawn and undrawn revolving credit facilities.
- (b) Leveraged loans as a share of total corporate credit in US, UK and eurozone.

More than 80% of the stock of US subprime mortgages in 2006 were securitised, in the form of mortgage-backed securities (MBS). By contrast, only around a third of outstanding leveraged loans are currently packaged into securities sold as collateralised loan obligations (CLOs).<sup>(4)</sup> In addition, around half of subprime mortgages were originated by non-bank lenders, whose 'originate-to-distribute' lending model and lack of regulation led to weak underwriting standards. By contrast, non-banks have had a less prominent role in underwriting leveraged loans (Table 1).

*In a similar way to subprime, leveraged loan markets are vulnerable to interest rate shocks.*

The majority of subprime mortgages were extended with variable interest rates, where rates increased after an initial discount period. Leveraged loans are also exposed to interest rate shocks as they are largely floating rate and interest-only contracts. This means that in an environment of higher financing costs, where interest rates or credit spreads increase, leveraged loan borrowers are vulnerable to an affordability or refinancing shock.

(1) International Monetary Fund (2018), *Global Financial Stability Report*, October and 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*.

(2) This would rise further if revolving credit facilities provided by banks were included.

(3) Maintenance covenants require borrowers to meet certain financial tests every reporting period.

(4) Excluding revolving credit facilities, but including amortising term loans.

**Table 1** Comparison between the markets for US subprime mortgages, global leveraged loans and their respective securitisations

	US subprime mortgages (2006)	Global leveraged loans (2018)
<b>Market size and growth</b>		
Market size (nominal)	US\$1.1 trillion	US\$2.2 trillion <sup>(a)</sup>
Market size (as percentage of relevant credit)	13% of US mortgages	9% of advanced-economy corporate credit
Annual credit growth	16%	Around 15% <sup>(a)</sup>
<b>Loan underwriting standards</b>		
Direct exposure retained by originator	3%	Around 30% <sup>(b)</sup>
Originated by banks	44%	> 90%
Weak non-price terms	40% without full documentation	Around 60% cov-lite
<b>Securitisation markets</b>		
Total securitisations	US\$1 trillion <sup>(c)</sup>	US\$0.8 trillion
Share of underlying assets that are securitised	> 80%	36% <sup>(a)</sup>
Synthetic market	Mostly used for speculation and arbitrage	Likely to be much smaller, and mostly used for risk management
Risk retention rules	No	Yes — EU Partial — US
Share funded through short-term wholesale funding (SIVs)	Around 25%	Negligible
Share of securitisations of securitisations	Around 10% <sup>(d)</sup>	< 1%

Sources: Association of British Insurers, Bank of England, Bloomberg Finance L.P., Cass Commercial Real Estate Lending survey, Datastream from Refinitiv, Deals Business Intelligence from Refinitiv, Deloitte, Deutsche Bank, ECB, Federal Reserve Bank of Chicago, Federal Reserve Bank of New York, Federal Reserve Board, 'Financial Accounts of the United States', International Monetary Fund, Krishnamurthy, A, Nagel, S and Orlov, D (2014), 'Sizing up repo', *The Journal of Finance*, LCD, an offering of S&P Global Market Intelligence, London Stock Exchange, New York Fed Consumer Credit Panel, ONS, Pinto, E (2010), 'Sizing total exposure to subprime and Alt-A loans in US first mortgage market as of 6.30.08', *Memorandum for Financial Crisis Inquiry Commission*, Preqin, S&P Global Ratings, US Bureau of Economic Analysis and Bank calculations.

(a) Excludes revolving credit facilities, but including amortising term loans.

(b) The share of exposures retained by banks in total.

(c) Refers to 2007, estimated by Pinto (2010), *ibid*.

(d) Refers to 2007, US securitisation market as a whole.

*Unlike subprime mortgages, the securitisation market for leveraged loans is less reliant on short-term wholesale funding...*

A substantial proportion of subprime mortgage securitisations were bought by investors that financed their purchases in short-term wholesale markets, including through issuance to money market funds (Table 1). The abrupt withdrawal of this funding and consequent inability of some institutions to securitise new mortgages led, indirectly, to a fall in the provision of credit to the real economy. By contrast, financing of CLOs does not rely on short-term wholesale funding.

*...and the banking system is not providing contingent liquidity lines to investors in CLOs.*

In the run-up to the crisis, banks had commitments to provide liquidity to leveraged structured investment vehicles (SIVs) investing in subprime mortgage securitisations. When wholesale funding for these SIVs was withdrawn during the crisis, the core banking system was exposed to subprime mortgage securitisations through these liquidity commitments. Currently, banks are not providing significant

off balance sheet financing to leveraged vehicles investing in CLOs; in part due to stronger regulatory frameworks implemented since the crisis.

*Post-crisis reforms have made leveraged loan securitisation markets more robust than they were for subprime...*

The global financial crisis exposed flaws in the regulatory framework for securitisations. As a result, there have been a number of regulatory initiatives in recent years related to securitisation, such as the recalibration of risk weights assigned to securitisation and enhanced disclosure requirements (see the *November 2017 Report*). Rating agencies are now regulated, and the transparency of loans underpinning CLOs is greater than subprime MBS, aiding investor scrutiny. In addition, European regulators implemented risk retention rules to ensure that the originator, sponsor or original lender has retained an interest in the securitisation of at least 5%. Risk retention rules, however, apply only partially in the US.

*...and there is less risk-taking through derivative products or more complex securitisations.*

In the past, securitisations were transformed into structures that were complex and opaque, and investors were unable to properly assess their risks.

Synthetic securitisations — where the underlying assets are derivatives rather than securities — are less common than prior to the crisis. And, unlike some synthetic subprime transactions seen pre-crisis (whose object was speculation or arbitrage), recent synthetic loan transactions are mostly used for risk management; transferring credit risk from the underlying loans onto another investor.

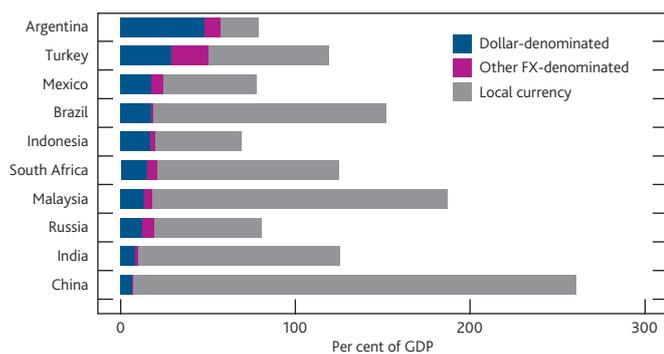
Finally, the leveraged loan market does not have any significant volumes of 'securitisations of securitisations', such as 'CDO-squareds', which accounted for around 10% of US mortgage securitisations in 2006 (Table 1).

# Global debt vulnerabilities

Risks to UK financial stability from global debt vulnerabilities are material. Financial conditions have continued to tighten since June, and while the most acute market pressures have focused on Turkey and Argentina, other emerging market economies remain vulnerable to a more widespread reduction in risk appetite. A sharp slowdown in growth in China — possibly as a result of an escalation of trade tensions with the US — would make its elevated debt levels significantly less sustainable. In Italy, a further deterioration in its financial outlook could result in material spillovers to the euro area and the UK. The FPC incorporated a very severe global stress in the 2018 stress test.

**Chart G.1** Dollar-denominated debt is high in both Argentina and Turkey

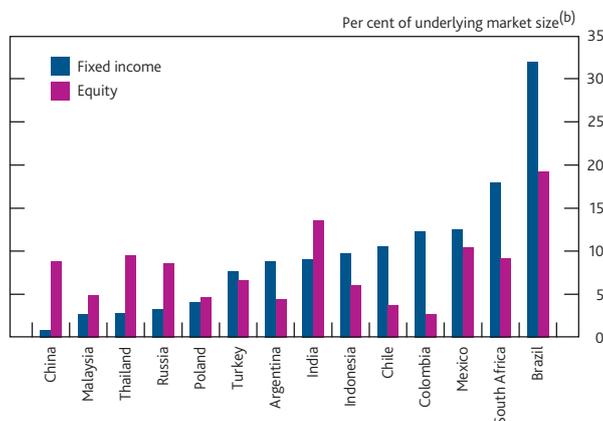
Non-financial sector debt by currency,<sup>(a)</sup> 2018 Q2



Sources: Institute of International Finance and Bank calculations.

(a) Split of household foreign currency debt into dollar and other foreign currencies is assumed to be the same as for corporate debt. In each of these countries less than 3% of household debt is in foreign currency.

**Chart G.2** Open-ended investment funds (OEIFs) hold a significant share of debt issued by some emerging markets OEIF holdings<sup>(a)</sup>



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

(a) For a sample of 73,570 open-ended funds and exchange-traded funds accounting for 92% of total fund assets under management covered in Morningstar.

(b) OEIF holdings as of 22 November 2018 scaled using latest available market size data: September 2018 for equity market capitalisation and March 2018 for debt outstanding.

*Risks to UK financial stability from global debt vulnerabilities are material.*

Global growth remains relatively robust, despite falling back somewhat from high rates in 2017, with most of the world growing at rates above estimates of potential growth in 2018 H1. Nevertheless, the FPC judges that global risks to UK financial stability are material, reflecting a range of vulnerabilities.

*Emerging market economies remain vulnerable to a widespread reduction in risk appetite...*

Since June, global financial conditions have responded to the ongoing normalisation of US monetary policy and continued to tighten. Emerging market economies (EMEs) have been particularly affected. Market pressures have been most acute for Turkey and Argentina, with the currencies of both countries falling by more than 10% against the dollar since the *June Report* and government borrowing costs remaining elevated. Both countries had large current account deficits and rely heavily on dollar-denominated debt (**Chart G.1**). Contagion to other EMEs has been focused on those with weak credit ratings.

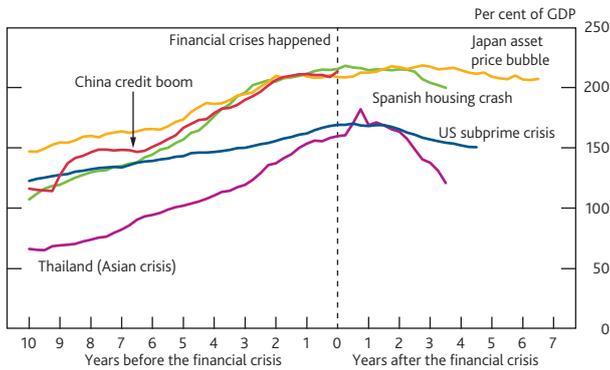
UK banks' direct exposures to non-China EMEs are, in aggregate, around 134% of common equity Tier 1 (CET1), around half their exposures to the US or the euro area. Within that, CET1 exposures to Turkey and Argentina are only 5% and 2% respectively. For there to be a significant risk to UK financial stability, current market pressures would need to develop into a severe EME crisis, with spillovers to global growth and asset prices.

*...and market-based finance could amplify spillovers.*

Market-based finance could be one channel for such spillovers. It has accounted for all of the increase in foreign lending to EMEs since the crisis. And open-ended investment funds (OEIFs) are large investors in some emerging market equity and debt markets (**Chart G.2**). Many OEIFs offer their 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.

**Chart G.3 Countries that underwent sharp credit booms have often experienced a crisis**

Private non-financial sector debt<sup>(a)</sup>

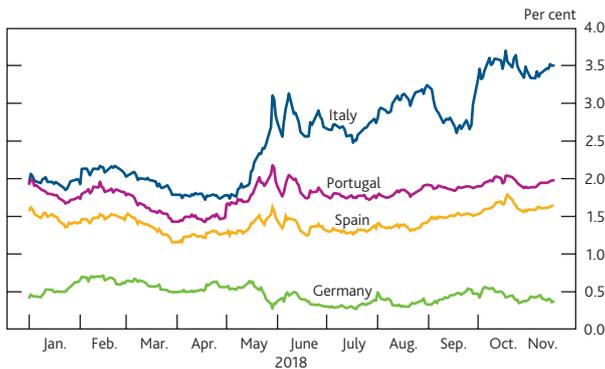


Sources: BIS total credit statistics and Bank calculations.

(a) Includes lending to households and non-financial corporations by all sectors at market value as a percentage of GDP, adjusted for breaks.

**Chart G.4 Italian sovereign borrowing costs have risen in response to the Italian government's draft budget**

Ten-year government bond yields<sup>(a)</sup>



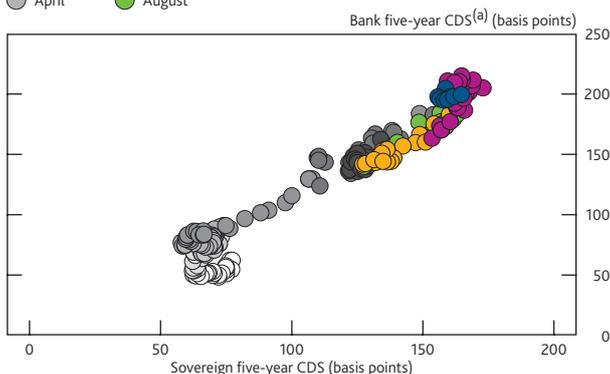
Source: Datastream from Refinitiv.

(a) Yields to maturity.

**Chart G.5 Italian sovereign stress has exposed balance sheet risks in the Italian banking system**

Italian sovereign and bank credit default swaps, daily data during 2018

- January
- February
- March
- April
- May
- June
- July
- August
- September
- October
- November



Sources: Datastream from Refinitiv and Bank calculations.

(a) Average of Intesa Sanpaolo Spa, Mediobanca Spa and Unicredit Italiano Spa.

*A slowdown in growth in China would make its elevated debt levels significantly less sustainable.*

Chinese private non-financial sector debt as a share of GDP is 213%, having risen around 60 percentage points in the past six years (Chart G.3). The Chinese authorities have taken policy actions to de-risk the financial system. But a sharp slowdown in economic growth — possibly as a result of an escalation of trade tensions with the US — would make China’s elevated debt levels significantly less sustainable.

In response to slowing growth, the Chinese authorities have adopted a range of measures to support domestic credit conditions, potentially encouraging a further build-up of debt. The renminbi has also fallen by around 10% against the US dollar since April. Capital controls are in place to help stabilise the currency but these could be tested by further downward pressure on the exchange rate. If sufficiently severe to necessitate a round of policy tightening, this could crystallise losses on banks’ lending to Chinese borrowers. UK banks’ direct exposures to China and Hong Kong are around 210% of CET1 capital in aggregate.

*A further deterioration in Italy’s financial outlook could result in material spillovers to the euro area and the UK.*

Following market tensions in May, Italian government bond yields rose again in October (Chart G.4), to their highest levels since early 2014. The rise was linked to the new Italian government’s publication of a draft budget, which envisaged a fiscal loosening, reversing the previous tightening policy. If implemented, this would have adverse implications for Italian public debt, which, at 130% of GDP, is already high.

Italian banks hold a significant proportion of Italian public debt, and greater perceived sovereign risk has spilled over to measures of their riskiness (Chart G.5), raising their funding costs. Further increases in funding costs, if passed on to households and businesses, could depress already weak growth, leading to an increase in non-performing loans (NPLs). Italian NPLs account for a quarter of all euro-area NPLs.

Although direct UK banking exposures to Italy are low, if financial strains were to spread across the euro area, there could be a material risk to UK financial stability. UK-owned banks have much higher claims on countries with close links to Italy, including France (63% of CET1) and Germany (74%).

*Risks from the US corporate sector remain material.*

There are particular risks associated with the rapid growth in leveraged loans (see Leveraged lending chapter).

*The FPC continues to assess UK banks’ resilience to global risks in its annual stress tests.*

UK banks were resilient to the 2018 stress test, which incorporated a synchronised global downturn in output growth as vulnerabilities across financial markets and the global economy crystallise.

# The FPC's assessment of the risks from leverage in the non-bank financial system

In 2017, the FPC asked for an in-depth assessment of the role of leverage in the non-bank financial system, especially leverage created through the use of derivatives. This chapter presents the FPC's full assessment, based on work undertaken jointly between the Bank and FCA.<sup>(1)</sup>

Leverage is a potential fragility found in many sectors of the financial system. Importantly, it allows a financial institution to increase its exposure to risk factors (such as interest rates or economic growth) beyond what would be possible through a direct investment of its own funds.

Leverage can be generated in two ways: by borrowing funds and investing the proceeds in risky instruments ('financial leverage'); or through transacting in instruments that directly amplify exposure to risk, such as derivatives ('synthetic leverage').

Assessing risks from leverage in the non-bank financial system is challenging, and entails combining complex regulatory and commercial data sets.

The FPC's conclusions are:

- Non-bank leverage can support financial market functioning, and so the provision of market-based finance to the real economy. But it can also expose non-banks to greater losses and sudden demands for liquidity, which can give rise to financial stability risks.
- Where the potential for greater losses threatens the provision of any critical services a non-bank provides (such as insurance) or the solvency of its systemically important counterparties (such as large banks), this should be mitigated by post-crisis reforms, such as capital requirements, central clearing and collateralisation of uncleared derivatives.
- But risks from potential sudden demands for liquidity remain. If a non-bank does not have sufficient liquid assets to meet these demands, it may be forced to sell less liquid assets, potentially depressing prices, causing losses for other institutions and impairing the functioning of markets.
- In the case of derivatives, liquidity is increasingly demanded on a daily basis to cover mark-to-market declines in their value ('variation margin'). These demands can arise regardless of whether a non-bank is using a derivative to increase its overall exposure to risk or to hedge other risks.
- The FPC's assessment focused on the capacity of non-banks in the UK to cover the posting of variation margin on over-the-counter (OTC) interest rate derivatives. Most non-banks appear to have sufficient liquid assets to meet such calls.
- However, this is only one example of the potential risks that are associated with leverage. And while risks of forced sales to meet derivative margin calls are currently limited, more comprehensive and consistent monitoring by authorities is needed to keep this under review.
- Data currently reported to the supervisors of non-banks do not include all the information needed to monitor the risks appropriately. The Bank will work with other domestic supervisors — the PRA, FCA and The Pensions Regulator (TPR) — to enhance the monitoring of these risks.
- Internationally, the International Organization of Securities Commissions (IOSCO) is operationalising the Financial Stability Board's (FSB's) recommendation to develop consistent leverage measures for funds.<sup>(2)</sup> It has recently issued a consultation paper on how to do this.<sup>(3)</sup> 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. Such measures will need to enable monitoring not only as to whether funds are using borrowing or derivatives, but also the potential losses and liquidity demands those funds could face. This would enable effective global risk assessment and support supervisors' decision-making.
- If it is found that risks reach systemic levels, further action should be considered.

(1) This follows initial work outlined in Box 4 of the [June 2018 Financial Stability Report](#).

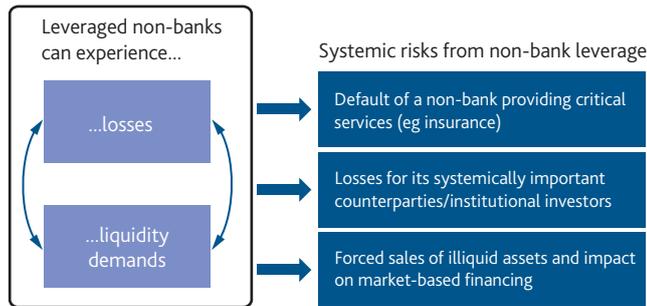
(2) See Financial Stability Board (2017), '[Policy recommendations to address structural vulnerabilities from asset management activities](#)', January.

