

January 2014

The Financial Policy Committee's powers to supplement capital requirements

A Policy Statement



BANK OF ENGLAND





BANK OF ENGLAND

January 2014

The Financial Policy Committee's powers to supplement capital requirements

A Policy Statement

The Financial Policy Committee (FPC) was established under the Bank of England Act 1998, through amendments made in the Financial Services Act 2012. The legislation establishing the FPC came into force on 1 April 2013. The objectives of the Committee are to exercise its functions with a view to contributing to the achievement by the Bank of England of its Financial Stability Objective and, subject to that, supporting the economic policy of Her Majesty's Government, including its objectives for growth and employment. The responsibility of the Committee, with regard to the Financial Stability Objective, relates primarily to the identification of, monitoring of, and taking of action to remove or reduce, systemic risks with a view to protecting and enhancing the resilience of the UK financial system.

The legislation requires the statutory FPC to prepare and maintain a written statement of the general policy that it proposes to follow in relation to the exercise of its powers of Direction. The FPC has Direction powers over sectoral capital requirements and Her Majesty's Government has proposed making the FPC responsible for setting the countercyclical capital buffer. This document meets the legislative requirements with regard to the FPC's Direction powers and is based on a draft Policy Statement published in January 2013 by the interim FPC, which operated from 2011 until March 2013.

The Financial Policy Committee:

Mark Carney, Governor

Jon Cunliffe, Deputy Governor responsible for financial stability

Andrew Bailey, Deputy Governor responsible for prudential regulation

Charles Bean, Deputy Governor responsible for monetary policy

Martin Wheatley, Chief Executive of the Financial Conduct Authority

Clara Furse

Andrew Haldane

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 13 January 2014 and, unless otherwise stated, uses data available as at 6 January 2014.

Contents

	Executive summary	5
1	Introduction	7
2	Description of the tools	9
2.1	What is the countercyclical capital buffer and what are sectoral capital requirements?	9
2.2	To whom will the tools apply?	9
2.3	To which exposures will the tools apply?	9
2.4	How will decisions on these tools be co-ordinated with overseas regulators?	11
2.5	How do these tools fit with the rest of the regulatory framework?	12
2.6	How will the FPC's decisions on macroprudential tools be communicated and enforced?	13
3	Impact of the tools on financial stability and growth	14
3.1	Direct impact on resilience	14
3.2	Indirect impact on resilience	15
Box 1	International experiences with sectoral capital requirements	17
3.3	Impact on the level of GDP: cycle and trend	19
Box 2	The impact of recent capital measures	20
4	Indicators for adjusting the tools	23
4.1	High-level considerations	23
4.2	Core indicators for the countercyclical capital buffer	25
Box 3	Credit-to-GDP indicators and the Basel III guidance	30
4.3	Core indicators for sectoral capital requirements	33
4.4	What did the core indicators suggest prior to the global financial crisis?	37
5	Conclusion	38
	References	44
	Glossary	47

The Financial Policy Committee's powers to supplement capital requirements

A Policy Statement

Executive summary

The Financial Services Act 2012 introduced legislation to put the Financial Policy Committee (FPC) on a statutory footing. The primary responsibility of the FPC is '*protecting and enhancing the resilience of the UK financial system*'. This responsibility relates chiefly to the '*identification of, monitoring of, and taking of action to remove or reduce, systemic risks*'. But the FPC's task is not to achieve resilience at any cost. Its actions must not, in the language of the legislation, have '*a significant adverse effect on the capacity of the financial sector to contribute to the growth of the UK economy in the medium or long term*'. The legislation provides that, subject to achieving its primary objective, the FPC must also support '*the economic policy of Her Majesty's Government, including its objectives for growth and employment*'.

The FPC has two main powers. The first is a power to make *Recommendations*. It can make Recommendations to anybody. But the FPC has a special power to make Recommendations on a comply or explain basis to the Prudential Regulation Authority (PRA) and the Financial Conduct Authority (FCA). This document is not about that first set of powers. The second is a power to *Direct* those regulators to adjust specific macroprudential tools. The Government has given the FPC Direction power over sectoral capital requirements (SCRs) by way of an Order that came into force on 1 April 2013. Moreover, the Government has proposed making the FPC responsible for decisions on the countercyclical capital buffer (CCB) applied to certain financial institutions in the United Kingdom. The tool is implemented in the European Union via the Capital Requirements Directive and Regulation (CRD IV / CRR), which became effective on 1 January 2014, with CCB provisions applying, at the latest, from 1 January 2016. These tools are primarily intended to tackle cyclical risks, such as those arising from unsustainable levels of leverage, debt or credit growth.

There is a statutory requirement for the FPC to prepare and maintain a general statement of policy for all the Direction powers it is given under the new legislation. This document is that Policy Statement for SCRs and, given the Government's

stated policy, for the CCB. It describes the CCB and SCRs, the likely impact of using these tools on financial stability and growth, and the circumstances in which the FPC might expect to use each tool.

The CCB tool will allow the FPC to change capital requirements above normal microprudential standards in relation to all loans and other exposures of banks to borrowers in the United Kingdom. The SCR tool is more targeted and allows the FPC to change capital requirements above microprudential standards on exposures to specific sectors judged to pose a risk to the system as a whole. The FPC can adjust SCRs for banks' exposures to three broad sectors (residential property, including mortgages; commercial property; and other parts of the financial sector), as well as more granular subsectors (for example, to mortgages with high loan to value or loan to income ratios at origination).

The CCB and SCRs apply to all UK incorporated banks, building societies and large investment firms (such as large broker dealers). The use of these tools might create incentives for regulatory arbitrage and for activity to move to financial institutions not covered by the rules. The FPC will monitor the extent to which any such 'leakages' reduce its ability to mitigate systemic risks and, if necessary, will make Recommendations to HM Treasury to expand the set of institutions to which these tools apply.

The FPC expects to co-operate closely with overseas regulators, including at the European Systemic Risk Board (ESRB), to ensure that macroprudential policy decisions are implemented effectively. CRD IV/CRR sets out formal co-ordination arrangements for the CCB. Overseas regulators will normally apply any CCB set in the United Kingdom to their banks' UK exposures, while the relevant overseas regulators will normally set the CCB in relation to UK banks' overseas exposures. CRD IV/CRR also sets out specific arrangements for co-ordinating with other European authorities when using SCRs.

The use of these tools will improve the ability of the financial system to withstand shocks. The CCB applied to UK exposures

and SCRs will be zero when the FPC judges that current and future threats to financial stability in the United Kingdom are low. When threats to stability emerge, the FPC can raise the CCB or SCRs, requiring banks to have a larger capital buffer to absorb unexpected losses when the 'cycle' turns. In simple terms, if banks have, say, 20% more capital, they can absorb losses that are 20% greater, all else equal. The tools might also affect the resilience of the financial system through effects on the price and availability of credit. These effects are likely to vary over time and according to the state of the economy. For example, in an upswing, an increase in the CCB or SCRs is likely to tighten credit conditions facing households, companies and financial intermediaries. This may help arrest the build-up of vulnerabilities created by an overextension of credit and thereby boost banks' resilience.

Conversely, previously accumulated capital buffers may be reduced when threats to resilience are judged to have receded or banks' capital buffers are judged to be more than sufficient to absorb future unexpected losses in the event of stress. The size of such future losses may in some circumstances be influenced by the setting of capital requirements. Reducing previously accumulated capital buffers may then help to mitigate a collective contraction in the supply of lending to households and businesses that could weaken growth and undermine resilience. At other times, however, such as periods of acute uncertainty in financial markets, banks may find it hard or expensive to fund themselves at lower capital ratios, so that any reduction in capital buffers has little effect or is even counterproductive. In those circumstances, lending might be better supported by the alternative action of recommending that banks raise levels of capital to underpin investor confidence in the financial system.

Using the CCB and SCRs will in some circumstances affect economic growth. Over time, if these tools are successful in reducing the likelihood and severity of financial crises, their use is likely to boost the expected level of UK GDP. In the near term, while historical experience is limited, the best available studies point, on average, towards only a modest negative impact on near-term growth if capital requirements are tightened, particularly if the outlook for inflation weakens such that monetary policy can be used to cushion the impact on growth.

Many indicators will be useful for shaping the decisions of the FPC on these tools and helping it to explain those decisions publicly. No single set of indicators can ever provide a perfect guide to systemic risks, or to the appropriate policy responses, due to the complexity of financial interlinkages, the tendency for the financial system to evolve over time and time lags before risks become apparent. The choice of indicators will also evolve over time as the FPC learns from experience, as

data availability and quality improve, and as new research is undertaken. Judgement will play a material role in all FPC decisions and policy will not be mechanically tied to any specific set of indicators. To support its judgement, the FPC will monitor a wide set of information, varying over time depending on the emerging risks, including both market and supervisory intelligence, and 'stress tests' of banking sector resilience.

The FPC will, however, routinely review the core indicators set out in Tables C and D (pages 40–43), which have been helpful in identifying emerging risks to financial stability in the past. These indicators can be used by the FPC when determining its use of the CCB and SCR powers — other indicators and analysis will be important for assessing structural threats from the distribution of risk across, and interconnections within, the financial system. The core indicators include measures of balance sheet stretch within the financial system and among borrowers, and measures of terms and conditions in financial markets. Some of these indicators may prompt further analysis on whether risks are concentrated in particular subsectors. The FPC will also examine whether changing patterns in the distribution of risks across financial institutions, households or corporates, including those overseas, may signal rising risks. Since instability often follows periods of rapid change in the financial system, it will be important to consider both significant changes in indicators and their absolute level.

The FPC will be more likely to adjust the CCB or SCRs when the degree of deviation from historical benchmarks suggested by the core indicators is greater, when the different indicators convey a more homogeneous picture, and when that picture is more consistent with market and supervisory intelligence. The indicators will be considered alongside each other and market and supervisory intelligence to judge whether an aggregate or sectoral response is more appropriate. They are published alongside the wider information set informing the FPC's decisions in its *Financial Stability Report* every six months and, for the CCB indicators, on the Bank's website every quarter.⁽¹⁾

The indicators may also be useful in judging whether or not policy has been effective. Success in this context means reducing the risk of a major disturbance to the financial system without having a significant adverse effect on the growth of the UK economy. The probability of a future systemic financial crisis cannot be readily observed. The success of the FPC's actions may, however, be partially assessed with reference to whether the indicators used to prompt and justify intervention evolve in ways that are more appropriate and sustainable.

(1) The publication schedule was amended following the FPC's meeting on 19 June 2018 — for more details see the Record of that meeting: www.bankofengland.co.uk/record/2018/financial-policy-committee-june-2018.

1 Introduction

The Financial Services Act 2012 introduced legislation to create the Financial Policy Committee (FPC). The FPC's statutory responsibility is the

'identification of, monitoring of, and taking of action to remove or reduce, systemic risks with a view to protecting and enhancing the resilience of the UK financial system', with the objective of contributing towards the Bank's Financial Stability Objective. Systemic risks include those attributable to 'structural features of financial markets, such as connections between financial institutions', to 'the distribution of risk within the financial sector' and to 'unsustainable levels of leverage, debt or credit growth'.

The FPC's task is not to achieve resilience at any cost, however. Its actions must not, in the provisions of the legislation, have 'a significant adverse effect on the capacity of the financial sector to contribute to the growth of the UK economy in the medium or long term'. The legislation provides that, subject to achieving its primary objective, the FPC must also support 'the economic policy of Her Majesty's Government, including its objectives for growth and employment'.⁽¹⁾

The FPC has two main sets of powers at its disposal. The first is a power to make *Recommendations*. It can make Recommendations to anybody. But the FPC has a special power to make Recommendations, on a comply or explain basis, to the Prudential Regulation Authority (PRA) and the Financial Conduct Authority (FCA) about the exercise of their functions, such as to adjust the rules that banks and other regulated financial institutions must abide by. Should the regulators decide not to implement Recommendations made on a comply or explain basis, they are required by the legislation to explain their reasons for not doing so. This document is not about this first set of powers.

The second set of powers is to give *Directions* to those regulators to adjust specific macroprudential tools. The Government has given the FPC Direction power over sectoral capital requirements (SCRs) by way of an Order ('the Macro-prudential Measures Order') that came into effect on 1 April 2013.⁽²⁾⁽³⁾ In a consultation in 2012, it also proposed making the FPC responsible for policy decisions on the countercyclical capital buffer (CCB) in the United Kingdom. Powers here will be provided under the European Union (EU) Capital Requirements Directive and Regulation (CRD IV/CRR) which became effective on 1 January 2014, with the CCB provisions applying, at the latest, from 1 January 2016. The Government also stated its intention to use the flexibility in the legislation to give the FPC powers over the CCB as soon as practicable after 1 January 2014.

The domestic legislation requires the FPC to publish a Policy Statement explaining the general approach the

Committee intends to follow in using the tools over which it has powers of Direction such as SCRs. The legislation does not require that for the CCB, which will be implemented under European legislation, rather than via the Direction power. The FPC nevertheless considers it appropriate also to produce such a statement in relation to this tool. In addition to these powers, the FPC had requested Direction power over a time-varying leverage ratio. In November 2013, the Chancellor requested that the FPC undertake a review of the role for the leverage ratio within the capital framework during 2014.

The CCB and SCR tools are designed to reduce the likelihood and severity of financial crises. Their primary purpose is to tackle cyclical risks, while structural risks will be dealt with by the FPC using its Recommendation power. Both tools provide the FPC with means to change the amount of capital that banks⁽⁴⁾ must have when threats to financial stability are judged to be emerging. They build on the existing microprudential regime, under which capital requirements depend on an estimate of the riskiness of each loan or asset — for example, unsecured personal loans typically have higher capital requirements than mortgage loans secured on residential property. The CCB tool, which the international Basel III framework proposed globally, allows the FPC to change capital requirements, over and above their microprudential level, in relation to *all loans* made by banks to borrowers in the United Kingdom. The SCR tool allows the FPC to change capital requirements, over and above their microprudential level, on exposures to specific sectors judged to pose a risk to the system as a whole.

This framework is in line with the April 2013 Recommendation on intermediate objectives and instruments of macroprudential policy of the European Systemic Risk Board (ESRB). This suggested five intermediate objectives of macroprudential policy relating to: (i) excessive credit growth and leverage; (ii) excessive maturity mismatch and market liquidity; (iii) direct and indirect exposure concentrations; (iv) misaligned incentives and moral hazard; and (v) financial infrastructures. These are all encompassed by the FPC's statutory objectives introduced by the Financial Services Act 2012. The ESRB also recommended that macroprudential authorities should have at least one tool available to address each of these intermediate objectives. The CCB and SCR tools are primarily designed to mitigate cyclical risks from excessive credit growth and leverage, although SCRs might also limit concentrations of exposures. The FPC's broad Recommendation power gives it tools to achieve the other

(1) See Tucker, Hall and Pattani (2013) for more detail on the role of the FPC.

(2) See www.legislation.gov.uk/uksi/2013/644/pdfs/ukxi_20130644_en.pdf and www.legislation.gov.uk/uksi/2013/644/pdfs/ukxiem_20130644_en.pdf.

(3) This does not preclude the possibility that the FPC, on occasion, may prefer to Recommend a change in SCRs rather than issue a Direction.

(4) In what follows, the term 'banks' is used to describe the set of firms to which the CCB and SCR tools will apply — namely banks, building societies and large investment firms. These institutions are defined explicitly in Section 2.2 of the Policy Statement.

intermediate objectives, allowing the FPC flexibility to act as and when it deems necessary subject to the domestic and EU legal framework.

This Policy Statement is structured as follows. Section 2 describes the CCB and SCR tools, including whom they apply to, how they fit with the existing regulatory framework, how decisions will be co-ordinated with overseas regulators, and how decisions will be communicated and enforced. Section 3

sets out the FPC's current assessment of how these tools will affect the resilience of the financial system and, given the secondary objective, growth. Section 4 explains the circumstances in which the FPC might expect to adjust the setting of each tool and provides a list of core indicators that the FPC will routinely review when reaching decisions. Section 5 concludes. As experience of operating the regime grows, the Policy Statement will be reviewed and updated from time to time.

2 Description of the tools

2.1 What is the countercyclical capital buffer and what are sectoral capital requirements?

The CCB tool will enable the FPC to require banks to build up capital when it judges it to be the best approach to head off threats to financial stability. An increase in the CCB serves two purposes. First, the additional capital buffer provides a cushion to absorb losses that are larger than anticipated under the normal microprudential regime.⁽¹⁾ Second, it provides incentives for banks to rein in excessive or underpriced exposures, which might reduce the extent of losses when boom turns to bust. The CCB would be released either when threats to stability are judged to have receded, or when the size of banks' capital buffers is judged to be more than sufficient to absorb future unexpected losses and credit conditions and other relevant indicators are weak. This would help to mitigate a contraction in the supply of lending to households and businesses which, though possibly sensible for an individual bank, could make the financial system as a whole less resilient if it led to economic growth contracting and more borrowers defaulting.

Under Basel III, the CCB will be phased in globally between 2016 and 2019, but can be introduced sooner. It is being implemented in the European Economic Area (EEA) via the CRD IV/CRR legislation, which came into force on 1 January 2014 and follows the Basel transition path with flexibility for earlier adoption. **This legislation requires each Member State to designate an authority which will be 'responsible for setting the countercyclical buffer rate for that Member State' each quarter. The Government has proposed that the Bank of England be the designated authority for the CCB, with responsibility for policy decisions on the CCB delegated to the Bank's FPC. The Government has also stated its intention to give the FPC power over the CCB rate applied to UK exposures as soon as is practicable after 1 January 2014.**

The SCR tool provides a means for the FPC temporarily to increase banks' capital requirements on exposures to specific sectors. For example, if the FPC judged that exuberant commercial property lending posed risks to financial stability, it could increase SCRs on commercial property loans so that banks were required to have more capital against such exposures. As with the CCB, this should increase resilience by enabling banks to absorb a higher level of commercial property losses than envisaged under the normal microprudential regime. It would also provide targeted incentives for banks to limit the expansion of riskier commercial property exposures. Reducing SCRs back towards the normal microprudential level once threats to stability are judged to have receded, or when credit conditions in the relevant sector are weak and the size of banks' capital buffers is judged to be more than sufficient to absorb future unexpected losses, will allow banks to maintain resilience and mitigate a contraction in the supply of loans to the economy.

SCRs could be applied by amending banks' 'risk weights' which affect risk-weighted assets and minimum capital requirements, or via capital buffers which apply over and above minimum capital requirements.⁽²⁾ Both approaches are possible under the range of powers available within CRD IV/CRR.⁽³⁾

Both tools are intended to incentivise banks to act pre-emptively, raising capital in good times, when it is more easily accessible, so that it can be used in bad times or when heightened risks to stability have receded.

2.2 To whom will the tools apply?

The CCB will apply to all banks, building societies, and large investment firms incorporated in the United Kingdom. Under CRD IV/CRR, a Member State may exempt small and medium-sized investment firms from the requirement to maintain the CCB if such an exemption does not pose a risk to financial stability. Under the 2013 'Macro-prudential Measures Order', SCRs can be applied to all banks, building societies and PRA-regulated investment firms incorporated in the United Kingdom, or a specified subset of them.⁽⁴⁾

The tools may be applied at both the individual entity and consolidated group level, in the same way as banks' microprudential capital requirements. Generally, the FPC will apply the tools at both levels.

No other financial services firms will be covered by these macroprudential tools. As noted in the Government's consultation document, this '*might create incentives for regulatory arbitrage, which might result in risky activities migrating into other sectors in order to avoid being subject to macro-prudential regulation*'.⁽⁵⁾ The FPC will monitor the extent to which any such leakages reduce its ability to mitigate systemic risks and, if it believes necessary, will make Recommendations to HM Treasury to expand the set of institutions to which these tools apply.

2.3 To which exposures will the tools apply?

The FPC's policy decisions on the CCB will apply to banks' UK exposures. The FPC's role in respect of the treatment of

(1) Capital can absorb losses while a bank remains a going concern because its value can be eroded through losses and there is no contractual obligation to pay shareholders (in the form of dividends or share buybacks).

(2) Risk weights are weights assigned to different assets based on how risky they are deemed to be.

(3) CRD IV/CRR is a maximum harmonising regulation but provides several ways by which SCRs may be implemented. These include powers under the so-called 'macroprudential carve-out' for the designated authority to vary residential and commercial property risk weights as well as measures related to intra-financial sector exposures, the possibility for the PRA to set higher risk weights or floors on loss given default parameters for exposures to UK residential or commercial property on 'financial stability' considerations (taking into account an assessment regarding the loss experience and forward-looking market developments), and the ability of the PRA to apply supervisory measures in a similar or identical manner to banks with similar risk profiles which are, or might be, exposed to similar risks or pose similar risks to the financial system (Pillar 2).

(4) The PRA is able to designate certain investment firms for prudential supervision by the PRA. The PRA has issued a statement of its policy with respect to the exercise of this power: www.bankofengland.co.uk/pr/Pages/publications/designationinvestmentfirms.aspx.

(5) See HM Treasury (2012), page 30.

UK banks' overseas exposures is described in Section 2.4 of this document.

The 'Macro-prudential Measures Order' on the SCR tool sets out the FPC's power to adjust SCRs for exposures to three broad sectors:

- residential property, including mortgages;
- commercial property; and
- other parts of the financial sector.

The FPC will generally seek to act at the highest level of aggregation commensurate with the risks, in part to reduce the scope for arbitrage. But there may be occasions when risks can be better dealt with at a more granular level. The FPC may adjust SCRs for more granular subsectors, as well as for all exposures to a given sector. Such an approach might help to tackle threats to stability before they spread, particularly by leaning against exuberance in specific subsectors. In the mortgage sector, for example, it may on occasion be preferable to apply the SCR to only those mortgages with high loan to value (LTV) or loan to income (LTI) ratios at origination.

When applying the SCR tool to banks' exposures to other parts of the financial sector, the FPC can target a broad range of exposures. This includes, among other things, secured and unsecured loans, and derivative and bond exposures to financial sector entities such as banks, building societies, investment firms, insurers, funds of various kinds and a range of other regulated and unregulated financial institutions.⁽¹⁾ When risks are particularly concentrated, it may be desirable to act in a more targeted way, applying SCRs to certain types of financial sector exposures only. This could be done in two main ways:

- First, by adjusting SCRs for *exposures to specific types of financial institution*. For example, prior to the global financial crisis,⁽²⁾ resilience might have been enhanced if capital requirements had been raised on banks' exposures to 'monoline' insurers that were specialising in selling protection against defaults in credit markets, or against exposures to 'special purpose vehicles' that were, for example, taking on debt to invest in securitised mortgages and other complex financial products. Alternatively, capital requirements could be increased on exposures to non-bank lenders if those institutions were financing a credit boom which could subsequently unwind and affect the core financial system through its interconnections with those institutions.
- Second, the FPC may adjust SCRs for *specific types of intra-financial system activity*, or by instrument. For example, had capital requirements been raised prior to the global financial crisis on riskier types of secured intra-financial system lending, such as through repurchase agreements (or 'repos') using low-quality collateral, banks

might have reduced their provision of leverage (ie debt) and thus exposures to these markets, which might have built resilience.⁽³⁾ This might have reduced the fallout from the subsequent collapse in this part of the repo market.

Both approaches are subject to regulatory arbitrage to avoid the rules, as well as other unintended consequences. If the FPC were to target particular types of institution, banks might be able to carry out the same activity through a different legal entity that is not subject to the requirements. And derivatives such as total return swaps may be used to mimic exposures, leaving scope for arbitrage.⁽⁴⁾ At times, it may be more appropriate to make policy Recommendations to mitigate risks associated with particular types of intra-financial sector exposures rather than using the SCR tool — for example, Recommendations in respect of liquidity buffers or margining requirements may have a role in the case of repo activity. In a March 2012 Statement, the interim FPC signalled that once international standards and discussions had progressed further, it was minded to advise HM Treasury that it should have powers of Direction over a time-varying liquidity tool and that it should reconsider the case for Direction powers over the terms of collateralised transactions by financial institutions.⁽⁵⁾

In the event of SCRs being used, the FPC's intention would be to apply any SCRs to *all* exposures to the targeted sector or subsector, regardless of their form and whether exposures are held in banks' trading or banking books. So if the SCR on residential mortgages were to be increased, this would apply to both mortgages held in the banking book and to exposures held in the form of a securitisation (originated or acquired), a purchased portfolio, a fund or for trading. The FPC considers that banks should adopt a 'look-through' approach to financial assets to determine their underlying risk — for instance, an increase in the SCR for banks' commercial property exposures would also apply to exposures to securitisations backed by commercial real estate loans. This is in line with the Basel capital framework.⁽⁶⁾ Consistent with the approach taken to

(1) A derivative is a financial instrument whose value derives from the value of an underlying asset, such as a commodity, currency, or security.

