Financial Stability Report


November 2016
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 objective for maintaining financial stability. 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 current main risks to 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
Nemat Shafik, 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
Martin Taylor
Charles Roxburgh attends as the Treasury member in a non-voting capacity.

This document was delivered to the printers on 29 November 2016 and, unless otherwise stated, uses data available as at 18 November 2016. This page was revised on 11 April 2018.

The Financial Stability Report is available in PDF at www.bankofengland.co.uk.
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Executive summary

Since the UK referendum on membership of the European Union, UK financial stability has been maintained through a challenging period of uncertainty around the domestic and global economic outlook. Substantial moves in financial market prices have not been amplified by the UK financial system.

• Over the period, there have been significant movements in UK asset prices, including a marked fall in the sterling exchange rate index of around 12%, falling commercial real estate (CRE) prices, falls in real government bond yields and a rise in market measures of inflation expectations.

• More recently, global asset prices have reacted sharply following the US election. US ten-year government bond yields have increased by around 50 basis points, the US dollar exchange rate index has appreciated by almost 4%, and equity prices in emerging market economies (EMEs) have fallen by 6%.

• Core financial markets have functioned effectively throughout the period, despite spikes in uncertainty and risk aversion, and with trading volumes at many multiples of normal levels at times. In the United Kingdom, bank funding costs remain significantly lower than during episodes of severe stress and credit conditions have not tightened.

• The ability of the UK financial system to accommodate these changes, rather than amplify their effect on the real economy, reflects the resilience of the system that has been built consistently over recent years.

The outlook for UK financial stability remains challenging. The UK economy has entered a period of adjustment following the EU referendum. The likelihood that some UK-specific risks to financial stability could materialise remains elevated.

• It will take time to clarify the United Kingdom’s new relationships with the European Union and the rest of the world as well as for the UK economy to adjust to these changes. The nature of, and path to, these new relationships will be the subject of forthcoming negotiations between the UK Government and the European Union. The orderliness of the adjustment will influence the risk to financial stability.

• Indicators of UK economic activity and business sentiment have recovered from their low points immediately following the EU referendum and are materially stronger than had been expected in July. Nevertheless, the economic outlook remains weaker than in the first half of the year.

• In the UK commercial real estate market, activity slowed further in 2016 Q3 (Chart A) and prices have fallen by 2.6% since the referendum. Despite signs of stabilisation more recently, there is a risk of further adjustment given the reliance of the market in recent years on inflows of foreign capital and, in some segments, stretched valuations. Further price falls could reduce companies’ access to finance, given the use of CRE as collateral.

Chart A  UK CRE transactions fell further in 2016 Q3
UK CRE transactions (gross quarterly flows)[(a)]

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UK CRE transactions (gross quarterly flows)[(a)] |
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<td><img src="chart.png" alt="Chart Image" /></td>
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Sources: The Property Archive and Bank calculations.

(a) Final data points are the sum of three months to October 2016.

• The United Kingdom’s large current account deficit (Chart B) is vulnerable to a reduction in foreign investor appetite for UK assets. This could be triggered by global factors, such as a reduction in international capital flows, or by UK-specific factors, such as perceptions of weaker long-run UK growth prospects. These would necessitate a sharper-than-expected narrowing of the current account.

• UK banks have materially reduced their reliance on short-term overseas borrowing, and the depreciation of sterling acts to improve the United Kingdom’s net foreign asset position. But a sharp adjustment in the current account could test financial stability indirectly through its impact on the real economy. It would be associated with
The level of UK household indebtedness remains high, with further depreciation of sterling, worsening the trade-off between growth and inflation.

- The 12% reduction in the sterling exchange rate since the referendum seems to reflect perceptions that the United Kingdom’s future trading arrangements will be less open for a period, requiring a lower real exchange rate to maintain competitiveness. There has not to date been any material change to the United Kingdom’s ability to finance its current account deficit, though there have been some indications of reduced investor appetite for CRE and equities.

- The level of UK household indebtedness remains high (Chart C), and the ability of some households to service their debts could be challenged by a period of higher unemployment. These households could affect broader economic activity by cutting back sharply on expenditure in order to service their debts.

- Following a review, the Financial Policy Committee (FPC) has agreed to maintain the Recommendations it made in June 2014 to insure against the risk of a marked loosening in underwriting standards in the owner-occupier mortgage market and a significant increase in the number of highly indebted households.

Vulnerabilities stemming from the global environment and financial markets, which were already elevated, have increased further since July.

- Following the US election, expectations of expansionary fiscal policy in the United States have helped push up advanced economy sovereign bond yields. Despite this, term premia on advanced economy bonds are still low (Chart D), suggesting that the risk of a sharp adjustment in fixed-income markets remains.

- Increases in sovereign bond yields, coupled with risks of reduced global trade, have reinforced the vulnerabilities associated with those EMEs with high levels of debt.

- China has a particularly high ratio of non-financial sector debt to GDP, estimated at around 260% (Chart E). Growth is increasingly reliant on rapid credit expansion, currently at around twice the rate of nominal GDP growth. Estimated net capital outflows picked up to near-record levels in 2016 Q3, and the renminbi has depreciated by 3% against the US dollar since the July Report.
• In some euro-area economies, sovereign debt positions remain vulnerable to a further rise in the cost of borrowing for governments or a weakening in growth prospects, perhaps associated with a reduction in global trade. Uncertainty is further heightened over the coming months by the forthcoming Italian referendum and a number of elections in the euro area.

• Challenges also remain to the resilience of the euro-area banking system. Price to book ratios are very low, including in Italy, where non-performing loan rates are high relative to provisions. Uncertainty about potential fines for past misconduct and concerns about the longer-term viability of business models are also weighing heavily on the valuations of some banks across the continent.

• Additional risks from the euro area could emerge as a consequence of the United Kingdom’s withdrawal from the European Union. Firms incorporated in the United Kingdom are estimated to be involved in over half of debt and equity issuance by EU (excluding UK) borrowers. UK firms also facilitate access to hedging instruments. Within the European Union, for example, over three-quarters of foreign exchange and over-the-counter interest rate derivatives trading takes place in the United Kingdom. Changes to the trading relationship between the United Kingdom and the European Union may require firms to alter their operations and the services they provide. If any such adjustments take place in a short timeframe, there could be a greater risk of disruption to services provided to the European real economy, which could spill back to the UK economy through trade and financial linkages.

Financial stability depends on the resilience of the system to risks. The UK banking system is capitalised to sustain the provision of financial services, including the supply of credit, to severe stresses such as those that could face the United Kingdom and global economies.

• Previous stress tests of major UK banks have tested their resilience to a range of risks, including a snap back of interest rates, sharp adjustment in UK property markets, and severe stress in the euro area and in China and emerging markets. The Bank’s 2016 stress test comprised a severe, synchronised UK and global recession with associated shocks to financial market prices. It also incorporated a misconduct cost stress. The FPC judges that, as a consequence of the stress test, the UK banking system is in aggregate capitalised to support the real economy in this scenario.

• UK banks have built up capital resources since the global financial crisis. The aggregate common equity Tier 1 capital of major UK banks was 13.5% of risk-weighted assets in September 2016 (Chart F).

- Chart F UK banks have built their capital resilience over time

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

(a) Major UK banks’ common equity Tier 1 capital as a percentage of their risk-weighted assets. Major UK banks are Banco Santander, Bank of Ireland, Barclays, Co-operative Banking Group, HSBC, LBC, National Australia Bank, Nationwide, RBS and Virgin Money. Data exclude Northern Rock/Virgin Money from 2008. (b) Between 2006 and 2011, the chart shows core Tier 1 ratios as published by banks, excluding hybrid capital instruments and making deductions from capital based on FSA definitions. Prior to 2008 that measure was not typically disclosed; the chart shows Bank calculations approximating it as previously published in the Report. (c) Weighted by risk-weighted assets. (d) From 2013, the ‘Basel III common equity Tier 1 capital ratio’ is calculated as CET1 capital over risk-weighted assets, according to the CRD IV definition as implemented in the United Kingdom. The Basel III peer group includes Barclays, Co-operative Banking Group, HSBC, LBC, Nationwide, RBS and Santander UK.

- In July, the FPC reduced the countercyclical buffer rate (CCyB) on banks’ UK exposures from 0.5% to 0%. The FPC has agreed to maintain the UK CCyB rate at 0% and reaffirms that it expects, absent any material change in the outlook, to maintain this rate until at least June 2017.
• Reducing the UK CCyB rate was a response to greater uncertainty around the UK economic outlook and an increased possibility that material domestic risks could crystallise in the near term. The FPC was concerned that banks could respond to these developments by hoarding capital and restricting lending. That position has not changed. The availability of banks’ capital resources, and their use to absorb shocks if risks materialise, insures against a tightening of bank credit conditions.

• The reduction of the UK CCyB rate is intended to reinforce the FPC’s expectation that all elements of capital and liquidity buffers are able to be drawn on, as necessary, to maintain the provision of services to the real economy. Consistent with this, the FPC supports the expectation of the Prudential Regulation Authority (PRA) Board that firms do not increase dividends and other distributions as a result of this action.

The FPC remains focused on the ability of the UK banking system to maintain this resilience in future.

• Some major UK banks continue to face the challenge of weak profitability (Chart G), which is reflected in market valuations of their equity. Weak profitability diminishes banks’ future ability to rebuild capital following a shock while also maintaining credit supply. The Bank will run an ‘exploratory’ scenario alongside the 2017 annual cyclical scenario to assess the impact on the UK banking sector of weak global supply growth, persistently low interest rates, and a continuation of declines in both world trade relative to GDP and cross-border banking activity.

Chart G  UK banks’ profitability remains low
UK banks’ statutory and underlying return on equity (RoE)\(\text{a}\)\(\text{b}\)\(\text{c}\)

<table>
<thead>
<tr>
<th>Year</th>
<th>Statutory RoE</th>
<th>Underlying RoE</th>
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<tbody>
<tr>
<td>2005</td>
<td>10</td>
<td>15</td>
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<tr>
<td>2006</td>
<td>9</td>
<td>14</td>
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<td>2007</td>
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<td>2008</td>
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<td>2011</td>
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<td>6</td>
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<tr>
<td>2015</td>
<td>0</td>
<td>5</td>
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</table>

Sources: Published accounts and Bank calculations.

• Changes to financial firms’ business models and structures as the United Kingdom withdraws from the European Union could have implications for the resilience of the financial system in the United Kingdom and more broadly. The FPC is working with supervisors to assess these implications as firms begin to plan for the United Kingdom’s new relationship with the European Union. Possible implications include disruption of services, particularly if any adjustment cannot be made smoothly, a further weakening of investment banking profitability and the potential for greater complexity in firms’ legal structures — which could place greater demands on firms’ risk management and on supervisory oversight, and pose challenges for effective resolution.

• Cyber and technology-enabled attacks continue to be a serious threat to the resilience of the UK financial system. High-profile incidents in 2016 have raised awareness of the importance for institutions of ensuring that they have appropriate controls and measures in place to counter fraud. In response to the recent incident at Tesco Bank, the UK authorities activated a contingency plan, as part of the Authorities’ Response Framework, to share intelligence across firms, allowing other institutions to review their own resilience to such threats.

• Following FPC Recommendations, important progress is being made in building cyber resilience in the UK financial sector. The FPC has reviewed this progress against its Recommendations and will consider next steps in 2017 Q1.

Recent market developments further highlight the importance of the resilience of markets, and of market-based finance, to sharp market moves. The resilience of market liquidity remains uneven.

• On 7 October, sterling depreciated by around 9% against the US dollar in less than 40 seconds, before quickly retracing much of the move. As with other recent episodes, this ‘flash event’ proved to be short-lived and without immediate consequences for financial stability. Nevertheless, such disruptions underscore the concern that liquidity in some markets may have become more fragile in recent years. The FPC, drawing on the work of the Bank for International Settlements Markets Committee, will seek to examine the potential implications of these developments for financial stability.

• Market liquidity could also be challenged during a period of adjustment related to the United Kingdom’s new relationship with the European Union. Any change in arrangements could have implications for levels of activity in exchanges and other trading venues. It could also affect the level of market-making activity by intermediaries as they adjust business structures. The FPC continues to assess these risks.
• The Bank is developing a system-wide stress simulation to assess the dynamics of markets under stress. It will include an analysis of the behaviour of various sectors — such as open-ended investment funds, insurance companies and dealers. That exercise will identify any material gaps in the data needed to assess risks.

• Relatedly, the FPC has assessed procyclicality in insurers’ investment activities. The current design of the ‘risk margin’ element of Solvency II rules could, in future, encourage procyclical investment behaviour. It should be addressed, including through the forthcoming review of Solvency II by the European Commission. Such incentives should also be avoided in the International Capital Standards for insurers, which are being developed by the International Association of Insurance Supervisors.

• The FPC has further concluded that unit-linked insurance products share some economic similarities with open-ended investment funds, with investors able to switch between funds at short notice. There is tentative evidence that this flexibility could lead to procyclical investment behaviour, particularly during times of stress. The Bank will include unit-linked funds in its system-wide stress simulation.

• The FPC has asked the Bank to complete an in-depth assessment of the financial stability risks associated with derivative transactions. This will examine progress towards implementation of the post-crisis reforms in derivatives markets and consider the implications for the resilience of the financial system. This will also contribute to a broader review by the Financial Stability Board.

The FPC remains committed to robust prudential standards in the UK financial system.

• The United Kingdom’s position as the leading internationally active financial centre, with a financial system that is, by asset size, around ten times GDP, means that the FPC’s statutory responsibility of protecting and enhancing the resilience of the UK financial system is particularly important for both the domestic and global economies.

• Irrespective of the particular form of the United Kingdom’s future relationship with the European Union, and consistent with its statutory responsibility, the FPC will remain committed to the implementation of robust prudential standards in the UK financial system. This will require a level of resilience to be maintained that is at least as great as that currently planned, which itself exceeds that required by international baseline standards.

• The FPC will need to ensure that the regulatory framework continues to evolve alongside international standards and the risk environment. It notes the importance to achieving its statutory objectives of having the macroprudential flexibility to align the resilience of the financial system to the risks it faces.

Part A of this Report sets out in detail the Committee’s analysis of the major risks and action it is taking in the light of those risks. Part B summarises the Committee’s analysis of the resilience of the financial system.
Risks associated with the global environment remain elevated. Following the US election, increases in advanced economy sovereign bond yields, coupled with risks of reduced global trade, have reinforced vulnerabilities associated with those emerging market economies with high levels of debt. China has a particularly high ratio of non-financial sector debt to GDP and growth is increasingly reliant on rapid credit expansion. Estimated net capital outflows from China picked up to near-record levels in 2016 Q3, and the renminbi has depreciated by 3% against the US dollar since the July Report. In some euro-area economies, sovereign debt positions remain vulnerable to a further rise in the cost of borrowing for governments or a weakening in growth prospects, perhaps associated with a reduction in global trade. Uncertainty is further heightened over the coming months by the forthcoming Italian referendum and a number of elections in the euro area. Challenges also remain to the resilience of the euro-area banking system. Reflecting these risks, the 2016 stress test of major UK banks incorporated a very severe global downturn.

The US election has reinforced existing vulnerabilities... Following the US election, there have been significant changes in global asset prices. Expectations of expansionary US fiscal policy have contributed to an increase in advanced economy sovereign yields, reversing much or all of their falls observed earlier in the year (see Financial market fragility chapter). The US dollar has appreciated by 4% since 8 November, and 6% since the July Report. The rise in advanced economy sovereign yields, coupled with risks of reduced global trade, has reinforced the vulnerabilities associated with those emerging market economies (EMEs) with high levels of debt. Since the US election, emerging market currencies have depreciated by 3% on average, and equity prices have fallen by 6%, largely reversing rising valuations that had occurred, supported by a strong period of capital inflows since July (Chart A.1).

These market developments have occurred against a backdrop of an already subdued outlook for EME economic growth. In the IMF’s October 2016 World Economic Outlook (WEO), EME growth was expected to remain weak in 2016, at just 4.2%, down from an average of 5.4% from 2010–15.

...and vulnerabilities in China continue to increase... Financial market volatility in China has fallen since the start of 2016, following a series of government stimulus measures which reduced concerns over China’s near-term prospects.

However, domestic vulnerabilities have continued to build as China’s growth has become increasingly reliant on rapid

### Chart A.1 Risk appetite for emerging market assets has fallen

IIF total portfolio inflows to EMEs estimate and equity and currency indices

<table>
<thead>
<tr>
<th>IIF total portfolio inflows to EM Es estimate (left-hand scale)</th>
<th>Emerging market equity $ index (right-hand scale)</th>
<th>Emerging market currency index (right-hand scale)</th>
</tr>
</thead>
</table>

Sources: Bloomberg, JPMorgan, MSCI, Institute of International Finance (IIF) and Bank calculations.

(a) IIF emerging market portfolio inflows estimate available to end-October.
(b) Equity index is MSCI Emerging Market Index (US$). The MSCI Inc. disclaimer of liability, which applies to the data provided, is available at www.bankofengland.co.uk/publications/Documents/fsr/2016/fsr16nov1.xlsx.
(c) Currency index is JPMorgan Emerging Markets Currency Index.
Credit expansion. Since the global financial crisis, non-financial sector debt has risen by around 100 percentage points relative to GDP. It now has a particularly high ratio of non-financial sector debt to GDP, estimated to be around 260% (Chart A.2).

Total social financing, a broad measure of private sector credit provision, grew at an annual rate of around 16% in Q3.(1) This is around twice the rate of nominal GDP growth. In the household sector, increases in mortgage lending have been associated with a rapid rise in property prices over the past year, particularly in some major cities (Chart A.3). But the level of household debt remains relatively low, at around 40% of GDP in Q2, compared to 170% in the corporate sector. The 2016 stress test incorporated a 35% fall in Chinese residential property prices.

China remains vulnerable to external shocks; net capital outflows are estimated by the IIF to have risen to around US$207 billion in Q3, close to the US$226 billion record outflow that occurred in 2015 Q3 following the surprise August depreciation of the renminbi and sharp falls in the Shanghai composite equity index. Since the July Report, the renminbi has fallen against the US dollar by 3%.

...while emerging market economies more generally are vulnerable to a further reduction in risk appetite.

In contrast to China, credit growth in other emerging market and Asian economies appears to have moderated. Private sector credit to GDP gaps generally declined in the year to Q1, although these remain elevated in several economies (Chart A.4).

Some economies remain at risk of a further reduction in appetite for EME assets and a disorderly episode of deleveraging. Emerging market governments with large domestic and external vulnerabilities may face particular difficulty refinancing debt, particularly those that have been downgraded to ‘junk’ status, such as Brazil and Turkey, or are one to two notches above a sub-investment grade rating, such as South Africa. In these countries, government financing costs have already increased on average by 70 basis points since the US election. Many of the most vulnerable economies also have strong trade linkages to China. Around 20% of Brazilian goods exports and nearly 10% of South African goods exports are to China.

The FPC judges that risks associated with China, Hong Kong and emerging markets remain elevated. UK banks’ exposures to these economies account for around 20% of their total assets. The FPC incorporated a very severe EME shock in its 2016 stress scenario: global GDP growth troughs at -1.9%, as

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(1) After adjusting for the statistical effect of replacing local government borrowing through financing vehicles with the issuance of municipal bonds.
it did during the 2008 global financial crisis, with growth in China and Hong Kong particularly adversely affected. Emerging market currencies depreciate against the US dollar, and commodity and other asset prices fall sharply, putting renewed pressure on commodity producers. UK banks’ impairments on real economy lending in China and Hong Kong reaches £12 billion in this scenario. The UK banking system was shown to be capitalised to support the real economy in this scenario, even if synchronised with a UK slowdown and an independent stress of misconduct costs.

**Sovereign debt positions remain vulnerable to rising bond yields.**

In advanced economies, private sector debt has declined relative to GDP since the crisis. However, sovereign debt has increased, and is expected to reach around 75% of GDP on average in 2016, compared to 50% pre-crisis (Chart A.5).

At the same time, on average, the differential between the real effective interest rate on government debt, and the growth rate of the economy, is expected to remain largely unchanged, as weaker growth is offset by lower interest rates. This differential is important as it drives the rate of increase of the ratio of debt to GDP for a given budget position and stock of debt. While the differential is expected to remain close to pre-crisis averages, higher average levels of debt will require relatively lower fiscal deficits (or larger surpluses) to stabilise debt positions. Several advanced economies, particularly Italy and Portugal, face both a large, positive differential and high debt stocks.

Debt positions remain vulnerable to a further rise in government borrowing costs or a weakening in growth prospects, perhaps associated with a reduction in global trade. For example, government yields in Italy and Portugal rose sharply following the US election, though currently remain well below levels observed in 2011–13, when previous concerns over debt sustainability surfaced (Chart A.6). There is also a risk that the Italian constitutional referendum and a number of forthcoming general elections could increase uncertainty and put further upwards pressure on bond yields.

UK banks’ ownership of government debt issued by vulnerable European periphery economies is relatively small, at around 0.1% of total assets. But rising sovereign bond yields in the euro area more generally would spill over to bank and real economy funding costs and to domestic demand. UK banks’ exposures to the euro area as a whole are large, at around 10% of assets. There are also strong economic links between the United Kingdom and the euro area, which accounts for two fifths of the United Kingdom’s trade and more than one third of UK foreign direct investment.
Bank equity prices in Europe remain low.
Bank equity prices in Europe have staged a partial recovery since the July Report. However, price to book ratios remain significantly lower on average than in 2015, particularly in Germany and Italy (Chart A.7).

In some cases, this could reflect concerns over asset quality and perceptions of non-performing loans yet to be provisioned for. In Italy, for example, non-performing loans exceed total provisions and common equity Tier 1 (CET1). Uncertainty about potential fines for past misconduct and concerns about the longer-term viability of business models are also weighing heavily on the valuations of some banks across the continent.

The recent recovery in bank equity prices could reflect a steeper yield curve and expectations of less onerous regulatory requirements following the US election. However, there are some exceptions: bank equity prices in Italy have fallen, possibly reflecting heightened political uncertainty, while large emerging market exposures appear to have weighed on Spanish bank valuations.

Euro-area banks’ CET1 ratios are significantly higher than before the crisis. But continued weak profitability could impair euro-area banking sector resilience in the event of further adverse shocks.