(3) See IOSCO (2018), '[Consultation paper on leverage in investment funds](#)', November.

*Non-bank leverage could give rise to systemic risks through higher losses and greater liquidity demands...*

Non-bank leverage can support financial market functioning, and so the provision of market-based finance to the real economy. But it can also expose non-banks to greater losses and sudden demands for liquidity. Where these are significant, it can give rise to financial stability risks (Figure H.1).

**Figure H.1** Financial stability risks from leverage



Losses may be greater when leverage is used to increase a non-bank's overall exposure to risk. The potential for greater losses may increase a non-bank's probability of default, threatening the provision of any critical services it provides (such as insurance), or the solvency of its systemically important counterparties (such as large banks) or investors. Greater losses may also lead to investor redemptions from non-banks, such as investment funds and hedge funds, leading to forced sales of potentially illiquid assets.<sup>(4)</sup>

A similar dynamic arises in the face of sudden liquidity demands. Non-banks largely obtain leverage through collateralised transactions, such as derivatives and repo. Therefore, they may face liquidity demands to meet calls for additional collateral, or 'margin', on transactions.<sup>(5)</sup> They may also face the risk of short-term borrowing not being rolled over. If a non-bank does not have sufficient liquid assets to meet these demands, it may be forced to sell less liquid assets, such as corporate bonds. This in turn could depress prices, causing losses for institutions holding those assets, and potentially impairing the functioning of markets important for the real economy.

The avoidance of large-scale forced asset sales in the face of sudden liquidity demands was one factor that led US authorities to provide funding support to US insurer AIG in 2008. This followed declines in the value of mortgage-related securities on which AIG had sold credit default swap (CDS) protection.<sup>(6)</sup> As an AAA-rated company, AIG's counterparties had not previously required much collateral against these derivatives exposures. But as the firm's rating was downgraded, AIG was faced with US\$40 billion of collateral calls.

*...but while post-crisis reforms have addressed solvency concerns, non-bank liquidity risks remain.*

The potential for greater losses for non-banks to threaten insurance provision or the solvency of banks should be mitigated by post-crisis reforms. Both banks and insurers face regulatory capital requirements and should be able to withstand losses arising from their own use of leverage, and that of their non-bank counterparties. More generally, counterparty credit risks between leveraged non-banks and systemically important entities are mitigated through greater collateralisation, including through increased central clearing of derivatives,<sup>(7)</sup> and margining<sup>(8)</sup> of uncleared derivatives.

However, the liquidity demands associated with greater collateralisation also need to be managed. Banks are required to hold sufficient liquid assets to cover collateral outflows as part of Basel's liquidity risk framework, including the Liquidity Coverage Ratio requirements.<sup>(9)</sup> In contrast, while non-banks have their own practices to manage liquidity risk, they do not face quantitative liquidity regulation.

In the case of derivatives, liquidity is increasingly demanded on a daily basis to cover mark-to-market declines in their value ('variation margin'). As such, these demands can arise even if a non-bank is not using leverage to increase its overall exposure to risk: for example, if a non-bank is using a derivative to 'hedge' a risk on its balance sheet and transfer it to those more willing, or potentially able, to bear it.

*The FPC focused on non-banks' use of OTC interest rate derivatives.*

Chart H.1 uses transaction-level data on sterling money markets and derivatives to assess non-banks' amounts outstanding in gilt repo borrowing<sup>(10)</sup> and a number of key derivatives products.<sup>(11)</sup> Four sectors account for the majority of non-banks' use of repo and derivatives: pension funds, insurers, investment funds and hedge funds.

(4) See 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*, July.

(5) Even if the asset that the derivative is hedging gains in value, one would need to sell the asset to realise the gain in order to meet such liquidity demands.

(6) Credit default swaps are contracts buying or selling insurance against changes in corporates' or governments' creditworthiness.

(7) In derivatives transactions that are 'centrally cleared', a central counterparty (CCP) effectively guarantees that if one counterparty fails, the CCP will continue to meet the obligations due to the other party.

(8) Derivatives margin requirements have two components. 'Initial margin' is posted at the beginning of a transaction to cover potential future adverse changes in the market value of the contract, and is recalculated on a regular basis. 'Variation margin' is exchanged to cover actual changes in the market value of the contract during its life. However, non-banks' uncleared deliverable FX forwards/swaps are exempt from mandatory margining (see Bank for International Settlements (2015), 'Margin requirements for non-centrally cleared derivatives', March; and 'Variation margin exchange for physically-settled FX forwards under EMIR', November 2017).

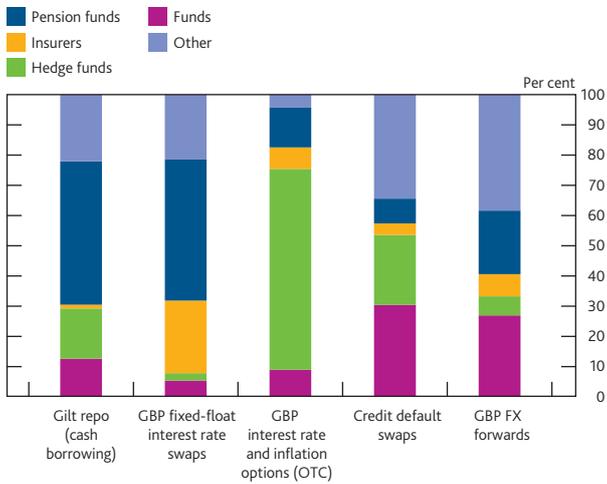
(9) See Bank for International Settlements (2013), 'Basel III: the Liquidity Coverage Ratio and liquidity risk monitoring tools', January.

(10) A repurchase agreement (repo) is an agreement to sell securities (eg UK government bonds, or 'gilts') at a given price, coupled with an agreement to repurchase these securities at a pre-specified price at a later date. A repo is economically similar to a collateralised loan since the securities provide credit protection in the event that the seller (ie the cash borrower) is unable to complete the second leg of the transaction.

(11) Transaction-level data on sterling money markets and derivatives are reported to the Bank and to EU trade repositories respectively.

**Chart H.1 Four sectors account for the majority of non-banks' repo and derivatives activity**

Amounts outstanding<sup>(a)</sup> in gilt repo and key derivatives products in October 2017,<sup>(b)</sup> split by sector (excluding banks, dealers and central counterparties)<sup>(c)</sup>



Sources: Bloomberg Finance L.P., Bank of England Sterling Money Market Data, DTCC Derivatives Repository plc, UnaVista Limited and Bank calculations.

(a) Notional amounts, except for GBP interest rate swaps, where the absolute value of each trade's estimated interest rate sensitivity ('DV01') is used.  
 (b) Gilt repo numbers are averages over January 2017 to June 2018.  
 (c) 'Other' includes other financials, non-financials, the official sector and unclassified entities.

The FPC's assessment focused on single-currency OTC interest rate derivatives — the largest class of derivatives globally by outstanding market value. Box 5 contains further details on non-banks' use of gilt repo borrowing, sterling interest rate swaps, CDS and sterling FX forwards.

*The majority of non-banks appear to have sufficient liquid assets to cover the posting of variation margin on their OTC interest rate derivatives.*

The FPC assessed the capacity of some non-banks in the UK to cover the posting of variation margin on OTC interest rate derivatives. Variation margin calls are estimated from instantaneous 25, 50 and 100 basis point increases in interest rates across all maturities and in all currencies.

The institutions covered include: the largest UK insurers; and the biggest derivatives users among UK pension funds, UK investment funds<sup>(12)</sup> and hedge funds reporting to the FCA. This amounts to over 100 non-banks with total assets of around £1.8 trillion, entailing the use of multiple PRA, FCA, ONS and commercial data sets. Derivatives data are drawn from trade repositories.

At an aggregate level, these non-banks' stock of liquid assets is around £56 billion in cash and £500 billion in government bonds. This is vastly greater than the total variation margin calls non-banks would face even under the most severe interest rate scenario considered here.

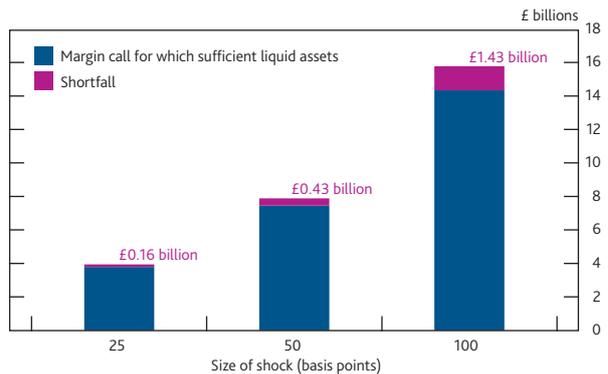
However, to estimate liquidity shortfalls and potential forced asset sales, this aggregate picture is amended:

- First, the shortfall between margin calls and liquid assets is calculated at the entity level.
- Second, since non-banks may face liquidity demands from other derivatives classes, liquid assets are adjusted down accordingly.<sup>(13)</sup>
- Third, non-banks' liquid asset holdings are adjusted for the falls in value of government bonds that occur when interest rates rise.
- Finally, margin calls on cleared derivatives are assumed to be met only in cash, in line with the practices of central counterparties (CCPs).<sup>(14)</sup> This differs to uncleared derivatives, for which market intelligence suggests margin calls can be met by non-banks with both cash and government bonds.

This analysis suggests that a small minority of non-banks would face margin calls in excess of their available liquid asset buffers. The shortfall increases non-linearly with the size of the shock, since more non-banks experience margin calls in excess of their available liquid assets (Chart H.2). However, the liquidity shortfall, and corresponding potential amount of forced asset sales, remains small as a proportion of the total demand on liquidity (9% of total estimated margin calls under a 100 basis point interest rate shock). Even if all non-banks

**Chart H.2 The total shortfall following margin calls under a range of scenarios remains relatively modest**

Total margin calls and subsequent shortfall faced by non-banks following variation margin calls on OTC forward rate agreements and single-currency interest rate swaps under a range of scenarios<sup>(a)(b)</sup>



Sources: Bloomberg Finance L.P., DTCC Derivatives Repository plc, FCA Alternative Investment Fund Managers Directive (AIFMD), Morningstar, ONS, Solvency II submissions, UnaVista Limited and Bank calculations.

(a) Derivatives positions as of 17 October 2017.  
 (b) 103 non-banks included in sample.

(12) Specifically, UK undertakings for collective investment in transferable securities (UCITS).  
 (13) In particular, the liquid asset amounts are adjusted down by the fraction of a firm's non-FX derivatives portfolio accounted for by interest rate derivatives. This adjustment uses scaled gross notional amounts to reflect different levels of volatility across derivatives classes. The scaling coefficients used are those in the highest maturity bucket of the Basel Committee on Banking Supervision's Current Exposure Method. See page 15, Bank for International Settlements (2014), 'Basel III leverage ratio framework and disclosure requirements', January.  
 (14) 28% of gross interest rate risk in the sample is cleared — within this, UCITS funds (89%) and hedge funds (42%) clear a lot more than insurers (20%) and pension funds (16%).

were to sell only sterling corporate bonds to obtain the liquidity to meet this shortfall, this is still equivalent to just 7% of monthly trading volume in the sterling corporate bond market.

This analysis also assumes that non-banks do not take any mitigating actions, such as closing out derivatives positions. This assumption is very conservative, particularly when assuming larger interest rate shocks that do not tend to occur on a single day. For example, a 100 basis point increase over a single day or a single week has never been experienced in 10-year sterling swap rates looking back to 1990. Even over a month, it would be a 1-in-1,000 event and over this period it is more likely that firms could take mitigating actions.

Taken together, these results suggest there currently appears to be no major systemic vulnerability arising from derivatives margin calls on non-banks.

*This is, however, a partial analysis — more complete and consistent monitoring is therefore required.*

Interest rate scenarios other than a parallel shift in yield curves may lead to larger margin calls, particularly for hedge funds. For example, margin calls on hedge funds following a 'flattening' of yield curves (short rates up, long rates down) are 5% higher than the margin calls following the parallel shift in the yield curve shown in **Chart H.2**.

Also, the analysis is limited to UK institutions and does not consider the potential for firms outside of the UK being forced into asset sales that impact markets globally, with spillovers to the UK.

In addition, variation margin calls are only one example of the kind of liquidity demands that can be generated by leverage — others include initial margin calls or repo collateral calls.

Finally, the potential for greater losses at non-banks to lead to solvency risks for systemically important counterparties and insurance companies is also important when assessing systemic risks.

For all these reasons, more comprehensive and consistent monitoring by authorities is required.

*Data currently reported to the supervisors of non-banks are not sufficient to measure the risks from leverage...*

For supervisors to measure the financial stability risks posed by non-bank leverage, measures are needed that are informative about the potential liquidity demands and losses generated by leverage (Box 6).

Liquidity risk deserves particular attention as the nature of the risk is evolving. For example, a further increase in the rate of central clearing will require more variation margin to be paid in cash rather than government bonds.

The FCA has examined risk management practices for the largest users of derivatives among investment funds and hedge funds reporting to it. It finds that fund managers are aware of the liquidity risks arising from the use of derivatives and actively monitor cash levels in their funds.

In addition, fund managers running pension funds' liability driven investment (LDI) programmes report daily monitoring of the level of liquid assets held by these pension funds against the potential calls on collateral that could arise in a stress. Those fund managers also limit rollover risk from repo by borrowing largely at maturities of between a month and a year (Box 5) and by spreading this across multiple counterparties and maturity dates.

However, it is not clear whether pension funds and insurers pay sufficient attention themselves to liquidity risks. For example, initial work by Bank staff has found that some insurers may not be recognising fully all the relevant liquidity risks.

*...and the Bank will work with other supervisors to enhance monitoring of the potential liquidity demands and losses generated by non-banks' leverage.*

The Bank will work with other domestic supervisors — the PRA, FCA and TPR — to enhance the monitoring of the potential liquidity demands and losses generated by non-bank leverage. If it is found that risks reach systemic levels, further action should be considered.

The FPC's assessment also supports the Bank and FCA's engagement with international work in this area. IOSCO is operationalising the FSB's recommendation to develop consistent leverage measures for funds.<sup>(15)</sup> It has recently issued a consultation paper on how to do this.<sup>(16)</sup> 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. Such measures will need to enable monitoring not only as to whether funds are using borrowing or derivatives, but also the potential losses and liquidity demands those funds could face. This would enable effective global risk assessment and support supervisors' decision-making. As set out in Box 6, measures solely based on derivatives' notional amounts are not informative about potential losses and liquidity demands.

(15) See Financial Stability Board (2017), 'Policy recommendations to address structural vulnerabilities from asset management activities', January.

(16) See IOSCO (2018), 'Consultation paper on leverage in investment funds', November.

**Box 5**

**Non-banks' use of repo borrowing and derivatives**

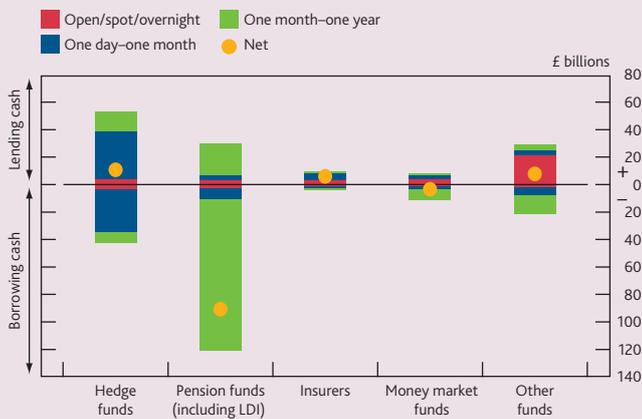
This box provides details as to non-banks' use of repo borrowing and interest rate, credit and FX derivatives, collated from the various data sets used in this analysis.

**Repo borrowing for liability driven investment**

Pension funds have the largest amount outstanding of non-bank gilt repo borrowing, concentrated at longer maturities (Chart A). This is to buy more gilts as part of their liability driven investment (LDI) strategies.

**Chart A Pension funds and hedge funds borrow large amounts of cash via repo**

Non-banks' average amounts outstanding in gilt repo between January 2017 and end-June 2018



Sources: Bank of England Sterling Money Market Data and Bank calculations.

Most UK defined-benefit pension funds have liabilities that exceed their assets — they are in deficit. Their liabilities are also exposed to interest rate and inflation risk. Pension funds could invest only in bonds to hedge this risk, but this would not provide enough return to close their deficits — they also need 'growth assets' (such as equities).

Using LDI strategies that employ leverage, pension funds can hedge against interest rate and inflation risk while retaining exposure to growth assets. The most common such LDI strategy is to use existing holdings of gilts as collateral to borrow cash, which is then invested in further conventional and inflation-linked gilts. Longer-maturity interest rate swaps and inflation swaps are also used and, less commonly, synthetic alternatives such as total return swaps. Derivatives can also be used to synthesise growth assets (for example, using equity futures).

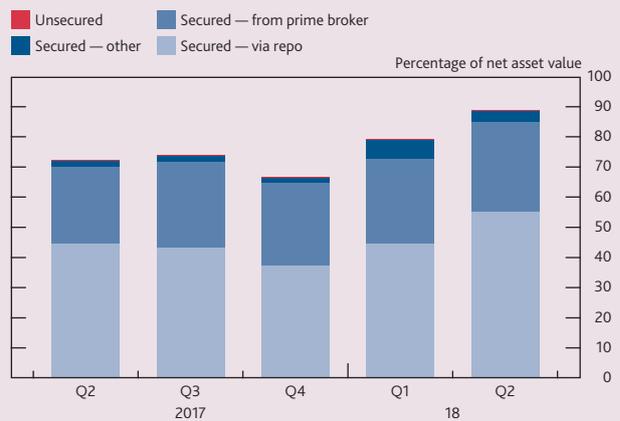
Pension funds usually outsource LDI strategies to fund managers, either through segregated accounts or by investing in pooled schemes.

**Cash and securities borrowing by hedge funds**

Hedge funds are also significant borrowers of cash in the repo market, albeit at shorter maturities than pension funds (Chart A). This borrowing has increased in recent months, with hedge funds further relying on secured borrowing from 'prime brokers' (Chart B).<sup>(1)</sup> Chart A shows that, in aggregate, hedge funds' gilt repo borrowing is largely matched by cash lending — for example, to borrow securities that they sell short.

**Chart B The majority of hedge funds' borrowing is via the repo market and prime brokers**

Total cash borrowing of hedge funds reporting to the FCA<sup>(a)</sup> (per cent of net asset value), by borrowing type



Sources: FCA Alternative Investment Fund Managers Directive (AIFMD) data and Bank calculations.

(a) Covers hedge funds reporting quarterly to the FCA under AIFMD.

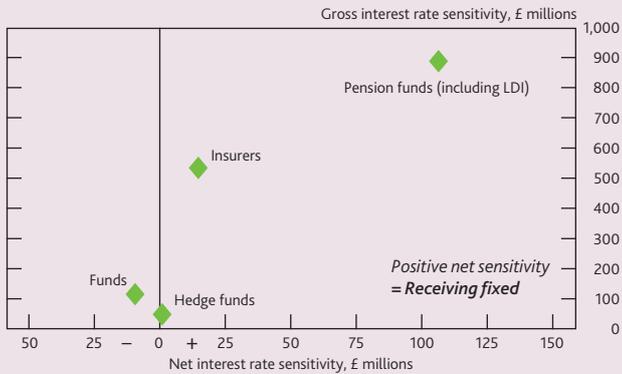
**Interest rate swaps**

Chart C shows non-banks' aggregate positioning in sterling fixed-float interest rate swaps.<sup>(2)</sup> In aggregate, pension funds are net receivers of the fixed rate (indicated by a positive net position on the x-axis), acting as a hedge for the interest rate risk on their liabilities.<sup>(3)</sup> Many hedge funds, meanwhile, often take offsetting positions at different maturities to gain exposure to changes in the shape (rather than the level) of the yield curve. This is seen in Chart C by a net position near zero.