(2) Throughout this Policy Statement, and unless qualified, 'the global financial crisis' is used to refer to the series of events and stresses that have affected the financial system since the collapse in some financial markets in the summer of 2007, while acknowledging that the intensity and nature of the crisis has varied over time.

(3) A repurchase agreement (repo) transaction entails borrowing money using securities as collateral. It involves the sale of a security for cash, coupled with an agreement to repurchase the same security at a predetermined price at a particular date in the future. For the lender, the corresponding transaction is called a 'reverse repo'. When the cash lent on repo trades is lower than the current market value of the security used as collateral, the level of overcollateralisation required is the 'margin'.

(4) Derivatives can be used to generate an exposure to a given asset without having to raise cash to buy it. For example a hedge fund could enter into a derivative contract called a 'total return swap' on which it paid the three-month interbank rate (Libor) and received any change in value on some other asset. This would mimic the returns it would receive by borrowing funds at Libor and using those funds to purchase that asset, thus allowing it to take a leveraged exposure to both its credit and market risk without having to borrow the cash to fund it.

(5) Recognising that the European Market Infrastructure Regulation establishes maximum harmonised prudential standards for the calculation of margin requirements by central counterparties (CCPs) across the EU.

(6) This provides that banks should, through their risk management processes and management information systems, 'be able to identify and aggregate similar risk exposures across the firm, including across legal entities, asset types (eg loans, derivatives and structured products), risk areas (eg the trading book) and geographic regions'. See Basel Committee on Banking Supervision (2009), page 16.

capital requirements in the microprudential framework, the tool would apply to undrawn credit lines (eg overdrafts) and other such contingent obligations as well as loaned amounts.

In terms of geographic coverage, the FPC may act either on all the residential property, commercial property or financial sector exposures of banks, irrespective of the domicile of the ultimate borrower; or on their UK exposures only in those sectors; or on their exposures to other specific countries. For example, had capital requirements been increased specifically on UK banks' US sub-prime residential mortgage exposures before the global financial crisis, this would have left banks better able to absorb subsequent losses and may also have limited the growth in these exposures.⁽¹⁾ The FPC may also adjust SCRs on UK banks' foreign exposures to reciprocate decisions taken by overseas authorities. CRD IV/CRR introduces a process to co-ordinate certain macroprudential measures taken by Member States, especially where the measures may affect more than one Member State; this is described below.

Finally, the FPC may choose to apply SCRs to both the stock of exposures on banks' books and to new exposures, or on new exposures only. Setting different capital requirements on new exposures created after a specific point in time may give the FPC greater influence over banks' incentives to lend, and thus act more directly on credit conditions. This may better reflect the fact that microprudential risks vary over the cycle with lending and macroeconomic conditions — loans extended at the peak of the cycle, for instance, tend to be more risky than loans made at the trough. Such an approach might imply a relatively limited increase in capital in absolute terms, however. Having different approaches to tackle particular risks complements the more targeted nature of the SCR tool. The FPC intends to choose the approach appropriate for the risks at hand.

2.4 How will decisions on the tools be co-ordinated with overseas regulators?

The FPC expects to co-operate closely with overseas regulators, including at the ESRB and through other global fora (such as the International Monetary Fund, the Committee on the Global Financial System and the Basel Committee on Banking Supervision), to ensure that macroprudential policy decisions are implemented effectively and that cross-border leakages are dealt with appropriately.

Under the Government's proposed implementation of the European legislation, the FPC will set the CCB rate to be applied to all lending by banks in the United Kingdom, irrespective of the country of origin of the lender.⁽²⁾ In the same way, other countries will set national CCB rates that will apply to lending by UK banks overseas. Banks that operate internationally will face a CCB that 'shall consist of the

weighted average of the countercyclical buffer rates that apply in the jurisdictions where the relevant credit exposures of the institution are located'.⁽³⁾ Table A illustrates how individual banks will calculate their 'institution-specific CCB rate'. The institution-specific CCB rate for a domestically active bank (Bank A) will be the UK CCB rate, whereas that for an internationally active bank (Bank B) will be a weighted average of the UK CCB rate and foreign CCB rates.

Table A Illustrative CCB rates for different banks

	Credit exposures	UK CCB rate (percentage points)	Foreign CCB rate (average across countries) (percentage points)	Institution-specific CCB rate (percentage points)
Bank A	100% UK 0% Foreign	1	2.5	1
Bank B	50% UK 50% Foreign	1	2.5	1.75

Under the EU legislation, within the EEA, these reciprocal arrangements — whereby overseas regulators apply a CCB rate chosen by the FPC to their banks' UK exposures and *vice versa* — are mandatory for CCB rates of up to 2.5% of risk-weighted assets from 1 January 2019.⁽⁴⁾ The EU legislation also permits authorities to apply CCB rates that exceed this level but it is not mandatory for other Member States to reciprocate for the excess above 2.5%. In this case, there is a greater potential scope for cross-border leakages. The FPC expects ordinarily to reciprocate overseas authorities when CCB rates above 2.5% are judged appropriate. For exposures to countries outside the EEA, the FPC can set CCB rates for UK banks that are higher than those chosen by the relevant overseas authorities — including where these authorities choose not to activate the CCB at all — when, in its view, the risks to UK financial stability justify such action. In exercising this option, the FPC intends to focus its analysis on countries to which the UK financial system has material exposures, either directly or indirectly.

The EU legislation gives the ESRB an important role in co-ordinating decisions on the CCB across the EEA. As set out in this legislation, this will include providing 'guidance on variables that indicate the build-up of system-wide risk

- (1) Where the FPC does decide to tackle exuberance in lending to a particular jurisdiction using SCRs, such exposures should be determined on a so-called 'ultimate risk' basis, so that the relevant country is determined by where the guarantor of the exposure resides, rather than where the exposure has been booked. In relation to securitisations, for example, this would mean that the properties on which the underlying mortgages were secured would determine the jurisdiction of the exposure.
- (2) To be specific, the FPC will set the CCB rate applied to UK lending by banks incorporated in the United Kingdom. But under the reciprocity arrangements set out in Basel III and the CRD IV/CRR, overseas regulators will be bound to apply a CCB rate to their banks' UK exposures which is no less than the rate chosen by the FPC for CCB rates up to 2.5% of risk-weighted assets.
- (3) Article 140 of CRD IV. The weighted average is calculated on the basis of the proportion of each bank's own funds requirement that relates to the relevant credit exposures in each jurisdiction.
- (4) The EU legislation provides that the CCB must be implemented by 1 January 2016 at the latest and phased-in in parallel with the capital conservation buffer becoming fully effective on 1 January 2019.

associated with periods of excessive credit growth in a financial system, in particular the relevant credit-to-GDP ratio and its deviation from the long-term trend, and on other relevant factors, including the treatment of economic developments within individual sectors of the economy, that should inform the decisions of designated authorities on the appropriate countercyclical buffer rate' (see Box 3 in Section 4), giving 'principles to guide designated authorities when exercising their judgement as to the appropriate countercyclical buffer rate' and making recommendations on buffer decisions applicable to non-EEA exposures.

Other macroprudential interventions, including SCRs, will be subject to different co-ordination arrangements in the EEA, depending on the provisions relied on in implementing particular measures. CRD IV/CRR sets out a formal framework of constrained discretion, balancing flexibility for national authorities to take action with co-ordination within the EEA. For example, under the so-called 'macroprudential carve-out', Member States' authorities can adjust capital requirements for domestically authorised institutions on residential property, commercial property and financial sector exposures up to a certain threshold without procedural constraint, provided the measures have been notified to the European authorities in advance of their implementation.⁽¹⁾ There is no obligation for authorities in other Member States to reciprocate. Proposals to act beyond this threshold within the scope of the 'carve-out' must be assessed by the ESRB and European Banking Authority (EBA) who will provide their opinions on whether the measures satisfy a range of conditions within one month of the notification. Taking into account these opinions, the European Commission may then, within one month, propose a decision to block the national measure. If it does so, the European Council must reach a decision to block or allow the proposed measure within a further month. The FPC will have due regard to the impact of its decisions on jurisdictions both inside and outside the EEA and will liaise with other overseas authorities, including the Committee on the Global Financial System and the Basel Committee on Banking Supervision, where appropriate.

2.5 How do these tools fit with the rest of the regulatory framework?

Under Basel III and CRD IV/CRR, the microprudential regulatory capital framework comprises the following elements which all fulfil distinct purposes:⁽²⁾

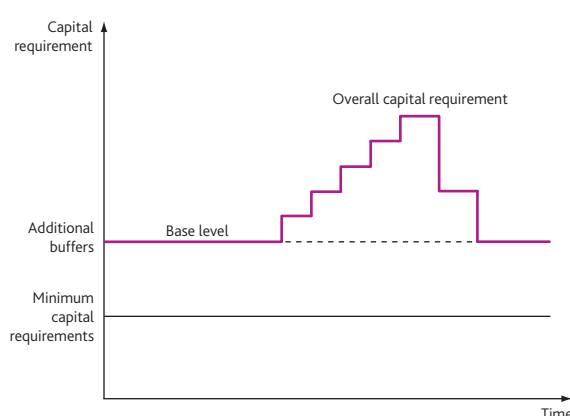
- a common minimum capital requirement, designed to protect against credit, market, operational and settlement risks, for which banks follow internationally agreed methods for calculation and calibration (on the basis of prudent valuation estimates);
- additional requirements advised by the PRA or FCA reflecting risks not fully tackled by the minimum capital

requirement (such as interest rate risk in the banking book), or capital needed to compensate for individual banks' shortcomings in management and governance or risk management and controls;

- a capital conservation buffer, designed to avoid breaches of minimum capital requirements. Banks with capital ratios within the conservation buffer will face automatic distribution restrictions;
- a systemic risk buffer for the banking system as a whole (or a subset thereof) to mitigate structural macroprudential risks and, separately, a buffer applied to individual banks judged to be systemically important;
- the PRA and the FCA also have powers to give guidance on individual banks' capital levels, which include an element reflecting a forward-looking assessment of the capital required to ensure that banks' minimum level of regulatory capital can be met at all times, even in the face of adverse circumstances.

The CCB and SCRs will be additional to these capital requirements, as illustrated in **Figure 1**. The FPC and the microprudential regulators will set these different requirements in a way that aims to avoid capital being required twice for the same risk. When the FPC does not judge there to be material threats to resilience in the United Kingdom, it expects the CCB rate applied to UK exposures and SCRs to be set to zero. The microprudential capital requirements will therefore form the base level for banks' capital requirements, with the FPC increasing the CCB or SCRs only when threats to financial stability emerge. The setting of the CCB will take into account whether or not the SCR has been activated, and

Figure 1 Illustration of the capital framework^(a)



(a) 'Additional buffers' refers to the capital conservation buffer, systemic risk buffers and any forward-looking guidance on capital levels by the microprudential regulators.

- (1) Under Article 458 CRR, risk weights may be increased by up to 25% without needing EU authorisation.
- (2) The framework for determining regulatory capital is explained in more detail in Prudential Regulation Authority (2013). The implementation of CRD IV/CRR is covered in the PRA's CRD IV Policy Statement PS 7/13, with the rules relating to the CRD IV capital buffer provisions to be implemented in early 2014. The PRA expects to consult on its approach to Pillar 2 in the course of 2014.

vice versa. The CCB and SCRs will be reduced back to the normal microprudential floor either when threats to resilience are judged to have receded, or when credit conditions are weak and the size of banks' capital buffers is judged to be more than sufficient to absorb future unexpected losses.

2.6 How will the FPC's decisions on macroprudential tools be communicated and enforced?

The FPC's policy decisions — and the text of any Directions issued to the PRA — will be published in the quarterly FPC Record after its policy meetings.⁽¹⁾ The FPC will explain the background to those decisions in its six-monthly *Financial Stability Report*, including an estimate of the costs and benefits of its actions — unless in its opinion such an assessment is not reasonably practicable. As discussed in Section 4, the FPC will monitor a set of core indicators for the CCB and SCRs, alongside a broader information set. The FPC's Directions and a copy of each *Financial Stability Report* will also be laid before Parliament by HM Treasury.

In addition, the EU legislation requires each national macroprudential authority to 'assess and set the appropriate CCB rate for its Member State on a quarterly basis'.⁽²⁾ It also requires each authority to 'announce the quarterly setting of the countercyclical buffer rate by publication on its website',⁽³⁾ together with a justification for its decision. The FPC will carry out these tasks in the United Kingdom.

Under CRD IV/CRR, banks will typically have twelve months to meet an increase in the CCB, although the legislation provides for a shorter implementation period in exceptional circumstances. Banks that fail to meet the buffer level in the required time or breach it subsequently will be subject to automatic restrictions on the dividends and discretionary bonuses that they can pay out and will be required to prepare a plan explaining how they will meet the buffer level within an

appropriate timeframe.⁽⁴⁾ It will be the responsibility of the PRA to monitor compliance and to impose further supervisory measures if needed. A decision to decrease the CCB can take effect immediately.

The PRA must implement Directions by the FPC to change SCRs as soon as reasonably practical. The FPC recognises that the implementation time will depend on a number of factors, including providing banks with a reasonable time to respond, any procedural requirements that apply to the PRA, and the implementation approach chosen. Occasionally, it may be important for a Direction to be implemented quickly to ensure it is effective — for instance, when a change in capital requirements is targeting new lending flows. SCRs targeted at the stock of banks' exposures may require more significant adjustment by banks, thus needing a longer implementation timeframe. The FPC may issue a Recommendation on the timing of implementation alongside its Direction, which could be subject to a duty to 'comply or explain'.

The PRA will explain to banks how they will implement Directions, including over what timeframe, and will report back to the FPC on progress.

Pillar 3 of the Basel framework requires that banks disclose specific information about minimum capital requirements. But Pillar 3 requirements do not currently separate out capital requirements that derive from macroprudential interventions. European legislation will require each bank to disclose its institution-specific CCB rate (calculated as the weighted average of the CCB rates applying in the jurisdictions to which the bank has relevant credit exposures, as set out in Section 2.4 above). The FPC believes that disclosing the effect of SCRs will help market participants to assess banks' risk profiles and capital adequacy and is an essential part of transparency about the FPC's policy more broadly.

(1) Under the legislation, there is a general provision to allow the FPC not to publish its decisions, including Directions on SCRs, immediately where this would be against the public interest. But it must keep the decision not to publish under review. This does not relate to the CCB as, under CRD IV/CRR, designated authorities are obliged to publish decisions quarterly.

(2) See Article 136(3) of CRD IV.

(3) See Article 136(7) of CRD IV.

(4) Under CRD IV/CRR, banks whose capital ratio falls within the upper quartile of the combined conservation buffer and CCB will be required to retain 40% of their profits. Banks then face a sliding scale of restrictions, whereby as a bank's capital ratio falls further from the target, it is required to conserve capital by paying out smaller dividends and bonuses to shareholders and employees. Specifically, these distribution restrictions increase to 60%, 80% and 100% as banks' capital ratios fall to the third, second and first quartiles respectively.

3 Impact of the tools on financial stability and growth

The CCB and SCR tools are both designed to enhance the resilience of the financial system. They can do this in two ways: first, via the *direct* effect of making the financial system better able to withstand shocks; and second, via the *indirect* effect on the amount of financial services supplied by the financial system through the cycle (either through the distribution or overall level of these services). In doing this, these tools may also have an impact on economic growth, both in the near term and, conceivably, over longer horizons. The key links in this chain are illustrated in Figure 2.⁽¹⁾

3.1 Direct impact on resilience

Capital acts as a cushion to absorb losses. When a bank's capital is insufficient and prospective losses become so large as to threaten solvency, it will find it hard to continue to fund itself in private markets. This was the situation facing a large number of financial institutions internationally during the global financial crisis. The result was a sharp contraction in both intra-financial system lending and the supply of credit to the real economy, with adverse consequences for the entire financial system. Governments responded with tax-payer bail outs to back-stop the financial system. The sharp 'deleveraging' that followed the outbreak of the crisis contributed to a severe recession and a protracted slowdown in the United Kingdom and elsewhere.

The CCB and SCR tools provide a means for the FPC to tackle risks that arise to the financial system. Had these tools been available and tightened prior to the crisis (as Figure 2 illustrates), banks would have had three broad options for how to respond:

- First, if the market had permitted it, they could have offset the increase in capital requirements by *reducing any voluntary buffers* they had, leaving overall capital levels

unchanged. If this route had been taken, then the policy change would have had little effect on the resilience of the system;

- Second, they could have *raised capital*, either by cutting dividends and bonuses to retain a greater proportion of their earnings or by issuing new shares;
- Third, they could have *reduced their risk-weighted assets*. This can be achieved either by reducing exposures or by rebalancing them away from riskier assets.

If banks had built up equity capital, they would have been able to absorb larger shocks before solvency was threatened, mitigating the negative dynamics described above. In simple terms, with, say, 20% more capital, banks could have absorbed losses that were 20% greater providing all else, including their liquidity buffers, was held equal. The tool would therefore have made the financial system more resilient — a channel depicted by the arrows (in Figure 2) linking the tool to banks' capital ratios and resilience.

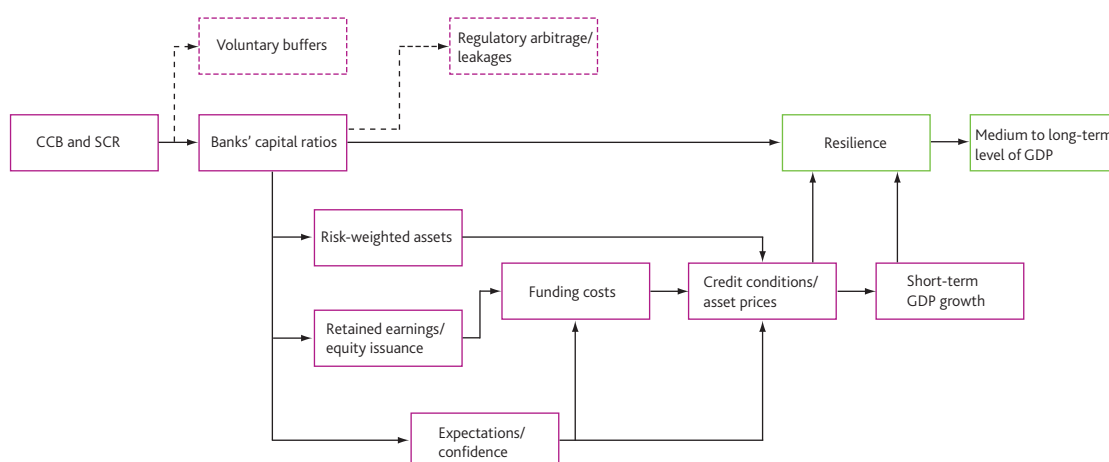
There may, however, be unintended consequences of using these tools:

- First, the CCB applies across the board to all UK exposures. Its use may therefore leave an apparently profitable boom in one part of the economy or financial system relatively untouched while reducing lending to other parts of the economy. To avoid this perverse outcome, SCRs are an important complement or alternative to the CCB. There is a risk though that applying SCRs to one sector may lead to banks increasing exposures to other systemically risky sectors that are not subject to SCRs;⁽²⁾

(1) See also Committee on the Global Financial System (2012).

(2) This need not be of concern if exposures in such sectors are appropriately diversified and priced.

Figure 2 The impact of the CCB and SCR on resilience and growth



- Second, the effectiveness of both tools can be undermined by flaws in microprudential risk weights. In particular, they will have less effect in circumstances where microprudential risk weights understate true risks or where opportunities exist for banks to influence their measured risk-weighted assets.⁽¹⁾ This issue is made more acute by the fact that risk exposures are likely to build up most rapidly on assets where risk is underestimated as this is where the regulatory constraints on leverage are loosest;
- Third, both tools are likely to cause some lending to migrate to institutions to which the tools do not apply. The FPC will seek to monitor the extent of any such leakages and, if it judges necessary, will make Recommendations to HM Treasury or the regulators to expand the scope of these tools. The FPC's tools are also likely to affect different banks in different ways and the impact will depend, among other things, on an individual bank's size, business model and corporate form.⁽²⁾ When making macroprudential policy decisions, the FPC must have regard to *'the principle that a burden or restriction which is imposed on a person, or the carrying on of an activity, should be proportionate to the benefits, considered in general terms, which are expected to result from the imposition of that burden or restriction'*.⁽³⁾

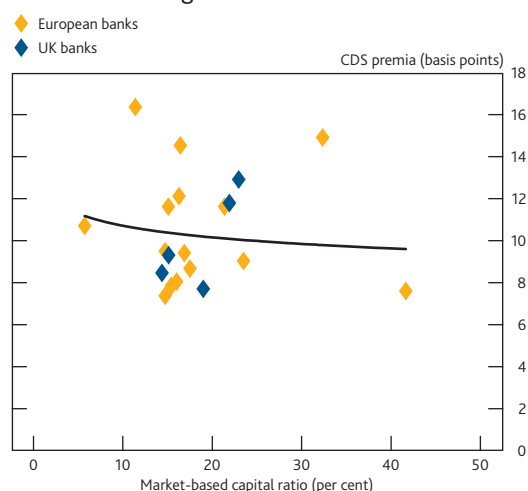
3.2 Indirect impact on resilience

In addition to those *direct* effects on resilience, the CCB and SCR may also alter the ease with which households and companies are able to borrow. This, in turn, may have *indirect* consequences for financial institutions' resilience. These effects are complex: there is limited historical experience from which to learn and it seems plausible that their impact will vary considerably depending upon prevailing economic conditions. Nonetheless, some general statements are possible.

Consider first a situation where market participants perceive, potentially mistakenly, that banks are solvent and risks to the stability of the banking system are small. In this case, banks can borrow cheaply at a rate that may be relatively insensitive to the amount of capital they have. As **Chart 1** shows, this was the situation preceding the global financial crisis, while acknowledging the potential mispricing that may be reflected in both of these indicators. Banks' cost of equity tends to exceed the rate at which they can borrow, however.⁽⁴⁾ So an increase in the CCB or SCRs in such circumstances is likely to increase banks' *overall* funding costs, as cheap debt will be replaced by more expensive equity. Banks may then pass on these higher costs by charging higher interest rates on their loans, reducing the amount of credit supplied to the economy.

This gives rise to an indirect channel through which these tools might bolster resilience. If capital buffers are increased in the midst of a credit boom, then the tighter credit conditions that follow may help arrest the build-up of vulnerabilities created

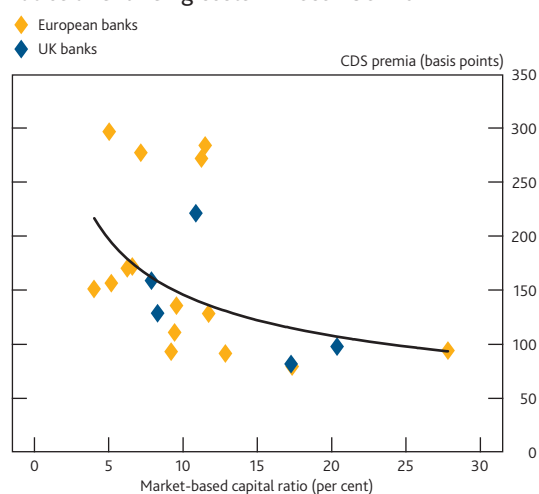
Chart 1 Relationship between market-based capital ratios and funding costs in December 2005^{(a)(b)(c)(d)}



Sources: Bank of England, Markit Group Limited, SNL Financial, published accounts and Bank calculations.

- Market-based capital ratios are banks' market capitalisation as a percentage of published risk-weighted assets.
- The sample shown is the largest 20 European banks by assets.
- Funding costs are proxied by five-year senior CDS premia. The 'line of best fit' shown above illustrates their relationship with market-based capital ratios.
- Where possible, SNL Financial data have been used to calculate the market-based capital ratio, but for some banks it was necessary to use published accounts data.

Chart 2 Relationship between market-based capital ratios and funding costs in December 2012^{(a)(b)(c)(d)(e)}



Sources: Bank of England, Markit Group Limited, SNL Financial, published accounts and Bank calculations.

- Market-based capital ratios are banks' market capitalisation as a percentage of published risk-weighted assets.
- The sample shown is the largest 20 European banks by assets.
- Funding costs are proxied by five-year senior CDS premia. The 'line of best fit' shown above illustrates their relationship with market-based capital ratios.
- Where possible, SNL Financial data have been used to calculate the market-based capital ratio, but for some banks it was necessary to use published accounts data.
- For one bank for which no CDS data were available for December 2012, data from the closest available date (November 2012) have been used.