Additional risks from the euro area could emerge as a consequence of the United Kingdom’s withdrawal from the European Union. Firms incorporated in the United Kingdom are estimated to be involved in over half of debt and equity issuance by EU (excluding UK) borrowers. UK firms also facilitate access to hedging instruments. Within the European Union, for example, over three-quarters of foreign exchange and over-the-counter interest rate derivatives trading takes place in the United Kingdom. Changes to the trading relationship between the United Kingdom and the European Union may require firms to alter their operations and the services they provide. If any such adjustments take place in a short timeframe, there could be a greater risk of disruption to services provided to the European real economy, which could spill back to the UK economy through trade and financial linkages.

Overall, the FPC judges that risks associated with the euro area remain elevated. The FPC incorporated a very severe global scenario in its 2016 stress scenario, with euro area impairments on corporate and household lending contributing £5.5 billion to banking sector losses. The 2016 stress test results indicate that the UK banking system is capitalised to sustain the provision of financial services, including the supply of credit, under this scenario.
Financial market fragility

Following the US election, expectations of expansionary fiscal policy in the United States have helped push up advanced economy sovereign bond yields, partly or fully reversing their falls in the first half of 2016. Since the July Report, however, real yields in the United Kingdom have fallen and are close to historic lows. Term premia in advanced economy government bond yields have risen but remain low compared to historical averages. Alongside continued low levels of estimated liquidity risk premia in corporate bond spreads, the risk of a further adjustment in fixed-income markets remains. An adjustment could be amplified by fragile market liquidity, potentially impacting the supply of finance to the real economy.

Advanced economy equity prices have increased...
Since the July Report, equity prices have risen across a range of advanced economies. In the United Kingdom, equity prices have risen by 3.8%. Within the FTSE All-Share index, shares of firms whose business is more UK-focused have regained some of the losses experienced immediately following the UK referendum on membership of the European Union; however, their equity prices are still 11.1% lower than at the start of the year, compared to a 7.2% rise for the broader index. In the euro area, equity prices have increased by 4.8%, only partially reversing falls in the first half of the year. The S&P 500 has risen by 3.8%, approaching record-high levels; a marked increase after falls in the weeks ahead of the US election.

... and government bond yields have increased markedly...
Following the election, expectations of expansionary fiscal policy in the United States have helped push up advanced economy sovereign bond yields (Chart A.8). Since the July Report, UK and German ten-year nominal government bond yields have risen by 55 and 45 basis points respectively, and have partly reversed their falls in the first half of the year. The S&P 500 has risen by 3.8%, approaching record-high levels; a marked increase after falls in the weeks ahead of the US election.

Movements in nominal bond yields can be attributed either to changes in real yields or compensation for inflation (Chart A.9). In the United States, both components have risen. In contrast, while the compensation for inflation has risen markedly in the United Kingdom, real yields have fallen. Ten-year real yields — based on RPI inflation indexed bond yields — are now at -1.74% and remain close to their lowest levels on record, with market contacts suggesting that falls...
since the referendum in part reflect increased perceptions of downside risks to the longer-term growth outlook. (1)

…which could test risk appetite in some markets…

In recent years, the low interest rate environment in advanced economies has encouraged investors to rebalance their portfolios into riskier assets. This has been an intended consequence of monetary policy. A reversal of yields could lead to a reassessment of portfolio choices, and could potentially reduce risk appetite. For instance, the rise in advanced economy sovereign bond yields, coupled with some risk of reduced openness to global trade, has already prompted falls in some risky asset prices in emerging market economies (see Global environment chapter).

…while continued low levels of term and liquidity risk premia means the risk of a further adjustment in fixed-income markets remains.

In advanced economies, some measures of the compensation for risk suggest that fixed-income markets remain vulnerable to a further adjustment. Estimates of term premia — the compensation investors demand for holding longer-maturity assets — in government bond markets have risen, but remain below historical averages (Chart A.10). A reversal to more normal levels could be reflected in a range of asset prices, particularly if this did not coincide with a substantially improved macroeconomic outlook. In the United Kingdom, this could arise, for example, if there were to be a reduction in overseas investor appetite to hold sterling-denominated assets (see UK current account chapter).

Yields on corporate bonds have broadly tracked sovereign bond yields down in recent years. As a result, they are vulnerable to an adjustment in risk-free rates due to increases in term premia.

Furthermore, estimates of the liquidity premium investors demand for holding corporate bonds (which remove credit risk compensation and risk-free yields from corporate bond yields) are below historical averages (Chart A.12). This


contrasts with an apparent reduction in underlying market liquidity for these securities in recent years, reinforcing the risk of a future adjustment in these markets.\(^{(1)}\)

An adjustment in prices in bond markets could be amplified by fragile market liquidity.

Fragile market liquidity in bond markets could magnify an adjustment in fixed-income asset prices. Some types of investors have the potential to behave procyclically (see Market-based finance chapter). A sudden increase in demand to sell fixed-income assets following a fall in prices could cause order-flow imbalances, if the dealers that intermediate these markets are unwilling or unable to absorb sales. This could amplify the initial price move, leading to further asset sales.

In the limit, the supply of credit to the real economy, and transfer of risk to those who are best placed to manage it, could be impaired. A sharp fall in asset prices could further adversely impact the balance sheets of banks and other financial institutions at the core of the financial system, including through their holdings of traded assets.

The FPC included a financial market stress in the 2015 annual stress test, taking into account the liquidity of trading book positions (see December 2015 Report). Further, in the context of concerns around market liquidity, the Bank is developing a system-wide stress simulation, to assess the dynamics of markets under stress. It will include an analysis of the behaviour of various sectors — such as open-ended investment funds, insurance companies and dealers (see Financial stability risks and regulation beyond the core banking sector chapter). The FPC also supports the Financial Conduct Authority’s intention to publish a discussion paper on the potential challenges associated with open-ended funds investing in illiquid assets, including commercial real estate.

The FPC continues to emphasise the importance of market participants recognising the underlying risks in different asset classes, managing them prudently, and pricing them accordingly.

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UK commercial real estate

Previously identified risks from an adjustment in the UK commercial real estate (CRE) market have in part crystallised. Activity slowed further in 2016 Q3 and prices have fallen by 2.6% since the UK referendum on membership of the European Union. In the period immediately after the referendum, several open-ended funds investing in the CRE market suspended dealing following significant net outflows. Since then, there have been signs of stabilisation in the market. Most open-ended funds have now reopened. There is a risk, however, of further adjustment in the CRE market that could create financial stability risks, given the reliance of the market on inflows of foreign capital and, in some segments, stretched valuations. Further price falls could reduce companies’ access to finance, given the use of CRE as collateral.

Activity in the CRE market slowed and prices fell in the months immediately after the referendum...

Activity in the commercial real estate (CRE) market slowed sharply following the UK referendum on membership of the European Union, continuing a significant slowdown in 2016 H1. The value of transactions in 2016 Q3 fell by 10% on the previous quarter, and was 27% lower than a year ago (Chart A.13). Aggregate CRE prices have fallen by 2.6% since the referendum.

Uncertainty around valuations rose immediately following the referendum, with the Royal Institution of Chartered Surveyors (RICS) recommending that its members qualify valuations with uncertainty clauses. In addition, a significant number of investors made redemptions from open-ended funds investing in the CRE market, leading to sizable net outflows (Chart A.14). Given the illiquid nature of CRE holdings, this created liquidity pressures for funds, and several funds suspended dealing. There were some instances of funds selling assets at a significant discount relative to pre-referendum valuations to raise cash and meet redemptions quickly. However, widespread rapid sales of CRE assets were avoided. Spillovers to open-ended funds investing in other markets were also limited (see Market-based finance chapter).

…but market conditions appear to have stabilised since...

The level of transactions has since recovered and the RICS survey of CRE investors pointed to a stabilisation in investor enquiries in 2016 Q3. Monthly data suggest that CRE prices were broadly flat on the month in October, and uncertainty clauses on valuations have largely been lifted. Most suspended open-ended funds have either reopened or have announced their intention to reopen by the end of 2016.
There is some tentative evidence that conditions in some segments in the market are stabilising more quickly than others. For example, industry contacts suggest that liquidity in the CRE market is tiered, with more liquidity available for assets with longer leases or those in central locations, and less liquidity in riskier parts of the market, including new development.

...although risks remain to the downside.

Despite the recent fall in prices, valuations in some segments of the market continue to appear stretched. CRE rental yields remain low, particularly for prime London offices (Chart A.15), suggesting that prices are elevated relative to rents and at greater risk of correction, with financial stability implications. In recent years, these yields have fallen broadly in line with government bond yields, suggesting that, in aggregate, investors’ perceptions of risks around the CRE market and expectations about future rental growth have not changed materially. There remains a risk that any fall in rental expectations or increase in risk premia could cause yields to correct sharply.

One way of assessing valuations in the CRE market is to use an investment valuations model. A sustainable valuation is calculated as the discounted sum of rental income earned over the next five years and the sale price in five years’ time. The future sale price, in turn, is determined by rents at the point of sale, risk-free interest rates, investors’ risk premia, and expected long-term rental growth.

A number of assumptions about the determinants of the future sale price can be made to generate a range of plausible sustainable valuations (Chart A.16). In one scenario, CRE yields remain low in the medium term. That would be consistent with assuming that the current low level of risk-free interest rates persists, and that both the risk premium and long-term rental growth expectations remain unchanged from current levels. In this case, current valuations would be a little below estimated sustainable levels (the higher bound of estimates in Chart A.16).

In another scenario, the average historical relationship between risk-free yields, risk premia and rental growth expectations is reasserted, such that CRE yields return to historical averages. This would suggest that current valuations are above estimated sustainable levels (the lower bound of estimates in Chart A.16). Such a scenario could be delivered in two different ways. In one, risk-free rates, the risk premium and long-term rental growth expectations all return to historical average levels. In another, risk-free rates remain low but are associated with a fall in rental growth expectations or a rise in risk premia relative to historical averages, consistent with a subdued outlook for medium-term growth.

Overall, this approach suggests there may continue to be a risk of further adjustment in the commercial property market.
However, the market is uneven, and valuations in some segments of the market — such as in parts of London — appear more stretched than the aggregate picture.

Some market indicators corroborate the risk of a further adjustment. Share prices of UK real estate investment trusts fell further in September and October, having recovered from their post-referendum lows (Chart A.17). Consensus forecasts from the Investment Property Forum, published in November, also point to average price falls, of around 8% by end-2017.

Price adjustments could be driven by the behaviour of overseas investors…

One factor that may be weighing on demand in the CRE market is a reduction in overseas investors’ risk appetite associated with uncertainty about the United Kingdom’s future relationship with the European Union. Overseas investment, which has accounted for around half of CRE transactions since 2012 and is therefore likely to have been an important determinant of prices, has fallen sharply in 2016 (Chart A.13). While the 15% fall in the sterling effective exchange rate since the start of the year may attract some foreign investors, the volatility in sterling may deter others. According to a survey by JLL in September, while 72% of international investors viewed the fall in sterling as an opportunity to invest in the United Kingdom, 45% intended to wait before doing so. And 67% of domestic investors thought that capital flows into UK CRE would decline if the United Kingdom no longer had full access to the European Single Market.

…and amplified by investors in open-ended funds…

Future price falls in the CRE market could be amplified by the behaviour of investors in open-ended commercial property funds. While suspensions helped to avoid widespread, rapid sales of CRE following the referendum, the underlying vulnerability that could arise from the liquidity mismatch between these funds’ assets and liabilities remains. Future shocks to the CRE market could therefore trigger similar cycles of redemptions, suspensions and discounted sales. The FPC supports the FCA’s intention to publish a discussion paper on the potential challenges associated with open-ended funds investing in illiquid assets, including CRE.

…and as well as by leveraged investors in a downturn.

Leveraged investors may seek to sell properties in a downturn, either to limit losses of their own equity, or because they cannot refinance their debt. Such sales would act to amplify any stress in the market. As comprehensive data on debt in the CRE market are not available, the Bank is engaging with the industry on proposals to develop a CRE debt database. *(1)* Available evidence suggests that, while the stock

### Chart A.16 There is a wide range of sustainable CRE valuations

Commercial real estate prices in the United Kingdom and range of sustainable valuations

Index: 2007 Q2 = 100

- **CRE prices**
- **Range of sustainable valuations**

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

| (a) Sustainable valuations are estimated using an investment valuation approach and are based on an assumption that property is held for five years. The sustainable value of a property is the sum of discounted rental and sale proceeds. The rental proceeds are discounted using a five-year gilt yield plus a risk premium, and the sale proceeds are discounted using a 20-year, five-year forward gilt yield plus a risk premium. Expected rental value at the time of sale is based on Investment Property Forum Consensus forecasts. The range of sustainable valuations represents varying assumptions about the rental yield at the time of sale: either rental yields remain at their current levels (at the upper end), or rental yields revert to their fifteen-year historical average (at the lower end). For more details, see Crosby, N and Hughes, C (2011), ‘The basis of valuations for secured commercial property lending in the UK’, *Journal of European Real Estate Research*, Vol. 4, No. 3, pages 225–42. |

### Chart A.17 UK real estate investment trust share prices fell in September and October

UK real estate investment trusts and FTSE All-Share indices, 17 June–18 November 2016

Sources: Bloomberg and Bank calculations.

| (1) For further details see Brazier, A (2015), ‘Nurturing resilience to the financial cycle’; www.bankofengland.co.uk/publications/Pages/speeches/2015/850.aspx. |

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*(1)* For further details see Brazier, A (2015), ‘Nurturing resilience to the financial cycle’; www.bankofengland.co.uk/publications/Pages/speeches/2015/850.aspx.
of debt used to finance UK CRE investment remains 32% below its 2008 peak, it has risen slightly since 2014 (Chart A.18).

Investors may find it harder or more expensive to refinance their loans if CRE prices were to fall substantially. Survey evidence suggests that around a third of UK banks’ CRE loans typically mature in the near term (Chart A.19). If prices were to fall in line with Investment Property Forum Consensus forecasts, Bank staff estimate that the proportion of loans with loan to value ratios exceeding 70% is likely to remain relatively low, at around a fifth of major UK banks’ CRE loan books, compared with the current proportion of around 10%. Refinancing could, however, pose more of a challenge in the event of larger price falls, particularly for highly leveraged borrowers.

The FPC will continue to monitor closely developments in the UK CRE market and potential amplification channels.

**While stress in the market could lead to tighter credit conditions facing the real economy, there is little evidence of this so far...**

CRE is widely used as collateral for corporate borrowing: a 2015 Bank of England review of bank lending to small and medium-sized companies suggested that 75% of those companies that borrow from banks use CRE as collateral. An amplified downturn in the CRE market could be transmitted to the real economy by reducing companies’ access to bank loans and their ability to undertake new investment. As discussed in the Bank’s 2016 Q3 Credit Conditions Review, there is little evidence so far of a tightening in bank credit availability to companies outside the CRE sector.

**...and the 2016 stress test suggests that major UK banks have become more resilient to stresses in the CRE market.**

Although foreign banks and non-bank lenders have gained market share in recent years (Chart A.18), UK banks continue to have material exposures to the CRE sector — averaging around 50% of common equity Tier 1 capital at end-2015 for those firms involved in the 2016 stress test (1). The exposures have fallen substantially since the crisis, with the stock of UK banks’ CRE lending having halved in value since 2008. Major UK banks have also broadly maintained their underwriting standards in recent years.

Reflecting this improvement in asset quality, UK CRE impairment rates in the Bank’s 2016 stress test are projected to be materially lower than those incurred by banks in the period following the financial crisis (2). That is despite banks facing price falls in the stress of around 40%, broadly similar to those observed during the financial crisis.

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1. The figure includes gross on balance sheet exposures as well as committed credit lines, and exposures booked in Jersey and Guernsey. Standard Chartered Bank is excluded, as it has minimal UK CRE exposures.
2. See ‘Stress testing the UK banking system: 2016 results’, www.bankofengland.co.uk/publications/Pages/news/2016/stresstesting.aspx. Impairments following the financial crisis are estimates based on banks’ annual SEC filings and reports.
The UK current account deficit remains large by historical and international standards. Its financing is reliant on material inflows of portfolio and foreign direct investment and is vulnerable to a reduction in foreign investor appetite for UK assets. This could be triggered by global factors, such as a reduction in international capital flows, or by UK-specific factors, such as perceptions of weaker long-run UK growth prospects. There has not to date been any material change to the United Kingdom’s ability to finance its current account deficit, though there have been some indications of reduced investor appetite for commercial real estate and equities. UK banks have materially reduced their reliance on short-term overseas borrowing, and the depreciation of sterling acts to improve the United Kingdom’s net foreign asset position. But a sharp adjustment in the current account could test financial stability indirectly through its impact on the real economy. It would be associated with higher funding costs for real economy borrowers and a further depreciation of sterling, worsening the trade-off between growth and inflation.

The current account deficit remains large, with substantial uncertainty around its outlook.

The UK current account deficit remains large by international and historical standards, at 5.9% of GDP in 2016 Q2 (Chart A.20). The deficit has widened significantly since 2011, largely reflecting a marked deterioration in the primary income balance on account of weaker foreign direct investment (FDI) earnings. In contrast, the trade balance has been broadly stable since 2011.

The sterling exchange rate index has depreciated by 15% since the start of 2016, including a fall of around 12% since the UK referendum on EU membership. Market contacts suggest that this depreciation is likely to have been associated with perceptions that the United Kingdom’s future trading arrangements with the European Union will be less open for a period. This would require a lower real exchange rate to maintain competitiveness.

Other things equal, the fall in the exchange rate should help to smooth the adjustment of the current account over time, by improving both trade and net income flows. But there are substantial risks around the outlook for the current account, particularly as details of the United Kingdom’s future trading relationships with the European Union and other countries are as yet unknown. For example, some service sectors such as financial services currently benefit from relatively open access to EU markets. The surplus in financial services trade is around 3% of GDP, around 1¾% percentage points of which is with the European Union.
The financing of the deficit remains vulnerable to a disruption in capital flows.

Over the past few years, the financing of the deficit has relied on continuing material inflows of portfolio investment and FDI, which have more than offset cross-border bank deposit flows (Chart A.21).

While the current account deficit remains large, this financing remains vulnerable to a reduction in foreign investor appetite for UK assets. This could be triggered by global factors, such as a reduction in international capital flows, or by UK-specific factors, such as perceptions of weaker long-run UK growth prospects, or a rise in the risk premium on UK assets.

A disruption in financing flows could be associated with further sterling depreciation, a fall in asset prices and tighter credit conditions for UK borrowers. As both the UK private and public sectors are net borrowers (Chart A.22), and ultimately rely on funding from abroad, any deterioration in funding conditions could be associated with a downward adjustment in domestic demand. The crystallisation of these risks could also coincide with a build-up in inflationary pressures associated with a decline in the exchange rate, worsening the trade-off between growth and inflation. The combination of these factors would probably drive an increase in banks’ non-performing loans.

A disruption in cross-border capital flows could also interact with other vulnerabilities. For example, falls in asset prices arising from a sharp reduction in portfolio debt and equity inflows could be amplified by the behaviour of investors in open-ended funds and lead to disruption in some financial markets (see Market-based finance chapter).

A disruption in flows has not materialised, but investor appetite for some sterling assets appears to have decreased since the referendum.

There has not to date been any material change to the United Kingdom’s ability to finance its current account deficit, though there have been some indications of reduced investor appetite for commercial real estate and equities.

The equity risk premium for the FTSE All-Share index rose following the referendum and has remained elevated in October and November (Chart A.23). That is consistent with data on non-residents’ net purchases of UK equities, which show that purchases have moderated relative to levels seen in 2015 (Chart A.24). The Bank of America Merrill Lynch Global Fund Manager survey also suggests reduced appetite for UK equities, with a net balance of 35% of asset managers reporting their portfolios were underweight equities in November, the highest level in six months.

In the UK commercial real estate sector, flows from overseas investors have fallen, consistent with a reduction in risk.

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**Chart A.21** There have been material inflows of portfolio investment and FDI over the past few years

*Net inward financing flows (a)*

- **Portfolio investment**
- **Foreign direct investment**
- **Reserves and net derivatives**
- **Total net inward financing flow**

Per cent of GDP

Source: ONS and Bank calculations.

(a) This is the change in UK foreign liabilities, less the change in UK foreign assets, for each category of investment. Four-quarter moving average.

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**Chart A.22** Both the UK private and public sectors were net borrowers in 2016 Q2, and ultimately rely on funding from abroad

*Net lending as a share of GDP by sector*

Per cent of GDP

Source: ONS and Bank calculations.

(a) Includes households, non-profit institutions serving households, private non-financial corporations and financial corporations.

(b) General government plus public corporations.
There has not been a widespread rise in risk premia on sterling assets in 2016

Sterling ERI and implied risk premia on sterling assets

<table>
<thead>
<tr>
<th>Financial Instruments</th>
<th>Standard Deviations</th>
</tr>
</thead>
</table>


(a) Series are normalised to have an average of zero and a standard deviation of one over the period 1 January 2000 to 18 November 2016. Data show the changes in these normalised series since 4 January 2016.

(b) As implied by a dividend discount model.

(c) Option-adjusted spreads. Sterling-denominated corporate bonds issued in domestic or eurobond markets.


(e) Sterling effective exchange rate index.

Overseas investors’ net purchases of UK equities have fallen in recent quarters

Changes in non-resident net holdings of FTSE 100 shares

<table>
<thead>
<tr>
<th>Year</th>
<th>Per cent of GDP</th>
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<tr>
<td>2011</td>
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<tr>
<td>2012</td>
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<td>2013</td>
<td>0</td>
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<tr>
<td>2014</td>
<td>0</td>
</tr>
<tr>
<td>2015</td>
<td>5</td>
</tr>
<tr>
<td>2016</td>
<td>10</td>
</tr>
</tbody>
</table>

Sources: ONS, S&P Global Market Intelligence and Bank calculations.

(a) Quarterly net changes in non-resident holdings of FTSE 100 companies’ shares, as listed on the index at 15 November 2016.

(b) The estimate for the change in the holding of shares in 2016 Q4 is based on data up to 15 November 2016. Both the 2016 Q3 and Q4 changes in the holding of shares are shown as percentages of quarterly nominal GDP in 2016 Q2.

(c) The change in the holding of shares is weighted at each quarterly period by the price of the underlying stock. These data are updated on the date on which a change in shareholding is formally registered, not the date on which the transaction itself takes place, which may be earlier. Data are non seasonally adjusted.

(d) The UK’s disclaimer of liability, which applies to the data provided, is available at www.bankofengland.co.uk/publications/Documents/fsr/2016/fsrYenov4.xlsx.