(1) See Kenny, F and Mallaburn, D (2017), 'Hedge funds and their prime brokers: developments since the financial crisis', Bank of England Quarterly Bulletin, 2017 Q4.  
 (2) A plain vanilla fixed-float interest rate swap is a contract in which a market participant pays to its counterparty cash flows at a predetermined fixed interest rate on a notional amount for a fixed period, receiving in return a floating rate on the same notional amount over the same period.  
 (3) Within this aggregate picture, however, there are some pension funds that take the opposite position. This is because their exposure to interest rates on their assets already exceeds that on their liabilities, for example, by holding additional gilts funded by repo. By paying the fixed rate on swaps, any such excess exposure is removed.

**Chart C** In aggregate, pension funds take the most directional exposure via interest rate swaps

GBP fixed-float interest rate swap positions — expressed as each sector's potential aggregate loss from a 1 basis point interest rate increase ('DV01') — January 2018



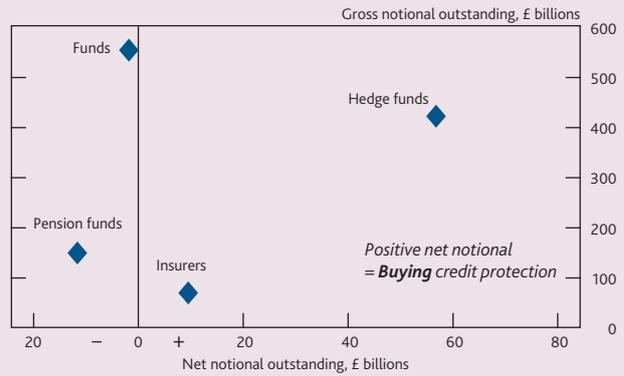
Sources: Bloomberg Finance L.P., DTCC Derivatives Repository plc, UnaVista Limited and Bank calculations.

**Credit default swaps and FX forwards**

Charts D and E show non-banks' use of CDS and sterling FX forwards respectively.<sup>(4)</sup> Based on gross notional amounts outstanding, CDS are used more by hedge funds and other investment funds, with limited use by insurers and pension funds. FX forwards are used mainly by investment funds and pension funds; their aggregate net buying of sterling (indicated by a positive net position on the x-axis) suggests they are hedging FX risk on foreign currency equity and bond holdings.

**Chart D** Investment funds are the largest non-bank sector in CDS...

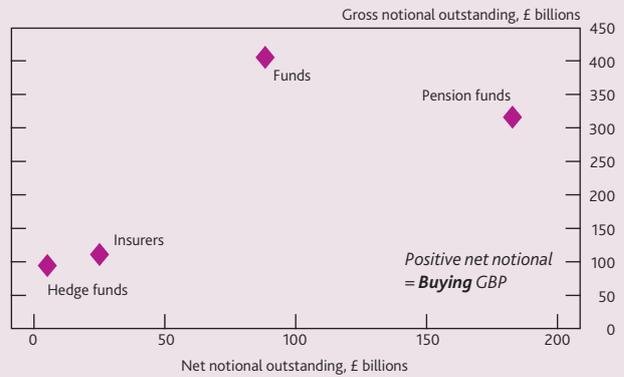
Net and gross notional outstanding of CDS — October 2017



Sources: DTCC Derivatives Repository plc, UnaVista Limited and Bank calculations.

**Chart E** ...and GBP FX forwards

Net and gross notional outstanding of GBP FX forwards — October 2017



Sources: DTCC Derivatives Repository plc, UnaVista Limited and Bank calculations.

(4) An FX forward agreement is a derivative in which counterparties agree to exchange a specified amount of different currencies at a specified future date.

## Box 6

### Measuring financial stability risks from leverage in investment funds and hedge funds

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.

#### (i) Use of borrowing and derivatives

Comparing a fund's gross notional exposure (GNE), which is the 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.

#### (ii) Funds' potential losses

However, GNE is not informative about the potential losses and liquidity demands that a fund could face:

- Notional amounts say nothing about the sensitivity of derivatives to different risk factors. For example, derivatives with two identical notional amounts could have underlying risk factors with very different volatilities (for example, interest rates versus commodities) and therefore different risk profiles. But GNE would not distinguish between the two.
- Aggregating absolute values ignores the potential for offsetting exposures. For example, a portfolio with £100 million GNE of 10-year interest rate swaps all paying the floating rate will have the same GNE as a portfolio consisting of £50 million of nine-year interest rate swaps paying the floating rate and £50 million of offsetting 11-year interest rate swaps (paying fixed and receiving the floating rate). But these two portfolios will have very different risk profiles.
- There is no distinction made as to the purpose of the exposure. So a fund with a large notional amount of interest rate swaps used for hedging, and therefore reducing its potential losses, could have a higher GNE than an institution with a small notional amount of credit default swaps used for increasing exposure to credit risk.

**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.<sup>(1)</sup>

#### (iii) The potential liquidity demands funds could face

With regards to liquidity risk, 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.

(1) See Bank for International Settlements (2015), '[Margin requirements for non-centrally cleared derivatives](#)', March.

# Financial stability risk and regulation beyond the core banking sector

The non-bank financial system is important to the provision of financial services to the UK real economy. Market-based finance complements the banking system in providing finance and other intermediation services to the real economy, while both banks and non-banks rely upon technology and other infrastructure providers to ensure the provision of these services.

The FPC aims to ensure that the financial system serves UK households and businesses in bad times as well as good. It is responsible for identifying, assessing, monitoring and taking action in relation to financial stability risks across the UK financial system<sup>(1)</sup> — including those arising from beyond the core banking sector. As part of meeting this responsibility, the FPC performs an annual assessment of risk and regulation beyond the core banking sector, covering financial markets, non-bank financial institutions and market infrastructure.<sup>(2)</sup>

The FPC considers the fragilities within the non-bank financial system and the transmission channels through which these can affect financial stability.<sup>(3)</sup> Where vulnerabilities are identified, the FPC assesses whether these will be addressed by domestic or international workstreams, or whether further action may be needed. On that basis, the FPC decides whether to commence or continue close monitoring of certain activities or sectors, or to launch an in-depth assessment.

Following these assessments, the FPC may recommend changes to regulation, via either: activities moving into the 'regulatory perimeter' (the boundary between regulated and non-regulated activities); or a change in regulation for activities already within the perimeter.<sup>(4)</sup>

This chapter provides an overview of the FPC's 2018 annual assessment. In summary:

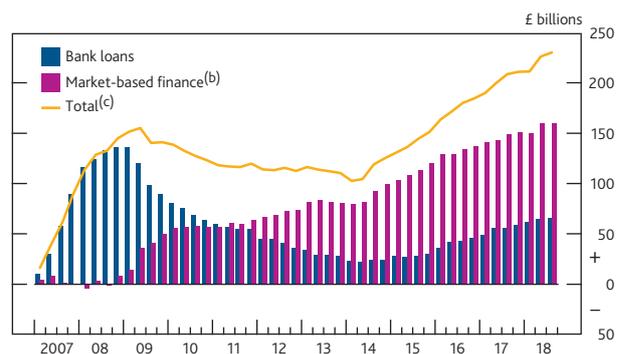
- The FPC has completed an in-depth assessment of the risks from leverage in the non-bank financial system. It has also started an in-depth assessment of risks arising from leveraged loan markets, in light of the rapid growth of leveraged lending.
- The FPC has reviewed progress against its conclusions from previous in-depth assessments. These relate to both domestic and international policy initiatives, covering: open-ended investment funds; market liquidity; insurance companies; and post-crisis reforms to derivatives markets. The FPC has also reviewed recent regulatory changes.
- Looking ahead, the FPC will continue to monitor developments closely in 'fast markets', exchange-traded funds and financial technology innovation. It will also commence close monitoring of risks from the provision of cloud services to the financial sector.

*The non-bank financial system is important for the provision of financial services to the UK economy.*

Market-based finance represents the system of financial markets, non-bank financial institutions and infrastructure that, alongside banks, provide financial services. It is an important complement to the banking system. Following the global financial crisis, for example, when the provision of loans by banks was impaired, lending via market-based finance to UK private non-financial corporations (PNFCs) grew, helping to support the real economy. While the stock of bank loans remains significant, since 2007, over two thirds of net finance raised publicly by UK PNFCs has been from market-based finance (**Chart I.1**), and most of this through corporate bond issuance.

**Chart I.1 Market-based finance is an important source of financing for UK companies**

Cumulative net finance raised by UK private non-financial corporations (PNFCs) since 2007<sup>(a)</sup>



Sources: Bank of England and Bank calculations.

- (a) Finance raised by PNFCs from UK monetary financial institutions (MFIs) and from capital markets. Data cover funds raised in both sterling and foreign currency, converted to sterling. Seasonally adjusted. Bonds and commercial paper are not seasonally adjusted.  
 (b) Market-based finance is composed of bonds, equities and commercial paper.  
 (c) Owing to the seasonal adjustment methodology, the total series may not equal the sum of its components.

- (1) The Bank of England Act 1998 ('the Act'), as amended by the Financial Services Act 2012, gives the FPC this statutory responsibility.  
 (2) These annual assessments support the FPC's medium-term priority to complete post-crisis reforms to market-based finance in the UK, and improve the assessment of systemic risks across the financial system.  
 (3) For further details see [November 2017 Financial Stability Report](#).  
 (4) The Act gives the FPC the power to make Recommendations to HM Treasury on regulated activities, as well as more general powers of Recommendation, including to the PRA and FCA; and gives the Bank information-gathering powers.

Both banks and non-banks further rely upon technology and other service providers to ensure the provision of finance and other intermediation services. Monitoring for emerging risks to the whole financial system is therefore crucial.

*The FPC has completed an in-depth assessment of risks from leverage in the non-bank financial system...*

The FPC has conducted an in-depth assessment of the role of leverage in the non-bank financial system (see The FPC’s assessment of the risks from leverage in the non-bank financial system chapter). From this assessment, the FPC has concluded that more comprehensive and consistent monitoring by authorities of the risks from leverage is needed. The Bank will work with other domestic supervisors — the PRA, FCA and The Pensions Regulator — to enhance monitoring of these risks. If it is found that risks reach systemic levels, further action should be considered.

*...started further work on corporate leverage...*

The FPC has expressed concern about the rapid growth of leveraged lending, including to UK businesses. It has therefore started an in-depth assessment of risks in leveraged loan markets, which includes reviewing how pockets of corporate indebtedness in the UK, and the increasing role of non-bank lenders globally, could pose risks to UK financial stability (see Leveraged lending chapter).

*...and reviewed progress against its conclusions from previous in-depth assessments...*

Over the past five years, the FPC has conducted in-depth assessments of: open-ended investment funds; market liquidity; insurance companies; and post-crisis reforms to derivatives markets. In reviewing progress against the conclusions from those assessments, the FPC noted a number of recent developments (covered in Table I.A), both domestically and in international fora, where the Bank continues to engage.

*...as well as recent regulatory changes.*

The FPC further noted that several regulatory reforms and changes to the regulatory perimeter have come into effect since last year’s assessment, for example:

- MiFID II has changed a wide range of capital markets regulation since taking effect in January 2018. Its aims include increasing the amount of trading undertaken on trading venues, and the transparency of that trading.
- EU benchmark regulation, also effective from January 2018, has brought relevant administrators of benchmarks into the scope of regulation. Relatedly, there are some initial signs of markets transitioning from Libor rates to overnight risk-free rates (see Box 7).

- Service providers to recognised payment systems may now be specified by HM Treasury for regulation by the Bank. Vocalink (a service provider to the Bacs, Faster Payments and LINK payment systems) has been specified as such and hence brought inside the Bank’s regulatory perimeter.

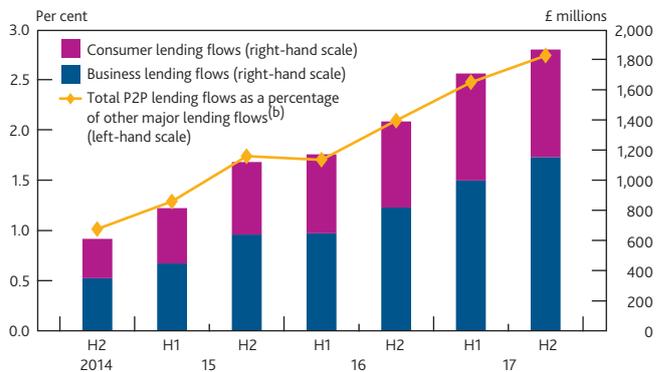
*The FPC is further committed to monitoring a number of activities and sectors closely.*

Previously, the FPC has committed to monitoring closely a number of fast-growing or evolving areas: exchange-traded funds; peer-to-peer (P2P) lending; financial technology innovation; and risks from ‘fast markets’. In its 2018 annual assessment, the FPC amended this list — removing P2P lending, and adding the provision of cloud services to the financial sector.

**Peer-to-peer lending**

The UK P2P lending market provides an alternative source of finance for households and businesses, in particular small businesses. The P2P lending sector remains small (**Chart I.2**), and annual growth rates have slowed from over 80% in 2015 to under 40% in 2017. In July 2018, the FCA published proposals to ensure that investors on P2P platforms receive clear and accurate information on the risks involved. This follows concerns that the complexity of some P2P business models could result in harm to investors. If adopted, the proposals may make the P2P lending sector more resilient in a downturn, by reducing the likelihood of investors suffering unanticipated losses and withdrawing from the market. The FPC judges that P2P lending is not likely to pose a threat to UK financial stability in the medium term, and has therefore removed P2P lending from its list of sectors it is monitoring closely.

**Chart I.2 The P2P lending sector remains small**  
Gross UK P2P lending<sup>(a)</sup>



Sources: Bank of England, Peer to Peer Finance Association (P2PFA), RateSetter.com and Bank calculations.

(a) New lending originated on platforms that are current or previous members of the P2PFA.  
 (b) ‘Other major lending flows’ is a sum of consumer and business lending. Consumer lending is consumer credit gross lending from MFIs and other lenders (excluding student loans and credit cards). Business lending is UK MFIs’ gross lending to small and medium-sized enterprises.

Table I.A Progress update on previous in-depth assessments by the FPC

In-depth assessment	Key findings and policy conclusions	Progress update
<b>Investment funds</b> (December 2015 <a href="#">Report</a> )	<ul style="list-style-type: none"> <li>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.</li> <li>Data gaps around leverage prevent holistic risk assessment.</li> <li>The FPC supports the Financial Stability Board's (FSB's) recommendations to address structural vulnerabilities from asset management activities. These are focused on liquidity mismatch and leverage, and are to be operationalised by the International Organization of Securities Commissions (IOSCO).</li> <li>Funds should be incorporated into the Bank's system-wide stress-test initiative.</li> </ul>	<ul style="list-style-type: none"> <li>In February 2018, IOSCO published <a href="#">recommendations</a> on liquidity risk management for funds, operationalising the FSB's liquidity recommendations.</li> <li>In November 2018, IOSCO issued a <a href="#">consultation paper</a> on how to operationalise the FSB recommendation to develop consistent leverage measures for funds. 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 (see The FPC's assessment of the risks from leverage in the non-bank financial system chapter).</li> <li>The FCA published a <a href="#">consultation paper</a> in October 2018 proposing reforms to open-ended funds investing in illiquid assets such as CRE. The FPC <a href="#">concluded</a> the proposed reforms were beneficial to UK financial stability, provided they were implemented as intended. But if open-ended CRE funds continued to grow, the FPC planned to revisit the issue.</li> <li>The FSB has carried out a systemic stress assessment that examined the potential impact of portfolio rebalancing behaviours by asset managers and institutional investors on liquidity in fixed-income markets. The Bank also continues to develop system-wide stress simulations.</li> </ul>
<b>Market liquidity</b> (July 2016 <a href="#">Report</a> )	<ul style="list-style-type: none"> <li>Key dealer-intermediated markets, including some corporate bond and repo markets, saw reduced liquidity — partly due to post-crisis regulation of dealers.</li> <li>International leverage ratio standards should be amended to minimise their impact on the liquidity of these markets without lowering resilience, by:               <ol style="list-style-type: none"> <li>including material, usable buffers;</li> <li>netting cash receivables and payables from securities sales; and</li> <li>offsetting client initial margin.</li> </ol> </li> </ul>	<ul style="list-style-type: none"> <li>In December 2017, the Basel III leverage ratio for internationally active banks was finalised (see Box 3 of the <a href="#">June 2018 Report</a>). This leverage ratio: (i) includes a buffer for global systemically important institutions; and (ii) nets cash receivables and payables from securities sales with the same counterparty.</li> <li>The Basel Committee on Banking Supervision (BCBS) published a <a href="#">consultation paper</a> in October 2018 exploring the offsetting of client initial margin for centrally cleared derivatives in the leverage ratio. This builds on work by the FSB and standard-setting bodies on incentives to centrally clear OTC derivatives. The BCBS is also considering measures to prevent leverage ratio 'window-dressing', whereby banks adjust their balance sheets around reporting dates. 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.</li> <li>There have also been signs of some improvement in gilt repo market functioning (see Resilience of the UK financial system to Brexit chapter).</li> </ul>
<b>Insurance companies</b> (November 2016 <a href="#">Report</a> )	<ul style="list-style-type: none"> <li>Limiting sensitivity of the 'risk margin' to changes in risk-free interest rates would have macroprudential benefits.</li> </ul>	<ul style="list-style-type: none"> <li>In February 2018, the European Insurance and Occupational Pensions Authority <a href="#">recommended</a> to the European Commission no change to the risk margin formula, but recommended that the wider design is assessed as part of the review of Solvency II due in 2021.</li> <li>The Bank is engaged in the International Association of Insurance Supervisors' work to develop International Capital Standards for insurers.</li> </ul>
<b>Derivatives</b> (November 2017 <a href="#">Report</a> )	<ul style="list-style-type: none"> <li>Post-crisis reforms to derivatives markets have improved the resilience of the financial system. Transaction-level trade repository (TR) data have increased the transparency of derivatives markets to authorities.</li> <li>Completing international work on central counterparty (CCP) resolution is important, and reforms to transparency of derivatives markets have further to go.</li> </ul>	<ul style="list-style-type: none"> <li>In April 2018, the Committee on Payments and Market Infrastructures (CPMI) and IOSCO published a <a href="#">framework</a> for supervisory stress testing of CCPs.</li> <li>In August 2018, the FSB and standard-setting bodies published <a href="#">analysis</a> of central clearing interdependencies and, in November 2018, published a <a href="#">final report</a> on incentives to centrally clear OTC derivatives.</li> <li>In November 2018, the FSB published a <a href="#">discussion paper</a> on financial resources to support CCP resolution and the treatment of CCP equity in resolution.</li> <li>FSB work to remove legal barriers to data sharing is ongoing. Work is also ongoing by the CPMI and IOSCO to harmonise global TR data reporting.</li> </ul>

## 'Fast markets'

The proportion of electronic trading in financial markets has increased substantially over recent decades, particularly in markets with more standardised products, such as equities. This change has allowed for greater transparency around prices in the market, as well as for more automated, or algorithmic, trading — some of which takes place at very high frequencies.

