

# Financial Stability Report

December 2015 | Issue No. 38



BANK OF ENGLAND



On 2 June 2016 footnote (a) in Chart A.26 on page 31 was amended having been drafted incorrectly.

On 17 May 2016 the values for the series 'Housing transactions: Advances to homemovers, % interest only' and 'Housing transactions: Advances to first-time buyers, % interest only' in Table A.3 on page 61 were amended having been shown incorrectly. In addition, the values for 'Spreads on new residential mortgage lending: Buy-to-let mortgages' shown in Table A.3 on page 61 were corrected for errors in the time series.



BANK OF ENGLAND

# Financial Stability Report

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

December 2015





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The primary responsibility of the Financial Policy Committee (FPC), a sub-committee of the Bank of England's Court of Directors, 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

Andrew Bailey, Deputy Governor responsible for prudential regulation

Ben Broadbent, Deputy Governor responsible for monetary policy

Tracey McDermott, Acting Chief Executive of the Financial Conduct Authority

Alex Brazier, Executive Director for Financial Stability Strategy and Risk

Clara Furse

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 30 November 2015 and, unless otherwise stated, uses data available as at 20 November 2015.

The *Financial Stability Report* is available in PDF at [www.bankofengland.co.uk](http://www.bankofengland.co.uk).



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# Executive summary

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The Financial Policy Committee (FPC) assesses the outlook for financial stability in the United Kingdom by identifying the risks faced by the UK financial system and weighing them against the resilience of the system. By doing so, it assesses the ability of the financial system to continue to provide its core functions to the economy, even under adverse circumstances. Following the global financial crisis, there was a period of heightened risk aversion and retrenchment from risk-taking as financial institutions, businesses and households sought to repair their balance sheets. The FPC judges that the system has now moved out of that period. Household debt has fallen relative to income, but is still elevated, banks are more resilient and credit is generally more available.

## Risks faced by the UK financial system

The global macroeconomic environment remains challenging. Risks in relation to Greece and its financing needs have fallen from their acute level at the time of the publication of the July 2015 *Report*. But, as set out in July, risks arising from the global environment have rotated in origin from advanced economies to **emerging market economies**. Since July, there have been further downward revisions to emerging market economy growth forecasts. In global **financial markets**, asset prices remain vulnerable to a crystallisation of risks in emerging market economies. More broadly, asset prices are currently underpinned by the continued low level of long-term real interest rates, which may in part reflect unusually compressed term premia. As a consequence, they remain vulnerable to a sharp increase in market interest rates. The impact of such an increase could be magnified, at least temporarily, by fragile market liquidity.

Domestically, the FPC judges that the financial system has moved out of the post-crisis period. Some domestic risks remain elevated. **Buy-to-let and commercial real estate activity** are strengthening. The United Kingdom's **current account deficit** remains high by historical and international standards, and household indebtedness is still high.

Against these elevated risks some others remain subdued, albeit less so than in the post-crisis period to date. Comparing credit indicators to the past alone cannot provide a full risk assessment of the level of risk today, but can be informative. Aggregate credit growth, though modest compared to pre-crisis growth, is rising and is close to nominal GDP growth. Spreads between mortgage lending rates and risk-free rates have fallen back from elevated levels.

The FPC judges that **cyber risk** continues to pose a threat to the financial system. More broadly, in the context of elevated geopolitical risks, the FPC emphasises the importance of market participants having robust contingency planning arrangements in place.

## Resilience of the UK financial system

In assessing the outlook for UK financial stability, the FPC weighs these risks against the resilience of the financial system.

The UK banking sector has become more resilient in line with regulatory requirements. The aggregate Tier 1 capital position of major UK banks was 13% of risk-weighted assets in September 2015.

The resilience of the UK banking sector to deterioration in global financial market conditions and the macroeconomic environment, including in emerging market economies, has been assessed in the 2015 annual stress test. The stress-test results and banks' capital plans, taken together, indicate that the banking system would have the capacity to maintain its core functions, notably lending capacity, in a stress scenario such as the one in the 2015 stress test. The results of the 2015 stress test also suggest that UK banks' capital adequacy is resilient to stressed projections for misconduct costs and fines, over and above those paid or provisioned for by end-2014 (Box 3).

## Box 1 The framework of capital requirements for UK banks

Since the crisis, authorities have worked to establish standards for bank equity and other capacity to absorb losses in order to fix some of the major fault lines that caused the financial crisis.

The work to design those standards is reaching completion and is now moving into the phase of full implementation. As that transition takes place, the FPC judges it appropriate to clarify the future requirements on UK banks.

The Supplement to this *Report* finalises the FPC's view on the overall calibration of the capital framework for UK banks. It sets out the FPC's view on the overall amount of capital for the system and the appropriate structure of those requirements. It describes how the framework of capital requirements is expected to evolve between now and the end position in 2019.

The FPC's aim is a prudent, coherent and transparent framework of capital requirements for UK banks. It expects the framework to be rationalised so that each element captures a specific form of risk and there is no duplication of requirements.

The FPC's aim is to ensure that the provision of banking services to the real economy is resilient to stress, without damaging the capacity of the banking system to support economic growth in the long term.

In reaching its assessment, the FPC has considered the overall amount of equity the banking system should have to absorb losses in 'going concern'. That judgement has been informed by new, and forthcoming, requirements for banks to have additional capacity to absorb losses in resolution (that is, as a 'gone concern').

**Overall, based on analysis of the economic costs and benefits of going concern bank equity, the Committee judges the appropriate Tier 1 equity requirement for the system, in aggregate, to be 11% of risk-weighted assets.** A small part of this can be met with contingent capital instruments. The FPC considers the appropriate level of common equity Tier 1 (CET1) to be 9½% of risk-weighted assets.

This assessment refers to the structural equity requirements applied to the aggregate system that do not vary through time. It also assumes that existing shortcomings in the

definitions of equity resources and risk-weighted assets will be corrected.

The FPC considers it appropriate that around half of the system's going concern equity requirement should be in the form of buffers that can be used to absorb losses under stress rather than in hard minimum requirements. These buffers serve a macroprudential purpose. By absorbing the impact of stress, they reduce the need for banks to withdraw services, such as credit provision, to the real economy.

Planned requirements will, after being fully phased in by 2019, take the equity requirement of the UK banking system as a whole to around 11% of risk-weighted assets. This comprises:

- a 6% minimum;
- a 2½% capital conservation buffer that establishes a baseline ability to absorb stress across the system; and
- an additional buffer of equity for globally systemic banks (of between 0% and 2½% for UK banks), depending on their systemic importance. This buffer reduces the probability that these banks will fail in line with the greater costs of their failure to the global economy. It skews equity in the system towards these banks and raises system equity levels by 1½% of risk-weighted assets.

The Committee will also consult in January 2016 on the precise framework for a buffer of equity that domestic ring-fenced banks and large building societies will be required to hold to reflect the particular damage their distress would cause to the UK real economy. As already established by Parliament, this buffer will vary between 0% and 3% of risk-weighted assets. The systemic risk buffer is expected to add around ½% of risk-weighted assets to equity requirements of the system in aggregate.

Requirements on the system in aggregate are therefore likely to sum to around 11%: the level the FPC judges appropriate for the system. **The FPC is not therefore seeking further structural increases in capital requirements for the system as a whole.** It considers the remaining ongoing work at international level to be concerned with the allocation of capital across the system and the various components of the capital framework.

In addition, individual banks are subject to supervisory equity requirements to reflect specific risks to which they are exposed. For example, their balance sheets may be more sensitive to a given level of economic risk than the system as a whole. By 2019, these requirements are expected to be small, on average, but will add capital to the system.

The FPC notes that the aggregate Tier 1 capital position of major UK banks was 13% of risk-weighted assets in September 2015, even though some elements of the requirements have yet to be phased in. And banks expect to build their equity ratios further in coming years.

The difference between the level the FPC judges appropriate and these plans in part reflects the definitional shortcomings in measures of risk-weighted assets, which are compensated for today in additional requirements including for trading book risk and defined-benefit pension fund risk. In part, it reflects supervisory requirements for specific risks, many of which are associated with the banking system being in transition and dealing with legacy issues. It probably also reflects banks' preference to run with some additional buffer of equity on top of their mandatory requirements. Some part of those voluntary buffers may reflect uncertainty about the future level of equity requirements. In clarifying the future framework, the FPC is seeking to minimise that motivation.

If no definitional corrections were to be made and prevailing risk-weight measures remained in place, the system would require measured Tier 1 equity of around 13.5% of risk-weighted assets to be consistent with the FPC's judgement about the appropriate level of capital. The measured level of equity in the system therefore has a little further to increase before 2019 in order to meet planned requirements.

The Committee's judgement about the appropriate amount of going concern equity, at 11% of risk-weighted assets, is substantially lower than some estimates, such as those made by the Basel Committee in the aftermath of the crisis. These had pointed to an appropriate level of going concern equity of around 18% of risk-weighted assets. The FPC's judgement that a lower level is now appropriate reflects three important changes since the crisis.

First, the Committee judges that **effective arrangements for resolving banks materially reduce both the probability of financial crises and the economic costs of bank failure**. An effective resolution regime has been established in the United Kingdom. Banks are restructuring in ways that will facilitate their resolution, including through ring-fencing. And new requirements for total loss-absorbing capacity for global systemically important banks will ensure these banks have liabilities that can be used to absorb losses and recapitalise them in resolution. These liabilities, which do not need to be Tier 1 capital instruments, should be roughly equal in size to their equity requirements. The FPC judges these standards to be appropriate and expects the principle behind them — to facilitate resolution — to be extended across the UK banking system. The Bank of England will consult on this shortly.

Second, the Committee places weight on other structural changes since the crisis that will reduce the exposure of the banking system to risks. Importantly, these include the ring-fencing of major UK banks as required by the Banking Reform Act. In addition, the FPC places weight on the role of **pre-emptive, judgement-led prudential supervision** conducted by the Prudential Regulation Authority.

Third, the **Committee intends to make active use of the time-varying countercyclical capital buffer** that will apply to banks' UK exposures. It is updating and clarifying its strategy for using this macroprudential instrument. That strategy has five core principles:

- The purpose of the countercyclical capital buffer, like the other equity buffers, is to absorb losses in stress, enabling banks to continue to support the real economy and therefore to avoid them amplifying the stress.
- The Committee intends to vary the countercyclical capital buffer according to changes in its view of the risks of potential losses on banks' UK exposures, and to do so symmetrically. In doing so, the Committee is avoiding the need to capitalise the banking system for high-risk conditions at all other points: an outcome it judges to be economically inefficient.
- Increasing the countercyclical capital buffer may restrain credit growth somewhat and mitigate the build-up of risks to banks, but the effect is unlikely to be substantial. This is not its primary objective and will generally not be expected to guide its setting.
- The FPC intends to set the countercyclical capital buffer above zero before the level of risk becomes elevated.
- By moving early, the FPC expects to be able to vary the countercyclical capital buffer more gradually. This approach is likely to be more robust to the inherent uncertainty in assessing the degree of risk and to uncertainty about the impact of additional equity requirements on credit conditions and the real economy. In addition, there are important time lags between when risks become clear and macroprudential policies to address them are implemented fully — for instance, banks typically have twelve months to adjust to any FPC decision to increase the countercyclical capital buffer.

During periods after the recovery and repair phase that typically follows a financial stress, but before the risks facing the system have become elevated, the Committee currently expects the countercyclical capital buffer to be in the region of 1% of risk-weighted assets. This will be kept under regular review and would change, for example, if the structure of

banks' balance sheets were to evolve, making them more sensitive to a given degree of economic risk.

In future, as set out in the Bank's approach to stress testing the UK banking system,<sup>(1)</sup> stress testing will be used to assess regularly whether the system-wide capital conservation buffer and countercyclical capital buffer together are sufficient to absorb the impact across the system of the prevailing risks materialising. Stress tests will assume that, at the system level, the capital conservation buffer can be used to absorb stress and that any prevailing countercyclical capital buffer would be cut rapidly to zero when the stress occurs.

**The FPC continues to view leverage requirements as an essential part of the framework.** These requirements, for equity relative to total — rather than risk-weighted — exposures, manage the problems with risk-weighting. The FPC's leverage framework requires major banks and building societies to satisfy a minimum leverage ratio of 3%.

As with its assessment of the appropriate risk-weighted equity requirement, the FPC's judgement about the appropriate minimum leverage ratio was informed by its intention to use the countercyclical capital buffer actively. As a guiding principle, leverage requirements will be scaled up in proportion to any countercyclical capital buffer on UK exposures and also for systemically important banks.

The principle behind the FPC's leverage requirements is that they are 35% of a firm's risk-weighted equity requirements. For example, a bank subject to a 2.5% equity buffer requirement for its systemic importance and a countercyclical capital buffer of 1% would have a risk-weighted capital requirement of 12%. Its leverage requirement would be 4.2%. As with the risk-weighted equity buffers, the FPC views the purpose of these additional systemic and countercyclical leverage buffers as to absorb the impact of stress.

**The FPC's view of the equity requirements for the system as a whole will not apply to each and every bank and building society** — there will be a distribution of requirements across firms reflecting the view of the Board of the Prudential Regulation Authority on the risks faced by each business relative to the system as a whole. For example, non-systemic banks could face lower requirements. Systemic banks that use risk-weight models that are highly sensitive to economic shocks or that have weak risk management and governance could face higher requirements. This distribution will reflect supervisory requirements for equity buffers for individual firms.

Ongoing work at the domestic and international level is seeking to adjust definitions of risk-weighted assets to address excessive variability across banks and to better capture some

specific risks, such as those associated with trading book assets. These will result in offsetting reductions in microprudential supervisory requirements in the United Kingdom, which currently correct for the shortcomings of risk measures. So the FPC does not expect forthcoming adjustments to add to system-wide capital requirements.

In addition, some elements of the framework of going concern equity requirements are to be phased in between 2016 and 2019. However, some of the risks that these requirements are designed to capture are already being captured by individual supervisory requirements for going concern equity. To avoid duplication, the FPC and Board of the Prudential Regulation Authority will co-ordinate work as system-wide requirements are phased in to ensure that existing requirements on individual banks are phased out appropriately. This will result in a prudent, transparent and consistent framework of going concern equity requirements in which different risks are captured by specific requirements.

(1) [www.bankofengland.co.uk/financialstability/Documents/stresstesting/2015/approach.pdf](http://www.bankofengland.co.uk/financialstability/Documents/stresstesting/2015/approach.pdf).

### Countercyclical capital buffer decision

The shift in financial conditions out of the post-crisis phase means that the FPC is actively considering the appropriate setting of the countercyclical capital buffer.

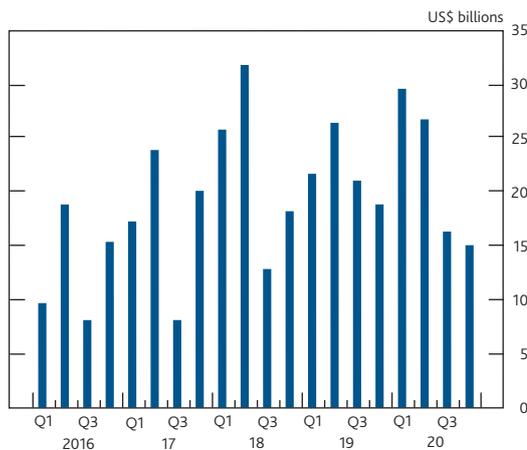
The risks currently captured by existing supervisory requirements have some overlap with those that will in future be captured by the FPC's intended approach to using the UK countercyclical capital buffer. The Board of the Prudential Regulation Authority will review individual requirements to reflect the FPC's strategy outlined in Box 1 and the Supplement to this *Report*, alongside its regular updating of supervisory requirements in 2016 Q1. The result of this process will mean an increase in the countercyclical capital buffer that will probably not change the overall capital requirements for individual banks. However, transparency would be enhanced, contributing to the overall resilience of the UK banking system, and potential overlap avoided. Of course, the FPC will take a decision at its next meeting about the appropriate level of the countercyclical capital buffer.

Therefore and in the light of this, the FPC is maintaining the UK countercyclical capital buffer rate at 0% at this stage. The FPC will carefully review the setting of the countercyclical capital buffer rate in March 2016, in view of the pending review by the Board of the Prudential Regulation Authority of individual requirements.

Beyond the core banking sector, the resilience of important intermediaries of market-based finance continues to improve; but underlying market liquidity in some core financial markets could be fragile, as underlined by recent episodes.

The Committee has completed its review of the potential risks to UK financial stability arising from the investment activities of open-ended investment funds offering short-notice redemptions, as part of its regular review of risks beyond the core banking sector. The FPC supports the Bank's intention to incorporate the activity of investment funds into system-wide stress testing and, in the near term, to assess the resilience of markets to large-scale fund redemptions. It supports further work by the Financial Conduct Authority to assess investor awareness of the liquidity risks associated with investment funds, to communicate good liquidity management to the asset management industry and to assess leverage in investment funds, including through international initiatives to address data gaps. The FPC also supports the recent Financial Stability Board statement that encouraged appropriate use of stress testing by funds to assess their ability individually and collectively to meet redemptions under difficult market liquidity conditions. The FPC will reassess its position in the light of these international initiatives.

**Chart A Refinancing needs for maturing US dollar-denominated bonds increase in 2017 and 2018**  
Maturity profile of US dollar-denominated bonds issued by non-financial companies in selected EMEs<sup>(a)</sup>



Sources: Dealogic and Bank calculations.

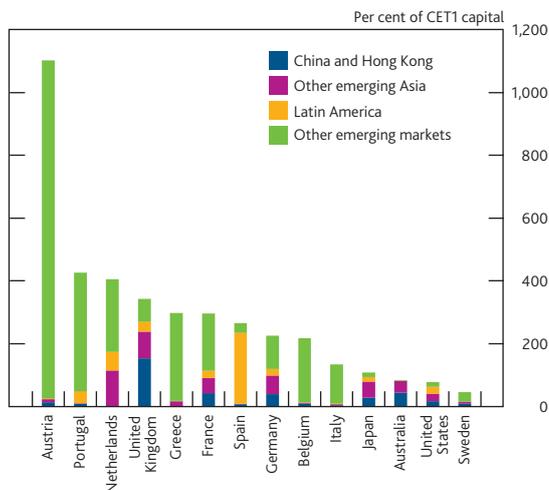
(a) Sample includes non-financial companies in 30 EMEs.

### Emerging market economy risks (pages 16–19)

The UK financial system has substantial exposures to emerging market economies, reflecting the large build up in private sector debt in many of these countries in recent years. At end-2014, private sector debt across emerging market economies was over 110% of annual output, an increase of 40 percentage points since 2008. In China, this ratio was close to 200%. A further downgrade to GDP growth prospects, capital outflows and currency depreciations have all acted to increase the burden of servicing elevated levels of emerging market economy debt. In October 2015, the IMF lowered its forecast for 2015 emerging market economy GDP growth for the fourth year in a row.

In a number of emerging market economies, businesses have issued a large volume of US dollar-denominated debt, and may be particularly vulnerable to exchange rate movements. Since 2009, the stock of emerging market economy non-financial companies' foreign currency denominated debt securities has tripled to US\$940 billion. The maturity profile of emerging market economy dollar-denominated corporate debt suggests refinancing needs will increase significantly in 2017 and 2018 (Chart A).

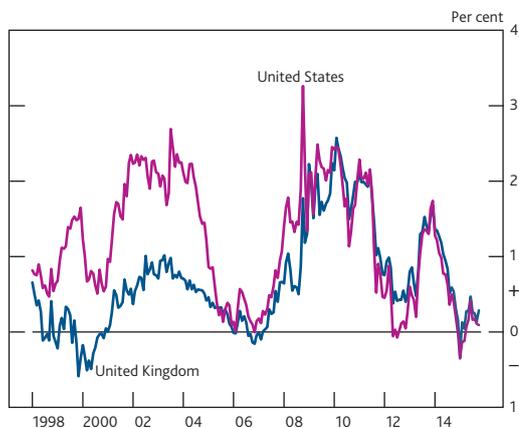
**Chart B UK banks have significant exposures to Asia**  
Banking system exposures to China, Hong Kong and other EMEs<sup>(a)(b)</sup>



Sources: BIS Consolidated Banking Statistics, SNL Financial and Bank calculations.

- (a) Foreign claims of domestically-owned banks on an ultimate risk basis, as at 2015 Q2. CET1 capital as at 2015 H1.  
 (b) Some countries do not publish the full breakdown of EME exposures. Where exposures to China are not published, they are included in other emerging Asia. Where other exposures are not published, they are included in other emerging markets. Netherlands does not publish exposures to China. Sweden does not publish exposures to Latin America.

**Chart C Term premia in government bonds are low**  
Estimates of term premia in ten-year government bond yields<sup>(a)(b)</sup>



Sources: Bloomberg, Federal Reserve Bank of New York and Bank calculations.

- (a) UK estimates are derived using the model described in Malik, S and Meldrum, A (2014), 'Evaluating the robustness of UK term structure decompositions using linear regression methods', Bank of England Working Paper No. 518; US estimates are available from [www.newyorkfed.org/research/data\\_indicators/term\\_premia.html](http://www.newyorkfed.org/research/data_indicators/term_premia.html).  
 (b) Estimates for the United Kingdom are calculated using data since May 1997.

Direct UK bank claims on China, Hong Kong and other emerging market economies were around 340% of CET1 in 2015 Q2 (**Chart B**). The FPC assessed the UK banking system's resilience to a severe downturn in emerging market economies through the 2015 annual stress test. That scenario also included a protracted period of debt-deflation in the euro area, which has the strongest trade links with emerging market economies of the major advanced economies (Box 3). The results, taken together with the improvements in banks' positions in 2015 and their capital plans, suggest that the UK banking system would have the capacity to maintain its core functions in that scenario.

### Financial market fragility (pages 20–25)

Financial market prices remain vulnerable to a sharp increase in market interest rates or the compensation demanded by investors for holding risky assets. Long-term interest rates in advanced economies remain at historically low levels. This partly reflects market expectations of a gradual normalisation of policy rates, but estimates of term premia — that is, the compensation investors require for uncertainty around the expected future path of interest rates — have also been at very low levels over the past year (**Chart C**). Against this backdrop, the compensation that investors demand for holding risky assets may be compressed in some market segments.

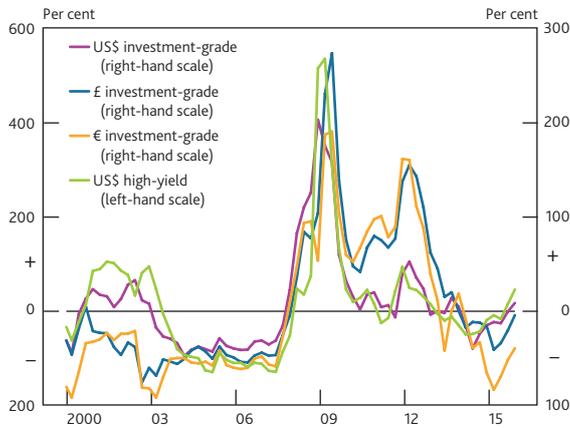
There are a number of developments that might cause term and risk premia to increase. These include a worsening in the outlook for the global economy and an associated deterioration in creditworthiness, and a rise in uncertainty about the future course of economic activity and interest rates. Crystallisation of these risks could pose a threat to UK financial stability, particularly if shocks to asset prices were amplified by fragile market liquidity. This vulnerability came to the fore in August 2015, when an episode of intense volatility in some markets materialised against the backdrop of concerns among market participants about a possible slowdown in economic growth in China.

Despite such periods of intense volatility, there is evidence that market and liquidity risks may not be fully reflected in the prices of some financial assets. For example, estimates of the compensation investors require to bear the liquidity risk associated with corporate bonds remain around historical norms (**Chart D**). It is possible that liquidity premia might increase rapidly if fragile market liquidity is exposed in some markets. While it is desirable that liquidity risks are priced prudently, the concern is that spreads could overshoot if any such market correction proves disorderly. This could arise, for example, in response to large-scale redemptions from investment funds in the event of a fall in risk appetite (Box 2).

It is important that market participants recognise the underlying risks in different asset classes, and price them

### Chart D Corporate bond liquidity risk premia have increased, but are still low given risks

Deviations of estimated corporate bond liquidity risk premia from historical averages<sup>(a)(b)</sup>

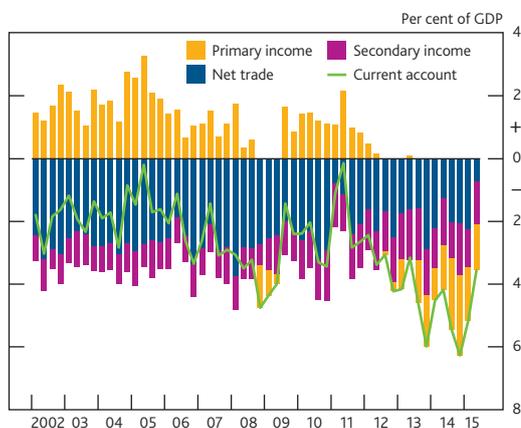


Sources: Bloomberg, BofA Merrill Lynch Global Research, Thomson Reuters Datastream and Bank calculations.

- (a) Implied liquidity premia are estimated using a Merton model as in Leland, H and Toft, K (1996), 'Optimal capital structure, endogenous bankruptcy, and the term structure of credit spreads', *Journal of Finance*, Vol. 51, pages 987–1,019, to decompose corporate bond spreads.  
 (b) Quarterly averages of deviations of implied liquidity risk premia from sample averages. Sample averages are from 1999 Q4 for € investment-grade and 1997 Q1 for £ investment-grade, US\$ investment-grade and US\$ high-yield corporate bonds.

### Chart E The UK current account deficit has widened since 2011

Decomposition of the UK current account<sup>(a)</sup>



Sources: ONS and Bank calculations.

- (a) Primary income mainly consists of compensation of employees and net investment income. Secondary income consists of transfers.

accordingly. The FPC has included financial market stress in the 2015 annual stress test and has reviewed the activities of investment funds. As the FPC set out in its response to the Chancellor's remit letter to the FPC in August 2015, it will assess the costs and benefits of the cumulative impact of regulatory reforms to make the financial system more resilient, including any unintended consequences for the provision of market liquidity in core financial markets. In doing so, it will draw on inputs from the Bank's recent Open Forum.

### UK current account (pages 26–28)

In recent years, the UK current account deficit has been large by historical (Chart E) and international standards. The deficit narrowed in 2015 Q2, but most of that narrowing was likely to have been driven by temporary factors. A persistent current account deficit could lead to a sudden adjustment in capital flows or depreciation of the exchange rate, with adverse consequences for UK financial stability.

The UK external balance sheet has become more resilient and the composition of the capital flows financing the deficit does not suggest any vulnerability over and above its size. Seventy per cent of the stock of UK inward foreign direct investment is equity-financed. Recent portfolio investment inflows appear to have been concentrated in equity, gilts and private sector debt securities. While there could be risks to UK financial stability associated with large-scale redemptions of investment fund shares, those are estimated to be only a small proportion of overall UK inward investment.

Nonetheless, the composition of capital flows can change over time and vulnerabilities can build quickly, particularly when the deficit is persistently large. The FPC monitors capital inflows to assess the extent to which vulnerabilities, such as refinancing risk, may be building, and remains vigilant to the possibility that capital inflows may amplify risks in specific sectors such as commercial real estate.

### UK property markets (pages 29–33)

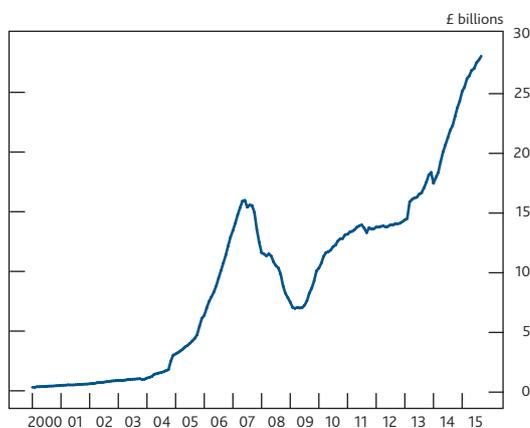
The buy-to-let sector continues to drive growth in the UK mortgage market. Since 2008, the outstanding stock of buy-to-let lending has grown by 5.9% per annum on average, compared with only 0.3% growth in the stock of lending to owner-occupiers. In the year to 2015 Q3, the stock of buy-to-let lending rose by 10%. Greater competition in this sector has not to date led to a widespread deterioration in underwriting standards of UK banks. But some smaller lenders have loosened their lending policies, for example by raising their maximum LTV thresholds. Strong growth in buy-to-let lending is driven in part by a structural shift in tenure to the private rental sector. But it may have implications for financial stability.

New loans to buy-to-let investors are often subject to less stringent affordability tests than loans to owner-occupiers. Assessed against relevant affordability metrics, buy-to-let borrowers may be more vulnerable to an unexpected rise in interest rates or a fall in income, which could exacerbate the scale of a fall in house prices. During an upswing in house prices, investors seeking capital gain can increase leverage including through the purchase of multiple properties. The resulting boost in demand can add further pressure to house prices, prompting both buy-to-let and owner-occupier borrowers to take on larger loans, thereby increasing indebtedness. Since 2010, credit loss rates incurred on buy-to-let loans in the United Kingdom have been around twice those incurred on lending to owner-occupiers.

The FPC remains alert to financial stability risks arising from rapid growth in buy-to-let mortgage lending and notes the difference in underwriting standards in the owner-occupier and buy-to-let mortgage markets, in particular in the typical interest rates used in affordability stress tests. The FPC will monitor developments in buy-to-let activity closely following the tax changes to the buy-to-let market announced by the Chancellor in the *Budget* and Autumn Statement. It supports the programme of work initiated by the Prudential Regulation Authority to review lenders' underwriting standards. HM Treasury is planning to launch this year a consultation on giving to the FPC similar powers of Direction on buy-to-let mortgage lending as those it has already provided on owner-occupier mortgage lending. In the interim, the FPC stands ready to take action if necessary to protect and enhance financial stability, using its powers of Recommendation.

#### Chart F Strong growth in assets under management of commercial real estate open-ended funds continues

Assets under management in open-ended funds investing in commercial real estate



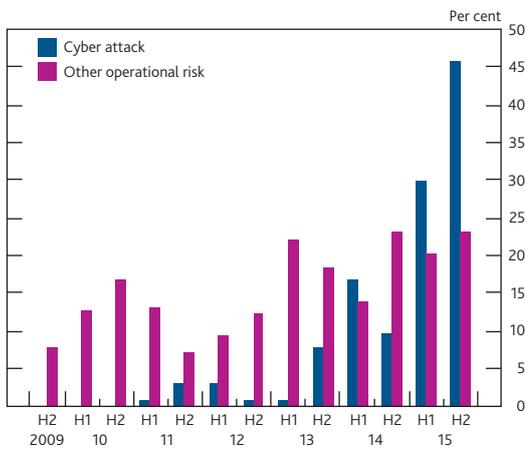
Source: The Investment Association.

The FPC continues to monitor closely developments in the UK commercial real estate market. Prices in the UK commercial real estate market have risen significantly and the funding of investments is becoming riskier. Following the financial crisis, equity financing of commercial real estate investment increased significantly, with a diminished role for leverage. But the use of leverage, particularly in London, has begun to increase a little over the past year or so. There have also been strong inflows to open-ended funds (**Chart F**). Exposures of the major UK banks remain substantial, averaging around 50% of their CET1 at end-2014. A severe downturn in the commercial real estate market could reduce the ability of some firms to access bank finance, given their use of commercial real estate as collateral. A recent Bank review of bank lending to small and mid-sized companies found that 75% of firms that borrow from banks rely on commercial real estate as collateral to support their borrowing.