In contrast, there has been little evidence of a reduction in investor appetite for gilts or corporate bonds following the referendum. The gilt term premium — the compensation investors demand to hold longer-term UK government bonds — has picked up recently but fell immediately following the referendum (Chart A.23) and remains low compared to historical averages (see Financial market fragility chapter). Data on overseas investors’ purchases of gilts, which are only available up to 2016 Q3, suggest that purchases were a little lower than in Q2, but remained positive. And market contacts continue to report little change in investors’ preferences for holding gilts in October and November. Investors’ appetite for holding sterling corporate bonds is reported to have improved following the announcement of the MPC’s policy package in August, consistent with falls in corporate bond spreads.

Taken together, the available indicators of capital inflows, as well as the more timely developments in measures of risk premia and funding costs, suggest little evidence of an abrupt disruption in cross-border flows to date. Given the substantial uncertainty around the economic outlook, the FPC judges that the likelihood that the risk of a fall in overseas investor appetite could materialise remains elevated. The FPC will continue to monitor all forms of capital inflow and risk premia on a range of UK assets.

Currency depreciation has improved the United Kingdom’s overall external balance sheet position…

Currency mismatches in a country’s external balance sheet can amplify risks associated with a large current account deficit. For example, domestic residents who use foreign currency funding to finance domestic currency assets could incur losses. In aggregate, the United Kingdom is in the opposite position. Estimates suggest that around 60% of the stock of external liabilities is denominated in foreign currency, compared with more than 90% of the stock of external assets. As a result, the depreciation in sterling has increased the value of external assets relative to liabilities, improving the United Kingdom’s net foreign asset position in 2016 H1 (Chart A.25).

…and the risk of amplification from currency mismatches on companies’ and banks’ balance sheets appears limited.

Within that aggregate picture, non-financial companies have large borrowings in foreign currency: estimates suggest these are in the region of around £300 billion, compared with foreign currency denominated assets of £200 billion. The majority of large companies make use of financial market foreign currency hedges in the short term. The cost of this financial hedging — for example, as proxied by the
Part A

UK current account

cross-currency basis swap rate, and as reported by contacts of the Bank’s Agents — appears to have risen a little over the past year. But the risk of significant losses from sterling depreciation is likely to be limited, as available data further suggest that many companies with foreign currency borrowings have large overseas revenues, and so are naturally hedged.

UK banks’ short-term foreign currency liabilities have fallen materially since the financial crisis. But they nevertheless represent a significant proportion of their overall short-term wholesale liabilities. Foreign currency short-term liabilities remain covered, in aggregate, by banks’ foreign currency denominated liquid assets (Chart A.26).

As part of the Bank’s contingency planning ahead of the UK referendum on EU membership, PRA supervisors engaged with banks to ensure that they had sufficient short-term liquid assets in each material currency to meet short-term liabilities and potential wholesale outflows under a severe wholesale stress scenario. The Bank also offered additional liquidity through its regular operations. In the event, banks retained access to foreign currency swap markets throughout the period of sterling volatility.

Previous annual stress tests have assessed the resilience of the UK banking system to a range of relevant risks. In the 2014 stress-test scenario, concerns over the sustainability of the United Kingdom’s internal and external debt positions led to a reassessment of prospects for the economy, a sharp depreciation of sterling and a rise in borrowing costs. At the time, the FPC judged that the stress-test results and banks’ capital plans, taken together, suggested that the banking system would have the capacity to maintain its core functions in that stress scenario. Banks’ resilience to funding market stresses was also assessed in the 2014, 2015 and 2016 stress tests.
The level of household indebtedness in the United Kingdom remains high by historical standards. Although average debt servicing ratios remain low, the ability of some households to service their debts could be challenged by a period of higher unemployment. These households could affect broader economic activity by cutting back sharply on expenditure in order to service their debts. It is important that mortgage underwriting standards do not slip and contribute unduly to higher levels of household indebtedness. Activity in the housing market has softened in recent months, but the outlook is highly uncertain. The FPC has agreed to maintain the Recommendations it made in June 2014 to insure against the risk of a marked loosening in underwriting standards in the owner-occupier mortgage market and a significant increase in the number of highly indebted households.

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**UK household indebtedness**

The level of household indebtedness in the United Kingdom remains high by historical standards. Although average debt servicing ratios remain low, the ability of some households to service their debts could be challenged by a period of higher unemployment. These households could affect broader economic activity by cutting back sharply on expenditure in order to service their debts. It is important that mortgage underwriting standards do not slip and contribute unduly to higher levels of household indebtedness. Activity in the housing market has softened in recent months, but the outlook is highly uncertain. The FPC has agreed to maintain the Recommendations it made in June 2014 to insure against the risk of a marked loosening in underwriting standards in the owner-occupier mortgage market and a significant increase in the number of highly indebted households.

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**Chart A.27** Household debt is high relative to income

UK household debt to income ratio\(^{(a)}\)(\(^{(b)}\))(\(^{(c)}\))

<table>
<thead>
<tr>
<th>Year</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987</td>
<td>60</td>
</tr>
<tr>
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<td>60</td>
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<tr>
<td>2011</td>
<td>60</td>
</tr>
<tr>
<td>2015</td>
<td>60</td>
</tr>
</tbody>
</table>

Sources: ONS and Bank calculations.

\(^{(a)}\) Total household debt to income is calculated as gross debt as a percentage of a four-quarter moving sum of disposable income. Includes all liabilities of the household sector except for the unfunded pension liabilities and financial derivatives of the non-profit sector. The household disposable income series is adjusted for financial intermediation services indirectly measured (FISIM).

\(^{(b)}\) Mortgage debt to income is calculated as total debt secured on dwellings as a percentage of a four-quarter moving sum of disposable income. The household disposable income series is adjusted for FISIM.

\(^{(c)}\) Non-mortgage debt to income is the residual of mortgage debt to income subtracted from total debt to income.

---

The level of UK household indebtedness remains high by historical standards...

After a prolonged period of retrenchment following the financial crisis, household debt began to rise again relative to incomes in early 2015. In 2016 Q2, the aggregate household debt to income (DTI) ratio was 133% (Chart A.27).

Highly indebted households are particularly vulnerable to shocks, such as falls in incomes or increases in interest rates, which threaten their ability to service their debts. If these households cut consumption sharply in order to service their debts, this may amplify any downturn in economic activity. Alternatively, if households default on their debts, this can test the resilience of lenders directly.

The increase in household indebtedness over the past three decades has been almost entirely driven by mortgage debt, the outstanding stock of which has doubled from 51% of household income in 1987 to 102% in 2016 Q2 (Chart A.27). Over the same period, households’ non-mortgage debt has been broadly flat, at around 30% of income.

…and total lending to households has been increasing...

Total lending to households grew by 4.1% in the twelve months to September 2016, close to the fastest growth rate since the global financial crisis. The annual growth rate of mortgage lending was 3.2% in the same period. This was slightly below its level earlier in 2016 but higher than at any other time since the end of 2008.

Consumer credit represents 13% of the stock of household debt and has expanded rapidly in recent years, reaching an annual growth rate of 10.2% in the twelve months to September 2016 (Chart A.28). Growth in dealership car finance has been particularly strong in the past three years, though recent months have seen an increased contribution to
consumer credit growth from other forms of unsecured lending, such as personal loans. Strong growth in unsecured lending stands in stark contrast to market expectations of a weakening in the outlook for the UK economy, as reflected, for example, by falls in real risk-free interest rates (see Financial market fragility chapter). To the extent that this tension is maintained going forward, it raises the prospect of a further rise in household indebtedness as increases in unsecured debt outpace growth in household incomes.

...with some households vulnerable to a period of higher unemployment or a severe fall in income.

The ability of households to service their debts has been supported in recent years by the low level of interest rates, contributing to reduced borrowing costs. Reflecting this, as set out in the Bank’s 2016 Q3 Credit Conditions Review, mortgage arrears rates have been falling since 2009 and write-off rates on consumer credit are at historically low levels. Average debt-servicing ratios (DSRs), which compare debt interest and repayment amounts with disposable incomes, fell after the crisis and have been flat since (Chart A.29). But there are signs that the number of vulnerable households, with particularly high mortgage DSRs, has stopped declining (Chart A.30).

An uncertain macroeconomic environment raises the prospect that households could face challenges to their ability to service their debts. As an illustration, Bank staff have estimated the impact on UK household DSRs from a rise in unemployment to 8%, and a severe fall in household income, similar to the 2008 recession. With all other factors held equal, the proportion of households with high mortgage DSRs would double, to a level last seen in 2007 (Chart A.30).

House prices have been rising relative to incomes in recent years...

House prices have been rising in recent years. Average UK house prices were 4.5 times average incomes in 2016 Q2, which is high by historical standards (Chart A.31). Rising house prices reflect a range of factors, including household income and, importantly, the supply of housing. In the years following the crisis, a persistent gap has opened between the number of new homes being constructed and the natural growth in demand. In the years 2010–15, construction began on an average of 150,000 houses per year in the United Kingdom, while the average annual increase in the number of households was over 230,000.

...highlighting the importance of mortgage underwriting standards...

Macropreudential policy cannot address underlying structural issues related to the supply of housing. But as house prices rise, it is important that mortgage underwriting standards do not slip and contribute unduly to higher levels of household indebtedness. Policy measures that target the flow of new lending guard against this, including the FPC’s 2014...
Chart A.31 House prices have risen relative to incomes
UK house price to income ratio(a)

![House price to disposable income chart]

Sources: Department for Communities and Local Government, Halifax/Markit, Nationwide.

(a) The ratio is calculated using a four quarter moving average of gross disposable income of the UK household and non-profit sector per household as the denominator. Aggregate household disposable income is adjusted for FISIM and changes in pension entitlements. Historical UK household population estimated using annual GB data assuming linear growth in the Northern Ireland household population between available data points.

Chart A.32 High-LTV lending has increased from post-crisis lows
Total volume and proportion of new mortgages for house purchase extended at LTVs of 90% or greater(b)(c)(d)

![Proportion and total volume of high LTV mortgages chart]

Sources: Council of Mortgage Lenders (CML), FCA Product Sales Database (PSD) and Bank calculations.

(a) Data are shown as a four-quarter moving average.
(b) Data include loans to first-time buyers, council/registered social tenants exercising their right to buy and home movers.
(c) The PSD includes regulated mortgage contracts only.
(d) The number of completions for house purchase ≥90% LTV is calculated using the aggregate number of mortgage completions for house purchase from the CML and the proportion of completions for house purchase ≥90% LTV from the PSD.

Recommendations on owner-occupier mortgage underwriting standards. These have helped guard against the risk of an increase in lending at high loan to income multiples (see The FPC’s review of its 2014 mortgage market Recommendations chapter).

Mortgagors with high loan to value (LTV) ratios are another potential source of vulnerability in the household sector. While high LTV mortgages may be appropriate in some cases, these borrowers are more likely to experience negative equity in the event of a fall in house prices. This can threaten the resilience of lenders, as the value of the housing collateral will not be sufficient to cover the mortgage loan in the event of a default. It can also prevent households from borrowing against their homes to mitigate the negative impact of income shocks on their expenditures. Evidence from the United States, for example, suggests that households with high LTV mortgages cut their consumption by more than other households during the crisis.(1)

The provision of high LTV lending has increased from its post-crisis lows, though both the proportion and total volume of high LTV lending remains lower than at any point between 1982 and 2008 (Chart A.32). At the same time, LTV ratios for outstanding loans have fallen as a result of house price growth and mortgagors repaying existing debt. As a result, only 3% of mortgagors had an LTV above 90% at end-2015.

In September, HM Treasury announced that the Help to Buy: mortgage guarantee scheme would close at the end of 2016, as planned. The FPC had previously judged that the scheme had not posed material risks to financial stability over the previous three years and that, in current market conditions, its closure would be unlikely to affect significantly the provision of mortgage finance.(2)

…and the resilience of lenders to a downturn in the market.
The housing market has softened in recent months, though it has performed more strongly than some indicators had suggested in July and August. This softening in part reflects increases in stamp duty land tax for additional properties in April, which created an incentive for transactions to be moved forward to the start of the year. Three-month on three-month annualised house price growth slowed from a peak of 9% in February to 2.8% in October.

Looking ahead, the majority of respondents to the October RICS survey of chartered surveyors, and the September NMG survey of households, continue to expect increases in house prices, albeit at a weaker rate than in previous years. But the outlook for the housing market is highly uncertain.

(2) For more details, see the September 2016 letter from the Governor to the Chancellor on Help to Buy, available at www.bankofengland.co.uk/financialstability/Documents/fpcletters/governorletter160922.pdf.
The resilience of the banking sector to severe house price falls has been assessed in successive stress tests of UK banks, which included greater price falls than those experienced in either the financial crisis or the recession of the early 1990s (Chart A.33).

**The FPC continues to monitor behaviour in the buy-to-let sector.**

The buy-to-let sector has expanded steadily over the past fifteen years, with the stock of outstanding buy-to-let mortgages growing from less than £10 billion in 2000 to over £220 billion in 2016 Q3 (Chart A.34). While buy-to-let transactions have slowed in recent months, there is no evidence of a widespread sell-off by investors associated with the softening of the market. The number of buy-to-let properties listed for sale since the referendum is in line with levels seen earlier in 2016 and in 2015.

In September 2016, the PRA published a Supervisory Statement setting out its expectations for underwriting standards for buy-to-let mortgage contracts. On 16 November 2016, HM Treasury laid legislation before Parliament to grant the FPC powers of Direction over buy-to-let mortgage lending. The FPC subsequently published a draft Policy Statement setting out how it would use these powers (see Annex 1).

The FPC’s assessment is consistent with the identification of risks by international bodies.

The European Systemic Risk Board (ESRB) recently concluded an assessment of housing market vulnerabilities across the European Union. As part of this process, the ESRB issued warnings to eight Member States of the European Union, including the United Kingdom. The risk channels identified by the ESRB are consistent with those previously identified by the FPC. The International Monetary Fund (IMF) also identified financial stability risks from UK household indebtedness as part of its 2016 Financial Sector Assessment Programme for the United Kingdom.

Both the ESRB and IMF acknowledged that the FPC has taken action to mitigate risks from household indebtedness, and concluded that the UK authorities should continue to monitor developments closely and be prepared to adjust macroprudential policy as necessary.

Following a review, the FPC has agreed to maintain the Recommendations it made in June 2014 to insure against the risk of a marked loosening in underwriting standards in the owner-occupier mortgage market and a significant increase in the number of highly indebted households (see the FPC’s review of its 2014 mortgage market Recommendations chapter).
The FPC’s review of its 2014 mortgage market Recommendations

In June 2014, the Financial Policy Committee (FPC) put in place a package of policy measures to insure against the risk of a marked loosening in underwriting standards in the owner-occupier mortgage market and a significant increase in the number of highly indebted households.

Excessive household debt has the potential to threaten financial stability. Highly indebted borrowers are more likely to face difficulties repaying their mortgages, threatening the resilience of lenders. And they are more likely to cut back spending sharply in response to adverse shocks, amplifying any downturn in economic activity.

The policy package introduced in 2014 consisted of two FPC Recommendations:

- **Loan to income (LTI) flow limit:** 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.

- **Affordability test:** 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, Bank Rate were to be 3 percentage points higher than the prevailing rate at origination.\(^1\)

The FPC reviews these Recommendations on a regular basis to assess whether they remain appropriate.\(^2\)

In concluding its 2016 review, the FPC has agreed to maintain both Recommendations at their current calibration.

The following judgements underpin this decision:

- The FPC judges that the calibration of the affordability test remains proportionate. The market-implied path for Bank Rate has fallen since 2014. But the FPC judges that, given the long-term nature of mortgage contracts, it would be imprudent to rely too heavily on potentially volatile market-implied measures of future interest rates. In addition, the current calibration of the affordability test strengthens resilience in the face of adverse income and unemployment shocks.

- Both Recommendations continue to provide insurance against a future deterioration in underwriting standards. The FPC assesses that the Recommendations have had only a modest effect on mortgage lending to date.

- In the event that the Recommendations were to become binding in the future, they would strengthen resilience, without incurring substantial economic costs.

The FPC has further decided to conduct a review of its overall strategy for setting policy to guard against risks stemming from the mortgage market in 2017.

In parallel to the FPC’s 2016 review, the PRA and the FCA have been reviewing the implementation of the LTI flow limit. Overall, their assessment is that implementation has not raised significant operational challenges for lenders, but the current fixed quarterly nature of the LTI flow limit could make it harder for some firms to manage their business pipeline. The PRA and the FCA are therefore consulting on moving to a four-quarter rolling limit.\(^3\)

**Background on the motivation of the policy package**

The FPC’s Recommendations were introduced in 2014 to insure against a marked loosening in lenders’ underwriting standards and a significant increase in the number of highly indebted households.

The FPC has outlined two channels through which highly indebted households can threaten financial stability: a direct channel, which stems from the risk that mortgage losses could pose to lender resilience; and an indirect channel, which arises from the impact highly indebted households can have on wider economic activity.

Mortgages are the largest loan exposure on the UK banking sector’s domestic balance sheet, accounting for around two thirds of major UK banks’ loans to UK borrowers. Poorly performing mortgages can threaten lender resilience. And empirical evidence suggests that the share of mortgagors experiencing repayment difficulties can rise sharply as the

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\(^1\) The affordability test Recommendation builds on existing FCA rules, which require lenders to have regard to future interest rate rises (see FCA rule MC-OB 11.6.18).

\(^2\) The FPC has a statutory obligation to review its Recommendations at regular intervals and to assess whether they ought to be withdrawn.

Mortgages are also the largest liability on the balance sheet of the UK household sector, accounting for around three quarters of total UK household debt. In the event of a fall in incomes or an increase in interest rates, a highly indebted household sector may cut back sharply on spending in order to keep servicing its mortgage debt. This could amplify any downturn in economic activity. Indeed, cross-country evidence shows that, during the recent crisis, countries which initially had higher levels of household debt relative to income saw larger falls in aggregate consumption (Chart B).

Analysis of household-level data also suggests that individual households with larger mortgage debt relative to income adjust spending more sharply in response to shocks. For example, data from the Living Costs and Food Survey show that, during the recent crisis, the fall in the consumption to income ratio among UK households with LTI ratios above 4 was around three times larger than the fall for those with LTI ratios between 1 and 2 (Chart C). Econometric studies of UK, Danish and Norwegian data confirm these results, even after controlling for other household characteristics (Table 1).
How the two Recommendations work together

The LTI flow limit and affordability test are complementary measures. They are applied in different ways, but they both work by constraining the amount that prospective mortgagors can borrow relative to their incomes. Both measures guard against a deterioration in underwriting standards, including by ensuring that risk-taking behaviour by a small number of lenders does not drive down overall market standards over time.

The LTI flow limit is a simple measure — the LTI ratio depends only on loan value and gross income. The affordability test is more complex. When assessing affordability, FCA rules require lenders to take into account a range of factors specific to each borrower, including mortgage term, spending and credit commitments.

By constraining the amount that can be borrowed, the affordability test effectively sets an LTI cap for each individual borrower. For example, a borrower who can dedicate up to 35% of their gross income to mortgage repayments (once other commitments have been taken into account), is seeking a 35-year mortgage, and applies to a lender that uses a stress interest rate of 7%, could borrow up to 4.5 times their income.

The relationship between the effective LTI cap implied by the affordability test and mortgage term is illustrated by Chart D. The swathe reflects how the share of income available for mortgage repayments can vary, depending on borrower-specific circumstances and the precise approach used by lenders. The bottom edge of the swathe is associated with 30% of income being available to support repayments, while the top edge is associated with 50%.

**Chart D** Relationship between the affordability test and the LTI flow limit in constraining lending

![Chart D](https://example.com/chart_d.png)


(a) Swathe for affordability test assumes borrowers have 30% to 50% of gross income available to support mortgage repayments, and lenders assess affordability at stress interest rates of 6.75% to 7%. A majority of loans completed in 2016 Q3 were affordability tested at a stress interest rate of 7%

(b) The FPC flow limit restricts the share of new mortgages at LTIs of 4.5 or greater to 15%.

**Impact of the Recommendations so far**

Both Recommendations continue to provide insurance against a future deterioration in underwriting standards. The FPC assesses that the Recommendations have had only a modest effect on mortgage lending to date.

When introduced, the FPC’s Recommendations were not expected to have a material impact on mortgage lending or housing transactions in the near term. Most lenders were already adhering to the standards set by the FPC. Instead, the Recommendations were intended to provide insurance against the possibility of a marked loosening of underwriting standards and a significant increase in the number of highly indebted households.

Consistent with that, the FPC’s assessment is that its Recommendations have not been excluding a significant number of prospective mortgagors from the market and their effect on loan size has been modest.

**LTI flow limit**

In aggregate, the flow of mortgages with an LTI above 4.5 has never been close to the 15% limit, and is currently around 10% (Chart E). In part, this is because lenders tend to manage their business pipeline in response to the FPC’s 15% flow limit by applying lower internal limits. So it is unlikely that the

**Chart E** Flow of new mortgages by LTI

![Chart E](https://example.com/chart_e.png)

Sources: FCA Product Sales Database and Bank calculations.

(a) FCA Product Sales Database includes regulated mortgage contracts only. Loan to income ratio calculated as loan value divided by the total reported gross income for all named borrowers. Chart excludes lifetime mortgages, advances for business purposes and remortgages with no change in the amount borrowed.
aggregate share of lending at LTIs above 4.5 would actually reach 15%. But a majority of lenders are advancing fewer than 10% of new loans at LTIs above 4.5. So there remains headroom for further high-LTI lending in aggregate.

One feature of recent lending has been a ‘bunching’ of loans just below the FPC’s 4.5 LTI limit. In part, this is likely to represent some individuals being constrained to smaller loans than they would have otherwise obtained. Bank staff estimate the size of this impact to be small in aggregate: if the share of borrowers with an LTI between 4 and 4.5 were to return to its level before the FPC Recommendations were made, and all additional borrowers entering this category were to obtain an LTI of 5 instead, the value of total mortgage lending would increase by less than 1%.

Affordability test
The impact of the FPC’s affordability test is more difficult to assess because the total number of prospective borrowers who fail is not directly observable. Nevertheless, the FPC assesses that the Recommendation has not been excluding a significant number of borrowers for four reasons.

First, data from mortgage intermediaries suggest that the proportion of mortgage applications being rejected has not changed materially since the introduction of the FPC Recommendations in 2014.

Second, information received from a small number of lenders does not suggest that the calibration of the affordability test is resulting in a material proportion of mortgage enquiries being rejected, even prior to the formal application stage.