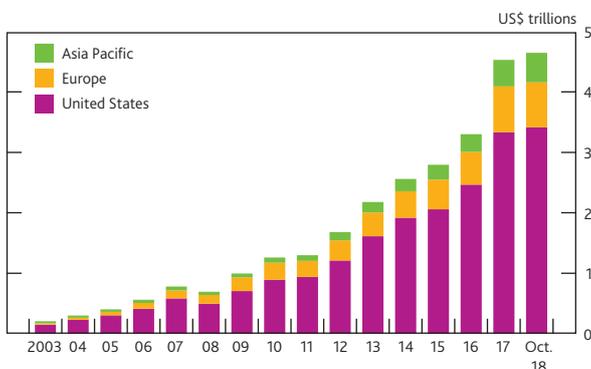
'Fast markets' bring some important benefits to financial market resilience; for example, by placing less reliance on the warehousing of risk by bank intermediaries. However, as set out in the *November 2017 Report*, they can also pose risks, including: the potential for 'flash episodes'; fragmentation of trading and liquidity, which can worsen price dislocation under stress; and a concentration in critical 'nodes' of the provision of market access for short-term liquidity providers (for example banks' provision of clearing services). The FPC continues to monitor 'fast markets' closely.

## Exchange-traded funds (ETFs)

ETFs' assets under management have grown sixfold over the past decade (*Chart I.3*). This may present benefits for financial stability. For example, in stress, trading in ETF shares may provide valuable liquidity.

**Chart I.3** ETFs continue to grow

Assets under management of ETFs by domicile



Sources: ETFGI and Bank calculations.

ETFs may however also present financial stability risks. For example, in common with some open-ended investment funds, some ETFs give rise to liquidity mismatch. In particular, some ETFs invest in less liquid assets while offering redemptions in cash as opposed to 'in kind' (that is, in exchange for a basket of the underlying securities). As a result, ETF investors may be more inclined to sell when asset prices fall, thereby amplifying stress. Furthermore, a small proportion of ETFs or other exchange-traded products (for example, those with short or leveraged investment strategies) automatically behave procyclically. Such dynamics were observed during increases in financial market volatility in February 2018. The FPC will continue to monitor ETFs closely, particularly those investing in illiquid assets, and consider potential risks.

## Financial technology innovations (fintech)

Fintech could deliver significant benefits to households and businesses, such as widening access to financial services and introducing new sources of credit. However, fintech may also introduce new risks to the financial system or contribute to the evolution of existing risks.

In January 2018, the revised EU Payment Services Directive (PSD2) and the Competition and Markets Authority's 'Open Banking' initiative came into force. Aiming to increase competition, innovation and security in payments and banking services, these initiatives oblige banks to give third parties access to customer accounts data, subject to customer permission. Such third parties could become an important part of the UK financial system, for example, if they were to provide popular apps that customers use to interact with their banks. However, demand for these services has been modest so far. The Bank will continue to monitor these developments.

In March 2018, the FPC judged that existing crypto-assets did not currently pose a material risk to UK financial stability, but that it would continue to monitor exposures of UK banks and insurers, and the use of crypto-assets for payments. This judgement is supported by the *conclusions* of the HM Treasury-FCA-Bank Cryptoassets Taskforce. The FSB has also developed a *framework* and metrics for monitoring crypto-assets.

## Cloud service providers

Cloud service providers offer shared virtual data storage and processing capabilities — an example of third-party service provision. If configured correctly, cloud services can significantly improve the operational resilience of individual financial firms, because the scale and expertise of cloud service providers allows them to build resilience in a way that exceeds the capability of individual firms.

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 cyber attack — could interfere with the provision of vital services by several firms.

As banks' usage of third-party cloud service provision is evolving, regulators are updating their guidance. The European Banking Authority recently issued *recommendations* on outsourcing to cloud service providers, clarifying supervisory expectations. More broadly, recognising the risks arising from third-party dependencies, the recent Bank-PRA-FCA *Discussion Paper* on operational resilience highlights the role of third-party service providers. It also sets out considerations for boards and senior management oversight.

## Box 7 Progress on the transition away from Libor

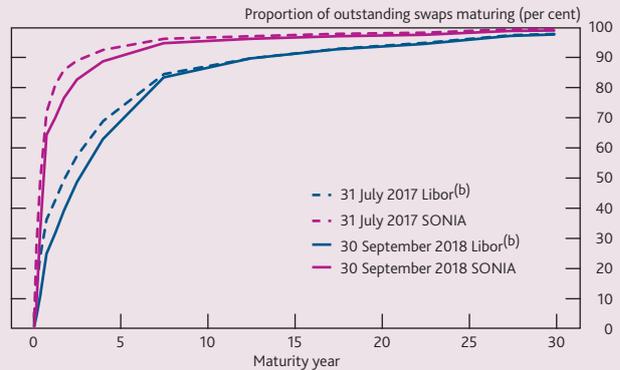
In June 2018, the FPC agreed it would continue to monitor progress on the risks associated with financial markets' reliance on Libor. There have since been encouraging signs of transition to alternative risk-free reference rates:

- First, the share of the notional cleared sterling swap market referencing SONIA (the preferred risk-free rate) reached 18% on a duration-adjusted basis, up from 11% in July 2017.<sup>(1)</sup> SONIA swaps tend to have short maturities as they have typically been used for short-term trading around MPC dates. The average residual maturity of cleared SONIA swaps has increased since July (**Chart A**) suggesting they may be being used for a wider range of purposes.
- Second, there has been a pickup in the volume of SONIA futures contracts traded. The monthly volume reached around 270,000 contracts in October, having been negligible in early 2018. However, the notional outstanding value of SONIA futures remains less than 2% of the equivalent for sterling Libor futures.<sup>(2)</sup>
- Third, as at end-October there has been over £5.5 billion of SONIA-linked bonds issued from a mix of banks and supranational government entities. SONIA has not typically been used in cash markets so these issuances mark a key transition milestone. The majority of sterling floating-rate issuance since September has been SONIA-linked.<sup>(3)</sup>
- Finally, progress has been made in other currencies. In the US, there is increased use of the secured overnight financing rate (SOFR), the preferred US dollar risk-free rate. As at end-October, there has been over US\$15 billion of SOFR-linked floating-rate bond issuances. Traded volumes of SOFR derivatives have also increased, particularly futures. In the euro area, the euro short-term rate (ESTER) was chosen as the preferred risk-free rate and is due to be published from the end of 2019.

In June, the FPC noted two important market-led consultations. First, the Working Group on Sterling Risk-Free Reference Rates launched a consultation on a forward-looking term benchmark based on SONIA. A term benchmark is seen by some market participants as essential for transition away from Libor. The Working Group published a summary of responses on 23 November and is considering next steps.

Second, ISDA launched a consultation on the fallback rate for Libor in over-the-counter (OTC) derivatives contracts, if Libor is discontinued. The implementation of fallback clauses is an important backstop to mitigate financial stability risks. ISDA published [preliminary results](#) of the consultation on 27 November.

**Chart A** The average outstanding SONIA swap maturity has increased since July 2017, suggesting broader usage  
Residual maturity of cleared outstanding SONIA and GBP Libor referencing swaps<sup>(a)</sup>



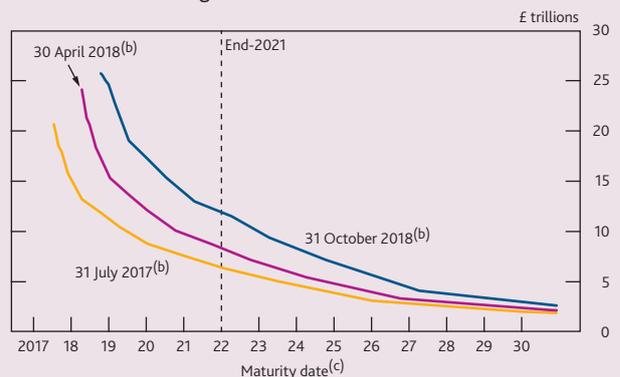
Sources: Bank and FCA estimates based on LCH data provided to the FCA.

- (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 and 30 September 2018 refer to observation dates for roll-off profile. The chart presumes no new trades are transacted after the observation dates.

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 in the UK on the actions they plan to take. Responses are due by 14 December and will support the FPC's monitoring of risks related to Libor transition.

Despite these developments, important challenges for the market and authorities remain. In particular, many new long-dated contracts are still referencing Libor. Since June 2018, the stock of cleared sterling Libor contracts maturing beyond 2021 has continued to grow (**Chart B**). In part, this reflects firms transacting swaps that exchange Libor cash flows for SONIA cash flows. The FPC will continue to monitor progress and report regularly on outstanding risks.

**Chart B** Growth in cleared derivatives contracts referencing GBP Libor exceeded their rate of roll-off  
Roll-off of outstanding notional for cleared GBP Libor derivatives<sup>(a)</sup>



Sources: Bank and FCA 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 and 31 October 2018 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 maturity of trades at dates specified in (b).

(1) Bank and FCA calculations based on LCH data provided to the FCA. Maturity of trades standardised to 1 year so that greater weighting is given to longer-dated notional trades and lower weighting is given to shorter-dated notional trades.  
 (2) Bank and FCA calculations based on data provided by CME, CurveGlobal and ICE.  
 (3) Data as at mid-October sourced through Eikon from Refinitiv and Bank calculations.

# Annex 1: Previous macroprudential policy decisions

This annex lists FPC Recommendations from previous periods that have been implemented 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 June 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 in November 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 3 October 2018, the FPC considered a recommendation from the European Systemic Risk Board (ESRB) for relevant authorities to reciprocate a risk-weight increase by the National Bank of Belgium on Belgian residential real estate risks by applying the risk-weight increase to certain banks in their jurisdiction. The recommendation applied to institutions with relevant exposures greater than €2 billion. Consistent with this, the FPC decided no action was necessary at the time as no UK credit institution had relevant exposures exceeding the materiality threshold proposed by the National Bank of Belgium.

On 29 October, the FPC received from the Chancellor a letter setting out the economic policy of HM Government. The FPC will respond in due course.

## Annex 2: Core indicators

**Table A.1** Core indicator set for the countercyclical capital buffer\* (a)

Indicator	Average, 1987–2006 <sup>(b)</sup>	Average 2006 <sup>(c)</sup>	Minimum since 1987 <sup>(b)</sup>	Maximum since 1987 <sup>(b)</sup>	Previous value (oya)	Latest value (as of 16 Nov. 2018)
<b>Non-bank balance sheet stretch<sup>(d)</sup></b>						
1 Credit to GDP <sup>(e)</sup>						
Ratio	121.2%	162.8%	86.8%	176.7%	148.7%	150.8% (2018 Q2)
Gap	7.3%	9.1%	-28.7%	21.0%	-16.6%	-12.1% (2018 Q2)
2 Private non-financial sector credit growth <sup>(f)</sup>	9.8%	9.2%	-2.0%	23.9%	4.9%	4.3% (2018 Q2)
3 Net foreign asset position to GDP <sup>(g)</sup>	4.0%	-6.3%	-28.4%	21.4%	-6.8%	-11.9% (2018 Q2)
4 Gross external debt to GDP <sup>(h)</sup>	181.5%	316.7%	113.5%	401.3%	307.4%	307.5% (2018 Q2)
<i>of which bank debt to GDP</i>	119.9%	193.7%	77.8%	265.2%	172.8%	172.9% (2018 Q2)
5 Current account balance to GDP <sup>(i)</sup>	-1.9%	-3.0%	-6.7%	0.6%	-4.6%	-3.9% (2018 Q2)
<b>Conditions and terms in markets</b>						
6 Long-term real interest rate <sup>(j)</sup>	1.4%	1.2%	-2.0%	2.2%	-1.5%	-1.7% (15 Nov. 2018)
7 VIX <sup>(k)</sup>	19.1	12.8	9.8	65.5	10.3	20.4 (13 Nov. 2018)
8 Global corporate bond spreads <sup>(l)</sup>	84 bps	84 bps	74 bps	482 bps	99 bps	122 bps (16 Nov. 2018)
9 Spreads on new UK lending						
Household <sup>(m)</sup>	480 bps	352 bps	284 bps	844 bps	626 bps	595 bps (Sep. 2018)
Corporate <sup>(n)</sup>	104 bps	97 bps	82 bps	392 bps	225 bps	234 bps (June 2018)
<b>Bank balance sheet stretch<sup>(o)</sup></b>						
10 Capital ratio						
Basel II core Tier 1 <sup>(p)</sup>	6.6%	6.3%	6.1%	12.3%	n.a.	n.a.
Basel III common equity Tier 1 <sup>(q)</sup>	n.a.	n.a.	n.a.	n.a.	14.5%	14.7% (2018 Q3)
11 Leverage ratio <sup>(r)</sup>						
Simple	4.7%	4.1%	2.9%	6.9%	6.7%	6.6% (2018 H1)
Basel III (2014 proposal)	n.a.	n.a.	n.a.	n.a.	5.0%	4.9% (2018 H1)
12 Average risk weights <sup>(s)</sup>	53.6%	46.4%	31.3%	65.4%	32.9%	31.3% (2018 H1)
13 Return on assets before tax <sup>(t)</sup>	1.0%	1.1%	-0.2%	1.5%	0.7%	0.7% (2018 H1)
14 Loan to deposit ratio <sup>(u)</sup>	114.5%	132.4%	92.5%	133.3%	94.7%	92.5% (2018 H1)
15 Short-term wholesale funding ratio <sup>(v)</sup>	n.a.	22.8%	8.5%	24.9%	8.5%	9.9% (end-2017)
<i>of which excluding repo funding</i>	n.a.	15.5%	3.8%	15.5%	4.4%	3.8% (end-2017)
16 Overseas exposures indicator: countries to which UK banks have 'large' and 'rapidly growing' total exposures <sup>(w)(x)</sup>		In 2006 Q4: AU, BR, CA, CH, CN, DE, ES, FR, IE, IN, JP, KR, KY, LU, NL, US, ZA			In 2017 Q2: CH, DE, FR, JP, KY, TW	In 2018 Q2: AU, CA, CN, DE, FR, JP, KR, NL, SG, TW, US
17 CDS premia <sup>(v)</sup>	12 bps	8 bps	6 bps	298 bps	35 bps	64 bps (15 Nov. 2018)
18 Bank equity measures						
Price to book ratio <sup>(z)</sup>	2.13	1.94	0.50	2.86	0.91	0.77 (16 Nov. 2018)
Market-based leverage ratio <sup>(aa)</sup>	9.7%	7.8%	1.9%	15.7%	5.8%	4.8% (16 Nov. 2018)

Table A.2 Core indicator set for sectoral capital requirements<sup>(a)</sup>

Indicator	Average, 1987–2006 <sup>(b)</sup>	Average 2006 <sup>(c)</sup>	Minimum since 1987 <sup>(b)</sup>	Maximum since 1987 <sup>(b)</sup>	Previous value (oya)	Latest value (as of 16 Nov. 2018)
<b>Bank balance sheet stretch<sup>(o)</sup></b>						
1 Capital ratio						
Basel II core Tier 1 <sup>(p)</sup>	6.6%	6.3%	6.1%	12.3%	n.a.	n.a.
Basel III common equity Tier 1 <sup>(q)</sup>	n.a.	n.a.	n.a.	n.a.	14.5%	14.7% (2018 Q3)
2 Leverage ratio <sup>(r)</sup>						
Simple	4.7%	4.1%	2.9%	6.9%	6.7%	6.6% (2018 H1)
Basel III (2014 proposal)	n.a.	n.a.	n.a.	n.a.	5.0%	4.9% (2018 H1)
3 Average mortgage risk weights <sup>(ab)</sup>	n.a.	n.a.	11.3%	22.4%	11.8%	11.3% (2018 H1)
UK average mortgage risk weights <sup>(ac)</sup>	n.a.	n.a.	9.7%	15.8%	10.2%	9.7% (2018 H1)
4 Balance sheet interconnectedness <sup>(ad)</sup>						
Intra-financial lending growth <sup>(ae)</sup>	12.0%	13.0%	-29.8%	45.5%	-11.9%	-29.8% (2018 H1)
Intra-financial borrowing growth <sup>(af)</sup>	14.1%	13.7%	-21.5%	29.5%	12.8%	6.1% (2018 H1)
Derivatives growth (notional) <sup>(ag)</sup>	37.7%	34.2%	-25.9%	52.0%	-1.5%	5.7% (2018 H1)
5 Overseas exposures indicator: countries to which UK banks have 'large' and 'rapidly growing' non-bank private sector exposures <sup>(ah)(x)</sup>		In 2006 Q4: AU, CA, DE, ES, FR, IE, IT, JP, KR, KY, NL, US, ZA		In 2017 Q2: HK, KY, US		In 2018 Q2: CA, FR, HK, SG, US
<b>Non-bank balance sheet stretch<sup>(d)</sup></b>						
6 Credit growth						
Household <sup>(ai)</sup>	10.6%	10.7%	-0.7%	21.6%	4.4%	3.7% (2018 Q2)
Commercial real estate <sup>(aj)</sup>	15.3%	18.5%	-9.7%	59.8%	-1.9%	1.8% (2018 Q3)
7 Household debt to income ratio <sup>(ak)</sup>	98.3%	139.0%	77.3%	146.8%	133.9%	134.2% (2018 Q2)
8 PNFC debt to profit ratio <sup>(al)</sup>	264.3%	356.1%	157.7%	422.6%	306.9%	319.2% (2018 Q2)
9 NBF1 debt to GDP ratio (excluding insurance companies and pension funds) <sup>(am)</sup>	54.8%	128.4%	13.7%	172.5%	124.9%	124.1% (2018 Q2)
<b>Conditions and terms in markets</b>						
10 Real estate valuations						
Residential price to rent ratio <sup>(an)</sup>	100.0	151.3	68.5	162.4	152.3	156.1 (2018 Q3)
Commercial prime market yields <sup>(ao)</sup>	5.4%	4.1%	3.7%	7.1%	3.9%	3.7% (2018 Q3)
Commercial secondary market yields <sup>(ao)</sup>	8.6%	5.6%	5.1%	10.2%	5.9%	5.9% (2018 Q3)
11 Real estate lending terms						
Residential mortgage LTV ratio (mean above the median) <sup>(ap)</sup>	90.6%	90.6%	81.6%	90.8%	87.5%	87.6% (2018 Q2)
Residential mortgage LTI ratio (mean above the median) <sup>(ap)</sup>	3.8	3.8	3.6	4.2	4.2	4.2 (2018 Q2)
Commercial real estate mortgage LTV (average maximum) <sup>(aq)</sup>	77.6%	78.3%	57.0%	79.6%	57.3%	57.2% (2018 H1)
12 Spreads on new UK lending						
Residential mortgage <sup>(ar)</sup>	80 bps	50 bps	35 bps	369 bps	121 bps	96 bps (Sep. 2018)
Commercial real estate <sup>(as)</sup>	137 bps	135 bps	119 bps	422 bps	263 bps	268 bps (2018 Q2)