#### Cyber risk (pages 34–35)

Cyber attack is a serious and growing threat to the resilience of the UK financial system. Cyber attacks have the potential to threaten the vital services that the financial system

**Chart G Concern about cyber risk continues to grow**  
*Systemic Risk Survey*: proportion of respondents highlighting cyber/operational risk as a key concern



Sources: Bank of England *Systemic Risk Surveys* and Bank calculations.

provides to the real economy. The risk from cyber attack has grown over time, reflecting increased use of technology in financial services. Awareness of cyber risk has continued to grow since the July 2015 *Report*. The proportion of respondents to the Bank's *Systemic Risk Survey* highlighting cyber risk as a key concern was 46% in 2015 H2, up from 30% in 2015 H1 (**Chart G**).

UK and international authorities have already taken action with regard to cyber risk, including through a joint UK-US cyber exercise in November 2015. The FPC will receive a report on a work programme implemented by UK authorities by Summer 2016. Progress on 'CBEST' vulnerability testing has continued with ten core firms now having completed CBEST tests, up from five at the time of the July 2015 *Report*. Firms need to build their resilience to cyber attack, develop the ability to recover quickly from attack given the inevitability that attacks will occur, and ensure effective governance of cyber risk across their functions.

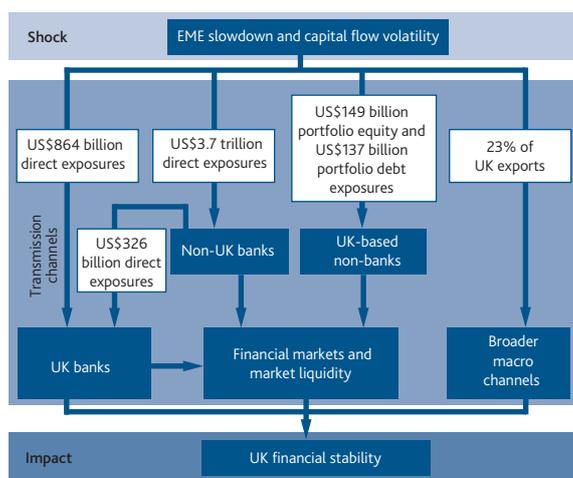
Part A of this *Report* sets out in detail the Committee's analysis of the major risks and action it is taking in the light of those risks. Part B summarises the Committee's analysis of the resilience of the financial system.

# Emerging market economy risks

The UK financial system has substantial exposures to emerging market economies (EMEs), reflecting the large build up in private sector debt in many of these countries in recent years. A further downgrade to GDP growth prospects, capital outflows and currency depreciations have all acted to increase the burden of servicing elevated levels of emerging market economy debt. In a number of countries, businesses have issued a large volume of US dollar-denominated debt, and may be particularly vulnerable to exchange rate movements. The FPC assessed the UK banking system's resilience to a severe downturn in EMEs through the 2015 annual stress test. The results, taken together with the improvement in banks' capital positions in 2015 and their capital plans, suggest that the UK banking system would have the capacity to maintain its core functions in that scenario.

**Chart A.1** The United Kingdom is linked to EMEs through several channels

Topology of UK financial system exposures to EMEs



Sources: BIS Consolidated Banking Statistics, IMF Coordinated Portfolio Investment Survey and Direction of Trade Statistics and Bank calculations.

*The United Kingdom has substantial financial links to emerging market economies...*

The United Kingdom is connected to emerging market economies (EMEs) through a number of direct and indirect channels (**Chart A.1**).<sup>(1)</sup>

Reflecting its role as a global financial centre, the United Kingdom's financial links with EMEs have deepened in recent years as EMEs have become more financially integrated and play an increasingly important role in the global economy. In 2014, EMEs accounted for 57% of world GDP, 37% of global trade (receiving 23% of UK exports) and were recipients of almost a quarter of global capital inflows.<sup>(2)</sup>

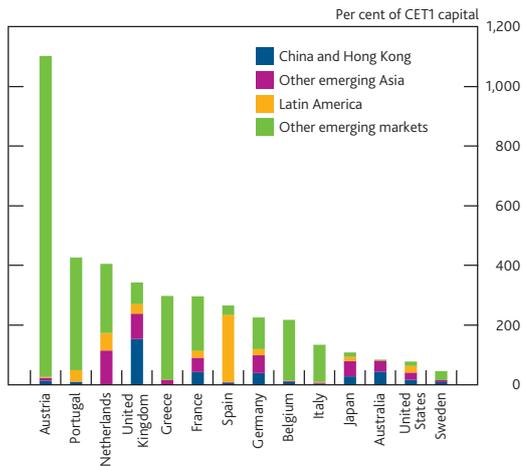
UK-owned banks have material exposure to EMEs via direct lending to households and firms. This exposes UK banks to credit losses, especially from Greater China and other Asian countries. Direct UK bank claims on China, Hong Kong and other EMEs were around 340% of common equity Tier 1 (CET1) in 2015 Q2 (**Chart A.2**), or US\$1.2 trillion, around a 20 percentage point fall since the July 2015 *Report*. UK banks have exposures to the United States and euro area of around 250% and 180% of CET1, respectively.

UK-based asset managers and UK-based insurers and pension funds held 2.0% (US\$196 billion) and 1.5% (US\$89 billion) respectively of their financial assets in EME securities at end-2014. Some such funds permit investors to redeem investments at short notice. The activity of these

(1) Due to varying data sources, the exact definition of EME varies throughout this chapter. We use the BIS definition when considering credit and banking exposures and the IMF definition when considering macroeconomic variables. The BIS definition does not include some offshore centres which are in the IMF definition, but does include some newly industrialised countries which are not included in the IMF definition.

(2) GDP weighted by purchasing power parity.

**Chart A.2 UK banks have significant exposures to Asia**  
Banking system exposures to China, Hong Kong and other EMEs<sup>(a)(b)</sup>

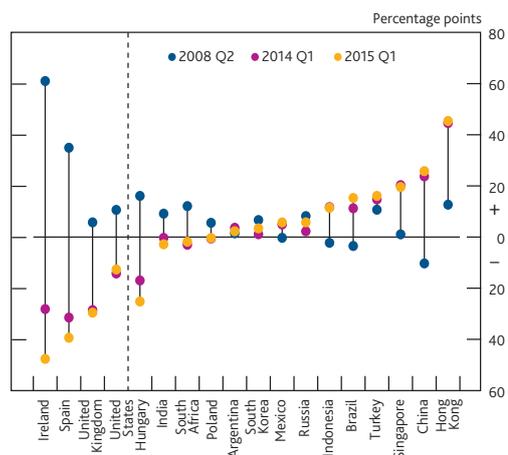


Sources: BIS Consolidated Banking Statistics, SNL Financial and Bank calculations.

(a) Foreign claims of domestically-owned banks on an ultimate risk basis, as at 2015 Q2. CET1 capital as at 2015 H1.

(b) Some countries do not publish the full breakdown of EME exposures. Where exposures to China are not published, they are included in other emerging Asia. Where other exposures are not published, they are included in other emerging markets. Netherlands does not publish exposures to China. Sweden does not publish exposures to Latin America.

**Chart A.3 Credit gaps in EMEs have been rising as advanced economies have deleveraged**  
Deviation of credit to GDP ratio from long-term trend<sup>(a)(b)</sup>

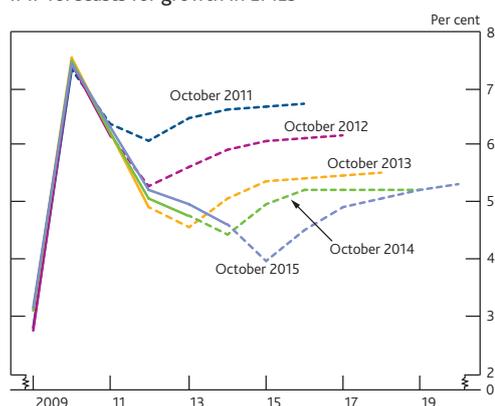


Sources: BIS Total credit statistics and Bank calculations.

(a) Raw data have been adjusted for breaks.

(b) Credit to GDP gaps use a one-sided HP filter with a (BIS-consistent) smoothing parameter of 400,000. Credit by all creditors to domestic private non-financial sector.

**Chart A.4 Successive IMF forecasts of EME GDP growth have been revised down**  
IMF forecasts for growth in EMEs



Source: IMF World Economic Outlook.

investment funds and their potential impact on market liquidity are examined in Box 2.

*...reflecting a substantial rise in private sector debt in emerging market economies since the crisis.*

While private sectors in advanced economies have deleveraged since the global financial crisis, the household and corporate sectors in a number of EMEs have built up substantial debts. Credit gaps — the difference between credit to GDP ratios and their long-term trends — are now larger in many EMEs than they were in the United States and the United Kingdom ahead of the crisis (Chart A.3). At end-2014, private sector debt across EMEs was over 110% of annual output, an increase of 40 percentage points since 2008. In China, this ratio was close to 200%, up from around 120% in 2008 Q1.

*The outlook for EME growth has deteriorated further making elevated debt levels more difficult to service.*

The ability of EMEs to service elevated debt levels is brought into question by slowing growth. In October 2015, the IMF lowered its forecast for 2015 EME GDP growth for the fourth year in a row (Chart A.4). Outturns have been particularly weak in Brazil, where GDP in 2015 Q2 was 2.6% lower than a year earlier, and Russia, where GDP in 2015 Q3 was 4.1% lower than a year earlier. For China, annual GDP growth has slowed moderately, to 6.9% in 2015 Q3 from 7.3% a year earlier, as the authorities have deployed additional monetary and fiscal policy measures. However, the risk of a sharper slowdown in China remains. This could have significant spillovers to the global economy.

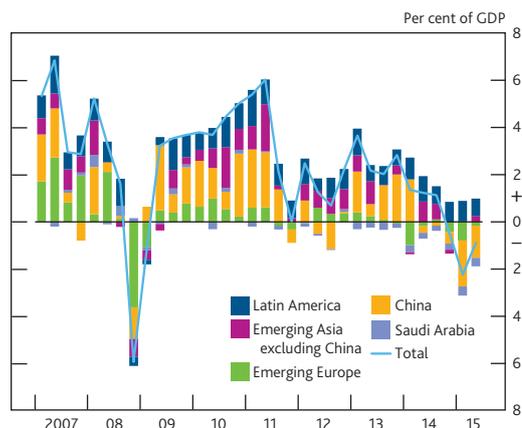
*Together with the prospect of higher US interest rates, this has contributed to capital outflows and tighter financial conditions...*

Net capital inflows into EMEs have fallen abruptly since the beginning of 2015, driven particularly by net private outflows from China (Chart A.5) of over US\$400 billion and from Russia of around US\$40 billion. Previous capital inflows were likely driven in part by a search for yield by advanced-economy investors and these flows are beginning to unwind as the Federal Open Market Committee (FOMC) approaches the point of raising US interest rates. Chinese foreign exchange reserves fell by almost US\$500 billion from their peak in mid-2014 to end-October 2015, due to a strengthening dollar and action taken by authorities to stabilise the exchange rate amid private capital outflows.

Partial data suggest that capital outflows picked up further through 2015 Q3, as the correction in Chinese equity markets and a change in the exchange rate regime for the renminbi appeared to prompt a widespread retrenchment in risk-taking. Consistent with this, EME equity and bond-focused mutual funds have experienced outflows of 5% of their assets under management since August (Chart A.6). Equity prices fell

### Chart A.5 Net capital flows to EMEs fell in 2015

Net capital flows to emerging market economies<sup>(a)</sup>

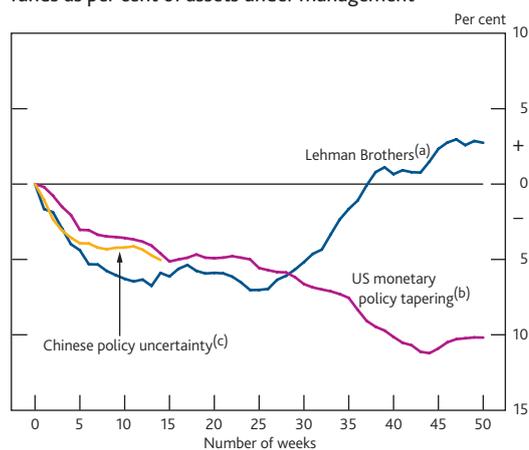


Sources: IMF *World Economic Outlook* (October 2015) and Bank calculations.

(a) Latin America comprises Brazil, Chile, Colombia, Mexico and Peru; Emerging Asia excluding China comprises India, Indonesia, Malaysia, Philippines and Thailand; Emerging Europe comprises Poland, Romania, Russia and Turkey.

### Chart A.6 EME-focused mutual funds have seen net outflows since August

Cumulative flows from EME equity and bond-focused mutual funds as per cent of assets under management



Sources: EPFR Global and Bank calculations.

(a) From 17 September 2008.  
(b) From 22 May 2013.  
(c) From 12 August 2015.

sharply across a range of EMEs in August and September 2015, but recovered, albeit temporarily, in October following the FOMC's decision to keep rates unchanged. Sovereign and corporate bond spreads have widened since the start of the year, including on US dollar-denominated bonds (Chart A.7).

*...and falls in commodity prices have put additional pressure on some regions.*

Commodity prices fell sharply in the second half of 2014, due to a combination of higher supply and weaker growth in demand from EMEs. The oil price has fallen by 63% since its post-crisis peak in mid-2014 and the price of non-oil commodities has fallen by 29% over the same period. Many commodity-exporting countries have seen exchange rates depreciate, growth slow, and government debts rise, as commodity prices have fallen. Supervisory information suggests that UK banks have exposures to commodity sectors (in advanced and emerging market economies) of around 50% of CET1.

*Tighter financial conditions and exchange rate depreciations have put pressure on firms, particularly those with foreign currency borrowing.*

Currency depreciations experienced by many EMEs should help support activity by boosting net trade, but in the short run can tighten financial conditions for those with foreign currency debts. Since 2009, the stock of EME non-financial companies' foreign currency denominated debt securities has tripled to US\$940 billion. The maturity profile of EME US dollar-denominated corporate debt suggests refinancing needs will increase significantly in 2017 and 2018 and beyond (Chart A.8).

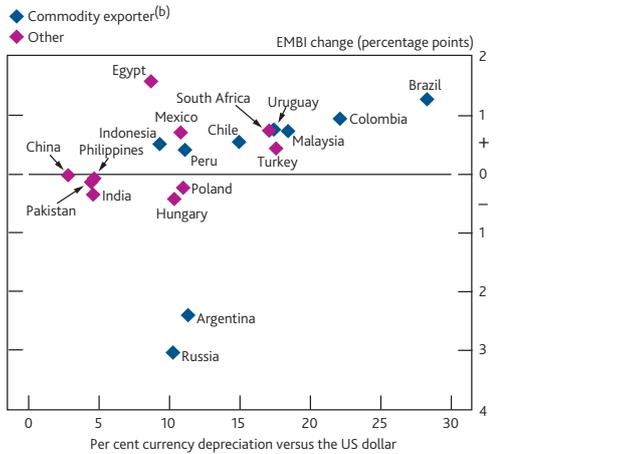
Some EME companies have already experienced difficulties in servicing their debts, increasing non-performing loans on some EME banks' balance sheets. This could put pressure on banks' capital positions, impairing lending capacity and exacerbating the economic slowdown. Some UK banks with exposures to EMEs have seen increases in non-performing loan rates on some of their EME lending, particularly in Asia, albeit from a low level.

*EME sovereigns appear better placed than during the East Asian crisis, but risks could migrate from private to public balance sheets.*

On some measures, EMEs appear better placed to deal with financial stresses than in the past. External debts relative to foreign exchange reserves, for example, are much lower in many vulnerable EMEs — such as Brazil — than was the case for those countries at the centre of the East Asia crisis in 1997 — such as Thailand (Chart A.9). In addition, many major EMEs now have floating exchange rates that should help them to adjust to shocks.

**Chart A.7 Commodity exporters have seen particularly large exchange rate depreciations**

Change in sovereign bond spreads and currency depreciation in EMEs<sup>(a)</sup>

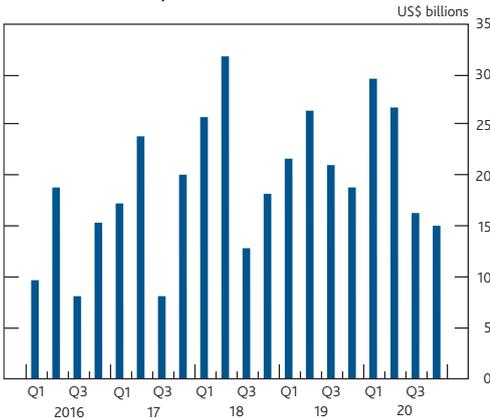


Sources: JPMorgan Chase & Co., Thomson Reuters Datastream and Bank calculations.

(a) Between 31 December 2014 and 20 November 2015.  
 (b) As defined in the IMF *World Economic Outlook*.

**Chart A.8 Refinancing needs for maturing US dollar-denominated bonds increase in 2017 and 2018**

Maturity profile of US dollar-denominated bonds issued by non-financial companies in selected EMEs<sup>(a)</sup>

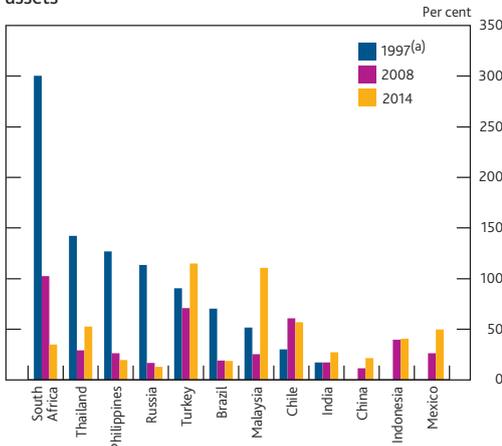


Sources: Dealogic and Bank calculations.

(a) Sample includes non-financial companies in 30 EMEs.

**Chart A.9 Many EMEs have high foreign exchange reserve balances relative to short-term external debts**

Ratio of short-term external debts to foreign exchange reserve assets



Sources: IMF *World Economic Outlook* (October 2015) and Bank calculations.

(a) There are no data available for China, Indonesia and Mexico.

Gross general government debt in EMEs has also risen at a much slower pace than private sector debt, increasing from around 35% of GDP in 2008 to just under 45% in 2015. And, unlike in 1997, the substantial majority (over 80%) of outstanding EME sovereign debt is now denominated in local currencies.

However, the potential for private sector debt to migrate to sovereign balance sheets is higher than in the past. IMF estimates suggest that over 40% of external corporate debt issued since 2010 in EMEs was issued by state-owned enterprises, many of which appear to benefit from implicit government guarantees.

*The 2015 stress-tests results suggest the UK banking system could maintain its core functions in a severe stress scenario for EMEs with material spillovers to the euro area.*

The 2015 annual stress test included an assessment of the UK banking system’s resilience to a severe downturn in EMEs that spilled over to trigger prolonged low growth and deflation in the euro area.

Where UK bank exposures are particularly concentrated, the stress scenario embodies a sharp deterioration in growth that is considerably more severe than the latest macroeconomic outlook. In the stress scenario, annual GDP growth in China slows sharply, falling to a low point of 1.7%, before returning to 7% by 2018 Q4. The IMF forecast China’s GDP growth to slow more moderately to a low point of 6%, by 2017.

For some commodity markets and commodity exporters, however, the outlook has evolved in a way that is much closer to the stress scenario. The current Brent oil price is 1.4% lower than the 2015 Q4 price embodied in the stress test. And downgrades to the IMF’s forecast for Brazilian GDP growth leave the latest outlook close to the stress scenario.

The stress scenario sees a significant rise in impairment rates for UK banks’ direct exposures. For example, the five-year cumulative impairment rate on loans to individuals and businesses in Hong Kong and China more than triples from the baseline to almost 5%.

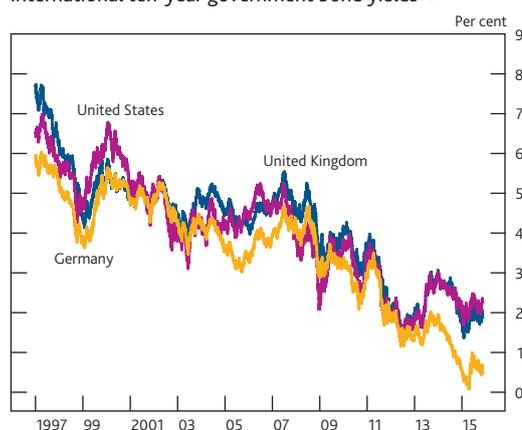
Box 3 and ‘Stress testing the UK banking system: 2015 results’ summarise the stress-test results in more detail. The stress-test results, taken together with the improvement in banks’ capital positions in 2015 and their capital plans, suggest that the UK banking system would have the capacity to maintain its core functions in that scenario.

The risk of a further deterioration in the outlook for EMEs remains, and the FPC will continue to monitor closely the associated risks to UK financial stability.

# Financial market fragility

Financial market prices remain vulnerable to a sharp increase in market interest rates or the compensation demanded by investors for holding risky assets. Crystallisation of these risks could pose a threat to UK financial stability, particularly if shocks to asset prices were amplified by fragile market liquidity. This vulnerability came to the fore in August 2015. Despite such periods of intense volatility, there is evidence that market and liquidity risks may not be fully reflected in the prices of some financial assets. It is important that market participants recognise the underlying risks in different asset classes, and price them accordingly. The FPC has included financial market stress in the 2015 annual stress test, reviewed the activities of investment funds and will continue to assess the impact of regulatory reforms on the provision of market liquidity.

**Chart A.10** Long-term interest rates remain low  
International ten-year government bond yields<sup>(a)</sup>



Source: Thomson Reuters Datastream.

(a) Yields to maturity.

**Chart A.11** Term premia in government bonds are low  
Estimates of term premia in ten-year government bond yields<sup>(a)(b)</sup>



Sources: Bloomberg, Federal Reserve Bank of New York and Bank calculations.

(a) UK estimates are derived using the model described in Malik, S and Meldrum, A (2014), 'Evaluating the robustness of UK term structure decompositions using linear regression methods', *Bank of England Working Paper No. 578*; US estimates are available from [www.newyorkfed.org/research/data\\_indicators/term\\_premia.html](http://www.newyorkfed.org/research/data_indicators/term_premia.html).

(b) Estimates for the United Kingdom are calculated using data since May 1997.

*Financial market prices are vulnerable to sharp increases in market interest rates or risk premia...*

Global financial market prices remain vulnerable to a sudden increase in long-term market interest rates, particularly if this were to materialise in the absence of a stronger outlook for economic growth.

Long-term interest rates in advanced economies remain at historically low levels (**Chart A.10**). This partly reflects market expectations of a gradual normalisation of policy rates, but estimates of term premia — that is, the compensation investors require for uncertainty around the expected future path of interest rates — have also been at very low levels over the past year (**Chart A.11**). A change in policy expectations — or increased investor uncertainty around these expectations — could lead to a sharp rise in market interest rates, triggering a broader revaluation of global asset prices.

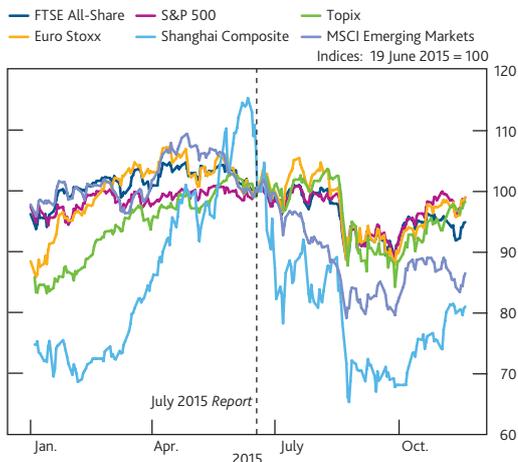
Asset prices are also vulnerable to a sudden fall in the willingness of investors to hold risky assets, including as a result of a reappraisal of the global economic outlook or a crystallisation of risks in emerging market economies (see Emerging market economy risks chapter).

*... which currently appear compressed in some markets.*

Against this backdrop, the compensation that investors demand for holding risky assets may be compressed in some market segments. In credit markets, investment grade corporate bond spreads are around normal levels, but higher-yield spreads appear low by historical standards, including for sterling-denominated bonds (see Risk outlook chapter).

Advanced-economy equity prices are a little below levels at the time of the July 2015 Report (**Chart A.12**), but could appear elevated for some markets based on simple valuation

**Chart A.12** Advanced-economy equity prices have largely recovered after marked falls in 2015 Q3  
International equity indices<sup>(a)</sup>



Sources: Bloomberg and Bank calculations.

(a) In local currency terms, except MSCI Emerging Markets, which is in US dollar terms.

**Chart A.13** Some international equity valuations appear stretched on some metrics

Cyclically adjusted price/earnings ratios (CAPE)<sup>(a)</sup>

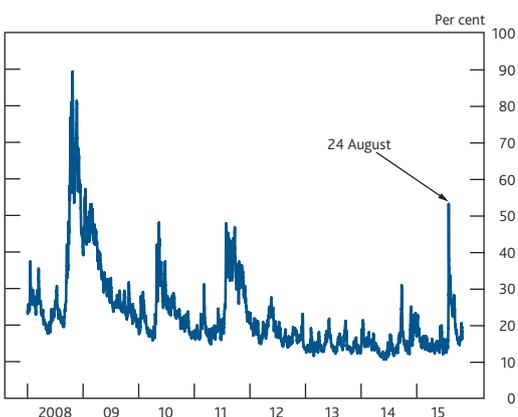


Sources: Global Financial Data and Bank calculations.

(a) Ratio between real price and the moving ten-year average of real earnings for an equity index.  
(b) Long-term averages are calculated using monthly data since April 1962 for the United Kingdom and January 1938 for the United States.

**Chart A.14** On 24 August 2015, implied equity market volatility reached levels not seen since 2009

Highest intraday level of option-implied equity volatility of the S&P 500 index (VIX)<sup>(a)</sup>



Source: Chicago Board Options Exchange.

(a) Series shows the highest value of the VIX index on each day. The VIX is a measure of market expectations of 30-day volatility as conveyed by S&P 500 stock index options prices.

metrics. For example, while the ratio between equity prices and company earnings (adjusted for the economic cycle) remains close to long-term averages for the United Kingdom, it has increased to pre-crisis levels for US equities (Chart A.13).

*As evidenced by the events of August, any market correction could be amplified by fragile market liquidity...*

A correction in market prices could be amplified and propagated by fragile market liquidity. As highlighted in the July 2015 Report, some markets appear to have become more fragile, as evidenced by episodes of short-term volatility and illiquidity over the past couple of years. Potential drivers of such episodes include a broad trend towards fast, electronic trading and the impact of necessary regulatory reforms on the provision of market liquidity. Overall, there is evidence that the level of liquidity in 'normal' times has declined in markets that remain reliant on dealers to intermediate between clients. But the resilience of these markets may have increased. The opposite seems to be likely for markets characterised by the growth of electronic trading platforms. This is consistent with recent episodes of short-term volatility and illiquidity having centred on fast, electronic markets, including those in which activity primarily occurs over exchange-traded venues (see Market-based finance section).

On 24 August 2015, an episode of intense volatility in some markets materialised against the backdrop of concerns among market participants about a possible slowdown in economic growth in China. In this instance, US equity futures prices fell sharply in overnight trading and hit their 'limit down' of 5%, at which point trading was halted. This created uncertainty around the price at which cash US equities would open when they began trading in the morning. Subsequent volatility and halts in the trading of cash equities had knock-on effects to derivative markets. For example, market makers were less able to undertake arbitrage between shares issued by equity exchange traded funds and the assets these funds track. Meanwhile, option-implied volatility on US equities reached its highest level since 2009 (Chart A.14).

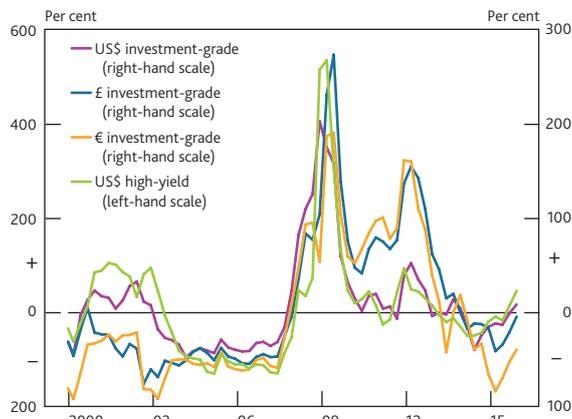
*...but these risks do not appear to be fully reflected in financial market prices.*

Despite such episodes of intense market volatility, there is evidence that market and liquidity risks may not be fully reflected in the prices of some financial assets. For example, option markets imply that investors place a relatively small weight on a substantial fall in risky asset prices, while implied volatilities — a measure of investor uncertainty around asset prices — have returned to their average pre-crisis levels in equity and interest rate markets. Similarly, model-based estimates of the compensation investors require to bear the liquidity risk associated with corporate bonds remain around historical norms (Chart A.15).

It is possible that liquidity premia will increase rapidly if fragile market liquidity is exposed in some markets. While it is

### Chart A.15 Corporate bond liquidity risk premia have increased, but are still low given risks

Deviations of estimated corporate bond liquidity risk premia from historical averages<sup>(a)(b)</sup>

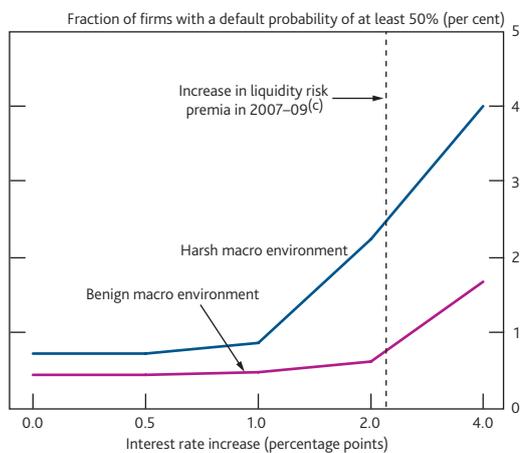


Sources: Bloomberg, BofA Merrill Lynch Global Research, Thomson Reuters Datastream and Bank calculations.

- (a) Implied liquidity premia are estimated using a Merton model as in Leland, H and Toft, K (1996), 'Optimal capital structure, endogenous bankruptcy, and the term structure of credit spreads', *Journal of Finance*, Vol. 51, pages 987–1,019, to decompose corporate bond spreads.  
 (b) Quarterly averages of deviations of implied liquidity risk premia from sample averages. Sample averages are from 1999 Q4 for € investment-grade and 1997 Q1 for £ investment-grade, US\$ investment-grade and US\$ high-yield corporate bonds.

### Chart A.16 Proportion of companies defaulting could increase with a rise in corporate bond spreads

Survey-estimated relationship between borrowing costs and the proportion of UK mid-sized companies likely to default<sup>(a)(b)</sup>



Sources: 2015 Bank's Survey of major UK banks on their small and medium-sized corporate lending, Bloomberg, BofA Merrill Lynch Global Research, Thomson Reuters Datastream and Bank calculations.

- (a) 'Benign macro environment' refers to a macroeconomic environment similar to that of end-2014. 'Harsh macro environment' refers to a recession similar to 2008–09.  
 (b) Based on a survey of UK banks' (largely floating rate) lending to small and medium-sized companies. The chart includes data for mid-sized companies with revenues between £25 million–£500 million only.  
 (c) Increase in average liquidity risk premium on sterling-denominated investment-grade corporate bonds between 2007 H1 and 2009 H1 estimated using a Merton model as in Leland, H and Toft, K (1996), 'Optimal capital structure, endogenous bankruptcy, and the term structure of credit spreads', *Journal of Finance*, Vol. 51, pages 987–1,019, to decompose bond spreads.

desirable that liquidity risks are priced prudently, the concern is that spreads could overshoot if any such market correction proves disorderly, creating a negative feedback loop between price falls and poor market liquidity. This could arise, for example, in response to large-scale redemptions from investment funds in the event of a fall in risk appetite (see Box 2).