Third, there has not been an unusual pickup in mortgage tenor since the policy was introduced. Were the affordability test to be excluding a large number of prospective mortgagees, borrowers could, in principle, seek to pass the test by lengthening mortgage tenor, which lowers monthly repayments. There has been a long-run trend towards longer mortgage terms since the crisis but no acceleration in that trend since the introduction of the affordability test (Chart F).

And fourth, first-time buyers, who might have been expected to be most affected by any measure that restricts loan size relative to income, have maintained their share of total mortgage lending at just over a third since 2014.

Do the Recommendations remain proportionate?
The FPC’s 2016 review considered both the LTI flow limit and the affordability test, as set out in this chapter. An important element of this review was the calibration of the affordability test, given the substantial change in the path of Bank Rate implied by market prices since the Recommendation was introduced. In June 2014, financial market prices implied a central expectation that Bank Rate would rise by around 225 basis points over five years. This compares to market expectations of a rise in Bank Rate of 75 basis points over five years on average in November 2016.

The FPC assesses that the calibration of the affordability test remains proportionate. This reflects two judgements. First, given the long-term nature of mortgage contracts, it would be imprudent to rely too heavily on potentially volatile market-implied measures of future interest rates. And second, the current calibration of the affordability test strengthens resilience in the face of adverse income and unemployment shocks.

Market expectations of future interest rates at longer horizons can adjust materially in light of economic news. Measures of long-term, trend interest rates — although very uncertain — are potentially more relevant. As set out in the November 2016 Inflation Report, these are determined by the balance between saving and investment preferences, which are likely to evolve slowly over time. The 300 basis points interest rate stress test is consistent with interest rates increasing only a little above some estimates of global, long-term, trend interest rates.\(^{(1)}\)

Although the affordability test is specified using an interest rate stress, it can also be viewed more generally as constraining the amount that households can borrow relative to their current income. In doing so, it introduces a general ‘safety margin’ between current incomes and mortgage repayments. So, as well as ensuring that the household sector in aggregate can avoid loan repayment difficulties if interest

\(^{(1)}\) For example, Rachel and Smith (2015), estimate that the global neutral real rate might settle at or slightly below 1% in the long to medium run. Given an inflation target of 2%, this would imply nominal interest rates of around 3%. See Rachel, L and Smith, T D (2015), ‘Secular drivers of the global real interest rate’, Bank of England Staff Working Paper No. 571, www.bankofengland.co.uk/research/Documents/workinpapers/2015/swp571.pdf.
rates were to rise, this safety margin also ensures that the household sector is better able to withstand fluctuations in growth, income and employment.

Analysis by Bank staff suggests that the margin of safety created by assessing affordability against a 300 basis point rise in Bank Rate also affords protection for the household sector to a downturn associated with a 2–3 percentage point rise in unemployment. Specifically:

- The proportion of households that would have a DSR greater than 40% in the face of an interest rate shock of 300 basis points is broadly equivalent to the proportion of households that would have a DSR greater than 40% in the face of an unemployment shock of around 3%.

- Empirical relationships between aggregate arrears and macroeconomic variables suggest that the proportion of households that would be in arrears if interest rates were to rise by 300 basis points is broadly equivalent to the proportion of households that would be in arrears if unemployment increased by just under 2%.

**How valuable is the resilience to shocks?**  

The FPC judges that, in the event that the Recommendations were to become binding in the future, they would meaningfully strengthen resilience, without incurring substantial economic costs.

To assess how its Recommendations strengthen resilience, the FPC has considered a scenario whereby lenders’ underwriting standards are assumed to loosen materially, so that the current calibration of the Recommendations both excludes a significant number of prospective mortgagors and restricts the loan size of those obtaining a mortgage.

In this scenario, if the FPC’s affordability test were to be removed, mortgage approvals would increase by around 7% and the value of new mortgage lending by around 16%. Further increases in mortgage lending would be constrained by the LTI flow limit, which is assumed to remain in place for the purposes of this scenario.

These assumptions result in the distribution of new mortgage lending shifting materially towards higher loan to income ratios. The share of new mortgages extended at an LTI multiple over four would increase from just under a quarter, to over 35% (Chart G). Over time, this would lead to a significant deterioration in the distribution of the stock of household debt.

This could materially reduce the resilience of household spending to adverse shocks. There are significant uncertainties in quantitatively mapping the impact of the distribution of debt on the volatility of consumption. But based on estimates in Table 1, the responsiveness of consumption to adverse shocks in this scenario could be up to 20% higher without the FPC’s affordability test in place. In addition, a scenario where lenders loosen underwriting standards and the FPC’s affordability test is removed would lead to higher mortgage arrears. These impacts could be even bigger if the LTI flow limit was also removed.

The macroeconomic costs of the FPC’s Recommendations arise only if lenders loosen underwriting standards to such an extent that the measures become binding. If underwriting standards do not loosen, the Recommendations do not impose an independent cost.

The costs would arise from tighter-than-otherwise credit constraints facing some households, which in turn could affect economic activity, at least in the short term. The Bank has previously published quantitative estimates of the impact of different FPC housing tools on short-run GDP.(1) Using a similar methodology, Bank staff estimate that removing the FPC affordability test in the above scenario would increase the level of nominal GDP by only 0.1% in three years’ time.

However, the Committee considers it unlikely that a restriction on household credit supply would have a material effect on the longer-term level or growth rate of the economy’s productive capacity. So any costs would be temporary, while the resilience benefits of reduced macroeconomic volatility in response to shocks would persist over the long term.

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The resilience of the UK banking sector is grounded on substantial capital and liquidity positions. The aggregate common equity Tier 1 capital of major UK banks was 13.5% of risk-weighted assets in September 2016. The aggregate leverage ratio was 4.7%. As a consequence of the 2016 annual stress test, the UK banking sector is, in aggregate, capitalised to support the real economy in a severe global and domestic stress. This resilience is reflected in banks’ funding costs.

Some major UK banks continue to face the challenge of weak profitability, which is reflected in market valuations of their equity. While net interest margins are stable, major UK banks continue to face a range of headwinds including redress for past misconduct and weak investment banking returns. Changes to financial firms’ business models and structures as the United Kingdom withdraws from the European Union could have implications for the resilience of the financial system in the United Kingdom and more broadly. A prolonged period of low returns could harm banks’ ability to absorb the impact of future shocks through retained earnings and threaten the resilience of the provision of financial services to the real economy, a risk that will be assessed in the 2017 exploratory scenario.

UK banks’ capital positions remain strong...

UK banks have built up capital resources since the global financial crisis. In September 2016, the aggregate common equity Tier 1 (CET1) ratio of major UK banks was 13.5% of risk-weighted assets (Chart B.1), while the Tier 1 capital ratio was 15.2% of risk-weighted assets. These ratios are in line with those levels that the Financial Policy Committee (FPC) has judged appropriate for the UK banking system, in aggregate, given prevailing risk-weight measures.¹

On a Basel III basis, the major UK banks’ aggregate leverage ratio is 4.7% of total exposures, above the current total of minimum requirements and buffers of 3.2% (Chart B.2). On 4 August 2016, the FPC announced its decision to exclude central bank reserves from the exposure measure in the UK leverage ratio framework, to ensure that the leverage ratio does not act as a barrier to the effective implementation of policy measures that might lead to an increase in central bank reserves.² This exclusion mechanically reduces the nominal amount of capital required to meet the current leverage ratio standard. However, the FPC intends to recalibrate the

¹ For further details on the FPC’s judgement on the appropriate level of capital for the banking system: www.bankofengland.co.uk/publications/Documents/fsr/2015/fsrsupp.pdf.

² This change was initially made on a temporary basis following an FPC Recommendation. Subject to its 2017 review, the FPC intends to take steps to ensure that the change can be put in place on a permanent basis, including by asking HM Treasury to change the relevant statutory instrument.
The Basel III leverage ratio corresponds to aggregate peer group Tier 1 capital over aggregate weighted by total exposures.

Prior to 2012, data are based on the simple leverage ratio defined as the ratio of equity raising, retained earnings and RWA reduction (a)(b)(c) estimated allocation of changes to UK banks’ CET1 ratios due to the crisis (Chart B.3).

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

(a) Prior to 2012, data are based on the simple leverage ratio defined as the ratio of shareholders’ claims to total assets based on banks’ published accounts (note a discontinuity due to introduction of IFRS accounting standards in 2005, which tends to reduce leverage ratios thereafter). The peer group used in Chart B.1 also applies here.

(b) Weighted by total exposures

(c) The Basel III leverage ratio corresponds to aggregate peer group Tier 1 capital over aggregate leverage ratio exposure. Up to 2013, Tier 1 capital includes grandfathered capital instruments and the exposure measure is based on the Basel 2010 definition. From 2014 H1, Tier 1 capital excludes grandfathered capital instruments and the exposure measure is based on the Basel 2014 definition. The Basel III peer group used in Chart B.1 also applies here.

UK banks have further strengthened their liquidity and funding positions.

Major UK banks have continued to strengthen their liquidity and funding positions. Their aggregate Liquidity Coverage Ratio, which measures the ratio of a bank’s liquid assets to the net outflows it might face under stressed conditions, was 121% in September 2016. Under proposals from the Basel Committee on Banking Supervision banks will also be subject to a Net Stable Funding Ratio (NSFR) requirement, whereby long-term assets will need to be backed by stable sources of funding. The implementation date for the NSFR requirement in the European Union is still to be confirmed. In aggregate, major UK banks have sufficient stable funding to meet the amount required under the provisional proposals.

UK-focused banks’ share prices remain low...

UK bank equity prices fell sharply following the UK referendum on membership of the European Union, but have since rebounded. On a weighted average basis, bank equity prices are back to their levels at the start of 2016 (Chart B.4). However, UK-focused banks have performed worse than internationally focused ones: the three largest UK-focused...
banks’ share prices are down 18% on average since the beginning of the year.

UK banks’ price to book ratios, which measure the market value of equity relative to the value of equity reported on banks’ balance sheets, remain low: the average ratio for the four largest UK banks is 0.7. This measure of bank value is considerably lower than pre-crisis levels (Table B.1).

...though asset quality has improved, suggesting investors are instead concerned about long-term profitability.

There is little evidence that low price to book ratios reflect perceptions of weak asset quality. Indicators of the quality of banks’ assets have improved in recent years. For example, ‘fair value deductions’ — which indicate how the book value of banks’ equity would be affected if they were required to take account of losses on customer loans not covered in the current accounting framework — have fallen materially for UK banks since the crisis (Chart B.5).

Similarly, measures of non-performing loans have improved substantially. UK banks have much lower ‘Texas ratios’ — the ratio of non-performing loans to total equity capital and loan-loss reserves — than many European counterparts with similar price to book ratios (Chart B.6).

Low price to book ratios instead appear to reflect a decline in UK banks’ perceived ‘franchise value’: their ability to generate returns for shareholders over the medium term.

While net interest margins have been maintained...

UK banks’ profitability has been persistently weak since the financial crisis. Their average reported return on equity (RoE) was 2% at end-2015, compared to an average of around 18% in 2005-07 (Chart B.7).

These falls in RoE have been contained to some extent as banks have maintained their net interest margins (NIMs) throughout a prolonged period of low rates. Falls in deposit rates have broadly offset lower lending rates (Chart B.8). Reflecting this, average reported NIMs in 2015 were around 2.3%, similar to their 2007 levels.\(^{(1)}\) Margins are expected to remain stable, despite recent falls in interest rates. In August, the Monetary Policy Committee (MPC) announced a further cut in Bank Rate to 0.25%, but this was accompanied by a Term Funding Scheme allowing banks access to funding at rates reflecting the fall in Bank Rate. This was intended to help reinforce the transmission of the reduction in Bank Rate to the real economy to ensure that households and firms benefit from the MPC’s actions. As set out in the November
Inflation Report, the cut in Bank Rate has been largely passed through to lower rates on deposits and borrowing.

...concerns about profitability reflect a number of headwinds.

Against this background, investor concerns reflect the fact that UK banks face material headwinds to restoring profitability, including legacy misconduct issues and weak investment banking returns.

Costs related to past misconduct have been a persistent drag on UK banks’ profitability. As an illustration, UK banks’ ‘underlying’ RoE, which strips out misconduct costs as well as one-time charges such as restructuring costs, was 8% in 2015, more than double the RoE actually achieved (Chart B.7). Major UK banks have paid out around £40 billion in fines and other redress costs since the beginning of 2011, with an additional £18 billion set aside at end-2015 in provisions for future misconduct costs. A substantial proportion of misconduct costs for UK banks has related to the mis-selling of payment protection insurance (PPI). The Financial Conduct Authority has proposed a deadline of June 2019 for PPI mis-selling claims. A number of other misconduct issues are also ongoing in the United Kingdom and abroad. The 2016 stress test includes an aggregate stressed projection for misconduct costs over and above those incurred or provided for at end-2015 of around £40 billion between 2016 and 2020.

The profitability of the investment banking businesses of UK banks has been weak since the crisis, with estimated average returns below those for UK retail banking (Chart B.9). While some of this weakness is likely to be cyclical, structural changes may make improving these businesses’ profitability challenging. Certain business lines, such as proprietary trading and some forms of securitisation, have shrunk materially. Demand for some other investment banking services and products, such as complex derivatives, may also have fallen following the crisis.

A prolonged period of low profitability would threaten banks’ ability to rebuild capital following future shocks to their balance sheets. As the sale or closure of non-core businesses is completed, UK banks are likely to be increasingly reliant on their ability to retain earnings, or attract equity investment, in order to maintain credit supply in the event that they draw down their capital buffers following a shock. At current levels of profitability and typical dividend payout ratios, it would take the average UK bank over four years to increase its capital ratio by 1 percentage point through retained earnings.

The United Kingdom’s withdrawal from the European Union could have further implications for the resilience of the UK financial system more broadly. To the extent that UK-incorporated banks risk losing their current ability to serve...
clients based in the European Economic Area (EEA) on a cross-border basis, some restructuring of corporate and investment banking businesses could be required in order to continue to serve those clients. Legal structures may need to be changed, regulatory permissions and authorisations obtained, and internal structures adjusted.

Such changes could raise the costs associated with some activities, posing further challenges to return on equity for corporate and investment banking units. The extent of this will depend on how far additional costs can be passed through to end clients and, where business volumes are cut back, how far costs can be reduced in line with revenues.

In addition, although affected firms are undertaking contingency planning, restructuring could test firms’ operational resilience, particularly if there were to be insufficient time to implement changes smoothly once the United Kingdom’s new arrangements with the European Union are known. The FPC is continuing to assess the extent of these risks, drawing on supervisory intelligence.

Market indicators support a view that resilience has improved...

Market indicators of low default risk are consistent with regulatory capital measures. Indicators of default risk have fallen since the July Report, and remain significantly below levels seen during past periods of market stress. These include funding spreads, which directly reflect the perceived risk of a bank defaulting on its creditors, and CDS premia, which measure the price of insuring against bank default (Table B.2).

On a historical comparison, some market indicators of bank risk (such as CDS premia or covered bond spreads) remain at or above their pre-crisis levels. There are two plausible reasons for this, other than suggesting that banks are now more or equally risky.

First, risk was mispriced before the crisis, as market participants paid insufficient regard to the possibility of bank failures, either because there had been a long period of stability, or because the size or riskiness of many exposures were not visible to them. Reforms since the crisis have mandated significant improvements in the transparency of banks’ balance sheets.

Second, market participants previously expected systemic institutions to receive state support in stress, in part due to the absence of a credible resolution regime for banks. The development of such a regime since the crisis means that investors can no longer rely on this implicit subsidy and therefore have to internalise some of the cost of default, with consequences for funding costs for these banks.
...and progress on establishing an effective resolution regime has continued, though EU withdrawal may pose challenges.

In the United Kingdom, the Bank published on 8 November its policy approach to determining the minimum amount of loss-absorbing resources that a firm should hold in order to make it resolvable (known as the minimum requirement for own funds and eligible liabilities, or MREL). (1) For a firm that provides essential functions to the economy, MREL is necessary to ensuring that the resolution strategy can maintain the continuity of these services to households and businesses. Such firms will need to raise MREL resources, including through restructuring existing liabilities in order to meet their interim requirements in 2020 and the full requirement that is due to come into force in 2022.

Restructuring of banking businesses in response to a change in the United Kingdom’s relationship with the European Union could lead firms to seek to operate more complex business models to serve EEA-based clients. As well as placing greater demands on firms’ own risk management and supervisory oversight, this complexity could present challenges to firms’ resolvability. While resolution action taken at the top of a banking group can generally avoid the need to address the operational intricacy below it, the scale of these challenges will depend on the extent and precise nature of any changes. The FPC, together with the Prudential Regulation Authority and the Bank, will monitor the evolution of these risks in coming months. The Bank has legal powers to direct firms to address impediments to resolvability, including to ensure operational continuity of critical services in resolution.

Low profitability may pose a risk to resilience in future.

The FPC judges that the UK banking system’s capital and liquidity positions would be resilient to a severe near-term stress. However, weak profitability diminishes banks’ future ability to rebuild capital following a shock while also maintaining credit supply.

The Bank will run an ‘exploratory’ scenario alongside the 2017 annual cyclical scenario to consider the impact of weak global supply growth, persistently low interest rates, a continuation of declines in world trade relative to GDP and cross-border banking activity. The focus of the test will be on the implications for banks’ business models, the economic impact of any actions they would take to ensure their viability and the implications for their future resilience.

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### Table B.2 Market indicators do not suggest concerns about banks’ resilience

**Selection of market indicators for UK banks**

<table>
<thead>
<tr>
<th></th>
<th>Pre-crisis</th>
<th>Global financial crisis</th>
<th>Euro sovereign debt crisis</th>
<th>July Report</th>
<th>Latest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price to book ratio*<a href="a">1</a></td>
<td>1.90</td>
<td>0.33</td>
<td>0.43</td>
<td>0.53</td>
<td>0.70</td>
</tr>
<tr>
<td>Additional Tier 1*[b]</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>737</td>
<td>660</td>
</tr>
<tr>
<td>Senior CDS*[c]</td>
<td>5</td>
<td>222</td>
<td>319</td>
<td>134</td>
<td>97</td>
</tr>
<tr>
<td>Senior unsecured bonds*[d]</td>
<td>–</td>
<td>368</td>
<td>322</td>
<td>96</td>
<td>59</td>
</tr>
<tr>
<td>Covered bonds*[e]</td>
<td>-2.4</td>
<td>218</td>
<td>127</td>
<td>11</td>
<td>3</td>
</tr>
</tbody>
</table>


(a) UK banks are Barclays, HSBC, LBG and RBS.
(b) Funding spreads are measured in basis points.
(c) Relates the share price with the book, or accounting, value of shareholders’ equity per share. Price to book ratios are adjusted for currency movements.
(d) Simple average of secondary market spreads over government bonds.
(e) Simple average of five-year euro senior CDS premia.
(f) Constant-maturity simple average of secondary market spreads to mid-swaps for five-year euro senior unsecured bonds, or a suitable proxy when unavailable.
(g) Constant-maturity simple average of secondary market spreads to swaps for five-year euro-denominated covered bonds or a suitable proxy.

(1) [www.bankofengland.co.uk/publications/Pages/news/2016/082.aspx](http://www.bankofengland.co.uk/publications/Pages/news/2016/082.aspx)
Box 1
Results of the 2016 stress test of the UK banking system

Summary
The 2016 stress test, which is the first conducted under the Bank’s new approach to stress testing, examined the resilience of the system to a more severe stress than in 2014 and 2015. It also judged banks against the Bank’s new hurdle-rate framework, which held systemic firms to a higher standard reflecting the phasing-in of capital buffers for global systemically important banks.

The test incorporated a synchronised UK and global recession with associated shocks to financial market prices, and an independent stress of misconduct costs.

While the Prudential Regulation Authority (PRA) Board judged that some capital inadequacies were revealed for three banks (The Royal Bank of Scotland Group, Barclays and Standard Chartered), these banks now have plans in place to build further resilience. The Financial Policy Committee (FPC) judged that, as a consequence of the stress test, the banking system is in aggregate capitalised to support the real economy in a severe, broad and synchronised stress scenario.

2016 stress-test scenario
The 2016 stress test assessed the resilience of the largest UK banks and building societies (hereafter referred to as ‘banks’) to a ‘tail risk’ scenario, the severity of which was based on the risk assessment the FPC and PRA Board made in March 2016. The 2016 scenario has annual global GDP growth reaching a trough at -1.9%, as it did during the 2008 global financial crisis. The level of UK GDP falls by 4.3%, accompanied by a 4.5 percentage point rise in the unemployment rate. The UK stress is roughly equivalent to that experienced during the 2008 global financial crisis. Nevertheless, at 8.8%, that low point was well above the 7.6% reached in 2014 and 2015. This strength of banks’ aggregate capital position in the 2016 stress test reflects improvements in their starting capital positions.

What is driving the results?
Relative to the baseline, by the low point at end-2017 the stress reduces the aggregate CET1 capital ratio by 5.0 percentage points and leverage ratio by 1.4 percentage points. This reflects a range of factors, including:

• Loan impairment charges amount to £63 billion over the first two years of the stress, around £46 billion higher than projected in the baseline.
• Traded risk losses, including the shortfall of investment banking revenue net of costs, reduce bank capital by £20 billion by the end-2017 low point, relative to the baseline projection.
• Net interest income is around £3.5 billion lower in the stress relative to banks’ aggregate baseline projection over the first two years of the stress. This reflects lower loan growth in response to weaker demand for credit, as well as tighter spreads between sterling loans and deposits.
• Stressed projections for misconduct costs beyond those provided for at the end of 2015. Around £30 billion of these additional misconduct costs are projected to be realised by the end of 2017.
• A projected 16% rise in aggregate risk-weighted assets in the first two years of the stress.

The impact of the stress is in part mitigated by significant cuts to ordinary dividends with payments modelled to be just £1.6 billion in the first two years of the stress.

The Bank has also modelled the conversion of AT1 instruments into CET1 capital for the three banks whose CET1 ratios fell below 7% in the stress. In aggregate, these conversions increase the CET1 ratio at the low point of the stress by 0.4 percentage points, from 8.4% to 8.8%.

References
(3) The seven participating banks and building societies are Barclays, HSBC, Lloyds Banking Group, Nationwide, The Royal Bank of Scotland Group, Santander UK and Standard Chartered.
Box 2
Building cyber resilience in the UK financial sector

Cyber and technology-enabled attacks continue to be a serious threat to the resilience of the UK financial system. High-profile incidents in 2016 have raised awareness of the importance for institutions of ensuring that they have appropriate controls and measures in place to counter fraud. This box summarises the important progress that has been made in building cyber resilience in the UK financial sector, following FPC Recommendations.