- \* 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](http://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](http://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 (one-month 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 H1). In the case of Nationwide, these relate to 2018 Q1 and Co-operative Bank, these relate to 2017 H2. 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 H1). In the case of Nationwide and the Co-operative Bank, these relate to 2017 H2. 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 H1), in the case of Nationwide and the Co-operative Bank these relate to 2017 H2. 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 H1), in the case of Nationwide and the Co-operative Bank relates to 2017 H2. 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. Where underlying data are not published estimates have been used. Repo includes repurchase agreements and securities lending. 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, Datastream from Refinitiv, ECB, 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 senior CDS premia, weighted by total assets until 2014 and by half-year total assets from 2015. Series starts in 2003. In the latest value Nationwide is weighted by 2017 H2 total assets as the latest published figures relate to 2017 H2. The Co-operative Bank fell out of the population on 17 June 2017. From 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., Datastream 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., Datastream 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 H1, except Nationwide and the Co-operative Bank which extend to 2017 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 H1, except Nationwide and the Co-operative Bank which extend to 2017 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 H1. Sources: Published accounts, regulatory data and Bank calculations.
- (ah) This indicator highlights the countries where UK-owned MFIs' non-bank private sector exposures are greater than 10% of UK-owned MFIs' tangible equity on an ultimate risk basis and have grown by more than 1.5 times nominal GDP growth in that country. Foreign exposures as defined in BIS consolidated banking statistics. Overseas sectoral exposures cannot currently be broken down further at the non-bank private sector level. The intention is to divide them into households and corporates as new data become available. Uses latest data available, with the exception of tangible equity figures for 2006-07, which are estimated using published accounts. Sources: Bank of England, Datastream from Refinitiv, ECB, 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 NBFJ 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 homeowners, 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<sup>(a)</sup>

Indicator	Average, 1987–2006 <sup>(b)</sup>	Average 2006 <sup>(c)</sup>	Minimum since 1987 <sup>(b)</sup>	Maximum since 1987 <sup>(b)</sup>	Previous value (oya)	Latest value (as of 16 Nov. 2018)
<b>Lender and household balance sheet stretch</b>						
<b>1 LTI and LTV ratios on new residential mortgages</b>						
Owner-occupier mortgage LTV ratio (mean above the median) <sup>(d)</sup>	90.6%	90.6%	81.6%	90.8%	87.5%	87.6% (2018 Q2)
Owner-occupier mortgage LTI ratio (mean above the median) <sup>(d)</sup>	3.8	3.8	3.6	4.2	4.2	4.2 (2018 Q2)
Buy-to-let mortgage LTV ratio (mean) <sup>(e)</sup>	n.a.	n.a.	56.6%	75.4%	61.0%	56.7% (2018 Q2)
<b>2 Household credit growth<sup>(f)</sup></b>						
	10.6%	10.7%	-0.7%	21.6%	4.4%	3.7% (2018 Q2)
<b>3 Household debt to income ratio<sup>(g)</sup></b>						
<i>of which: mortgages<sup>(h)</sup></i>	98.3%	139.0%	77.3%	146.8%	133.9%	134.2% (2018 Q2)
<i>of which: owner-occupier mortgages<sup>(i)</sup></i>	68.7%	101.3%	49.3%	109.6%	98.5%	97.8% (2018 Q2)
<i>of which: owner-occupier mortgages<sup>(i)</sup></i>	77.7%	92.8%	64.8%	96.9%	81.5%	80.8% (2018 Q2)

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<b>4 Approvals of loans secured on dwellings<sup>(j)</sup></b>						
	97,905	119,041	26,284	132,709	65,742	65,269 (Sep. 2018)
<b>5 Housing transactions<sup>(k)</sup></b>						
Advances to homemovers <sup>(l)</sup>	48,985	59,342	14,300	93,500	32,100	29,400 (Sep. 2018)
% interest only <sup>(m)</sup>	53.3%	31.0%	1.8%	81.3%	2.2%	2.4% (Sep. 2018)
Advances to first-time buyers <sup>(l)</sup>	39,179	33,567	8,500	55,800	30,800	29,400 (Sep. 2018)
% interest only <sup>(m)</sup>	52.1%	24.0%	0.0%	87.9%	0.0%	0.0% (Sep. 2018)
Advances to buy-to-let purchasers <sup>(l)</sup>	10,128	14,113	3,600	29,100	6,400	5,200 (Sep. 2018)
% interest only <sup>(n)</sup>	n.a.	n.a.	50.0%	74.3%	72.3%	72.6% (Sep. 2018)
<b>6 House price growth<sup>(o)</sup></b>						
	1.7%	2.2%	-5.8%	6.6%	1.2%	1.1% (Sep. 2018)
<b>7 House price to household disposable income ratio<sup>(p)</sup></b>						
	2.9	4.3	2.1	4.6	4.5	4.6 (2018 Q2)
<b>8 Rental yield<sup>(q)</sup></b>						
	5.8%	5.1%	4.8%	7.6%	4.8%	4.8% (Sep. 2018)
<b>9 Spreads on new residential mortgage lending</b>						
All residential mortgages <sup>(r)</sup>	80 bps	50 bps	35 bps	369 bps	121 bps	96 bps (Sep. 2018)
Difference between the spread on high and low LTV residential mortgage lending <sup>(r)</sup>	18 bps	25 bps	1 bps	293 bps	90 bps	40 bps (Sep. 2018)
Buy-to-let mortgages <sup>(s)</sup>	n.a.	n.a.	61 bps	397 bps	253 bps	182 bps (2018 Q2)

(a) A spreadsheet of the series shown in this table is available at [www.bankofengland.co.uk/financial-stability](http://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.

(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.

(h) The household disposable income series is adjusted for financial intermediation services indirectly measured (FISIM). Sources: ONS and Bank calculations.

(i) 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. Sources: ONS and Bank calculations.

(j) 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.

(k) 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.

(l) 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.

(m) 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.

(n) 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.

(o) 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.

(p) 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.

(q) 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 financial intermediation services indirectly measured (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.

(r) 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.

(s) 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.

(t) The spread on new buy-to-let mortgages is the weighted average effective spread charged on new floating and fixed-rate non-regulated mortgages over safe rates. Spreads are taken relative to Bank Rate for the floating-rate products. The safe rate for fixed-rate mortgages is calculated by weighting two-year, three-year and five-year gilts by the number of buy-to-let fixed-rate mortgage products offered at these maturities. Series starts in 2007. Sources: Bank of England, Bloomberg Finance L.P., Moneyfacts and Bank calculations.

## Annex 3: Text previously deferred from publication

The second chapter of this *Report* sets out the FPC's assessment of the resilience of the UK financial system to Brexit.

The FPC has been publishing its views on the risks to the UK financial system that could arise from Brexit since the EU referendum in 2016, as set out in its Financial Stability Reports and Records of its meetings. These publications have included: the FPC's regular assessment of the resilience of the UK banking system to adverse economic shocks that could arise from Brexit; and the checklist of actions by which the FPC has regularly monitored risks to UK financial stability from the UK leaving the EU without an agreement in place and the actions needed to avoid disruption to end-users of financial services. The FPC's latest assessment on both is in the 'Resilience of the UK financial system to Brexit' chapter.

At points of review during this period, the FPC has judged that publishing particular parts of its discussion at those points in time would be against the public interest — for example, where disclosure could act to raise the probability of risks being triggered and run counter to the objective of contingency planning and where it judged that there was a risk that publication could prejudice negotiations between the UK and EU, which, given the benefit of an orderly transition, would have been at odds with financial stability. In such cases, the FPC is able to defer publication, under Section 9U of the Bank of England Act 1998. The FPC subsequently published parts of this text when it judged doing so was no longer against the public interest — for example in December 2017.<sup>(1)</sup>

When the FPC defers publication of its discussion, it is required to specify a date at which it can be released, or keep that decision under review. When taking the decision in relation to the relevant text on Brexit, the FPC initially expected not to be able to publish this text until after the point of the UK's exit from the EU. But it has kept this under regular review.

At its meeting on 20 November 2018, ahead of publication of this *Report*, the FPC decided that it was no longer necessary to defer the publication of the remaining text from its previous discussions on Brexit. The majority of the relevant text relates to the Committee's discussion of the adverse economic shocks that could arise from Brexit. It has published on a number of occasions its judgement that the Bank's 2017 stress test of the UK banking system encompassed an appropriately wide range of UK macroeconomic outcomes that could be associated with Brexit. The 'Resilience of the UK financial system to Brexit' chapter contains further detail, and an assessment compared to the 2018 stress test; detail from this is also included in the Bank's response to a request from the Treasury Committee for the Bank to provide an analysis of how the EU Withdrawal Agreement will affect the Bank's ability to deliver its statutory remits for monetary and financial stability, including in a 'no deal, no transition' scenario. As the Bank set out on 20 November 2018, the publication of this *Report* was brought forward in order to meet that request.<sup>(2)</sup>

This text where publication was previously deferred is reproduced in full below. The Records of the FPC's previous meetings will be updated to include this text when the Record of the FPC's most recent meeting is published on 5 December.

(1) Page 20 and Annex 2 of the [Record](#) of the FPC's November 2017 meetings.

(2) [www.bankofengland.co.uk/news/2018/november/change-of-publication-date-for-fsr-and-stress-testing-results](http://www.bankofengland.co.uk/news/2018/november/change-of-publication-date-for-fsr-and-stress-testing-results).

*Text where publication was previously deferred from the Record of the meeting on 22 March 2017*

9. In reviewing potential 'tail' risks, the FPC had an initial discussion of the risks if the United Kingdom were to withdraw from the European Union without a negotiated agreement, in the absence of an adjustment period, and where market participants had not been able to prepare fully by the point of withdrawal. These fell into two broad categories:
- Direct risks to the provision of financial services. This included: loss of cross-border banking services; disruption to market liquidity caused by fragmentation of securities and derivatives trading; disruption to clearing infrastructure; and loss of authorisations and associated uncertainty around the continued enforceability and performance of some financial contracts.
  - Macroeconomic shocks that might also test the resilience of the financial system. This included the possibility of some direct disruption to economic activity — for example, because of non-tariff barriers to trade. It also included the risk of a sharp re-evaluation of the strength of, and uncertainty around, the UK economic outlook; this could prompt a sudden fall in confidence and increase in risk aversion towards UK assets.
10. The FPC asked the Bank to institute regular monitoring of these risk channels and the mitigants in place or being developed to address them. It asked for frequent reporting to the FPC, including between its official meeting cycles. The FPC also requested that stress scenarios be developed against which the resilience of the UK financial system could be assessed.
11. This work would support the FPC in overseeing contingency plans in place to maintain financial stability in a range of possible outcomes.
12. The FPC agreed that publication of its discussion was against the public interest during the period when contingency planning was being undertaken. Disclosure could act to raise the probability of risks being triggered and run counter to the objective of contingency planning. In addition, disclosure could prejudice the negotiations with the EU around the UK's withdrawal. The Committee therefore decided to defer publication, under Section 9U of the Bank of England Act 1998. The earliest date on which the information might be published was likely to be after the United Kingdom had exited from the European Union; the FPC would review whether publication was still against the public interest at that point.

*Text where publication was previously deferred from the Record of the meeting on 21 June 2017*

91. The FPC discussed whether it was still against the public interest to publish text from the Record of its March 2017 meeting on risks in a scenario in which there was no agreement in place at the point of the UK's exit from the European Union, given the material it planned to publish in the forthcoming *Financial Stability Report*.
92. In March, the FPC had agreed that it was against the public interest to publish the material during the period when contingency planning was being undertaken: disclosure could act to raise the probability of risks being triggered and run counter to the objective of contingency planning. In addition, disclosure could prejudice the negotiations with the EU around the UK's withdrawal.
93. The FPC's view remained that it was against the public interest to publish this text. The text under consideration included a request to Bank staff to prepare a framework through which the Committee could monitor regularly risks to UK financial stability from the UK leaving the EU without an agreement in place, and for the development of stress scenarios based on this against which the resilience of the UK financial system could be assessed. The FPC had been briefed on the monitoring framework ahead of its meeting and had drawn on it to prepare material for the forthcoming *Financial Stability Report*. But, given the sensitivity of such a stress scenario on an ongoing basis as negotiations developed, the FPC judged that publication of that text created the same risks that it had discussed in March.
94. The FPC therefore decided that publication of the text, and this discussion, should remain deferred, under Section 9U of the Bank of England Act 1998. It would not now need to review this decision until after the United Kingdom exited from the European Union, because the need to review at this meeting arose from the forthcoming publication of the *Financial Stability Report*.

*Text where publication was previously deferred from the Record of the meeting on 20 September 2017*

*Note that some of the text initially deferred from this Record on insurance contracts was subsequently published by the FPC in the Record of its meetings on 22 and 27 December 2017.*

57. The risk of disruption to cross-border asset management services had increased. UK-located asset managers accounted for over 35% of assets managed in Europe. Fragmentation of asset management activity between the United Kingdom and the EU could reduce material economies of scale and scope that were currently achieved by pooling of funds. The European Securities and Markets Authority had published an Opinion setting out a more restrictive approach to delegation arrangements involving third countries. At the margin, this increased the risk that UK-located asset managers would be restricted in their ability to provide delegated portfolio management services to EU-domiciled funds. Firms' contingency planning appeared to be at a relatively early stage, increasing the risk of disruption to the provision of these services. The FCA was engaging with firms to improve efforts on contingency plans.
59. As the FPC had set out in its *Financial Stability Report* in June, without contingency plans that could be executed in the available time, effects on financial stability could also arise through macroeconomic shocks that could test the resilience of the financial system. On 5 July 2017, the FPC had met with the Monetary Policy Committee (MPC) to discuss the risks of adverse economic shocks as the United Kingdom withdrew from the European Union. The macroeconomic projections set out in the MPC's *Inflation Report* had been conditioned on the average of a range of possible outcomes for the United Kingdom's new relationship with the European Union and the assumption of a smooth adjustment to that new relationship. The Committees were presented with initial analysis of the potential impact on these projections if the UK instead left the EU in 2019 Q2 on WTO terms, without an agreed transition period. The FPC would meet with the MPC again on 4 October to assess further the scale of these risks to the macroeconomic outlook.
60. The FPC discussed whether it was in the public interest to publish all of the details of its discussion on EU withdrawal at this meeting. There were benefits to disclosure, where it could inform and catalyse contingency planning and therefore mitigate possible financial stability risks. But in some cases, publishing the details of the FPC's discussion at this stage could precipitate action that contingency planning was seeking to avoid. A clear example of this was the risk of a discontinuity in insurance contracts. Work was underway, but not yet finalised, by HM Treasury, the PRA and FCA on options to provide a solution to protect UK policyholders, where this could be achieved by unilateral action from UK authorities; the FPC would receive an update on this work at its meeting in November. Additional disclosures at this stage could prompt policyholders to take costly and potentially unnecessary actions to safeguard the future continuity of their contracts. In some areas, there continued to be a risk that publishing further material could undermine negotiations between the UK and EU — which, given the benefit of an orderly transition, would be at odds with financial stability.
61. The FPC therefore agreed that, on balance, publication of some details of its discussion on EU withdrawal risks was currently against the public interest. It therefore decided to defer publication of those details, under Section 9U of the Bank of England Act 1998. It did not expect to be able to publish much of this text until after the United Kingdom had exited from the European Union. However, it would keep this under review.

*Text where publication was previously deferred from the Record of the meetings on 22 and 27 November 2017*

109. The FPC discussed whether it was appropriate to publish now details of its earlier discussions on potential scenarios of macroeconomic impacts of leaving the EU without a deal, given its assessment at this meeting of the ACS scenario against various combinations of the potential risks in a disorderly Brexit. There continued to be a risk that publishing this earlier material could undermine negotiations between the United Kingdom and the European Union — which, given the benefit of an orderly transition, would be at odds with financial stability. Given the uncertainty around the estimates, a suggestion of apparently precise scenarios could be misleading and liable to misinterpretation. The FPC therefore agreed that it remained against the public interest to publish details of its discussions in previous meetings. It considered that by making public its judgement that a disorderly Brexit was encompassed by the stress test, it had fulfilled its statutory obligations at this juncture.

*Text where publication was previously deferred from the Record of the meeting on 12 March 2018*

86. Under Section 9U of the Bank of England Act 1998, the FPC can defer publication of some parts of the Records of its meetings, if it decides that publication at that point would be against the public interest. Where it defers publication of text, it sets a date for publication or keeps that decision under review.
87. The FPC discussed whether it was appropriate to publish now parts of its previous Records where it had deferred publication of some of its discussions on the implications of the United Kingdom's withdrawal from the European Union. This text was predominantly on potential scenarios of macroeconomic impacts of leaving the EU without a deal. It had not expected to be able to publish this text until after the United Kingdom had exited from the European Union. But it had decided to keep this publication under review. In the FPC's view, there continued to be a risk that publishing this material could undermine negotiations between the United Kingdom and the European Union — which, given the benefit of an orderly transition, would be at odds with financial stability. Given the uncertainty around the estimates, a suggestion of apparently precise scenarios could be misleading and liable to misinterpretation. The FPC therefore agreed that it remained, at this stage, against the public interest to publish details of its discussions in previous meetings.

*Text where publication was previously deferred from the Record of the meeting on 19 June 2018*

48. The FPC discussed whether it was now appropriate to publish parts of its previous Records where it had deferred publication of some of its discussions on the implications of the United Kingdom's withdrawal from the European Union. This text was predominantly on potential scenarios of macroeconomic impacts of leaving the EU without a deal. It had not expected to be able to publish this text until after the United Kingdom had exited from the European Union, but had kept this under review. In the FPC's view, there continued to be a risk that publishing this material could undermine negotiations between the United Kingdom and the European Union — which, given the benefit of an orderly transition, would be at odds with financial stability. Given the uncertainty around the estimates, a suggestion of apparently precise scenarios could be misleading and liable to misinterpretation. Under Section 9U of the Bank of England Act, the FPC therefore agreed that it remained against the public interest to publish these parts of its previous Records. In line with its previous reviews, it also confirmed that it would review this again after the point of exit. It had published its judgement that its 2017 stress-test scenario for major UK banks encompassed a wide range of UK macroeconomic outcomes that could be associated with Brexit, and therefore that Brexit risks did not warrant additional capital buffers for banks. And the now regular publication of its checklist would continue to provide details of its assessment of progress on actions that would mitigate risks of disruption to important financial services used by households and businesses associated with Brexit.

*Text where publication was previously deferred from the Record of the meeting on 3 October 2018*

9. At its meetings, the Committee considered again the range of adverse economic shocks that could arise as the UK withdrew from the EU and their potential impact on financial stability. The scale and probability of the risks would depend not just on the nature of the new relationship with the EU and the transition to it, but also on many other factors, including the extent of contingency planning and mitigating actions by governments in the UK and EU.
10. Consistent with its remit, the FPC continued to focus on combinations of risks that, even though they might be unlikely to occur, would have the greatest impact on financial stability. In that context, the FPC considered the particular risks that could arise if the UK's relationship with the EU were to move abruptly to default WTO rules without an implementation period. Within that scenario, the Committee focused on outcomes that would be very unlikely to be exceeded in their severity.
11. The shocks the UK could possibly experience included: a sharp decline in trade flows; disruption to the supply side of the economy arising from barriers to cross-border trade and investment; disruption to the provision of financial services and the functioning of financial markets including those for derivatives. There could also be reduced investor appetite for UK assets and a depreciation of sterling, resulting in higher inflation. Reflecting all of this, uncertainty could be expected to increase and confidence decline. In an un-cooperative outcome, banks could also face higher than expected costs in restructuring their business models.
12. The Committee reviewed a range of model estimates of these Brexit risks.