*A market correction could threaten financial stability if there were sustained illiquidity in financial markets.*

An overshoot in corporate bond spreads may unnecessarily reduce the ability of some companies to service refinanced debt, threatening their solvency. Survey evidence suggests that the proportion of UK medium-sized companies that are likely to be vulnerable to default could rise sharply were borrowing costs to rise by more than 200 basis points, as seen from 2007–09 (Chart A.16). In addition, some firms may be deterred from raising new financing, resulting in a cancellation of investments that would otherwise have been expected to be profitable.

In extremis, the supply of credit to the real economy, and transfer of risk to those who are best placed to manage it, could be impaired if there were sustained illiquidity in, and dislocation of, key financial markets. For example, the UK high-yield non-financial corporate bond primary issuance market was closed for four consecutive quarters during the global financial crisis in 2008–09 and for one quarter during the euro-area sovereign debt crisis in 2011.

A sharp fall in asset prices could further impact the balance sheets of banks and other financial institutions at the core of the financial system, including through their holdings of traded assets. More generally, falls in mark-to-market values of securities could result in material gross collateral flows related to repo and derivative transactions. This would create liquidity risks for major UK banks and other core intermediaries. A fall in the value of assets used as collateral could also reduce other leveraged investors' ability to fund their holdings of assets, forcing them to deleverage rapidly, and leading to further price falls across a range of markets.

It is important that market participants recognise the underlying risks in different asset classes, manage them prudently, and price them accordingly. The FPC has: included a financial market stress in the 2015 annual stress test, taking into account the liquidity of trading book positions (see Box 3); undertaken a review of the activities of investment funds in the context of a fragile market liquidity environment (see Box 2); and will assess the costs and benefits of the cumulative impact of regulatory reforms to make the financial system more resilient, including any unintended consequences for the provision of market liquidity in core financial markets. In doing so, it will draw on the Bank's recent Open Forum.

## Box 2 Investment funds

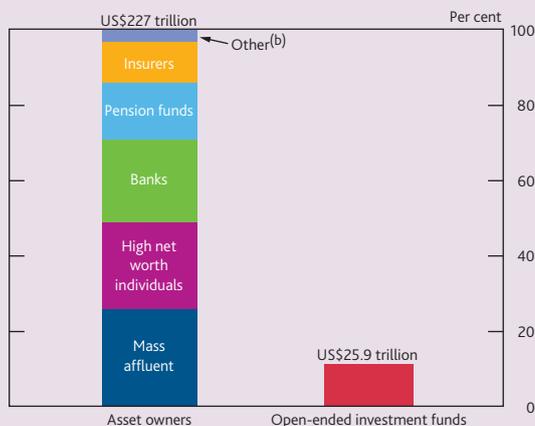
The Bank of England Act 1998 gives the FPC responsibility to identify, assess, monitor and take action in relation to financial stability risks across the UK financial system, including risks arising from beyond the core banking sector. The FPC published its annual review of risks beyond the core banking sector in the July 2015 *Report*. As part of that review, the Committee stated its intention to undertake a regular deep analysis of a range of activities.

This box — which considers the activities of open-ended investment funds — is the first in a series that will look in detail at financial stability risks and regulation beyond the core banking sector.

### The activities of open-ended investment funds

Open-ended investment funds account for US\$26 trillion of assets under management globally, or 11% of global assets (Chart A).<sup>(1)</sup> Open-ended investment funds domiciled in the United Kingdom hold around US\$1.3 trillion of assets. They invest in a variety of financial instruments, including corporate bonds and equities, thereby supporting the flow of capital to the real economy, domestically and globally.

Chart A Split of global financial assets by owner<sup>(a)</sup>



Sources: BlackRock, McKinsey Global Institute analysis and Bank calculations.

(a) Data as at 2012.

(b) Includes sovereign wealth funds, foundations/endowments and family offices.

Asset management firms act as agents for investors, making investment decisions on their behalf according to agreed objectives. Whereas depositors' claims on banks are redeemable at a given value, asset managers make no such guarantee as to the future value of investments.

### Risks to financial stability

The potential risks to financial stability connected with investment funds' activities relate to their prospective impact on markets, particularly where they offer short-term redemptions to investors while investing in longer-dated and

potentially illiquid assets. The recent rapid growth in open-ended funds, and their continued investment in less liquid assets, has reinforced the risk that large-scale investor redemptions could result in sales of assets by funds that might test markets' ability to absorb them. The risk is that this could impair market liquidity, which is already fragile, particularly in markets that are important for extending funding to the real economy (see Financial market fragility chapter).

In response to the FPC's March 2015 Statement, Bank and FCA staff conducted a joint information-gathering exercise on 17 asset management firms and 143 of their funds, focusing on those with large holdings of corporate bonds. Analysis drawing on the information gathered from these firms suggests that: first, in aggregate, surveyed funds expected to be able to liquidate over one day roughly three times estimated dollar corporate bond market turnover; and second, redemptions from their funds would need to exceed the severest level seen since 2007 in order to test liquidity in sterling corporate bond markets. The future redemption behaviour of investors — and markets' ability to absorb the resulting asset sales by funds — may differ to that witnessed historically. For example, there is evidence to suggest that dealers may be less willing to accommodate asset sales than previously (see Market-based finance section).

### Additional sources of fragility

There are three ways in which the activities of open-ended investment funds might exacerbate large-scale asset sales and lead to market disruption.

#### (i) First-mover advantage

Were investors remaining in a fund to bear some or all of the costs of meeting redemptions, this might create incentives for investors to redeem ahead of others. This could increase the scale of subsequent asset sales during periods of stress. But — at least for the funds surveyed — this risk appears minimal:

- First, asset management firms surveyed stated that they would meet large redemptions by selling assets of varying liquidity. This should avoid creating an advantage for redeeming investors that might otherwise be conferred, for example, if redemptions were met via the sale of more liquid assets.
- Second, UK-authorized funds have the ability to apply mechanisms — such as swing pricing and dilution levies — that allow the costs associated with meeting redemptions to be reflected in the amount received by redeeming investors.<sup>(2)</sup>

(1) The term 'funds' refers to a broader universe of investment vehicles than just open-ended investment funds; however, the two terms are used interchangeably in what follows.

(2) 'Swing pricing' involves adjusting the price of fund units to reflect the trading costs associated with net fund flows. A 'dilution levy' has a similar effect, but is a separate additional charge made to redeeming or subscribing investors, which is applied to their net proceeds or costs.

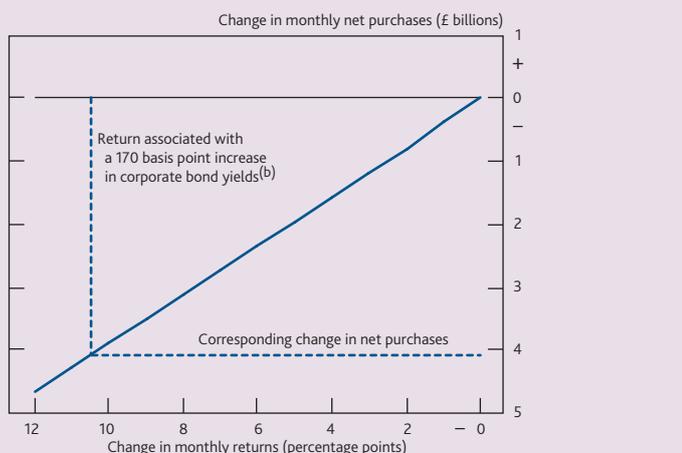
One residual concern is that the use of these and other tools might create additional risks if investors are unaware of the potential for their use. For example, the application of tools used to limit redemptions (such as deferrals and fund suspensions) could — were they to cause investors to reappraise the liquidity of their holdings of investment funds more generally — cause further redemptions from, and asset sales by, other funds.

**(ii) Procyclical behaviour by investors and fund managers**

It is possible that funds’ offering of short-term redemptions may have encouraged some investors to invest more in less liquid assets than they would otherwise. If investors were suddenly to become aware of the liquidity risk to which they are exposed, this could exacerbate the scale of their redemptions.

**Chart B** shows an estimate of the association between monthly changes in the market value of, and asset managers’ demand for, sterling corporate bonds. This suggests that a 10% fall in market prices (broadly equivalent to a 170 basis point increase in yields) could be associated with a reduction in net purchases of over £4 billion, which is greater than 30% of estimated monthly market turnover. Sales of this scale exceed the amount that asset managers estimate their funds could liquidate within a month, suggesting that market liquidity might be tested. Movements in market prices associated with large-scale sales by funds might also risk leading to further fund redemptions and sales that, in turn, could add to market disruption.

**Chart B** Estimated net purchases by asset managers associated with changes in the price of sterling corporate bonds<sup>(a)</sup>



Sources: BofA Merrill Lynch Global Research, Dealogic, FCA, Thomson Reuters Datastream and Bank calculations.

(a) Based on a regression of monthly net purchases by asset managers of sterling corporate bonds, against contemporaneous returns on the iBoxx sterling corporate bond index, and controlling for gross issuance of sterling corporate bonds and changes in US Treasury yields. Data from 2011–15.  
 (b) Highest monthly increase in investment-grade sterling corporate bond yields, observed in October 2008. Data from 1997.

Market liquidity may be more likely to be tested if investment funds concentrate their holdings in similar securities. There are a number of reasons why fund investment decisions may be correlated. For example, performance is often evaluated against common benchmarks. And if performance is evaluated against that of other funds, this might create an incentive for investment funds to invest in securities that are widely held by their peers, in order to avoid differing performance.

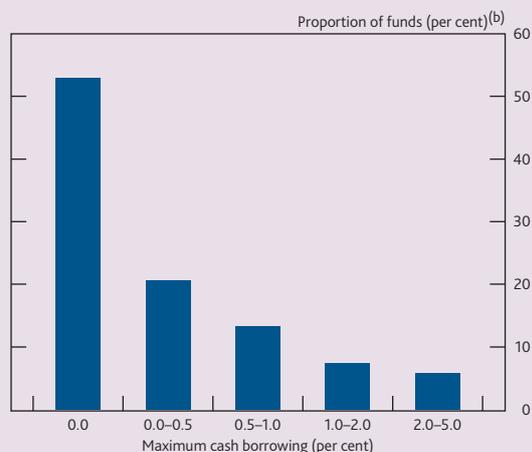
The impact of investment fund asset sales on market functioning will also be affected by the behaviour of other investors. Many UK defined benefit pension funds have in place triggers that would prompt them to reallocate their portfolios away from equities and towards fixed-income assets if a rise in long-term market interest rates were to reduce their deficits. However, the extent to which they are likely to act countercyclically by buying corporate bonds sold by asset managers in stresses is not known with certainty. The likely behaviour of other investors is less certain.

**(iii) Leverage**

Funds can gain leverage by borrowing, including from banks. This has the potential to increase the volume of sales — and hence risks to market liquidity — that occur from a given level of investor redemptions.

The FPC judges risks from such financial, or ‘balance sheet’, leverage, to be contained. UCITS regulations limit fund borrowing to 10% of the value of their net assets, on a short-term basis. **Chart C** shows the distribution of the level of fund borrowing for those funds that reported borrowing in the Bank-FCA information gathering exercise. Only 6% of funds had borrowing that exceeded 2% of their net assets, well below this regulatory limit.

**Chart C** Fund borrowing as a proportion of net asset values<sup>(a)</sup>



Sources: Bank-FCA survey and Bank calculations.

(a) Data include 68 funds that reported borrowing, out of a total survey sample of 143.  
 (b) Proportion of funds that reported.

Funds can also gain leverage through their use of derivatives. Such 'synthetic' leverage can be used to reduce risk via the hedging of exposures, but can also be used to increase exposure as part of more complex investment strategies. There is currently no single standardised measure of synthetic leverage reported consistently across funds, which prevents the FPC from making a holistic assessment of risks in this area. Efforts are, however, under way to address data gaps in the area of leverage.

### Policy

The majority of investment funds that are domiciled or marketed in the United Kingdom are governed by harmonised European rules. This — combined with the fact that only a small proportion of open-ended investment funds globally is domiciled in the United Kingdom — underlines the importance of current and forthcoming international initiatives in assessing the potential risks posed by funds.

After reviewing the activities of funds, the FPC:

- Supports the FCA's intention to assess investor awareness of the liquidity risks associated with investment funds in its forthcoming market study.<sup>(1)</sup> This should increase understanding of the extent to which investors are aware of any risks associated with investing in less liquid assets.
- Has reviewed the results of the information-gathering exercise and is satisfied that fund managers have satisfactory firm-level liquidity management practices (including the use of swing pricing and dilution levies) that prevent a first-mover advantage being conferred on redeeming investors. It also supports the FCA's consideration of how best to communicate good liquidity management practices to the asset management industry.
- Notes that it is important that fund investors are aware of the potential for funds to use exceptional liquidity management tools (including the application of deferrals and fund suspensions). This might reduce open-ended investment funds' investment in less liquid assets during an upswing and reduce the probability of a sudden reappraisal of liquidity risk in stressed market conditions. And if investors are aware of these tools, it might reduce the likelihood of large-scale redemptions following their use.
- Supports the recent Financial Stability Board (FSB) statement that encouraged appropriate use of stress testing by funds to assess their ability individually and collectively to meet redemptions under difficult market liquidity conditions.<sup>(2)</sup>
- Supports the Bank's intention to incorporate the activity of investment funds into system-wide stress testing, as set out

in a recent stress-testing approach document.<sup>(3)</sup> In the near term, this will include a desk-based simulation exercise to assess the resilience of markets to large-scale fund redemptions.

- Notes the importance of ongoing work by the FSB to assess vulnerabilities in relation to asset management activities.

The FPC considers that, together, these initiatives will help to assess the risks posed by any procyclical behaviour and allow for the consideration of a wider set of policy actions.

Finally, the FPC supports the FCA's recent consultation on the rules for UK investment funds, including the standardisation of derivatives reporting,<sup>(4)</sup> and supports the FSB's initiative to assess leverage in investment funds.

(1) [www.fca.org.uk/your-fca/documents/market-studies/ms15-02-1-asset-management-market-study-tor](http://www.fca.org.uk/your-fca/documents/market-studies/ms15-02-1-asset-management-market-study-tor).

(2) [www.financialstabilityboard.org/2015/09/meeting-of-the-financial-stability-board-in-london-on-25-september/](http://www.financialstabilityboard.org/2015/09/meeting-of-the-financial-stability-board-in-london-on-25-september/).

(3) [www.bankofengland.co.uk/financialstability/Documents/stresstesting/2015/approach.pdf](http://www.bankofengland.co.uk/financialstability/Documents/stresstesting/2015/approach.pdf).

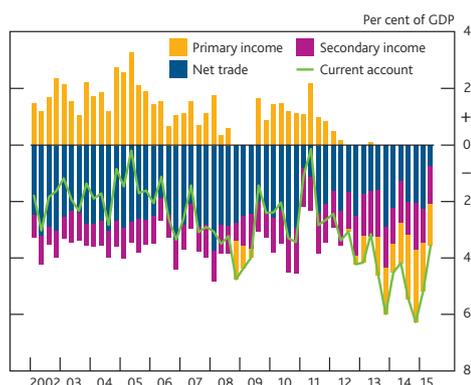
(4) [www.fca.org.uk/static/documents/consultation-papers/cp1527-ucits-v.pdf](http://www.fca.org.uk/static/documents/consultation-papers/cp1527-ucits-v.pdf).

# UK current account

In recent years, the UK current account deficit has been large by historical and international standards. A persistent current account deficit could lead to a sudden adjustment in capital flows or depreciation of the exchange rate, with adverse consequences for UK financial stability. The UK external balance sheet has become more resilient and the composition of the capital flows financing the deficit does not suggest any vulnerability over and above its size. Nonetheless, the composition of capital flows can change over time and vulnerabilities can build quickly. The FPC monitors capital inflows to assess the extent to which vulnerabilities, such as refinancing risk, may be building, and remains vigilant to the possibility that capital inflows may amplify risks in specific sectors.

**Chart A.17** The UK current account deficit has widened since 2011

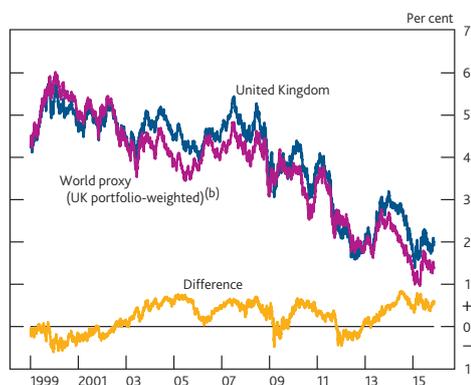
Decomposition of the UK current account<sup>(a)</sup>



Sources: ONS and Bank calculations.

(a) Primary income mainly consists of compensation of employees and net investment income. Secondary income consists of transfers.

**Chart A.18** Differential rates of return likely explain a small part of the deterioration in the current account International ten-year government bond yields<sup>(a)</sup>



Sources: Bloomberg, ONS and Bank calculations.

(a) Measured as ten-year zero-coupon yields derived from prices of conventional government bonds covering a broad range of maturities.  
(b) Proxy for the yield received by UK investors in overseas government bonds. Combination of euro-area (France and Germany) and US ten-year zero-coupon yields, weighted by the proportions of UK external assets accounted for by those countries.

*The UK current account deficit narrowed in 2015 Q2...*

The current account deficit narrowed from 5.2% of GDP in 2015 Q1 to 3.6% in 2015 Q2 (Chart A.17), reflecting a fall in the trade deficit from 2.3% to 0.7%. Most of the narrowing was likely to have been driven by temporary factors; according to monthly data, the trade deficit widened to around 1.8% of GDP in 2015 Q3.<sup>(1)</sup> Following data revisions, the current account deficit is now estimated to have been 5.1% in 2014, compared with 5.5% at the time of the July 2015 Report. That remains the largest annual deficit since official records began, and is wide by international standards.

*...but remains a potential source of fragility.*

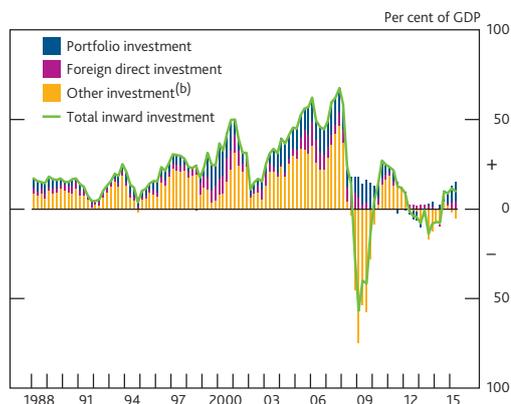
Since 2011, and even though the recovery in the UK economy over that period may have eliminated spare capacity in the United Kingdom more quickly than its main trading partners, the trade deficit has been broadly flat. Nevertheless, the UK current account has worsened significantly, accounted for by weaker net primary income. In principle, this may be related to the difference in rates of return on overseas and UK assets. However, the gap between benchmark bond yields in the United Kingdom and its main trading partners is around levels seen in the mid-2000s (Chart A.18), when net primary income was much stronger. Falls in primary income have instead been driven largely by lower income flows received by UK companies on their foreign direct investment (FDI) assets. Recent work by the ONS suggests this has been concentrated in a few industries, such as mining and quarrying and telecommunications.<sup>(2)</sup> In the absence of an explanation for these lower income flows, it is hard to be certain how persistent they may be.

(1) This does not reflect the revisions in the GDP release on 27 November. Recent estimates of net trade are more uncertain than usual. See [www.ons.gov.uk/ons/rel/uktrade/uk-trade/august-2015/index.html](http://www.ons.gov.uk/ons/rel/uktrade/uk-trade/august-2015/index.html).

(2) See [www.ons.gov.uk/ons/rel/fdi/foreign-direct-investment/index.html](http://www.ons.gov.uk/ons/rel/fdi/foreign-direct-investment/index.html).

**Chart A.19 UK inward investment has picked up but remains low by historical standards**

Inward investment to the United Kingdom<sup>(a)</sup>



Sources: ONS and Bank calculations.

(a) Net acquisition of foreign liabilities by UK residents, four-quarter moving average.  
(b) Other investment consists mostly of loans and deposits.

**Table A.1 The composition of recent financing flows is not a major source of vulnerability**

Financing flows behind the current account deficit, 2014 Q3 — 2015 Q2

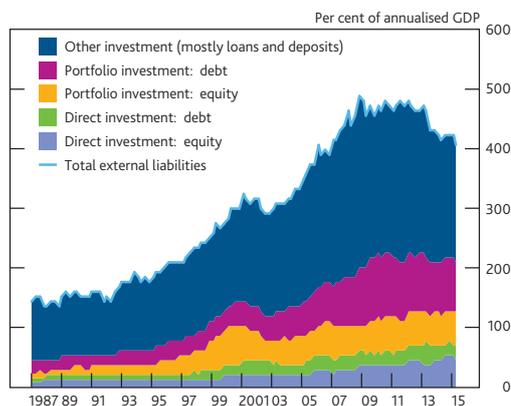
£ billions, 2014 Q3 — 2015 Q2	Inward investment (net acquisition of foreign liabilities by UK residents)	Outward investment (net acquisition of foreign assets by UK residents)	Net inward financing flow <sup>(a)</sup>
Direct investment	78	12	66
Portfolio investment	203	-7	210
of which equity	57	-38	95
of which investment fund shares	0	7	-7
of which debt securities	146	25	121
of which government debt	41	n.a.	n.a.
of which other debt securities	105	n.a.	n.a.
Other investment <sup>(b)</sup>	-101	-6	-94
Other (reserves and net derivatives)	n.a.	99	-99
Total	180	98	83

Sources: 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. The total net inward financing flow is equal in magnitude to the current account deficit (plus net errors and omissions).  
(b) 'Other investment' consists mostly of loans and deposits.

**Chart A.20 The United Kingdom's external liabilities as a share of GDP have been falling**

UK gross external liabilities by type<sup>(a)</sup>



Sources: ONS and Bank calculations.

(a) Derivatives are excluded.

A persistently large current account deficit could make the United Kingdom more vulnerable to a sudden adjustment in capital flows, perhaps because of a change in the risk environment or a loss of confidence by foreign investors financing the deficit. Ease in financing the current account deficit rests on the credibility of the UK macroeconomic policy framework and its continuing openness to trade and investment. The United Kingdom has maintained this confidence in recent years but it is important that this continues.

*However, capital inflows do not appear to be associated with large refinancing risks...*

In the year to 2015 Q2, UK inward investment picked up, to around 10% of GDP, but that is half of its average since 1988 (Chart A.19).<sup>(1)</sup> Over the past year, UK residents have continued to repay foreign short-term bank loan liabilities, included within 'other investment' (Table A.1). The new liabilities incurred to finance the deficit over that period include FDI and portfolio investment. FDI inflows are often associated with stable and long-lasting financing relationships, and so should be less liable to reversal. Over the past 20 years, the volatility of UK FDI inflows has been only around half that of other capital inflows to the United Kingdom. Further, 70% of the stock of UK inward FDI is equity-financed, so is not subject to refinancing risk (Chart A.20).

Portfolio investment comprises overseas residents' purchases of UK debt securities, equity and investment fund shares.<sup>(2)</sup> There is uncertainty around official estimates of cross-border portfolio flows, because it is difficult to trace the holders of securities traded in secondary markets. Recent portfolio investment inflows appear to have been concentrated in equity, gilts and private sector debt securities. The average maturity of UK government debt is significantly longer than the G7 average, and hence is not subject to significant refinancing risk. Further, net UK private sector bond issuance since 2011 has been negative at all maturities under five years. While in principle there could be risks to UK financial stability associated with large-scale redemptions of investment fund shares (Box 2), those are estimated to be only a small proportion of overall UK inward investment (Table A.1).

*...and the UK external balance sheet is more resilient.*

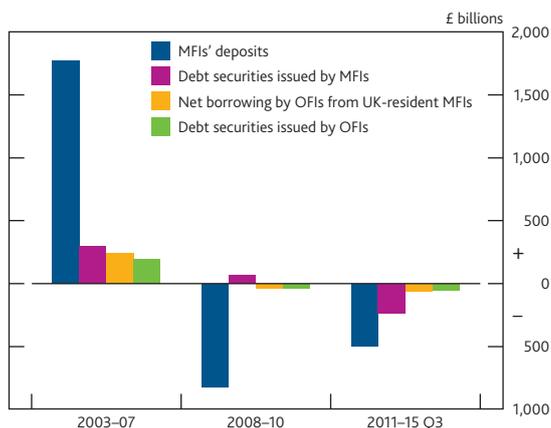
The United Kingdom's stock of external liabilities has been falling as a share of GDP in recent years, but remains high (Chart A.20). Large gross external liabilities are likely to imply greater interconnectedness and, where those liabilities consist of debt, higher leverage and refinancing risk for some

(1) Empirical evidence suggests that the risks associated with a wider current account deficit are amplified when gross inward investment flows are large. See for example Obstfeld, M (2012), 'Does the current account deficit still matter?'

(2) Claims are classified as portfolio investment under the System of National Accounts (2008) if they represent a claim on less than 10% of a company. Claims above this threshold are classified as direct investment.

### Chart A.21 UK financial institutions have reduced their foreign currency-denominated debt

Changes in UK-resident financial institutions' foreign currency-denominated debt liabilities by type<sup>(a)</sup>

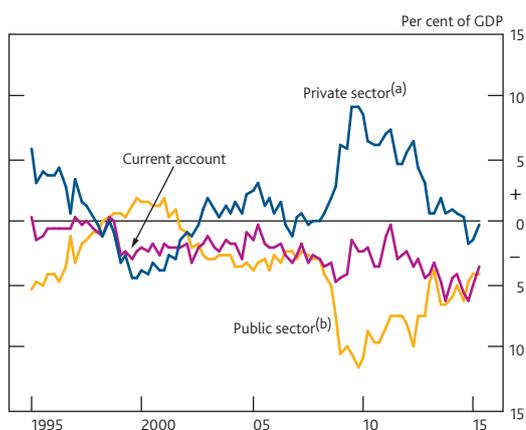


Sources: Bank of England and Bank calculations.

(a) The chart shows the net incurrence of foreign currency-denominated debt liabilities in each class in each period. Building societies are excluded from the MFI data before 2008 but their contribution to the total is small. Data are not seasonally adjusted.

### Chart A.22 The private sector financial balance has fallen

Net lending as a share of GDP by sector



Sources: 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.

UK residents. This risk will be mitigated, however, to the extent that around a quarter of UK external liabilities are those of UK-resident branches of foreign-owned banks, which may be able to draw on the resources of their parent companies in the event that refinancing risk crystallises.

The currency composition of a country's external balance sheet also matters. A loss of confidence in a country can lead to a sudden depreciation in the exchange rate. If that were to occur, institutions that have borrowed in foreign currency to finance assets denominated in domestic currency could incur losses. The United Kingdom, in aggregate, is in the opposite position: a greater share of its external liabilities than external assets is denominated in sterling.<sup>(1)</sup> And at the sector level, there is limited evidence to suggest any particular vulnerability. UK monetary financial institutions have repaid nearly £700 billion of foreign-currency debt since 2011 (Chart A.21). Over the same period, other financial institutions (OFIs) have repaid £60 billion of foreign-currency loans to domestic banks, and made a further £50 billion of net repayments of foreign-currency denominated securities.<sup>(2)</sup> Data on OFIs' overseas borrowing, which is likely to be in foreign currency, are more limited. But ONS surveys of securities dealers (the part of the sector with highest outstanding debt) show that their overseas borrowing has not increased as the current account deficit has widened.

#### The FPC monitors capital inflows actively.

The 2014 annual stress test assessed the resilience of the UK banking system to a scenario in which 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.

Nevertheless, the composition of capital flows financing a deficit can change over time and vulnerabilities can build quickly. The FPC monitors capital inflows to assess the extent to which vulnerabilities, such as refinancing risk, may be building. While the widening in the current account deficit since 2011 has coincided with a fall in net saving by the UK private sector (Chart A.22), that has not yet been associated with significant growth in overall lending to households and companies (see Risk outlook chapter). However, the FPC remains vigilant to the possibility that capital inflows may amplify risks in specific sectors such as commercial real estate (see UK property markets chapter).

(1) See Whitaker, S (2006), 'The UK international investment position', available at [www.bankofengland.co.uk/publications/Documents/quarterlybulletin/qb060301.pdf](http://www.bankofengland.co.uk/publications/Documents/quarterlybulletin/qb060301.pdf). It is estimated that around 40% of the United Kingdom's external liabilities are denominated in sterling, compared with around 5% of its external assets.

(2) The OFI sector includes a range of non-bank financial firms, including broker-dealers, special purpose vehicles, hedge funds, finance companies and central counterparties.

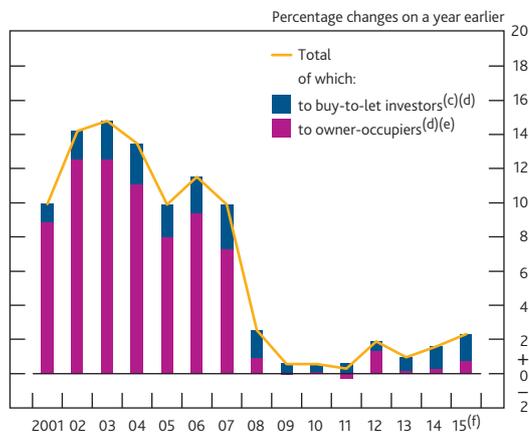
# UK property markets

The buy-to-let sector continues to drive growth in the mortgage market. Greater competition in this sector has not to date led to a widespread deterioration in underwriting standards of UK banks. Nevertheless, strong growth in buy-to-let lending may have implications for financial stability. The FPC will monitor developments in buy-to-let activity closely following the tax changes to the buy-to-let market announced by the Chancellor in the *Budget* and Autumn Statement. The FPC supports the programme of work initiated by the PRA to review lenders' underwriting standards.

Prices in the UK commercial real estate (CRE) market have risen significantly and the funding of investments is becoming riskier, with growing use of leverage and strong inflows to open-ended funds. A severe downturn in the CRE market could reduce the ability of some firms to access bank finance, given their use of commercial real estate as collateral.

**Chart A.23** Mortgage lending growth has been driven by buy-to-let lending

Change in outstanding lending to individuals secured on dwellings, by borrower type<sup>(a)(b)</sup>



Sources: Bank of England, Council of Mortgage Lenders and Bank calculations.

- (a) Data are not seasonally adjusted.  
 (b) Movements in amounts outstanding can reflect breaks in data series (such as changes in methodology, population changes, write-offs and transfers) as well as underlying flows.  
 (c) Semi-annual data are interpolated pre-2008.  
 (d) Bars show contributions to growth in total outstanding lending to individuals secured on dwellings.  
 (e) Lending to owner-occupiers is calculated as outstanding lending to individuals secured on dwellings less outstanding lending secured on buy-to-let properties.  
 (f) The 2015 lending data assume that the growth rates in Q4 are the same as in Q3.