Cyber attack testing

Important progress has been made by many financial services firms, financial market infrastructures (FMIs) and regulators in building cyber resilience. In response to the FPC’s June 2013 cyber Recommendation (which was replaced in June 2015), the UK authorities developed and implemented the CBEST framework (Table 1).

Table 1 FPC’s cyber Recommendations


In June 2013, the FPC recommended that:

‘HM Treasury, working with the relevant government agencies, the PRA, the Bank’s financial market infrastructure supervisors and the FCA should work with the core UK financial system and its infrastructure to put in place a programme of work to improve and test resilience to cyber attack.’

In July 2015, the June 2013 Recommendation was replaced with the following Recommendation:

‘The FPC recommends that the Bank, the PRA and the FCA work with firms at the core of the UK financial system to ensure that they complete CBEST tests and adopt individual cyber resilience action plans. The Bank, the PRA and the FCA should also establish arrangements for CBEST tests to become one component of regular cyber resilience assessment within the UK financial system.’

Under CBEST, firms and FMIs at the core of the UK financial system have been subject to simulated cyber attack, designed specifically for each firm and FMI, drawing on government and private sector intelligence and expertise. The first round of the CBEST vulnerability testing programme is now materially complete (Chart A). Thirty out of 35 core firms and FMIs have completed CBEST tests, three times the number at the time of the December 2015 Report.

CBEST has shown that financial sector resilience against cyber attack is increasing. Firms and FMIs have improved their resilience and are more alert to risks to critical economic functions. The tests have also highlighted and reinforced some core lessons for resilience to cyber attack. For instance:

- many cyber vulnerabilities can be traced back to weaknesses in basic controls that all organisations should have in place to protect the confidentiality, integrity and availability of systems and information;
- organisations need to invest in their capability to detect and limit the impact of penetration of their external defences to cyber attack, not just in the external defences themselves; and
- mitigation of cyber risk requires both technological solutions and investment in people, business practices and ways of working.

Where weaknesses in individual firms’ and FMIs’ resilience have been identified by CBEST testing, remediation plans have been put in place. Where appropriate, these require expedient actions by firms and FMIs. Such firms and FMIs have been subject to close and continual review by the authorities and further tests to validate that remedial actions have been effective. Other components of firms’ and FMIs’ supervisory action plans have included: in-depth cyber reviews; demonstrations to the authorities of technical controls and processes; improvements to the governance of cyber risk management; and the introduction of processes to ensure firms and FMIs continually develop and improve cyber resilience. Company boards are ultimately accountable for remediying cyber vulnerabilities, for delivery of supervisory action plans and for their organisation’s cyber risk management and resilience in general.

The future of cyber testing

Consistent with the FPC’s Recommendation that CBEST testing becomes one component of regular cyber resilience assessment, the UK authorities have developed proposals to embed CBEST into the supervisory process.
The future CBEST framework will have three main elements:

- firms will be expected to conduct their own regular testing of cyber resilience;
- firms’ own testing and resilience will be subject to regular ‘spot checks’; and
- certain critical firms will be subject to regular concurrent cyber resilience testing, using a common ‘scenario’ or ‘threat’, set by the financial authorities in conjunction with government agencies, such as the new National Cyber Security Centre (NCSC).

This approach will embed cyber resilience testing as part of firms’ and FMIs’ general risk management, and will deliver comparable results across subsets of similar firms.

Broadening the assessment of cyber resilience

Cyber testing, such as CBEST, is just one component of the UK authorities’ broader programme of work to improve cyber resilience in the financial system, which has been supported by the FPC and is vital given the rapidly evolving nature of cyber threats (Table 2). This programme is being pursued both domestically and internationally, given the cross-jurisdictional threat posed by cyber risk.

<table>
<thead>
<tr>
<th>Table 2 UK authorities’ cyber resilience plan: main elements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Firm specific</strong> — setting expectations for core firms which underpin the operational functioning of the financial system, with a supervisory toolkit to test firms’ progress against these expectations.</td>
</tr>
<tr>
<td><strong>Sector wide</strong> — taking a whole-of-sector view of cyber resilience and driving the right capabilities throughout the sector to address vulnerabilities and respond to incidents.</td>
</tr>
<tr>
<td><strong>Recovery and response</strong> — defining the capabilities needed by firms to maintain and recover critical economic functions in the event of a catastrophic data loss or disruption to applications caused by a cyber attack.</td>
</tr>
<tr>
<td><strong>International</strong> — developing consensus internationally on ways to manage dependencies on cross-border financial systems and working towards common standards.</td>
</tr>
</tbody>
</table>


The UK authorities plan to develop supervisory assessment of all elements of firms’ and FMIs’ cyber resilience capabilities. This will include those elements not directly or fully covered by the CBEST framework. The standards will be based on internationally developed guidance on cyber resilience for the financial sector, published by the G7 Cyber Expert Group, which is co-chaired by the Bank. Such an approach will help to ensure that firms’ and FMIs’ cyber risks will be subject to the same standard of regulatory requirements as prudential risks in future. These cyber resilience standards are consistent with existing guidance published by HM Government.

UK authorities, working with the NCSC, are further simplifying and improving mechanisms for information sharing across the financial sector. A single cross-market operational resilience group has been established. And firms have received guidance from the sector on the reporting of cyber incidents to government agencies and financial authorities.

In response to the recent incident at Tesco Bank, the UK authorities activated a contingency plan, as part of the Authorities’ Response Framework, to share intelligence across firms, allowing other institutions to review their own resilience to such threats.

Firms, FMIs and financial authorities continue to improve their incident response capability. Following the UK and US authorities’ joint exercise on cyber resilience in 2015, communication protocols to assist firms and governments to respond to cyber incidents have been enhanced. And work is ongoing to improve intelligence and information handling. Reporting mechanisms are now aligned across the US and UK Authorities’ Response Frameworks to aid joint communication and response activities. Further actions will be implemented in the coming months.

Market-based finance is an important component of the UK financial system, supporting the provision of financial services to the real economy. The provision of market-based finance relies on the resilience of market liquidity, which remains uneven. Core financial markets have functioned effectively since the July Report, though the ‘flash event’ in the sterling exchange rate underscores the concern that liquidity in some markets may have become more fragile in recent years. Core intermediaries, such as dealers, continue to be resilient. But the willingness of dealers both to extend repo financing and intermediate investment flows has been declining. Market liquidity could be tested by high demand for liquidity services during a stress, including from open-ended investment funds and insurers. It could also be challenged during a period of adjustment related to the United Kingdom’s new trading relationship with the European Union.

Market-based finance is an important component of the UK financial system.
Market-based finance has become increasingly important over the past few years, as a means of providing financial services to the real economy. Non-bank financial institutions represent key sources of market-based finance and account for almost half of the UK financial system’s total assets, up by 10 percentage points since 2009 (Chart B.10). These institutions provide finance to the real economy, predominantly by investing in capital markets, such as equity and corporate bond markets. Sterling investment-grade issuance by UK companies had fallen off around the UK referendum on membership of the European Union, but has since picked up sharply following the announcement by the Monetary Policy Committee of its intention to purchase corporate bonds (the Corporate Bond Purchase Scheme (CBPS)) (Chart B.11).

The provision of market-based finance is more likely to be stable when financial markets are liquid and function smoothly. Resilient financial markets are vital to the functioning of the economy, providing essential services to borrowers and savers and to financial institutions that intermediate credit to households and companies, including real money investors and commercial banks.

Core financial markets have functioned effectively...
Core markets have generally functioned well since the July Report, despite testing conditions. These include periods of extremely high trading volumes in foreign exchange and futures markets and, more recently, marked increases in advanced economy government bond yields (see Financial market fragility chapter). For example, on the day following...
Given its conclusion in the July Report that there has been some reduction in the liquidity of some government and fixed-income markets more recently. This may in part reflect the implementation of reforms in mid-October that aim to address risks associated with Money Market Fund (MMF) holdings of private sector assets. As a result of these reforms, there has been growth in US Government MMFs, which conduct a significant amount of repo with banks collateralised with government securities. In the United Kingdom, the latest Bank of England Money Market Liaison Committee (MMMLC) survey, conducted in the first half of 2016, found that, on balance, perceptions of sterling secured market functioning improved in the six months to May (Chart B.14). However, the market was deemed to be functioning poorly overall.
corporate bond markets in recent years, most markedly in the repo markets, the FPC welcomes the announcement that the Financial Stability Board (FSB) will undertake further monitoring and analysis on global market depth and funding liquidity conditions. This will include a cross-jurisdiction study of developments in repo markets by the Committee on the Global Financial System, given the importance of these financing markets for overall market liquidity and functioning.

Markets could be tested by high demand for liquidity, including from open-ended investment funds...

Dealers further support market liquidity through the direct provision of liquidity services, by intermediating flows between investors. These services are particularly important in the context of some fixed-income markets, including for corporate securities. In recent years, however, dealer inventories have been falling, for example, inventories of US corporate bonds held by US primary dealers have fallen to around 40% of their average level between 2002–05. This may be an indication of dealers’ reduced willingness to allocate balance sheet capacity to the warehousing of securities that is necessary to intermediate between buyers and sellers in these markets.

Such reduction in the supply of liquidity services is in stark contrast to potential increases in the demand for liquidity, including, for example, from open-ended investment funds.

Total assets of open-ended investment funds worldwide have nearly doubled following the global financial crisis. While strong growth in equity funds’ assets largely reflects valuation gains, net inflows have played a bigger role in the growth of bond funds (Chart B.15). Consistent with this, open-ended bond funds hold a larger proportion of the corporate bonds in issuance than in 2008 (Chart B.16).

High demand for liquidity from sterling corporate bond funds did not materialise during the period of heightened uncertainty around the UK referendum on EU membership. In contrast to outflows seen from UK commercial real estate funds (see UK commercial real estate chapter) and UK-focused equity funds, sterling corporate bond funds experienced net inflows. However, during this period, corporate bond prices typically rose, in line with those of sovereign bonds. The risk remains that, were prices of fixed-income securities, including corporate bonds, to fall, these funds could experience outflows. Large-scale redemptions could result in sales of securities by funds that might test the ability of dealers to intermediate them. Procyclical behaviour by investors (redeeming from funds as returns fall) could amplify these effects.

The FSB has developed proposals to address structural vulnerabilities related to asset management activities, which the FPC supports; in particular, that: (i) authorities give...
consideration to system-wide stress testing as a way to capture effects of collective selling by funds and other investors; (ii) funds’ investment strategies should be consistent with the terms and conditions governing fund unit redemptions; and (iii) authorities should develop simple and consistent measure(s) of leverage in funds to enhance their understanding of related risks (see Financial stability risk and regulation beyond the core banking sector chapter).

... and procyclical investment behaviour of insurers.
Market perceptions of insurers’ resilience appear to have improved since the July Report. Equity prices of UK insurers have recovered following significant falls in the immediate aftermath of the EU referendum (Chart B.17). However, the solvency position of life insurers could be adversely affected by a persistent low interest rate environment as low rates increase the present value of their liabilities, which are typically long term. Since the July Report, the UK ten-year swap rate has increased 45 basis points, but has fallen 59 basis points since the start of the year.

The FPC has assessed the propensity of UK life insurers to invest procyclically (see Risks to financial stability from insurers’ investment behaviour chapter). It has concluded that the current design of the ‘risk margin’ element of Solvency II rules could, in future, encourage procyclical investment behaviour, and should be addressed, including through the forthcoming review of Solvency II by the European Commission. Such incentives should also be avoided in the International Capital Standards for insurers, which are being developed by the International Association of Insurance Supervisors.

Market liquidity and market-based finance could also be challenged by the United Kingdom’s new relationship with the European Union.
A period of adjustment related to the United Kingdom’s new relationship with the European Union could also have implications for market liquidity. For example, it could impact levels of activity in exchanges and other trading venues. It could also affect the level of market-making activity by intermediaries as they adjust business structures.

Over time, the provision of market-based finance more generally could be affected. The UK financial system is diverse and combines large pools of capital, sourced from across the world, with the means of accessing that capital, through services provided to both domestic and international borrowers. This clustering — or agglomeration — of activity contributes to deep and liquid markets, which support the provision of market-based finance. If the United Kingdom’s withdrawal from the European Union were to fragment capital markets, these benefits could eventually be eroded. This could result in a gradual shift in the financing of UK and EU companies towards banks and away from market-based
finance, reducing diversification and potentially diminishing the resilience of credit provision. The extent of this may also depend on how far loss of agglomeration benefits raises the costs of equity and debt issuance for real economy borrowers, which the FPC will assess over time.

**The Bank is continuing to develop a system-wide stress simulation to assess the dynamics of markets under stress.**

In the context of concerns around market liquidity, the Bank is developing a system-wide stress simulation, to assess the dynamics of markets under stress. It will include an analysis of the behaviour of various sectors — such as open-ended investment funds, insurance companies and dealers (see Financial stability risk and regulation beyond the core banking sector chapter).

The FPC has further concluded that unit-linked insurance products share some economic similarities with open-ended investment funds, with investors able to switch between funds at short notice. Such flexibility could lead to procyclical investment behaviour, particularly during times of stress. The Bank will include unit-linked funds in its system-wide stress simulation.
Box 3
Issues around the sterling flash event

In the early hours of 7 October, sterling depreciated by around 9% against the US dollar in less than 40 seconds, before quickly retracing much of the move. (1) This ‘flash event’ is the most recent of a series of episodes of heightened short-term volatility (Chart A), which have largely centred on markets with widespread use of electronic and high-frequency trading.

While such disruptions have generally proved to be short-lived, and without immediate consequences for financial stability, they nevertheless underscore the concern that liquidity in some markets may have become more fragile in recent years. (2)

No material losses were reported by major UK banks as a consequence of the sterling flash event. But if occurrences of heightened volatility were to increase in frequency, or if market dysfunction lasted longer in future episodes, confidence in affected markets could be undermined, potentially impairing financial stability. For example, further flash events in sterling exchange rates could lead to an increase in the trading and hedging costs faced by market participants. This could increase the return required by investors for holding sterling-denominated assets, increasing funding costs faced by the UK government and corporate sector.

The Bank for International Settlements (BIS) Markets Committee is preparing a report on the sterling flash event to which the Bank of England has submitted detailed analysis. A final report will be submitted by the Markets Committee to the Economic Consultative Committee (ECC) of Governors in January. (3)

This box provides a high-level description of the movements in sterling on 7 October 2016, including the possible triggers of the event and the factors that acted to amplify volatility during it. It focuses on movements in the sterling exchange rate against the dollar, though corresponding movements were seen against other currencies.

Description of movements during the event

The movements in sterling can be described in three stages.

Shortly after midnight on 7 October, trading volumes in the sterling exchange rate increased significantly and, between 12:07:03am and 12:07:11am, sterling depreciated from 1.26 to 1.25 against the dollar. (4)(5) The price movement over this period was orderly, with bid-offer spreads remaining unchanged, and the price impact of individual trades not unusually elevated.

Sterling continued to fall sharply. At 12:07:15am it had fallen below 1.24 against the dollar, with the speed of price movements triggering a trading halt for sterling/US dollar futures on the Chicago Mercantile Exchange (CME) futures platform (Chart B). Continued selling pressure depleted the ‘resting’ orders that were in place to buy sterling on a range of major trading venues. Following this, market functioning became highly impaired for a period of just over ten minutes: order book depth was much lower than usual, individual trades had an unusually large impact on prices, and significant gapping was observed between traded prices. During this period, there was a sharp drop off in participation on key trading venues, which points to a potentially greater role for the idiosyncratic actions of individual market participants in driving the subsequent price falls below 1.20 against the dollar.

By around 12.20am, the market began to recover. Sterling retraced to stand around 2.2% lower against the dollar than its level immediately prior to the event. By this time, market participants had begun to return to major trading venues, and order book depth had improved. Orderly market functioning resumed relatively quickly, though trading volumes and bid-offer spreads remained higher than their usual overnight

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Notes:
1. Based on traded prices observed on Reuters Matching foreign exchange platform.
3. The ECC is an 18-member group of Central Bank Governors hosted by the BIS.
4. All dates and times in this section are given in British Summer Time (GMT+1).
5. Based on the mid-price on Reuters Matching foreign exchange platform.
levels. Spillovers to non-sterling currencies or other asset classes during the event were limited. UK government bond yields rose sharply when the market opened the following morning, but trading was orderly, and there was no apparent impact on risky asset prices.

Though the peak-to-trough fall in sterling was of a similar magnitude to the overnight fall following the EU referendum, the events on 7 October are set apart by the lack of a clear fundamental trigger, the speed with which developments took place, the fact that the price move reversed almost entirely, and the short-lived but severe impairment of market functioning and price discovery. In contrast, as detailed in the July Report, foreign exchange markets appeared resilient following the EU referendum, with no apparent impairment of price discovery.

**Triggers and amplifiers during the sterling event**

**Context and trigger**

The sterling move began shortly before the publication of a news story containing information that market participants interpreted as supporting a depreciation of sterling. This timing suggests that, while the story may have acted to reinforce the negative pressure on sterling, it was not the initial trigger. A number of other potential triggers have been suggested by market participants. These include: a large trade executed erroneously (a so-called ‘fat finger’ error), the use of a poorly calibrated execution algorithm, unsophisticated retail trading, or a deliberate attempt to move the price lower. It is hard to definitively rule out these possibilities as not all activity in the foreign exchange market is observable.

Regardless of the trigger, it is likely that the relatively low level of liquidity at the time of day when the incident occurred meant the market was more vulnerable to an imbalance in order flow. Though the foreign exchange market is open for 24 hours a day during the week, the majority of trading in sterling/US dollar takes place between 7am and 5pm UK time, with volumes highest when the London and New York markets are open (Chart C). Accordingly, measures of liquidity are typically lower outside these hours. During the event, volumes transacted on Reuters’ foreign exchange platform were over 80 times their average level for the same time of day over the preceding week.

**Functioning of critical trading infrastructure**

The sterling event did not appear to be amplified by any weaknesses in critical trading infrastructure. There were no reported issues with major foreign exchange platforms and banks’ risk management controls generally functioned as expected.

However, the presence of circuit breakers on some foreign exchange trading venues may have contributed to a sharp withdrawal of liquidity across the market more broadly. In addition to the trading pause on the CME futures market following the initial price movement, a number of further pauses were triggered on the same platform given the continued volatility (Chart B). These trading pauses could have discouraged firms from participating in the spot market given some firms may be reliant on the CME for pricing information.
Procyclical and mechanistic responses to price falls
The fall in sterling is likely to have been amplified by mechanistic selling by some market participants in order to hedge options positions by transacting in the spot market, and to fulfil orders placed with them by clients. In some cases, this selling may have occurred without regard to underlying market conditions or likely price impact of trading.

Data gathered from firms supervised by the Prudential Regulation Authority point to a concentration of exotic options positions whose risk profiles were highly sensitive to falls through the 1.22–1.25 level in sterling/US dollar. The increase in selling pressure observed as the spot price passed through these levels may in part be explained by hedging flows related to these positions.

In addition, the subsequent fall in sterling may have been exacerbated by the use of algorithms that were inappropriate for the trading conditions observed around the time of the flash event.

Withdrawal of liquidity providers
As in some previous episodes of heightened volatility, the initial fall in sterling may also have been amplified by the withdrawal of market participants in their role as market makers. A number of banks have confirmed that they withdrew from market-making during the sterling episode, as automated controls designed to protect them from volatile market conditions were triggered. And market contacts suggest that some non-bank market makers may also have withdrawn or widened pricing during the event. This resulted in a sharp decline in depth in the spot market (Chart B).

The FPC is continuing its analysis of developments in market liquidity, including in fast, electronic markets, particularly in light of this event. The FPC, drawing on the work of the BIS Markets Committee, will seek to examine the potential implications for financial stability if episodes of heightened market volatility become more frequent, or if market dysfunction is longer-lasting in any future event.
Financial stability risk and regulation beyond the core banking sector

The Bank of England Act 1998, as amended by the Financial Services Act 2012, gives the FPC responsibility to identify, assess, monitor and take action in relation to financial stability risks across the UK financial system, including risks arising from beyond the core banking sector. (1)

To meet this responsibility, the FPC conducts an annual assessment of financial stability risk and regulation beyond the core banking sector. This process also helps ensure that the UK authorities adhere to the Financial Stability Board’s (FSB’s) policy framework for shadow banking entities, which asks authorities to define and keep up to date the regulatory perimeter. (2)

This chapter provides an update on the progress the FPC has made following its 2015 annual assessment and presents an overview of its 2016 assessment. In summary:

• The FPC is not recommending any changes to the regulatory perimeter at this stage.

• Further to its in-depth assessment of the activities of open-ended investment funds in 2015:
  – The FPC supports the proposals being developed by the FSB to address structural vulnerabilities related to asset management activities.
  – The FPC supports the FCA’s intention to publish a discussion paper on the potential challenges associated with open-ended funds investing in illiquid assets, including commercial real estate (CRE).
  – The FPC supports the Bank’s ongoing work to develop a system-wide stress simulation, which will include an analysis of the behaviour of various sectors such as open-ended investment funds, insurance companies and dealers.
  – The FPC has completed an in-depth assessment of risks to financial stability associated with the investment activities of insurers (see Risks to financial stability from insurers’ investment behaviour chapter).
  – The FPC is continuing its analysis of developments in market liquidity, including in fast, electronic markets, particularly in light of the flash event in the sterling exchange rate on 7 October 2016 (see Box 3).

• Further to the FPC noting marked changes in repo market conditions in the July 2016 Report, the Bank is contributing to an international review of repo market functioning by the Committee on the Global Financial System (CGFS).

• The FPC has asked the Bank to complete an in-depth assessment of the financial stability risks associated with derivative transactions. This will examine progress towards implementation of the post-crisis reforms in derivatives markets and consider the implications for the resilience of the financial system.

• The FPC, alongside the MPC, will continue to monitor closely developments in defined-benefit pension fund deficits in the current low interest rate environment (see November 2016 Inflation Report). It will also monitor closely a number of fast-growing areas, including exchange-traded funds, peer-to-peer lending, and other innovations in financial technology.