13. If particularly adverse combinations of these Brexit shocks were to occur, GDP could fall by around 8%. Such a fall in output would be bigger than in the annual cyclical scenario (ACS) stress test but would occur only in the event of major disruption to the supply side of the economy from barriers to cross-border trade and investment. In such a scenario, a greater proportion of the fall in GDP would be accounted for by a shock to supply and, in particular, potential productivity. All else equal, lower productivity would tend to increase labour demand. Reflecting that, unemployment could rise to around 7%, which would be relatively muted compared to the fall in GDP. In very adverse outcomes, residential property prices could decline by around 30%, and CRE prices by around 50%. The interest rates faced by households and businesses could rise by 250 basis points more than the rise in risk-free rates.
14. The Committee noted that its 2017 ACS stress test scenario already contained many of the features of these worst case scenarios. In the stress test, unemployment rose to 9.5%, GDP declined by 4.7%, residential property prices declined by 33%, and CRE prices declined by 40%. The stress test scenario also featured a sudden reduction in investor appetite for UK assets and the sterling exchange rate falling by 27% to its lowest ever level against the dollar. In the stress scenario that pushed inflation up to 5.1% and Bank Rate increased to 4%. Although, in a very severe outcome, the mix of output and unemployment shocks could be different to the ACS stress test scenario, even very severe outcomes were overall unlikely to result in more severe losses for banks than the ACS stress test scenario.
15. The Committee also noted that, in addition to very adverse domestic macroeconomic outcomes, its 2017 ACS stress test scenario contained a severe global recession and stressed outcomes for misconduct costs. As a whole, the 2017 stress test scenario could hence be considered more severe than very disorderly Brexit outcomes.
16. The Committee agreed, under Section 9U of the Bank of England Act, that it was against the public interest to publish this part of its discussion, for the same reasons that it had set out when it had initially discussed the potential scenarios of macroeconomic impact. It would review this pending developments in the UK's negotiations with the EU.

## Annex 4: 2018 annual cyclical scenario: bank-specific results

Annexes 4 and 5 of this report, setting out the individual bank results and supervisory stance with respect to those banks, have been formally approved by the PRC. These were finalised on 27 November 2018.

The Prudential Regulation Authority (PRA) is a part of the Bank of England and responsible for the prudential regulation and supervision of banks, building societies, credit unions, insurers and major investment firms. The PRA's most significant supervisory decisions are taken by the PRC. The PRC is accountable to Parliament.

### **The Prudential Regulation Committee:**

Mark Carney, Governor

Sam Woods, Deputy Governor responsible for prudential regulation

Jon Cunliffe, Deputy Governor responsible for financial stability

Ben Broadbent, Deputy Governor responsible for monetary policy

David Ramsden, Deputy Governor responsible for markets and banking

Andrew Bailey, Chief Executive of the Financial Conduct Authority

David Belsham

Sandra Boss

Norval Bryson

Jill May

Mark Yallop

**Table A4.A** Projected CET1 capital ratios and Tier 1 leverage ratios in the 2018 ACS<sup>(a)(b)(c)(d)(e)</sup>

	Actual (end-2017)	Minimum stressed ratio (before 'strategic' management actions or AT1 conversion)	Minimum stressed ratio after 'strategic' management actions and before the conversion of AT1		Minimum stressed ratio (after the impact of 'strategic' management actions and conversion of AT1)	Hurdle rate <sup>(g)</sup>	Actual (2018 Q3)
			Non-dividend 'strategic' management actions only <sup>(f)</sup>	All 'strategic' management actions including CRD IV related restrictions			
<b>CET1 ratios</b>							
Barclays	13.3	6.9	7.2	8.9	11.0	7.9	13.2
HSBC	14.6	5.8	6.4	9.1	9.1	7.8	14.3
Lloyds Banking Group	14.0	6.3	6.7	9.3	11.4	8.5	14.6
Nationwide	30.4	13.3	14.1	14.1	14.1	7.9	31.7
The Royal Bank of Scotland Group	16.2	9.6	9.7	9.7	9.7	7.3	16.7
Santander UK	12.2	10.8	10.9	10.9	10.9	7.5	13.1
Standard Chartered	13.6	7.1	7.1	7.9	7.9	6.7	14.5
<b>Aggregate</b>	<b>14.5</b>	<b>7.0</b>	<b>7.4</b>	<b>9.2</b>	<b>9.7</b>	<b>7.8</b>	<b>14.7</b>
<b>Leverage ratios</b>							
Barclays	5.1	3.4	3.5	3.9	3.9	3.61	4.9
HSBC	6.1	3.9	4.0	4.6	4.6	3.75	5.9
Lloyds Banking Group	5.3	3.3	3.5	4.5	4.5	3.79	5.3
Nationwide	4.9	4.8	5.1	5.1	5.1	3.60	5.0
The Royal Bank of Scotland Group	6.2	5.1	5.2	5.2	5.2	3.59	6.3
Santander UK	4.4	3.9	3.9	3.9	3.9	3.26	4.4
Standard Chartered	6.0	4.1	4.3	4.9	4.9	3.48	5.8
<b>Aggregate</b>	<b>5.7</b>	<b>4.2</b>	<b>4.2</b>	<b>4.6</b>	<b>4.6</b>	<b>3.52</b>	<b>5.5</b>

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

- (a) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets, where these are in line with CRR and the UK implementation of CRD IV via the PRA Rulebook.  
(b) The Tier 1 leverage ratio is Tier 1 capital expressed as percentage of the leverage exposure measure excluding central bank reserves, in line with the PRA's Policy Statement 21/17.  
(c) Minimum aggregate CET1 ratios are calculated by dividing aggregate CET1 capital by aggregate risk-weighted assets at the aggregate low point of the stress in 2019. Minimum aggregate Tier 1 leverage ratios are calculated by dividing aggregate Tier 1 capital by the aggregate leverage exposure measure at the aggregate low point of the stress in 2019.  
(d) The minimum CET1 ratios and leverage ratios shown in the table do not necessarily occur in the same year of the stress scenario for all banks. For individual banks, low-point years are based on their post-strategic management action and CRD IV restrictions.  
(e) All figures shown on a transitional IFRS 9 basis. Actuals for end-2017 are shown on the basis of 1 January 2018 in order to incorporate IFRS 9 transitional impacts.  
(f) This excludes CRD IV distribution restrictions. Where a bank is subject to such restrictions all non business as usual cuts to distributions subject to CRD IV restrictions will appear in the next column — 'All 'strategic' management' actions including CRD IV related restrictions. This should not be interpreted as a judgement by the Bank that any or all of such cuts are conditional on such restrictions.  
(g) The aggregate hurdle rate is calculated as a weighted average of hurdle rates in the aggregate low-point year.

**Table A4.B** Dividends, variable remuneration, AT1 coupons and other distributions in the 2018 ACS

£ billions	Dividends <sup>(a)</sup>		Variable remuneration <sup>(b)</sup>		AT1 discretionary coupons and other distributions <sup>(c)</sup>	
	Actual 2017	To end-2019 in the stress	Actual 2017	To end-2019 in the stress	Actual 2017	To end-2019 in the stress
Barclays	0.5	0.0	1.0	0.0	1.0	0.0
HSBC <sup>(d)</sup>	6.3	0.0	2.5	0.0	0.6	0.0
Lloyds Banking Group	2.2	0.0	0.5	0.0	0.7	0.7
Nationwide <sup>(e)</sup>	0.1	0.2	0.1	0.1	0.1	0.2
The Royal Bank of Scotland	0.0	0.0	0.4	0.4	0.6	1.2
Santander UK	0.6	0.0	0.2	0.4	0.2	0.3
Standard Chartered <sup>(d)</sup>	0.3	0.0	0.9	0.4	0.3	0.0
<b>Aggregate</b>	<b>9.9</b>	<b>0.2</b>	<b>5.7</b>	<b>1.3</b>	<b>3.5</b>	<b>2.4</b>

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

- (a) Dividends shown net of scrip payments, and are in respect of the year noted.  
(b) Variable remuneration reflects discretionary distributions only (ie upfront cash awards awarded in the current year, paid in the current year only), pre-tax.  
(c) Other distributions includes preference dividends, and other discretionary distributions.  
(d) HSBC and Standard Chartered figures have been converted to sterling using exchange rates consistent with the stress scenario.  
(e) Dividend figures for Nationwide refer to distributions relating to its Core Capital Deferred Shares, a CET1 capital instrument.

**Table A4.C** Projected consolidated solvency ratios in the stress scenario

	Actual (end-2017) <sup>(i)</sup>	Minimum stressed ratio <i>(before 'strategic' management actions or AT1 conversions)</i>	Minimum stressed ratio after 'strategic' management actions and before conversion of AT1		Minimum stressed ratio <i>(after the impact of 'strategic' management actions and conversion of AT1)</i>	Hurdle rate	Actual (2018 Q3)	Submit revised capital plan?
			Non-dividend 'strategic' management actions only <sup>(i)</sup>	All 'strategic' management actions including CRD IV related restrictions				
<b>IFRS 9 Transitional</b>								
Common equity Tier 1 ratio <sup>(a)(b)</sup>	13.3%	6.9%	7.2%	8.9%	11.0%	7.9%	13.2%	Not required
Tier 1 capital ratio <sup>(c)</sup>	17.1%	9.4%(g)	9.8%(g)	11.5%(g)	11.5%(g)		17.5%	
Total capital ratio <sup>(d)</sup>	21.3%	12.9%(g)	13.3%(g)	15.0%(g)	15.0%(g)		21.3%	
<i>Memo: risk-weighted assets (£ billions)</i>	314	427(g)	420(g)	422(g)	422(g)		316	
<i>Memo: CET1 (£ billions)</i>	42	29(g)	30(g)	37(g)	46(g)		42	
Tier 1 leverage ratio <sup>(a)(e)</sup>	5.1%	3.4%	3.5%	3.9%	3.9%	3.61%	4.9%	
<i>Memo: leverage exposure (£ billions)</i>	985	1,078 <sup>(h)</sup>	1,078 <sup>(h)</sup>	1,078 <sup>(h)</sup>	1,078 <sup>(h)</sup>		1,063	
<b>IFRS 9 non-transitional</b>								
Common equity Tier 1 ratio <sup>(f)</sup>	13.0%	5.1%	5.5%	6.5%	8.8%	7.0%	12.8%	
Tier 1 leverage ratio <sup>(f)</sup>	5.0%	2.7%	2.8%	3.2%	3.2%	3.25%	4.8%	

Sources: Participating firms' published accounts and STDF data submissions, Bank analysis and calculations.

- (a) The low points for the common equity Tier 1 (CET1) ratio and leverage ratio shown in the table do not necessarily occur in the same year of the stress scenario and correspond to the year where the minimum stressed ratio is calculated after 'strategic' management actions and before AT1 conversion.
- (b) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets, where these are in line with CRR and the UK implementation of CRD IV via the PRA Rulebook.
- (c) Tier 1 capital ratio is defined as Tier 1 capital expressed as a percentage of RWAs where Tier 1 capital is defined as the sum of CET1 capital and additional Tier 1 capital in line with the UK implementation of CRD IV.
- (d) Total capital ratio is defined as total capital expressed as a percentage of RWAs where total capital is defined as the sum of Tier 1 capital and Tier 2 capital in line with the UK implementation of CRD IV.
- (e) The Tier 1 leverage ratio is Tier 1 capital expressed as a percentage of the leverage exposure measure excluding central bank reserves, in line with the PRA's Policy Statement PS21/17.
- (f) The low point year on a non-transitional IFRS 9 basis may differ to the low point year on a transitional IFRS 9 basis. Non-transitional IFRS 9 hurdle rates are hypothetical. The Bank will review its method for calculating these hurdle rates in future years (see Box 1 on page 11).
- (g) Corresponds to the same year as the minimum CET1 ratio over the stress scenario after 'strategic' management actions.
- (h) Corresponds to the same year as the minimum leverage ratio over the stress scenario after 'strategic' management actions.
- (i) This excludes CRD IV distribution restrictions. Where a bank is subject to such restrictions all non-business as usual cuts to distributions subject to CRD IV restrictions will appear in the next column — 'All 'strategic' management actions including CRD IV related restrictions. This should not be interpreted as a judgement by the Bank that any or all of such cuts are conditional on such restrictions.
- (j) Actuals for end-2017 are shown on the basis of 1 January 2018 in order to incorporate the implementation of IFRS 9.

## Barclays plc

Barclays is a retail, corporate and investment bank with trading operations, focused in the United Kingdom and United States. The results show that Barclays' capital position is above its CET1 ratio hurdle rate of 7.9% and Tier 1 leverage ratio hurdle rate of 3.61% in the hypothetical stress scenario with a low point of 8.9% CET1 ratio in 2019 and 3.9% leverage ratio in 2018 after 'strategic' management actions. **The PRC judged that this stress test did not reveal capital inadequacies for Barclays given its balance sheet at end-2017.**

On a non-transitional IFRS 9 basis, Barclays' capital position fell to a low point of 6.5% CET1 ratio in 2018 and a low point of 3.2% leverage ratio in 2018 after 'strategic' management actions. The contractual trigger in Barclays' AT1 capital references a 7% non-transitional CET1 ratio. Therefore, Barclays' AT1 capital converted into CET1, increasing the transitional and non-transitional low points to 11.0% and 8.8% respectively.

The scenario for the 2018 stress test included a synchronised global downturn and a traded risk shock in many of the economies where Barclays operates. Barclays' large UK and international credit card business, as well as its UK mortgage and personal loan book, meant it faced increases in impairments as a result of the global macroeconomic stress. IFRS 9 has resulted in impairments being realised earlier in the stress than under IAS 39, however the impact on capital is mitigated due to the application of IFRS 9 transitional arrangements. An increase in market and counterparty credit risk losses contributed further to the deterioration, though these recover in outer years. This is offset by an increase in net interest income over the stress and favourable sterling depreciation. The assessment includes stressed projections of misconduct costs. Up to the transitional CET1 low point, Barclays pays no dividends and is subject to CRD IV restrictions on distributions. The assessment also incorporates the impact of 'strategic' management actions that the PRC judged Barclays could realistically take in the stress scenario, including cost reductions.

The Interim Management Statement published on 24 October 2018 showed CET1 capital and Tier 1 leverage ratios of 13.2% and 4.9%, respectively. **The PRC did not require Barclays to submit a revised capital plan.**

**Table A4.D** Projected consolidated solvency ratios in the stress scenario

	Actual (end-2017) <sup>(i)</sup>	Minimum stressed ratio (before 'strategic' management actions or AT1 conversions)	Minimum stressed ratio after 'strategic' management actions and before conversion of AT1		Minimum stressed ratio (after the impact of 'strategic' management actions and conversion of AT1)	Hurdle rate	Actual (2018 Q3)	Submit revised capital plan?	
			Non-dividend 'strategic' management actions only <sup>(i)</sup>	All 'strategic' management actions including CRD IV related restrictions					
<b>IFRS 9 Transitional</b>									
Common equity Tier 1 ratio <sup>(a)(b)</sup>	14.6%	5.8%	6.4%	9.1%	9.1%	7.8%	14.3%	Not required	
Tier 1 capital ratio <sup>(c)</sup>	17.4%	7.7%(g)	8.5%(g)	11.1%(g)	11.1%(g)		17.3%		
Total capital ratio <sup>(d)</sup>	21.0%	10.0%(g)	11.0%(g)	13.6%(g)	13.6%(g)		20.7%		
Memo: risk-weighted assets (US\$ billions)	872	1,118(g)	1,039(g)	1,041(g)	1,041(g)		863		
Memo: CET1 (US\$ billions)	127	65(g)	67(g)	95(g)	95(g)		123		
Tier 1 leverage ratio <sup>(a)(e)</sup>	6.1%	3.9%	4.0%	4.6%	4.6%	3.75%	5.9%		
Memo: leverage exposure (US\$ billions)	2,346	2,284(h)	2,239(h)	2,241(h)	2,241(h)		2,448		
<b>IFRS 9 non-transitional</b>									
Common equity Tier 1 ratio <sup>(f)</sup>	14.5%	6.3%	6.7%	8.2%	8.2%	6.6%	14.2%		
Tier 1 leverage ratio <sup>(f)</sup>	6.1%	3.5%	3.6%	4.2%	4.2%	3.34%	5.9%		

Sources: Participating firms' published accounts and STDF data submissions, Bank analysis and calculations.

- (a) The low points for the common equity Tier 1 (CET1) ratio and leverage ratio shown in the table do not necessarily occur in the same year of the stress scenario and correspond to the year where the minimum stressed ratio is calculated after 'strategic' management actions and before AT1 conversion.
- (b) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets, where these are in line with CRR and the UK implementation of CRD IV via the PRA Rulebook.
- (c) Tier 1 capital ratio is defined as Tier 1 capital expressed as a percentage of RWAs where Tier 1 capital is defined as the sum of CET1 capital and additional Tier 1 capital in line with the UK implementation of CRD IV.
- (d) Total capital ratio is defined as total capital expressed as a percentage of RWAs where total capital is defined as the sum of Tier 1 capital and Tier 2 capital in line with the UK implementation of CRD IV.
- (e) The Tier 1 leverage ratio is Tier 1 capital expressed as a percentage of the leverage exposure measure excluding central bank reserves, in line with the PRA's Policy Statement PS21/17.
- (f) The low point year on a non-transitional IFRS 9 basis may differ to the low point year on a transitional IFRS 9 basis. Non-transitional IFRS 9 hurdle rates are hypothetical. The Bank will review its method for calculating these hurdle rates in future years (see Box 1 on page 11).
- (g) Corresponds to the same year as the minimum CET1 ratio over the stress scenario after 'strategic' management actions.
- (h) Corresponds to the same year as the minimum leverage ratio over the stress scenario after 'strategic' management actions.
- (i) This excludes CRD IV distribution restrictions. Where a bank is subject to such restrictions all non-business as usual cuts to distributions subject to CRD IV restrictions will appear in the next column — 'All 'strategic' management actions including CRD IV related restrictions. This should not be interpreted as a judgement by the Bank that any or all of such cuts are conditional on such restrictions.
- (j) Actuals for end-2017 are shown on the basis of 1 January 2018 in order to incorporate the implementation of IFRS 9.

## HSBC Holdings plc

HSBC is a global, universal bank. The results show that HSBC's capital position remains above its CET1 ratio hurdle rate of 7.8% and Tier 1 leverage ratio hurdle rate of 3.75% in the hypothetical stress scenario with a low point of 9.1% CET1 ratio in 2019 and 4.6% leverage ratio in 2018 after 'strategic' management actions. **The PRC judged that this stress test did not reveal capital inadequacies for HSBC given its balance sheet at end-2017.**

On a non-transitional IFRS 9 basis, HSBC's capital position fell to a low point of 8.2% CET1 ratio in 2018 and a low point of 4.2% leverage ratio in 2018 after 'strategic' management actions.

The scenario for the 2018 stress test included a synchronised global downturn and a traded risk shock in many of the economies where HSBC operates, including Asia, the United States, the United Kingdom and the euro area, as well as a generalised downturn in emerging markets, particularly severe among countries exposed to China and the United States. The CET1 ratio impact is higher as a result of higher RWAs and lower returns in comparison to the 2017 ACS. IFRS 9 has resulted in impairments being realised earlier in the stress than under IAS 39, however the impact on capital is mitigated due to the application of IFRS 9 transitional arrangements. The assessment includes stressed projections of misconduct costs. Up to the transitional CET1 low point, HSBC pays no ordinary dividends and is subject to CRD IV restrictions on distributions. The assessment also incorporates the impact of 'strategic' management actions that the PRC judged HSBC could realistically take in the stress scenario, including cost and asset reductions.