## Housing market risks

*Housing market activity is picking up from low levels, with mortgage lending driven by the buy-to-let sector...*

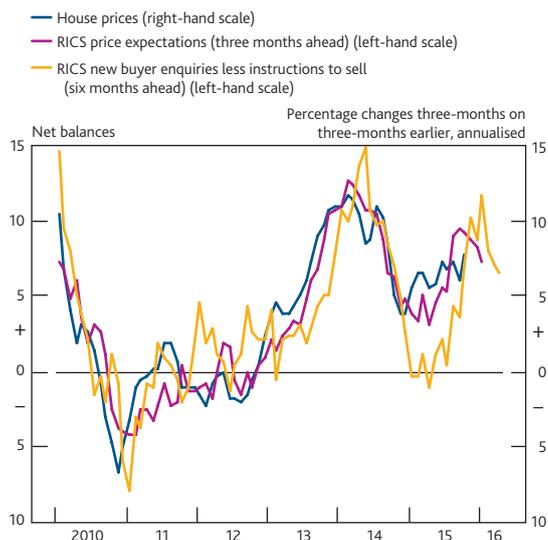
Mortgage lending growth has been gradually picking up but remains well below pre-crisis levels (**Chart A.23**). Mortgage approvals for house purchase were 69,000 in September 2015, higher than the 62,000 level six months earlier, but well below the 1994–2007 monthly average of 99,000. Despite modest lending growth and activity, house price inflation has risen, to 7.8% on a three-month on three-month annualised basis in October, and forward-looking indicators suggest it will remain strong in the near-term (**Chart A.24**).

The buy-to-let sector continues to drive growth in the UK mortgage market. Since 2008, the outstanding stock of buy-to-let lending has grown by 5.9% per annum on average, compared with only 0.3% in the stock of lending to owner-occupiers. In the year to 2015 Q3, the stock of buy-to-let lending rose by 10%, compared to 0.4% for owner-occupiers. The total flow of buy-to-let lending in 2015 will be close to its pre-crisis peak if it continues to grow at its current rate, although the share accounted for by remortgaging is now higher (**Chart A.25**).

*... due to structural factors and strong competition.*

Strong growth in buy-to-let lending is driven in part by a structural shift in tenure to the private rental sector. Since 2008, this has been driven largely by the reduced availability of high loan to value (LTV) mortgage lending, which has increased the age at which many potential first-time buyers leave the private rental sector. Population dynamics, including

**Chart A.24 UK house price inflation has picked up**  
House price growth and forward-looking indicators<sup>(a)</sup>

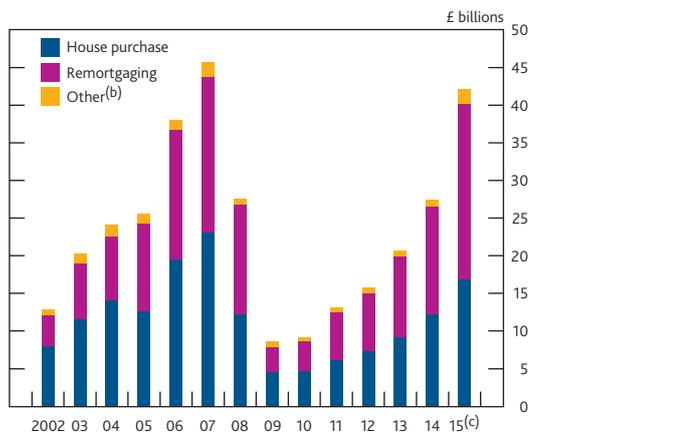


Sources: Halifax, Nationwide, Royal Institution of Chartered Surveyors (RICS) and Bank calculations.

(a) RICS series adjusted to have the same mean and variance as the houses price series.

**Chart A.25 The flow of buy-to-let lending is near its pre-crisis peak**

Gross advances of buy-to-let lending, split by purpose<sup>(a)</sup>



Sources: Council of Mortgage Lenders and Bank calculations.

(a) Sterling. Non-seasonally adjusted annual data. There is a step change in 2005 H1 as a large lender submitted buy-to-let data to the Council of Mortgage Lenders for the first time.

(b) This category includes other lending and further advances.

(c) The 2015 data assume that the growth rates in Q4 are the same as in Q3.

migration, have also played a role. These increases in rental demand, alongside low interest rates and low returns on alternative assets in the post-crisis period, have boosted the attractiveness of borrowing for buy-to-let investment.

Over the past two years, buy-to-let lending spreads have fallen by nearly 1 percentage point and, over the past 18 months, the share of new lending by lenders outside the largest six UK banks has risen from 27% to 42%. This greater competition has not to date led to a widespread deterioration in underwriting standards of UK banks. Major lenders have tightened affordability criteria over the past year. However, some smaller lenders have loosened their lending policies, for example by raising their maximum LTV thresholds. Strong growth in buy-to-let lending, and the potential for underwriting standards to slip, may have implications for financial stability.

*Compared to lending to owner-occupiers, buy-to-let borrowers may be more sensitive to rising interest rates...*

New loans to buy-to-let investors are often subject to less stringent affordability tests than loans to owner-occupiers. According to industry standards, the affordability of a buy-to-let loan is typically tested by ensuring that the rental income exceeds 125% of loan interest payments at a mortgage interest rate of 5%–6%. In contrast, and in accordance with the FPC’s June 2014 Recommendation, the affordability of loans to owner-occupiers is tested by ensuring that the borrower has sufficient income to cover their mortgage payments at a more stringent mortgage interest rate of around 7%, despite owner-occupier mortgage rates tending to be around 0.7 percentage points lower.<sup>(1)</sup>

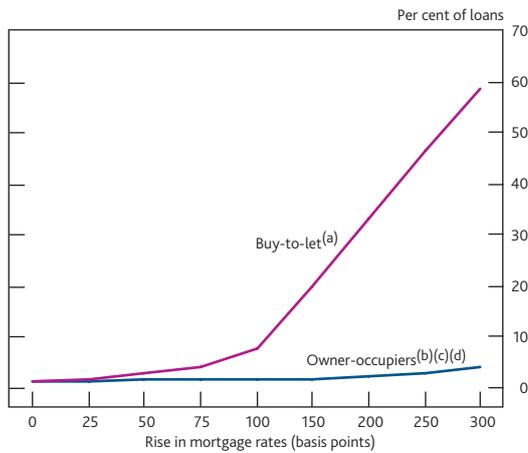
Assessed against these affordability metrics, buy-to-let borrowers may be more vulnerable than owner-occupiers to an unexpected rise in interest rates or a fall in income. For example, if mortgage rates rose by 300 basis points, the increment by which the FPC recommended the affordability of mortgages to owner-occupiers is tested, nearly 60% of buy-to-let borrowers who took out loans recently would see their rental income no longer covering 125% of their interest payments. By comparison, only 4% of recent owner-occupier borrowers would see their mortgage debt costs rise to above 40% of income, a level above which households are more likely to experience payment difficulties (Chart A.26).<sup>(2)</sup>

(1) In June 2014, the FPC made two Recommendations. First, that 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. Second, that the PRA and FCA should ensure that mortgage lenders limit the portion of mortgages at loan to income multiples of 4.5 and above to no more than 15% of their new mortgages.

(2) See June 2014 *Financial Stability Report*, page 58, available at [www.bankofengland.co.uk/publications/Documents/fsr/2014/fsrfull1406.pdf](http://www.bankofengland.co.uk/publications/Documents/fsr/2014/fsrfull1406.pdf).

**Chart A.26 Buy-to-let lending appears more sensitive to interest rate rises**

Borrowers vulnerable to interest rate rises

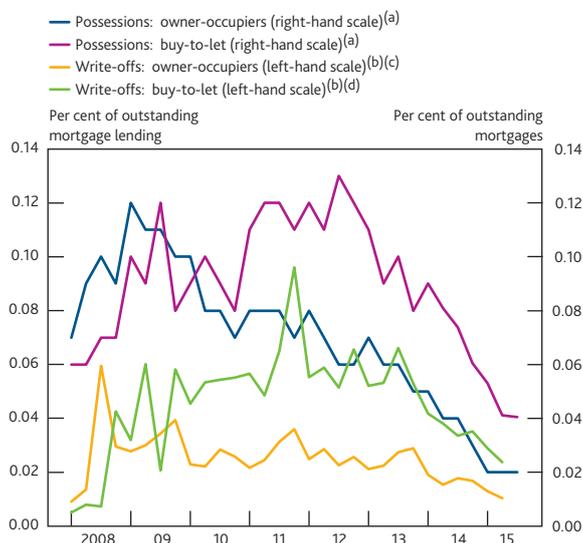


Sources: Council of Mortgage Lenders Buy-to-let Mortgage Survey, FCA Product Sales Data and Bank calculations.

- (a) Per cent of buy-to-let mortgages originated over the five quarters to 2015 Q1 for which rental income would no longer cover 125% of interest payments for a given rise in mortgage interest rates.
- (b) Per cent of owner-occupier mortgages originated over the five quarters to 2015 Q1 for which interest payments would exceed 40% of household income for a given rise in mortgage interest rates.
- (c) The FCA Product Sales Data include regulated mortgage contracts only, and therefore exclude other regulated home finance products such as home purchase plans and home reversions, and unregulated products such as second charge lending and buy-to-let mortgages.
- (d) Includes all owner-occupier mortgages for house purchase and re-mortgages with an increase in principal.

**Chart A.27 Credit risk on buy-to-let lending has been higher in recent years**

Quarterly possessions and write-offs on mortgage lending



Sources: Bank of England and Council of Mortgage Lenders.

- (a) The possession rate is the number of properties taken into possession per quarter as a per cent of outstanding mortgage loans at the start of the quarter.
- (b) The write-off rate is the value of loans written-off per quarter as a per cent of the mortgage stock at the start of the quarter.
- (c) This series covers all mortgage lending regulated by the Mortgage Conduct of Business rules implemented after 31 October 2004.
- (d) This series covers 'unregulated mortgage lending'. In 2015 70% of this was buy-to-let, with the remainder including second-charge mortgage lending and lending that took place before the implementation of the Mortgage Conduct of Business rules.

*...amplifying a downturn in house prices.*

The latest NMG survey suggests that around 15% of buy-to-let investors would consider selling their properties if their interest payments were no longer covered by rental income. A further 45% would be inclined to sell if property prices were expected to fall by more than 10%. Such procyclical behaviour could exacerbate the scale of a fall in house prices following an unexpected rise in interest rates or a fall in income, which could impact adversely consumer spending and economic stability.

*Buy-to-let lending can increase household indebtedness during an upswing in house prices...*

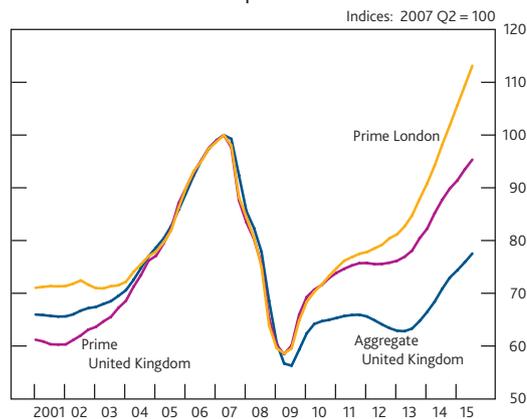
During an upswing in house prices, investors seeking capital gains can increase leverage, including through the purchase of multiple properties, for example by extracting equity from existing properties. The resulting boost in demand can add further pressure to house prices, prompting both buy-to-let and owner-occupier borrowers to take on larger loans, thereby increasing indebtedness. The FPC's June 2014 Recommendations aimed to limit risks from a further significant rise in the number of highly indebted households. Nevertheless, the level of household debt relative to income remains elevated in the United Kingdom and is an important indicator of systemic risk (see Risk outlook chapter).

*...and has suffered higher credit loss rates than owner-occupier lending in the past.*

Over recent years, credit losses across all types of mortgage lending have fallen, reflecting falls in unemployment and a contraction in mortgage interest rate spreads. However, credit loss rates incurred on buy-to-let loans in the United Kingdom have been around twice those incurred on lending to owner-occupiers (Chart A.27). This reflects both a higher incidence of possession for buy-to-let loans, and greater losses in the event of possession. The latter is despite the fact that fewer buy-to-let loans are extended at high LTV ratios. Since these loans tend to be extended on interest-only terms, loan values on buy-to-let loans do not decline as the loan matures.

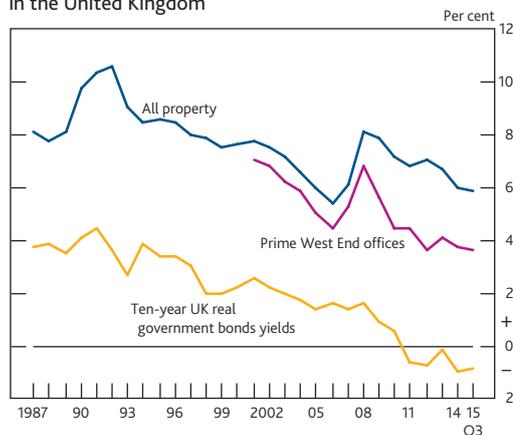
The FPC remains alert to financial stability risks arising from rapid growth in buy-to-let lending and will monitor developments in buy-to-let activity closely following the tax changes to the buy-to-let market announced by the Chancellor in the *Budget* and Autumn Statement. It supports the programme of work initiated by the PRA to review lenders' underwriting standards. HM Treasury is planning to launch in 2015 a consultation on giving the FPC similar powers of Direction on buy-to-let lending as those it has already provided on owner-occupier mortgage lending. In the interim, the FPC stands ready to take action if necessary to protect and enhance financial stability, using its powers of Recommendation.

**Chart A.28 Prices have risen strongly in recent years**  
UK commercial real estate prices



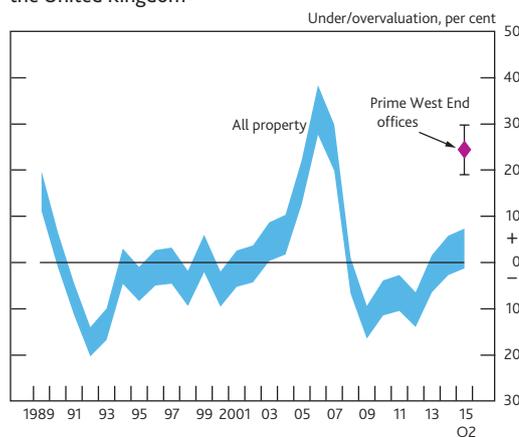
Sources: MSCI and Bank calculations.

**Chart A.29 Rental yields have been falling**  
Commercial real estate rental yields and government bond yields in the United Kingdom



Sources: Bloomberg, MSCI and Bank calculations.

**Chart A.30 An investment valuation approach indicates some parts of the CRE market are overvalued**  
Extent of under/overvaluation of commercial real estate prices in the United Kingdom<sup>(a)</sup>



Sources: Association of Real Estate Funds (AREF), Bloomberg, Investment Property Forum, MSCI and Bank calculations.

(a) Investment valuations are based on assuming property is held for five years with the cash flows from the rent and sale discounted. It is assumed that the property is sold at a rental yield (in line with long-run averages fifteen years). The sale proceeds and rental income are discounted by the ten-year gilt yield plus a risk premium. The swathe represents varying assumptions on the average through the cycle risk premium, given the inherent uncertainty in measuring it; the lower end of the range is from a survey of investors from AREF and the higher end is a risk premium derived from the long-run relationship between gilt yields and property yields. 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.

## Commercial property risks

*UK commercial real estate prices continue to rise rapidly, outpacing rents...*

Following the onset of the global financial crisis, prices in the UK commercial real estate (CRE) market fell by 44%, far in excess of the peak-to-trough fall in residential property prices of 20%, with some lenders suffering significant losses. In aggregate, 9% of the UK banks' pre-crisis stock of CRE debt was written off between 2008 and 2014, while lenders with lower-quality underwriting standards typically had write-off rates above 20%. Over the past century, the United Kingdom has experienced five CRE cycles and similar cycles have been seen in a range of developed economies.

Commercial property prices have risen strongly since 2013, especially in the prime market and particularly in London (Chart A.28). With rents rising at a slower pace, rental yields have fallen and are very low by historical standards, reaching around 4% for some properties in September 2015.<sup>(1)</sup> While these rental yields do not look compressed relative to current, unusually low, medium-term real interest rates, if these rates were to rise, commercial property valuations could look stretched (Chart A.29).

As an illustration, a common industry approach is to consider a property's 'investment value', in which a prudent valuation of the future proceeds of sale are discounted at an appropriate target rate of return alongside future rents received until the point of sale. For example, a valuation could be constructed on the basis that a property is sold after five years at a price consistent with a long-run rental yield. Discounting this value alongside rents by a range of target rates of return — depending on ten-year government yields and different risk premia assumptions — shows that, while the UK CRE market appears 'fairly valued' overall, some parts of the market look overvalued (Chart A.30).

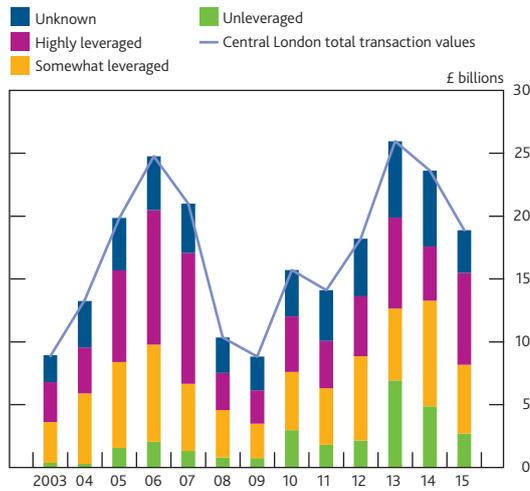
*...driven by foreign and non-bank investors, including leveraged investors...*

Investment in UK CRE has been strong over the past three years. This has been driven by overseas investors, notably from the United States and Asia. Following the financial crisis, equity financing of CRE investment increased significantly, with a diminished role for leverage. However, the use of leverage, particularly in London, has begun to increase a little over the past year or so (Chart A.31). Leveraged investors create credit risk for lenders and may have a higher propensity to act as forced sellers of property, due to re-financing risks and covenant breaches.

(1) Data from MSCI.

### Chart A.31 Use of leverage by investors in London has increased

Investment in London by use of leverage<sup>(a)</sup>

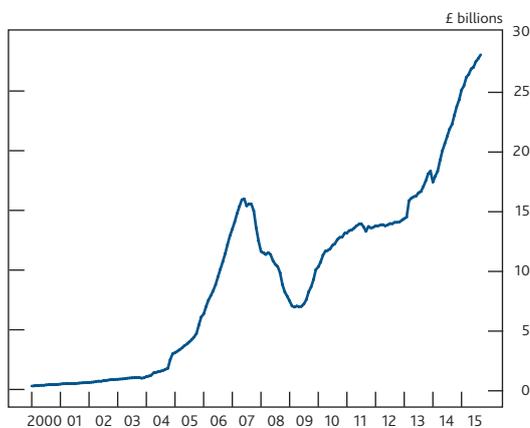


Sources: The Property Archive and Bank calculations.

(a) The Property Archive data of investors has been mapped to the use of leverage based on the business model of investors. For instance, pension funds are mapped to unleveraged, real estate investment trusts to somewhat leveraged, and private equity to highly leveraged.

### Chart A.32 Strong growth in assets under management of commercial real estate open-ended funds continues

Assets under management in open-ended funds investing in commercial real estate



Source: The Investment Association.

There have also been strong inflows to open-ended funds investing in UK CRE (Chart A.32). These funds now have more assets under management than in 2007 and hold approximately 5% of the total stock of UK commercial property. Open-ended funds offer investors short-term redemptions against large and illiquid property investments. During the 2007–08 downturn in the UK CRE market, they experienced sharp outflows, becoming forced sellers of CRE investments and amplifying price falls.

#### ...posing a risk to UK financial stability.

Over the past six years, foreign banks and non-bank lenders have gained market share and now account for 60% of the flow of new lending to the CRE sector. Nevertheless, exposures of the major UK banks remain substantial, averaging around 50% of their common equity Tier 1 capital at end-2014.<sup>(1)</sup> The resilience of UK banks to a downturn in the CRE market was assessed in the 2014 annual stress test. This considered the impact of a 30% fall in UK commercial property prices and a significant rise in Bank Rate on banks' CRE exposures at end-2013.<sup>(2)</sup> A Bank survey conducted in 2014 examined flows of new lending and found that almost 30% of UK banks' new prime commercial property lending was at an LTV of 65% or over, a level beyond which high losses have been incurred under stress historically. If prime CRE prices were to fall to valuations consistent with historic average rental yields, this share could more than double.

A severe downturn in the CRE market could also reduce the ability of some firms to access bank finance, given their use of commercial real estate as collateral. A recent Bank review of bank lending to small and mid-sized companies further found that 75% of firms that borrow from banks rely on commercial real estate as collateral to support their borrowing.

The FPC continues to monitor closely developments in the UK CRE market. The Bank is also engaging with industry on: proposals to develop a CRE debt database; and whether alternative approaches to valuing commercial property could be a useful warning indicator or risk management tool.<sup>(3)</sup> Risks from open-ended funds are covered in the FPC's work on investment funds (see Box 2).

(1) Exposures are from banks' stress-testing returns which define Commercial Real Estate narrowly as Income Producing Real Estate. Banks will have significant amounts of other commercial property related exposure (eg hotels) not included in these exposures.

(2) See [www.bankofengland.co.uk/financialstability/Documents/fpc/results161214.pdf](http://www.bankofengland.co.uk/financialstability/Documents/fpc/results161214.pdf) for more details.

(3) See the recent speech by Alex Brazier, available at [www.bankofengland.co.uk/publications/Documents/speeches/2015/speech850.pdf](http://www.bankofengland.co.uk/publications/Documents/speeches/2015/speech850.pdf).

# Cyber risk

Cyber attack is a serious and growing threat to the resilience of the UK financial system. Cyber attacks have the potential to threaten the vital services that the financial system provides to the real economy. UK and international authorities have already taken action with regard to cyber risk. The FPC will receive a report on a work programme implemented by UK authorities by Summer 2016.

### *Cyber attack is a serious and growing threat.*

As set out in the July 2015 *Report*, cyber attacks have the potential to disrupt the vital services that the financial system provides to the real economy. The impact of attacks can be amplified by interconnections in the financial system. The risk from cyber attack has grown over time, reflecting increased use of technology in financial services. Firms need to build their resilience to cyber attacks, develop the ability to recover quickly from attacks, and ensure effective governance — which means viewing cyber risk as a strategic priority, rather than a narrow ‘technology’ issue.

The threat posed by cyber attack has been underscored by several recent high-profile data breaches in the telecoms sector. Experience shows that breaches can also occur in the financial sector; for example, a 2013 attack on JPMorgan Chase compromised the personal details of 83 million account holders. Breaches of this kind cause distress, disruption and economic damage to the firms and individuals involved. A larger concern is that a serious attack directly disrupts the critical economic functions performed by the financial sector. This was seen in a 2013 attack on the Korean banking system, which affected ATMs and mobile internet banking.

Awareness of cyber risk has continued to grow since the July 2015 *Report*. The proportion of respondents to the Bank’s *Systemic Risk Survey* highlighting cyber risk as a key concern was 46% in 2015 H2, up from 30% in 2015 H1 and 10% in 2014 H2 (**Chart A.33**).

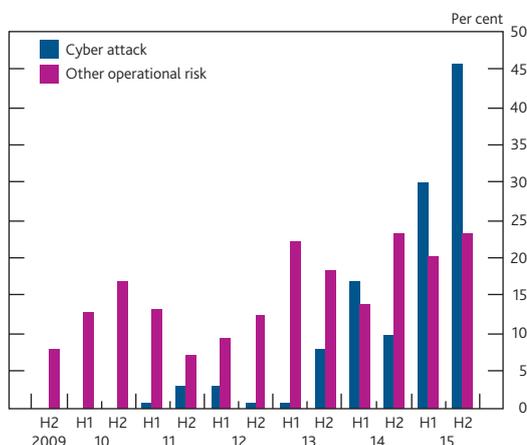
### *UK and international authorities have taken action.*

The UK authorities have taken a number of actions with regard to cyber risk since the July 2015 *Report*:

- progress on cyber vulnerability testing has continued through the CBEST framework, which uses government and private sector expertise to deliver bespoke, controlled cyber security tests. CBEST was developed in response to an FPC Recommendation in June 2013. In June 2015, the FPC further recommended that the Bank, the PRA and the FCA

**Chart A.33** Concern about cyber risk continues to grow

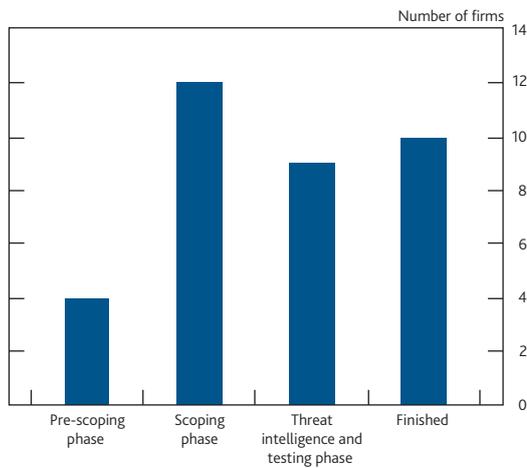
*Systemic Risk Survey*: proportion of respondents highlighting cyber/operational risk as a key concern



Sources: Bank of England *Systemic Risk Surveys* and Bank calculations.

**Chart A.34 Core firms are undergoing CBEST vulnerability testing**

CBEST: current progress



Source: Bank of England.

work to ensure that firms at the core of the financial system undertake CBEST testing, and that this testing be integrated into regular supervisory activity. Ten core firms have now completed CBEST tests, up from five at the time of the July 2015 *Report* (Chart A.34);<sup>(1)</sup> and

- in November 2015, UK and US authorities conducted a joint exercise with major global financial firms to enhance their co-operation and ability to respond to cyber attacks, by improving understanding in three areas: information sharing, incident response handling and public communications.<sup>(2)</sup>

In addition, the July 2015 *Report* set out a programme of work that the Bank, the FCA and HM Treasury are undertaking to enhance financial system cyber resilience, including:

- reviewing the list of the core firms that are most critical to financial stability in the event of a major cyber attack, including those not regulated by the financial authorities, so that relevant regulators can take account of this in their cyber planning;
- defining and developing a clear set of capabilities that will enhance *ex-ante* cyber resilience within the UK financial system and improve the effective *ex-post* collective capability of the sector and the authorities to respond to, and recover from, a major cyber attack; and
- developing co-operation with international authorities to assess and improve cyber resilience in the financial sector, recognising cyber as a potentially cross-jurisdictional threat.

The FPC will receive an update on this work programme by Summer 2016.

<sup>(1)</sup> See Annex 1 for the full Recommendation and further details on CBEST testing.

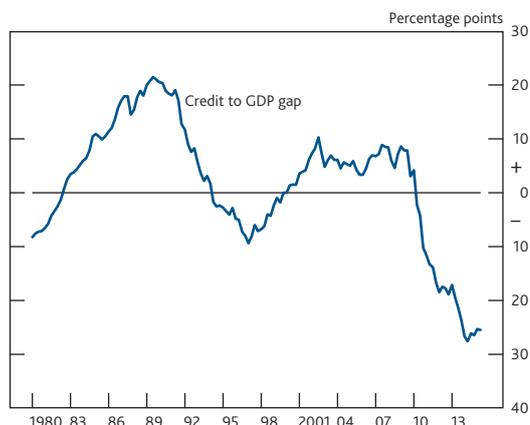
<sup>(2)</sup> [www.gov.uk/government/news/transatlantic-exercise-to-tackle-cyber-threat](http://www.gov.uk/government/news/transatlantic-exercise-to-tackle-cyber-threat).

# Risk outlook

Earlier sections of this *Report* highlight the major risks identified by the FPC. Against these elevated risks some other risks remain subdued, albeit less so than in the post-crisis period to date.

Comparing credit indicators to the past alone cannot provide a full risk assessment of the level of risk today, but can be informative. Aggregate credit growth, though modest compared to pre-crisis growth, is rising and is close to nominal GDP growth. Spreads between mortgage lending rates and risk-free rates have fallen back from elevated levels. Household debt has fallen relative to income, but is still elevated. This shift in financial conditions out of the post-crisis phase means that the FPC is actively considering the appropriate setting of the countercyclical capital buffer (CCyB) rate. It is maintaining the UK CCyB rate at 0% at this stage. The FPC will carefully review the setting of the CCyB in March.

**Chart A.35** The credit gap remains very negative  
Private non-financial sector credit to GDP gap<sup>(a)</sup>



Sources: British Bankers' Association, Revell, J and Roe, A (1971), 'National balance sheets and national accounting — a progress report', *Economic Trends*, No. 211, ONS and Bank calculations.

(a) Credit is defined as debt claims on the UK private non-financial sector. This includes all liabilities of the household and not-for-profit sector except for the unfunded pension liabilities and financial derivatives of the not-for-profit sector, and private non-financial corporations' (PNFCs) loans and debt securities excluding derivatives, direct investment loans and loans secured on dwellings. The credit to GDP gap is calculated as the percentage point difference between the credit to GDP ratio and its long-term trend, where the trend is based on a one-sided Hodrick-Prescott filter with a smoothing parameter of 400,000. See Countercyclical Capital Buffer Guide at [www.bankofengland.co.uk/financialstability/Pages/fpc/coreindicators.aspx](http://www.bankofengland.co.uk/financialstability/Pages/fpc/coreindicators.aspx) for further explanation of how this series is calculated.

Earlier sections of this *Report* highlight the major risks identified by the FPC. These include: emerging market economy risks, financial market fragility, the UK current account, UK property markets, and cyber risk. Against these elevated risks some other risks remain subdued, albeit less so than in the post-crisis period to date.

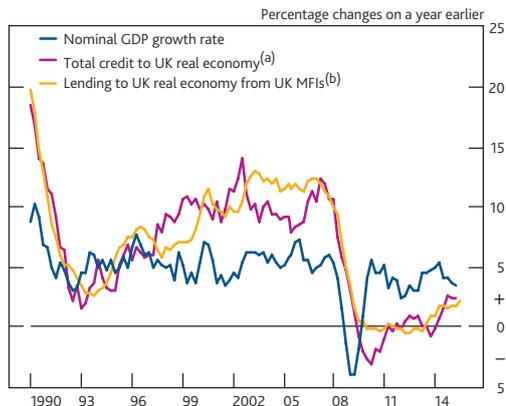
**Chart A.35** shows the gap between the private non-financial sector credit to GDP ratio and its long-term trend in the United Kingdom. This gap forms the basis for the Basel 'buffer guide' to setting the countercyclical capital buffer (CCyB) rate. According to this guide, the CCyB rate should be set at 0% given that the credit to GDP gap remains very negative.

The Committee considers there to be a number of drawbacks to this measure and that there should be no simple, mechanistic link between the buffer guide and the CCyB rate. The FPC therefore sees merit in considering additional indicators of leverage and the availability of credit alongside the credit to GDP gap in its assessment of current threats to stability. Comparing credit indicators to the past alone cannot provide a full risk assessment of the level of risk today, but can be informative.

## *Credit growth to the non-financial private sector remains modest but is rising...*

Aggregate credit extended to UK households and private non-financial corporations (PNFCs) by the financial sector grew by 2.5% in the twelve months to 2015 Q2. While modest compared to pre-crisis growth, aggregate credit growth is rising and is close to nominal GDP growth (**Chart A.36**). Banks' lending growth in the twelve months to 2015 Q3 increased to just over 2%.

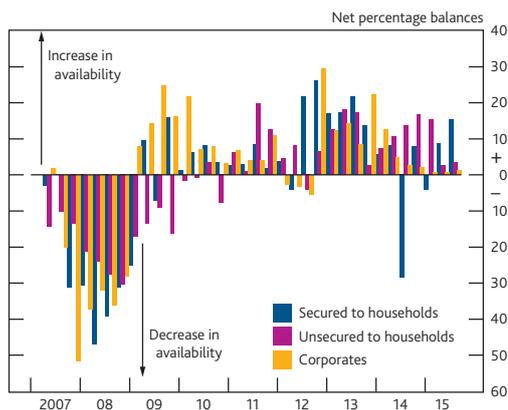
**Chart A.36 Credit growth continues to normalise**  
UK nominal GDP and UK real economy credit growth



Sources: Bank of England, ONS and Bank calculations.