Activity-based risk-assessment framework
Risks arising from beyond the core banking sector reside in financial markets and the activities of non-bank financial institutions (NBFIs). Globally, NBFIs account for a significant proportion of financial system assets. In the United Kingdom, despite a particularly large banking system due to its international nature, NBFIs account for almost half of the UK financial system’s total assets (see Market-based finance chapter). By comparison, NBFIs account for 60% and just under a half of the US and euro-area financial systems, respectively. (3)

The FPC assesses risks from financial markets and the activities of NBFIs by focusing on three key transmission channels: (i) the provision of critical services; (ii) risks to systemically important counterparties; and (iii) disruption to systemically important financial markets. Each transmission channel is considered to present greater risks when combined with

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(1) 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 powers in respect of information gathering.


slores of fragility, such as leverage and liquidity or maturity mismatch between assets and liabilities.\(^{(1)}\)

**Progress update since 2015 assessment**

Since its last annual assessment in July 2015, the FPC has completed three in-depth reviews:\(^{(2)}\)

(i) **Open-ended investment funds**

Total assets of global open-ended investment funds have nearly doubled since end-2008, from around US$20 trillion to just under US$40 trillion at mid-2016. Fixed-income funds have more than doubled over this period to nearly US$9 trillion. The growth in these funds reflects investor demand for fixed-income assets, including those issued by UK businesses. On a cumulative basis, virtually all net financing raised by UK private non-financial businesses since the crisis has been in the form of bond rather than bank finance.

Open-ended investment funds offer short-term redemptions; and in some cases invest in longer-dated and potentially illiquid assets, giving rise to a liquidity mismatch. Large-scale investor redemptions could result in sales of assets by funds that might test markets’ ability to absorb them, potentially amplifying market moves and impairing market liquidity. Should some funds have to suspend redemptions, this might in turn create incentives for investors to redeem from other funds.

These dynamics were recently illustrated in the case of open-ended funds investing in the UK CRE market. In the months leading up to the EU referendum, and immediately following it, these funds experienced significant net outflows. In response, a number of funds suspended dealings. There was also some evidence of funds selling properties at significant discounts to pre-referendum values to meet redemptions (see UK commercial real estate chapter).

The FPC supports the FCA’s plans to publish a discussion paper on the potential challenges associated with the structure of open-ended funds investing in illiquid assets, including CRE funds.

The Committee’s in-depth assessment of open-ended investment funds was published in the December 2015 Report, following which:

- The FSB has developed proposals to address structural vulnerabilities related to asset management activities, which the FPC supports; in particular, that: (i) authorities give consideration to system-wide stress testing as a way to capture effects of collective selling by funds and other investors; (ii) funds’ investment strategies should be consistent with the terms and conditions governing fund unit redemptions; and (iii) authorities should develop simple and consistent measure(s) of leverage in funds to enhance their understanding of related risks.\(^{(3)}\) The FSB will publish the final recommendations by the end of the year, at which point the International Organization of Securities Commissions (IOSCO) will start operationalising some of them.

- In February 2016, the FCA published an update describing good practices for liquidity risk management and oversight, based on what it observed at leading investment management firms.\(^{(4)}\) This includes: clear disclosure of liquidity risk to investors; ensuring that a fund’s dealing arrangements are appropriate for its investment strategy; a regular assessment of liquidity demands; and fund-level stress testing.

- The Bank is continuing to develop a system-wide stress simulation, which will include an analysis of the behaviour of various sectors — such as open-ended investment funds, insurance companies and dealers — to assess their impact on market functioning. As part of this work, the Bank will consider data requirements of such a simulation exercise and identify any material data gaps.\(^{(5)}\)

(ii) **Insurance companies**

As set out in the Risks to financial stability from insurers’ investment behaviour chapter, the FPC has reviewed the extent to which the introduction of Solvency II, in January 2016, might affect the propensity of UK life insurers to invest procyclically. It judges that limiting the sensitivity of the ‘risk margin’ to changes in risk-free interest rates would have macroprudential benefits. This should be addressed, including through the forthcoming review of Solvency II by the European Commission. Such incentives to invest procyclically should also be avoided in the International Capital Standards for insurers, which are being developed by the International Association of Insurance Supervisors.

In addition, the FPC has assessed whether the risks to market liquidity emanating from unit-linked insurance products are comparable to the risks from open-ended investment funds. The FPC has concluded that there are some economic similarities, with investors typically able to switch between different funds at short notice. Such flexibility could lead to procyclical investment behaviour. The Bank will include assets held by the insurance sector, including unit-linked funds, in its system-wide stress simulation.

\(^{(1)}\) The risk assessment framework is described in more detail in Box 9 of the June 2014 Report; www.bankofengland.co.uk/publications/Documents/fsr/2014/fsrfull1406.pdf. It is consistent with the FSB’s policy framework for shadow banking entities; www.fsb.org/wp-content/uploads/r_130829c.pdf. In particular, the focus is on activities rather than the NBFI’s themselves. This abstracts from entities’ legal structures and can accommodate new types of institutions as they arise.


\(^{(3)}\) The FSB published a consultation document in June on proposed policy recommendations; www.fsb.org/2016/06/proposed-policy-recommendations-to-address-structural-vulnerabilities-from-asset-management-activities/.


\(^{(5)}\) See Box 5 in ‘The Bank of England’s approach to stress testing the UK banking system’; www.bankofengland.co.uk/financialstability/Documents/stresstesting/2015/approach.pdf.
(iii) Market liquidity
The FPC has conducted an in-depth assessment of liquidity in dealer-intermediated markets. In its July 2016 Report the FPC noted that key dealer-intermediated markets, including corporate bond and repo markets, had seen a reduction in liquidity — in part attributable to post-crisis regulation of dealers. The FPC judged that the net economic benefit of post-crisis regulations had been materially positive, but that it was appropriate to adjust regulatory measures, where possible, to minimise their impact on the liquidity of core financial markets, without compromising their positive effect on resilience.

In addition, the Bank is contributing to an international review of repo market functioning by the CGFS.

The FPC is continuing its analysis of developments in market liquidity, including in fast, electronic markets, particularly in light of the flash event in the sterling exchange rate on 7 October 2016 (see Box 3).

2016 annual assessment
The FPC’s 2016 annual assessment considered activities beyond the core banking sector that could potentially cause or amplify shocks to the real economy. In doing so, the FPC took particular note of activities that are growing rapidly or where the nature of the activities is changing, for example, in response to changes in regulation or the current low interest rate environment.

The FPC is not recommending any changes to the regulatory perimeter at this stage, but intends to complete an in-depth assessment of financial stability risks associated with derivative transactions, and to monitor closely a number of other areas.

Derivative transactions
The FPC has asked the Bank to complete an in-depth assessment of the financial stability risks associated with derivative transactions.

The global derivatives market is large, with over US$600 trillion of contracts outstanding. Derivatives enable firms to hedge financial risk, but they may also be used for speculative purposes and can give rise to extensive intra-financial system exposures, potentially of a complex and opaque nature.

The G20 agreed a set of reforms to derivatives markets in 2009 following the financial crisis. These promoted the trading of standardised over-the-counter (OTC) derivatives contracts on exchanges or electronic trading platforms, where appropriate, and their clearing through central counterparties (CCPs). The G20 also called for greater transparency through the reporting of derivatives contracts to trade repositories, and for higher capital requirements for non-centrally cleared derivatives. Subsequently, it was also agreed that there should be margin requirements for non-centrally cleared derivatives.

As an intended consequence of these reforms, there has been a significant and mandated move to central clearing for standardised OTC derivatives. CCPs place themselves between buyers and sellers of a trade, simplifying the network of exposures between market participants. Central clearing further tends to reduce the aggregate amount of risk in the system through multilateral netting, that is, by market participants holding a single net position at a CCP rather than multiple and otherwise potentially offsetting positions at different counterparties.

As a result of these developments CCPs have become more important as counterparties to financial institutions. For example, based on trade repository data, Chart A shows that the network of counterparties in cleared and uncleared sterling forward rate agreements is concentrated around the most significant CCP in the market. In response, tighter regulatory requirements have been introduced internationally to enhance CCP resilience and resolvability. The FSB is also working with a number of international bodies on a CCP.

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Chart A: Network of counterparties in cleared and uncleared sterling forward rate agreements

Sources: DTCC & UnaVista Trade Repository data and Bank calculations.

(1) Gross notional value, including both OTC and exchange-traded derivatives.
(3) A forward rate agreement is an OTC interest rate derivative in which counterparties agree that a certain interest rate will apply to the borrowing/lending of a certain notional principal amount during a specified future period.
workplan to further enhance CCP resilience, including through the provision by the Committee on Payments and Markets Infrastructures and IOSCO of more granular guidance on CCP stress testing and margins, and to ensure that appropriate recovery and resolution arrangements are in place for CCPs.\(^{(1)(2)}\)

Initial margins are an important component of the resilience of CCPs, and are used to mitigate counterparty exposures. But they may also increase the risk of procyclical effects on market conditions if margin requirements increase unduly during periods of stress. This would require counterparties posting margin to have to find additional liquid assets, often at precisely the times when it is most difficult for them to do so.

International regulatory standards for margin calculations by CCPs explicitly recognise the need to limit procyclicality in margin requirements, while ensuring that the soundness and financial security of CCPs is not negatively affected. And regarding non-centrally cleared derivatives, internationally agreed principles of the margining framework also note that the initial margin amount should be calibrated to limit procyclicality.\(^{(3)}\)

In its in-depth assessment the FPC will examine progress towards implementation of the post-crisis reforms in derivatives markets and consider the implications for the resilience of the financial system. This work will also contribute to a broader review by the FSB.\(^{(4)}\) In addition, the FPC will assess the extent to which trade repository data are sufficient for assessing the distribution of risks across the system from derivative transactions and any improvements that should be considered.

**Developments that the FPC will monitor closely**

**Challenges for non-bank business models in a low interest rate environment**

The FPC remains vigilant to the challenges for non-bank business models, such as those of defined-benefit pension funds and insurers, arising from a low interest rate environment. Alongside the MPC, it will continue to monitor closely developments in defined-benefit pension fund deficits (see November 2016 Inflation Report).

Risks to financial stability from defined-benefit pension fund deficits are likely to be small. In the United Kingdom, there are around 6,000 Pension Protection Fund-eligible defined-benefit pension schemes, sponsored by less than 1% of UK companies. Although many of these companies are large, less than 10% of total private sector employees are active members of those schemes. While around 80% of the schemes are currently in deficit, the majority of aggregate deficit is concentrated in a small number of schemes. Nevertheless, the FPC will continue to assess the scale of any risks arising from defined-benefit pension schemes.

### Exchange-traded funds

Exchange-traded funds’ ( ETFs’ ) assets under management have grown six-fold over the past decade (Chart B). ETFs offer a low-cost method of investing in diversified strategies, the majority of which passively track the performance of particular indices or portfolios. ETFs are often traded on-exchange, which provides a means for intraday price discovery and liquidity. As a result, ETFs are increasingly being used by investors for hedging and cash management, as well as for investment purposes.

**Chart B  Assets under management of exchange-traded funds by domicile**

ETFs rely on a set of Authorised Participants ( APs ) to create and redeem their shares in exchange for a basket of the underlying securities or cash. This provides arbitrage opportunities for APs, helping ensure that the price of ETF shares is closely aligned with the value of the underlying securities. If the liquidity of the underlying securities deteriorates and APs are not able to execute this arbitrage, ETF shares could trade at a material discount to net asset value (NAV) or with widened bid-offer spreads for a prolonged period. For example, on the morning of 24 August 2015, trading opened late for more than half of S&P 500 equities on the New York Stock Exchange due to high short-term volatility. As a result, APs became less able to take advantage of arbitrage opportunities, leading to large, albeit short-lived, discounts to NAV for some equity ETFs. A prolonged period of impaired price discovery could crystallise so-called ‘basis risk’ for ETF investors, where there is a difference between the ETF price and the price of the underlying assets.

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\(^{(1)}\) See www.fsb.org/2016/08/progress-report-on-the-ccp-workplan-2/.


\(^{(3)}\) See www.bis.org/bcbs/publ/d317.pdf.

In the United States, the Financial Stability Oversight Council and the Securities and Exchange Commission are assessing risks from ETFs, including the risk of the arbitrage mechanism not functioning effectively.

Peer-to-peer lending

The UK peer-to-peer (P2P) lending market provides an alternative source of finance for households and businesses. The total stock of P2P lending is only around 1% of the total outstanding stock of consumer credit lending and loans to small and medium-sized enterprises (SMEs). But P2P lending is growing rapidly, with gross new lending almost doubling in size every year between 2011 and 2015. Moreover, while lending on P2P platforms is currently equivalent to only around 2% of other gross flows of new lending to consumers and SMEs (Chart C), their share of lending flows to smaller firms is particularly significant, with P2P lending estimated to account for nearly 14% of equivalent gross bank lending flows to small businesses in 2015.

P2P lending is potentially beneficial as an alternative source of finance. However, it could pose financial stability risks since its resilience over the business cycle is untested. If investors do not fully understand or assess the risks they face, such as default and liquidity risk, a downturn and an ensuing increase in the default rate could lower investors’ appetite for P2P products. Such a loss of confidence could lead to disruption of credit supply to the real economy, and small firms in particular.

The FPC does not intend to amend the regulatory perimeter for P2P lending at this stage, but notes the FCA’s ongoing work to review the regulatory framework for P2P platforms in light of the sector’s rapid growth and developments in firms’ business models.

Financial technology innovations

Alongside P2P lending, the FPC continues to monitor other innovations in financial technology, as these could also in principle present both benefits and risks for financial stability. Relatedly, the FPC supports work underway internationally at the FSB to analyse specific financial technology innovations and highlight any regulatory issues that merit policy attention. The Bank will participate actively in this work.

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[2] Consumer credit gross lending from MFIs and other lenders (excluding student loans and credit cards), and UK MFIs’ gross lending (excluding overdrafts) to non-financial SMEs.

[3] The 14% figure is calculated using a data set from the British Bankers’ Association for gross bank lending flows to small firms. This data set contains a smaller sample of lenders than the data set used in Chart C, which is for lending from UK MFIs to all SMEs.

Risks to financial stability from insurers’ investment behaviour

The Bank of England Act 1998, as amended by the Financial Services Act 2012, gives the FPC responsibility to identify, assess, monitor and take action in relation to financial stability risks across the UK financial system, including risks arising from beyond the core banking sector.

The FPC presented its first annual assessment of risks beyond the core banking sector in the July 2015 Report (see Financial stability risk and regulation beyond the core banking sector chapter for the 2016 assessment). As part of that, the FPC noted its intention to conduct a detailed assessment of risks to financial stability arising from the investment activities of UK insurers.

Separately, in September 2016, the United Kingdom’s Treasury Committee announced an inquiry into the introduction and operation of Solvency II (the prudential regulatory regime for European insurance companies), in order to supplement its work on the relationship that the United Kingdom might seek with the European Union. This inquiry will, in part, seek to assess the strengths and weaknesses of Solvency II as it currently stands, covering a range of issues, including its impact on competition, and safety and soundness.

The FPC has reviewed the risks to financial stability from insurers’ investment activities, focusing on: (i) the extent to which the introduction of Solvency II, in January 2016, might affect the propensity of UK life insurers to invest procyclically; and (ii) whether the risks to market liquidity emanating from unit-linked insurance products are comparable to the risks from open-ended investment funds.

Procyclicality, in the short-term, refers to the tendency to invest in a way that amplifies market movements and contributes to asset price volatility. In the medium-term, procyclicality refers to the tendency to invest in line with asset price and economic cycles, so that investors’ willingness to bear risk diminishes in periods of stress and increases in upturns.

This chapter presents the FPC’s conclusions, which are:

- Solvency II contributes to the resilience of the insurance sector. It also includes some features — such as the so-called ‘matching adjustment’ — that are beneficial from a macroprudential perspective by reducing potential instability across the financial system.

- Under its current design, the so-called ‘risk margin’ — a provision that increases the value of a firm’s liabilities (and consequently reduces its excess capital over regulatory requirements) to facilitate their transfer to another insurer should the business fail — could, in future, encourage insurance companies to reinforce falls (rises) in risk-free interest rates by switching into (out of) low-risk assets.

- The FPC judges that limiting the sensitivity of the risk margin to changes in risk-free interest rates would have macroprudential benefits. This should be addressed, including through the forthcoming review of Solvency II by the European Commission. Such incentives to invest procyclically should also be avoided in the International Capital Standards (ICS) for insurers, which are being developed by the International Association of Insurance Supervisors (IAIS).

- The FPC has further concluded that unit-linked insurance products share some economic similarities with open-ended investment funds. For instance, investors are typically able to switch between different funds at short notice. There is tentative evidence that this flexibility could lead unit-linked policyholders to invest procyclically, particularly during times of stress. That is, when risky assets prices have fallen, policyholders have switched from funds invested in more risky assets to those invested in less risky assets. This reinforces risks associated with open-ended funds and market liquidity (see Market-based finance chapter). The Bank will include assets held by the insurance sector, including unit-linked funds, in its system-wide stress simulation designed to assess the resilience of market liquidity.

**UK life insurers are significant investors in financial assets.** Insurance companies are important financial intermediaries: they support the real economy by enabling households and firms to transfer the risks they face, and — alongside other institutional investors — by helping to channel long-term savings into investment via financial sector assets (Chart A).

In the United Kingdom, life insurers hold £1.7 trillion of assets. These account for a significant proportion of the total assets outstanding in several UK securities markets (Table 1).

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(2) Where insurers hold long-dated assets to match long-dated stable liabilities, such as annuities, the ‘matching adjustment’ allows them to look through the impact of short-term market movements on assets when valuing their liabilities.
Creating incentives for insurers to act in ways that amplify behaviour by international and UK insurance companies following the dot-com crash of the early 2000s, but found less evidence of procyclical behaviour during the 2008–09 global financial crisis. (1)

It found evidence of procyclical investment across asset classes (e.g., switching between equity and fixed income securities) or within a given asset class (e.g., switching between investment-grade and high-yield corporate bonds).

In 2013, the Bank of England established an industry working group to examine the investment behaviour of insurers and pension funds. It found evidence of procyclical investment behaviour by international and UK insurance companies following the dot-com crash of the early 2000s, but found less evidence of procyclical behaviour during the 2008–09 global financial crisis. (1)

The working group identified a number of drivers of insurers’ investment behaviour, which relate to different types of UK insurance business. In the United Kingdom, there are two main types of life insurance product:

- **Non-linked products** (that represent £0.7 trillion of assets), where insurance firms bear all or part of the market risk on asset holdings, and regulation is a key driver of investment behaviour. Examples include annuities and with-profits products.

- **Unit-linked products** (that represent £1 trillion of assets), where policyholders typically bear the market risk on asset holdings. Policyholders’ investment decisions are a key driver of investment behaviour for unit-linked products.

The potential for insurers that sell each of these types of product to behave procyclically is examined in turn.

### Non-linked products and Solvency II

Solvency II, which came into force on 1 January 2016, is the first forward-looking, risk-based prudential regulatory regime for insurers to be applied across Europe. It aims to enhance the level of policyholder protection and improve the resilience of the insurance sector.

**Solvency II introduces a number of features which have a bearing on investment behaviour…**

Three features introduced under Solvency II have a particular bearing on investment behaviour:

- **The so-called ‘risk margin’.** Solvency II introduces a ‘risk margin’ provision that increases the value of a firm’s liabilities to reflect the compensation another firm might require to accept the transfer of those liabilities, were it to fail. The risk margin has a bearing on insurers’ solvency positions and therefore could affect investment behaviour, as well as risk management decisions.

- **New countercyclical solvency measures.** Under Solvency II, the so-called ‘matching adjustment’ cushions certain life insurers’ capital resources, subject to conditions and prior approval, by enabling firms to look through the impact of short-term market movements on assets when valuing liabilities. (2)

- **Increased market transparency.** Insurers are required to disclose regularly their solvency positions to regulators and market analysts. This might incentivise firms to build capital buffers above regulatory requirements and increase their resilience to shocks. But it might also incentivise firms to dispose of risky assets in times of stress.

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(2) The matching adjustment replaces the so-called ‘liquidity premium’ under the former Individual Capital Adequacy Standards (ICAS) regime.
The implementation of the new regime has led to the identification of some specific instances where Solvency II may not be working as intended. These were highlighted by the Bank in its response to the European Commission’s Call for Evidence on the EU Regulatory Framework for Financial Services.\(^{(1)}\)

One issue identified relates to the risk margin, which, under its current design, is very sensitive to prevailing risk-free interest rates, particularly for firms with long-dated annuity books. The risk margin is currently calculated by multiplying a cost of capital — which is invariant to changes in financial market conditions, including risk-free interest rates — by the net present value of future capital requirements. As risk-free interest rates fall, the net present value of future capital requirements increases.\(^{(2)}\) This can cause the value of the risk margin to increase considerably.

The risk margin’s sensitivity to risk-free interest rates increases the volatility of insurers’ solvency positions (that is, the excess of insurers’ capital resources over their capital requirements). From a macroprudential perspective, this could incentivise procyclical investment behaviour by encouraging insurers to de-risk as risk-free interest rates fall. It could also reduce insurers’ incentives to hold long-term, risky assets.

Furthermore, empirical evidence suggests that, from a microprudential perspective, the sensitivity of the risk margin to interest rates cannot be justified based on historical evidence on the cost of transferring insurance business, which the risk margin is intended to reflect. In particular, Bank analysis finds that the margin at which insurance liabilities have transferred between firms in the past is not strongly correlated with interest rates (Chart B).\(^{(3)}\)

**Chart B** Range of past transfer margins of UK life insurers’ liabilities compared to ten-year UK government bond yields

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<table>
<thead>
<tr>
<th>Level of ten-year UK government bond yields (basis points)</th>
<th>Percentage of best estimate of insurance liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>200–300</td>
<td>0</td>
</tr>
<tr>
<td>300–400</td>
<td>2</td>
</tr>
<tr>
<td>400–500</td>
<td>4</td>
</tr>
</tbody>
</table>

Sources: PRA regulatory data, Thomson Reuters Datastream and Bank calculations.

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As evidenced by a model of insurers’ expected future investment behaviour.

Since Solvency II’s introduction, there is little evidence that the risk margin has encouraged insurers to invest procyclically, or that it has reduced their willingness to provide stable finance for long-term assets. For example, despite the UK ten-year swap rate falling by 104 basis points over the first half of 2016, large UK insurers experienced only modest deteriorations in their solvency positions.

This is, in part, because insurers are currently able to use so-called ‘transitional measures on technical provisions’ (TMTPs). These offset the impact of the risk margin on insurance liabilities written before the introduction of Solvency II. While TMTPs are in place, insurers are able to apply to recalculate TMTPs if their risk profiles change materially.\(^{(4)}\)

However, the impact of these TMTPs will continue to wane gradually over the next fifteen years. Bank staff have therefore developed an asset allocation model to assess insurers’ expected future investment behaviour as TMTPs run-off. Throughout, we focus on annuity writers, who are particularly affected by the introduction of Solvency II.