The Interim Management Statement published on 29 October 2018 showed CET1 capital and Tier 1 leverage ratios of 14.3% and 5.9%, respectively. **The PRC did not require HSBC to submit a revised capital plan.**

**Table A4.E** Projected consolidated solvency ratios in the stress scenario

	Actual (end-2017) <sup>(i)</sup>	Minimum stressed ratio <i>(before 'strategic' management actions or AT1 conversions)</i>	Minimum stressed ratio after 'strategic' management actions and before conversion of AT1		Minimum stressed ratio <i>(after the impact of 'strategic' management actions and conversion of AT1)</i>	Hurdle rate	Actual (2018 Q3)	Submit revised capital plan?	
			Non-dividend 'strategic' management actions only <sup>(i)</sup>	All 'strategic' management actions including CRD IV related restrictions					
<b>IFRS 9 Transitional</b>									
Common equity Tier 1 ratio <sup>(a)(b)</sup>	14.0%	6.3%	6.7%	9.3%	11.4%	8.5%	14.6%	Not required	
Tier 1 capital ratio <sup>(c)</sup>	17.2%	8.4% <sup>(g)</sup>	9.0% <sup>(g)</sup>	11.5% <sup>(g)</sup>	11.5% <sup>(g)</sup>		17.6%		
Total capital ratio <sup>(d)</sup>	21.2%	12.7% <sup>(g)</sup>	13.4% <sup>(g)</sup>	16.0% <sup>(g)</sup>	16.0% <sup>(g)</sup>		21.8%		
<i>Memo: risk-weighted assets (£ billions)</i>	211	255 <sup>(g)</sup>	244 <sup>(g)</sup>	245 <sup>(g)</sup>	245 <sup>(g)</sup>		207		
<i>Memo: CET1 (£ billions)</i>	30	16 <sup>(g)</sup>	16 <sup>(g)</sup>	23 <sup>(g)</sup>	28 <sup>(g)</sup>		30		
Tier 1 leverage ratio <sup>(a)(e)</sup>	5.3%	3.3%	3.5%	4.5%	4.5%	3.79%	5.3%		
<i>Memo: leverage exposure (£ billions)</i>	657	631 <sup>(h)</sup>	616 <sup>(h)</sup>	617 <sup>(h)</sup>	617 <sup>(h)</sup>		672		
<b>IFRS 9 non-transitional</b>									
Common equity Tier 1 ratio <sup>(f)</sup>	13.8%	3.5%	3.8%	6.4%	8.6%	6.9%	14.3%		
Tier 1 leverage ratio <sup>(f)</sup>	5.2%	2.3%	2.4%	3.4%	3.4%	3.25%	5.2%		

Sources: Participating firms' published accounts and STDF data submissions, Bank analysis and calculations.

- (a) The low points for the common equity Tier 1 (CET1) ratio and leverage ratio shown in the table do not necessarily occur in the same year of the stress scenario and correspond to the year where the minimum stressed ratio is calculated after 'strategic' management actions and before AT1 conversion.
- (b) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets, where these are in line with CRR and the UK implementation of CRD IV via the PRA Rulebook.
- (c) Tier 1 capital ratio is defined as Tier 1 capital expressed as a percentage of RWAs where Tier 1 capital is defined as the sum of CET1 capital and additional Tier 1 capital in line with the UK implementation of CRD IV.
- (d) Total capital ratio is defined as total capital expressed as a percentage of RWAs where total capital is defined as the sum of Tier 1 capital and Tier 2 capital in line with the UK implementation of CRD IV.
- (e) The Tier 1 leverage ratio is Tier 1 capital expressed as a percentage of the leverage exposure measure excluding central bank reserves, in line with the PRA's *Policy Statement PS21/17*.
- (f) The low point year on a non-transitional IFRS 9 basis may differ to the low point year on a transitional IFRS 9 basis. Non-transitional IFRS 9 hurdle rates are hypothetical. The Bank will review its method for calculating these hurdle rates in future years (see Box 1 on page 11).
- (g) Corresponds to the same year as the minimum CET1 ratio over the stress scenario after 'strategic' management actions.
- (h) Corresponds to the same year as the minimum leverage ratio over the stress scenario after 'strategic' management actions.
- (i) This excludes CRD IV distribution restrictions. Where a bank is subject to such restrictions all non-business as usual cuts to distributions subject to CRD IV restrictions will appear in the next column — 'All 'strategic' management actions including CRD IV related restrictions. This should not be interpreted as a judgement by the Bank that any or all of such cuts are conditional on such restrictions.
- (j) Actuals for end-2017 are shown on the basis of 1 January 2018 in order to incorporate the implementation of IFRS 9.

## Lloyds Banking Group plc

Lloyds Banking Group (LBG) is a retail and commercial bank with a small trading business operating primarily in the United Kingdom. The results show that LBG's capital position is above its CET1 ratio hurdle rate of 8.5% and Tier 1 leverage ratio hurdle rate of 3.79% in the hypothetical stress scenario with a low point of 9.3% CET1 ratio and 4.5% leverage ratio in 2019 after 'strategic' management actions. **The PRC judged that this stress test did not reveal capital inadequacies for Lloyds Banking Group given its balance sheet at end-2017.**

On a non-transitional IFRS 9 basis, LBG's capital position fell to a low point of 6.4% CET1 ratio in 2019 and a low point of 3.4% leverage ratio in 2019 after 'strategic' management actions. The contractual trigger in LBG's AT1 capital references a 7% non-transitional CET1 ratio. Therefore, LBG's AT1 capital was converted into CET1, increasing the transitional and non-transitional low points to 11.4% and 8.6% respectively.

LBG's largely UK-centric business model meant it faced increases in impairments and RWAs as a result of the UK macroeconomic stress, driven by higher interest rates, unemployment and house price falls. The impact of impairments was seen across all major portfolios. IFRS 9 has resulted in impairments being realised earlier in the stress than under IAS 39, however the impact on capital is mitigated due to the application of IFRS 9 transitional arrangements. RWAs on wholesale and retail secured lending also contributed to increased capital consumption. The assessment includes stressed projections of misconduct costs. Up to the transitional CET1 low point, LBG pays no ordinary dividends and is subject to CRD IV restrictions on distributions in 2019. The assessment also incorporates the impact of other 'strategic' management actions that the PRC judged LBG could realistically take in the stress scenario, including cost reductions.

The Interim Management Statement published on 25 October 2018 showed CET1 capital and Tier 1 leverage ratios of 14.6% and 5.3%, respectively. **The PRC did not require Lloyds Banking Group to submit a revised capital plan.**

**Table A4.F** Projected consolidated solvency ratios in the stress scenario

	Actual (end-2017) <sup>(i)</sup>	Minimum stressed ratio <i>(before 'strategic' management actions or AT1 conversions)</i>	Minimum stressed ratio after 'strategic' management actions and before conversion of AT1		Minimum stressed ratio <i>(after the impact of 'strategic' management actions and conversion of AT1)</i>	Hurdle rate	Actual (2018 Q3)	Submit revised capital plan?
			Non-dividend 'strategic' management actions only <sup>(i)</sup>	All 'strategic' management actions including CRD IV related restrictions				
<b>IFRS 9 Transitional</b>								
Common equity Tier 1 ratio <sup>(a)(b)</sup>	30.4%	13.3%	14.1%	14.1%	14.1%	7.9%	31.7%	Not required
Tier 1 capital ratio <sup>(c)</sup>	34.3%	15.1% <sup>(g)</sup>	15.8% <sup>(g)</sup>	15.8% <sup>(g)</sup>	15.8% <sup>(g)</sup>		35.5%	
Total capital ratio <sup>(d)</sup>	47.2%	19.0% <sup>(g)</sup>	19.8% <sup>(g)</sup>	19.8% <sup>(g)</sup>	19.8% <sup>(g)</sup>		44.9%	
<i>Memo: risk-weighted assets (£ billions)</i>	32	71 <sup>(g)</sup>	71 <sup>(g)</sup>	71 <sup>(g)</sup>	71 <sup>(g)</sup>		33	
<i>Memo: CET1 (£ billions)</i>	10	10 <sup>(g)</sup>	10 <sup>(g)</sup>	10 <sup>(g)</sup>	10 <sup>(g)</sup>		10	
Tier 1 leverage ratio <sup>(a)(e)</sup>	4.9%	4.8%	5.1%	5.1%	5.1%	3.60%	5.0%	
<i>Memo: leverage exposure (£ billions)</i>	222	217 <sup>(h)</sup>	217 <sup>(h)</sup>	217 <sup>(h)</sup>	217 <sup>(h)</sup>		228	
<b>IFRS 9 non-transitional</b>								
Common equity Tier 1 ratio <sup>(f)</sup>	30.3%	13.3%	14.1%	14.1%	14.1%	7.8%	31.5%	
Tier 1 leverage ratio <sup>(f)</sup>	4.9%	4.8%	5.1%	5.1%	5.1%	3.58%	5.0%	

Sources: Participating firms' published accounts and STDF data submissions, Bank analysis and calculations.

- (a) The low points for the common equity Tier 1 (CET1) ratio and leverage ratio shown in the table do not necessarily occur in the same year of the stress scenario and correspond to the year where the minimum stressed ratio is calculated after 'strategic' management actions and before AT1 conversion.
- (b) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets, where these are in line with CRR and the UK implementation of CRD IV via the PRA Rulebook.
- (c) Tier 1 capital ratio is defined as Tier 1 capital expressed as a percentage of RWAs where Tier 1 capital is defined as the sum of CET1 capital and additional Tier 1 capital in line with the UK implementation of CRD IV.
- (d) Total capital ratio is defined as total capital expressed as a percentage of RWAs where total capital is defined as the sum of Tier 1 capital and Tier 2 capital in line with the UK implementation of CRD IV.
- (e) The Tier 1 leverage ratio is Tier 1 capital expressed as a percentage of the leverage exposure measure excluding central bank reserves, in line with the PRA's Policy Statement PS21/17.
- (f) The low point year on a non-transitional IFRS 9 basis may differ to the low point year on a transitional IFRS 9 basis. Non-transitional IFRS 9 hurdle rates are hypothetical. The Bank will review its method for calculating these hurdle rates in future years (see Box 1 on page 11).
- (g) Corresponds to the same year as the minimum CET1 ratio over the stress scenario after 'strategic' management actions.
- (h) Corresponds to the same year as the minimum leverage ratio over the stress scenario after 'strategic' management actions.
- (i) This excludes CRD IV distribution restrictions. Where a bank is subject to such restrictions all non-business as usual cuts to distributions subject to CRD IV restrictions will appear in the next column — 'All 'strategic' management actions including CRD IV related restrictions. This should not be interpreted as a judgement by the Bank that any or all of such cuts are conditional on such restrictions.
- (j) Actuals for end-2017 are shown on the basis of 1 January 2018 in order to incorporate the implementation of IFRS 9.

## Nationwide Building Society

Nationwide is a UK building society. The results show that Nationwide's capital position remains above its CET1 ratio hurdle rate of 7.9% and Tier 1 leverage ratio hurdle rate of 3.60% in the hypothetical stress scenario with a low point of 14.1% CET1 ratio and 5.1% leverage ratio in 2019 after 'strategic' management actions. **The PRC judged that this stress test did not reveal capital inadequacies for Nationwide given its balance sheet at end-2017.**

IFRS 9 has minimal impact on Nationwide's capital position in the stress as regulatory 'Expected Losses' (ELs) remain in excess of provisions on most portfolios. IFRS 9 impacts earnings as provisions and impairments increase, but Nationwide remains profitable in each year of the stress, as it benefits from higher interest income from rising interest rates.

Nationwide's UK-centric business model meant it faced increases in impairments and RWAs as a result of the UK macroeconomic stress, driven by higher interest rates, unemployment and house price falls. The significant increase in risk weights on retail secured mortgages is largely due to Nationwide's use of a 'point in time' based modelling approach for these portfolios. The assessment includes stressed projections of misconduct costs. Nationwide continues to make annual distributions on its Core Capital Deferred Shares (CCDS) for 2018 and 2019 (the transitional CET1 low point) in the stress scenario. This assessment incorporates the impact of 'strategic' management actions that the PRC judged Nationwide could realistically take in the stress scenario, including cost reductions.

The Interim Management Statement published on 22 November 2018 showed CET1 capital and Tier 1 leverage ratios of 31.7% and 5.0%, respectively. **The PRC did not require Nationwide to submit a revised capital plan.**

# The Royal Bank of Scotland plc

**Table A4.G** Projected consolidated solvency ratios in the stress scenario

	Actual (end-2017) <sup>(i)</sup>	Minimum stressed ratio (before 'strategic' management actions or AT1 conversions)	Minimum stressed ratio after 'strategic' management actions and before conversion of AT1		Minimum stressed ratio (after the impact of 'strategic' management actions and conversion of AT1)	Hurdle rate	Actual (2018 Q3)	Submit revised capital plan?
			Non-dividend 'strategic' management actions only <sup>(i)</sup>	All 'strategic' management actions including CRD IV related restrictions				
<b>IFRS 9 Transitional</b>								
Common equity Tier 1 ratio <sup>(a)(b)</sup>	16.2%	9.6%	9.7%	9.7%	9.7%	7.3%	16.7%	Not required
Tier 1 capital ratio <sup>(c)</sup>	20.0%	12.1%(g)	12.1%(g)	12.1%(g)	12.1%(g)		20.6%	
Total capital ratio <sup>(d)</sup>	24.1%	15.3%(g)	15.4%(g)	15.4%(g)	15.4%(g)		24.7%	
<i>Memo</i> : risk-weighted assets (£ billions)	201	288(g)	288(g)	288(g)	288(g)		194	
<i>Memo</i> : CET1 (£ billions)	32	28(g)	28(g)	28(g)	28(g)		32	
Tier 1 leverage ratio <sup>(a)(e)</sup>	6.2%	5.1%	5.2%	5.2%	5.2%	3.59%	6.3%	
<i>Memo</i> : leverage exposure (£ billions)	588	590(h)	590(h)	590(h)	590(h)		580	
<b>IFRS 9 non-transitional</b>								
Common equity Tier 1 ratio <sup>(f)</sup>	16.2%	9.2%	9.2%	9.2%	9.2%	6.9%	16.7%	
Tier 1 leverage ratio <sup>(f)</sup>	6.2%	4.8%	4.8%	4.8%	4.8%	3.25%	6.3%	

Sources: Participating firms' published accounts and STDF data submissions, Bank analysis and calculations.

- (a) The low points for the common equity Tier 1 (CET1) ratio and leverage ratio shown in the table do not necessarily occur in the same year of the stress scenario and correspond to the year where the minimum stressed ratio is calculated after 'strategic' management actions and before AT1 conversion.
- (b) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets, where these are in line with CRR and the UK implementation of CRD IV via the PRA Rulebook.
- (c) Tier 1 capital ratio is defined as Tier 1 capital expressed as a percentage of RWAs where Tier 1 capital is defined as the sum of CET1 capital and additional Tier 1 capital in line with the UK implementation of CRD IV.
- (d) Total capital ratio is defined as total capital expressed as a percentage of RWAs where total capital is defined as the sum of Tier 1 capital and Tier 2 capital in line with the UK implementation of CRD IV.
- (e) The Tier 1 leverage ratio is Tier 1 capital expressed as a percentage of the leverage exposure measure excluding central bank reserves, in line with the PRA's Policy Statement PS21/17.
- (f) The low point year on a non-transitional IFRS 9 basis may differ to the low point year on a transitional IFRS 9 basis. Non-transitional IFRS 9 hurdle rates are hypothetical. The Bank will review its method for calculating these hurdle rates in future years (see Box 1 on page 11).
- (g) Corresponds to the same year as the minimum CET1 ratio over the stress scenario after 'strategic' management actions.
- (h) Corresponds to the same year as the minimum leverage ratio over the stress scenario after 'strategic' management actions.
- (i) This excludes CRD IV distribution restrictions. Where a bank is subject to such restrictions all non-business as usual cuts to distributions subject to CRD IV restrictions will appear in the next column — 'All 'strategic' management actions including CRD IV related restrictions. This should not be interpreted as a judgement by the Bank that any or all of such cuts are conditional on such restrictions.
- (j) Actuals for end-2017 are shown on the basis of 1 January 2018 in order to incorporate the implementation of IFRS 9.

## The Royal Bank of Scotland Group plc

The Royal Bank of Scotland Group (RBS) has retail, commercial and trading businesses predominantly in the United Kingdom. The results show that RBS's capital position remains above its CET1 ratio hurdle rate of 7.3% and its Tier 1 leverage ratio hurdle rate of 3.59% in the hypothetical stress scenario, with a low point of 9.7% CET1 ratio in 2019 and 5.2% leverage ratio in 2020 after 'strategic' management actions. **The PRC judged that this stress test did not reveal capital inadequacies for RBS given its balance sheet at end-2017.**

On a non-transitional IFRS 9 basis, RBS's capital position fell to a low point of 9.2% CET1 ratio in 2019 and a low point of 4.8% leverage ratio in 2018 after 'strategic' management actions.

RBS's largely UK-centric business model meant it faced increases in impairments and RWAs as a result of the UK macroeconomic stress, driven by higher interest rates, unemployment and house price falls. In the scenario, higher income from rising interest rates was offset by an increase in impairments relating to RBS's corporate and retail lending books. IFRS 9 has resulted in impairments being realised earlier in the stress than under IAS 39, however the impact on capital is mitigated due to the application of IFRS 9 transitional arrangements. Increased RWAs contributed to higher capital consumption in the scenario, particularly in RBS's secured retail and wholesale portfolios. This assessment also includes stressed projections of misconduct costs. Up to the transitional CET1 low point, RBS does not pay ordinary dividends, which is in line with its published dividend policy. The assessment incorporates the impact of 'strategic' management actions that the PRC judged RBS could realistically take in this stress scenario, including cost reductions. RBS's total 'strategic' management actions were lower in this year's test than in the 2017 ACS as RBS was not subject to CRD IV restrictions in this year's scenario.

The Interim Management Statement published on 26 October 2018 showed CET1 capital and Tier 1 leverage ratios of 16.7% and 6.3%, respectively. **The PRC did not require RBS to submit a revised capital plan.**

# Santander UK Group Holdings plc

**Table A4.H** Projected consolidated solvency ratios in the stress scenario

	Actual (end-2017) <sup>(i)</sup>	Minimum stressed ratio (before 'strategic' management actions or AT1 conversions)	Minimum stressed ratio after 'strategic' management actions and before conversion of AT1		Minimum stressed ratio (after the impact of 'strategic' management actions and conversion of AT1)	Hurdle rate	Actual (2018 Q3)	Submit revised capital plan?
			Non-dividend 'strategic' management actions only <sup>(i)</sup>	All 'strategic' management actions including CRD IV related restrictions				
<b>IFRS 9 Transitional</b>								
Common equity Tier 1 ratio <sup>(a)(b)</sup>	12.2%	10.8%	10.9%	10.9%	10.9%	7.5%	13.1%	Not required
Tier 1 capital ratio <sup>(c)</sup>	15.0%	13.6%(g)	13.8%(g)	13.8%(g)	13.8%(g)		16.1%	
Total capital ratio <sup>(d)</sup>	17.8%	17.1%(g)	17.2%(g)	17.2%(g)	17.2%(g)		18.9%	
Memo: risk-weighted assets (£ billions)	87	82(g)	82(g)	82(g)	82(g)		79	
Memo: CET1 (£ billions)	11	9(g)	9(g)	9(g)	9(g)		10	
Tier 1 leverage ratio <sup>(a)(e)</sup>	4.4%	3.9%	3.9%	3.9%	3.9%	3.26%	4.4%	
Memo: leverage exposure (£ billions)	287	273(h)	273(h)	273(h)	273(h)		279	
<b>IFRS 9 non-transitional</b>								
Common equity Tier 1 ratio <sup>(f)</sup>	12.1%	9.5%	9.7%	9.7%	9.7%	7.7%	13.1%	
Tier 1 leverage ratio <sup>(f)</sup>	4.4%	3.4%	3.4%	3.4%	3.4%	3.25%	4.4%	

Sources: Participating firms' published accounts and STDF data submissions, Bank analysis and calculations.