- (a) Twelve-month growth rate of nominal credit. Credit is defined here as debt claims on the UK private non-financial sector. This includes all liabilities of the household and not-for-profit sector and private non-financial corporations' (PNFCs) loans and debt securities excluding derivatives, direct investment loans and loans secured on dwellings.  
(b) Sterling M4 lending by UK MFIs to the household sector and PNFCs. Data cover loans and MFIs' holdings of securities. Seasonally adjusted.

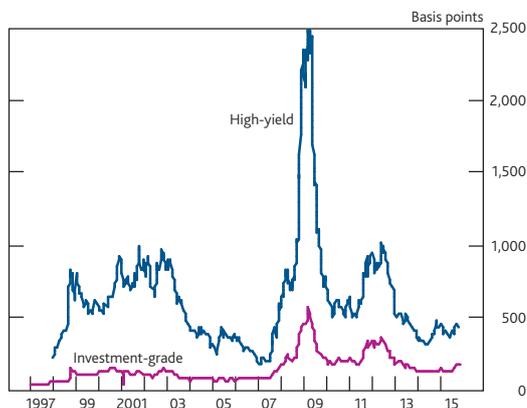
**Chart A.37 Credit availability continues to increase**  
Household and corporate credit availability<sup>(a)</sup>



Sources: Bank of England *Credit Conditions Surveys* and Bank calculations.

- (a) Net percentage balances are calculated by weighting together the responses of those lenders who answered the question as to how the availability of credit provided to the sector overall changed in the past three months.

**Chart A.38 Sterling-denominated corporate bond spreads have risen**  
Sterling-denominated corporate bond spreads<sup>(a)</sup>



Source: BofA Merrill Lynch Global Research.

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

Lenders' responses to the Bank's latest *Credit Conditions Survey* (Chart A.37) indicate that banking sector credit is generally more available. This, combined with reports from the Bank's Agents, suggests that, on balance, weakness in demand appears to be a more important driver of outcomes than supply constraints.

Sterling-denominated investment-grade and high-yield corporate bond spreads have risen by 23 basis points and 50 basis points respectively since the July 2015 *Report* (Chart A.38). But the difference between high-yield and investment-grade corporate bond spreads has remained low by historical standards. Large companies continue to report favourably on the availability of credit in the *Deloitte CFO survey*. Credit conditions for small and medium-sized enterprises (SMEs), however, remain tighter than those faced by larger firms. Limitations of credit data may be one barrier to entry in SME lending markets, which could inhibit effective competition and lead to lower availability of credit.

In the household sector, lenders' terms and conditions on residential mortgages do not appear unusually lax, but lending at high loan to income ratios remains significant. The share of new mortgages extended with loan to income ratios at or above 4.5 — the level beyond which the FPC recommended in June 2014 a limit on the flow of new lending of 15% — was 7.6% in 2015 Q2, compared with 10.1% a year earlier. Spreads between mortgage lending rates and risk-free rates have fallen back from elevated levels, particularly for higher loan to value (LTV) mortgages: spreads on new 90% LTV mortgages (quoted rates for two-year fixed) were an average of 223 basis points in October 2015, down from a peak of 570 basis points in mid-2010, but still well above 2006 levels (for the same product but at a 95% LTV).

Since 2008, aggregate debt has been falling relative to income, but is still elevated (Chart A.39). Mortgage approvals for house purchase are gradually picking up and have fed through into higher mortgage lending, with lending growth in the twelve months to September 2015 of 2.2% (see UK property markets chapter). However, mortgage lending remains subdued by historical standards.

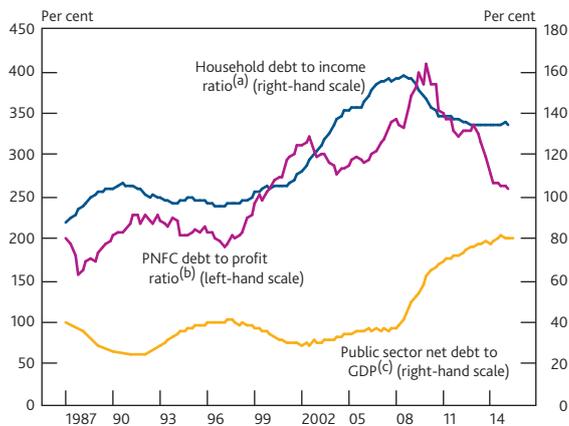
*...and there are pockets of vulnerability.*

Much of the increase in household mortgage lending has been for buy-to-let (BTL) properties, whose share in total gross mortgage lending is now at its highest level since the series began in 1999 (see UK property markets chapter).

Consumer credit continues to grow robustly; in the twelve months to September 2015, consumer credit (excluding student loans) grew by 8.2%. Data from the latest NMG survey suggest unsecured debt payments make a significant contribution to mortgagors' debt-servicing ratios (Chart A.40). These payments may also be a particular

### Chart A.39 Household and public sector debt remain elevated

Public and private sector indebtedness

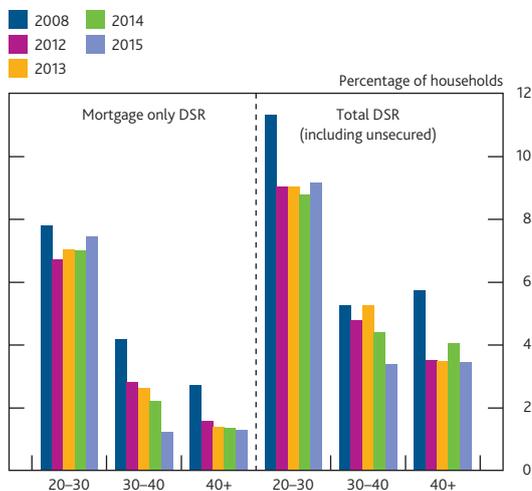


Sources: ONS and Bank calculations.

- (a) 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) Gross debt as a percentage of a four-quarter moving sum of gross operating surplus. Gross debt is measured as loans and debt securities excluding derivatives, direct investment loans and loans secured on dwellings. The corporate gross operating surplus series is adjusted for FISIM.
- (c) Public sector net debt excludes public sector banks. Not seasonally adjusted.

### Chart A.40 Unsecured debt repayments increase debt service cost for mortgagors

Distribution of debt-servicing ratios (DSRs) for households with mortgages<sup>(a)</sup>



Sources: NMG Consulting survey and Bank calculations.

- (a) The mortgage DSR is calculated as total mortgage payments (including principal repayments) as a percentage of pre-tax income. The total DSR is calculated as total mortgage and unsecured debt payments (including principal repayments) as a percentage of pre-tax income. Reported repayments may not account for endowment mortgage premia. The chart shows the number of mortgagors within a particular DSR band as percentage of all households (including non-mortgagor households).

burden for renters, who typically spend a significant share of income paying for accommodation. However, recent survey evidence suggests that the proportion of renters and mortgagors finding unsecured debt repayments a heavy burden has fallen in recent years.

The United Kingdom's large current account deficit remains a risk for financial stability (see UK current account chapter). And public sector net debt remains elevated by post-war historical standards (Chart A.39).

*Overall, the UK financial system has moved out of its post-crisis repair phase.*

Overall, the FPC judges that the financial system has moved out of the post-crisis period — a period of heightened risk aversion and retrenchment from risk-taking as financial institutions, businesses and households sought to repair their balance sheets. The shift in financial conditions out of the post-crisis phase means that the FPC is actively considering the appropriate setting of the CCyB.

A Supplement to this *Report* finalises the FPC's view on the overall calibration of the capital framework for UK banks.<sup>(1)</sup> The FPC's aim is a prudent, coherent and transparent framework of capital requirements for UK banks. It expects the framework to be rationalised so that each element captures a specific form of risk and there is no duplication of requirements.

The risks currently captured by existing supervisory requirements have some overlap with those that will in future be captured by the FPC's intended approach to using the UK CCyB. The Board of the PRA will review individual requirements to reflect the FPC's strategy outlined in the Supplement to this *Report*, alongside its regular updating of supervisory requirements in 2016 Q1.

Therefore and in light of this, the FPC is maintaining the UK CCyB at 0% at this stage. The FPC will carefully review the setting of the CCyB rate in March, in view of the pending review by the Board of the PRA of individual requirements.

(1) [www.bankofengland.co.uk/publications/Documents/fsr/2015/fsrsupp.pdf](http://www.bankofengland.co.uk/publications/Documents/fsr/2015/fsrsupp.pdf).

# Resilience of the UK financial system

The UK banking sector has become more resilient in line with regulatory requirements. The aggregate Tier 1 capital position of major UK banks was 13% of risk-weighted assets in September 2015. The resilience of the UK banking sector to deterioration in global financial market conditions and the macroeconomic environment, including in emerging market economies, has been assessed in the 2015 annual stress test. The stress-test results and banks' capital plans, taken together, indicate that the banking system would have the capacity to maintain its core functions, notably lending capacity. Beyond the core banking sector, the resilience of important intermediaries of market-based finance continues to improve but underlying market liquidity in some core financial markets could be fragile, as underlined by recent episodes.

## Banking sector

This section assesses the resilience of the UK banking sector.

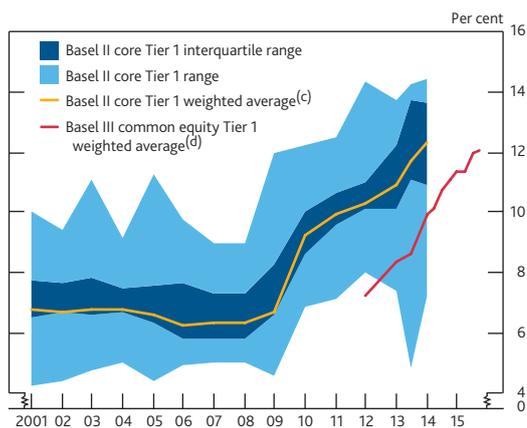
*UK banks have continued to improve their capital positions...*

UK banks continue to prepare for full implementation of the Basel III capital framework in January 2019. Over the past six months, major UK banks have increased their ratios of common equity Tier 1 (CET1) capital to risk-weighted assets, from an aggregate of 11.4% in March 2015 to 12% in September 2015 (Chart B.1). As set out in the July 2015 *Report*, the internationally agreed end-point requirement for CET1 ratios is, on average, 9% for UK global systemically important banks (G-SIBs).

UK banks' capital requirements are detailed in full in a Supplement to this *Report*. The FPC has judged the appropriate Tier 1 equity requirement for the system, in aggregate, to be 11% of risk-weighted assets. As noted in Box 1, if no definitional corrections were to be made and prevailing risk-weight measures remained in place, the system would require measured Tier 1 equity of around 13.5% of risk-weighted assets to be consistent with this judgement. The aggregate Tier 1 capital position of major UK banks was 13% of risk-weighted assets in September 2015.

From 1 January 2016, the largest UK banks are also required to meet non-risk based capital requirements in the form of a leverage ratio. The major UK banks' aggregate leverage ratio was over 4.7% at end-September 2015, higher than the proposed leverage ratio requirement as it would fully apply. The aggregate leverage ratio for UK banks increased by around 30 basis points between end-March 2015 and end-September 2015, mainly due to reductions in the leverage exposure measure. Around a third of the increase was due to

**Chart B.1 Capital positions have strengthened**  
Major UK banks' capital ratios<sup>(a)(b)</sup>



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

- (a) Major UK banks' core Tier 1 capital as a percentage of their risk-weighted assets. Major UK banks are Banco Santander, Bank of Ireland, Barclays, Co-operative Bank, HSBC, Lloyds Banking Group, National Australia Bank, Nationwide, RBS and Virgin Money. Data exclude Northern Rock/Virgin Money from 2008.
- (b) From 2008, 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) The mean is weighted by risk-weighted assets.
- (d) The Basel II series was discontinued with CRD IV implementation on 1 January 2014. The 'Basel III common equity Tier 1 capital ratio' is calculated as aggregate peer group common equity Tier 1 levels over aggregate risk-weighted assets, according to the CRD IV definition as implemented in the United Kingdom. The Basel III peer group includes Barclays, Co-operative Bank, HSBC, Lloyds Banking Group, Nationwide, RBS and Santander UK.

issuance of additional Tier 1 (AT1) capital, which can be used to meet up to 25% of the minimum leverage requirement. Major UK banks issued almost £4.5 billion of AT1 instruments during the second and third quarters of 2015.

The resilience of the UK banking sector to deterioration in global financial market conditions and the macroeconomic environment, including in emerging market economies, has been assessed in the 2015 annual stress test. The stress-test results and banks' capital plans, taken together, indicate that the banking system would have the capacity to maintain its core functions, notably lending capacity. The results of the 2015 stress test also suggest that UK banks' capital adequacy is resilient to stressed projections for misconduct costs and fines, over and above those paid or provisioned for by end-2014 (Box 3).

*...while continuing to reduce international and intra-financial exposures...*

UK banks have further changed the composition of their balance sheets. Since 2008, UK banks have been increasing the share of their domestic lending as a proportion of total assets while reducing the share of overseas and intra-financial sector lending. During this period, the outstanding stock of overseas loans has fallen by over 25%, including a decline of almost 4% in the year to September 2015. Intra-financial sector lending has fallen by 22% since 2008, although the pace of decline has slowed recently (Chart B.2).

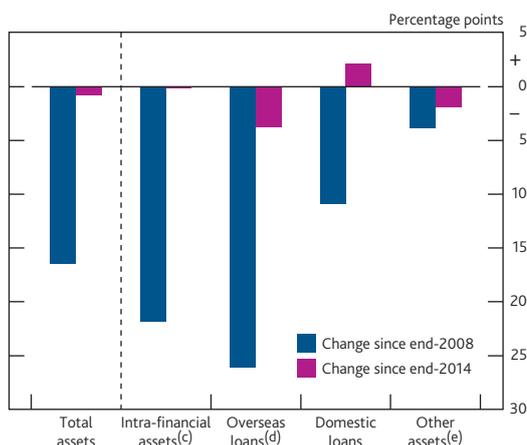
UK banks' large exposures to financial institutions, defined as those net exposures greater than 10% of eligible capital, have fallen by over 90% since 2008. As well as reductions in intra-financial sector lending, this reflects both increases in capital, which have reduced the relative size of large exposures, and increased use of collateral by banks to limit net exposures. Banks may have also diversified their exposures across more counterparties, leading to a larger number of smaller exposures. These trends suggest UK banks are more resilient to direct credit risk from exposures to banks and other financial institutions.

Banks also have derivative exposures to financial institutions, which in times of stress can change rapidly. While use of collateral reduces counterparty risk from these exposures, banks are vulnerable to market risk and liquidity risk. Liquidity risk arises as banks may need to borrow or purchase assets to meet calls to place more collateral against their exposures. In a stress, this risk may be more acute due to falls in collateral values (see Financial market fragility chapter).

*...and maintaining strong liquidity positions.*

Since 2008, UK banks have also improved their liquidity positions. As of 1 October 2015, firms have been required to comply with the Liquidity Coverage Ratio standard. UK banks are currently required to hold sufficient liquid assets to meet 80% of stressed outflows. Most of the largest UK firms have

**Chart B.2 International and intra-financial sector exposures continue to decline**  
Change in UK banks' assets<sup>(a)(b)</sup>



Sources: Bank of England and Bank calculations.

(a) UK banks are all UK resident monetary financial institutions. Data as at end-September 2015. Due to changes in data reporting, pre-2010 data are constructed from separate series for banks and building societies.

(b) Total assets excluding derivatives.

(c) Includes intragroup loans.

(d) Includes some loans to overseas financial institutions.

(e) Includes cash, central bank deposits, treasury bills and government bonds.

### Box 3

## Results of the 2015 stress test of the UK banking system

On 1 December 2015, the Bank of England published the results of the 2015 stress test, which covered seven major UK banks and building societies (hereafter referred to as 'banks') and explored vulnerabilities facing the UK banking system, given the outlook for financial stability.<sup>(1)(2)</sup> This box summarises these results and describes the judgements and actions taken by the FPC and PRA Board that were informed by the stress-test results and analysis.

### The 2015 stress scenario

**The stress scenario is not a forecast of macroeconomic and financial conditions. It does not encapsulate a set of events that is expected, or likely, to materialise. Rather it represents a coherent tail-risk scenario designed specifically to assess the resilience of UK banks.**

The 2015 stress test and methodology were discussed and agreed by the FPC and PRA Board in March 2015.<sup>(3)</sup> In the 2015 macroeconomic stress scenario, global growth is materially lower than expectations incorporated in the baseline scenario, with the level of world GDP falling short of the October 2014 IMF *World Economic Outlook* forecast by almost 7% during the third year of the stress. In China, policy is assumed to support a rebalancing of the economy towards consumption, but that takes time to take effect and growth slows to a low point of 1.7% on an annualised basis. Oil prices fall to a low of US\$38 per barrel and other commodity prices also fall sharply. In the euro area, weaker domestic demand, world trade and commodity prices are assumed to lead to further disinflationary pressures and deflation which persists for more than three years.

Financial market sentiment is assumed to deteriorate rapidly and safe-haven capital flows to high-quality US assets are generated. Volatility in financial markets ensues, with the VIX index peaking at 46 percentage points in the second half of 2015, compared with a peak of around 60 percentage points in 2008. The US dollar appreciates against a wide range of currencies, with emerging market economy (EME) exchange rates particularly affected, depreciating on average by more than 25% peak-to-trough against the US dollar during the stress.<sup>(4)</sup> Liquidity in some markets is assumed to become seriously impaired and credit risk premia rise sharply. These movements in financial market prices are embodied in a traded risk stress scenario designed to be congruent with the macroeconomic stress.

The Bank prescribed an aggregate lending path in the stress, in which lending to the UK real economy expanded by 9% over

the five years of the stress, in line with Bank staff's projection of the demand for credit over that period. It also ensured that banks' projections for lending to the UK real economy were consistent, in aggregate, with this path for lending in the stress. Performance in the stress was assessed against two metrics of capital adequacy. As in the 2014 test, banks were assessed against a common equity Tier 1 (CET1) capital ratio of 4.5% of risk-weighted assets (RWAs). For the 2015 test, an additional leverage ratio threshold has been introduced. This was set at 3% of the Leverage Exposure Measure, to be met with Tier 1 capital.<sup>(5)</sup>

### What have we learned from the stress test about bank resilience?

To derive the projections of bank capital adequacy in the stress scenario, Bank staff used banks' own models, in-house models, sectoral analysis and peer comparison. Bank staff made judgements in producing the final projections, under the guidance of the FPC and PRA Board. The bank-specific results have been approved by the PRA Board.

Based on the Bank's final projections, the aggregate CET1 ratio and Tier 1 leverage ratio are projected to decrease significantly in the stress scenario, with both measures falling to a low in 2016. The aggregate CET1 ratio decreases from 11.2% at the end of 2014 to a low point of 7.6% in 2016, after accounting for 'strategic' management actions (**Chart A**). This compares with a fall in the aggregate CET1 ratio in the 2014 stress test from 10% at the end of 2013 to a low point of 7.6% over a two-year period.<sup>(6)</sup> The aggregate Tier 1 leverage ratio falls from 4.4% at the end of 2014, to a low point of 3.5% in 2016 after 'strategic' management actions (**Chart B**).

The severity of the impact of the stress can also be measured by comparing the stress projection with the aggregate projection of banks' capital adequacy in the baseline scenario. The baseline path of the aggregate CET1 ratio is projected to rise from 11.2% at the end of 2014 to 12% in 2016. This measure of the impact of the stress is therefore the difference between the 7.6% stress low point and this baseline path. That is 4.4 percentage points in 2016 (**Table 1**). Most banks are projected to incur substantial pre-tax losses in the first two years of the stress scenario. These losses total £37 billion, equivalent to around two thirds of the reduction

(1) See 'Stress testing the UK banking system: 2015 results'; [www.bankofengland.co.uk/financialstability/Documents/fpc/results011215.pdf](http://www.bankofengland.co.uk/financialstability/Documents/fpc/results011215.pdf).

(2) 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.

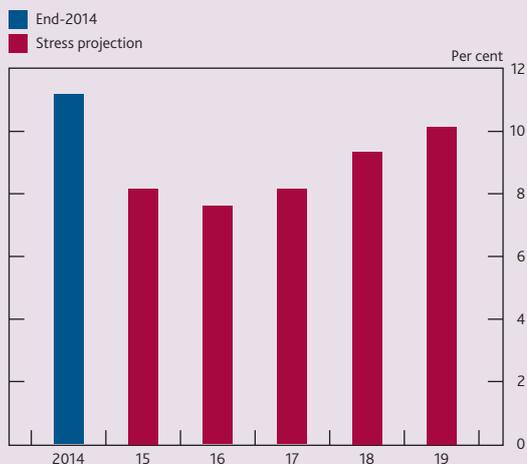
(3) See 'Key elements of the 2015 stress test'; [www.bankofengland.co.uk/financialstability/Documents/stresstesting/2015/keyelements.pdf](http://www.bankofengland.co.uk/financialstability/Documents/stresstesting/2015/keyelements.pdf).

(4) This group of EMEs comprises Argentina, Brazil, China, Indonesia, Mexico, Russia, Saudi Arabia, South Africa and Turkey.

(5) Relevant AT1 instruments are permitted to comprise up to 25% of this requirement.

(6) Figures for the CET1 ratio in the 2014 stress test do not include The Co-operative Bank for consistency of comparison.

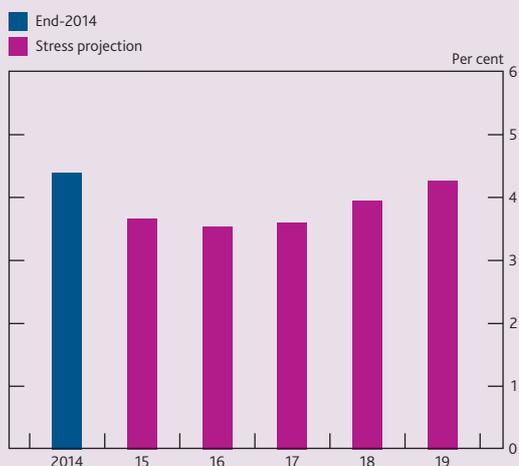
**Chart A** Aggregate CET1 capital ratio projections in the stress, after the impact of 'strategic' management actions<sup>(a)(b)</sup>



Sources: Participating banks' Firm Data Submission Framework (FDSF) data submissions, Bank analysis and calculations.

- (a) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets, where these are defined in line with the UK implementation of the CRR via the PRA Rulebook.  
 (b) For Nationwide the stress tests are based on an estimated 4 April 2015 balance sheet, rather than end-2014.

**Chart B** Aggregate Tier 1 leverage ratio projections in the stress, after the impact of 'strategic' management actions<sup>(a)(b)</sup>



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

- (a) The end-point Tier 1 leverage ratio as defined in the FPC's leverage ratio review, taking into account the European Commission Delegated Act on the leverage ratio.  
 (b) For Nationwide the stress tests are based on an estimated 4 April 2015 balance sheet, rather than end-2014.

in CET1 capital over that period. The shortfall in aggregate profits relative to base is driven by:

- falling global GDP and rising unemployment, which reduce borrowers' ability to service debts, and contribute to material increases in loan impairment charges;
- sharp movements in market prices and increased counterparty credit risk, which lead to material traded risk losses;

**Table 1** Contributions to the shortfall in the aggregate CET1 capital ratio and Tier 1 leverage ratio at the low point of the stress in 2016 relative to the baseline projection

	CET1 ratio <sup>(a)</sup>	Leverage ratio <sup>(b)</sup>
<b>Actual end-2014</b>	<b>11.2%</b>	<b>4.4%</b>
<b>Baseline end-2016</b>	<b>12.0%</b>	<b>4.9%</b>
Impairments	-1.8 pp	-0.6 pp
Traded risk losses <sup>(c)</sup>	-1.6 pp	-0.6 pp
Net interest income	-0.3 pp	-0.1 pp
Misconduct costs	-1.4 pp	-0.5 pp
Risk-weighted assets/leverage exposure measure <sup>(d)</sup>	-1.2 pp	0.2 pp
Dividends	1.0 pp	0.4 pp
Expenses and taxes	0.7 pp	0.2 pp
Other <sup>(e)</sup> (including reduced AT1 issuance)	0.2 pp	-0.3 pp
<b>Stress end-2016</b>	<b>7.6%</b>	<b>3.5%</b>

Sources: Participating banks' published accounts and FDSF data submissions, Bank analysis and calculations.

- (a) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets, where these are defined in line with the UK implementation of the CRR via the PRA Rulebook.  
 (b) The end-point Tier 1 leverage ratio as defined in the FPC's leverage ratio review, taking into account the European Commission Delegated Act on the leverage ratio.  
 (c) Traded risk losses comprise: market risk, counterparty credit risk, CVA, PVA, estimates for investment banking revenues net of costs, and AFS and FVO parts of the banking book. The aggregate proportion of banks' total revenues less costs allocated to investment banking has been estimated by the Bank.  
 (d) Changes in risk-weighted assets impact the CET1 ratio, whereas changes in the leverage exposure measure impact the Tier 1 leverage ratio.  
 (e) Other comprises other profit and loss and other capital movements. Other profit and loss includes other provisions, fees and commissions and other income. In addition to AT1 issuance, other capital movements include exchange rate movements, pension assets devaluation, deferred tax assets, prudential filters, and actuarial gain from banks' loan defined benefits.

- lower net interest income, reflecting weaker loan growth in the United Kingdom and the lower path for Bank Rate — which falls to and remains at zero in the stress scenario. This lower path for Bank Rate and lower lending volumes prevent banks from increasing their net interest income as they expected to do under the baseline scenario, in which Bank Rate rose gradually. As discussed above, the stress scenario is not a forecast of UK macroeconomic and financial conditions; and
- stressed projections for misconduct fines and other costs beyond those provided for at the end of 2014. The 2015 stress-test exercise examines banks' resilience to a much higher level of misconduct costs than UK banks had provided for as at the end of 2014. Around £30 billion of these misconduct costs are projected to be realised by the end of 2016.

Reflecting the Asian and emerging markets focus of the 2015 stress scenario and differences between banks' balance sheets, there is significant variation in the impact of the stress on CET1 ratios across banks. The least material reductions are projected for the UK-focused banks with smaller trading operations.

### Impairments

The aggregate impact of the macroeconomic stress scenario on banks' loan books is an increase in both default rates, and in the losses banks face in the event of default. This leads to global impairment charges on lending totalling £58 billion to the 2016 low point of the stress after 'strategic' management

actions — around £37 billion higher than under the baseline projection.<sup>(1)</sup> Projected impairment rates on non-UK lending are higher than those for UK lending in the 2015 stress test. As a result, despite non-UK loans and advances to households and companies totalling less than 40% of aggregate lending to households and companies by banks at end-2014, these loans account for around 60% of total impairment charges incurred by banks under the stress.

### Traded risk

The traded risk methodology adopted for the 2015 stress test differed substantially from the European Banking Authority's (EBA's) methodology adopted in the Bank's 2014 stress test. In particular, the 2015 traded risk scenario is designed to reflect the macroeconomic stress, involving sharp movements in several market prices, including interest rates, exchange rates, volatility measures, credit spreads and equity indices. These movements are particularly pronounced in Asian markets. The scenario also involved testing banks' ability to withstand the default of several large counterparties.

Broadly, the traded risk stress had its most significant impact on the profitability of those banks most exposed to Asian financial markets, in line with the focus of the 2015 stress scenario. Traded risk losses, including an estimate of the decline in projected net investment banking revenues in the stress relative to banks' baseline projections, reduce bank capital by £34 billion over the first two years of the stress.<sup>(2)</sup> Market risk losses spread across trading book and available-for-sale and fair value options portfolios account for around half of overall traded risk losses under the stress. Counterparty credit risk losses, relating to the default of large counterparties and stressed prudent valuation adjustments are also projected to account for significant shares of total losses.

### Misconduct costs

In addition to the macroeconomic and traded risk elements of the stress, the 2015 stress test also incorporates stressed projections, generated by Bank staff for potential misconduct costs and fines beyond those paid or provided for by the end of 2014 — the start point of the scenario.

**These stressed misconduct cost projections are not a central forecast of misconduct provisions and costs during the period covered by the stress test. Their inclusion in the test means that the 2015 stress-test results incorporate simultaneous and unrelated stresses for banks: a macroeconomic and traded risk stress along with a misconduct cost stress.**

At end-2014, banks had paid just under £30 billion in misconduct costs and fines since 2009, and had provided for a further £13 billion. Under current accounting standards, provisions are made where an obligation exists only once

settlement is considered probable, and the amount can be estimated reliably.

There remains a very high degree of uncertainty around any approach to quantifying misconduct cost risks facing UK banks. The stressed projections for misconduct costs over and above those incurred or provided for at end-2014 relate to known misconduct issues, such as mis-selling of payment protection insurance and misconduct in wholesale markets, and are assumed to be independent of the macroeconomic element of the test. The stressed projections have been calibrated by Bank staff to have a low likelihood of being exceeded.<sup>(3)</sup> They are therefore, by design, much larger than the amounts that had already been provided by banks at end-2014. Partly because they relate only to known issues, however, they cannot be considered a 'worst case' scenario. Over the five years of the stress scenario stressed misconduct costs are assumed to reduce banks' pre-tax profits by around £40 billion.

### Risk-weighted assets

Higher projected RWAs are another significant factor driving the overall deterioration in the aggregate CET1 ratio under the 2015 stress test. Between end-2014 and end-2016 aggregate RWAs are projected to rise 11%, with higher RWAs in the stress accounting for 1.2 percentage points of the 4.4 percentage point reduction in the aggregate CET1 ratio relative to the baseline at the end-2016 low point. At that low point, average risk weights are projected to be around 4 percentage points higher than they are in the baseline. Aggregate total assets are broadly similar in the base and stress projections at the 2016 low point.

Both the macroeconomic and traded risk stresses contribute to the rise in RWAs in the stress. In aggregate, RWAs associated with counterparty credit risk and credit valuation adjustments increase by more than 60% over the first two years of the stress, with increases in RWAs of this type contributing most heavily to the difference between projected RWAs in the base and stress at the end of 2016.

### UK elements of the stress

The stress scenario is less severe for UK households in the 2015 stress test than in the 2014 stress exercise, with lower unemployment and stronger real household income. UK residential and commercial property prices are substantially higher at the low point of the stress than they

(1) This is the total of impairments on retail and wholesale loans, residual impairments on structured finance and other impairments are not included in this figure.  
 (2) Traded risk losses include: market risk losses; counterparty credit risk losses; losses arising from changes in banks' credit valuation adjustment; prudent valuation adjustment; gains/losses from available-for-sale and fair value option positions; and investment banking revenues and costs.  
 (3) This marks a change relative to the Bank's treatment of misconduct costs in the 2014 stress test.

were in the 2014 stress, limiting the loss given default on banks' portfolios. For UK households and companies, the rise in the rate at which they can borrow in the stress scenario is offset in part by the projected fall in Bank Rate which is passed through into lending rates. This is an important factor limiting the extent to which UK impairments are projected to rise under the stress.

### Automatic and strategic mitigating responses to the stress

Banks can choose, and in some cases are mandated to take, a range of actions that help to mitigate the deterioration in their capital positions under the stress scenario. These actions fall into three broad categories: (1) mandatory actions triggered by falls in banks' capital ratios (for example, dividend restrictions); (2) 'business-as-usual' actions that would be a natural response to weakening economic conditions (for example, reducing staff bonuses); and (3) 'strategic' management actions, where decision-making would be likely to entail a significant involvement from banks' Boards (for example, reducing staff numbers). 'Strategic' management actions were only accepted if they were judged as plausible, and, where taken, have been recorded in banks' results.