- The risk of this is more material for banks using internal model-based approaches to calculate regulatory capital; banks using a standardised regulatory approach will have less scope for such arbitrage.
- For instance, one possible impact of SCRs (if implemented via a floor) may be to reduce the differential in capital requirements between banks using model-based approaches and those using the standardised approach.
- As per the legislation (see section 9F of the Bank of England Act 1998 as amended by the Financial Services Act 2012).
- This reflects the preferential treatment of debt in the tax system, market perceptions that the debt-holders of large banks are unlikely to suffer losses because such banks will not be allowed to fail (the so-called 'too-big-to-fail' problem), and greater uncertainty over the future earnings that will accrue to shareholders compared to debt-holders who have more certainty over interest payments. These frictions may also make the cost of debt insensitive to banks' leverage and hence their solvency risk.

by the overextension of credit. Symmetrically, if previously accumulated capital buffers are reduced in the midst of a contraction, then that may help to loosen credit conditions if banks are constrained by their regulatory capital requirements, so boosting the economy and thereby helping to reduce borrower defaults.⁽¹⁾ There is an important difference between SCRs and the CCB in this regard. Changes in SCRs affect the *relative* cost to a bank of continuing to lend to the targeted sector which may lead to a shift in lending to other sectors, potentially altering the aggregate effect on lending. Box 1 discusses the international experience of using SCRs, including some evidence on the effect on lending across different sectors. Changes by the FPC to the CCB rate applied to UK exposures, by contrast, affect capital requirements relating to all UK lending but not on foreign lending. The impact of SCRs is also likely to depend on whether the measure is applied to the stock and flow of lending or to new lending only.

The effect of these tools on risk-taking behaviour will be more powerful if financial markets anticipate that the policy change will be reinforced by further policy changes in the future if excessive risk-taking continues. An FPC policy decision to increase either the CCB or SCRs may therefore lead banks collectively to reduce their risky exposures, enhancing the resilience of the financial system as a result. As in other areas of public policy, there could be an important role for expectations in shaping behaviour. This 'signalling channel' is depicted in **Figure 2** by the arrows running from capital ratios through to credit conditions, via the box marked 'expectations', and then on to resilience.

There are as yet no published quantitative estimates of the likely impact of changes in the CCB or SCRs on credit conditions. But some recent studies have analysed the quantitative impact of an increase in capital requirements on banks' lending behaviour (**Table B**). While the results differ according to the methodologies employed and whether sector-wide or firm-specific capital changes are being analysed, most find that an increase in regulatory capital requirements generates only a modest tightening in credit conditions. A 1 percentage point increase in capital requirements is estimated to lead to an increase in the interest rate on bank loans of between 4.5 and 25 basis points and a decline in aggregate bank lending of between 0% and 3.6% relative to baseline, except for one study which finds a somewhat larger impact on bank lending. These effects may operate with long and variable lags, such that it takes time for the full impact of a change in capital requirements to be felt on credit conditions.

These are the best quantitative estimates currently available to guide the FPC in setting the CCB and SCRs. But the uncertainty is sufficiently large that they need to be treated with caution. The estimates may *understate* the impact of the CCB on credit conditions for two reasons. First, they abstract

Table B Illustrative estimates of the impact of a 1 percentage point increase in banks' headline capital requirements on credit conditions

	Loan rates (basis points)	Loan volumes (per cent)
Aiyar, Calomiris and Wieladek (2014) ^(a)	–	[–5.7; –8.0]
Bridges <i>et al</i> (2014) ^(b)	–	–3.5
Elliot (2009) ^(c)	[4.5, 19.0]	–
Francis and Osborne (2012) ^(d)	–	0.0
Macroeconomic Assessment Group (2010) ^(e)	17.3 [5.1, 25.0]	–1.4 [–0.7; –3.6]

- (a) Results based on an econometric analysis of the impact of the UK Financial Services Authority's microprudential Pillar 2 requirements over the period 1998–2007. Reported results show the cumulative impact across a range of estimated models on lending to PNFCs, excluding the potential for leakages via foreign branch lending, with the maximum and minimum reported in square brackets. Monetary policy is held constant.
- (b) Bridges *et al* (2014) undertake an econometric analysis of the impact of changes in microprudential regulatory capital requirements on bank capital and bank lending in the United Kingdom between 1990 and 2011. They analyse the lending response in four different sectors. They find that banks, on average, cut, in descending order of magnitude based on point estimates, loan growth for commercial real estate, other corporates and household secured lending in the year following an increase in capital requirements. The response of unsecured household lending is smaller and not significant over the first year as a whole. Loan growth mostly recovers within three years. The result for aggregate lending displayed in the table is calculated as the cumulative impact over three years for each sector, weighted by each sector's share of lending as at 2011. Monetary policy is held constant.
- (c) Results based on a loan pricing equation calibrated for US banks linking capital requirements to lending rates. The maximum effect refers to the case where banks are able to pass through in full the costs of higher aggregate capital requirements to their customers. The minimum effect assumes a modest decline in banks' funding and administrative costs. Results are calculated from Tables 1 and 2 in Elliott (2009). Monetary policy is held constant.
- (d) Taken from Francis and Osborne (2012), Table 5. Results based on an econometric analysis of the impact of microprudential Pillar 2 requirements imposed by the UK Financial Services Authority over the period 1996–2007. Results assume a 44% pass-through from regulatory capital requirements to banks' capital ratios. Monetary policy is held constant.
- (e) The Macroeconomic Assessment Group (MAG) analysed the impact of the transition to Basel III across a range of alternative models, calibrated across a wide variety of jurisdictions (including the United Kingdom). The reported figures in the table refer to the median impact across a range of estimated models (see Annex 2.2 in MAG (2010)), with the maximum and minimum reported in square brackets. Estimation assumes implementation of permanently higher capital requirements over two years. Results are for the 18th quarter of the simulation. Monetary policy is held constant.

from quantity rationing effects, whereby banks withdraw from providing credit to some borrowers at any price. Second, some of the studies allow for a longer adjustment period than will be permitted for the CCB tool. But they may also *overstate* the impact on credit conditions. One reason for this is that the results pertain to a change in headline capital requirements, whereas the CCB and SCRs will only apply, or will apply differentially, to different subsets of banks' balance sheets — such as their overall UK lending or sectoral exposures. Another reason for caution is that the studies analyse a one-off increase in capital requirements rather than a countercyclical regime, under which aggregate capital requirements are increased in response to emerging threats to stability and then reduced.

More fundamentally, all such estimates reflect average relationships between banks' capital ratios and credit conditions over the past. It is well known that past relationships are often a poor guide to the future, particularly when there are large structural changes in the economy. The creation of the FPC might be one such structural change. To give one example of how this might affect the multipliers above, if financial markets come to expect the FPC to raise capital requirements in a sequence of steps when exuberant lending threatens financial stability, then the initial impact of

(1) There is evidence that banks that are well-capitalised going into a crisis can support the real economy by maintaining lending. For example, Kapan and Minoiu (2013) argue that banks that had more capital at the beginning of the global financial crisis were better able to maintain lending than banks with less capital. Peek and Rosengren (1997) make the reverse point that capital constrained Japanese banks were more inclined to reduce lending in the United States between the late 1980s and early 1990s as Japanese stock prices declined.

Box 1

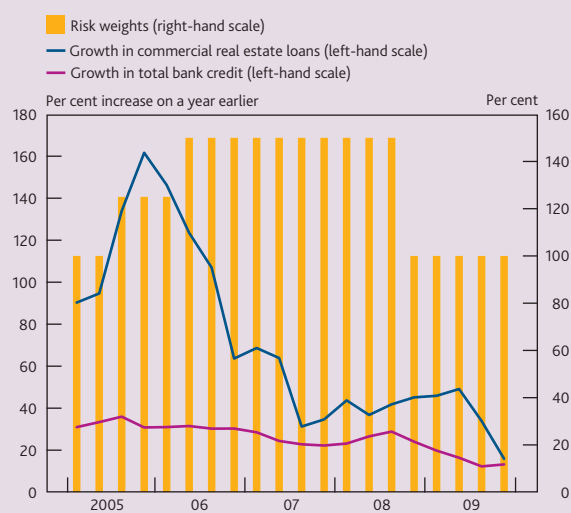
International experiences with sectoral capital requirements

This box discusses the application of sectoral capital requirements (SCRs) internationally, deriving lessons for the use of this tool for macroprudential policy. SCRs are inherently flexible and this is reflected in country experiences: they have been applied to a range of sectors, including exposures to residential and commercial real estate, unsecured personal loans, foreign currency loans and exposures to non-bank financial institutions (NBFIs). They have also been targeted at specific subsectors, such as high loan to value (LTV) exposures, and applied to both the stock and the flow of lending. Such choices have been influenced by the aims of authorities, for instance whether the primary purpose is to enhance bank resilience or to restrain lending growth within a given sector. Comparing different examples of countercyclically motivated actions is instructive in helping to understand the reasons for deploying tools, implementation options and the challenges of appropriate timing and calibration. **Table A** summarises the examples discussed in this box.

In India, the authorities tightened sectoral capital requirements, via risk weights, and provisioning requirements on the stock of exposures across a range of broad sectors between 2005 and 2007 to protect banks' balance sheets against risks from high asset price and credit growth. In particular, risk weights on commercial real estate exposures were raised from 100% to 125% in July 2005 and again, to 150%, in May 2006 given the continued rapid expansion in credit to the sector. The tightenings were followed by a

sustained reduction in the growth of credit to the commercial real estate sector (**Chart A**). But the impact was less clear for other measures taken, eg on NBFIs.

Chart A Risk weights against loans to commercial real estate in India



Source: Reserve Bank of India (2010).

The Reserve Bank of India (RBI) has suggested that the provisioning measures may have been more effective than the changes in risk weights, as banks operating at higher than minimum capital requirements were not forced to raise capital by the increase in SCRs, which they say is also confirmed by anecdotal evidence.⁽¹⁾ The RBI viewed the measures as countercyclical and they were mainly reversed in November 2008 following the onset of the global financial crisis. Although this was not accompanied by faster credit

Table A Examples of SCRs applied internationally

Country	Action	Flow/stock	Implementation	Motivation	Impact	Source
Brazil (2010)	Risk weight increased for long-term and high LTV car loans; effective reduction of risk weight on short-term loans followed in 2011 regardless of LTV.	Flow	The later action aimed to make the regulation simpler to implement and monitor.	Bank resilience, credit growth.	Large reduction in proportion of new long-term loans following initial action.	Da Silva and Harris (2012), Martins and Schechtman (2013).
Brazil (2011)	Risk weight on long-term payroll guaranteed loans increased from 150% to 300%; followed earlier increase from 100% in 2010.	Flow	Risk weights on similar long-term consumer credit increased to reduce leakage.	Bank resilience, credit growth.	Large reduction in proportion of new long-term loans following second increase.	Da Silva and Harris (2012), Martins and Schechtman (2013).
India (2005–06)	Increased risk weight for CRE from 100% to 125% and later to 150%; reduced to 100% in 2008.	Stock	Provisioning measures also applied.	Bank resilience.	Significant reduction in growth of CRE loans following increase.	Sinha (2011), Reserve Bank of India (2010).
India (2007)	Risk weight on exposures to NBFIs increased from 100% to 125%; reversed in 2008.	Stock	Provisioning measures also applied.	Bank resilience.	Impact on NBFI lending growth unclear.	Sinha (2011), Reserve Bank of India (2010).
Switzerland (2012–13)	Activation of 1 percentage point capital buffer on the stock of residential property.	Stock	Implementation lag of over six months.	Bank resilience, strong housing market.	Too early to assess.	Swiss National Bank (2013).
Ireland (2006)	Risk weight on portion of loan >80% LTV up from 50% to 60%.	Flow	Applied at around the peak of the property market.	Bank resilience.	Limited actions described as 'too little, too late'.	Central Bank of Ireland (2010).
Australia (2004)	Risk weight for 'low-doc' mortgages increased from 50% to 100%.	Flow	Implementation lag of over six months.	Bank resilience.	Helped to prevent 'low-doc' segment of the market from taking off as the share of approvals for targeted mortgages fell relative to the total.	Australian Prudential Regulation Authority (2003).

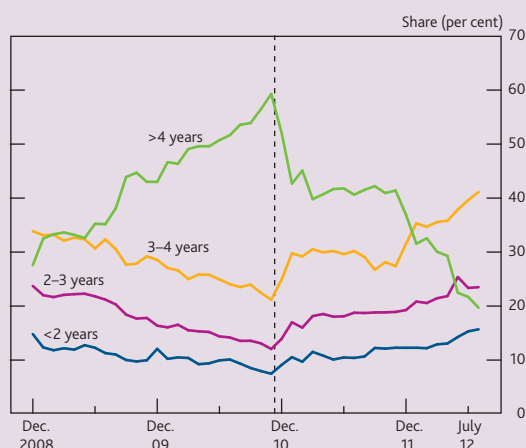
growth in the targeted sectors, credit growth may have been weaker if the measures had not been loosened.

SCRs have also been applied countercyclically in Switzerland. Following strong growth in mortgage credit and house prices in a low interest rate environment, the authorities announced the introduction of a capital buffer of 1 percentage point on all domestic residential mortgage loans in February 2013 to enhance banks' resilience to a correction of the building vulnerabilities.⁽²⁾ Banks had until September 2013 to meet the buffer requirement. There were claims that mortgage rates would increase as a result but they remained broadly flat immediately following the announcement, possibly because most banks could meet the increased requirements from voluntarily held capital buffers. There is tentative evidence that house price growth has slowed, but demand for investment properties has remained high.

Some authorities have applied SCRs in a more granular way, targeting specific exposures within a sector. Such changes generally have a limited direct effect on resilience as, by definition, they apply to a particular segment of exposures, meaning that any increase in capital is often small. However, banks' behaviour may change as lending to the targeted sector is discouraged either via a signalling effect or because it becomes relatively more costly. There is strong evidence for this from Brazil where risk weights were changed on several specific types of loan. Risk weights were doubled, from 75% to 150%, for new long-term consumer loans, including car loans, in December 2010. The move was motivated by rapid growth in consumer and vehicle credit of over 20% and almost 50%, respectively during 2010, often at long maturities and not matched by an increase in the maturity structure of banks' funding.⁽³⁾ The move was aimed at discouraging such lending rather than being primarily focused on building balance sheet resilience. Following the tightening, which was described as unexpected by the market, the proportion of long-term vehicle loans declined sharply (**Chart B**) and the average delinquency rate also fell considerably.⁽⁴⁾ Moreover, spreads of targeted loans increased materially, while those of non-targeted loans were broadly unchanged (**Chart C**).

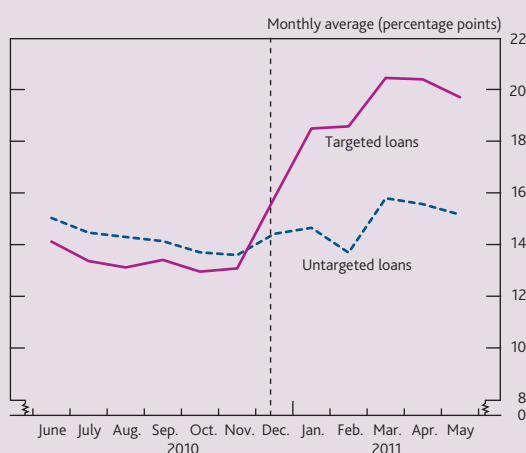
Separately, the Brazilian central bank increased risk weights on payroll-guaranteed consumer loans with longer maturities from 100% to 150% in December 2010. But the effects on lending were modest so risk weights were increased again in November 2011, from 150% to 300%. At the same time, the central bank also reduced risk weights on shorter-term consumer loans and increased risk weights on long-term non-guaranteed loans to prevent leakages. These changes resulted in a sharp reduction of the share of new long-term payroll-guarantee loans relative to short-term payroll-guarantee loans. These examples suggest that effects on relative lending can be substantial, both in terms of

Chart B New auto loans by maturity in Brazil



Sources: Martins and Schechtman (2013) and Bank calculations.

Chart C Loan spread charged on new auto loans in Brazil



Sources: Martins and Schechtman (2013) and Bank calculations.

quantity and price effects, depending on the calibration of measures.

In Ireland, risk weights on the portion of existing and new loans exceeding 80% LTV were increased on a sliding scale from 50% to 60% depending on the LTV rate. The change was implemented in May 2006 and resulted in a 2.4% Tier 1 capital requirement for 100% LTV mortgages, compared with 2% before. A change in capital requirements was chosen over harder limits on high LTV mortgages, eg banning mortgages with an LTV above 100%, in part because quantitative constraints were viewed as inconsistent with the pursued 'principles-based' approach to regulation which was less prescriptive and avoided interfering with product design. The Central Bank of Ireland reports that there was some delay in implementation due to hesitation by the financial regulator, despite strong property-related credit growth.⁽⁵⁾ As a result, the measure was applied relatively late in the cycle at around the time the residential property market was peaking. The Central Bank of Ireland described the action, in retrospect, as

'too little, too late', and there was little effect on either resilience or lending, highlighting the importance of timing and calibration.⁽⁶⁾ The potential effectiveness of early intervention is highlighted by the Australian approach to 'low doc' mortgages. Based on early concerns around such mortgages and evidence from other countries that this might lead to higher than normal loss rates, the authorities acted in 2004 to raise risk weights on these mortgages from 50% to 100% where the LTV was above 60% and the loan was not covered by mortgage insurance. This action appears to have been effective at 'nipping in the bud' the growth of the 'low doc' segment of the market as the share of approvals relative to the total stagnated and later fell.

The examples covered in this box demonstrate the versatility of SCRs with implementation possible across and within sectors, and on either the stock or flow of lending. They are often used in conjunction with tools affecting the terms and conditions of lending. The flexibility of the tool means that it is difficult to specify how it would be used precisely. In particular, different indicators may be required for different approaches towards using the tool: ie whether resilience of banks' balance sheets or credit growth in particular sectors is

being targeted. Banks' resilience is more directly enhanced when broad sectors or the stock of exposures are targeted. Effects on credit growth have varied, suggesting that calibration is important. Moreover, timing is critical, with the contrast between Ireland and Australia highlighting the importance of early intervention. And the Brazilian case demonstrates the importance of both being ready to perform sequential tightening if an initial intervention does not achieve its objectives and managing leakages, particularly when granular subsectors are targeted.

-
- (1) See Sinha (2011).
 - (2) As noted in Section 2.1, SCRs can be implemented via a change in risk weights or via a capital buffer. A capital buffer can be mapped into an equivalent increase in risk weights: for a firm with a common equity Tier 1 ratio requirement of 7% (the 4.5% Basel III minimum plus the 2.5% capital conservation buffer), an additional 1 percentage point sectoral capital buffer would be equivalent to scaling average risk weights for exposures to that sector by a factor of 1.14 (eight divided by seven). For example, in the case of residential mortgages, increasing risk weights from 35% — the minimum risk weight for residential mortgages under the standardised approach — to 40% would be equivalent to a 1 percentage point increase in capital against these exposures.
 - (3) The original measures included a sliding scale of combinations of maturity and LTV for which risk weights were increased.
 - (4) See Da Silva and Harris (2012) and Martins and Schechtman (2013).
 - (5) See Central Bank of Ireland (2010).
 - (6) See Central Bank of Ireland (2010, page 102).

the FPC's actions might be larger than past relationships would suggest. As time passes and evidence develops, improving understanding of the quantitative effects of these macroprudential tools will be an important topic for research by academics and staff in policy institutions.

The relationship between capital requirements and credit conditions might vary across time and economic circumstances for other reasons too. For example, in a situation of acute uncertainty in which market participants are highly concerned about banks' vulnerabilities to shocks, banks' borrowing costs may be sensitive to their capital adequacy (see **Chart 2**). Banks may be reluctant to raise external capital unilaterally and may be insufficiently profitable to generate capital organically. But a decision to increase capital adequacy for all banks — if combined with a Recommendation to do this by boosting the *level* of capital rather than by reducing the level of assets — may solve this co-ordination problem and improve confidence to such an extent that overall funding costs fall. If the FPC is concerned not to inhibit the supply of lending to the real economy, adjusting to higher capital requirements via the level of capital (ie the numerator of the capital ratio) would be important to avoid increasing banks' incentives to raise their capital ratios by slowing lending growth (ie the denominator of the capital ratio). If the impact on the level of capital is large enough, credit conditions might then loosen and resilience increase, a channel shown (in **Figure 2**) by the arrows going via the box marked 'confidence' that link capital ratios to funding costs and credit conditions. The recapitalisation of UK banks in 2008 and the US stress

tests and consequent capital raising of 2009 may have had precisely such an effect (**Box 2**).

This is not an exhaustive set of scenarios. It is intended to make clear that the impact of the CCB and SCRs on credit conditions is likely to vary depending on expectations, the health of the financial system, and the state of the economic cycle.

3.3 Impact on the level of GDP: cycle and trend

The costs of financial crises can be extremely large and there is now mounting evidence that the effects on economic activity can be long-lasting, if not permanent.⁽¹⁾ That being so, if the CCB and SCR tools are successful in reducing the likelihood and severity of financial crises, even by modest amounts, their use is likely to have substantial positive benefits for the expected level of UK GDP over time.⁽²⁾ This channel is shown by the arrow linking resilience to the medium to long-term level of GDP in **Figure 2**.

The CCB and SCR tools might also influence the cyclical pattern of economic growth in the short term. The relationships here are complex and there is limited historical experience with such measures from which to gauge them.⁽³⁾

-
- (1) See Cerra and Saxena (2008), International Monetary Fund (2009a, 2012), Reinhart and Rogoff (2009) and Schularick and Taylor (2012).
 - (2) This is consistent with the conclusion from a range of official sector studies, including the Basel Committee on Banking Supervision (2010a) and HM Treasury (2012).
 - (3) More fundamentally, and as previously mentioned in Section 3.2, historical relationships between bank balance sheets, credit and economic growth may be a poor guide to assessing the impact of these new macroprudential tools as banks are likely to change their behaviour in response to the regime change. This is a version of the so-called Lucas critique (Lucas (1976)).

Box 2

The impact of recent capital measures

What lessons are there from policy measures taken overseas to gauge the impact of the CCB on resilience, credit conditions and growth? While the CCB has not yet been used in its precise form, some closely related policies have been applied. This box considers two such case studies: (i) the Spanish dynamic provisioning regime, which in some ways is the closest analogue to the CCB that has been used in practice; and (ii) the US Supervisory Capital Assessment Program (SCAP) in 2009 and the EU's 'capital exercise' in 2011, both of which are examples of raising capital to restore confidence in the midst of a crisis.

Spanish dynamic provisioning

In 2000, the Banco de España required Spanish banks to have an extra buffer of provisions that could be used in bad times. The buffer was increased in line with banks' lending before being capped by the authorities and, at its height in 2004, amounted to around 1.25% of total loans. The Spanish authorities released the buffer in 2008 when the crisis hit, and by end-2010 it stood at below 0.5% of total loans.

This had little impact on lending during the boom, as customers borrowed instead from banks that were relatively less constrained by the policy. But it was more successful in allowing banks to absorb some losses and maintain lending during the crisis. One study estimates that a 1% pre-crisis provisions-to-loans buffer, when released in the downswing, increased credit by 10% and employment by 2.7% relative to what it would have otherwise been.⁽¹⁾ However, with hindsight, much higher provisions would have been needed to restrain credit and allow banks to absorb fully the losses from the crisis.

US Supervisory Capital Assessment Program and EU capital exercise

The US SCAP aimed to protect banks against potential tail risks in the face of heightened market uncertainty and allow them to maintain lending in case of an adverse shock. The US agencies assessed the capital shortfall of 19 banks relative to forward-looking macroeconomic stress scenarios. The results of the assessment, published in May 2009, highlighted a capital shortfall of around \$75 billion for ten of these banks.⁽²⁾ The majority of the shortfall was met over the next six months, primarily through increasing common equity.⁽³⁾

While it is difficult to draw firm conclusions, the SCAP did appear to improve market confidence in those banks faced with a shortfall. Equity prices and CDS spreads of those banks outperformed other banks (**Chart A**). The stock of lending by shortfall banks — stripping out write-downs on legacy assets — increased following the policy (solid blue line in **Chart B**),

albeit by a slightly smaller amount than lending by the non-shortfall banks (solid magenta line in **Chart B**).

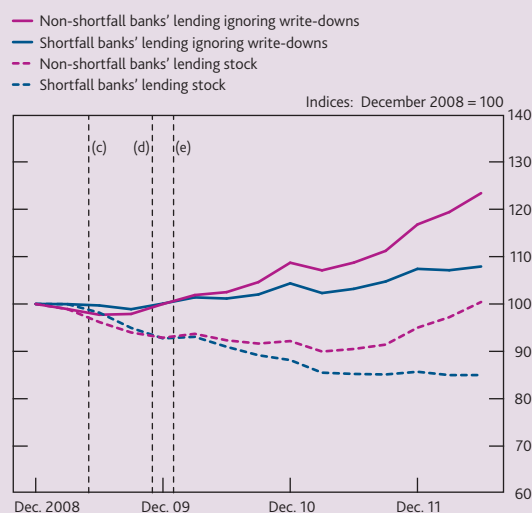
Chart A Market reactions to the US SCAP stress tests — difference between 'shortfall' and 'non-shortfall' banks^{(a)(b)}



Sources: Bloomberg, Markit Group Limited, UBS Delta and Bank calculations.