- (a) The low points for the common equity Tier 1 (CET1) ratio and leverage ratio shown in the table do not necessarily occur in the same year of the stress scenario and correspond to the year where the minimum stressed ratio is calculated after 'strategic' management actions and before AT1 conversion.
- (b) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets, where these are in line with CRR and the UK implementation of CRD IV via the PRA Rulebook.
- (c) Tier 1 capital ratio is defined as Tier 1 capital expressed as a percentage of RWAs where Tier 1 capital is defined as the sum of CET1 capital and additional Tier 1 capital in line with the UK implementation of CRD IV.
- (d) Total capital ratio is defined as total capital expressed as a percentage of RWAs where total capital is defined as the sum of Tier 1 capital and Tier 2 capital in line with the UK implementation of CRD IV.
- (e) The Tier 1 leverage ratio is Tier 1 capital expressed as a percentage of the leverage exposure measure excluding central bank reserves, in line with the PRA's Policy Statement PS21/17.
- (f) The low point year on a non-transitional IFRS 9 basis may differ to the low point year on a transitional IFRS 9 basis. Non-transitional IFRS 9 hurdle rates are hypothetical. The Bank will review its method for calculating these hurdle rates in future years (see Box 1 on page 11).
- (g) Corresponds to the same year as the minimum CET1 ratio over the stress scenario after 'strategic' management actions.
- (h) Corresponds to the same year as the minimum leverage ratio over the stress scenario after 'strategic' management actions.
- (i) This excludes CRD IV distribution restrictions. Where a bank is subject to such restrictions all non-business as usual cuts to distributions subject to CRD IV restrictions will appear in the next column — 'All 'strategic' management actions including CRD IV related restrictions. This should not be interpreted as a judgement by the Bank that any or all of such cuts are conditional on such restrictions.
- (j) Actuals for end-2017 are shown on the basis of 1 January 2018 in order to incorporate the implementation of IFRS 9.

## Santander UK Group Holdings plc

Santander UK Group Holdings Plc (Santander UK) is the UK subsidiary of Banco Santander S.A. and is a retail and commercial bank with a relatively small trading business. The results show that Santander UK's capital position remains above its CET1 ratio hurdle rate of 7.5% and Tier 1 leverage ratio hurdle rate of 3.26% in the hypothetical stress scenario with a low point of 10.9% CET1 ratio in 2018 and 3.9% leverage ratio in 2021 after 'strategic' management actions. **The PRC judged that this stress test did not reveal capital inadequacies for Santander UK given its balance sheet at end-2017.**

On a non-transitional IFRS 9 basis, Santander UK's capital position fell to a low point of 9.7% CET1 ratio in 2019 and a low point of 3.4% leverage ratio in 2019 after 'strategic' management actions.

Santander UK's UK-centric business model meant it faced increases in impairments as a result of the UK macroeconomic stress, driven by higher interest rates, unemployment and house price falls. Net interest income increases in the stress driven by higher interest rates. IFRS 9 has resulted in impairments being realised earlier in the stress than under IAS 39, however the impact on capital is mitigated due to the application of IFRS 9 transitional arrangements. This assessment includes stressed projections of misconduct costs. Up to the transitional CET1 low point, as well as in 2019, Santander UK does not pay ordinary dividends, which is in line with its published dividend policy. The assessment incorporates the impact of 'strategic' management actions that the PRC judged Santander UK could realistically take in the stress scenario, including cost reductions.

The Interim Management Statement published on 31 October 2018 showed CET1 capital and Tier 1 leverage ratios of 13.1% and 4.4%, respectively. **The PRC did not require Santander UK to submit a revised capital plan.**

# Standard Chartered plc

**Table A4.1** Projected consolidated solvency ratios in the stress scenario

	Actual (end-2017) <sup>(i)</sup>	Minimum stressed ratio (before 'strategic' management actions or AT1 conversions)	Minimum stressed ratio after 'strategic' management actions and before conversion of AT1		Minimum stressed ratio (after the impact of 'strategic' management actions and conversion of AT1)	Hurdle rate	Actual (2018 Q3)	Submit revised capital plan?	
			Non-dividend 'strategic' management actions only <sup>(i)</sup>	All 'strategic' management actions including CRD IV related restrictions					
<b>IFRS 9 Transitional</b>									
Common equity Tier 1 ratio <sup>(a)(b)</sup>	13.6%	7.1%	7.1%	7.9%	7.9%	6.7%	14.5%	Not required	
Tier 1 capital ratio <sup>(c)</sup>	16.0%	8.9%(g)	8.9%(g)	9.7%(g)	9.7%(g)		17.0%		
Total capital ratio <sup>(d)</sup>	21.0%	11.7%(g)	11.7%(g)	12.5%(g)	12.5%(g)		21.7%		
<i>Memo: risk-weighted assets (US\$ billions)</i>	280	369(g)	367(g)	367(g)	367(g)		265		
<i>Memo: CET1 (US\$ billions)</i>	38	26(g)	26(g)	29(g)	29(g)		38		
Tier 1 leverage ratio <sup>(a)(e)</sup>	6.0%	4.1%	4.3%	4.9%	4.9%	3.48%	5.8%		
<i>Memo: leverage exposure (US\$ billions)</i>	717	709(h)	709(h)	709(h)	709(h)		743		
<b>IFRS 9 non-transitional</b>									
Common equity Tier 1 ratio <sup>(f)</sup>	13.5%	6.8%	6.7%	7.5%	7.5%	6.4%	14.3%		
Tier 1 leverage ratio <sup>(f)</sup>	6.0%	4.4%	4.4%	4.6%	4.6%	3.25%	5.8%		

Sources: Participating firms' published accounts and STDF data submissions, Bank analysis and calculations.

- (a) The low points for the common equity Tier 1 (CET1) ratio and leverage ratio shown in the table do not necessarily occur in the same year of the stress scenario and correspond to the year where the minimum stressed ratio is calculated after 'strategic' management actions and before AT1 conversion.
- (b) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets, where these are in line with CRR and the UK implementation of CRD IV via the PRA Rulebook.
- (c) Tier 1 capital ratio is defined as Tier 1 capital expressed as a percentage of RWAs where Tier 1 capital is defined as the sum of CET1 capital and additional Tier 1 capital in line with the UK implementation of CRD IV.
- (d) Total capital ratio is defined as total capital expressed as a percentage of RWAs where total capital is defined as the sum of Tier 1 capital and Tier 2 capital in line with the UK implementation of CRD IV.
- (e) The Tier 1 leverage ratio is Tier 1 capital expressed as a percentage of the leverage exposure measure excluding central bank reserves, in line with the PRA's Policy Statement PS21/17.
- (f) The low point year on a non-transitional IFRS 9 basis may differ to the low point year on a transitional IFRS 9 basis. Non-transitional IFRS 9 hurdle rates are hypothetical. The Bank will review its method for calculating these hurdle rates in future years (see Box 1 on page 11).
- (g) Corresponds to the same year as the minimum CET1 ratio over the stress scenario after 'strategic' management actions.
- (h) Corresponds to the same year as the minimum leverage ratio over the stress scenario after 'strategic' management actions.
- (i) This excludes CRD IV distribution restrictions. Where a bank is subject to such restrictions all non-business as usual cuts to distributions subject to CRD IV restrictions will appear in the next column — 'All 'strategic' management actions including CRD IV related restrictions. This should not be interpreted as a judgement by the Bank that any or all of such cuts are conditional on such restrictions.
- (j) Actuals for end-2017 are shown on the basis of 1 January 2018 in order to incorporate the implementation of IFRS 9.

## Standard Chartered plc

Standard Chartered is a retail and commercial bank with a trading business, mainly operating in Asia, Africa and the Middle East. The results show that Standard Chartered's capital position remains above its CET1 ratio hurdle rate of 6.7% and Tier 1 leverage ratio hurdle rate of 3.48% in the hypothetical stress scenario with a low point of 7.9% CET1 ratio in 2019 and 4.9% leverage ratio in 2020 after 'strategic' management actions. **The PRC judged that this stress test did not reveal capital inadequacies for Standard Chartered given its balance sheet at end-2017.**

On a non-transitional IFRS 9 basis, Standard Chartered's capital position fell to a low point of 7.5% CET1 ratio in 2019 and a low point of 4.6% leverage ratio in 2018 after 'strategic' management actions.

The scenario for the 2018 stress test included a synchronised global downturn and traded risk shock in many of the economies where Standard Chartered operates, with a particularly severe impact on China, as well as a generalised downturn in emerging market economies. Balance sheet changes led to higher net interest income generation compared to the 2017 ACS. Aggregate loan impairments were a less material driver of stress in this year's scenario, reflecting continued improvements in credit quality, although IFRS 9 has resulted in impairments being realised earlier in the stress than under IAS 39. The impact on capital is mitigated due to the application of IFRS 9 transitional arrangements. The assessment includes stressed projections of misconduct costs. Up to the transitional CET1 low point, as well as the transitional leverage low point in 2020, Standard Chartered pays no ordinary dividends and is subject to CRD IV restrictions on distributions. The assessment incorporates the impact of 'strategic' management actions that the PRC judged Standard Chartered could realistically take in the stress scenario, including cost and asset reductions.

The Interim Management Statement published on 31 October 2018 showed CET1 capital and Tier 1 leverage ratios of 14.5% and 5.8%, respectively. **The PRC did not require Standard Chartered to submit a revised capital plan.**

## Annex 5: 2018 annual cyclical scenario: bank-specific projected impairment charges and traded risk losses

**Table A5.A** Projected cumulative five-year impairment charge rates on UK lending in the stress scenario <sup>(a)(b)</sup>

Per cent	Mortgage lending to Individuals	Non-mortgage lending to Individuals	Commercial real estate lending	Lending to businesses excluding commercial real estate
Barclays	0.9	35.9	6.7	9.2
HSBC	0.7	22.4	5.9	8.6
Lloyds Banking Group	3.4	27.0	7.2	9.4
Nationwide	1.1	27.4	6.0	–
The Royal Bank of Scotland Group	0.9	22.5	6.2	8.7
Santander UK	1.5	20.6	6.2	12.6
Standard Chartered	–	–	–	3.4

Sources: Participating Banks STDF Data Submissions, Bank analysis and calculations.

(a) Cumulative impairment charge rates = (five-year total impairment charge) / (average gross on balance sheet exposure), where the denominator is a simple average of 2017, 2018, 2019, 2020, 2021 year-end positions. The HSBC and Standard Chartered impairment charge rates are calculated by first converting each component to sterling using exchange rates consistent with the stress scenario.

(b) Portfolios with cumulative impairment charges of £0.0 billion (ie below £0.05 billion) is excluded.

**Table A5.B** Projected cumulative five-year impairment charges on UK lending in the stress scenario<sup>(a)(b)</sup>

£ billions	Mortgage lending to Individuals	Non-mortgage lending to Individuals	Commercial real estate lending	Lending to businesses excluding commercial real estate
Barclays	1.2	10.3	0.2	4.0
HSBC	0.7	3.0	0.6	6.7
Lloyds Banking Group	9.4	9.7	1.1	4.3
Nationwide	1.9	1.1	0.1	–
The Royal Bank of Scotland Group	1.4	3.0	0.6	5.4
Santander UK	2.3	2.4	0.5	1.7
Standard Chartered	–	–	–	0.1

Sources: Participating Banks STDF Data Submissions, Bank analysis and calculations.

(a) Cumulative impairment charge rates = (five-year total impairment charge) / (average gross on balance sheet exposure), where the denominator is a simple average of 2017, 2018, 2019, 2020, 2021 year-end positions. The HSBC and Standard Chartered impairment charge rates are calculated by first converting each component to sterling using exchange rates consistent with the stress scenario.

(b) Portfolios with cumulative impairment charges of £0.0 billion (ie below £0.05 billion) is excluded.

**Table A5.C** Projected cumulative five-year impairment charge rates in the stress scenario<sup>(a)(b)(c)</sup>

Per cent

	Lending to individuals					Lending to businesses				
	United Kingdom	Hong Kong and China	United States	Euro area	Rest of world	United Kingdom	Hong Kong and China	United States	Euro area	Rest of world
Barclays	6.7	–	32.1	8.0	–	9.0	–	9.6	6.9	10.8
HSBC	3.2	4.9	5.7	1.2	9.4	8.3	6.1	6.8	3.3	5.0
Lloyds Banking Group	6.1	–	–	4.7	3.0	8.9	–	4.6	4.1	2.8
Nationwide	1.6	–	–	–	–	5.7	–	–	–	–
The Royal Bank of Scotland	2.6	–	–	4.3	–	8.4	–	7.3	7.1	6.6
Santander UK	2.8	–	–	–	–	10.3	–	–	–	–
Standard Chartered	–	4.1	–	–	5.1	3.2	8.1	2.2	4.6	6.5

Sources: Participating Banks STDF Data Submissions, Bank analysis and calculations.

(a) Cumulative impairment charge rates = (five-year total impairment charge) / (average gross on balance sheet exposure), where the denominator is a simple average of 2017, 2018, 2019, 2020, 2021 year-end positions. The HSBC and Standard Chartered impairment charge rates are calculated by first converting each component to sterling using exchange rates consistent with the stress scenario.

(b) Portfolios with cumulative impairment charges of £0.0 billion (ie below £0.05 billion) is excluded.

(c) Data exclude material associates.

**Table A5.D** Projected cumulative five-year impairment charges in the stress scenario<sup>(a)(b)(c)</sup>

£ billions

	Lending to individuals					Lending to businesses				
	United Kingdom	Hong Kong and China	United States	Euro area	Rest of world	United Kingdom	Hong Kong and China	United States	Euro area	Rest of world
Barclays	11.5	–	8.6	1.1	–	4.3	–	1.7	0.3	0.4
HSBC	3.7	4.8	1.2	0.3	7.6	7.3	11.1	4.2	2.0	8.5
Lloyds Banking Group	19.1	–	–	0.7	0.1	5.3	–	0.2	0.1	0.1
Nationwide	3.0	–	–	–	–	0.1	–	–	–	–
The Royal Bank of Scotland	4.4	–	–	0.8	–	5.9	–	0.1	0.8	0.7
Santander UK	4.7	–	–	–	–	2.2	–	–	–	–
Standard Chartered	–	1.5	–	–	3.3	0.1	2.0	0.1	0.2	5.0

Sources: Participating Banks STDF Data Submissions, Bank analysis and calculations.

(a) Cumulative impairment charge rates = (five-year total impairment charge) / (average gross on balance sheet exposure), where the denominator is a simple average of 2017, 2018, 2019, 2020, 2021 year-end positions. The HSBC and Standard Chartered impairment charge rates are calculated by first converting each component to sterling using exchange rates consistent with the stress scenario.

(b) Portfolios with cumulative impairment charges of £0.0 billion (ie below £0.05 billion) is excluded.

(c) Data exclude material associates.

**Table A5.E** Projected traded risk losses in 2018 of the stress scenario<sup>(a)(b)(c)</sup>

£ billions

Barclays	6.5
HSBC	12.4
Lloyds Banking Group	2.1
The Royal Bank of Scotland Group	1.5
Santander UK	0.6
Standard Chartered	4.2

Sources: Participating Banks STDF Data Submissions, Bank analysis and calculations.

(a) Traded risk losses include: market risk losses; counterparty credit risk losses, losses arising from changes in banks' credit and fair value adjustments; prudential value adjustment; gain/losses from fair value through other comprehensive income items and fair value options; excluding securitisation positions. They exclude banking revenues and costs.

(b) Nationwide is excluded as it has minimal traded risk exposures.

(c) Losses for HSBC and SCB are converted to sterling using exchange rates consistent with the annual cyclical scenario for comparability with other banks.

# Glossary and other information

## Glossary of selected data and instruments

**CDS** – credit default swap.  
**GDP** – gross domestic product.  
**HPI** – house price index.  
**Libor** – London interbank offered rate.  
**MBS** – mortgage-backed security.  
**OIS** – overnight index swap.  
**RPI** – retail prices index.  
**SOFR** – secured overnight financing rate.  
**SONIA** – sterling overnight index average.  
**STDF** – stress testing data framework.

## Abbreviations

**ACS** – annual cyclical scenario.  
**AT1** – additional Tier 1.  
**BCBS** – Basel Committee on Banking Supervision.  
**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.  
**CLO** – collateralised loan obligation.  
**CME** – Chicago Mercantile Exchange.  
**CPMI** – Committee on Payments and Market Infrastructures.  
**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.  
**EME** – emerging market economy.  
**ESMA** – European Securities and Markets Authority.  
**ETF** – exchange-traded fund.  
**EU** – European Union.  
**FCA** – Financial Conduct Authority.  
**FDI** – foreign direct investment.  
**FISIM** – financial intermediation services indirectly measured.  
**FPC** – Financial Policy Committee.  
**FSB** – Financial Stability Board.  
**G7** – Canada, France, Germany, Italy, Japan, the United Kingdom and the United States.  
**GNE** – gross notional exposure.  
**HMRC** – Her Majesty’s Revenue and Customs.  
**ICE** – Intercontinental Exchange.

**ICE/BofAML** – Intercontinental Exchange/Bank of America Merrill Lynch.  
**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.  
**LDI** – liability driven investment.  
**LTI** – loan to income.  
**LTV** – loan to value.  
**M&A** – mergers & acquisitions.  
**MCOB** – Mortgages and Home Finance: Conduct of Business sourcebook.  
**MFI** – monetary financial institution.  
**MiFID** – Markets in Financial Instruments Directive.  
**MPC** – Monetary Policy Committee.  
**MSCI** – Morgan Stanley Capital International Inc.  
**NBFI** – non-bank financial institution.  
**NPISH** – non-profit institutions serving households.  
**NPL** – non-performing loan.  
**OECD** – Organisation for Economic Co-operation and Development.  
**OEIF** – open-ended investment fund.  
**ONS** – Office for National Statistics.  
**OTC** – over the counter.  
**PNFC** – private non-financial corporation.  
**PRA** – Prudential Regulation Authority.  
**PRC** – Prudential Regulation Committee.  
**P2P** – peer to peer.  
**RBS** – Royal Bank of Scotland.  
**RWA** – risk-weighted asset.  
**SIV** – structured investment vehicle.  
**SME** – small and medium-sized enterprise.  
**SRB** – systemic risk buffer.  
**S&P** – Standard & Poor’s.  
**TMTP** – transitional measures on technical provisions.  
**TPR** – The Pensions Regulator.  
**TR** – trade repository.  
**UCITS** – undertakings for collective investment in transferable securities.  
**WEO** – IMF *World Economic Outlook*.  
**WTO** – World Trade Organisation.