The headline stress-test results include projected reductions in banks' dividend payments to shareholders relative to the baseline. These reductions partially offset the impact of the stress scenario on banks' capital adequacy. In total, reductions in dividends worth around £21 billion mitigate the fall in the aggregate CET1 capital ratio by around 1 percentage point at the low point of the stress in 2016. The majority of this reduction is driven by banks' adherence to publicly quantified dividend policies or automatic dividend restrictions, which come about as a result of some banks' projections implying that they will use at least part of their CRD IV capital buffers.<sup>(1)</sup>

### Lending paths in the stress

In the 2014 stress test, the FPC agreed a general principle that banks' proposed management actions to change the size of their loan books would not be accepted, unless driven by changes in credit demand that would be expected to occur in the stress scenario. This reflected a key macroprudential goal of stress testing which is to help the FPC assess whether the banking system is adequately capitalised to maintain the supply of financial services to the real economy in the face of adverse shocks. In line with the FPC's general principle, the 2015 stress test incorporates three features:

- The FPC's general principle is reflected in the calibration of the macroeconomic stress scenario. Although demand for credit falls in the stress, the calibration of the scenario is based on the assumption that banks do not reduce the availability of credit independent of passing through funding cost increases;
- The paths published for the base and stress scenarios include aggregate bank lending to the UK real economy. Reflecting the assumption that banks do not reduce credit availability, the stress scenario is one in which UK real economy lending growth remains broadly positive, with the level of lending increasing by 9% over the five years of the stress. The Bank ensured that banks' own projections for lending were consistent, in aggregate, with the published stress scenario lending path; and
- Banks were asked to identify any proposed deviations from the FPC's principle in their balance sheet projections.

### FPC and PRA Board actions taken in response to the stress test

The PRA Board and the FPC use the results of the stress test as part of their respective evaluation of the capital adequacy of individual institutions and the resilience of the system as a whole. The overall 'hurdle rate' framework was agreed by the FPC and the PRA Board earlier in the year. This is not a mechanistic 'pass-fail' test and there is, therefore, no automatic link between stress-test results and capital actions required. Although the exercise only assessed the impact of a single stress scenario, it allowed policymakers to form judgements on the resilience of the UK banking system to a severe macroeconomic downturn, which could be a feature of different possible stressed states.

The FPC noted that in the stress, in aggregate, the risk-weighted CET1 capital and Tier 1 leverage ratios of UK banks were 7.6% and 3.5% respectively, after management actions. The FPC also noted that the capitalisation of the system had improved further over the course of 2015. Moreover, the stress-test results and banks' capital plans, taken together, indicated that the banking system would have the capacity to maintain its core functions in a stress scenario such as the one in the 2015 stress test.

The FPC considered the information from the 2015 stress test, alongside other indicators and analysis, including the 2014 stress test, in assessing the overall capital adequacy of the UK banking system. UK banks continue to strengthen their balance sheets and improve their capital positions. Other things being equal, this suggests that UK banks would be more resilient in the face of the macroeconomic stress scenario in the 2014 stress test. The FPC judged that no macroprudential actions on bank capital were required in response to the 2015 stress test. The stress-test results suggested that the banking system was capitalised to support the real economy in

(1) Under the Capital Requirements Directive IV, banks that fail to meet their combined buffer are subject to automatic restrictions on distributions of dividends and bonuses. Stress-test results for banks projected not to meet their combined buffer during the stress scenario include the impact of these restrictions. Reductions to dividends account for the majority of these mandated cuts.

a global stress scenario which adversely impacts the United Kingdom, such as that incorporated in the 2015 stress scenario.

Some banks have issued high-trigger AT1 capital instruments since the balance sheet cut-off date of 31 December 2014 for the 2015 stress test. None of the banks' AT1 capital instruments as at end-2014 would have converted to equity in this particular scenario. But the FPC and PRA Board noted that the conversion of these instruments to equity would act to support the resilience of the banking system, as well as individual banks within it, in future stresses. They emphasised that investors in these instruments should be aware that this would happen should a stress materialise in which banks' CET1 capital ratios fell below these instruments' trigger points.

In determining whether an individual bank's capital needed to be strengthened further, the PRA Board considered a number of factors, including whether a bank's CET1 ratio was projected to fall below the 4.5% risk-weighted CET1 ratio, or below the 3% Tier 1 leverage ratio thresholds. Where individual banks' CET1 and Tier 1 leverage ratios were close to these thresholds, the PRA Board also considered other factors. These included, but were not limited to, whether banks' capital resources in the stress were sufficient to cover their Pillar 1 capital requirements on a CET1, Tier 1 and Total capital basis, and individual capital guidance which includes Pillar 2A capital requirements.<sup>(1)</sup> These Pillar 2A capital requirements relate to risks not adequately captured under the common minimum requirements or Pillar 1 regime, including, for example, pension risk, concentration risk and interest rate risk in the banking book. The PRA Board was also mindful of the extent to which vulnerabilities in banks' business models were tested by the particular stress scenario.

The PRA Board judged that this stress test did not reveal capital inadequacies for five of the seven banks, given their balance sheets at end-2014 (Barclays, HSBC, Lloyds Banking Group, Nationwide, and Santander UK). For the other two banks (The Royal Bank of Scotland Group and Standard Chartered) the PRA Board decided that, given continuing improvements to their resilience over the course of 2015 and plans to increase capital, these banks were not required to submit a revised capital plan.

## Next steps

In October 2015, the Bank released *The Bank of England's approach to stress testing the UK banking system*, which sets out the main features of the Bank's stress-testing framework to 2018.<sup>(2)</sup> This framework has been shaped both by lessons learnt during the 2014 and 2015 stress tests, and feedback to the 2013 discussion paper.<sup>(3)</sup> Over the next three years, the Bank is planning to:

- develop an approach to stress testing that is explicitly countercyclical, with the severity of the test, and associated regulatory capital buffers, varying systematically with the level of risk;
- improve the consistency between the concurrent stress test and the overall capital framework, including by ensuring that systemically important banks are held to higher standards; and
- enhance its own modelling capability, while ensuring that banks continue to play an important role in producing their own projections of the impact of the stress.

As part of the new framework, the Bank will design and run a scenario that is intended to assess the risks to the banking system emanating from the financial cycle each year — the 'annual cyclical scenario'. The severity of this scenario will increase as risks build up and decrease as those risks crystallise or abate. In addition, every other year, the annual cyclical scenario will be complemented by an additional scenario intended to probe the resilience of the system to risks that may not be neatly linked to the financial cycle — the 'biennial exploratory scenario'. This scenario will explore emerging or latent threats to financial stability. It will not be used to change the Bank's risk tolerance, but will aim to explore risks that are not captured by the annual cyclical scenario.

The Bank's intention to run the exploratory scenario biennially will ensure that the burden on banks remains reasonable and proportionate. In 2016, the EBA intends to run a stress test, and the Bank will run the cyclical scenario only. In 2017, the Bank intends to run both the cyclical and exploratory scenarios together for the first time. In 2018, the Bank intends to run the cyclical scenario only.

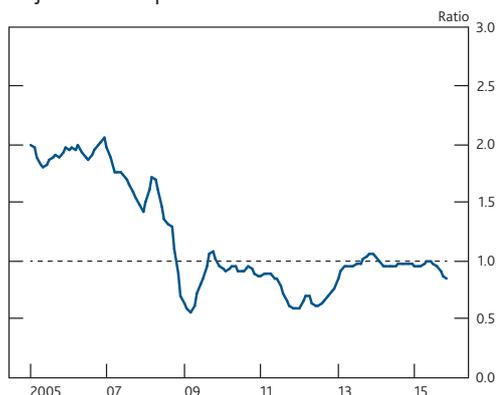
(1) Internationally agreed Pillar 1 capital requirements include minimum ratios for risk-weighted CET1 capital set at 4.5%, risk-weighted Tier 1 (CET1 and additional Tier 1) capital set at 6%, and risk-weighted total capital (Tier 1 and Tier 2), set at 8%. Pillar 2A risk-weighted capital requirements are additional requirements that are set by the PRA for individual banks. For further details see, *PRA Policy Statement PS17/15, 'Assessing capital adequacy under Pillar 2'*, July 2015: [www.bankofengland.co.uk/pradocuments/publications/ps/2015/ps1715update.pdf](http://www.bankofengland.co.uk/pradocuments/publications/ps/2015/ps1715update.pdf).

(2) See 'The Bank of England's approach to stress testing the UK banking system'; [www.bankofengland.co.uk/financialstability/Documents/stresstesting/2015/approach.pdf](http://www.bankofengland.co.uk/financialstability/Documents/stresstesting/2015/approach.pdf).

(3) See 'A framework for stress testing the UK banking system: a discussion paper'; [www.bankofengland.co.uk/financialstability/fsc/Documents/discussionpaper1013.pdf](http://www.bankofengland.co.uk/financialstability/fsc/Documents/discussionpaper1013.pdf).

### Chart B.3 Market indicators reflect banks' low returns

Major UK banks' price to book ratios<sup>(a)(b)</sup>

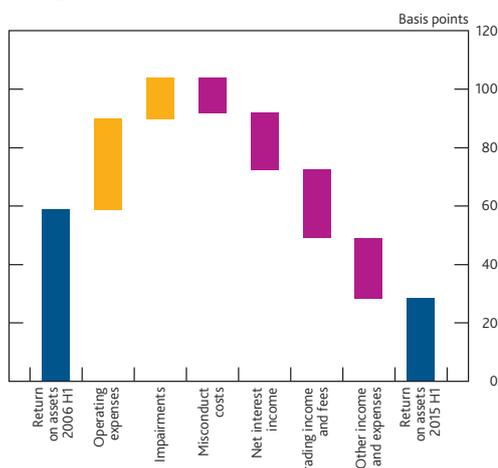


Sources: Thomson Reuters Datastream and Bank calculations.

- (a) Chart shows the ratio of share price to book value per share. An average of the ratios in the peer group, weighted by end-year total assets, is shown.  
 (b) Major UK banks peer group as per Chart B.1 excluding Britannia, Co-operative Bank and Nationwide. Northern Rock/Virgin Money are excluded from 2008.

### Chart B.4 Profitability has remained weak

Change in UK banks' return on assets before tax, decomposed<sup>(a)(b)</sup>

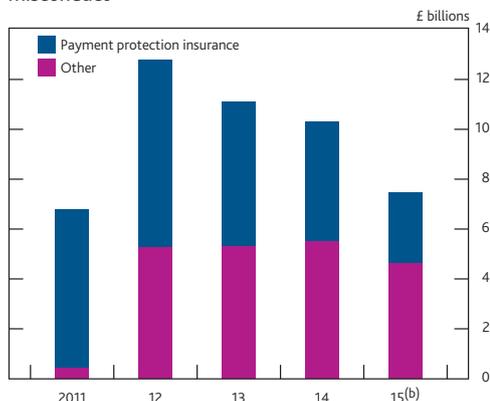


Sources: Bank of England, participating banks' Firm Data Submission Framework (FDSF) data submissions, published accounts and Bank calculations.

- (a) Return on assets before tax is defined as pre-tax profits divided by average assets for the half-year.  
 (b) UK banks are Barclays, Co-operative Bank, HSBC, Lloyds Banking Group, Nationwide, RBS and Santander UK.

### Chart B.5 Charges relating to past misconduct continue to reduce profits

UK banks' charges to the income statement relating to past misconduct<sup>(a)</sup>



Sources: Bank of England, participating banks' FDSF data submissions, published accounts and Bank calculations.

- (a) UK banks are Barclays, HSBC, Lloyds Banking Group, Nationwide, RBS and Santander UK.  
 (b) Data for January to end-September 2015.

disclosed that they already meet the full end-point 100% requirement.

#### *Profitability has remained weak and broadly flat...*

Persistently weak profitability could hamper UK banks' ability to build capital in the future through retained earnings. UK banks' profitability improved very marginally between 2014 H1 and 2015 H1, but remains low relative to historic levels. Consistent with that, major UK banks' shares continue to trade around or below their book value, falling further since the July 2015 *Report* (Chart B.3).

UK banks' aggregate return on assets in 2015 H1 was less than half of its value in 2006 H1, at 30 basis points. As Chart B.4 shows, this fall reflects a number of factors. Two main drivers have been trading income and net interest income, which contributed to reductions in the return on assets of around 20 basis points each since 2006 H1. Since 2011, banks have further faced charges relating to past misconduct (Chart B.5). Misconduct costs reduced pre-tax profits by 40% on average between 2011 and June 2015. UK banks disclosed a further £1.5 billion of provisions relating to past misconduct in their 2015 Q3 results. Given the number of ongoing investigations and redress actions, it is likely that misconduct costs will remain high in the near future. But there is considerable uncertainty about the size of these costs.

Lower impairment charges in 2015 H1 relative to 2006 H1 have provided some support for UK banks' return on assets. But at over 90% lower than their crisis peak, these charges appear unlikely to fall further (Chart B.6).

#### *...and funding costs have increased slightly.*

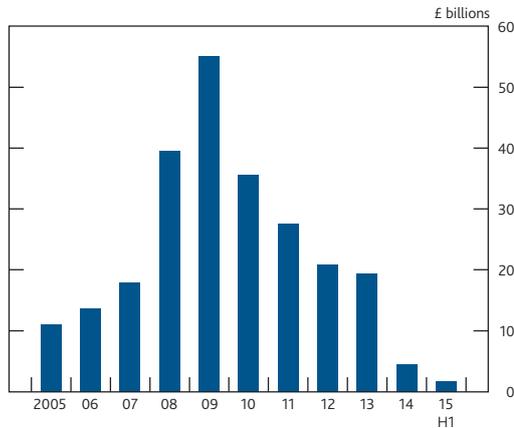
Net interest income accounted for almost 50% of UK bank's revenues in 2015 H1. Increases in funding costs could weaken net interest income, if these are not passed through to interest rates on lending. Indicative measures of wholesale funding spreads increased slightly in 2015 Q3 from their post-crisis low earlier this year (Chart B.7). This reflected, in part, investor reaction to events in emerging market economies (EMEs) and associated volatility in financial markets. These increases have partially reversed during 2015 Q4.

The impact of wholesale funding cost increases on total funding costs are likely to be lower compared to the period before the global financial crisis, as UK banks have reduced their reliance on wholesale funding. Major UK banks' wholesale funding declined by £1.4 trillion between 2008 and end-June 2015, a reduction of over 50%, while deposits increased by almost £200 billion (Chart B.8). The cost of deposit funding has remained broadly flat since the July 2015 *Report*.

Nevertheless, in the Bank of England's *Bank Liabilities Survey* conducted in 2015 Q3, lenders reported that widening funding spreads had led to increases in their transfer prices — the internal prices charged to business units within each bank to

### Chart B.6 Lower impairment charges have provided some support for returns

UK banks' impairment charges<sup>(a)</sup>

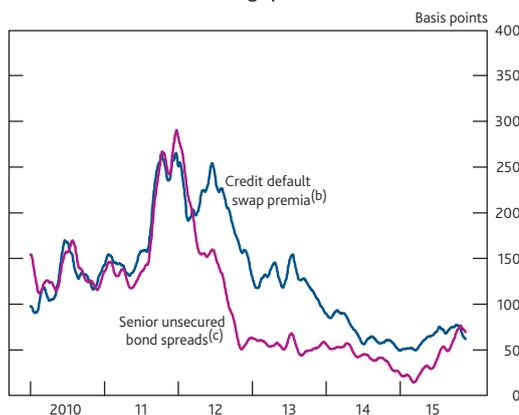


Sources: Bank of England and published accounts.

(a) UK banks are Barclays, Co-operative Bank, HSBC, Lloyds Banking Group, Nationwide, RBS and Santander UK.

### Chart B.7 Funding costs increased slightly

UK banks' wholesale funding spreads<sup>(a)</sup>



Sources: Bank of England, Bloomberg, Markit Group Limited and Bank calculations.

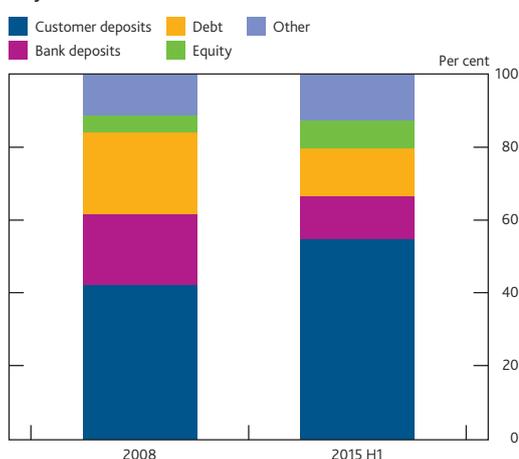
(a) UK banks are Barclays, HSBC, Lloyds Banking Group, Nationwide, RBS and Santander UK. Data are monthly averages, weighted by total assets.

(b) Five-year senior CDS premia.

(c) Constant maturity secondary market spreads to mid-swaps for five-year euro senior unsecured bonds or a suitable proxy when unavailable.

### Chart B.8 Banks have reduced their reliance on wholesale funding

Major UK banks' liabilities<sup>(a)(b)</sup>



Sources: Bank of England, published accounts and Bank calculations.

(a) Major UK banks peer group as per Chart B.1.

(b) Excludes derivative liabilities. Deposit data includes some repurchase agreements.

fund the flow of new loans. But there has been little evidence so far of this rise being passed through into the interest rates charged on new lending. If this continues, banks' net interest income may start to decline.

#### *Further restructuring may be needed to meet resolvability requirements...*

In November 2015, the Financial Stability Board finalised a total loss-absorbing capacity (TLAC) standard designed to ensure that G-SIBs have sufficient capacity to absorb losses and be recapitalised in the event of failure.<sup>(1)</sup> The Bank intends to implement TLAC in the United Kingdom through its power to set a minimum requirement for own funds and eligible liabilities (MREL). In order to comply with these requirements, UK banks may need to make changes to their balance sheets, for example, by restructuring existing wholesale funding to be issued from holding companies rather than bank operating companies.

#### *...and structural reform requirements.*

From 1 January 2019, banks with core deposits greater than £25 billion will be required to ring-fence their core retail activities. In October 2015, the PRA published a second consultation paper setting out its proposed ring-fencing policy covering prudential arrangements, intragroup arrangements and use of financial market infrastructures.<sup>(2)</sup> The policy is intended to support bank resolvability and increase the resilience of ring-fenced bodies to risks originating in other parts of their group or the global financial system, in order to help ensure the continuity of core banking services for individuals and small businesses.

#### *Structural improvements in payments schemes have enhanced resilience of members.*

The recent introduction of cash prefunding has improved the resilience of UK banks to credit and liquidity risks arising from their participation in the Bacs and Faster Payments Service (FPS) payment schemes. Bacs and FPS are deferred net settlement systems, which means that payments are accumulated, netted and then settled in batches. This creates risks for the period during which settlement is deferred. As of September 2015, members of these schemes now fully back other members' exposures to them with cash, protecting each member against the failure of any or all participants.

## Insurance sector

This section considers the resilience of the UK insurance sector.

#### *Solvency II and new capital requirements for G-SIIs should strengthen insurers' resilience...*

On 1 January 2016, Solvency II will come into force, and introduce new requirements for all European insurers, including: more risk-based capital requirements; higher standards for the

(1) [www.financialstabilityboard.org/wp-content/uploads/TLAC-Principles-and-Term-Sheet-for-publication-final.pdf](http://www.financialstabilityboard.org/wp-content/uploads/TLAC-Principles-and-Term-Sheet-for-publication-final.pdf).

(2) [www.bankofengland.co.uk/prd/Documents/publications/cp/2015/cp3715.pdf](http://www.bankofengland.co.uk/prd/Documents/publications/cp/2015/cp3715.pdf).

quality of capital instruments issued; and strengthened governance and risk management requirements.

In addition, from 2019, insurers that are designated as global systemically important insurers (G-SIIs) will be expected to meet new resilience standards under International Association of Insurance Supervisors (IAIS) proposals. The IAIS proposals, which have been endorsed by the Financial Stability Board, include a Higher Loss Absorbency (HLA) requirement designed to help reduce the probability and expected impact of a G-SII's failure on the financial system. The initial proposal for the HLA requirement, which was announced in October 2015, complements the Basic Capital Requirements (BCR) for G-SIIs, approved in 2014.

G-SIIs, including Aviva and Prudential in the United Kingdom, will be expected to hold capital resources at least equal to the sum of the BCR and HLA requirements. These will be applied to all activities at the group level. Under the HLA proposal, traditional insurance activities will face capital surcharges of between 6% and 13.5%, whereas non-traditional non-insurance activities will carry larger surcharges of between 8.5% and 27%, depending on systemic designation scores assigned to each G-SII and the type of business activity undertaken.

*... while UK insurers appear able to withstand a severe market stress.*

Market perceptions of UK insurers' credit risk, as measured by the cost of default protection, have been stable throughout 2015, but remain modestly higher than before the global financial crisis (Chart B.9).

A key risk facing UK insurers is the possibility of a market stress (see Financial market fragility chapter). Solvency II specifies a number of severe but possible market stresses, including: a 22% price fall in equities listed in advanced economies; a 25% depreciation of investments denominated in foreign currencies; and a fall in the prices of ten-year investment grade bonds ranging from 7% to 20%, depending on their credit rating.

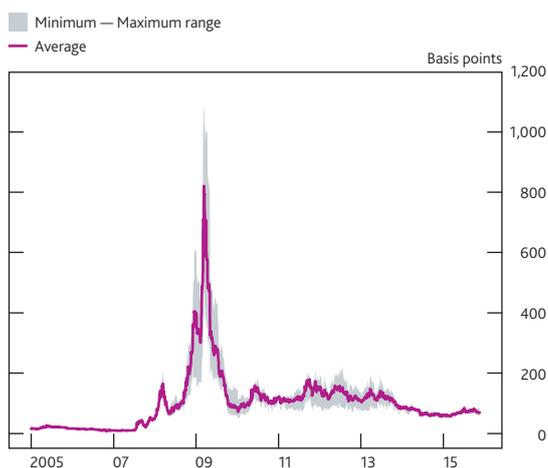
As at end-2014, UK insurers appear to hold sufficient capital resources to withstand each of these stresses separately.<sup>(1)</sup> This reflects, in part, the large share of UK insurers' assets (£1 trillion from around £1.8 trillion) that are associated with unit-linked products, where policyholders bear the market risk on their asset holdings (Chart B.10).

*Although profitability has improved, UK insurers are operating in a challenging environment.*

Since 2008, net income before taxes reported by a sample of UK-domiciled insurers has recovered from an aggregate loss

**Chart B.9 Market perceptions of UK insurers' credit risk remained stable in 2015**

Cost of default protection for selected UK insurers<sup>(a)</sup>

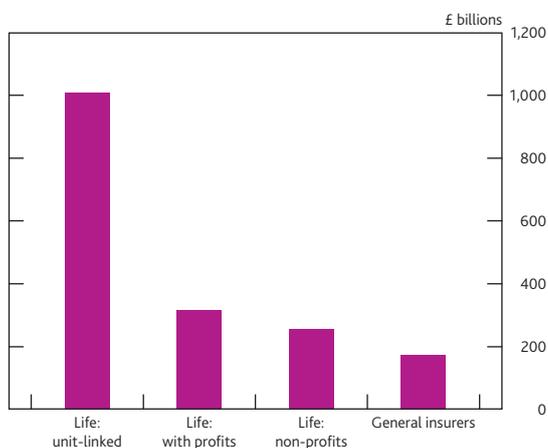


Sources: Market CDS Pricing and Bank calculations.

(a) Arithmetic mean of five-year senior credit default swap premia of selected UK insurance groups (Aviva, Legal and General, Prudential and Standard Life).

**Chart B.10 Policyholders bear the majority of the market risk related to UK life insurers' assets**

UK insurance industry assets broken down by sector<sup>(a)(b)</sup>



Source: PRA regulatory returns.

(a) Data to end-2014.

(b) General insurers excludes Lloyd's of London.

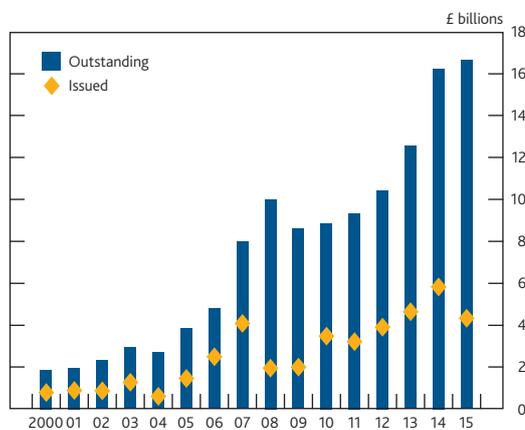
(1) On a standard formula basis using market stresses and scenarios specified by the Level 2 text under Solvency II.

of £5.1 billion to reach a profit of £11.7 billion in 2014.<sup>(1)</sup> However, future profitability is subject to potential headwinds, which could affect UK insurers' resilience in the long run.

Partly reflecting increased competition, the insurance premiums charged by general insurers and reinsurers in the property and catastrophe markets have been under pressure in recent years. Competition is especially strong in the reinsurance market, in part due to an increasing supply of capital from institutional investors, such as pension funds or hedge funds, to support alternative reinsurance activity.<sup>(2)</sup> A substantial proportion of this increase in alternative capital can be attributed to catastrophe bonds, with the amount outstanding growing from £9.5 billion in 2008 to £16.6 billion in 2015 (Chart B.11).

**Chart B.11 Alternative capital continues to enter the reinsurance sector**

Catastrophe bonds issued and outstanding<sup>(a)(b)</sup>

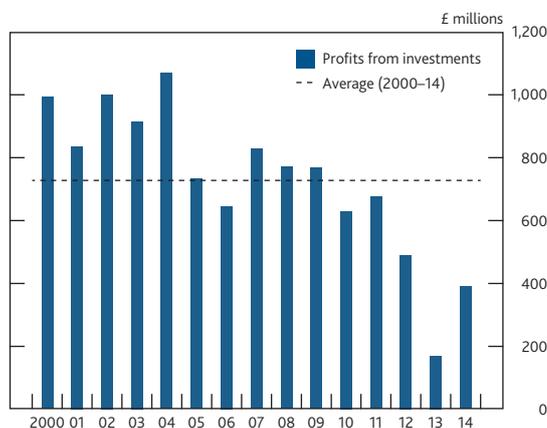


Sources: www.Artemis.bm Deal Directory and Bank calculations.

- (a) Includes only newly issued and outstanding deals, as of end-October 2015.  
 (b) These are predominantly catastrophe bonds but include some life, health and other insurance-linked securities.

**Chart B.12 Low interest rates have reduced insurers' returns**

General insurers' profits from investment activities<sup>(a)(b)</sup>



Source: PRA regulatory returns.

- (a) Data to end-2014.  
 (b) General insurers excludes Lloyd's of London.

The profitability of some life insurers could also be affected by the increasing availability of alternative retirement products to annuities, for instance drawdowns, which enable policyholders to withdraw income from pension savings. This follows the Government's pension reforms announced in 2014, which removed the effective requirement on defined contribution pension holders to buy an annuity at retirement.<sup>(3)</sup> As a result, the number of annuities sold in the United Kingdom fell from an average of 47,000 per quarter in 2014 to approximately 20,000 per quarter in 2015.<sup>(4)</sup>

Finally, the profitability of UK insurers could further be affected by a continuation of the low interest rate environment. Although the durations of UK insurers' assets and liabilities are well matched, insurers' investment income is impacted as the proceeds from maturing assets are reinvested in lower-yielding securities. This has already affected the profitability of UK general insurers in particular, which typically invest about 75% of their assets in short to medium-term, fixed-income products. Profits from investment activities for these firms in 2013 and 2014 were markedly below their long run average (Chart B.12).

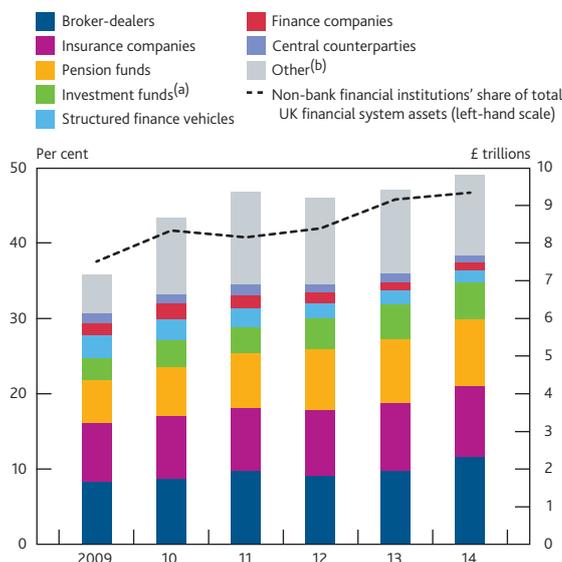
*The FPC will assess risks arising from the UK insurance sector further in 2016.*

As significant investors in financial instruments, such as bonds and equities, insurers have the potential to exacerbate asset price falls, for instance by selling assets when the prices of these assets are declining. Solvency II will provide some largely prescriptive measures that aim to limit such procyclical behaviour, but it gives less scope for flexibility than the current UK regime. As described in the July 2015 *Report*, the FPC has a

- (1) Based on a sample of 20 firms. Source: SNL Financials. Data as of end-2014.  
 (2) In addition to increasing competition, alternative capital could give rise to new risks going forward. For instance, catastrophe bonds distribute risk to other parts of the financial system, but in so doing create connections between insurance risks and other financial intermediaries. The FPC has asked Bank staff to review these risks in the first half of 2016.  
 (3) The effective requirement for policyholders to buy an annuity at retirement was removed by lowering the tax rate on withdrawals from defined contribution pensions from 55% to the relevant marginal rate of income tax.  
 (4) Source: Association of British Insurers. Data as of end-Q3 2015.

**Chart B.13 Non-bank financial institutions are a significant part of the UK financial system**

UK non-bank financial institutions' balance sheet assets

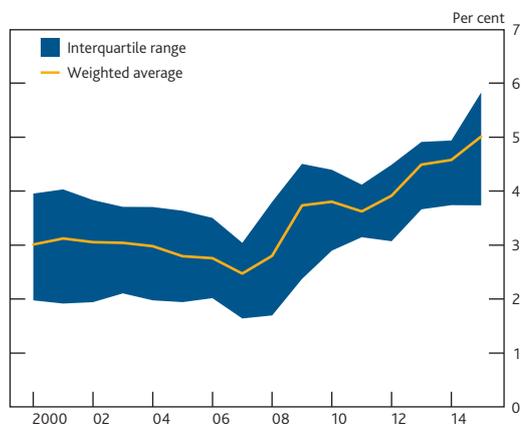


Sources: AFME, Bank of England, FCA, LCH.Clearnet Limited annual accounts, ICEU, Morningstar, ONS and Bank calculations.

(a) Includes money market funds.

(b) May include holding companies and real estate investment trusts as well as statistical discrepancies. Work is under way at the Bank and ONS to identify further components of this category.

**Chart B.14 Dealers' leverage ratios continue to improve**  
Dealers' leverage ratios(a)(b)(c)



Sources: SNL Financial, The Banker/TheBankerDatabase.com, banks' published accounts and Bank calculations.

(a) Leverage ratio defined as reported Tier 1 capital (or common equity where not available) divided by total assets, adjusted for accounting differences on a best-endeavours basis.

(b) Dealers included are BofA Merrill Lynch, Barclays, BNP Paribas, Citigroup, Crédit Agricole, Credit Suisse, Deutsche Bank, Goldman Sachs, HSBC, JP Morgan Chase & Co., Mitsubishi UFJ, Morgan Stanley, RBS, Société Générale and UBS. Pre-crisis data also include Bear Stearns, Lehman Brothers and Merrill Lynch.