- (a) The differences are calculated as the index of 'shortfall' banks less that of 'non-shortfall' banks, for each of the CDS spreads and equity price series respectively. All of the underlying indices equal 100 on 6 March 2009.
- (b) The panel includes all 19 banks that took part in the SCAP where possible. Due to limited data availability, the equity price indices exclude GMAC and the CDS price indices exclude Regions Financial Corporation, Fifth Third Bank and Sun Trust Bank. PNC Financial Services Group CDS data are included from 31 March 2009.
- (c) First vertical dashed line: US agencies publish SCAP results, identifying banks with shortfalls (7 May 2009).
- (d) Second vertical dashed line: US agencies announce that banks have met their shortfalls (9 November 2009).

Chart B Real-economy lending by 'shortfall' and 'non-shortfall' banks in the US SCAP stress tests^{(a)(b)}



Sources: Federal Reserve National Information Centre and Bank calculations.

- (a) Total stock of loans and leases excluding those to financial institutions and non-US residents. For the series ignoring write-downs, the cumulative charge-offs on real-economy lending are added back into the stock of lending to neutralise the effect of charge-offs.
- (b) The panel includes all 19 banks that took part in the SCAP apart from Goldman Sachs and Morgan Stanley, due to limited data availability. 2008 Q4 and 2009 Q1 data for Ally Financial and March 2009 data for American Express have been estimated as the average of the year 2009.
- (c) First vertical dashed line: US agencies publish SCAP results, identifying banks with shortfalls (7 May 2009).
- (d) Second vertical dashed line: US agencies announce that banks have met their shortfalls (9 November 2009).
- (e) Third vertical dashed line: Lending data after 1 January 2010 have been adjusted to neutralise the effect of a change in the accounting rules, which required banks to take some securitisations back onto their balance sheet. This resulted in a higher reported lending stock for some banks, which did not correspond to real activity. These large increases in lending have been removed from the data.

A somewhat similar programme was implemented in the European Union in 2011, to help restore confidence in the banks in the midst of the sovereign debt crisis. In late 2011, EU banks were required to meet a 9% minimum core Tier 1 ratio by June 2012, after a sovereign stress, mainly by raising capital levels. The EBA announced a corresponding capital shortfall of about €76 billion for 27 EU banks. As in the case of the SCAP, the market reaction appeared to be positive: CDS spreads moved more favourably for banks that increased their capital than for those that did not. EBA (2013) finds that compliance with its recommendation has been achieved mainly via new capital measures and, to a lesser extent, by reducing risk-weighted assets through, for example, reduced lending.

Conclusion

These experiences suggest that the impact of the CCB on resilience and credit conditions will depend on the

circumstances in which the tool is used. If used in a countercyclical manner, the CCB should increase resilience and help maintain lending in the downturn. But the lesson from Spain is that the tool may be ineffective in curbing exuberance in the upswing if the required increase in buffers is small. An increase in capital requirements can also be used to support confidence during times of market stress, provided — as shown by the SCAP and EU experiences — banks are required to adjust by raising levels of nominal capital. Such actions do not necessarily have a negative impact on lending, although the evidence is not clear cut.

- (1) Jiménez *et al* (2012).
- (2) Board of Governors of the Federal Reserve System (2009a).
- (3) Board of Governors of the Federal Reserve System (2009b).

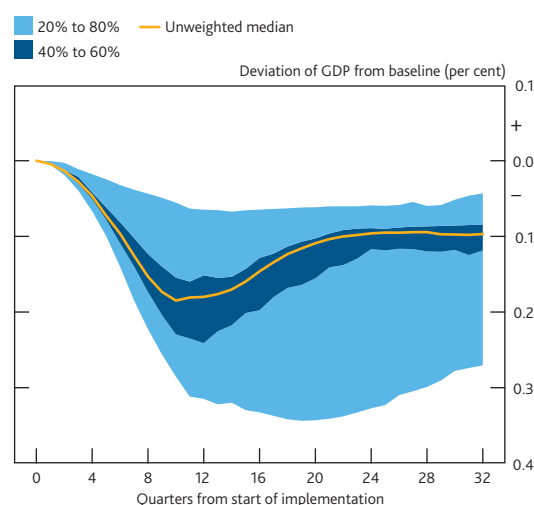
And there is likely to be a range of possible scenarios and possible outcomes.

As described in Section 3.2, an increase in the CCB or SCRs in the upswing of the cycle would be expected to dampen credit conditions somewhat, raising interest rates on bank credit and reducing the availability of credit for some borrowers. This is likely to reduce overall spending, particularly in sectors that rely heavily on bank credit. GDP growth may slow in the short run as a result. Releasing the CCB or SCRs might have the opposite effect, loosening credit conditions, boosting overall spending and GDP growth in the short run. This channel is shown by the arrow in Figure 2 linking credit conditions to short-term GDP growth.

The best estimates available point towards only a modest impact on economic growth through this channel. This is particularly so if the use of the CCB or SCRs changes the outlook for inflation such that monetary policy can be used to cushion the impact on growth. A study commissioned by the Financial Stability Board and the Basel Committee on Banking Supervision compares the impact of capital requirements on GDP growth across a wide set of models, most of which include a simplified reaction of monetary policy in cushioning the impact on GDP growth of the tightening in credit conditions.⁽¹⁾ It finds that GDP will contract by between 0.05% and 0.35% relative to baseline in the short run following a 1 percentage point increase in headline capital requirements; the largest average impact on GDP across these models is around -0.2% occurring after around ten quarters (Chart 3).

These estimates may understate or overstate the impact of the CCB and SCR tools on growth for the same reasons that the estimated effect on credit conditions is uncertain. More

Chart 3 Estimated impact on GDP of a 1 percentage point increase in capital requirements implemented over two years^(a)

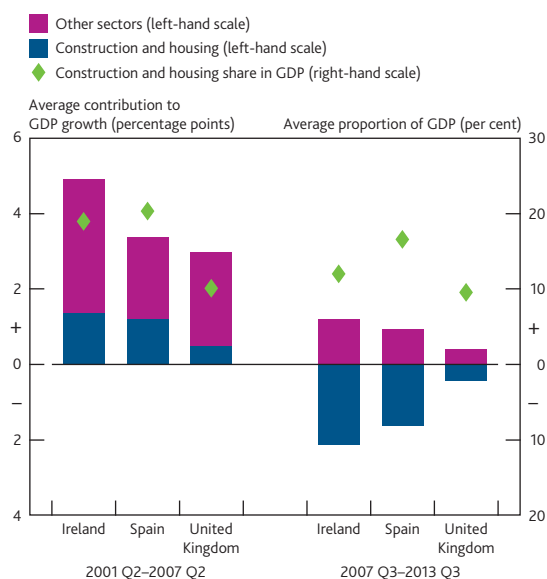


Source: Macroeconomic Assessment Group (2010).

(a) The shaded areas indicate the 20th–80th percentile and 40th–60th percentile ranges respectively. The orange line shows the unweighted median. The distribution of outcomes is computed across 89 models discussed in Macroeconomic Assessment Group (2010). The results do not include the impact of international spillovers.

fundamentally, there is no automatic link between credit conditions and short-run economic growth. Rather, the effects will depend on which sectors experience a change in credit conditions following the use of the CCB or SCR tools. These issues are highlighted by comparing the effect the credit boom had on growth in the United Kingdom prior to the global financial crisis with its effect in Spain and Ireland. The Spanish and Irish economies experienced extraordinary housing and construction booms between 1999 and 2007. As Chart 4 illustrates, at the height of the boom, construction investment accounted for around 20% of the level of GDP in both

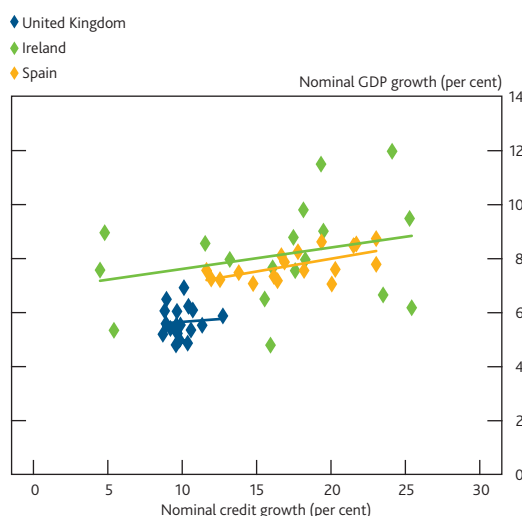
(1) See Macroeconomic Assessment Group (2010).

Chart 4 Contribution of construction to GDP growth

Sources: Eurostat and Bank calculations.

countries and for a significant proportion of growth pre-crisis. Had the Spanish or Irish authorities raised capital buffers sufficiently to make their banking systems more resilient in the face of such vulnerabilities, overall economic growth is likely to have been weaker in the short run. With the benefit of hindsight, it is clear though that such a slowdown in growth would have been small compared to the very severe effects of the subsequent credit crunch.

By contrast, the credit boom in the United Kingdom was largely associated with an increase in property prices and an unsustainable expansion in lending *within* the financial sector.⁽¹⁾ Many commentators consider the stimulus to economic growth from the pre-crisis credit boom to have been somewhat smaller in the United Kingdom as a result (Chart 5). It is likely, therefore, that the impact on growth may have been

Chart 5 Correlations between growth in credit and GDP, 2003–07^(a)

Sources: Bank for International Settlements, Eurostat, ONS and Bank calculations.

(a) Percentage change in the stock of nominal credit, and nominal GDP compared to a year earlier. Data are quarterly, from 2003 Q1 to 2007 Q2. Credit covers all debt of the household, non-profit institutions and non-financial corporate sectors. This includes both loans and debt securities.

smaller than in Spain or Ireland had a tightening of either the CCB or SCRs cooled credit growth in these sectors.

A second difference is that the Monetary Policy Committee (MPC) in the United Kingdom had more flexibility than individual euro-zone countries to adjust interest rates to influence the path of nominal demand so that inflation remained close to target. Had the CCB or SCRs been tightened in the United Kingdom prior to the crisis, and had this weakened the outlook for aggregate demand and inflation, then it is plausible that the MPC might have mitigated some of the impact on growth through its setting of interest rates, shifting the composition of aggregate demand away from credit-intensive spending towards less credit-intensive spending.

(1) See Bank of England (2011).

4 Indicators for adjusting the tools

Many indicators, alongside supervisory input and market intelligence, will be useful for shaping the decisions of the FPC and helping it to explain those decisions publicly. No single set of indicators can ever provide a perfect guide to systemic risks, or to the appropriate policy responses due to the complexity of financial interlinkages, the tendency for the financial system to evolve over time and time lags before risks become apparent. And, in some cases, particular signals from the same indicator may have opposite implications depending on the underlying reasons for the movement in the indicator and the point in the financial cycle. Judgement will, therefore, play a material role in all FPC decisions and policy will not be mechanically tied to any specific set of indicators. To support its judgement, the FPC will monitor a wide and time-varying set of measures, depending on the emerging risks, including both market and supervisory intelligence, and 'stress tests' of banking sector resilience.⁽¹⁾

The FPC has, however, identified relatively short lists of core financial and economic indicators for the CCB and SCRs that it will routinely review in conjunction with analysis on the drivers of movements in them. As part of the FPC's regular briefings, these provide consistency to FPC decision-making and give a basis for explaining the Committee's decisions to an external audience, which should help to enhance the predictability of the regime and reinforce the signalling channel of macroprudential policy. In any particular set of circumstances, some of these indicators will be more important than others in helping the FPC to reach its judgements. But the greater the degree of deviation from historical benchmarks suggested by the core indicators, the more homogeneous the picture that the different indicators convey, and the more consistent that picture is with market and supervisory intelligence, the more likely it is that the FPC will adjust the CCB or SCRs in response. The indicators will be considered alongside each other and market and supervisory intelligence to judge whether an aggregate or sectoral response is more appropriate. They are published alongside the wider information set informing the FPC's decisions in its *Financial Stability Report* every six months and, for the CCB indicators, on the Bank's website every quarter.⁽²⁾⁽³⁾

For the CCB, one indicator is given particular prominence in the EU legislation — the credit-to-GDP gap, the difference between the ratio of household and corporate indebtedness to GDP and its long-term trend. Box 3 on pages 30–31 discusses its role in more detail and how the other indicators for the CCB will be seen as complementary to it, as envisaged in the Basel and CRD IV/CRR texts. The remaining indicators, for both tools, were helpful, with hindsight, in identifying previous periods of financial instability, including the threats to resilience arising prior to and during the crisis in the United Kingdom, and relate to the FPC's high-level views on

the circumstances in which its powers over the CCB and SCRs might need to be deployed and deactivated.

The usefulness of these indicators may change as the FPC deploys them to help guide its decisions. If banks, businesses and households come to expect that policy actions will be partially informed by particular indicators, they may respond in a way which results in the historical relationships between those indicators and systemic risk weakening. More broadly, the indicators relate to the use of the CCB or SCR powers — other indicators and analysis will, for example, be important for assessing structural threats from the distribution of risk across, and interconnections within, the financial system. The indicators will also evolve over time as the FPC learns from experience, as the financial system evolves, as data availability and quality improve and as new research is undertaken.⁽⁴⁾ This is particularly the case for indicators speaking to the use of SCRs on financial sector exposures — an important dimension of financial stability analysis but one for which current indicators are all somewhat inadequate.

4.1 High-level considerations

Core indicators should highlight the need to adjust the CCB or SCRs to increase capital requirements above their normal microprudential level in a timely manner when threats to systemic stability are heightened, either at the aggregate level or from specific sectors. Such threats may stem from macroeconomic or financial risks affecting areas in which the financial system is heavily concentrated. But they often have their roots in a self-reinforcing cycle linking credit and asset prices, which lowers immediate defaults but encourages more risk-taking.⁽⁵⁾ Although such exuberance may appear across the economy as a whole, it sometimes arises first, or most powerfully, in specific sectors and may go hand in hand with rising household or corporate indebtedness. Risks may also be exacerbated by rising leverage in the financial system, perhaps due to a collective appetite to chase high returns (a so-called 'search for yield'), by increased exposures within the financial system, by greater reliance on unstable sources of funding or by rising external indebtedness. And they may be amplified by either widespread or sector-specific relaxations in lending standards, which might also be reflective of wider conditions in financial markets. As a result, national balance sheets and the balance sheets of financial institutions, corporates and households may become overstretched, and increasingly vulnerable to even small increases in borrower default or falls in collateral values at exactly the time when low perceived risks could be depressing microprudential capital requirements.

(1) For example, in discussing housing market risks, Bank of England (2013b) highlights a range of additional indicators that the FPC considers in its assessment.

(2) See www.bankofengland.co.uk/financialstability/Pages/fpc/coreindicators.aspx.

(3) The publication schedule was amended following the FPC's meeting on 19 June 2018 — for more details see the Record of that meeting; www.bankofengland.co.uk/record/2018/financial-policy-committee-june-2018.

(4) Several international initiatives to improve financial sector data are likely to come to fruition over the next two years, including the introduction under CRD IV of common European supervisory reporting (COREP) and various G20-endorsed initiatives which target data gaps in respect of global systemic linkages between financial institutions (International Monetary Fund and Financial Stability Board (2009)).

(5) Minsky (1986), Bank of England (2009b, 2011), Geanakoplos (2010), Turner (2011), Tucker (2009, 2011) and King (2012).

At other times, it will be appropriate to reduce the CCB or SCRs so that capital requirements move back to their normal microprudential level. This will be the case when threats to resilience are judged to have receded and so the need for banks to have additional capital has passed. Such an action might be warranted if credit or other exposures become more sustainable, if sectoral imbalances correct, if the risk of external threats to the UK financial system diminishes, or if losses crystallise that can be absorbed within existing buffers to leave banks adequately capitalised.

In adjusting the CCB or SCRs, the FPC will take account of any circumstances in which the size of future losses — and hence threats to resilience — may be influenced by the setting of capital requirements. For example, efforts by banks to meet regulatory requirements by restricting lending could in some circumstances lead to a damaging collective contraction in the supply of credit, which weakens the economy and leads to more borrowers defaulting and ultimately further bank losses. By mitigating this risk, a timely reduction of such supplementary capital requirements may help to boost economic growth, and in so doing, help to maintain resilience. Consistent with this, the Basel III guidance for the CCB notes that the buffer could be *'released when the credit cycle turns so that the released capital can be used to help absorb losses and reduce the risk of the supply of credit being constrained by regulatory capital requirements'*.⁽¹⁾

A critical factor determining whether or not to reduce capital requirements in such circumstances will be the size of banks' (usable) capital buffers. If they are judged by the FPC, the microprudential regulator and bank investors to be sufficient to absorb banks' unexpected future losses⁽²⁾ and to provide sufficient capital adequacy even after buffers have been drawn down, then reducing capital requirements may help to maintain resilience through the indirect effects discussed above and support the FPC's secondary objective for growth and employment. But when it is judged that banks' ability to absorb future losses is insufficient and that there is a material risk that such losses could threaten the capital adequacy of the banking system, the direct decrease in resilience from a reduction in the CCB or SCRs would not support financial stability. Moreover, if banks find it hard or expensive to fund themselves at lower capital ratios, as was the situation facing a large number of banks internationally during the global financial crisis, reducing the CCB or SCRs would have little effect on lending or may even be counterproductive. In those circumstances, lending might be better supported through the alternative action of Recommending that banks raise levels of capital to underpin investor confidence — though it would be important to consider other regulatory levers in parallel, including banks' liquidity requirements.

Decisions to reduce the CCB or SCRs may, therefore, be informed by assessing indicators of capital adequacy, including

estimates of potential losses under stress (see below), market-based indicators of banks' resilience, credit conditions, and the outlook for growth and banks' profitability.

Taken together, these high-level considerations suggest that an appropriate set of indicators for the CCB and SCRs should include measures of balance sheet stretch, both within the financial system and amongst end-borrowers in the wider economy, and measures of terms and conditions in financial markets. They also highlight that the relative importance of different indicators is likely to vary depending on whether the FPC is considering an increase or reduction in capital requirements. **Tables C and D** on pages 40–43 list the FPC's core indicators for the CCB and SCR tools respectively, provide working definitions for each indicator, and set out their latest and previous values and historical benchmarks. These indicators are discussed in detail below.

The indicators for the SCR tool are somewhat more granular in nature than those for the CCB tool, tending to focus on the broad sectors that the FPC might target. They may also act as a prompt for further analysis to determine whether risks are concentrated in particular subsectors, which cannot be covered by a short list of indicators. The FPC will also look beyond the aggregate and sector-level measures to examine whether changing patterns in the distribution of risks across banks, non-bank financial institutions, households or corporates, including those overseas, may signal rising risks, for example among a significant subset of institutions or borrowers. Since instability often follows periods of rapid change in the financial system, it will be important to consider both significant changes in indicators and their absolute level.

The indicators may also be useful in judging whether or not policy has been effective. Success in this context means reducing the risk of a major disturbance to the financial system without having a significant adverse effect on the growth of the UK economy. The probability of a future systemic financial crisis cannot be readily observed. The success of the FPC's actions may, however, be partially assessed with reference to whether the indicators used to prompt and justify intervention evolve in ways that are more appropriate and sustainable. At the same time, it will also be important to consider whether other indicators have moved in an adverse way, given the risk of unintended consequences. For example, even if an increase in SCRs for a particular sector helped to curtail overextension in that sector, a shifting of risk to other sectors could potentially undermine the effect on system-wide resilience.

The role of projections and stress testing

The FPC recommended in March 2013 that, *'looking to 2014 and beyond, the Bank and PRA should develop proposals for regular stress testing of the UK banking system. The purpose of*

(1) See Basel Committee on Banking Supervision (2010c), page 3.

(2) That is, the losses banks may face in the event of an unlikely stress.

those tests would be to assess the system's capital adequacy'. Bank of England (2013a) sets out a proposed framework for such stress tests. It proposes, in particular, that stress tests would be conducted annually and concurrently across the institutions that are in scope.⁽¹⁾ Each exercise would explore a range of adverse scenarios relative to a baseline scenario, including: a) common scenarios applied across all banks taking part in the exercise, designed by the FPC in consultation with the PRA Board; and b) bespoke scenarios, designed by individual banks and approved by the PRA Board. The baseline scenario would be designed by the FPC and informed by, among other things, the MPC's forecasts as communicated in the Bank's *Inflation Report*, while judgements in the common adverse scenarios would likely be informed, at least in part, by the FPC's set of core indicators.

The proposed stress testing framework would provide a forward-looking, quantitative assessment of the capital adequacy of the UK banking system and individual institutions within it. Outputs from stress tests would include projections for system-wide financial sector profits, losses and balance-sheet evolution, and so future capital and leverage ratios. The FPC may use these exercises to assess whether financial institutions' current financial resources are likely to provide a sufficient buffer against risks to the financial system, both in aggregate and in relation to particular sectors. This could highlight a need to increase the CCB or SCRs to lower the risk that particular stress scenarios might precipitate a financial crisis, or a need to loosen policy, perhaps because the external environment is stronger, risks have dissipated, or credit conditions are weak. The PRA would likely use the results of stress tests as inputs to setting bank-specific capital requirements.

4.2 Core indicators for the countercyclical capital buffer⁽²⁾

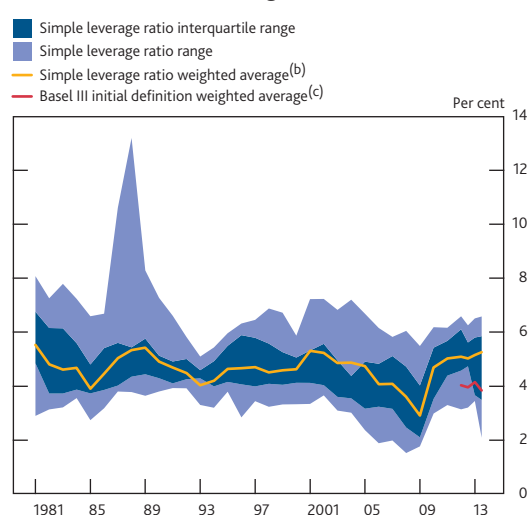
Bank balance sheet stretch (indicators 1–9)

Aggregate capital ratios (1) and leverage ratios (2) are natural indicators of banking system resilience, reflecting the amount of capital that the financial sector has available to absorb losses on its assets.⁽³⁾ Capital ratios are computed using measures of risk-weighted assets, where less weight is assigned to those assets that are deemed to be less risky, whereas leverage ratios assign all on balance sheet assets the same weight. A simple measure of the leverage ratio avoids any adjustments to the accounting definition of assets, some of which can be quite complex in nature. But some adjustments to assets may be helpful — for example, to capture both exposures held off balance sheet and the embedded leverage in derivatives, as well as to achieve comparability between banks subject to different accounting regimes. It is, therefore, important to consider leverage ratio measures which aim to capture these adjustments, such as those considered as part of the Basel III discussions, alongside the simple leverage ratio measure. In addition, the relationship between risk-weighted assets and (unweighted)

assets used for the core Tier 1 capital ratio and simple leverage ratio respectively, as reflected in average risk weights (3), also provides a gauge on the average riskiness of banks' assets.

A rapid build-up in leverage (ie a fall in leverage ratios) in major UK banks (Chart 6) was an important driver of the global financial crisis.⁽⁴⁾⁽⁵⁾ And, at the individual bank level, leverage ratios were a better predictor of banks that subsequently got into trouble than risk-based capital ratios.⁽⁶⁾ Banking sector leverage also rose prior to the Nordic crises in the late 1980s and early 1990s and ahead of a range of other crises.⁽⁷⁾ But it was less informative in signalling vulnerabilities prior to some other past episodes of banking sector distress in the United Kingdom, and in the United States prior to the

Chart 6 UK banks' leverage ratios^(a)



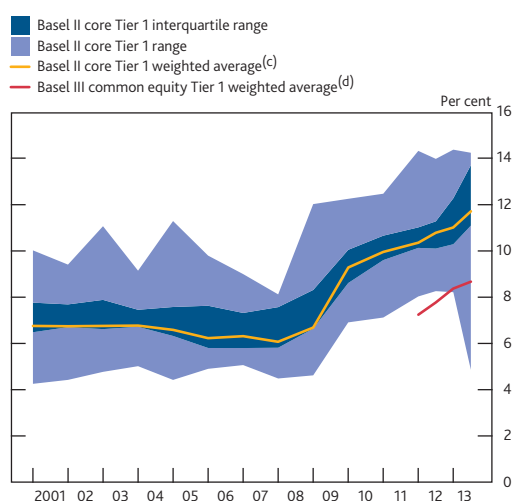
Sources: PRA regulatory returns, published accounts and Bank calculations.