The model assumes that insurers’ asset allocations are based on their objective to maximise shareholders’ profits, but — at the same time — to be mindful of a breach of regulatory capital requirements.\(^{(5)}\)

Insurers appear resilient to increases in credit spreads, but may be encouraged to de-risk following risk-free interest rate falls.

When spreads between corporate bond yields and risk-free interest rates widen, the model suggests that life insurers’ investment responses are limited under Solvency II. This is because the matching adjustment allows insurers to ‘look through’ much of any short-term change in spreads, and therefore protects their solvency positions. As a result, following a 100 basis points increase in corporate bond spreads due to a rise in liquidity premia — that is, the compensation investors require to bear the liquidity risk...
associated with holding bonds — insurers substitute only 0.3% of their portfolios from risky to low-risk assets (Chart C).

The model also considers investment responses to changes in risk-free interest rates. While TMTPs are in place, insurers face only moderate incentives to de-risk following falls in risk-free interest rates. While TMTPs are in place, insurers face only moderate incentives to de-risk following falls in risk-free interest rates. In particular, for a 100 basis points fall in risk-free interest rates, insurers find it optimal to switch about 3% of their asset portfolios from risky to low-risk assets (Chart C).

But as TMTPs run-off, similar falls in risk-free interest rates encourage insurers to switch a larger proportion — an additional 5.5% — of their asset portfolios from risky to low-risk assets. In the model, this is driven by the risk margin, which, under its current design, is very sensitive to risk-free interest rates.

The procyclicality arises because interest rate falls increase the value of the risk margin and therefore worsen insurers’ solvency positions. This encourages them to reduce the variance of their asset portfolios by disposing of risky assets and investing instead in low-risk assets to reduce the risk of a further deterioration in their solvency positions. Such behaviour could amplify changes in market prices.

The risk margin may also reduce life insurers’ incentives to invest in long-term, risky assets.

Certain aspects of Solvency II encourage life insurers to match their liabilities to policyholders against increased holdings of long-term, risky assets. One example of this is the matching adjustment, which reduces the volatility of insurers’ solvency positions. The benefit provided by the matching adjustment is greater than that provided by the comparable measure included under the previous regulatory regime in the United Kingdom.

But the model also suggests that the risk margin provides a counteracting disincentive to hold long-term, risky assets, particularly when TMTPs are not available or cannot be recalculated. The additional balance sheet volatility that is introduced by the risk margin incentivises insurers to minimise other sources of risk, including from holdings of long-term, risky assets. This could impact life insurers’ ability to invest in a way that matches policyholders’ long-term savings interests, and affect companies’ ability to raise stable, long-term finance.

The FPC judges that limiting the sensitivity of the risk margin to changes in risk-free interest rates would have macroprudential benefits. This should be addressed, including through the forthcoming review of Solvency II by the European Commission. Such incentives to invest procyclically should also be avoided in the ICS for insurers, which are being developed by the IAIS.

Unit-linked funds and policyholder behaviour

Unit-linked funds are a type of pooled investment offered by insurance companies through their life or pension policies. About £1 trillion of assets are managed through the funds to which these policies are linked. These funds offer customers exposure to a broad range of asset classes, and are significant investors in UK financial markets.

Although unit-linked funds are linked to long-term contracts issued by insurance companies, these funds share some economic similarities with open-ended investment funds. For example: policyholders typically bear the investment risk; funds are typically structured to allow investors to change their asset allocations at short notice (for instance, in the form of switches between funds); and funds invest in both liquid and less liquid assets. In the United Kingdom, unit-linked funds are similar in size to UK-authorised open-ended investment funds, which managed about £870 billion of assets at end-2015.

The FPC completed a review of investment funds in 2015 (see the December 2015 Report). It noted that the activities of open-ended investment funds that offer short-term redemptions have the potential to amplify market stress.
through procyclical behaviour by investors. Given the similarities between these and unit-linked funds, it is therefore appropriate to assess whether unit-linked funds are likely to pose similar risks to market functioning.

**Risks of procyclical investment by unit-linked funds may be lower than for investment funds...**

Unit-linked policyholders might be expected to be less responsive to changes in financial market conditions than investors in investment funds. This is because most unit-linked policies facilitate long-term pension savings, the holders of which may be willing to look through short-term fluctuations in asset prices. And even if policyholders request to switch funds, these switches may not translate one-for-one into asset disposals by unit-linked funds. This is because, just like investment funds, unit-linked insurers can use several ‘tools’ to manage liquidity risk.

First, unit-linked funds can limit or suspend withdrawals. Second, insurers can purchase the units that policyholders switch out of, and thereby take the risk associated with these units onto their own balance sheets.

In times of market stress, however, insurers may be less likely to increase the riskiness of their own balance sheets where this leads to an increase in regulatory capital requirements. As with investment funds, unit-linked insurers may also have incentives not to limit or suspend policyholder switches, for instance, in order to protect their franchises’ reputations.

...but evidence suggests a cohort of policyholders may invest procyclically in response to falls in risky asset prices.

Evidence suggests that the vast majority of unit-linked policyholders tend not to respond to short-term changes in financial markets. But this does not preclude the existence of a cohort of policyholders that actively manage their asset portfolios.

Based on a recent Bank survey of unit-linked providers, there is tentative evidence of increased switching rates by policyholders following substantial falls in risky asset prices. These increases in switching rates typically reflect reallocations from risky to less risky assets, including cash.

The FPC notes the economic similarities between open-ended investment funds and unit-linked funds, including their comparable asset holdings and potential risks from investor behaviour, particularly during times of stress. The Bank will include assets held by the insurance sector, including unit-linked funds, in its system-wide stress simulation designed to assess the resilience of market liquidity.
In its response to the Chancellor’s remit and recommendations letter in May this year, the FPC said it planned to review, update and publish its medium-term work programme later in 2016.\(^1\) This chapter takes stock of the work that the FPC plans to undertake in 2017.

**Risk assessment**

The FPC has a statutory responsibility to identify, monitor and take action to remove or reduce systemic risks with a view to protecting and enhancing the resilience of the UK financial system. It will continue to assess the risks listed in this Report, and others as they emerge. As part of this, the FPC will continue to assess the financial stability implications of the United Kingdom’s withdrawal from the European Union, as that process develops.

**Banking sector resilience**

**Stress testing**

The 2017 stress test will, for the first time, include two scenarios: the annual cyclical scenario, intended to assess risks to the banking system emanating from the financial cycle; and the biennial exploratory scenario (BES), designed to complement the annual cyclical scenario by probing the resilience of the system to risks that may not be neatly linked to the financial cycle. This will allow an examination of emerging or latent threats to financial stability including, among other things, slow-burn risks affecting the banking sector, and how these risks develop over a longer forecast horizon than the cyclical scenario.

The Bank intends that the first exploratory scenario will consider the impact of weak global supply growth, persistently low interest rates and a continuation of other structural changes on profitability on individual banks and the sector as a whole. The forecast horizon of the 2017 BES will be seven years in order to capture the full impact of this persistent weakness. The 2016 stress-test results provide further details on the 2017 BES.\(^2\)

The seven banks that participated in the 2016 stress test will participate in both scenarios in 2017.

**Framework for bank capital requirements**

In December 2015, the FPC set out its assessment of the overall calibration of the risk-weighted capital framework for UK banks. The assessment rested on a number of judgements, in particular progress on international work to address definitional shortcomings in measures of risk-weighted assets, the effectiveness of arrangements for resolving banks and the economic costs of higher capital requirements. The FPC has said previously that a natural point for a full review of these judgements would be in 2019, as the final elements of the Basel III capital framework are phased in. But there will be a first opportunity to assess some of the judgements underlying the capital framework in 2017.

The FPC has also committed to review the UK leverage ratio framework in 2017. The review will consider: progress towards an international standard for a minimum leverage ratio requirement and implications for the calibration of the UK leverage ratio framework; recalibration of the UK leverage ratio standard to adjust, following the FPC’s decision in July 2016, for the exclusion of central bank reserves from the exposure measure of the leverage ratio; and the scope of application of the framework, including whether to extend the minimum leverage ratio requirement and countercyclical leverage ratio buffer to all PRA-regulated banks, building societies and investment firms from 2018, and whether the leverage ratio framework should apply to individual entities within groups or subgroups that are also subject to risk-weighted requirements.

**Market-based finance resilience**

The FPC has committed to carry out an annual assessment of risks and regulation beyond the core banking sector and a regular deep analysis of a range of activities undertaken by the non-bank financial system.

The conclusions of the FPC’s latest annual assessment are set out in the Financial stability risk and regulation beyond the core banking sector chapter. Looking ahead, the FPC has asked the Bank to complete an in-depth assessment of the financial stability risks associated with derivative transactions. This will review progress towards implementation of the post-crisis reforms in derivatives markets and consider whether there are any implications for the resilience of the financial system. This work will contribute to a broader review by the Financial Stability Board. In addition, the FPC will assess the extent to which trade repository data are sufficient for assessing the distribution of risks across the system from derivative transactions and any improvements that should be considered.

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\(^1\) See www.bankofengland.co.uk/financialstability/Documents/fpc/letters/governorletter260516.pdf.

\(^2\) See www.bankofengland.co.uk/financialstability/Documents/fpc/results301116.pdf.
The FPC also continues to analyse developments in market liquidity and potential risks associated with open-ended investment funds, following on from in-depth assessments in these areas in 2015. The FPC supports the Bank’s work to develop a system-wide stress simulation to assess the dynamics of markets under stress. It will include an analysis of the behaviour of various sectors — such as open-ended investment funds, insurance companies and dealers. That exercise will identify any material gaps in the data needed to assess risks.

**The FPC’s medium-term priorities**
In 2013, the FPC established three medium-term priorities in addition to its overarching priority to identify systemic risks and take action to remove or reduce them. These were to:

- establish a medium-term capital framework for banks;
- end ‘too big to fail’, including through development of the new resolution regime; and
- ensure diverse and resilient sources of market-based finance.

In 2017 the FPC will review progress against these priorities and develop its approach to the next phase of this work.

The FPC has also decided to conduct a review of its overall strategy for setting policy to guard against risks stemming from the mortgage market in 2017 (see The FPC’s review of its 2014 mortgage market Recommendations chapter).
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 13/Q1/6 refers to the sixth Recommendation made following the 2013 Q1 Committee meeting.

Recommendations implemented since the previous Report

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>16/Q2/2</td>
<td>Reduction of PRA supervisory buffers reflecting risks that would be captured by a UK countercyclical capital buffer rate</td>
<td>Implemented</td>
</tr>
</tbody>
</table>

The FPC recommends to the PRA that, where existing PRA supervisory buffers of PRA-regulated firms reflect risks that would be captured by a UK countercyclical capital buffer rate, it reduce those buffers, as far as possible and as soon as practicable, by an amount of capital which is equivalent to the effect of a UK countercyclical capital buffer rate of 0.5%.

The PRA Board agreed to implement the Recommendation and published a Statement and letter to firms explaining how their PRA buffers were to be adjusted. Firms have communicated their updated PRA buffer calculations to the PRA and these have been reviewed by PRA supervisors.

The FPC supports the expectation of the PRA Board that firms do not increase dividends and other distributions as a result of this action.

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>16/Q3/1</td>
<td>Exclusion of claims on central banks from the leverage exposure measure</td>
<td>Implemented</td>
</tr>
</tbody>
</table>

The FPC recommends to the PRA that, when applying its rules on the leverage ratio, it considers allowing firms to exclude from the calculation of the total exposure measure those assets constituting claims on central banks where they are matched by deposits accepted by the firm that are denominated in the same currency and of identical or longer maturity.

The FPC made this Recommendation at its additional July meeting. This was announced on 4 August, on the same day the PRA issued a statement saying it would implement the Recommendation, and invited firms currently subject to the UK leverage framework to apply for a temporary rule modification to that effect.

The explanation of the FPC’s decision is set out in the Records of the meetings on 28 June and 1 July, and 25 July.[1]

FPC will consult and decide on the appropriate form of recalibration of the UK leverage ratio standard following the exclusion as part of its 2017 review of the leverage ratio framework.

Recommendations and Directions currently outstanding

14/Q3/1 Powers of Direction over housing instruments
Action under way

The FPC recommends that HM Treasury exercise its statutory power to enable the FPC to direct, if necessary to protect and enhance financial stability, the PRA and FCA to require regulated lenders to place limits on residential mortgage lending, both owner-occupied and buy-to-let, by reference to: (a) loan to value ratios; and (b) debt to income ratios, including interest coverage ratios in respect of buy-to-let lending.

Legislation granting the FPC powers of Direction over loan to value (LTV) and debt to income limits in respect of mortgages on owner-occupied properties came into force in April 2015.

HM Treasury published a response document related to its consultation on granting the FPC powers of Direction over buy-to-let lending and laid the legislation before Parliament on 16 November 2016. HM Treasury has said publicly that subject to parliament approving the legislation it expects the FPC to have the powers from early 2017.

On 18 November, the FPC published a draft update to its existing Policy Statement(1) on housing instruments (which covered powers of Direction in respect of mortgages on owner-occupied properties), to include a description of how the FPC intends to use its proposed powers of Direction over buy-to-let lending.

15/Q2/3 CBEST vulnerability testing
Action under way

The FPC recommends that the Bank, the PRA and the FCA work with firms at the core of the UK financial system to ensure that they complete CBEST tests and adopt individual cyber resilience action plans. The Bank, the PRA and the FCA should also establish arrangements for CBEST tests to become one component of regular cyber resilience assessment within the UK financial system.

Thirty of the 35 core firms have now completed CBEST cyber vulnerability tests (up from 23 at the time of the July 2016 Report). Those firms which have completed CBEST tests have implemented individual cyber resilience action plans to address vulnerabilities identified. Work by the UK authorities (the Bank, the FCA and HM Treasury) to develop proposals for embedding CBEST testing into the supervisory toolkit and firms’ own regular risk management processes is also under way.

At its November meeting, the FPC completed a statutory review of the Recommendation and agreed that it should be maintained.

Alongside its Recommendation on CBEST testing, in June 2015, the FPC endorsed a broader work programme by the authorities to enhance financial system cyber resilience to: review the list of core firms to ensure that it captures those most critical to financial stability in the event of a major cyber attack; define and develop a clear set of capabilities that will enhance the financial system’s resilience and improve its ability to respond to and recover from a major cyber attack; and develop co-operation with international authorities. This work programme is under way. In November, the FPC received a progress update on the work programme. It will receive a further update in 2017 H1.

16/Q2/1 Distribution of capital to meet ‘fair shares’ of systemic buffers
Action under way

The FPC recommends to the PRA that it should seek to ensure that, where systemic buffers apply at different levels of consolidation, there is sufficient capital within the consolidated group, and distributed appropriately across it, to address both global systemic risks and domestic systemic risks.

This Recommendation was made at the FPC’s May 2016 meeting to agree the final systemic risk buffer (SRB) framework. The explanation for the Recommendation was set out in the Record of that meeting.(2) The PRA has consulted on its planned approach to implement this Recommendation(3) and now intends to issue a policy statement containing the final policy. The FPC will review progress against the Recommendation after this date.

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(1) www.bankofengland.co.uk/financialstability/Pages/fpc/policystatements.aspx
(2) www.bankofengland.co.uk/financialstability/Pages/fpc/meetings/default.aspx
(3) www.bankofengland.co.uk/pra/Pages/publications/cp/2016/cp2516.aspx
Other FPC policy decisions which remain in place

The table below sets out 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 reduced the UK CCyB rate from 0.5% to 0% of banks’ UK exposures with immediate effect at its July meeting. At the time it stated that absent any material change in the outlook, and given the need to give banks the clarity necessary to facilitate their capital planning, it expected to maintain a 0% UK CCyB rate until at least June 2017. At its meeting on 23 November, the FPC agreed to maintain the UK CCyB rate at 0% and reaffirmed this expectation. This rate is reviewed on a quarterly basis.

The United Kingdom has also previously reciprocated a number of foreign CCyB decisions — for more details see the Bank of England website.(1) Under PRA rules, foreign CCyB rates applying from 2016 onwards will be automatically reciprocated up to 2.5%.

### Prevailing FPC Recommendation on mortgage affordability tests

When assessing affordability in respect of a potential borrower, UK mortgage lenders are required to have regard to any prevailing FPC Recommendation on appropriate interest rate stress tests. This requirement is set out in FCA rule MCOB 11.6.18(2). (2) In June 2014, the FPC made the following Recommendation (14/Q2/1):

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, Bank Rate were to be 3 percentage points higher than the prevailing 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).

At its November meeting, the FPC completed a statutory review of the Recommendation. It decided to maintain the Recommendation and not to amend its calibration. The explanation for this is set out in The FPC’s review of its 2014 mortgage market Recommendations chapter.

### 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 their respective approaches to implementing this Recommendation: the PRA has issued a Policy Statement, including rules,(3) and the FCA has issued general guidance.(4)

The FPC reviewed this Recommendation in November and decided not to amend the calibration. The explanation for this is set out in The FPC’s review of its 2014 mortgage market Recommendations chapter.

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(1) [www.bankofengland.co.uk/financialstability/Pages/fpc/ccbrates.aspx](http://www.bankofengland.co.uk/financialstability/Pages/fpc/ccbrates.aspx).
## Annex 2: Core indicators

### Table A.1 Core indicator set for the countercyclical capital buffer (a)

<table>
<thead>
<tr>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-bank balance sheet stretch</strong>&lt;sup&gt;(b)&lt;/sup&gt;</td>
</tr>
<tr>
<td>1 Credit to GDP&lt;sup&gt;(c)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Ratio</td>
</tr>
<tr>
<td>Gap</td>
</tr>
<tr>
<td>2 Private non-financial sector credit growth&lt;sup&gt;(d)&lt;/sup&gt;</td>
</tr>
<tr>
<td>10.1%</td>
</tr>
<tr>
<td>3 Net foreign asset position to GDP&lt;sup&gt;(e)&lt;/sup&gt;</td>
</tr>
<tr>
<td>-2.3%</td>
</tr>
<tr>
<td>4 Gross external debt to GDP&lt;sup&gt;(f)&lt;/sup&gt;</td>
</tr>
<tr>
<td>183.0%</td>
</tr>
<tr>
<td>of which bank debt to GDP</td>
</tr>
<tr>
<td>5 Current account balance to GDP&lt;sup&gt;(g)&lt;/sup&gt;</td>
</tr>
<tr>
<td>-1.7%</td>
</tr>
</tbody>
</table>

### Conditions and terms in markets

<table>
<thead>
<tr>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 Long-term real interest rate&lt;sup&gt;(h)&lt;/sup&gt;</td>
</tr>
<tr>
<td>3.10%</td>
</tr>
<tr>
<td>7 VIX&lt;sup&gt;(i)&lt;/sup&gt;</td>
</tr>
<tr>
<td>19.1</td>
</tr>
<tr>
<td>8 Global corporate bond spreads&lt;sup&gt;(j)&lt;/sup&gt;</td>
</tr>
<tr>
<td>84 bps</td>
</tr>
<tr>
<td>9 Spreads on new UK lending</td>
</tr>
<tr>
<td>Household&lt;sup&gt;(k)&lt;/sup&gt;</td>
</tr>
<tr>
<td>480 bps</td>
</tr>
<tr>
<td>Corporate&lt;sup&gt;(l)&lt;/sup&gt;</td>
</tr>
<tr>
<td>104 bps</td>
</tr>
</tbody>
</table>

### Bank balance sheet stretch<sup>(m)</sup>

<table>
<thead>
<tr>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Capital ratio</td>
</tr>
<tr>
<td>Basel II core Tier 1&lt;sup&gt;(n)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Basel III common equity Tier 1&lt;sup&gt;(o)&lt;/sup&gt;</td>
</tr>
<tr>
<td>11 Leverage ratio&lt;sup&gt;(p)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Simple</td>
</tr>
<tr>
<td>Basel III (2014 proposal)</td>
</tr>
<tr>
<td>12 Average risk weights&lt;sup&gt;(q)&lt;/sup&gt;</td>
</tr>
<tr>
<td>53.6%</td>
</tr>
<tr>
<td>13 Return on assets before tax&lt;sup&gt;(r)&lt;/sup&gt;</td>
</tr>
<tr>
<td>1.0%</td>
</tr>
<tr>
<td>14 Loan to deposit ratio&lt;sup&gt;(s)&lt;/sup&gt;</td>
</tr>
<tr>
<td>114.5%</td>
</tr>
<tr>
<td>of which excluding repo funding</td>
</tr>
</tbody>
</table>

### Overseas exposures indicator: countries to which UK banks have ‘large’ and ‘rapidly growing’ total exposures<sup>(t)</sup>

<table>
<thead>
<tr>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>In 2006 Q4: AU, BR, CA, CH, CN, DE, ES, FR, IE, IN, JP, KR, KY, LU, NL, US, ZA</td>
</tr>
<tr>
<td>In 2015 Q2: KY</td>
</tr>
<tr>
<td>17 CDS premia&lt;sup&gt;(u)&lt;/sup&gt;</td>
</tr>
<tr>
<td>12 bps</td>
</tr>
<tr>
<td>18 Bank equity measures</td>
</tr>
<tr>
<td>Price to book ratio&lt;sup&gt;(v)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Market-based leverage ratio&lt;sup&gt;(w)&lt;/sup&gt;</td>
</tr>
</tbody>
</table>
### Core indicator set for sectoral capital requirements