(c) Data to 2014 are for end-December. Data for 2015 are for end-June.

workplan to assess macro-prudential risks associated with the investment activities of insurance companies, alongside non-traditional, non-insurance activities, in 2016.

## Market-based finance

This section assesses the resilience of market-based finance in the United Kingdom.

*Market-based finance is an important component of the UK financial system.*

Non-bank financial institutions (NBFIs) represent key sources of market-based finance and account for almost half of the UK financial system's total assets (Chart B.13). NBFIs provide finance to the real economy through direct finance and by investing in capital markets, such as corporate bond and equity markets. Examples of direct finance include insurance companies' investments in infrastructure and lending to households and businesses undertaken by non-bank finance companies. More significant is NBFIs' investment in capital markets: insurance companies and pension funds, for example, account for only 4% of direct lending to the real economy but hold 16% of UK corporate securities.<sup>(1)</sup>

*With investment in capital markets relying on core intermediaries and core financial markets...*

The provision of market-based finance is more likely to be stable when core financial markets are liquid and function smoothly. Operating at the centre of global financial markets are core intermediaries, or 'dealers', alongside key financial market infrastructures, such as central counterparties (CCPs), upon whose safety the resilience of those markets further relies.

*...dealers continue to appear more resilient...*

The aggregate leverage ratio of the world's largest dealers reached 5% at end-June (Chart B.14) and the implementation of leverage ratio requirements across jurisdictions is progressing. Additionally, international authorities are revising the standards for how banks and dealers are required to allocate capital to trading activities, including accounting for differences in instruments' liquidity risk.<sup>(2)</sup> These developments should further strengthen resilience at the core of the system.

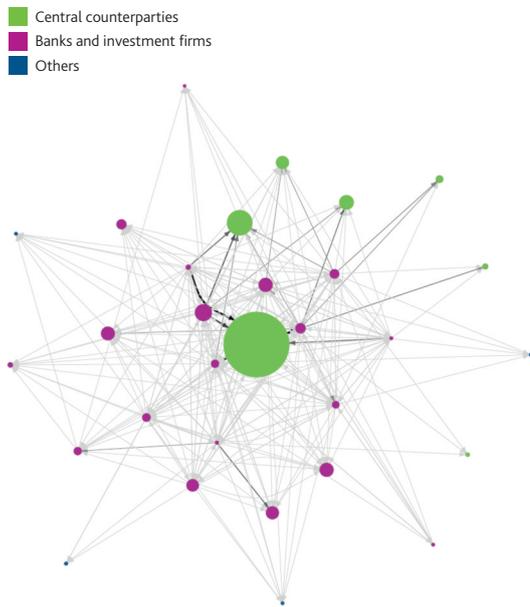
Through the derivative markets, dealers are exposed to clients, CCPs and one another. Since the crisis, a significant and mandated move to central clearing for standardised contracts has simplified networks between firms. CCPs place themselves between buyers and sellers of a trade, transforming the complex web of bilateral exposures among market participants into a network where exposures are increasingly to and from CCPs. As a result, CCPs now appear in the core of the network, to which UK banks and investment firms are heavily exposed (Chart B.15).

(1) Includes equity and debt securities issued by UK non-governmental sectors.

(2) See 'Fundamental review of the trading book: outstanding issues — consultative document', December 2014; [www.bis.org/bcbs/publ/d305.htm](http://www.bis.org/bcbs/publ/d305.htm).

### Chart B.15 Central clearing has simplified the network of financial system interlinkages

UK banks and investment firms' 30 largest derivative counterparties: the 'core of the network'<sup>(a)(b)</sup>

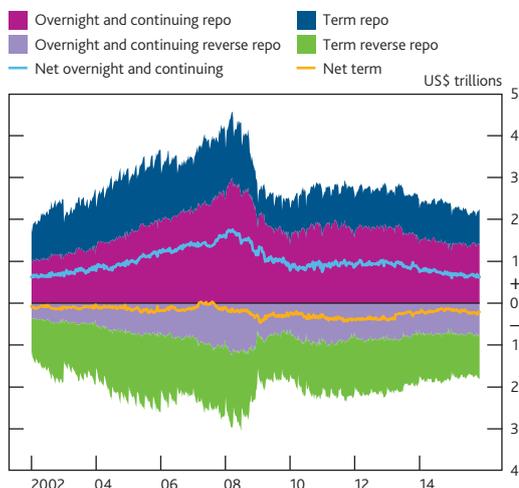


Source: Bank survey of banks' exposures.

- (a) The 30 largest derivative counterparties have been identified based on a survey of 23 UK banks and investment firms' top 20 exposures measured as exposures at default (net of collateral), to each of the following: banks, non-bank financial institutions and non-financial corporations; on 30 June 2015. Only UK subsidiaries of non-UK banks are included as reporting firms.
- (b) The size of each node is scaled by reporting firms' total amount of exposures to that firm. Each arrow points from one firm to another firm to which it has exposure. The thickness of the lines is based on the size of the exposure.

### Chart B.16 US primary dealers' repo activity has declined over the past year

US primary dealers' repo financing<sup>(a)(b)</sup>



Sources: Federal Reserve Bank of New York and Bank calculations.

- (a) The Federal Reserve Bank of New York trades US government and select other securities with designated primary dealers, which include banks and securities broker-dealers.
- (b) Data to 11 November 2015.

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 possibly offsetting positions at different counterparties. Nevertheless, counterparty exposures due to derivatives remain significant. According to a survey of 23 banks and investment firms, total exposures due to derivatives (measured as exposures at default, net of collateral) amounted to over 80% of combined CET1 capital of those institutions.<sup>(1)</sup>

*...and authorities are focusing on the resilience and resolvability of CCPs.*

Greater use of central clearing has increased the systemic importance of CCPs. In response, tighter regulatory requirements have been introduced and international work is being pursued: to enhance CCP resilience, including through stress testing; and to analyse interdependencies and the potential for contagion effects between CCPs and their direct and indirect members. Work has also continued internationally to ensure that appropriate recovery and resolution arrangements are in place.<sup>(2)</sup>

*But reductions in dealers' repo activity may have knock-on consequences.*

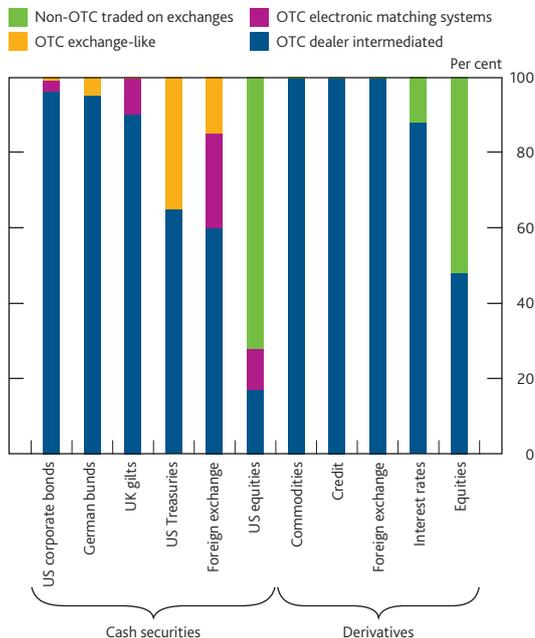
The financial system is further interconnected through repo and securities lending markets.<sup>(3)</sup> These markets are integral to the smooth functioning of the financial system and facilitate the participation of leveraged investors, such as dealers and leveraged hedge funds, which rely on securities financing transactions to fund their trading activities. These transactions are also the means by which some financial institutions, including commercial banks and money market funds, can lend to the financial system on a secured basis and others, such as pension funds and insurance companies, can provide securities on loan to facilitate settlements and short positions.

Over the past year, US primary dealers have reduced their repo activity by around US\$160 billion (**Chart B.16**). More broadly, market contacts have suggested that reductions in repo activity have gathered pace in recent months, leading to wider bid-offer spreads and decreasing availability of repos. Clients that have large net positions or provide little revenue to dealers from other services, such as many levered hedge funds, are reported to be most affected.<sup>(4)</sup> These and other market participants may become less willing or able to borrow in repo markets, including to take advantage of arbitrage

- (1) Firms reported top 20 exposures to each of the following: banks, non-bank financial institutions and non-financial corporations; on 30 June 2015.
- (2) See '2015 CCP Workplan'; [www.financialstabilityboard.org/wp-content/uploads/Joint-CCP-Workplan-for-2015-For-Publication.pdf](http://www.financialstabilityboard.org/wp-content/uploads/Joint-CCP-Workplan-for-2015-For-Publication.pdf).
- (3) Securities lending is the temporary transfer of financial securities, such as equities and bonds, from a lender to a borrower. The lender usually requires the borrower to provide cash or securities to collateralise the loan. Repos allow one firm to sell a security to another firm with a simultaneous promise to buy the security back at a later date at a predetermined price.
- (4) Net repo position is the difference between gross repo and gross reverse repo.

### Chart B.17 Securities are transacted in different ways

Estimated importance of various trading mechanisms in selected markets<sup>(a)(b)(c)(d)</sup>

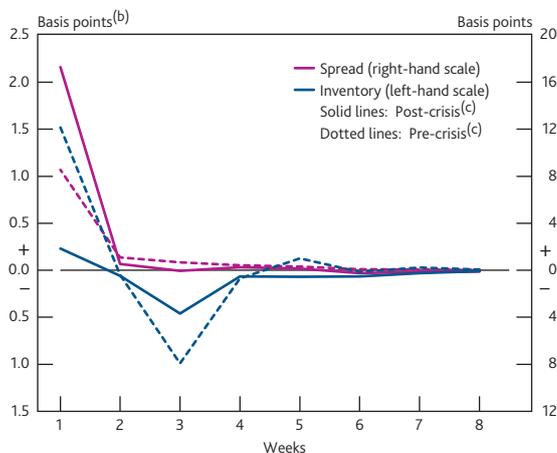


Sources: Bank of England, Bank for International Settlements, Debt Management Office, Federal Reserve Bank of New York, ICAP BrokerTec, McKinsey and Greenwich Associates, Tuttle (2013) 'Alternative Trading Systems: Description of ATS Trading in National Market System Stocks', Tuttle (2014) 'OTC Trading: Description of Non-ATS OTC Trading in National Market System Stocks' and Bank calculations.

- (a) Cash securities are given as proportion of trading volumes.  
 (b) Derivative figures are proportions of notional amounts outstanding inferred from BIS statistics, which divide derivative markets into those traded OTC and those traded on exchanges. This may overstate the importance of OTC markets, categorised here as 'intermediated by dealers'.  
 (c) Exchanges include public exchanges only. Electronic matching systems exclude key electronic request-for-quote systems, for example as available via Bloomberg and Tradeweb, but includes dark pools, electronic communications networks and dealer-to-client platforms offering live executable prices.  
 (d) Figures include dealer-to-client and inter-dealer markets.

### Chart B.18 Dealer inventories of US corporate bonds respond less to shocks than prior to the crisis

Sensitivity of US dollar-denominated high-yield corporate bond spreads and dealer inventory to reduced demand from asset managers<sup>(a)</sup>



Sources: BofA Merrill Lynch Global Research, Dealogic, EPFR Global, Federal Reserve Bank of New York, SIFMA and Bank calculations.

- (a) Sensitivity of US dollar-denominated high-yield corporate bond spreads and US primary dealers' inventory in these securities to a one standard deviation decline in demand for corporate bonds from asset management companies as a proportion of market size.  
 (b) Fraction of market size.  
 (c) Pre and post-crisis defined as 2004–06 and 2012–February 2015 respectively.

opportunities that are increasingly prevalent and persistent across financial markets. This may, in turn, have adverse implications for the efficiency and liquidity of financial markets more generally. During a severe market stress, it is further possible that some market participants may find it more difficult to raise cash through the repo of securities, including those securities generally regarded as liquid.

*Lower levels of liquidity in dealer-intermediated markets may prove more resilient in the future...*

Liquid financial markets help facilitate the financing of investment in the real economy. Over the past few years, financial markets have been affected by a number of structural changes. For example, innovation has generated a broad trend towards fast, electronic trading. And necessary regulation implemented in response to the global financial crisis to ensure the safety and soundness of core intermediaries has discouraged them from market-making as principal — though this may also reflect greater risk aversion on their part. The importance of trading mechanisms varies (Chart B.17) but these developments have led to changes across a range of markets.

Some financial markets, such as cash fixed income markets, rely on dealers to intermediate between clients, including by building and releasing inventories as part of their market-making activity. The level of liquidity in normal times in these markets appears to have fallen.

For example, average trade sizes for transactions larger than US\$1 million in US dollar-denominated investment-grade corporate bonds have fallen from around US\$5.6 million in 2006 to US\$4.1 million in 2014. There is further evidence to suggest that dealers are varying their inventories less to meet demand — for example, in response to sales of high-yield US corporate bonds by asset managers — with the result that spreads are varying more (Chart B.18).<sup>(1)</sup> And in the sterling corporate bond market, dealer inventories have fallen though, importantly, this does not appear to have affected dealers' trading volumes (Chart B.19).

These developments are not necessarily problematic. To the extent that lower liquidity in some markets is the price of ensuring greater resilience in stress conditions via a more resilient core, they may even be desirable.

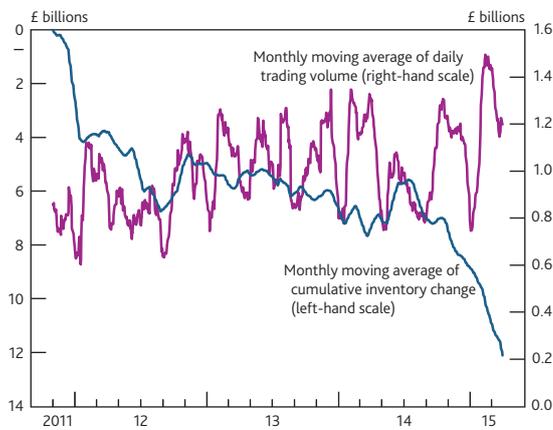
*... while other markets with higher normal levels of liquidity potentially susceptible to disruptions.*

In some other markets, the growth of electronic trading platforms over the past decade has facilitated the development of automated trading strategies based on pre-defined algorithms. For example, in US Treasury markets, principal trading firms (PTFs) — which employ automated trading

(1) See 'Has corporate bond market liquidity fallen?'; <http://bankunderground.co.uk/2015/08/27/has-corporate-bond-market-liquidity-fallen/>.

### Chart B.19 Dealer inventories in sterling corporate bond markets have fallen but not transaction volumes

Sterling corporate bond market: dealer inventories and transaction volumes<sup>(a)</sup>



Sources: FCA and Bank calculations.

(a) Trading volume and cumulative inventory change calculations only include transactions reported by FCA-regulated dealers on a principal basis and in instruments issued more than three months ago. Duplicate, erroneous and outlier transactions have been removed on a best-endeavours basis. Data include intra-group transactions.

strategies — have grown market share significantly. Based on US authorities' analysis of a subset of the US Treasury markets, PTFs now account for the majority of trading in the futures and electronically brokered inter-dealer cash markets.<sup>(1)</sup> Overall, the normal level of liquidity in these markets appears to have increased. The volume-weighted average bid-offer spread for FTSE 100 equities, for example, has been on a declining trend over the past decade.

But, in some cases, the resilience of these markets may have diminished. This is consistent with recent episodes of short-term volatility and illiquidity having centred on fast, electronic markets, including exchange-traded venues.

A number of lessons can be drawn from these episodes.<sup>(2)</sup>

For example, weaknesses in trading infrastructure can impede market access, amplify price movements and undermine investor confidence in a stress, as highlighted by the turbulence following the Swiss franc episode in January 2015. In the event, some dealers withdrew from the market as pricing on their electronic trading platforms proved ill-equipped to manage the size and speed of market activity, leading to illiquidity and sharp price movements.<sup>(3)</sup> This highlights the importance of firms' risk management and controls keeping pace with developments in market structure, including the growth of algorithmic trading (see Box 4).

Recent episodes have further demonstrated that consensus views among investors can jeopardise market liquidity if there is a rush to exit commonly held positions. The unwinding of common positions in German government bond markets in mid-April 2015 caused heightened volatility in that market.<sup>(4)</sup>

Furthermore, investor behaviour that distorts prices in one market can be rapidly transmitted to others via arbitrage activity. In other circumstances, such as in August 2015, the absence of arbitrage activity can lead to large pricing anomalies, reinforcing uncertainty among investors. And while circuit breakers can forestall disruptions in the market to which they are applied, they can have adverse knock-on consequences (see Financial market fragility chapter).

Finally, bank and NBFIs' ability and willingness to put capital at risk as principal has changed. During the October 2014 US Treasury episode, PTFs withdrew some limit orders and traditional dealers became more reluctant to make markets, thereby likely contributing to a further decline in market depth.

(1) 'Joint Staff Report: The U.S. Treasury Market on October 15, 2014'; [www.treasury.gov/press-center/press-releases/Documents/Joint\\_Staff\\_Report\\_Treasury\\_10-15-2015.pdf](http://www.treasury.gov/press-center/press-releases/Documents/Joint_Staff_Report_Treasury_10-15-2015.pdf).

(2) See 'Financial Stability Paper 34: The resilience of financial market liquidity'; [www.bankofengland.co.uk/financialstability/Pages/fpc/fspapers/fs\\_paper34.aspx](http://www.bankofengland.co.uk/financialstability/Pages/fpc/fspapers/fs_paper34.aspx).

(3) 'Market liquidity', *Financial Stability Report*, July 2015, pages 16–18; [www.bankofengland.co.uk/publications/Documents/fsr/2015/fsrfull1507.pdf](http://www.bankofengland.co.uk/publications/Documents/fsr/2015/fsrfull1507.pdf).

(4) See footnote 3.

## Box 4

### Implications of algorithmic trading for risk management and controls

Algorithmic trading, in which computers interact directly with electronic trading venues, and typically without human intervention, has grown rapidly over the past decade.<sup>(1)</sup> This growth has occurred alongside various other developments. For example, a greater proliferation of trading venues lends itself to automated decision-making to choose between them. And when many investment banks are shrinking, staff cost savings have been another driving factor. Conduct concerns may also be relevant, given less perceived scope for market abuse when humans are not directly engaged in trading decisions.

At the same time, there is evidence to suggest that liquidity in some financial markets has become more fragile over recent years and that the growth of algorithmic trading may be a contributing factor (see Market-based finance section). It is therefore essential that algorithms used by financial institutions are resilient to stressed market conditions. This box draws on the experience of the 'Swiss franc' episode to examine the implications of algorithmic trading for firms' risk management and controls.

#### Lessons from the 'Swiss franc' episode

On 15 January 2015, the Swiss National Bank abandoned its exchange rate floor against the euro, resulting in a 30% appreciation of the Swiss franc against the euro in 20 minutes.<sup>(2)</sup> During this period, the algorithms run by the primary liquidity providers in the foreign exchange market were unable to adapt to the speed and size of market activity. As a result, and in order to avoid an excessive accumulation of risk, firms' algorithms were stopped from interacting with electronic trading venues (either via automated 'kill' switches or manual intervention). This withdrawal of market-making contributed to an evaporation of liquidity, thereby amplifying the effect of the initial news on the Swiss franc exchange rate.

This episode reflected, in part, weaknesses in the design of algorithms that had not been identified due to poor risk management and controls, inadequate oversight and insufficient governance. It raised a number of prudential concerns including:

- whether the financial and operational risks associated with algorithmic trading are fully understood and appropriately governed in financial institutions;
- whether financial institutions' risk management and control frameworks are evolving sufficiently to capture the complexities of algorithmic trading;<sup>(3)</sup> and

- whether firms have assessed adequately the risks from events in which large intraday moves are coupled with liquidity droughts, and the implication of these events on their algorithmic trading activities and more broadly.

#### Implications for risk management and controls

Algorithmic trading at large financial institutions introduces new complexities that have implications for risk management and controls:<sup>(4)</sup>

- firms' organisational structures for independent risk and controls functions seem currently to classify algorithmic trading, due to its technological nature, as vulnerable to operational risk, and to manage its risk on that basis. Firms will need to widen the scope of risk management around this activity, given that it also has implications for market risk and counterparty risk;
- as observed on 15 January, large exposures were built up in under a minute and were outside firms' risk tolerance. Algorithmic trading therefore necessitates intraday market risk and counterparty risk monitoring and management;
- financial institutions engaging in algorithmic trading offer their clients direct or sponsored access to the market.<sup>(5)</sup> This introduces a new set of counterparty risk considerations;
- effective control of algorithmic trading requires specialist front office and control functions staff, who understand and are able to escalate and explain to senior management the exact nature of the risks run via algorithmic trading; and
- algorithmic pricing methodologies and trading strategies often involve complex models, and so the testing and stress testing of the assumptions behind these methodologies need specialists' involvement and need to be completely embedded in the risk management and control framework.

Information collected to date suggests that risk management and controls around algorithmic trading are still not fully and consistently embedded within financial institutions' governance processes. The Bank will continue to engage with firms on this topic, and to conduct selective reviews of algorithmic trading. It will also continue to assess the resilience of financial market liquidity in light of the evolving structure of markets, including algorithmic trading.

(1) See Anderson, N, Webber, L, Noss, J, Beale, D and Crowley-Reidy, L (2015), 'The resilience of financial market liquidity', *Bank of England FS Paper No. 34*; [www.bankofengland.co.uk/financialstability/Pages/fpc/fspapers/fs\\_paper34.aspx](http://www.bankofengland.co.uk/financialstability/Pages/fpc/fspapers/fs_paper34.aspx).

(2) See July 2015 *Financial Stability Report*, (page 16); [www.bankofengland.co.uk/publications/Documents/fsr/2015/fsrfull1507.pdf](http://www.bankofengland.co.uk/publications/Documents/fsr/2015/fsrfull1507.pdf).

(3) See the Senior Supervisors Group note on algorithmic trading; [www.newyorkfed.org/medialibrary/media/newsevents/news/banking/2015/SSG-algorithmic-trading-2015.pdf](http://www.newyorkfed.org/medialibrary/media/newsevents/news/banking/2015/SSG-algorithmic-trading-2015.pdf).

(4) As defined in MiFiD II, Article 4, Para 39.

(5) Under sponsored access, clients' algorithms can submit and execute orders using their sponsoring firms' market identifier, without these algorithms necessarily going through the sponsoring firms' checks or controls.

## 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*

13/Q1/6	Develop proposals for regular stress testing of the UK banking system	Implemented
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Looking to 2014 and beyond, the Bank and PRA should develop proposals for regular stress testing of the UK banking system. The purpose of those tests would be to assess the system's capital adequacy. The framework should be able to accommodate any judgements by the Committee on emerging threats to financial stability.

In October 2015, the Bank published its approach to stress testing the UK banking system.<sup>(1)</sup> This approach sets out the main features of the Bank's stress-testing framework, informed both by lessons learnt during the 2014 and 2015 tests, and by responses to the Bank's October 2013 Discussion Paper on stress testing.<sup>(2)</sup> As discussed in the approach document, the Bank's stress-testing framework will continue to evolve to reflect further regulatory developments, such as structural reform to the banking sector.

### Recommendations and Directions currently outstanding

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

As set out in the July 2015 *Report*, 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, and the FPC has published a policy statement describing how it intends to use these tools.<sup>(3)</sup> HM Treasury intends to consult on the FPC's proposed LTV/interest coverage ratio powers for the buy-to-let sector later in 2015.

(1) [www.bankofengland.co.uk/financialstability/Documents/stresstesting/2015/approach.pdf](http://www.bankofengland.co.uk/financialstability/Documents/stresstesting/2015/approach.pdf).

(2) For a summary of the feedback received on the 2013 Discussion Paper see [www.bankofengland.co.uk/financialstability/fsc/Documents/discussionpaper1013feedback.pdf](http://www.bankofengland.co.uk/financialstability/fsc/Documents/discussionpaper1013feedback.pdf).

(3) [www.bankofengland.co.uk/financialstability/Pages/fpc/policystatements.aspx](http://www.bankofengland.co.uk/financialstability/Pages/fpc/policystatements.aspx).

15/Q2/1(D)	Direction on the leverage ratio	Action under way
15/Q2/2	Role of AT1 in minimum leverage ratio requirements	Action under way

The FPC directs the PRA to implement in relation to each major UK bank and building society on a consolidated basis measures to:

- require it to hold sufficient Tier 1 capital to satisfy a minimum leverage ratio of 3%;
- secure that it ordinarily holds sufficient Tier 1 capital to satisfy a countercyclical leverage ratio buffer rate of 35% of its institution-specific countercyclical capital buffer rate, with the countercyclical leverage ratio buffer rate percentage rounded to the nearest 10 basis points;
- secure that if it is a global systemically important institution (G-SII) it ordinarily holds sufficient Tier 1 capital to satisfy a G-SII additional leverage ratio buffer rate of 35% of its G-SII buffer rate.

The minimum proportion of common equity Tier 1 that shall be held is:

- 75% in respect of the minimum leverage ratio requirement;
- 100% in respect of the countercyclical leverage ratio buffer; and
- 100% in respect of the G-SII additional leverage ratio buffer.

Common equity Tier 1 may include such elements that are eligible for grandfathering under Part 10, Title 1, Chapter 2 of Regulation (EU) No 575/2013 as the PRA may determine.

The FPC recommends to the PRA that in implementing the minimum leverage ratio requirement it specifies that additional Tier 1 capital should only count towards Tier 1 capital for these purposes if the relevant capital instruments specify a trigger event that occurs when the common equity Tier 1 capital ratio of the institution falls below a figure of not less than 7%.

On 10 July 2015, the PRA published a consultation paper on 'Implementing a UK leverage ratio framework' (CP24/15).<sup>(1)</sup> The consultation sets out the PRA's proposed approach to implementing the FPC's Direction, including the scope of application, minimum leverage ratio requirement, leverage ratio buffers, definitions and reporting and disclosure requirements. This consultation closed on 12 October 2015. The PRA will publish a policy statement, finalised rules and supervisory statements by the end of 2015, and proposes that the leverage ratio framework should come into force on 1 January 2016. The supervisory expectation that currently applies to these firms to maintain a 3% minimum leverage ratio will be superseded by the PRA's leverage ratio framework.

15/Q2/3	CBEST vulnerability testing	Action under way
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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.

Ten core firms have now completed CBEST cyber vulnerability tests (up from five at the time of the July 2015 *Report*), with a further nine in the process of testing. Those firms which have completed CBEST tests have now received individual cyber resilience action plans. The UK authorities (the Bank, FCA and HM Treasury) also intend to integrate CBEST testing into the regular supervisory toolkit for these core firms (see Cyber risk chapter).

Alongside its Recommendation on CBEST testing, the FPC endorsed in June 2015 a broader work programme by the authorities 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. The FPC will receive a report on this work by Summer 2016, which will allow it to consider whether additional action is needed.

(1) [www.bankofengland.co.uk/pr/pa/Pages/publications/cp/2015/cp2415.aspx](http://www.bankofengland.co.uk/pr/pa/Pages/publications/cp/2015/cp2415.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 current UK CCyB rate is 0%. This rate is reviewed on a quarterly basis. The United Kingdom has also reciprocated a number of foreign CCyB decisions — for more details see the Bank of England website.<sup>(1)</sup> Under PRA rules, foreign CCyB rates applying from 2016 onwards will be automatically reciprocated if they are less than 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).<sup>(2)</sup> 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).**

### 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 is practicable.**

The PRA and the FCA have published their respective approaches to implementing this Recommendation: the PRA has issued a policy statement, including rules,<sup>(3)</sup> and the FCA has issued general guidance.<sup>(4)</sup>

(1) [www.bankofengland.co.uk/financialstability/Pages/fpc/ccbrates.aspx](http://www.bankofengland.co.uk/financialstability/Pages/fpc/ccbrates.aspx).

(2) [www.fshandbook.info/FS/html/FCA/MCOB/11/6](http://www.fshandbook.info/FS/html/FCA/MCOB/11/6).

(3) [www.bankofengland.co.uk/pru/Documents/publications/ps/2014/ps914.pdf](http://www.bankofengland.co.uk/pru/Documents/publications/ps/2014/ps914.pdf).

(4) [www.fca.org.uk/news/fg14-08](http://www.fca.org.uk/news/fg14-08).