- (a) The mean and ranges shown are based on the simple leverage ratio defined as the ratio of shareholders' claims to total assets based on banks' published accounts (note a discontinuity due to introduction of IFRS accounting standards in 2005, which tends to reduce leverage ratios thereafter). Data exclude Northern Rock/Virgin Money from 2008.
- (b) Weighted by total assets.
- (c) This corresponds to the estimates submitted to the PRA by banks on a best endeavours basis based on the original Basel III 2010 definition (BCBS (2010d)) (aggregate peer group Tier 1 capital over aggregate leverage ratio exposure). During 2013, the BCBS has been reviewing the exposure measure used for the Basel III definition, with a view to publishing a final definition early in 2014. This may differ from the definition used in this Policy Statement. Tier 1 capital includes some 'grandfathered' instruments which will no longer be eligible after the full transition in 2019. The Basel III sample includes Barclays, HSBC, Lloyds Banking Group, RBS, Nationwide, Santander UK and Co-operative Banking Group.

- (1) How these stress tests can be co-ordinated with EBA exercises is being considered, with further work to be done in 2014.
- (2) Many of the charts in this and the next subsection use shading to highlight episodes of financial stress in the United Kingdom: the secondary banking crisis from 1973 Q4 to 1975 Q4 (Reid (1982)); the small banks' crisis from 1990 Q3 to 1994 Q2 (Logan (2000)); and the global financial crisis shown from 2007 Q3 onwards, given that there is not as yet a widely agreed end point for the crisis period.
- (3) Note that banks' actual capital ratios may fluctuate relative to the CCB rate setting due to changes in voluntary buffers. Given that this indicator is closely related to the tools, it may, however, be particularly prone to behaving differently as the FPC starts to use the CCB and SCRs.
- (4) Unless otherwise noted, 'major UK banks' as of 2014 refers to: Banco Santander, Bank of Ireland, Barclays, Co-operative Banking Group, HSBC, Lloyds Banking Group (LBG), National Australia Bank, Nationwide, Royal Bank of Scotland (RBS) and Virgin Money. For more details on the sample going backwards, see footnote (d) to Tables C and D on pages 40 and 42.
- (5) Consistent with regulatory definitions, this Policy Statement defines leverage ratios by dividing the relevant measures of capital by assets (eg a leverage ratio of 4%) rather than the reverse (eg a leverage ratio of 25 times). But the discussion uses the standard English language interpretation of associating rising levels of leverage with greater indebtedness — under the definition used here, this is equivalent to a falling leverage ratio.
- (6) See International Monetary Fund (2009b), Basel Committee on Banking Supervision (2010b) and Haldane and Madouros (2012).
- (7) See Box 3 of Bank of England (2009a) and Barrell *et al* (2010).

Latin American debt crisis of the 1980s.⁽¹⁾ Risk-based core Tier 1 capital ratios provided a relatively weaker signal ahead of the global financial crisis, not changing materially during the upswing (Chart 7) as average risk weights fell. The definition of core Tier 1 capital also overstates the resilience of banks due to the inclusion of certain items that are not truly loss-absorbing on a going concern basis. The FPC will therefore also monitor the Basel III common equity capital ratio metric, which provides a better measure of true loss-absorbing capacity.

Chart 7 UK banks' capital ratios^{(a)(b)}



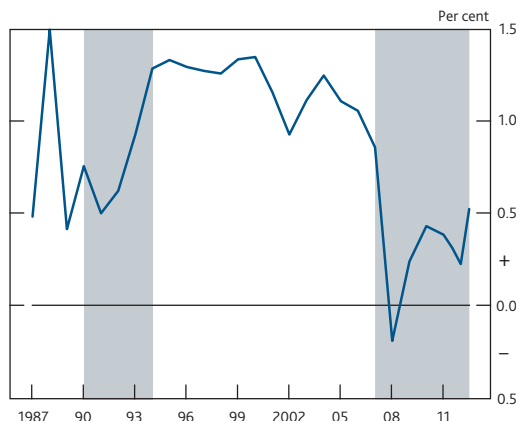
Sources: PRA regulatory returns, published accounts and Bank calculations.

- (a) Major UK banks' core Tier 1 capital as a percentage of their risk-weighted assets. The series uses the major UK banks peer group as of 2014 and their constituent predecessors. 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 PRA definitions. Prior to 2008 that measure was not typically disclosed; the chart shows Bank calculations approximating it as previously published in the *Financial Stability Report*.
- (c) The mean is weighted by risk-weighted assets.
- (d) 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, corresponding to the Basel III estimates submitted to the PRA by banks on a best endeavours basis. The Basel III sample includes Barclays, HSBC, Lloyds Banking Group, RBS, Nationwide, Santander UK and Co-operative Banking Group.

If the FPC were to judge that prevailing or prospective capital ratios seem too low given its assessment of the risks, a possible response would be to increase the CCB rate applied to UK exposures. If, by contrast, capital ratios appeared adequate but leverage was growing, so that average risk weights were falling, further analysis would be necessary. Such developments could reflect relatively 'safe' balance sheet expansion — for instance, growth in mortgage lending at low LTV ratios — in which case policy action may not be required. They may also, however, reflect mis-measurement of risk weights or declining prudence in banks' risk management, signalling generalised over optimism about risks and a possible need to increase the CCB. At times, however, it may be simpler and more direct for the FPC to make a Recommendation that banks' leverage ratio standards are toughened relative to microprudential requirements. And if falling risk weights are due to developments in a particular sector, it may be more appropriate to apply the SCR tool (see Section 4.3).

The banking sector's aggregate pre-tax **return on assets (RoA)** (4) provides a simple, high-level view of the core profitability of the banking system. Since profits are the first line of defence against losses, weak profitability during periods of stress may indicate a reduced ability of the banking system to remain resilient in the face of threats, and thus a need to exercise caution in reducing the CCB rate applied to UK exposures. In expansions, large or prolonged movements in RoA could signal the emergence of underlying risks which would warrant further investigation to determine whether and how the CCB should be adjusted in response. For example, an increasing RoA may signal that banks are holding riskier assets, while a falling RoA, as seen in the United Kingdom from the late 1990s to 2007 (Chart 8), may indicate that risk is underpriced.

Chart 8 UK banks' return on assets before tax^(a)



Sources: Published accounts and Bank calculations.

- (a) Calculated as major UK banks' profit before tax divided by total assets. Total assets are averaged over the reference and previous year. Series is annual with the exceptions of 2012 H1 and 2013 H1. For these periods, profit before tax has been annualised and total assets are averaged for the previous twelve-month period.

If banks' funding is too reliant on unstable sources, they may be highly vulnerable to system-wide bank runs. Unstable deposits are often those provided 'wholesale' by other financial institutions or capital markets, perhaps sourced from abroad, rather than retail deposits. Swings in the way banks finance themselves can also play a role in driving the broader credit cycle: for example, the growth of UK bank balance sheets prior to the crisis was highly correlated with a rise in the proportion of funding sourced from short-term wholesale deposits.⁽²⁾ High or rapidly increasing aggregate **loan to deposit ratios** (5) and **short-term wholesale funding ratios** (6) provide simple measures of these risks, to which the FPC might respond by increasing the level of the CCB, though it may sometimes be simpler and more direct to make a Recommendation that banks' liquidity standards are toughened relative to microprudential requirements.⁽³⁾

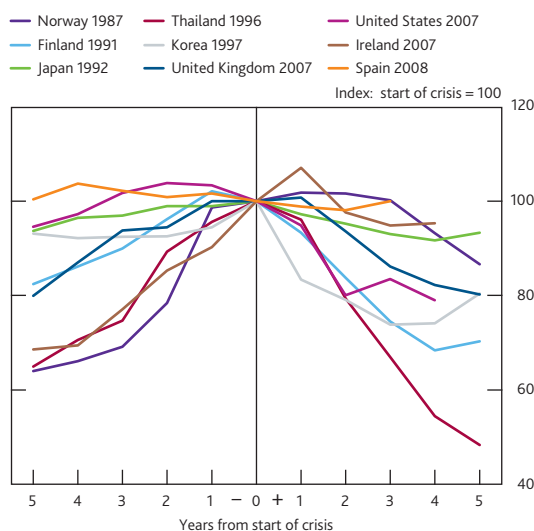
(1) Tucker (2012b).

(2) See Financial Services Authority (2009a). Hahm, Shin and Kwanho (2013) formulate a model of credit supply in which a high proportion of non-deposit funding can increase vulnerabilities and provide empirical support using data from emerging economies. Tarullo (2013) argues that excessive reliance on short-term wholesale funding, particularly via repurchase agreements, can create systemic vulnerabilities.

(3) One weakness of the FPC's current funding measures is that it is not possible to distinguish between retail deposits and deposits placed by non-bank financial institutions on a consolidated basis. The FPC wishes to see improved data in this area.

Rising loan to deposit ratios were evident in many countries prior to the crisis, and, with hindsight, the indicator also signalled impending distress in some of the countries in East Asia which suffered crises in 1997–98 (Chart 9). Banks also became increasingly reliant on short-term wholesale funding prior to this crisis, both in the United Kingdom (Chart 10) and globally.⁽¹⁾ At the same time, risks linked to the residency of the provider of funding, rather than the type or maturity of funding, point to the usefulness of national balance sheet indicators, as discussed further below. In addition, a range of other measures give a fuller picture of the liquidity risks faced by banks, such as the simple growth in

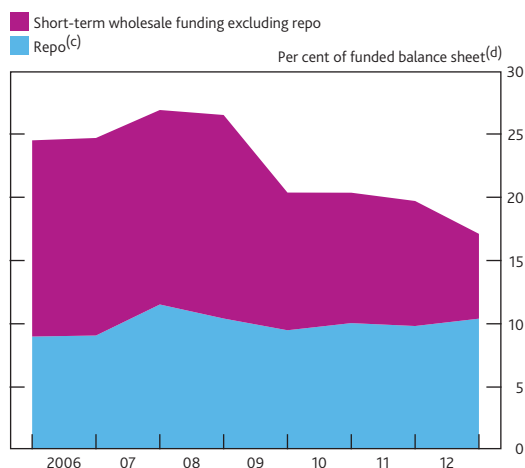
Chart 9 Loan to deposit ratio before and after major banking crises^{(a)(b)}



Sources: World Bank, published accounts and Bank calculations.

- (a) The years beside the country names give the dates of the first year of a banking crisis, based on Reinhart and Rogoff (2009).
 (b) The UK measure is major UK banks' loans and advances to customers as a percentage of customer deposits, where customer refers to all non-bank borrowers and depositors. Where disclosed, repurchase agreements are excluded from loans and deposits. The measure for all other countries is the 'Bank credit to bank deposits' series from the World Bank Global Financial Development database.

Chart 10 UK banks' short-term wholesale funding^{(a)(b)}



Sources: Published accounts and Bank calculations.

- (a) Residual contractual maturity of less than three months.
 (b) Wholesale funding comprises deposits by banks, debt securities, subordinated liabilities and repo. In some cases, where underlying data are not published, estimates have been used.
 (c) Repurchase agreements and securities lending.
 (d) Proxied by total liabilities excluding derivatives and liabilities to customers under investment contracts.

overall wholesale funding (see Section 4.3) and the ease with which assets may be liquidated in distress.

As Section 2 notes, the FPC will be able to set a CCB rate to be applied to some foreign exposures. An **overseas exposure indicator (7)**, highlighting system-wide banking sector exposures to foreign countries which are both significant relative to capital and growing rapidly, provides one simple means for the FPC to identify such vulnerabilities. At the end of 2006, this indicator would have flagged concerns over UK banks' exposures to several countries, including Ireland, Spain and the United States, reflecting the rapid growth of UK banks' exposures in sterling terms between 2005 and the end of 2006. Similar to market and supervisory intelligence, this indicator may be seen as a device for triggering deeper enquiries. In particular, on its own, it does not provide much insight into the riskiness of foreign exposures, so it is also important to consider measures of balance sheet stretch in those countries which are flagged. The indicator also fails to capture risks from indirect exposures via third countries — for example, UK banks were vulnerable to the Latin American debt crisis of the 1980s not only directly but also via their exposures to US banks that were suffering heavy losses. So where obvious risks in overseas countries (or groups of countries) are growing or crystallising, the FPC will assess UK banks' direct and indirect vulnerabilities, independent of the signal from this indicator.

Market-based metrics relating to bank debt (8) and bank equity (9) may provide insights on market participants' assessment of the health of banks. In relation to the former, **credit default swap (CDS) premia** on senior debt can provide an indicator of financial market participants' assessment of the likelihood of bank failure, alongside measures on other types of bank debt.⁽²⁾ The views of equity market investors may be gauged by considering the aggregate **price to book** and **market-based leverage ratios** of banks. The former measures the market value of equity relative to the book, or accounting, value of the difference between banks' assets and debt liabilities, thus reflecting, among other things, investor confidence in banks, their future earnings potential, and the accounting valuation of net assets.⁽³⁾ The latter offers a market assessment of how well capitalised banks are relative to their assets given their future earnings prospects and risks. In the immediate run-up to the global financial crisis, it proved

(1) For example, see Bank of England (2011) and Adrian and Shin (2011) on US banks; see Shin and Shin (2010) for Korea.

(2) A CDS contract provides a contingent insurance-type payout to the holder of such protection if there is a default on the underlying referenced bond (which may be senior or subordinated), in exchange for a premium paid from the holder of protection to the seller. CDS premia may be used to gauge market perceptions of the probability of default, at least from the perspective of a so-called 'risk-neutral' investor, by equating the size of the known payments from the buyer to the seller with the uncertain payment from the seller to the buyer, where the latter is a combination of the expected payout in the case of default and the probability that this event occurs. If market participants are risk-averse, this approach may overstate the inferred probability of default.

(3) See Box 2 of Bank of England (2012a).

a useful discriminator between banks that subsequently failed and those which survived.⁽¹⁾

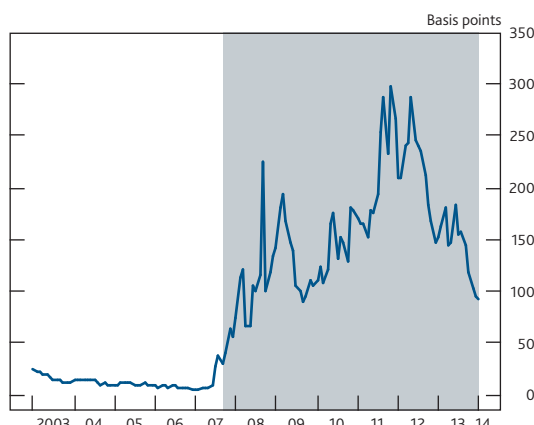
The interpretation of these indicators is likely to vary across the financial cycle. In some circumstances, they may be useful in gauging how the riskiness of banks is evolving during periods of stress. For example, a reduction in CDS premia or a rise in price to book and market-based leverage ratios during a downturn may indicate that threats to resilience are receding, so that it may be appropriate to reduce the CCB back towards normal microprudential levels. Low price to book ratios may be useful in pointing towards the need to raise capital during periods of stress, though raising capital in these circumstances may be less commercially attractive than when price to book ratios are high. But, as market measures, all of these metrics can be subject to significant mispricing. They may simply mirror movements in broader market indices and reflect wider

exuberance, as was the case immediately prior to the global financial crisis when CDS premia were low and price to book and market-based leverage ratios were high (Charts 11 and 12). Conversely, they may reflect excessive pessimism at other points of the cycle, for example in a panic. Market-based indicators also provided relatively weak signals of impending distress prior to other crises, including, for example, the East Asian crisis of 1997–98, where sovereign spreads and rating agency credit assessments in early 1997 were more favourable, on average, in countries most affected by the subsequent crisis.⁽²⁾

Non-bank balance sheet stretch (indicators 10–14)

Box 3 discusses how rapid expansions in credit often precede crises and the role of the **credit-to-GDP (10)** gap and ratio of credit-to-GDP as potential indicators of the need to increase the CCB. But **nominal credit growth (11)** to the private non-financial sector has in the past tended to respond more quickly when the financial cycle turns, so may be a more timely indicator of the potential need to release the CCB. Strong nominal credit growth can also be a useful corroborative indicator of rising risks in the upswing, especially since it can speak directly to rising levels of indebtedness.⁽³⁾ It has tended to precede many different crises (Chart 13 and Chart A in Box 3 on pages 30–31) — for example, private sector credit to residents in Ireland grew at an annual

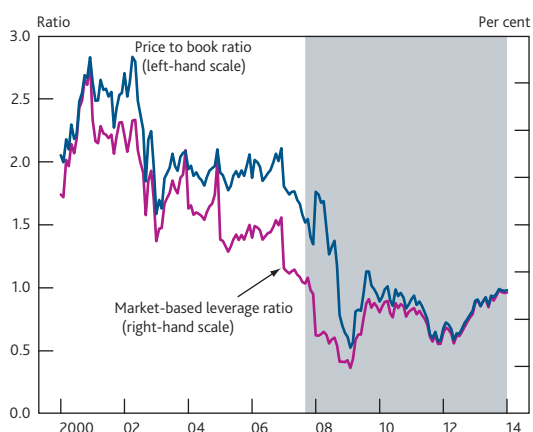
Chart 11 UK banks' senior CDS premia^{(a)(b)}



Sources: Markit Group Limited, published accounts and Bank calculations.

(a) Average of major UK banks' five-year senior CDS premia, weighted by end-year total assets.
(b) Includes Nationwide from July 2003.

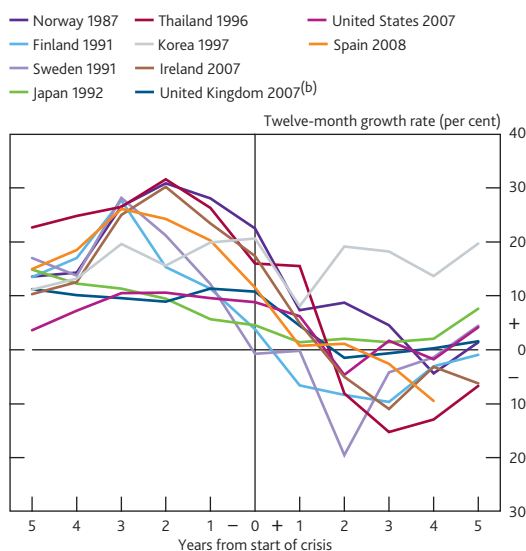
Chart 12 UK banks' price to book and market-based leverage ratios^{(a)(b)}



Sources: Thomson Reuters Datastream, published accounts and Bank calculations.

(a) The price to book ratio 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, are shown. The market-based leverage ratio is defined as 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).
(b) The sample comprises the major UK banks excluding Britannia, Co-operative Banking Group, and Nationwide. Northern Rock/Virgin Money are excluded from 2008.

Chart 13 Nominal credit growth before and after major banking crises^(a)



Sources: IMF International Financial Statistics, ONS and Bank calculations.

(a) The years beside the country names give the dates of the first year of a banking crisis, based on Reinhart and Rogoff (2009).
(b) For the definition of UK credit please see Chart A in Box 3 on pages 30–31.

- (1) Haldane and Madouros (2012). Consistent with the definition used for balance sheet leverage ratios, this Policy Statement defines market-based leverage ratios by dividing market capitalisation by assets rather than the reverse.
- (2) Berg, Borensztein and Pattillo (2005).
- (3) Koo (2008) and Reinhart and Rogoff (2009) discuss how rising levels of indebtedness may increase the potential for future instability. See Box 3 for further details. An important consideration in this regard is how credit moves relative to other nominal variables.

rate of over 20% between early 2004 and early 2008. But credit growth can be volatile. Hence, unsustainable increases in the stock of credit, as would be captured by credit-to-GDP measures, may be of greater concern than short periods of strong credit growth, which may sometimes cool down in an orderly fashion.⁽¹⁾

Credit measures provide indicators of the indebtedness of the UK private non-financial sector. But developments in the broader national balance sheet can also threaten financial stability.⁽²⁾ For example, excessive borrowing from abroad at the national level can expose a country to large and sudden capital outflows, creating vulnerabilities somewhat similar in nature to those generated by a high loan to deposit ratio in banks. In particular, foreign funding tends to be flightier than domestic debt both because foreign investors may be more likely to withdraw in periods of disturbance and because they may feel more comfortable investing at home during periods of global stress.⁽³⁾ In addition, excessive foreign financing can generate exchange rate risk if there is a mismatch in the currency denomination of the United Kingdom's claims and obligations. It may also play a role in driving domestic credit booms if external investors are searching for yield or otherwise have a high appetite for risk. Increasing capital requirements in such circumstances may, therefore, help to limit the potential fallout to the financial system from a sharp reduction in cross-border capital flows.

When assessing national balance sheets, it is important to consider both stocks of external assets and liabilities and the associated cross-border capital flows. Both net and gross measures matter.⁽⁴⁾ Net measures are useful for assessing the sustainability of a country's spending patterns and risks to the exchange rate. Gross measures reveal the composition of assets and liabilities, and therefore patterns of financial intermediation and consequent vulnerabilities to a withdrawal of external funding.

In terms of stock measures, the economy's **net foreign asset position (12)**, reflecting the difference between gross external assets and liabilities, is important because a large negative position may reveal cumulative unsustainable patterns in spending that may eventually necessitate macroeconomic adjustment if a country is to be able to service its debts. This can be painful with deficit countries having to save more (relative to investment) and export more (relative to imports). Metrics of net external balance sheets do not, however, give a complete picture as they may mask material differences between the holders of external assets and liabilities or significant mismatch risks stemming from (unhedged) differences between the currency and maturity of external assets and liabilities.

It is, therefore, also important to consider **gross external debt (13)** relative to GDP as well as gross external assets.

Gross positions can transmit risks via the global financial network either from creditor to borrower countries or *vice versa*. The gross external debt position provides an overall picture of a country's reliance on external debt funding. Within that, high levels of bank debt financing may be of particular concern, especially if it is short-term. Empirical research shows that countries that had accumulated large gross external debt positions ahead of the global financial crisis subsequently experienced larger declines in GDP.⁽⁵⁾ But substantial gross external debt may be less problematic if it is balanced at the level of individual institutions by large gross external assets which could be readily used to meet prospective outflows. In the United Kingdom, the size of gross positions reflects, in part, 'entrepôt' financial activities in the City of London: in particular, a significant component of the resident banking system comprises foreign-owned banks whose main business is to intermediate global capital flows by borrowing and lending externally — for example, at end-2011 only around 30% of UK resident monetary financial institutions' (MFIs) external debt liabilities were accounted for by currency and deposits of UK-owned banks and building societies.⁽⁶⁾ That said, some foreign-owned banks located in the United Kingdom are involved in lending to the UK real economy, with foreign branches having had a particular tendency to retrench on business lending during the global financial crisis. But since UK lending makes up only a relatively small fraction of their overall activity, the large gross external liabilities associated with these banks will probably exaggerate their direct relevance to the stable provision of financial services to the UK real economy. At the same time, gross external assets can pose a significant risk to creditor countries if the assets are particularly illiquid or risky and are financed by debt liabilities, or if there are significant foreign exchange mismatches between assets and liabilities. So if the United Kingdom exhibits a large build-up of gross external assets, it is important to consider what underlies it.

While stock measures can provide an important picture of the current position of the national balance sheet, flow measures are likely to be useful in identifying growing risks. These include measures of different types of gross capital flows, which are conceptually equivalent to the change in the relevant stock positions, adjusted for valuation effects stemming from movements in exchange rates and financial asset prices; and changes in net foreign assets, also adjusted for valuation effects, as measured by the **current account (14)**. Gross flows may help to capture a build-up in national funding risks, while the current account may be

(1) See Drehmann, Borio and Tsatsaronis (2011).

(2) Senior and Westwood (2000) and Hoggarth, Mahadeva and Martin (2010).

(3) These patterns have been evident in a range of crises — see, for example, Hoggarth, Mahadeva and Martin (2010), Box 1 of Bank of England (2012b), Giannetti and Laeven (2012) and Hahn, Shin and Kwanho (2013).

(4) Cecchetti (2011) and Tucker (2012a).

(5) Al-Saffar, Ridinger and Whitaker (2013).

(6) This underestimates the share of external debt accounted for by UK-owned institutions, as data are not available to split securities held by non-residents between UK and foreign-owned MFIs.