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Average, 1987–2006 (b)</th>
<th>Average 2006 (c)</th>
<th>Minimum since 1987 (d)</th>
<th>Maximum since 1987 (e)</th>
<th>Previous value (oya)</th>
<th>Latest value (as of 18 November 2016)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bank balance sheet stretch</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Capital ratio</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basel II core Tier 1 (o)</td>
<td>6.6%</td>
<td>6.3%</td>
<td>6.1%</td>
<td>12.3%</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Basel III common equity Tier 1 (j)</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>12.0%</td>
<td>13.5% (2016 Q3)</td>
</tr>
<tr>
<td>2 Leverage ratio</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simple</td>
<td>4.7%</td>
<td>4.1%</td>
<td>2.9%</td>
<td>6.6%</td>
<td>6.2%</td>
<td>6.2% (2016 H1)</td>
</tr>
<tr>
<td>Basel III (2014 proposal)</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>4.6%</td>
<td>4.7%</td>
<td>4.7% (2016 H1)</td>
</tr>
<tr>
<td>3 Average mortgage risk weights</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UK average mortgage risk weights (m)</td>
<td>n.a.</td>
<td>n.a.</td>
<td>13.7%</td>
<td>22.4%</td>
<td>15.1%</td>
<td>13.7% (2016 H1)</td>
</tr>
<tr>
<td>4 Balance sheet interconnectedness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intra-financial lending growth (n)</td>
<td>12.0%</td>
<td>13.0%</td>
<td>-18.8%</td>
<td>45.5%</td>
<td>-14.8%</td>
<td>10.2% (2016 H1)</td>
</tr>
<tr>
<td>Intra-financial borrowing growth (m)</td>
<td>14.1%</td>
<td>13.7%</td>
<td>-21.5%</td>
<td>29.5%</td>
<td>-10.0%</td>
<td>-8.5% (2016 H1)</td>
</tr>
<tr>
<td>Derivatives growth (notional) (p)</td>
<td>37.7%</td>
<td>34.2%</td>
<td>-25.9%</td>
<td>52.0%</td>
<td>-25.9%</td>
<td>17.8% (2016 H1)</td>
</tr>
<tr>
<td><strong>Overseas exposures indicator: countries to which UK banks have large and rapidly growing non-bank private sector exposures</strong></td>
<td></td>
<td></td>
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<tr>
<td>In 2015 Q2: —</td>
<td></td>
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<tr>
<td>In 2016 Q2: KY</td>
<td></td>
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<tr>
<td><strong>Non-bank balance sheet stretch</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>6 Credit growth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household (i)</td>
<td>10.3%</td>
<td>11.2%</td>
<td>-0.6%</td>
<td>19.6%</td>
<td>2.7%</td>
<td>4.0% (2016 Q2)</td>
</tr>
<tr>
<td>Commercial real estate (i)</td>
<td>15.3%</td>
<td>18.5%</td>
<td>-9.7%</td>
<td>59.8%</td>
<td>-3.5%</td>
<td>1.6% (2016 Q3)</td>
</tr>
<tr>
<td>7 Household debt to income ratio (k)</td>
<td>100.1%</td>
<td>141.8%</td>
<td>78.2%</td>
<td>150.5%</td>
<td>131.4%</td>
<td>133.1% (2016 Q2)</td>
</tr>
<tr>
<td>8 PNFC debt to profit ratio (l)</td>
<td>237.0%</td>
<td>297.0%</td>
<td>157.0%</td>
<td>407.4%</td>
<td>246.0%</td>
<td>294.3% (2016 Q2)</td>
</tr>
<tr>
<td>9 NBFI debt to GDP ratio (excluding insurance companies and pension funds)</td>
<td>56.4%</td>
<td>122.0%</td>
<td>14.0%</td>
<td>176.8%</td>
<td>133.5%</td>
<td>131.4% (2016 Q2)</td>
</tr>
<tr>
<td><strong>Conditions and terms in markets</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Real estate valuations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential price to rent ratio (m)</td>
<td>100.0</td>
<td>151.1</td>
<td>66.9</td>
<td>160.6</td>
<td>135.7</td>
<td>141.3 (2016 Q3)</td>
</tr>
<tr>
<td>Commercial prime market yields (n)</td>
<td>5.4%</td>
<td>4.0%</td>
<td>3.8%</td>
<td>7.3%</td>
<td>4.0%</td>
<td>4.1% (2016 Q3)</td>
</tr>
<tr>
<td>Commercial secondary market yields (n)</td>
<td>8.9%</td>
<td>5.8%</td>
<td>5.4%</td>
<td>10.9%</td>
<td>7.0%</td>
<td>6.1% (2016 Q3)</td>
</tr>
<tr>
<td>11 Real estate lending terms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential mortgage LTV ratio (mean above the median) (n)</td>
<td>90.6%</td>
<td>90.6%</td>
<td>81.6%</td>
<td>90.8%</td>
<td>86.6%</td>
<td>87.5% (2016 Q3)</td>
</tr>
<tr>
<td>Residential mortgage LTV ratio (mean above the median) (n)</td>
<td>3.8%</td>
<td>3.8%</td>
<td>3.6%</td>
<td>4.1%</td>
<td>4.0%</td>
<td>4.1 (2016 Q3)</td>
</tr>
<tr>
<td>Commercial real estate mortgage LTV (average maximum) (n)</td>
<td>77.6%</td>
<td>78.3%</td>
<td>57.7%</td>
<td>79.6%</td>
<td>64.5%</td>
<td>57.7% (2016 H1)</td>
</tr>
<tr>
<td>12 Spreads on new UK lending</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential mortgage (w)</td>
<td>81 bps</td>
<td>50 bps</td>
<td>34 bps</td>
<td>361 bps</td>
<td>155 bps</td>
<td>179 bps (Sep. 2016)</td>
</tr>
<tr>
<td>Commercial real estate (w)</td>
<td>137 bps</td>
<td>135 bps</td>
<td>119 bps</td>
<td>422 bps</td>
<td>255 bps</td>
<td>248 bps (2016 Q2)</td>
</tr>
</tbody>
</table>
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, Co-operatives and Building Society data, and Bank calculations.

Annex 2 Core indicators

- [a] The spread of the series in this table is available at www.bankofengland.co.uk/financialstability/Pages/pc/coreindicators.aspx.
- [b] The ratio of household saving to disposable income.
- [c] The ratio of household saving to income.
- [d] The ratio of the between the highest and the minimum since the start date are used.
- [e] 2006 was the last year before the start of the global financial crisis.
- [f] The data are not available for all countries at the same time.
- [g] Credit is defined as credit claims on the UK private non-financial sector. This includes all liabilities of the household and non-for-profit sector except for the unfunded pension liabilities and financial derivatives of the not-for-profit sector, and private non-financial corporations' (NPCs') loans and debt securities exclusive of 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 the investment loans ratio. The CRB is a one-hundredth of a percentage point. Sources: Bank of England, www.bankofengland.co.uk/financialstability/Pages/pc/coreindicators.aspx for further explanation of how this series is sourced. Sources: BBA, ONS Retail, and J A (1971), National balance sheets and national accounting framework, 1961-2011. Bank of England
- [h] Twelve-month growth rate of nominal credit (defined as the change in net credit as a proportion of the stock of credit twelve months ago). Credit is defined as above. Sources: ONS and Bank calculations.
- [i] Future growth rate of consumer credit. Sources: ONS and Bank calculations.
- [j] Ratios computed using a four-quarter moving sum of GDP. Monetary financial institutions (MFI) cover banks and building societies resident in the United Kingdom. Sources: ONS and Bank calculations.
- [k] Historical data up to 1990 are estimated.
- [l] Five-year interest rates five years forward, derived from the Bank of England index liabilities government bond curve. Sources: Bloomberg and Bank calculations.
- [m] One-month moving average. The X10 is a measure of market expectations of 10-day volatility as conveyed by the S&P 500 stock index options prices. Sources: Bloomberg and Bank calculations.
- [n] The index is for a one-year T+20-year T government bond spread. This trend results from the relative timing aspect of interest rate moves. The spread reflects corporate debt issued publicly in the US and emerging markets and debt markets from both developed and emerging global market issuers. Index constituents are weighted based on market value. Spreads are optionally adjusted to show the number of basis points the yield on five-year T minus yield on 10-year T at the time of the T-20-year spread. Sources: Barclays and Bank calculations.
- [o] A weighted average of yield spread 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. Spreads are taken relative to gift yields of matching maturity for fixed-rate products until August 2009, after which spreads are taken relative to OIS of matching 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. Sources: ONS and Bank calculations. FCA Product Sales Data includes regulated mortgage contracts only but is used to weight all mortgage products. Sources start in 1997.
- [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 subgroups as at 2014. Sources: ONS and Bank calculations.
- [q] A simple leverage ratio calculated as aggregate peer group equity (shareholders' claims) over aggregate peer group assets over aggregate Basel 2010 leverage ratio exposure. The Basel III (2014) series corresponds to aggregate peer group equity over aggregate Basel III leverage ratio exposure. Sources: ONS and Bank calculations.
- [r] 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. Sources: Bank of England, Thomson Reuters Datastream, published accounts and Bank calculations.
- [s] Data are available on a consolidated basis. Sources: Thomson Reuters Datastream, published accounts and Bank calculations.
- [t] Gross debt as a percentage of four-quarter moving sum of nominal GDP. The NBFI sector includes all financial corporations apart from monetary financial institutions (ie deposit taking institutions). This indicator additionally disclosed. 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. 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 2005 and of ABN AMRO by RBS in 2007 to avoid distorting large growth rates resulting from stop changes in the size and interconnections of the major UK peer group. Series exclude National Australia Bank.
- [u] Lending to other banks and financial corporations. Growth rates are on year on year. Latest value shown growth rate for year to 2016 H1. Data point excludes National Australia Bank. Sources: Published accounts and Bank calculations.
- [v] Wholesale funding, composed of deposits from banks and non-subordinated securities in issue. Growth rates are on year on year. Latest value shown growth rate for year to 2016 H1. Data point excludes National Australia Bank. One weakness of the current measure is that it is not possible to distinguish between retail deposits and deposits placed by non-bank financial institutions on a consolidated basis. Sources: Published accounts and Bank calculations.
- [w] Major UK banks' annual 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 the profit to assets ratio in the year prior to the merger. Series are annual to 2015 H1. Sample includes National Australia Bank between 2005-2007. Sources: Published accounts and Bank calculations.
- [x] Major UK banks' loans and advances to customers as a percentage of corporate 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. Sources: Published accounts and Bank calculations.
- [y] Gross debt as a percentage of total assets. This indicator highlights the countries where UK-owned monetary financial institutions' (MFI's) overall exposures are greater than 10% of UK-owned MFIs' tangible equity on an ultimate risk basis and have grown by more than 1.5 times nominal GDP growth in that country. Foreign exposures as defined in BIS consolidated banking statistics. Uses latest data available, with the exception of tangible equity figures for 2006-07, which are estimated using published accounts. Sources: Bank of England, ECB, IFR Web Financial Overview (WEO), Thomson Reuters Datastream, published accounts and Bank calculations.
- [z] Abbreviations used are: AUS (Australia), BRZ (Brazil), CAN (Canada), CHN (China), CYP (Cyprus), CZE (Czech Republic), DE (Germany), ESP (Spain), FIN (Finland), FRA (France), HUN (Hungary), IRL (Ireland), ISL (Iceland), IT (Italy), KOR (Korea), KUW (Kuwait), LKA (Lanka), MYS (Malaysia), NLD (Netherlands), NZL (New Zealand), PHL (Philippines), POL (Poland), POR (Portugal), QAR (Qatar), RSA (South Africa), SGP (Singapore), TAI (Taiwan), THA (Thailand), UK (United Kingdom), UAE (United Arab Emirates), USA (United States), VCT (Vietnam), ZAF (South Africa).
- [ab] Share of the price bracket, or the accounting, value of shareholders' equity per average. Sources: ONS and Bank calculations.
- [ac] Financial sector 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 distorting large growth rates resulting from stop changes in the size and interconnections of the major UK peer group. Series exclude National Australia Bank.
- [ad] Lending to other banks and financial corporations. Growth rates are on year on year. Latest value shown growth rate for year to 2016 H1. Data point excludes National Australia Bank. Sources: Published accounts and Bank calculations.
- [ae] Wholesale funding, composed of deposits from banks and non-subordinated securities in issue. Growth rates are on year on year. Latest value shown growth rate for year to 2016 H1. Data point excludes National Australia Bank. One weakness of the current measure is that it is not possible to distinguish between retail deposits and deposits placed by non-bank financial institutions on a consolidated basis. Sources: Published accounts and Bank calculations.
- [af] 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 share changes. Source: starts in 2002. Growth rates are on year on year. Latest value shown growth rate for year to 2016 H1. Sources: Published accounts and Bank calculations.
- [ag] This indicator highlights the countries where the share of UK-owned MFIs' non-bank private sector exposures is greater than 10% of UK-owned MFIs' tangible equity on an ultimate risk basis and have grown by more than 1.5 times nominal GDP growth in that country. Foreign exposures as defined in BIS consolidated banking statistics. Uses latest data available, with the exception of tangible equity figures for 2006-07, which are estimated using published accounts. Sources: Bank of England, ECB, IFR Web Financial Overview (WEO), Thomson Reuters Datastream, published accounts and Bank calculations.
- [ah] This indicator highlights the countries where UK-owned monetary financial institutions' (MFI's) 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. Sources: National Australia Bank for the period 2003-2015, and 2009-2015. Sources: Published accounts and Bank calculations.
- [ai] Gross debt as a percentage of total assets. This indicator highlights the countries where UK-owned monetary financial institutions' (MFI's) overall exposures are greater than 10% of UK-owned MFIs' tangible equity on an ultimate risk basis and have grown by more than 1.5 times nominal GDP growth in that country. Foreign exposures as defined in BIS consolidated banking statistics. Uses latest data available, with the exception of tangible equity figures for 2006-07, which are estimated using published accounts. Sources: Bank of England, ECB, IFR Web Financial Overview (WEO), Thomson Reuters Datastream, published accounts and Bank calculations.
- [aj] The 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. Spreads are taken relative to gift yields of matching maturity for fixed-rate products until August 2009, after which spreads are taken relative to OIS of matching maturity. Spreads are taken relative to Bank Rate for the tracker product. Sources: FCA Product Sales Data. FCA Product Sales Data includes regulated mortgage contracts only but is used to weight all mortgage products. Sources start in 1997.
- [ak] 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, Co-operatives and Building Society data, and Bank calculations.
Lender and household balance sheet stretch

1 LTV and DTI limits on new residential mortgages

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</thead>
<tbody>
<tr>
<td>Owner-occupier mortgage LTV ratio (mean above the median)(b)</td>
<td>90.6%</td>
<td>90.6%</td>
<td>81.6%</td>
<td>90.8%</td>
<td>86.8%</td>
<td>87.5% (2016 Q3)</td>
</tr>
<tr>
<td>Owner-occupier mortgage LTV ratio (mean above the median)(b)</td>
<td>3.8</td>
<td>3.8</td>
<td>3.6</td>
<td>4.1</td>
<td>4.0</td>
<td>4.1 (2016 Q3)</td>
</tr>
<tr>
<td>Buy-to-let mortgage LTV ratio (mean)(o)</td>
<td>n.a.</td>
<td>n.a.</td>
<td>70.9%</td>
<td>78.6%</td>
<td>71.6%</td>
<td>71.3% (2016 Q2)</td>
</tr>
<tr>
<td>2 Household credit growth(h)</td>
<td>10.3%</td>
<td>11.2%</td>
<td>-0.6%</td>
<td>19.6%</td>
<td>2.7%</td>
<td>4.0% (2016 Q2)</td>
</tr>
<tr>
<td>3 Household debt to income ratio(l)</td>
<td>100.1%</td>
<td>141.8%</td>
<td>78.2%</td>
<td>150.5%</td>
<td>131.4%</td>
<td>133.1% (2016 Q2)</td>
</tr>
<tr>
<td>of which: mortgages(n)</td>
<td>70.8%</td>
<td>103.8%</td>
<td>50.7%</td>
<td>113.2%</td>
<td>101.0%</td>
<td>101.7% (2016 Q2)</td>
</tr>
<tr>
<td>of which: owner-occupier mortgages(f)</td>
<td>80.6%</td>
<td>95.0%</td>
<td>67.2%</td>
<td>100.0%</td>
<td>85.0%</td>
<td>84.3% (2016 Q2)</td>
</tr>
</tbody>
</table>

Conditions and terms in markets

4 Approvals of loans secured on dwellings(l) | 97,915 | 119,036 | 26,709 | 134,915 | 69,619 | 62,932 (Sep. 2016) |
5 Housing transactions(h) | 130,081 | 139,088 | 51,700 | 223,051 | 105,000 | 93,130 (Sep. 2016) |
6 House price growth(o) | 1.8% | 2.2% | -5.6% | 7.0% | 2.0% | 0.7% (Oct. 2016) |
7 House price to household disposable income ratio(g) | 3.0 | 4.6 | 2.2 | 4.8 | 4.3 | 4.5 (2016 Q2) |
8 Rental yield(h) | 5.8% | 5.1% | 4.8% | 7.6% | 5.1% | 5.0% (May 2016) |
9 Spreads on new residential mortgage lending

<table>
<thead>
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<th>All residential mortgages(1)</th>
<th>Buy-to-let mortgages(h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.8 bps</td>
<td>n.a.</td>
<td>61 bps</td>
</tr>
<tr>
<td>75 bps</td>
<td>34 bps</td>
<td>381 bps</td>
</tr>
<tr>
<td>135 bps</td>
<td>15 bps</td>
<td>293 bps</td>
</tr>
<tr>
<td>179 bps</td>
<td>35 bps</td>
<td>272 bps</td>
</tr>
</tbody>
</table>

(a) A spreadsheet of the series shown in this table is available at the Bank of England's Financial Stability Report. (b) The series start after 1987, the average between the start date and 2006 and the minimum since the start date are used. (c) The number of houses sold/bought in the current month is sourced from HMRC's Land Transaction Return. (d) The overall spread on residential mortgage lending is a weighted average of quoted mortgage rates over safe rates, using 90% LTV two-year fixed-rate mortgages and 75% LTV tracker, two and five-year fixed-rate mortgages. (e) The ratio is calculated using a four-quarter moving average of gross disposable income of the UK household and non-profit sector per household as the denominator. Aggregate household disposable income is adjusted for FISIM and changes in pension entitlements. Historical UK household population estimated using annual CB data assuming linear growth in the Northern Ireland household population between available data points. Series starts in 1990. Sources: Department for Communities and Local Government, Halifax/Markit, Nationwide, ONS and Bank calculations. (f) The ratio is calculated using a four-year moving average of gross disposable income of the UK household and non-profit sector per household as the denominator. Aggregate household disposable income is adjusted for FISIM and changes in pension entitlements. Historical UK household population estimated using annual CB data assuming linear growth in the Northern Ireland household population between available data points. Series starts in 1990. Sources: Department for Communities and Local Government, Halifax/Markit, Nationwide, ONS and Bank calculations. (g) The ratio is calculated using a four-quarter moving average of gross disposable income of the UK household and non-profit sector per household as the denominator. Aggregate household disposable income is adjusted for FISIM and changes in pension entitlements. Historical UK household population estimated using annual CB data assuming linear growth in the Northern Ireland household population between available data points. Series starts in 1990. Sources: Department for Communities and Local Government, Halifax/Markit, Nationwide, ONS and Bank calculations. (h) 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. There are structural breaks in the series, 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: Council of Mortgage Lenders, HMRC and Bank calculations. (i) 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 Council of Mortgage Lenders switches source. Data prior to 2002 are at a quarterly frequency. Sources: Council of Mortgage Lenders and Bank calculations. (j) 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 spread two-year, three-year and five-year risk-free interest rates by the number of buy-to-let fixed-rate mortgage products offered at these maturities. The risk-free rates are the appropriate maturity until August 2008, after which the OIS is used. Series starts in 2007. Sources: Bank of England, Moneyfacts and Bank calculations.
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Glossary and other information

**Glossary of selected data and instruments**

- **CDS** – credit default swap.
- **CPI** – consumer prices index.
- **ERI** – exchange rate index.
- **GDP** – gross domestic product.
- **OIS** – overnight index swap.
- **RPI** – retail prices index.

**Abbreviations**

- **AP** – Authorised Participant.
- **AT1** – additional Tier 1.
- **BHPS** – British Household Panel Survey.
- **BIS** – Bank for International Settlements.
- **CEBEST** – UK Government's National Cyber Security Programme.
- **CBPS** – Corporate Bond Purchase Scheme.
- **CCyB** – countercyclical capital buffer.
- **CCP** – central counterparty.
- **CET1** – common equity Tier 1.
- **CGFS** – Committee on the Global Financial System.
- **CME** – Chicago Mercantile Exchange.
- **CML** – Council of Mortgage Lenders.
- **CRD IV** – Capital Requirements Directive.
- **CRE** – commercial real estate.
- **DMO** – Debt Management Office.
- **DSR** – debt-servicing ratio.
- **DTI** – debt to income.
- **DTTC** – Depository trust and Clearing Corporation.
- **ECB** – European Central Bank.
- **ECC** – Economic Consultative Committee.
- **EEA** – European Economic Area.
- **EME** – emerging market economy.
- **ESRB** – European Systemic Risk Board.
- **ETF** – exchange-traded fund.
- **EU** – European Union.
- **FCA** – Financial Conduct Authority.
- **FDI** – foreign direct investment.
- **FISIM** – financial intermediation services indirectly measured.
- **FMI** – financial market infrastructure.
- **FPC** – Financial Policy Committee.
- **FSA** – Financial Services Authority.
- **FSB** – Financial Stability Board.
- **FTSE** – Financial Times Stock Exchange.
- **G-SIB** – global systemically important bank.
- **HMRC** – Her Majesty's Revenue and Customs.
- **IAIS** – International Association of Insurance Supervisors.
- **ICAS** – Individual Capital Adequacy Standards.
- **ICS** – International Capital Standards.
- **IIF** – Institute of International Finance.
- **IMF** – International Monetary Fund.
- **IOSCO** – International Organization of Securities Commissions.
- **LBG** – Lloyds Banking Group.
- **LTI** – loan to income.
- **LTV** – loan to value.
- **MCOB** – Mortgages and Home Finance: Conduct of Business sourcebook.
- **MFI** – monetary financial institution.
- **MMF** – money market fund.
- **MSCI** – Morgan Stanley Capital International Inc.
- **NAV** – net asset value.
- **NBFI** – non-bank financial institution.
- **NCSC** – National Cyber Security Centre.
- **NIM** – net interest margin.
- **NSFR** – Net Stable Funding Ratio.
- **ONS** – Office for National Statistics.
- **OTC** – over the counter.
- **PNFC** – private non-financial corporation.
- **PPI** – payment protection insurance.
- **PRA** – Prudential Regulation Authority.
- **PSD** – Product Sales Database.
- **RBS** – Royal Bank of Scotland.
- **RICS** – Royal Institution of Chartered Surveyors.
- **RoE** – return on equity.
- **SME** – small and medium-sized enterprise.
- **SRB** – systemic risk buffer.
- **S&P** – Standard & Poor’s.
- **TMTPs** – transitional measures on technical provisions.
- **WEO** – IMF *World Economic Outlook*.  

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*Note: The abbreviations and terms provided are a selection and may not be exhaustive.*