## Annex 2: Core indicators

Table A.1 Core indicator set for the countercyclical capital buffer<sup>(a)</sup>

Indicator	Average, 1987–2006 <sup>(b)</sup>	Average 2006 <sup>(c)</sup>	Minimum since 1987 <sup>(b)</sup>	Maximum since 1987 <sup>(b)</sup>	Previous value (oya)	Latest value (as of 20 November 2015)
<b>Bank balance sheet stretch<sup>(d)</sup></b>						
1 Capital ratio						
Basel II core Tier 1 <sup>(e)</sup>	6.6%	6.3%	6.2%	12.3%	n.a.	n.a.
Basel III common equity Tier 1 <sup>(f)</sup>	n.a.	n.a.	n.a.	n.a.	11.1%	12.0% (2015 Q3)
2 Leverage ratio <sup>(g)</sup>						
Simple	4.7%	4.1%	2.9%	6.3%	5.8%	6.3% (2015 H1)
Basel III (2014 proposal)	n.a.	n.a.	n.a.	n.a.	4.0%	4.6% (2015 H1)
3 Average risk weights <sup>(h)</sup>	53.6%	46.4%	34.6%	65.4%	38.6%	37.4% (2015 H1)
4 Return on assets before tax <sup>(i)</sup>	1.0%	1.1%	-0.2%	1.5%	0.5%	0.3% (2015 H1)
5 Loan to deposit ratio <sup>(j)</sup>	114.5%	132.4%	96.0%	133.3%	97.5%	97.4% (2015 H1)
6 Short-term wholesale funding ratio <sup>(k)</sup>	n.a.	24.3%	12.6%	26.5%	14.1%	12.6% (end-2014)
of which excluding repo funding <sup>(k)</sup>	n.a.	15.6%	5.8%	16.1%	5.8%	6.3% (end-2014)
7 Overseas exposures indicator: countries to which UK banks have 'large' and 'rapidly growing' total exposures <sup>(l)(m)</sup>		In 2006 Q4: AU, BR, CA, CH, CN, DE, ES, FR, IE, IN, JP, KR, KY, LU, NL, US, ZA			In 2014 Q2: CN, HK, SG, TW	In 2015 Q2: KY
8 CDS premia <sup>(n)</sup>	12 bps	8 bps	6 bps	298 bps	56 bps	71 bps (Nov. 2015)
9 Bank equity measures						
Price to book ratio <sup>(o)</sup>	2.14	1.97	0.52	2.86	0.99	0.85 (Nov. 2015)
Market-based leverage ratio <sup>(p)</sup>	9.7%	7.8%	1.9%	15.7%	5.7%	5.3% (Nov. 2015)
<b>Non-bank balance sheet stretch<sup>(q)</sup></b>						
10 Credit to GDP <sup>(r)</sup>						
Ratio	124.0%	157.4%	93.8%	176.7%	141.7%	139.8% (2015 Q2)
Gap	5.7%	5.2%	-27.6%	21.4%	-27.6%	-25.5% (2015 Q2)
11 Private non-financial sector credit growth <sup>(s)</sup>	10.1%	9.8%	-3.1%	22.8%	0.6%	2.5% (2015 Q2)
12 Net foreign asset position to GDP <sup>(t)</sup>	-3.6%	-13.1%	-25.3%	19.4%	-23.7%	-20.1% (2015 Q2)
13 Gross external debt to GDP <sup>(u)</sup>	193.4%	320.8%	122.8%	406.6%	321.1%	306.5% (2015 Q2)
of which bank debt to GDP	127.9%	201.9%	84.3%	275.4%	172.4%	161.9% (2015 Q2)
14 Current account balance to GDP <sup>(v)</sup>	-1.8%	-2.3%	-6.3%	0.4%	-4.2%	-3.6% (2015 Q2)
<b>Conditions and terms in markets</b>						
15 Long-term real interest rate <sup>(w)</sup>	3.10%	1.27%	-0.88%	5.29%	-0.34%	-0.54% (20 Nov. 2015)
16 VIX <sup>(x)</sup>	19.1	12.8	10.6	65.5	14.4	15.9 (20 Nov. 2015)
17 Global corporate bond spreads <sup>(y)</sup>	115 bps	87 bps	52 bps	486 bps	107 bps	135 bps (30 June 2015)
18 Spreads on new UK lending						
Household <sup>(z)</sup>	480 bps	352 bps	285 bps	840 bps	662 bps	642 bps (Sep. 2015)
Corporate <sup>(aa)</sup>	106 bps	100 bps	84 bps	386 bps	249 bps	237 bps (Dec. 2014)

Table A.2 Core indicator set for sectoral capital requirements<sup>(a)</sup>

Indicator	Average, 1987–2006 <sup>(b)</sup>	Average 2006 <sup>(c)</sup>	Minimum since 1987 <sup>(b)</sup>	Maximum since 1987 <sup>(b)</sup>	Previous value (oya)	Latest value (as of 20 November 2015)
<b>Bank balance sheet stretch<sup>(d)</sup></b>						
1 Capital ratio						
Basel II core Tier 1 <sup>(e)</sup>	6.6%	6.3%	6.2%	12.3%	n.a.	n.a.
Basel III common equity Tier 1 <sup>(f)</sup>	n.a.	n.a.	n.a.	n.a.	11.1%	12.0% (2015 Q3)
2 Leverage ratio <sup>(g)</sup>						
Simple	4.7%	4.1%	2.9%	6.3%	5.8%	6.3% (2015 H1)
Basel III (2014 proposal)	n.a.	n.a.	n.a.	n.a.	4.0%	4.6% (2015 H1)
3 Average mortgage risk weights <sup>(ab)</sup>	n.a.	n.a.	15.0%	22.4%	17.3%	15.0% (2015 H1)
4 Balance sheet interconnectedness <sup>(ac)</sup>						
Intra-financial lending growth <sup>(ad)</sup>	12.0%	13.0%	-15.3%	45.5%	-7.1%	-10.4% (2015 H1)
Intra-financial borrowing growth <sup>(ae)</sup>	14.1%	14.0%	-19.8%	28.9%	-3.2%	-8.3% (2015 H1)
Derivatives growth (notional) <sup>(af)</sup>	37.7%	34.2%	-25.9%	52.0%	-18.9%	-25.9% (2015 H1)
5 Overseas exposures indicator: countries to which UK banks have 'large' and 'rapidly growing' non-bank private sector exposures <sup>(ag)(m)</sup>		In 2006 Q4: AU, CA, DE, ES, FR, IE, IT, JP, KR, KY, NL, US, ZA			In 2014 Q2: CH, FR, HK, IE, JP, SG	In 2015 Q2: KY
<b>Non-bank balance sheet stretch<sup>(q)</sup></b>						
6 Credit growth						
Household <sup>(ah)</sup>	10.3%	11.2%	-0.6%	19.6%	2.1%	2.6% (2015 Q2)
Commercial real estate <sup>(ai)</sup>	15.3%	18.5%	-9.7%	59.8%	-7.4%	-3.6% (2015 Q3)
7 Household debt to income ratio <sup>(aj)</sup>	108.8%	149.4%	87.7%	157.4%	134.4%	135.0% (2015 Q2)
8 PNFC debt to profit ratio <sup>(ak)</sup>	237.9%	297.7%	156.8%	407.4%	266.1%	258.6% (2015 Q2)
9 NBFI debt to GDP ratio (excluding insurance companies and pension funds) <sup>(al)</sup>	59.4%	126.3%	15.1%	179.0%	152.0%	147.3% (2015 Q2)
<b>Conditions and terms in markets</b>						
10 Real estate valuations						
Residential price to rent ratio <sup>(am)</sup>	100.0	151.1	66.9	160.6	132.1	135.7 (2015 Q3)
Commercial prime market yields <sup>(an)</sup>	5.4%	4.0%	3.8%	7.3%	4.2%	4.0% (2015 Q3)
Commercial secondary market yields <sup>(an)</sup>	8.9%	5.8%	5.4%	10.9%	8.0%	7.0% (2015 Q3)
11 Real estate lending terms						
Residential mortgage loan to value ratio (mean above the median) <sup>(ao)</sup>	90.6%	90.6%	81.6%	90.8%	86.7%	86.5% (2015 Q2)
Residential mortgage loan to income ratio (mean above the median) <sup>(ao)</sup>	3.8	3.8	3.6	4.1	4.1	4.0 (2015 Q2)
Commercial real estate mortgage loan to value (average maximum) <sup>(ap)</sup>	77.6%	78.3%	60.0%	79.6%	62.2%	63.6% (2014 H2)
12 Spreads on new UK lending						
Residential mortgage <sup>(aq)</sup>	81 bps	50 bps	34 bps	361 bps	187 bps	155 bps (Sep. 2015)
Commercial real estate <sup>(ar)</sup>	138 bps	135 bps	119 bps	422 bps	290 bps	262 bps (2014 Q4)

- (a) A spreadsheet of the series shown in this table is available at [www.bankofengland.co.uk/financialstability/Pages/fpc/coreindicators.aspx](http://www.bankofengland.co.uk/financialstability/Pages/fpc/coreindicators.aspx).
- (b) If the series starts after 1987, the average between the start date and 2006 and the maximum/minimum since the start date are used.
- (c) 2006 was the last year before the start of the global financial crisis.
- (d) Unless otherwise stated, indicators are based on the major UK bank peer group defined as: Abbey National (until 2003); Alliance & Leicester (until 2007); Bank of Ireland (from 2005); Bank of Scotland (until 2000); Barclays; Bradford & Bingley (from 2001 until 2007); Britannia (from 2005 until 2008); Co-operative Banking Group (from 2005); Halifax (until 2000); HBOS (from 2001 until 2008); HSBC (from 1992); Lloyds TSB/Lloyds Banking Group; Midland (until 1991); National Australia Bank (from 2005); National Westminster (until 1999); Nationwide; Northern Rock (until 2011); Royal Bank of Scotland; Santander (from 2004); TSB (until 1994); Virgin Money (from 2012) and Woolwich (from 1990 until 1997). Accounting changes, eg the introduction of IFRS in 2005 result in discontinuities in some series. Restated figures are used where available.
- (e) Major UK banks' aggregate core Tier 1 capital as a percentage of their aggregate risk-weighted assets. The core Tier 1 capital ratio series starts in 2000 and uses the major UK banks peer group as at 2014 and their constituent predecessors. Data exclude Northern Rock/Virgin Money from 2008. From 2008, core Tier 1 ratios are as published by banks, excluding hybrid capital instruments and making deductions from capital based on PRA definitions. Prior to 2008, that measure was not typically disclosed and Bank calculations approximating it as previously published in the *Financial Stability Report* are used. The series are annual until end-2012, half-yearly until end-2013 and quarterly afterwards. Sources: PRA regulatory returns, published accounts and Bank calculations.
- (f) The Basel II series was discontinued with CRD IV implementation on 1 January 2014. The 'Basel III common equity Tier 1 capital ratio' is calculated as aggregate peer group common equity Tier 1 levels over aggregate 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, Lloyds Banking Group, Nationwide and Santander UK. Sources: PRA regulatory returns and Bank calculations.
- (g) A simple leverage ratio calculated as aggregate peer group equity (shareholders' claims) over aggregate peer group assets (note a discontinuity due to the introduction from 2005 of IFRS accounting standards, which tends to reduce reported leverage ratios thereafter). The Basel III (2010) series corresponds to aggregate peer group Tier 1 capital (including grandfathered instruments) over aggregate Basel 2010 leverage ratio exposure. The Basel III (2014) series corresponds to aggregate peer group CRD IV end-point Tier 1 capital over aggregate Basel 2014 exposure measure, and the previous value is for June 2014. Note that the simple series excludes Northern Rock/Virgin Money from 2008. The Basel III series consists of Barclays, Co-operative Banking Group, HSBC, Lloyds Banking Group, Nationwide, RBS and Santander UK. The series are annual until end-2012 and half-yearly afterwards. Sources: PRA regulatory returns, published accounts and Bank calculations.
- (h) Aggregate end-year peer group risk-weighted assets divided by aggregate end-year peer group published balance sheet assets. Data for 2014 H1 onwards are on a CRD IV basis. Sample excludes Northern Rock for all years. Series begins in 1992 and is annual until end-2012 and half-yearly afterwards. Sources: Published accounts and Bank calculations.
- (i) Calculated as 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 those of the acquiring group. Series is annual. Latest value shows return on assets between 2014 H1 and 2015 H1. Previous value is for 2014 as a whole. Sources: Published accounts and Bank calculations.
- (j) Major UK banks' loans and advances to customers as a percentage of customer deposits, where customer refers to all non-bank borrowers and depositors. Repurchase agreements are excluded from loans and deposits where disclosed. One weakness of the current measure is that it is not possible to distinguish between retail deposits from households and deposits placed by non-bank financial corporations on a consolidated basis. Additional data collections would be required to improve the data in this area. The series begins in 2000 and is annual until end-2012 and half-yearly afterwards. Sources: Published accounts and Bank calculations.
- (k) Share of total funding (including capital) accounted for by wholesale funding with residual maturity of under three months. Wholesale funding comprises deposits by banks, debt securities, subordinated liabilities and repo. Funding is proxied by total liabilities excluding derivatives and liabilities to customers under investment contracts. Where underlying data are not published estimates have been used. Repo includes repurchase agreements and securities lending. The series starts in 2005. Sources: Published accounts and Bank calculations.
- (l) This indicator highlights the countries where UK-owned monetary financial institutions' (MFIs) overall exposures are greater than 10% of UK-owned MFIs' tangible equity on an ultimate risk basis and have grown by more than 1.5 times nominal GDP growth in that country. Foreign exposures as defined in BIS consolidated banking statistics. Uses latest data available, with the exception of tangible equity figures for 2006-07, which are estimated using published accounts. Sources: Bank of England, ECB, IMF *World Economic Outlook (WEO)*, Thomson Reuters Datastream, published accounts and Bank calculations.
- (m) Abbreviations used are: Australia (AU), Brazil (BR), Canada (CA), Switzerland (CH), People's Republic of China (CN), Germany (DE), Spain (ES), France (FR), Ireland (IE), Italy (IT), Hong Kong (HK), India (IN), Japan (JP), Republic of Korea (KR), Cayman Islands (KY), Luxembourg (LU), Malaysia (MY), Netherlands (NL), Singapore (SG), Taiwan (TW), United Arab Emirates (AE), United States (US) and South Africa (ZA).
- (n) Average of major UK banks' five-year senior CDS premia, weighted by total assets until 2014 and by half-year total assets in 2015. Series starts in 2003. Includes Nationwide from July 2003. Sources: Markit Group Limited, published accounts and Bank calculations.
- (o) Relates the share price with the book, or accounting, value of shareholders' equity per share. Simple averages of the ratios in the peer group, weighted by end-year total assets. The sample comprises the major UK banks excluding Britannia, Co-operative Banking Group and Nationwide. Northern Rock is excluded from 2008 and Virgin Money from 2012. Series starts in 2000. Sources: Thomson Reuters Datastream, published accounts and Bank calculations.
- (p) Total peer group market capitalisation divided by total peer group assets (note a discontinuity due to introduction of IFRS accounting standards in 2005, which tends to reduce leverage ratios thereafter). The sample comprises the major UK banks excluding Britannia, Co-operative Banking Group and Nationwide. Northern Rock are excluded from 2008 and Virgin Money from 2012. Series starts in 2000. Sources: Thomson Reuters Datastream, published accounts and Bank calculations.
- (q) The current vintage of ONS data is not available prior to 1997. Data prior to this and beginning in 1987 have been assumed to remain unchanged since *The Blue Book 2013*.
- (r) Credit is defined as debt claims on the UK private non-financial sector. This includes all liabilities of the household and not-for-profit sector except for the unfunded pension liabilities and financial derivatives of the not-for-profit sector, and private non-financial corporations' (PNFCs) loans and debt securities excluding derivatives, direct investment loans and loans secured on dwellings. The credit to GDP gap is calculated as the percentage point difference between the credit to GDP ratio and its long-term trend, where the trend is based on a one-sided Hodrick-Prescott filter with a smoothing parameter of 400,000. See *Countercyclical Capital Buffer Guide* at [www.bankofengland.co.uk/financialstability/Pages/fpc/coreindicators.aspx](http://www.bankofengland.co.uk/financialstability/Pages/fpc/coreindicators.aspx) for further explanation of how this series is calculated. Sources: BBA, ONS, Revell, J and Roe, A (1971), 'National balance sheets and national accounting — a progress report', *Economic Trends*, No. 211 and Bank calculations.
- (s) Twelve-month growth rate of nominal credit. Credit is defined as above. Sources: ONS and Bank calculations.
- (t) As per cent of annual GDP (four-quarter moving sum). Sources: ONS and Bank calculations.
- (u) Ratios computed using a four-quarter moving sum of GDP. MFIs cover banks and building societies resident in the United Kingdom. Sources: ONS and Bank calculations.
- (v) As per cent of quarterly GDP. Sources: ONS and Bank calculations.
- (w) Five-year real interest rates five years forward, derived from the Bank's index-linked government liabilities curve. Sources: Bloomberg and Bank calculations.
- (x) The VIX is a measure of market expectations of 30-day volatility as conveyed by S&P 500 stock index options prices. Series starts in 1990. One-month moving average. Sources: Bloomberg and Bank calculations.
- (y) 'Global corporate debt spreads' refers to the global broad market industrial spread. This tracks the performance of non-financial, investment-grade corporate debt publicly issued in the major domestic and eurobond markets. Index constituents are capitalisation-weighted based on their current amount outstanding. Spreads are option adjusted, (ie they show the number of basis points the matched-maturity government spot curve is shifted in order to match a bond's present value of discounted cash flows). One-month moving average. Series starts in 1997. Sources: BofA Merrill Lynch Global Research and Bank calculations.
- (z) The household lending spread is a weighted average of mortgage and unsecured lending spreads, with weights based on relative volumes of new lending. The mortgage spread is a weighted average of quoted mortgage rates over risk-free rates, using 90% LTV two-year fixed-rate mortgages and 75% LTV tracker, two and five-year fixed-rate mortgages. Spreads are taken relative to gilt 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. Spreads are taken relative to Bank Rate. Series starts in 1997. Sources: Bank of England, CML and Bank calculations.
- (aa) The UK corporate lending spread is a weighted average of: SME lending rates over Bank Rate; CRE lending rates over Bank Rate; and, as a proxy for the rate at which banks lend to large, non-CRE corporates, UK investment-grade company bond spreads over maturity-matched government bond yields (adjusted for any embedded option features such as convertibility into equity). Weights based on relative volumes of new lending. Series starts in October 2002. Sources: Bank of England, BofA Merrill Lynch Global Research, BBA, Bloomberg, De Montfort University, Department for Business, Innovation and Skills and Bank calculations.
- (ab) Sample excludes Bank of Ireland; Britannia; National Australia Bank; Northern Rock; Virgin Money; and Nationwide for 2008 H2 only. Average risk weights for residential mortgages (exposures on the Retail IRB method only) are calculated as total risk-weighted assets divided by total exposure value for all banks in the sample. Calculated on a consolidated basis, except for Nationwide for 2014 H2/2015 H1 where only solo data were available. Series starts in 2008 and is updated half-yearly. Sources: PRA regulatory returns and Bank calculations.
- (ac) The disclosures the series are based on are not currently sufficient to ensure that all intra-financial activity is included in these series, nor is it possible to be certain that no real-economy activity is included. Additional data collections would be required to improve the data in this area. The intra-financial lending and borrowing growth series are adjusted for the acquisitions of Midland by HSBC in 1992, and of ABN AMRO by RBS in 2007 to avoid reporting large growth rates resulting from step changes in the size and interconnectedness of the major UK bank peer group.
- (ad) Lending to other banks and other financial corporations. Growth rates are year on year. Latest value shows growth rate for 2015 H1. Previous value is for 2014 as a whole. Sources: Published accounts and Bank calculations.
- (ae) Wholesale borrowing, composed of deposits from banks and non-subordinated securities in issue. Growth rates are year on year. Latest value shows growth rate for 2015 H1. Previous value is for 2014 as a whole. 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 shares change. Series starts in 2002. Growth rates are year on year. Latest value shows growth rate for 2015 H1. Previous value is for 2014 as a whole. Sources: Published accounts and Bank calculations.
- (ag) This indicator highlights the countries where UK-owned MFIs' non-bank private sector exposures are greater than 10% of UK-owned MFIs' tangible equity on an ultimate risk basis and have grown by more than 1.5 times nominal GDP growth in that country. Foreign exposures as defined in BIS consolidated banking statistics. Overseas sector exposures cannot currently be broken down further at the non-bank private sector level. The intention is to divide them into households and corporates as new data become available. Uses latest data available, with the exception of tangible equity figures for 2006-07, which are estimated using published accounts. Sources: Bank of England, ECB, IMF *World Economic Outlook (WEO)*, Thomson Reuters Datastream, published accounts and Bank calculations.
- (ah) Twelve-month nominal growth rate of total household and not-for-profit sector liabilities except for the unfunded pension liabilities and financial derivatives of the not-for-profit sector. Sources: ONS and Bank calculations.
- (ai) Four-quarter growth rate of UK-resident MFIs' loans to the real estate sector. The real estate sector is defined as: buying, selling and renting of own or leased real estate; real estate and related activities on a fee or contract basis; and development of buildings. Non seasonally adjusted. Quarterly data. Data cover lending in both sterling and foreign currency from 1998 Q4. Prior to this period, data cover sterling only. Source: Bank of England.
- (aj) Gross debt as a percentage of a four-quarter moving sum of disposable income. Includes all liabilities of the household sector except for the unfunded pension liabilities and financial derivatives of the non-profit sector. The household disposable income series is adjusted for financial intermediation services indirectly measured (FISIM). Sources: ONS and Bank calculations.
- (ak) Gross debt as a percentage of a four-quarter moving sum of gross operating surplus. Gross debt is measured as loans and debt securities excluding derivatives, direct investment loans and loans secured on dwellings. The corporate gross operating surplus series is adjusted for FISIM. Sources: ONS and Bank calculations.
- (al) Gross debt as a percentage of four-quarter moving sum of nominal GDP. The NBSI sector includes all financial corporations apart from MFIs'. This indicator additionally excludes insurance companies and pension funds. Sources: ONS and Bank calculations.
- (am) Ratio between an average of the seasonally adjusted Halifax and Nationwide house price indices and RPI housing rent. The series is rebased so that the average between 1987 and 2006 is 100. Sources: Halifax, Nationwide, ONS and Bank calculations.
- (an) The prime (secondary) yield is the ratio between the weighted averages, across the lowest (highest) yielding quartile of commercial properties, of IPD's measures of rental income and capital values. Source: Investment Property Databank (IPD UK).
- (ao) Mean LTV (respectively LTI) ratio on new advances above the median LTV (LTI) ratio, based on loans to first-time buyers, council/registered social tenants exercising their right to buy and homemovers, and excluding lifetime mortgages and advances with LTV above 130% (LTI above 10x). Data include regulated mortgage contracts only, and therefore exclude other regulated home finance products such as home purchase plans and home reversions, and unregulated products such as second charge lending and buy-to-let mortgages. Series starts in 2005. Sources: FCA Product Sales Data and Bank calculations.
- (ap) Average of the maximum offered loan to value ratios across major CRE lenders. Series starts in 2002. Sources: De Montfort University and Bank calculations.
- (aq) The residential mortgage lending spread is a weighted average of quoted mortgage rates over risk-free rates, using 90% LTV two-year fixed-rate mortgages and 75% LTV tracker, two and five-year fixed-rate mortgages. Spreads are taken relative to gilt 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. Weights based on relative volumes of new lending. Series starts in 1997. Sources: Bank of England, CML and Bank calculations.
- (ar) The CRE lending spread is the average of rates across major CRE lenders relative to Bank Rate. Series starts in 2002. Sources: Bank of England, De Montfort University and Bank calculations.

Table A.3 Core indicator set for LTV and DTI limits<sup>(a)</sup>

Indicator	Average, 1987–2006 <sup>(b)</sup>	Average 2006 <sup>(c)</sup>	Minimum since 1987 <sup>(b)</sup>	Maximum since 1987 <sup>(b)</sup>	Previous value (oya)	Latest value (as of 20 November 2015)
<b>Lender and household balance sheet stretch</b>						
<b>1 LTI and LTV ratios on new residential mortgages</b>						
Owner-occupier mortgage LTV ratio (mean above the median) <sup>(d)</sup>	90.6%	90.6%	81.6%	90.8%	86.7%	86.5% (2015 Q2)
Owner-occupier mortgage LTI ratio (mean above the median) <sup>(d)</sup>	3.8	3.8	3.6	4.1	4.1	4.0 (2015 Q2)
Buy-to-let mortgage LTV ratio (mean) <sup>(e)</sup>	n.a.	n.a.	70.9%	78.6%	71.8%	71.5% (2015 Q2)
<b>2 Household credit growth<sup>(f)</sup></b>						
	10.3%	11.2%	-0.6%	19.6%	2.1%	2.6% (2015 Q2)
<b>3 Household debt to income ratio<sup>(g)</sup></b>						
	108.8%	149.4%	87.7%	157.4%	134.4%	135.0% (2015 Q2)
<i>of which: mortgages<sup>(g)</sup></i>	76.8%	109.3%	56.7%	118.3%	103.9%	103.4% (2015 Q2)
<i>of which: owner-occupier mortgages<sup>(h)</sup></i>	85.8%	100.1%	73.2%	104.5%	88.5%	87.0% (2015 Q2)
<b>Conditions and terms in markets</b>						
<b>4 Approvals of loans secured on dwellings<sup>(i)</sup></b>						
	97,941	118,996	26,662	135,115	61,096	68,874 (Sep. 2015)
<b>5 Housing transactions<sup>(j)</sup></b>						
Advances to homemovers <sup>(k)</sup>	48,985	59,342	14,300	93,500	31,300	33,800 (Sep. 2015)
% interest only <sup>(l)</sup>	53.3%	31.0%	2.3%	81.3%	6.4%	2.7% (Sep. 2015)
Advances to first-time buyers <sup>(k)</sup>	39,179	33,567	8,500	55,800	26,300	28,600 (Sep. 2015)
% interest only <sup>(l)</sup>	52.1%	24.0%	0.0%	87.9%	0.4%	0.3% (Sep. 2015)
Advances to buy-to-let purchasers <sup>(k)</sup>	10,128	14,113	3,603	18,967	8,700	11,300 (Sep. 2015)
% interest only <sup>(m)</sup>	n.a.	n.a.	50.0%	70.2%	65.1%	70.2% (2015 Q2)
<b>6 House price growth<sup>(n)</sup></b>						
	1.8%	2.2%	-5.6%	7.0%	1.2%	1.9% (Oct. 2015)
<b>7 House price to household disposable income ratio<sup>(o)</sup></b>						
	3.2	4.7	2.3	4.9	4.1	4.3 (2015 Q2)
<b>8 Rental yield<sup>(p)</sup></b>						
	5.8%	5.1%	4.8%	7.6%	5.1%	5.0% (Oct. 2015)
<b>9 Spreads on new residential mortgage lending</b>						
All residential mortgages <sup>(q)</sup>	81 bps	50 bps	34 bps	361 bps	187 bps	155 bps (Sep. 2015)
Difference between the spread on high and low LTV residential mortgage lending <sup>(q)</sup>	18 bps	25 bps	1 bps	293 bps	176 bps	103 bps (Oct. 2015)
Buy-to-let mortgages <sup>(r)</sup>	n.a.	n.a.	61 bps	398 bps	292 bps	272 bps (2015 Q2)

(a) A spreadsheet of the series shown in this table is available at [www.bankofengland.co.uk/financialstability/Pages/fpc/coreindicators.aspx](http://www.bankofengland.co.uk/financialstability/Pages/fpc/coreindicators.aspx).

(b) If the series start after 1987, the average between the start date and 2006 and the maximum/minimum since the start date are used.

(c) 2006 was the last year before the global financial crisis.

(d) Mean LTV (respectively LTI) ratio on new advances above the median LTV (LTI) ratio, based on loans to first-time buyers, council/registered social tenants exercising their right to buy and homemovers, and excluding lifetime mortgages and advances with LTV ratio above 130% (LTI above 10x). Data include regulated mortgage contracts only, and therefore exclude other regulated home finance products such as home purchase plans and home reversions, and unregulated products such as second charge lending and buy-to-let mortgages. Series starts in 2005. Sources: FCA Product Sales Data and Bank calculations.

(e) Estimated mean LTV ratio of new non-regulated lending advances, of which buy-to-let is 88% by value. The figures include further advances and remortgages. The raw data is categorical: the share of mortgages with LTV ratio less than 75%; between 75% and 90%; between 90% and 95%; and greater than 95%. An approximate mean is calculated by giving these categories weights of 70%, 82.5%, 92.5% and 97.25% respectively. Series starts in 2007. Sources: Bank of England and Bank calculations.

(f) The twelve-month nominal growth rate of credit. Defined as the four-quarter cumulative net flow of credit divided by the stock in the initial quarter. Credit is defined as all financial liabilities of the household. Sources: ONS and Bank calculations.

(g) Gross debt as a percentage of a four-quarter moving sum of disposable income. Includes all liabilities of the household sector except for the unfunded pension liabilities and financial derivatives of the non-profit sector. The household disposable income series is adjusted for financial intermediation services indirectly measured (FISIM). Sources: ONS and Bank calculations.

(h) Due to data limitations, the mortgage debt of owner-occupiers is calculated as the product of the share of total mortgage debt directed to owner-occupiers on the asset side of lenders' balance sheets with total loans secured on dwellings on the liabilities side of household balance sheets. Series starts in 1999. Sources: Council of Mortgage Lenders, ONS and Bank calculations.

(i) Data are for monthly number of approvals of loans for house purchase secured on dwellings covering sterling loans by UK MFIs and other lenders to UK individuals. Approvals are measured net of cancellations. Seasonally adjusted. Series starts in 1993. Source: Bank of England.

(j) The number of houses sold/bought in the current preceding three quarters is sourced from HMRC's Land Transaction Return. From 2008 the Return excluded properties priced at less than £40,000 (2006 and 2007 data have also been revised by HMRC to correct for this). Data prior to 2005 comes from the Survey of Property Transactions; the UK total figure is computed by assuming that transactions in the rest of the United Kingdom grew in line with England, Wales and Northern Ireland. Seasonally adjusted. Sources: Council of Mortgage Lenders, HMRC and Bank calculations.

(k) The number of new mortgages advanced for house purchase in the preceding three quarters. Buy-to-let series starts in 2001. Sources: Council of Mortgage Lenders and Bank calculations.

(l) The share of new owner-occupied mortgages advanced for house purchase that are interest only. Interest-only mortgages exclude mixed capital and interest mortgages. There are structural breaks in the series in April 2015 where the Council of Mortgage Lenders switches source. Data prior to 2002 are at a quarterly frequency.

(m) The share of unregulated mortgages that are interest only. The data include all mortgages, not just those for house purchase. Interest-only mortgages exclude mixed capital and interest mortgages. Sources: Bank of England and Bank calculations.

(n) House prices are calculated as the mean of averages of United Kingdom house price as reported by the Nationwide and Halifax building societies. Series starts in 1991. Sources: Halifax, Nationwide and Bank calculations.

(o) The ratio is calculated using gross disposable income of the UK household and non-profit sector per household as the denominator. Aggregate household disposable income is adjusted for financial intermediation services indirectly measured (FISIM). Historical UK household population estimated by assuming linear growth in Northern Ireland household population between available data points. Series starts in 1990. Sources: Department of Communities and Local Governments, Halifax, Nationwide and Bank calculations.

(p) Using ARLA data up until 2014. From 2015 onwards, the series uses LSL Property Services plc. data normalised to the ARLA data over 2008 to 2014, when both series are available. Series starts in 2001. Sources: Association of Residential Letting Agents, LSL Property Services plc. and Bank calculations.

(q) 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. Spreads are taken relative to gilt years of matching maturity until August 2009, after which spreads are taken relative to OIS of the same maturity. Spreads are taken relative to Bank Rate for the tracker product. Weights are based on relative volumes of new lending. The difference in spread between high and low LTV lending is the rate on 90% LTV two-year fixed-rate mortgages less the 75% LTV two-year fixed-rate. Series starts in 1997. Sources: Bank of England, Bloomberg, Council of Mortgage Lenders, FCA Product Sales Data and Bank calculations.

(r) The spread on new buy-to-let mortgages is the weighted average effective spread charged on new floating and fixed-rate unregulated mortgages over safe rates. Spreads are taken relative to Bank Rate for the floating-rate products. The safe rate for fixed-rate mortgages is calculated by weighting two-year, three-year and five-year risk-free interest rates by the number of buy-to-let fixed-rate mortgage products offered at these maturities. The risk-free rates are gilts of 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.

**GDP** – gross domestic product.

**M4** – UK non-bank, non-building society private sector's holdings of sterling notes and coin, and their sterling deposits (including certificates of deposit, holdings of commercial paper and other short-term instruments and claims arising from repos) held at UK banks and building societies.

**OIS** – overnight index swap.

**RPI** – retail prices index.

### Abbreviations

**AREF** – Association of Real Estate Funds.

**AT1** – additional Tier 1.

**BCR** – Basic Capital Requirements.

**BIS** – Bank for International Settlements.

**BTL** – buy-to-let.

**CAPE** – cyclically adjusted price/earnings ratio.

**CBEST** – UK Government's National Cyber Security Programme.

**CCyB** – countercyclical capital buffer.

**CCP** – central counterparty.

**CET1** – common equity Tier 1.

**CML** – Council of Mortgage Lenders.

**CRD IV** – Capital Requirements Directive.

**CRE** – commercial real estate.

**CRR** – Capital Requirements Regulation.

**DSR** – debt-servicing ratio.

**DTI** – debt to income.

**EBA** – European Banking Authority.

**ECB** – European Central Bank.

**EME** – emerging market economy.

**EU** – European Union.

**FCA** – Financial Conduct Authority.

**FDI** – foreign direct investment.

**FISIM** – financial intermediation services indirectly measured.

**FOMC** – Federal Open Market Committee.

**FPC** – Financial Policy Committee.

**FPS** – Faster Payments Service.

**FSA** – Financial Services Authority.

**FSB** – Financial Stability Board.

**FTSE** – Financial Times Stock Exchange.

**G-SIB** – global systemically important bank.

**G-SII** – global systemically important insurer.

**HLA** – Higher Loss Absorbency.

**HMRC** – Her Majesty's Revenue and Customs.

**IAIS** – International Association of Insurance Supervisors.

**IFRS** – International Financial Reporting Standard.

**IMF** – International Monetary Fund.

**LTI** – loan to income.

**LTV** – loan to value.

**MCOB** – Mortgages and Home Finance: Conduct of Business sourcebook.

**MFI** – monetary financial institution.

**MREL** – minimum requirement for own funds and eligible liabilities.

**MSCI** – Morgan Stanley Capital International Inc.

**NBFI** – non-bank financial institution.

**OFI** – other financial institution.

**ONS** – Office for National Statistics.

**OTC** – over the counter.

**PNFC** – private non-financial corporation.

**PRA** – Prudential Regulation Authority.

**PTF** – principal trading firm.

**RBS** – Royal Bank of Scotland.

**RICS** – Royal Institution of Chartered Surveyors.

**SME** – small and medium-sized enterprise.

**S&P** – Standard & Poor's.

**TLAC** – total loss-absorbing capacity.

**WEO** – IMF *World Economic Outlook*.



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