Box 3

Credit-to-GDP indicators and the Basel III guidance

The Basel III agreement sets out a reference guide to foster a consistent approach to decision making on the CCB rate. It is based on the so-called credit-to-GDP gap indicator. This measures the amount of credit that has been extended to the household and corporate sectors divided by the level of GDP, with allowance made for potential shifts over time in the sustainable level, or trend, of that ratio.⁽¹⁾ The size of the credit gap is then translated into a guide for setting the CCB rate applied to exposures to a particular jurisdiction. The measure aims to capture whether credit in the economy is dangerously high and therefore warrants activating the CCB. Under the EU's CRD IV/CRR, the FPC will be required to publish a guide broadly along these lines each quarter and explain its decisions on the CCB rate applied to UK exposures with reference to it. The ESRB, tasked with working out details, has yet to issue guidance on precisely how such a guide should be calculated.⁽²⁾

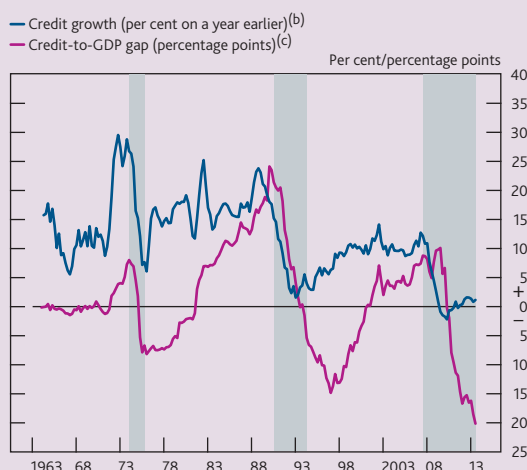
How well does the credit-to-GDP measure perform?

Credit booms tend to go hand in hand with rapid expansions in the balance sheets of banks and other leveraged financial institutions. Strong credit growth has characterised the build-up to many financial crises in history — this includes the Great Depression, the Nordic and Japanese crises of the late 1980s and early 1990s, many emerging market crises such as the East Asian crisis, and the global financial crisis.⁽³⁾

The credit-to-GDP gap as defined in Basel III would have signalled emerging vulnerabilities in the United Kingdom prior to past crises (**Chart A**). Ahead of the global financial crisis, the reference guide would have pointed towards activating the CCB in 2002.⁽⁴⁾ Looking back, it also suggests that the CCB should have been activated ahead of the secondary banking crisis in the 1970s and the small banks' crisis in the early 1990s. More generally, wider cross-country evidence over many different crises tends to support the conclusion that the credit-to-GDP gap is a useful leading indicator of crises.⁽⁵⁾

As the Basel III guidance notes, the measure may, however, be a poor indicator of the possible need to reduce the CCB in the face of deteriorating credit conditions as it typically continues to increase at the onset of a crisis. In particular, while GDP might decline rapidly, the stock of credit can be slow to fall, especially if companies draw on credit lines previously provided by financial institutions, highlighting the potential usefulness in looking at movements in its two components separately. The indicator may also be sensitive to the way the trend is computed which could limit its reliability. It may mask concerns arising from a sustained period of fast credit growth

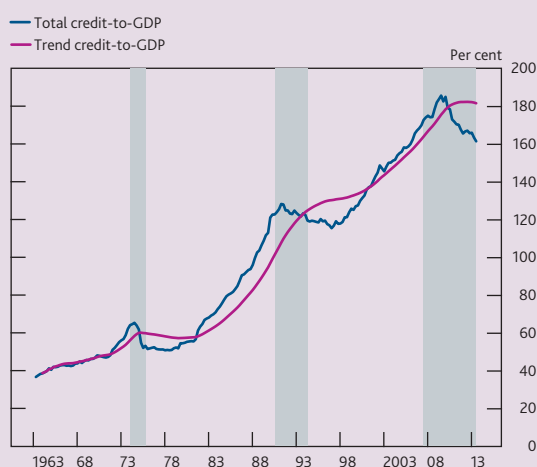
Chart A UK credit gap and credit growth^(a)



Sources: Bank of England, ONS and Bank calculations.

- (a) 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' loans and debt securities excluding derivatives, direct investment loans and loans secured on dwellings. ONS data are not available before 1987. Before then, stable relationships between the ONS household and private non-financial corporation debt data and Bank of England household and private non-financial corporation lending data are assumed and the ONS household and private non-financial corporation debt series is assumed to grow at the same rate as the Bank of England household and private non-financial corporation lending series.
- (b) Twelve-month growth rate of nominal credit.
- (c) 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.

Chart B UK credit-to-GDP ratio^(a)



Sources: Bank of England, ONS and Bank calculations.

- (a) Credit is defined as in **Chart A** and the credit-to-GDP trend is calculated as in **Chart A**.

that is potentially well in excess of nominal GDP growth because it will treat some of the expansion in credit as sustainable — for example, in **Chart B**, if the level of the credit-to-GDP ratio (blue line) had been exactly in line with the trend (magenta line) between the late 1990s and the global financial crisis, the credit-to-GDP gap indicator would have measured zero but the rise in the level of credit relative to GDP would have been of concern. Rising indebtedness may indicate the potential for future instability by making the economy more vulnerable to shocks and by increasing the deflationary effect of subsequent deleveraging. Indeed some empirical evidence suggests that aggregate leverage in the economy beyond a certain level may be harmful for stability.⁽⁶⁾

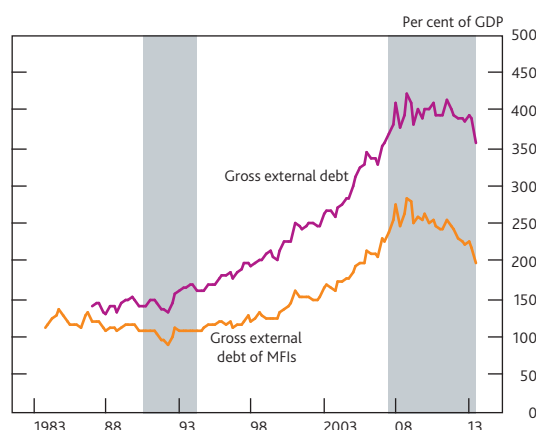
It is, therefore, important to complement the credit-to-GDP gap measure with other indicators — a point acknowledged in the Basel III guidance and in EU legislation.⁽⁷⁾ It is in this spirit that the FPC will also consider credit-to-GDP levels in their own right (**Chart B**) and, more generally, has set out a complementary core set of indicators to sit alongside credit-to-GDP measures.

- (1) See Basel Committee on Banking Supervision (2010c). More specifically, the guide uses a broad definition of credit including all credit extended to households and private non-financial corporates (PNFCs) independent of its form and the identity of the supplier of funds. To calculate the credit-to-GDP gap, a smooth version of the credit-to-GDP ratio, ie its trend, is subtracted from the actual ratio. The trend is calculated using a backward-looking, one-sided Hodrick-Prescott filter, meaning that it can be calculated in real time. Edge and Meisenzahl (2011) argue that a trend derived from a two-sided Hodrick-Prescott filter would be closer to the 'true' trend, but this would not be available for policymakers in real time. They also look into the effect of data revisions on the credit-to-GDP gap. In the United Kingdom, data revisions tend not to have had a large impact on the measured gap.
- (2) Basel III suggests that a credit gap of 2 percentage points maps to a CCB rate of 0% and a credit gap of 10 percentage points to a CCB rate of 2.5%.
- (3) See Kindleberger (1989), Basel Committee on Banking Supervision (2004), Koo (2008), Schularick and Taylor (2012) and Dell'Ariccia *et al* (2012).
- (4) While the broad credit series from the ONS is shown here in line with the Basel III suggestion, there are some concerns with the data on private non-financial corporations therein. A narrow measure based on Bank of England data provides a robustness check — it would have suggested activating the CCB in 2003.
- (5) See Borio and Lowe (2002), Alessi and Detken (2011) and Drehmann, Borio and Tsatsaronis (2011). Barrell and Karim (2012), however, find little evidence that the ratio of credit-to-GDP affects the incidence of crises in OECD countries, although they find some role in emerging market economies.
- (6) See Koo (2008) and Reinhart and Rogoff (2009). Arcand, Berkes and Panizza (2012) and Cecchetti and Kharroubi (2012) make a related point, linking leverage in the economy to output growth.
- (7) In particular, Recital 82 of the CRD IV text notes that the '[methodology on the basis of the ratio between credit and GDP] should serve as a common starting point for decisions on buffer rates by the relevant national authorities, but should not give rise to an automatic buffer setting or bind the designated authority'.

indicative of the extent to which domestic credit is being financed over and above domestic saving, and could reflect an economy which is borrowing and spending unsustainably.

Charts 14 and 15 show how national balance sheet indicators, with the benefit of hindsight, signalled vulnerabilities in the United Kingdom prior to the global financial crisis. Gross external debt rose particularly rapidly from about 2004, with a significant portion of this accounted for by bank debt. And the United Kingdom's net foreign asset position deteriorated from the mid-1990s onwards, reflecting a persistent current account deficit. Adverse developments in national balance sheets have also been seen in other countries prior to crises. For example, some combination of large and persistent current account deficits (**Chart 16**) and high or rising external indebtedness were observed prior to the Latin American debt

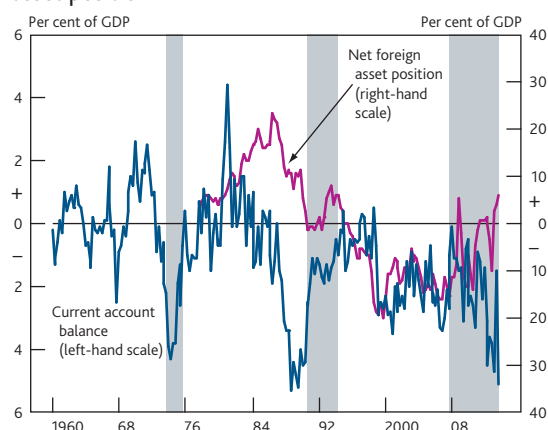
Chart 14 UK gross external debt^(a)



Sources: ONS and Bank calculations.

(a) Ratios computed using a four-quarter moving sum of GDP. MFIs are monetary financial institutions, and cover banks and building societies resident in the United Kingdom.

Chart 15 UK current account balance^(a) and net foreign asset position^(b)



Sources: ONS and Bank calculations.

(a) As per cent of quarterly GDP.

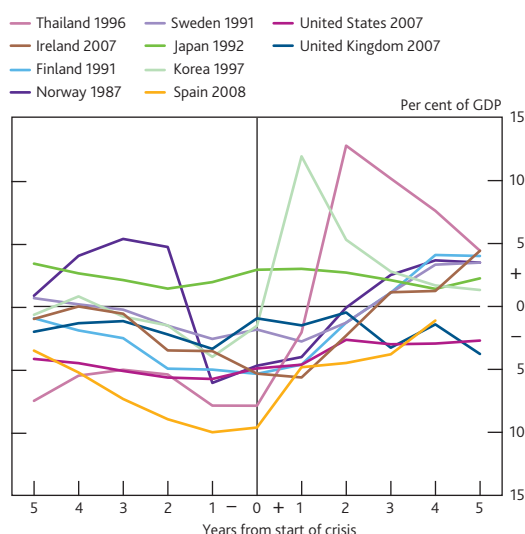
(b) As per cent of annual GDP (four-quarter moving sum).

crisis of the 1980s, the East Asian crisis of 1997–98, and the more recent crises in the United States and some euro-area economies.⁽¹⁾ And the importance of monitoring gross external assets is highlighted by Germany's recent experience — while running a current account surplus, German banks built up exposure to the US sub-prime market in the early to mid-2000s, subsequently suffering significant losses on those assets. Some of these exposures were booked in German affiliates outside Germany, including in the United States, highlighting the importance of also looking at foreign exposures on a group consolidated basis, including the local as well as cross-border claims on foreign countries of domestically owned banks.

- (1) More generally across a wide sample of countries, Reinhart and Reinhart (2008) and Barrell *et al* (2010) find that current account deficits are an important leading indicator of financial crises.

The shape of the United Kingdom's national balance sheet may sometimes be driven by developments outside the scope of the FPC, being influenced by changes in exchange rates and sometimes signalling incipient inflationary pressures. Also, even when the net foreign asset and current account positions look benign, domestic factors can still lead to banking system distress. For example, Japan experienced a prolonged banking crisis throughout the 1990s despite running a persistent current account surplus both beforehand and contemporaneously (Chart 16).

Chart 16 Current account balances before and after major banking crises^(a)



Sources: IMF *World Economic Outlook*, October 2013, ONS and Bank calculations.

(a) The years beside the country names give the dates of the first year of a banking crisis, based on Reinhart and Rogoff (2009).

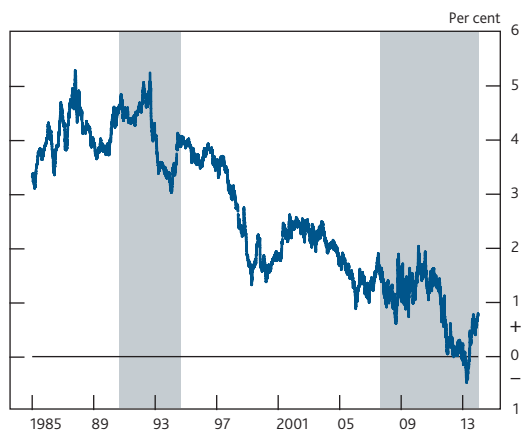
In addition, all external balance sheet indicators are prone to significant measurement error and data revisions. That highlights the importance of developing better data in this area, and a need to exercise caution in interpreting movements in the series.

Conditions and terms in markets (indicators 15–18)

Exuberance often arises in the financial system when lenders and market participants switch into riskier activities in an effort to chase high returns. Given the presence of absolute return targets, including return on assets or return on equity, this may be more likely when the return on relatively safe assets, as might be reflected by the level of the **long-term real interest rate (15)** (ie the long-term interest rate adjusted for expected inflation), is low.⁽¹⁾ For example, low and falling long-term real interest rates prior to the global financial crisis (Chart 17) — reflecting high global desired saving relative to investment, a shortage of safe assets and the possible effects of persistently accommodative monetary policy on expected real interest rates and term premia — may have played a role in driving the subsequent 'search for yield'.⁽²⁾ In such conditions, the FPC might therefore increase the CCB to build resilience. But the long-term real interest rate can move for

many reasons, not all of which may generate financial stability risks. The FPC will need to assess the underlying reasons for such movements when considering the appropriate policy response.

Chart 17 UK long-term real interest rate^(a)



Sources: Bloomberg and Bank calculations.

(a) Five-year real interest rates five-years forward, derived from the Bank's index-linked government liabilities curve.

Broad conditions in global capital markets can be indicative of overall levels of risk appetite and uncertainty in the financial system. These may be reflected both in metrics relating to equity markets, such as the **VIX (16)**, which captures expectations of stock market volatility; and those relating to debt markets, such as measures of **global corporate bond spreads (17)** over risk-free rates. Compressed global debt spreads are likely to reflect, and potentially be driven by, low levels of volatility and uncertainty. In such conditions, risk may be priced too cheaply, through a search for yield and compression of term and liquidity premia.⁽³⁾ Self-reinforcing dynamics may emerge if flows into risky assets push down measured risk or temporarily improve liquidity, thereby prompting further asset reallocation. It may, therefore, be appropriate to increase the CCB in such circumstances since banks may subsequently be exposed to a dislocation in financial markets when the exuberance dissipates. By contrast, if expected volatility falls during a downturn in the financial cycle, this may point to a reduction in the risk of adverse outcomes and receding threats to banking system resilience and could, therefore, be a signal to reduce the CCB. The appropriate policy following a sharp reversal in risk appetite and rise in volatility following a period of exuberance may be harder to judge. It may signal a sharp tightening of credit conditions, which could suggest a need to reduce the CCB. But it would also be important to consider how such developments might affect the risk of direct losses to banks and uncertainty around that, as discussed in Section 4.1.

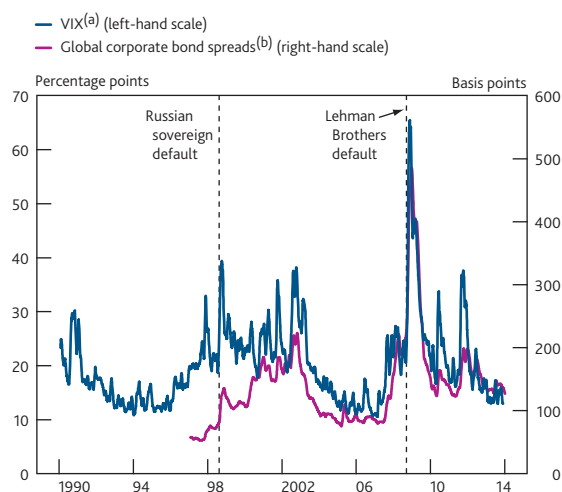
(1) For example, Borgy, Clerc and Renne (2009) find that a decrease in the long-term real interest rate increases the likelihood of asset price booms.

(2) Astley *et al* (2009), Bernanke *et al* (2011), King (2011), Hanson and Stein (2012) and Tucker (2012a).

(3) See Bank of England (2004) for a discussion of such developments prior to the global financial crisis.

Chart 18 suggests that global risk appetite rose in the early to mid-2000s alongside investor expectations of a more benign economic environment, before subsequently reversing with the onset of distress in 2007. The connection between conditions in wider financial markets and threats to the banking system may, however, vary over time. These indicators need to be considered alongside measures of balance sheet stretch both within the banking system and outside it, and in light of the scale of direct and potential indirect exposure of banks to global capital markets.

Chart 18 VIX and global corporate bond spreads

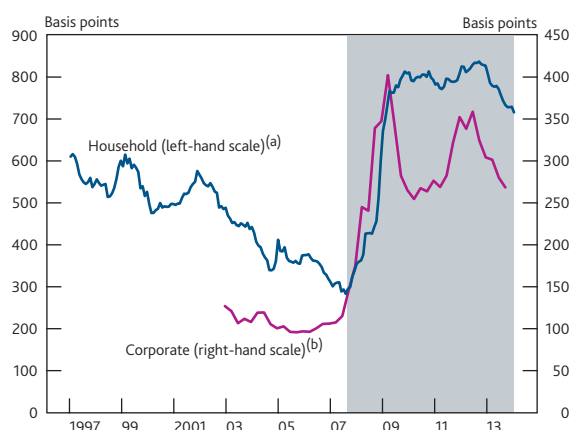


Sources: Bloomberg, Bank of America Merrill Lynch and Bank calculations.

- (a) One-month moving average. The VIX is a measure of market expectations of 30-day volatility as conveyed by S&P 500 stock index options prices.
 (b) One-month moving average. '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).

Spreads on new lending (18) in the United Kingdom (ie the cost of borrowing relative to risk-free rates) provide a timely gauge of conditions in domestic loan markets. Rising lending spreads during periods of stress may highlight the potential need to reduce the CCB to try to mitigate a sharp contraction in credit, provided that such an action is consistent with the FPC's resilience objective. In expansions, considering spreads alongside changes in the quantity of credit may help to identify whether credit growth is largely driven by an increase in supply by financial institutions or by strong demand from households and businesses. The former may point to rising threats to financial stability and is likely to be suggestive of a need to increase the CCB; the latter may indicate overoptimistic assumptions about future income growth, with further analysis needed to identify whether this poses a risk to the financial system. For example, prior to the crisis, low and falling lending spreads in the corporate and household sectors (**Chart 19**) alongside rapid growth in the quantity of credit were indicative of a supply driven expansion; whereas the somewhat higher spreads during the previous credit expansion in the late 1980s, especially in the household sector, may have

Chart 19 Indicative spreads on new UK lending



Sources: Bank of America Merrill Lynch, Bank of England, British Bankers' Association, Bloomberg, Council of Mortgage Lenders, De Montfort University, Department for Business, Innovation and Skills, FCA Product Sales Data and Bank calculations.

- (a) 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 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 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.
 (b) The 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.

pointed towards a greater balance between supply and demand factors.⁽¹⁾

It should, however, be noted that lending spreads are affected by the degree of competition, which varies across different products in the United Kingdom, and a range of other factors which may not be linked to the financial cycle. In addition, data limitations and differences across types of borrower make it difficult to construct overall measures of loan spreads, particularly for the corporate sector, so it is important to analyse whether particular market segments are driving observed movements. In this regard, other information, such as the Bank of England's *Credit Conditions Survey*, is likely to provide useful intelligence on overall conditions in loan markets.

4.3 Core indicators for sectoral capital requirements Bank balance sheet stretch (indicators 1–5)

Aggregate **capital ratios (1)** and **leverage ratios (2)** can help the FPC to judge whether to adjust SCRs, as well as the CCB. As discussed in Section 4.2, the relationship between these indicators, as captured in average risk weights, is also informative in its own right. In principle, average risk weights in each of the three broad sectors to which the SCR tool may be applied are, therefore, natural indicators of sectoral risks on banks' balance sheets. While falling risk weights in a particular sector could reflect relatively 'safe' balance sheet expansion, they might also signal exuberance which would point towards a need to increase the SCR for that sector. The FPC will,

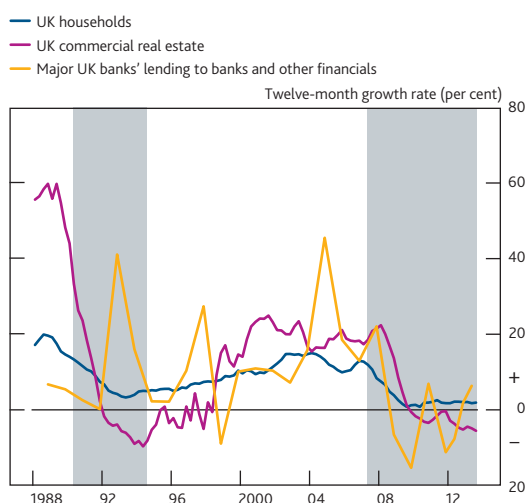
(1) See Breedon and Joyce (1992) and Anderson (2004).

therefore, consider the evolution of **average risk weights on mortgages (3)** and plans to extend this metric to commercial property and financial sector exposures when data availability improves.⁽¹⁾

A key reason for adjusting SCRs is to enhance resilience in response to material concentrations of risk on financial institution balance sheets. Collectively, UK banks will always be heavily exposed to the three sectors over which the Government has granted the FPC a power of Direction. But rapid growth in exposures could signal growing vulnerabilities either across a sector or within a particular part of it. For residential and commercial property lending, economy-wide measures of credit growth in those sectors, discussed further below, are likely to be highly correlated with growth in banking sector exposures. But risks to banks from connections with other financial sector players, or 'counterparties', arise from both lending and borrowing relationships, and from other activities such as trading and risk management, and including derivative transactions. If financial sector counterparties get into difficulty, they may not only precipitate direct losses to banks but could also contribute to funding pressures on them, as was the case when US money market mutual funds reduced their lending to the core banking system during the global financial crisis. This suggests that bank balance sheet measures of **the growth rates of intra-financial system lending and borrowing, and in the notional value of derivatives (4)** (supplemented with information and market intelligence on the counterparty risk created by derivative transactions) may help to gauge changing systemic risks from connections both among banks and between the banking sector and the rest of the financial system.⁽²⁾ For example, growth in intra-financial system lending was particularly pronounced in the United Kingdom prior to the crisis and played a strong role in the subsequent collapse (**Chart 20**).

In relation to vulnerabilities created by concentrations of risk in foreign countries, the FPC will consider an extended version of the CCB **overseas exposure indicator (5)** to highlight system-wide sectoral exposures to foreign countries which are both significant relative to capital and growing rapidly.⁽³⁾ For example, this would have flagged concerns over UK banks' exposures to the US non-bank private sector in late 2006, and possibly earlier and specifically in the household sector had the relevant data been available at the time. Such a signal could then have facilitated a more thorough investigation of the underlying drivers of the vulnerability, which may have revealed sub-prime lending as a particular concern. The indicator should be viewed with the same caveats as the equivalent CCB indicator — for example, it would not have captured UK banks' indirect exposures to sub-prime mortgages, via their exposures to US banks and securities houses that were suffering heavy losses and via effects operating through international financial markets.

Chart 20 UK sectoral credit growth^(a)



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

(a) Twelve-month nominal growth rate of credit. Household series includes all liabilities of the household and not-for-profit sector. Commercial real estate series includes UK-resident banks' and building societies' claims on the sector (including lending for development of buildings). Intra-financial series, derived from published accounts, includes lending to other banks and other financial corporations. This series is 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.

Non-bank balance sheet stretch (indicators 6–9)

Section 4.2 discusses the role of credit expansions and contractions in the financial cycle. But such developments have often been concentrated in particular sectors. For example, commercial property lending was especially exuberant in the United Kingdom prior to the crisis, while lending to the UK real economy, especially to small and medium enterprises, has been particularly weak since the onset of stress (**Chart 20**). The Japanese crisis of the 1990s was preceded by rapid growth in lending across a number of sectors, including to consumers, the real estate industry and small and medium-sized enterprises, all of which reversed rapidly during that crisis. And in advance of the Nordic crises in the late 1980s and early 1990s, there was a boom in credit to the real economy, particularly in the household and commercial property sectors.⁽⁴⁾ This experience points towards the usefulness of **sectoral nominal credit growth (6)** as an indicator of both the potential need to raise SCRs during upswings and lower them during downswings.

Growth in real-economy credit and intra-financial sector connectivity may, however, be of greater concern when it is

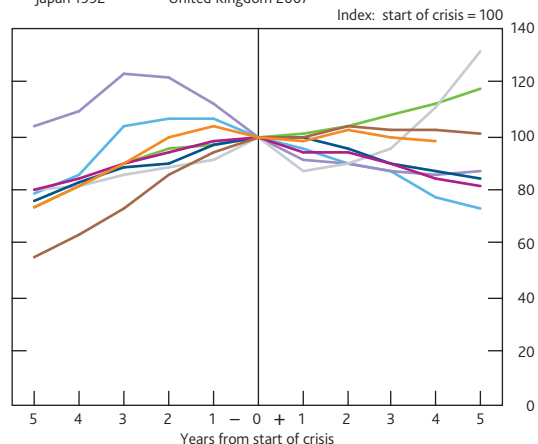
- (1) Some data gaps will be filled over the next two years as the United Kingdom implements COREP, the EU-wide common supervisory reporting framework, which is mandatory under CRD IV.
- (2) The notional value of a derivative is the face amount that is used to calculate payments made on it. The intra-financial lending and borrowing, and notional derivatives series discussed in this Policy Statement are estimated based on published accounts disclosures. These disclosures 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.
- (3) Overseas sectoral exposures cannot currently be broken down further than at the non-bank private sector level. The intention is to divide them into households and corporates as new data become available over the next couple of years.
- (4) See Basel Committee on Banking Supervision (2004); and, on Japan, Ichinose (1999) and Box 2 in Bank of England (2012b).

persistent and when borrowers or counterparties are heavily indebted. So indicators of balance sheet stretch in different sectors will be a useful complement. In particular, high indebtedness relative to the ability of households, businesses and financial institutions to generate income may pose systemic risks to the financial system, which could emerge if the economy enters a downturn and borrowers are no longer able to repay their debts or financial sector counterparties get into difficulty. This highlights the importance of considering: **household debt to income ratios (7)** in relation to SCRs on residential mortgage lending; the extent of **corporate gearing (8)** in relation to SCRs on commercial property lending, as measured by private non-financial corporations' debt to operating surplus ratio; and the **indebtedness of non-bank financial institutions (NBFIs) (9)** relative to GDP (excluding insurance companies and pension funds) in relation to SCRs on financial sector exposures.⁽¹⁾ It should, however, be noted that rising indebtedness may be less of a concern if financed by long-term investors using their own wealth rather than by leveraged financial institutions because any losses which then arise are less likely to be amplified. And, with all of these indicators, it may be difficult to disentangle slow-moving trends in indebtedness from cyclical swings. Although slow changes could be a cause for concern because fragility can increase even if indebtedness grows gradually, they might reflect non-threatening developments in the financial system.

Household debt to income ratios have increased sharply in advance of a wide range of crises internationally, playing, for example, a key role during the global financial crisis in the United States and Ireland (**Chart 21**).⁽²⁾ In the United Kingdom, the household debt to income ratio rose sharply

Chart 21 Household debt-to-income ratios before and after major banking crises^(a)

Finland 1991 Korea 1997 United States 2007
Sweden 1991 Ireland 2007 Spain 2008
Japan 1992 United Kingdom 2007

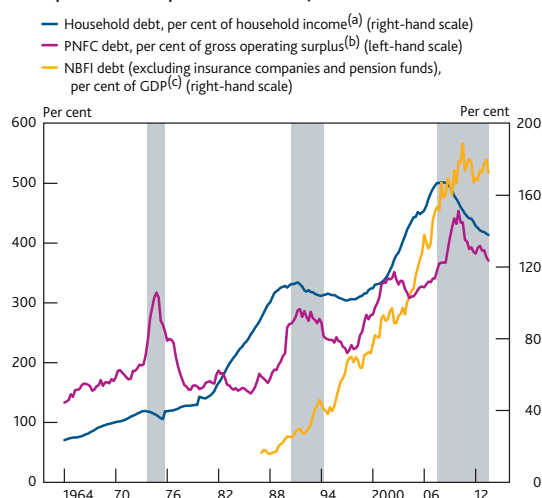


Sources: Bank of Finland, Bank of Japan, Bank of Korea, Economic and Social Research Institute (Japan), OECD, ONS, the Riksbank, Statistics Sweden and Bank calculations.

(a) The ratio of the stock of household debt to household income. The definition of debt and income varies slightly from country to country, depending on data availability. The years beside the country names give the dates of the first year of a banking crisis, based on Reinhart and Rogoff (2009).

prior to both the global financial crisis and the small banks' crisis of the early 1990s (**Chart 22**). UK banks have, however, experienced relatively limited losses on their household exposures to date during the crisis, in contrast to the early 1990s where widespread repossessions precipitated large losses at some financial institutions,⁽³⁾ although this also reflects the unusually accommodative stance of monetary policy. On the corporate side, gearing was also high in both the United Kingdom (**Chart 22**) and Ireland prior to the global financial crisis. And very high levels of corporate indebtedness were evident in Japan in the late 1980s, playing a major role in the subsequent collapse.

Chart 22 UK household debt to income, corporate debt to profit and NBFI debt to GDP (excluding insurance companies and pension funds) ratios



Sources: Bank of England, 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. ONS data on household debt are used from 1989. Before then, due to limited data availability, a stable relationship is assumed between the ONS debt data and the Bank of England lending data. 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. ONS data on private non-financial corporate (PNFC) debt are used from 1989 due to limited data availability. Before then, a stable relationship is assumed between the ONS debt data and the Bank of England lending data. The corporate gross operating surplus series is adjusted for FISIM.
- (c) Gross debt as a percentage of four-quarter moving sum of nominal GDP. The NBFI sector includes all financial corporations apart from monetary financial institutions (ie deposit-taking institutions). This indicator additionally excludes insurance companies and pension funds.

Financial institutions accounted for some two thirds of the increase in the UK debt to GDP ratio between 2003 and 2007. In addition to banks, rising financial sector indebtedness was evident across a wide range of other financial institutions, instruments and structures replicating the core features of commercial banks but subject to less stringent regulation (the so-called 'shadow banking' sector). Such NBFIs may be highly vulnerable to shocks if they take on too much debt, particularly in the face of a high or increasing mismatch between short-term debt and longer-term assets, which increases the risk of bank runs.⁽⁴⁾ And they can threaten the

- (1) If measured relative to trend, these measures would be similar to sectoral versions of the credit-to-GDP gap indicator for the CCB. A related indicator which also captures interest payments would be a sector's debt service ratio. Drehmann and Juselius (2012) have found this to be a promising measure for signalling growing vulnerabilities.
- (2) On the US experience, see Mian and Sufi (2009, 2011).
- (3) See Bank of England (2012a).
- (4) These risks typically arise less in the case of insurance companies or pension funds, explaining their exclusion from the indicator.

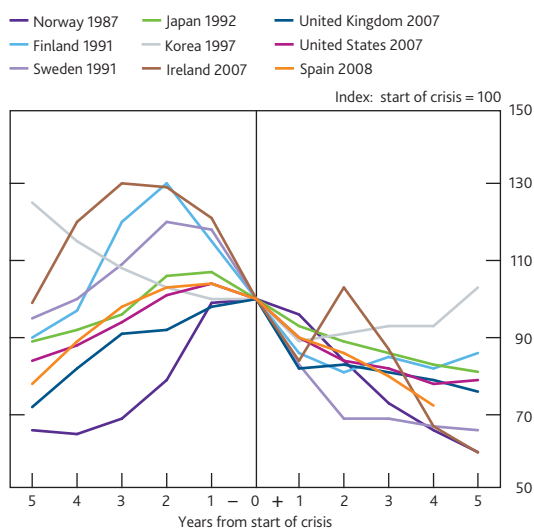
core banking system via both direct connections and indirect effects operating through disruption to wider financial markets, highlighting the need for frequent analysis and market intelligence to understand the nature of these connections and how they vary across different NBFIs.

The indebtedness of UK NBFIs, excluding insurance companies and pension funds (Chart 22), provides one source of high-level information on changing systemic risks emanating from the shadow banking sector.⁽¹⁾ The indicator is, however, an imperfect measure. Its UK focus reflects current data constraints but broader, global developments in shadow banking are a key area of attention for the FPC as UK banks are highly integrated into the global financial network. Given the diversity of shadow banks, and NBFIs more generally, it will also be important to look beyond movements in the headline indicator to consider which particular types of activity or institution might be driving changes in the size and nature of indebtedness. To facilitate this, the FPC will seek to develop further indicators in this area and wishes to see improved 'flow of funds' data that track financial flows around the system.

Conditions and terms in markets (indicators 10–12)

Strong growth in bank lending may be of particular concern when accompanied by exuberance in property markets. Rapidly rising **residential and commercial property prices (10)** have, with hindsight, signalled impending stress across many countries, often peaking 1–2 years in advance of crises (Chart 23). Experience during the global financial crisis in the United States, Spain and Ireland has illustrated how corrections in credit-funded housing booms can have significant adverse implications for the wider economy.⁽²⁾ And, over past decades in the United Kingdom, peaks in the deviation of house prices relative to income, rent or the

Chart 23 House price to rent ratios before and after major banking crises^(a)

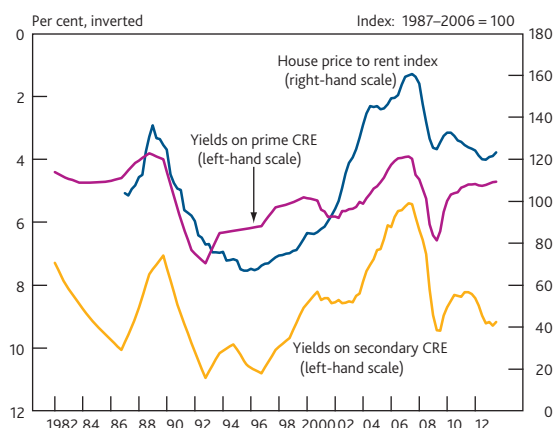


Sources: Halifax, Nationwide, OECD Economic Outlook database, ONS and Bank calculations.

(a) The years beside the country names give the dates of the first year of a banking crisis, based on Reinhart and Rogoff (2009).

long-term trend of prices have all tended to precede crises. The same is true of commercial property prices (Chart 24), although divergent trends in primary and secondary commercial real estate yields also highlight the importance of looking beyond aggregates which may conceal exuberance in particular segments of the market.

Chart 24 UK real estate indicators^{(a)(b)}



Sources: Halifax, Investment Property Databank (IPD), Nationwide, ONS and Bank calculations.

(a) The residential house price to rent index is the ratio between an average of the seasonally adjusted Halifax and Nationwide house price indices and RPI housing rent.
(b) The prime (secondary) yield is the ratio between the weighted averages of IPD's measures of rental income and capital values for the lowest (highest) yielding quartile of commercial properties.

Property price measures may, therefore, be useful in gauging the need to increase SCRs on mortgage and commercial property lending and also the need to reduce them, given that they may adjust rapidly with the onset of stress. At the same time, such measures can often appear elevated for long periods, so it may be difficult to use them to identify the appropriate time to increase SCRs. It is also difficult to identify what might represent an appropriate 'equilibrium' level or trend. So, while the core indicator set uses a price to rent ratio for residential housing, and commercial real estate yields (the inverse of the price to rent ratio) to gauge the sustainability of property prices, it may be particularly informative in this case to consider a range of complementary indicators of property prices. The FPC has highlighted a number of such indicators in its November 2013 *Financial Stability Report*.⁽³⁾

Swings in property markets often go hand in hand with changes in mortgage availability.⁽⁴⁾ Although the provision of some individual mortgages with high LTV or LTI ratios may be appropriate, excessive average LTV ratios have been a feature of the build-up to several financial crises. For example, risky mortgages played a major role in contributing to the US property boom prior to the global financial crisis, with higher LTV ratios also subsequently associated with higher

(1) Financial Stability Board (2012a, 2012b) discuss the risks from shadow banking and a range of possible indicators which may be used for monitoring the sector.

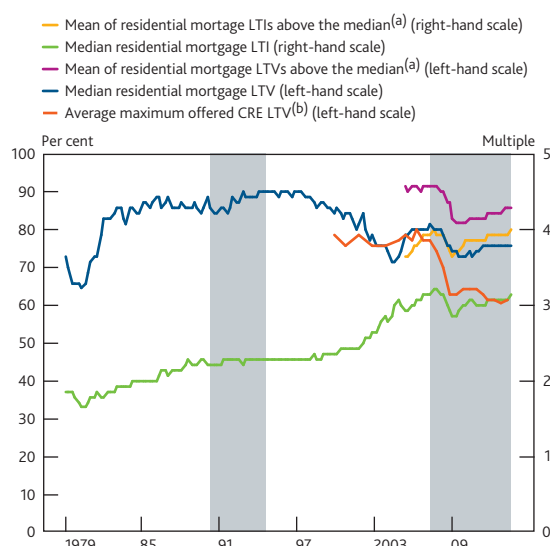
(2) See also Barrell *et al* (2010) and Drehmann, Borio and Tsatsaronis (2011).

(3) See Bank of England (2013b).

(4) For example, Crowe *et al* (2013) find a relationship between high LTV ratios and high house price growth.

default rates.⁽¹⁾ Tracking movements in LTV and LTI ratios on new real estate lending (11) may, therefore, provide a guide as to whether SCRs on residential or commercial real estate lending, including at the more granular level of high LTV or high LTI lending, might need to be adjusted. There is, however, less evidence of LTV ratios on new mortgages rising materially in the United Kingdom prior to the global financial crisis or the early 1990s crisis, though LTI ratios on residential mortgages were, in retrospect, a better indicator of impending distress (Chart 25) and a coincidence of high LTVs and high LTIs may generate particular concerns. Since it is the upper end of the distribution of LTVs and LTIs that tends to create financial stability risks, the indicators selected are based on the average LTV and LTI in the top half of the distribution for residential mortgages, and the average across commercial property lenders of the maximum LTV granted on their lending secured by commercial property.

Chart 25 UK loan to value and loan to income ratios on new real estate loans



Sources: FCA Product Sales Data, Council of Mortgage Lenders, De Montfort University and Bank calculations.

- (a) 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 10). 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.
- (b) Average of the maximum offered loan to value ratios across major CRE lenders.

As discussed in Section 4.2, spreads on new lending (12) provide a timely gauge of credit conditions in lending markets. They may be used as indicators for the SCR tool in a very similar way as for the CCB tool, but focussing on residential mortgages and commercial real estate lending (Chart 26). Information on LTV and LTI ratios as well as spreads may be usefully supplemented by wider information on lending terms, in particular underwriting standards for both residential and commercial real estate lending.

Similar considerations highlight the importance of considering the terms, conditions and pricing of lending and financing

Chart 26 Indicative spreads on new UK real estate lending^{(a)(b)}



Sources: Bank of England, Bloomberg, Council of Mortgage Lenders, De Montfort University, FCA Product Sales Data and Bank calculations.

- (a) The residential mortgage lending spread 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 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.
- (b) The CRE lending spread is the average of rates across major CRE lenders relative to Bank Rate.

transactions in wholesale financial markets when setting SCRs on financial sector exposures. For example, margin requirements on secured lending transactions between financial institutions, which have some similarities to an LTV ratio, fell prior to the global financial crisis as conditions became buoyant before spiking sharply with the emergence of concerns over sub-prime and complex securities.⁽²⁾ At present, there are limited regular information sources on such measures but the FPC wishes to see better data in this area and relevant indicators may be added to the core set as data availability and quality improve. In the meantime, the FPC will consider other sources of information on developments in this area, including market intelligence and surveys.⁽³⁾

4.4 What did the core indicators suggest prior to the global financial crisis?

Taken as a whole, how well would the indicator set have performed in pointing to the need to have increased the CCB rate applied to UK exposures and SCRs in the United Kingdom prior to the global financial crisis? As discussed, most of the core indicators pointed towards rising threats prior to the crisis — indeed, Tables C and D on pages 40–43 highlight several

- (1) Geanakoplos (2010).
- (2) Committee on the Global Financial System (2010) and Geanakoplos (2010). When the cash lent on repo trades is lower than the current market value of the security used as collateral, the discount is referred to as the haircut. Haircuts therefore act as the inverse of leverage. Conversely, the term 'margin' is used to describe the level of overcollateralisation required. If a firm lends £95 in cash against collateral of £100, the discount of 5% on the collateral is referred to as the haircut. The equivalent margin would be 5.26% ($5/95 \times 100$).
- (3) Data on margins and haircuts are expected to improve in the coming years. At present, the International Swaps and Derivatives Association publishes an annual survey on margins in over-the-counter (OTC) derivatives markets, and the International Capital Markets Association conducted a study of haircuts and initial margins in the repo market in February 2012. But such surveys and studies currently only provide a partial view on margins/haircuts in relevant markets. Several initiatives aim to improve data in this area (see Financial Stability Board (2012a, 2012b) and CPSS/IOSCO (2013)). The Bank also has access to information on margins (including methodologies) and collateral haircuts applied by CCPs that fall under its new supervisory responsibilities.

sharp differences from historical benchmarks by 2006. But it should also be acknowledged that these indicators have been identified with the benefit of hindsight. And while some of the indicators were showing warning signs in 2004 and 2005, with rising exposures to US households also evident, the overall picture was relatively less clear-cut. Coupled with publication lags for some data series, this highlights the risk that the indicators might not signal vulnerabilities sufficiently in advance of crises, emphasising the importance of applying judgement. In addition, while flagging higher-level concerns, intra-financial sector lending growth and the overseas exposure indicator would not have directly identified some of the more granular subsectors that contributed to the global financial crisis, such as particular types of financial sector exposure or US sub-prime. And movements in capital ratios, market-based measures of bank debt and LTV ratios on new mortgages failed to suggest rising vulnerabilities altogether (see **Charts 7, 11 and 25** respectively).

Compared with some of these measures, other indicators would have been more helpful in signalling increasing threats to resilience. For example, at the sectoral level, the easing of covenant restrictions on corporate lending or the fall in the quality of collateral required on wholesale secured lending between financial institutions may have pointed towards exuberance in those sectors.⁽¹⁾ Market intelligence had also identified some of the early indications of exuberance and rapid innovation in financial markets that subsequently contributed to the global financial crisis. This included

observations that investors and financial institutions were willing to take greater risks to preserve or increase financial returns in a search for yield, including by increasing leverage and buying potentially illiquid assets; and of vulnerabilities in the credit derivatives market, some of which were linked to efforts by investment banks to enhance the return on some of these securities.⁽²⁾

These considerations highlight that while the core indicator set is expected to capture broad developments in risks to financial stability, additional information and judgement will also be required, depending on the sources of risk and including both market and supervisory intelligence. This evidence will be included routinely in *Financial Stability Reports*.

5 Conclusion

Effective macroprudential policy tools are important to the FPC's ability to meet its objectives. The Government has proposed to make the FPC responsible for policy decisions on the CCB in the United Kingdom and has given the FPC Direction power over SCRs. This Policy Statement sets out how the FPC envisages each tool working, discusses their likely impact on financial stability and economic growth, and explains the circumstances in which the FPC might adjust the setting of each tool. As experience of operating the regime grows, the Policy Statement will be reviewed and updated by the FPC from time to time.

⁽¹⁾ Bank of England (2005) discussed the easing of corporate credit conditions.

⁽²⁾ See Rule (2001) and Bank of England (2004).

Table C Core indicator set for the countercyclical capital buffer^(a)

Indicator	Average, 1987–2006 ^(b)	Average 2006 ^(c)	Minimum since 1987 ^(b)	Maximum since 1987 ^(b)	Previous value (one year ago)	Latest value (as of 6 Jan. 2014)
Bank balance sheet stretch^(d)						
1 Capital ratio						
Basel II core Tier 1 ^(e)	6.6%	6.3%	6.1%	11.7%	10.8%	11.7% (2013 H1)
Basel III common equity Tier 1 ^(f)	n.a.	n.a.	n.a.	n.a.	7.8%	8.7% (2013 H1)
2 Leverage ratio ^(g)						
Simple	4.7%	4.1%	2.9%	5.4%	5.0%	5.3% (2013 H1)
Basel III initial proposal	n.a.	n.a.	n.a.	n.a.	4.0%	3.8% (2013 H1)
3 Average risk weights ^(h)	53.6%	46.4%	35.2%	65.4%	35.2%	35.8% (2013 H1)
4 Return on assets before tax ⁽ⁱ⁾	1.0%	1.1%	-0.2%	1.5%	0.3%	0.5% (2013 H1)
5 Loan to deposit ratio ^(j)	114.0%	132.4%	96.0%	133.3%	106.3%	100.6% (2013 H1)
6 Short-term wholesale funding ratio ^(k)	n.a.	24.5%	17.0%	26.8%	19.6%	17.0% (2012)
of which excluding repo funding ^(k)	n.a.	15.6%	6.7%	16.1%	9.9%	6.7% (2012)
7 Overseas exposures indicator: countries to which UK banks have 'large' and 'rapidly growing' total exposures ^(l)	In 2006 Q4: AU, BR, CA, CH, CN, DE, ES, FR, IE, IN, JP, KR, KY, LU, NL, US, ZA			In 2012 Q3: CH, CN, DE, JP, NL, SG		In 2013 Q3: CH, ES, HK, MY, SC, TW
8 CDS premia ^(m)	12 bps	8 bps	6 bps	298 bps	153 bps	93 bps (6 Jan. 2014)
9 Bank equity measures						
Price to book ratio ⁽ⁿ⁾	2.14	1.97	0.52	2.83	0.90	0.98 (6 Jan. 2014)
Market-based leverage ratio ^(o)	9.7%	7.8%	1.9%	14.9%	4.7%	5.1% (6 Jan. 2014)
Non-bank balance sheet stretch^(p)						
10 Credit-to-GDP ^(q)						
Ratio	128.0%	163.9%	91.2%	185.8%	167.2%	161.6% (2013 Q3)
Gap	2.9%	5.8%	-20.1%	24.1%	-15.2%	-20.1% (2013 Q3)
11 Private non-financial sector credit growth ^(r)	10.3%	10.0%	-2.2%	23.8%	1.6%	1.1% (2013 Q3)
12 Net foreign asset position to GDP ^(s)	-3.5%	-15.1%	-20.1%	21.6%	-9.8%	6.1% (2013 Q3)
13 Gross external debt to GDP ^(t)	202.5%	336.0%	130.8%	421.6%	389.3%	357.0% (2013 Q3)
of which bank debt to GDP	133.9%	210.0%	90.2%	285.1%	227.3%	198.4% (2013 Q3)
14 Current account balance to GDP ^(u)	-1.9%	-2.8%	-5.3%	0.5%	-3.6%	-5.1% (2013 Q3)
Conditions and terms in markets						
15 Long-term real interest rate ^(v)	3.10%	1.27%	-0.48%	5.29%	0.23%	0.77% (6 Jan. 2014)
16 VIX ^(w)	19.1	12.8	10.6	65.5	17.0	14.1 (6 Jan. 2014)
17 Global corporate bond spreads ^(x)	115 bps	87 bps	52 bps	486 bps	138 bps	127 bps (6 Jan. 2014)
18 Spreads on new UK lending						
Household ^(y)	478 bps	350 bps	283 bps	837 bps	808 bps	716 bps (Dec. 2013)
Corporate ^(z)	107 bps	102 bps	96 bps	402 bps	325 bps	269 bps (2013 Q3)

(a) A spreadsheet of the series shown in this table is available at 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 complete non-crisis year.

(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). As National Australia Bank, Nationwide and Virgin Money have not yet published their 2013 H1 results, their 2012 results are used for 2013 H1. 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 is annual with the exceptions of 2012 H1 and 2013 H1. Sources: PRA regulatory returns, published accounts and Bank calculations.

(f) 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, corresponding to the Basel III estimates submitted to the PRA by banks on a best endeavours basis. The Basel III sample includes Barclays, HSBC, Lloyds Banking Group, RBS, Nationwide, Santander UK and Co-operative Banking Group. Series starts in 2011. 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) and, in addition from 2011, a series corresponding to the estimates submitted to the PRA by banks on a best endeavours basis based on the original Basel III 2010 definition (BCBS (2010d)) (aggregate peer group Tier 1 capital over aggregate leverage ratio exposure). During 2013, the BCBS has been reviewing the exposure measure used for the Basel III definition, with a view to publishing a final definition early in 2014. This may differ from the definition used in this Policy Statement. Tier 1 capital includes some instruments which are subject to grandfathering arrangements. Note that the simple series excludes Northern Rock/Virgin Money from 2008, and the Basel III series consists of Barclays, Co-operative Banking Group, HSBC, Lloyds Banking Group, Nationwide, RBS and Santander UK. The simple series is annual with the exceptions of 2012 H1 and 2013 H1. Sources: PRA regulatory returns, published accounts and Bank calculations.

(h) Calculated dividing aggregate peer group risk-weighted assets by aggregate peer group assets. Series starts 1992. All data points are annual with the exception of 2012 H1 and 2013 H1. Sources: Published accounts and Bank calculations.

(i) Calculated as major UK banks' profit before tax divided by total assets. Total assets are averaged over the reference and previous year. Series is annual with the exceptions of 2012 H1 and 2013 H1. For these periods, profit before tax has been annualised and total assets are averaged for the previous twelve-month period. 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 FPC's current funding measures is that it is not possible to distinguish between retail deposits and deposits placed by non-bank financial institutions on a consolidated basis. The FPC wishes to see improved data in this area. The series begins in 2000 and is annual with the exceptions of 2012 H1 and 2013 H1. 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. In some cases 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' overall exposures are greater than 10% of UK-owned monetary financial institutions' 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. Tangible equity figures for 2006–07 are estimated using published accounts. Countries flagged in 2006 Q4 were Australia (AU), Brazil (BR), Canada (CA), Switzerland (CH), People's Republic of China (CN), Germany (DE), Spain (ES), France (FR), Ireland (IE), India (IN), Japan (JP), Republic of Korea (KR), Cayman Islands (KY), Luxembourg (LU), Netherlands (NL), United States (US) and South Africa (ZA). Countries flagged in 2012 Q3 were Switzerland (CH), People's Republic of China (CN), Germany (DE), Japan (JP), Netherlands (NL) and Singapore (SG). Countries flagged in 2013 Q3 were Switzerland (CH), Spain (ES), Hong Kong (HK), Malaysia (MY), Singapore (SG) and Taiwan (TW). Sources: Bank of England, ECB, IMF *World Economic Outlook* (October 2013), Thomson Reuters Datastream, published accounts and Bank calculations.

- (m) Average of major UK banks' five-year senior CDS premia, weighted by total assets. Series starts in 2003. Includes Nationwide from July 2003. Sources: Markit Group Limited, published accounts and Bank calculations.
- (n) 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.
- (o) 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 is excluded from 2008 and Virgin Money from 2012. Series starts in 2000. Sources: Thomson Reuters Datastream, published accounts and Bank calculations.
- (p) 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*.
- (q) 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 and private non-financial corporations' (PNFCs') loans and debt securities excluding derivatives, direct investment loans and loans secured on dwellings. ONS data are not available before 1987. Before then, stable relationships between the ONS household and PNFC debt data and Bank of England household and PNFC lending data are assumed and the ONS household and PNFC debt series is assumed to grow at the same rate as the Bank of England household and PNFC lending series. 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. Sources: Bank of England, ONS and Bank calculations.
- (r) Twelve-month growth rate of nominal credit. Credit is defined as above. Sources: Bank of England, ONS and Bank calculations.
- (s) As per cent of annual GDP (four-quarter moving sum). Sources: ONS and Bank calculations.
- (t) Ratios computed using a four-quarter moving sum of GDP. Bank debt refers to debt of MFIs which are monetary financial institutions, and cover banks and building societies resident in the United Kingdom. Sources: ONS and Bank calculations.
- (u) As per cent of quarterly GDP. Sources: ONS and Bank calculations.
- (v) Five-year real interest rates five years forward, derived from the Bank's index-linked government liabilities curve. Source: Bank of England.
- (w) 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.
- (x) '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. The series starts in 1997. Sources: Bank of America Merrill Lynch, Bloomberg and Bank calculations.
- (y) 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 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 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.
- (z) The 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 2002 Q4. Sources: Bank of America Merrill Lynch, Bank of England, BBA, Bloomberg, De Montfort University, Department for Business, Innovation and Skills and Bank calculations.

Table D Core indicator set for sectoral capital requirements^(a)

Indicator	Average, 1987–2006 ^(b)	Average 2006 ^(c)	Minimum since 1987 ^(b)	Maximum since 1987 ^(b)	Previous value (one year ago)	Latest value (as of 6 Jan. 2014)
Bank balance sheet stretch ^(d)						
1 Capital ratio						
Basel II core Tier 1 ^(e)	6.6%	6.3%	6.1%	11.7%	10.8%	11.7% (2013 H1)
Basel III common equity Tier 1 ^(f)	n.a.	n.a.	n.a.	n.a.	7.8%	8.7% (2013 H1)
2 Leverage ratio ^(g)						
Simple	4.7%	4.1%	2.9%	5.4%	5.0%	5.3% (2013 H1)
Basel III initial proposal	n.a.	n.a.	n.a.	n.a.	4.0%	3.8% (2013 H1)
3 Average mortgage risk weights ^(h)	n.a.	n.a.	18.9%	22.5%	20.7%	19.3% (2013 H1)
4 Balance sheet interconnectedness ⁽ⁱ⁾						
Intra-financial lending growth ^(j)	12.0%	13.0%	-15.3%	45.5%	-7.7%	6.4% (2013 H1)
Intra-financial borrowing growth ^(k)	14.1%	14.0%	-19.3%	28.9%	-4.0%	-13.1% (2013 H1)
Derivatives growth (notional) ^(l)	37.7%	34.2%	-18.0%	52.0%	-2.9%	6.9% (2013 H1)
5 Overseas exposures indicator: countries to which UK banks have 'large' and 'rapidly growing' non-bank private sector exposures ^(m)	In 2006 Q4: AU, CA, DE, ES, FR, IE, IT, JP, KR, KY, NL, US, ZA				In 2012 Q3: DE, SG	In 2013 Q3: CN, DE, FR, IE, SG
Non-bank balance sheet stretch ⁽ⁿ⁾						
6 Credit growth						
Household ^(o)	10.1%	11.4%	0.8%	19.9%	2.2%	1.9% (2013 Q3)
Commercial real estate ^(p)	15.3%	18.4%	-9.7%	59.8%	-4.7%	-5.5% (2013 Q3)
7 Household debt to income ratio ^(q)	114.5%	156.2%	91.9%	167.2%	140.5%	137.9% (2013 Q3)
8 PNFC debt to profit ratio ^(r)	269.0%	331.8%	166.1%	453.9%	395.3%	370.6% (2013 Q3)
9 NBFI debt to GDP ratio (excluding insurance companies and pension funds) ^(s)	62.3%	133.7%	15.8%	189.0%	174.2%	172.6% (2013 Q3)
Conditions and terms in markets						
10 Real estate valuations						
Residential price to rent ratio ^(t)	100.0	151.1	66.9	160.6	120.0	123.2 (2013 Q3)
Commercial prime market yields ^(u)	5.4%	4.0%	3.8%	7.3%	4.8%	4.7% (2013 Q3)
Commercial secondary market yields ^(u)	8.9%	5.8%	5.4%	10.9%	9.0%	9.2% (2013 Q3)
11 Real estate lending terms						
Residential mortgage LTV ratio (mean above the median) ^(v)	90.6%	90.6%	81.6%	90.8%	84.6%	85.3% (2013 Q3)
Residential mortgage LTI ratio (mean above the median) ^(v)	3.8	3.8	3.6	4.0	3.9	4.0 (2013 Q3)
Commercial real estate mortgage LTV (average maximum) ^(w)	77.5%	78.3%	60.4%	79.6%	60.7%	61.3% (2013 Q2)
12 Spreads on new UK lending						
Residential mortgage ^(x)	81 bps	50 bps	34 bps	361 bps	326 bps	197 bps (Dec. 2013)
Commercial real estate ^(y)	138 bps	137 bps	117 bps	409 bps	380 bps	319 bps (2013 Q3)

(a) A spreadsheet of the series shown in this table is available at 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 complete non-crisis year.

(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). As National Australia Bank, Nationwide and Virgin Money have not yet published their 2013 H1 results, their 2012 results are used for 2013 H1. 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 is annual with the exceptions of 2012 H1 and 2013 H1. Sources: PRA regulatory returns, published accounts and Bank calculations.

(f) 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, corresponding to the Basel III estimates submitted to the PRA by banks on a best endeavours basis. The Basel III sample includes Barclays, HSBC, Lloyds Banking Group, RBS, Nationwide, Santander UK and Co-operative Banking Group. Series starts in 2011. 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) and, in addition from 2011, a series corresponding to the estimates submitted to the PRA by banks on a best endeavours basis based on the original Basel III 2010 definition (BCBS (2010d)) (aggregate peer group Tier 1 capital over aggregate leverage ratio exposure). During 2013, the BCBS has been reviewing the exposure measure used for the Basel III definition, with a view to publishing a final definition early in 2014. This may differ from the definition used in this Policy Statement. Tier 1 capital includes some instruments which are subject to grandfathering arrangements. Note that the simple series excludes Northern Rock from 2008, and the Basel III series consists of Barclays, Co-operative Banking Group, HSBC, Lloyds Banking Group, Nationwide, RBS and Santander UK. The simple series is annual with the exceptions of 2012 H1 and 2013 H1. Sources: PRA regulatory returns, published accounts and Bank calculations.

(h) 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 Barclays before 2011 H2 where only solo data were available. Series starts in 2008 and is updated half-yearly. Sources: PRA regulatory returns and Bank calculations.

(i) The disclosures the series are based on are not currently sufficient to ensure that all intrafinancial 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 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.

(j) Lending to other banks and other financial corporations. The series is annual with the exception of 2012 H1 and 2013 H1. Sources: Published accounts and Bank calculations.

(k) Wholesale borrowing, composed of deposits from banks and non-subordinated securities in issue. The series is annual with the exception of 2012 H1 and 2013 H1. One weakness of the current measure is that it is not possible to distinguish between retail deposits and deposits placed by non-bank institutions on a consolidated basis. Sources: Published accounts and Bank calculations.

(l) 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 future should market shares change. Series starts in 2002. The series is annual with the exception of 2012 H1 and 2013 H1. Sources: Published accounts and Bank calculations.

- (m) This indicator highlights the countries where UK-owned monetary financial institutions' non-bank private sector exposures are greater than 10% of UK-owned monetary financial institutions' tangible equity on an ultimate risk basis and have grown by more than 1.5 times nominal GDP growth in that country. Foreign exposures as defined in BIS consolidated banking statistics. Overseas sectoral exposures cannot currently be broken down further at the non-bank private sector level. The intention is to divide them into households and corporates as new data become available over the next couple of years. Tangible equity figures for 2006-07 are estimated using published accounts. Countries flagged in 2006 Q4 were Australia (AU), Canada (CA), Germany (DE), Spain (ES), France (FR), Ireland (IE), Italy (IT), Japan (JP), Republic of Korea (KR), Cayman Islands (KY), Netherlands (NL), United States (US) and South Africa (ZA). Countries flagged in 2012 Q3 were Germany (DE) and Singapore (SG). Countries flagged in 2013 Q3 were People's Republic of China (CN), Germany (DE), France (FR), Ireland (IE) and Singapore (SG). Sources: Bank of England, ECB, IMF *World Economic Outlook* (October 2013), Thomson Reuters Datastream, published accounts and Bank calculations.
- (n) 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*.
- (o) Twelve-month nominal growth rate of total household and not-for-profit sector liabilities. Series starts in 1988. Sources: ONS and Bank calculations.
- (p) Twelve-month nominal growth rate of UK-resident banks' and building societies' claims on the commercial real estate sector. Commercial real estate series includes UK-resident banks' and building societies' claims on the sector (including lending for development of buildings). Source: Bank of England.
- (q) Gross debt as a percentage of a four-quarter moving sum of disposable income. Includes all liabilities of the household sector. ONS data on household debt are used from 1989. Before then, due to limited data availability, a stable relationship is assumed between the ONS debt data and the Bank of England lending data. The household disposable income series is adjusted for financial intermediation services indirectly measured (FISIM). Sources: Bank of England, ONS and Bank calculations.
- (r) 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. ONS data on private non-financial corporate (PNFC) debt are used from 1989 due to limited data availability. Before then, a stable relationship is assumed between the ONS debt data and the Bank of England lending data. The corporate gross operating surplus series is adjusted for financial intermediation services indirectly measured (FISIM). Sources: Bank of England, ONS and Bank calculations.
- (s) Gross debt as a percentage of four-quarter moving sum of nominal GDP. The NBF1 sector includes all financial corporations apart from monetary financial institutions (ie deposit-taking institutions). This indicator additionally excludes insurance companies and pension funds. Sources: ONS and Bank calculations.
- (t) The residential house price to rent index is the 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.
- (u) 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).
- (v) 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 10). 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 start in 2005. Sources: FCA Product Sales Data and Bank calculations.
- (w) Average of the maximum offered LTV ratios across major CRE lenders. Series starts in 2002. Sources: De Montfort University and Bank calculations.
- (x) The residential mortgage lending spread 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 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.
- (y) 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.

References

- Adrian, T and Shin, H (2011), 'Financial intermediary balance sheet management', *Annual Review of Financial Economics*, Vol. 3, No. 1, pages 289–307.
- Aiyar, S, Calomiris, C and Wieladek, T (2014), 'Does macropru leak? Evidence from a UK policy experiment', *Journal of Money, Credit and Banking*, forthcoming.
- Al-Saffar, Y, Ridinger, W and Whitaker, S (2013), 'The role of external balance sheets in the financial crisis', *Bank of England Financial Stability Paper No. 24*, October.
- Alessi, L and Detken, C (2011), 'Quasi real time early warning indicators for costly asset price boom/bust cycles: a role for global liquidity', *European Journal of Political Economy*, Vol. 27, No. 3, pages 520–33.
- Anderson, S (2004), *The CML mortgage market manifesto: taking the past into the future*, London: Council of Mortgage Lenders.
- Arcand, J, Berkes, E and Panizza, U (2012), 'Too much finance', *IMF Working Paper WP/12/161*.
- Astley, M, Giese, J, Hume, M and Kubelec, C (2009), 'Global imbalances and the financial crisis', *Bank of England Quarterly Bulletin*, Vol. 49, No. 3, pages 178–90.
- Australian Prudential Regulation Authority (2003), 'Proposed changes to the risk-weighting of residential mortgage lending', Discussion Paper, November.
- Bank of England (2004), *Financial Stability Review*, December.
- Bank of England (2005), *Financial Stability Review*, June.
- Bank of England (2009a), *Financial Stability Report*, June.
- Bank of England (2009b), 'The role of macroprudential policy: a discussion paper', November.
- Bank of England (2011), 'Instruments of macroprudential policy: a discussion paper', December.
- Bank of England (2012a), *Financial Stability Report*, June.
- Bank of England (2012b), *Financial Stability Report*, November.
- Bank of England (2013a), 'A framework for stress testing the UK banking system: a discussion paper', October.
- Bank of England (2013b), *Financial Stability Report*, November.
- Barrell, R, Davis, E P, Karim, D and Liadze, I (2010), 'Bank regulation, property prices and early warning systems for banking crises in OECD countries', *Journal of Banking and Finance*, Vol. 34, No. 9, pages 2,255–64.
- Barrell, R and Karim, D (2012), 'Macro prudential policy and credit: the right question but the wrong answer', *mimeo*.
- Basel Committee on Banking Supervision (2004), 'Bank failures in mature economies', *BIS Working Paper No. 13*.
- Basel Committee on Banking Supervision (2009), *Enhancements to the Basel II framework*, July.
- Basel Committee on Banking Supervision (2010a), *An assessment of the long-term economic impact of stronger capital and liquidity requirements*, August.
- Basel Committee on Banking Supervision (2010b), *Calibrating regulatory minimum capital requirements and capital buffers: a top-down approach*, October.
- Basel Committee on Banking Supervision (2010c), *Guidance for national authorities operating the countercyclical capital buffer*, December.
- Basel Committee on Banking Supervision (2010d), *Basel III: a global regulatory framework for more resilient banks and banking systems*, December.
- Berg, A, Borensztein, E and Pattillo, C (2005), 'Assessing early warning systems: how have they worked in practice?', *IMF Staff Papers*, Vol. 52, No. 3, pages 462–502.
- Bernanke, B, Bertaut, C, DeMarco, L and Kamin, S (2011), 'International capital flows and the returns to safe assets in the United States, 2003–2007', *Financial Stability Review No. 15*, Banque de France, February.
- Board of Governors of the Federal Reserve System (2009a), 'The supervisory capital assessment program: overview of results, Washington: Board of Governors', 7 May.
- Board of Governors of the Federal Reserve System (2009b), Press Release regarding the Supervisory Capital Assessment Program (SCAP), 9 November.
- Borgy, V, Clerc, V and Renne, J-P (2009), 'Asset-price boom-bust cycles and credit: what is the scope of macroprudential regulation?', *Banque de France Working Paper No. 263*.
- Borio, C and Lowe, P (2002), 'Assessing the risk of banking crises', *BIS Quarterly Review*, pages 43–54.
- Breedon, F and Joyce, M (1992), 'House prices, arrears and possessions', *Bank of England Quarterly Bulletin*, May, pages 173–79.
- Bridges, J, Gregory, D, Nielsen, M, Pezzini, S, Radia, A and Spaltro, M (2014), 'The impact of capital requirements on bank lending', *Bank of England Working Paper*, forthcoming.
- Cecchetti, S (2011), 'Global imbalances: current accounts and financial flows', remarks prepared for the Myron Scholes Global Markets Forum, 27 September 2011.
- Cecchetti, S and Kharroubi, E (2012), 'Reassessing the impact of finance on growth', *BIS Working Paper No. 381*.

Central Bank of Ireland (2010), 'The Irish banking crisis regulatory and financial stability policy 2003–2008 — a report to the Minister for Finance by the Governor of the central bank', 31 May 2010.

Cerra, V and Saxena, S (2008), 'Growth dynamics: the myth of economic recovery', *American Economic Review*, Vol. 98, No. 1, pages 439–57.

Committee on the Global Financial System (2010), 'The role of margin requirements and haircuts in procyclicality', *CGFS Publications No. 36*.

Committee on the Global Financial System (2012), 'Operationalising the selection and application of macroprudential instruments', *CGFS Publications No. 48*.

Committee on Payment and Settlement Systems and Board of the International Organisation of Securities Commissions (2013), *Consultative report on public qualitative disclosure standards for central counterparties*, October.

Crowe, C, Dell'Ariccia, G, Igan, D and Rabanal, P (2013), 'How to deal with real estate booms: lessons from country experiences', *Journal of Financial Stability*, Vol. 9, No. 3, pages 300–19.

Da Silva, L and Harris, R (2012), 'Sailing through the global financial storm: Brazil's recent experience with monetary and macroprudential policies to lean against the financial cycle and deal with systemic risks', *Banco Central Do Brasil Working Paper No. 290*.

Dell'Ariccia, G, Igan, D, Laeven, L, Tong, H, Bakker, B and Vandenbussche, J (2012), 'Policies for macrofinancial stability: how to deal with credit booms', *IMF Staff Discussion Notes No. 12/06*.

Drehmann, M, Borio, C and Tsatsaronis, K (2011), 'Anchoring countercyclical capital buffers: the role of credit aggregates', *International Journal of Central Banking*, Vol. 7, No. 4, pages 189–240.

Drehmann, M and Juselius, M (2012), 'Do debt service costs affect macroeconomic and financial stability?', *BIS Quarterly Review*, September, pages 21–35.

Edge, R and Meisenzahl, R (2011), 'The unreliability of credit-to-GDP ratio gaps in real-time and the implications for countercyclical capital buffers', *International Journal of Central Banking*, Vol. 7, No. 4, pages 261–98.

Elliott, D (2009), 'Quantifying the effects on lending of increased capital requirements', *Pew Financial Reform Project Briefing Papers*, No. 7.

European Banking Authority (2013), *Risk assessment of the European banking system*, July.

Financial Services Authority (2009), *The Turner review: a regulatory response to the global banking crisis*, March.

Financial Stability Board (2012a), *Strengthening oversight and regulation of shadow banking: a policy framework for strengthening oversight and regulation of shadow banking entities*, 18 November.

Financial Stability Board (2012b), *Global shadow banking monitoring report 2012*, 18 November.

Francis, W and Osborne, M (2012), 'Capital requirements and bank behavior in the UK: are there lessons for international capital standards?', *Journal of Banking and Finance*, Vol. 36, No. 3, pages 803–16.

Geanakoplos, J (2010), 'Solving the present crisis and managing the leverage cycle', *Federal Reserve Bank of New York Economic Policy Review*, August, pages 101–31.

Giannetti, M and Laeven, L (2012), 'Flight home, flight abroad and international credit cycles', *American Economic Review*, Vol. 102, No. 3, pages 219–24.

Hahm, J, Shin, H and Kwanho, S (2013), 'Non-core bank liabilities and financial vulnerability', *Journal of Money, Credit and Banking*, Vol. 45, pages 3–36.

Haldane, A and Madouros, V (2012), 'The dog and the frisbee', available at www.bankofengland.co.uk/publications/Documents/speeches/2012/speech596.pdf.

Hanson, S and Stein, J (2012), 'Monetary policy and long-term real rates', *Finance and Economics Discussion Series*, Federal Reserve Board.

HM Treasury (2012), *The Financial Services Bill: the Financial Policy Committee's macro-prudential tools*, September.

Hoggarth, G, Mahadeva, L and Martin, J (2010), 'Understanding international bank capital flows during the recent financial crisis', *Bank of England Financial Stability Paper No. 8*.

Ichinose, A (1999), 'The bubble and monetary policy in Japan: 1984–89', *Okayama Economic Review*, Vol. 31, No. 3, pages 1–33.

International Monetary Fund (2009a), *World Economic Outlook: Crisis and Recovery*, April.

International Monetary Fund (2009b), *Global Financial Stability Report*, April.

International Monetary Fund (2012), *Global Financial Stability Report*, April.

International Monetary Fund and Financial Stability Board (2009), *The financial crisis and information gaps: report to the G20 Finance Ministers and Central Bank Governors*, October.

Jiménez, G, Ongena, S, Peydró, J and Saurina, J (2012), 'Macroprudential policy, countercyclical bank capital buffers and credit supply: evidence from the Spanish dynamic provisioning experiments', *Barcelona GSE Working Paper No. 628*.

Kapan, T and Minoiu, C (2013), 'Balance sheet strength and bank lending during the global financial crisis', *IMF Working Paper No. 13/102*.

Kindleberger, C (1989), *Manias, panics and crashes: a history of financial crises*, New York, Basic Books.

King, M (2011), 'Global imbalances: the perspective of the Bank of England', *Financial Stability Review No. 15*, Banque de France, February, pages 1–8.

King, M (2012), 'The 2012 BBC Today Programme Lecture', available at www.bankofengland.co.uk/publications/Documents/speeches/2012/speech567.pdf.

Koo, R (2008), *The holy grail of macroeconomics: lessons from Japan's great recession*, Wiley.

Logan, A (2000), 'The early 1990s small banks' crisis: leading indicators', *Bank of England Financial Stability Review*, December, pages 130–45.

Lucas, R (1976), 'Econometric policy evaluation: a critique', in Brunner, K and Meltzer, A (eds), *The Phillips curve and labour markets*, Carnegie-Rochester Conference Series on Public Policy, No. 1, New York: American Elsevier, pages 19–46.

Macroeconomic Assessment Group (2010), *Assessing the macroeconomic impact of the transition to stronger capital and liquidity requirements: Interim Report*, Bank for International Settlements, August.

Martins, B and Schechtman, R (2013), 'Loan pricing following a macro prudential within-sector capital measure', *Banco Central Do Brasil Working Paper No. 323*.

Mian, A and Sufi, A (2009), 'The consequences of mortgage credit expansion: evidence from the US mortgage default crisis', *Quarterly Journal of Economics*, Vol. 124, No. 4, pages 1,449–96.

Mian, A and Sufi, A (2011), 'House prices, home equity-based borrowing and the US household leverage crisis', *American Economic Review*, Vol. 101, No. 5, pages 2,132–56.

Minsky, H (1986), *Stabilizing an unstable economy*, Yale University Press.

Peek, J and Rosengren, E (1997), 'The international transmission of financial shocks: the case of Japan', *American Economic Review*, Vol. 87, No. 4, pages 495–505.

Prudential Regulation Authority (2013), 'The Prudential Regulation Authority's approach to banking supervision', April.

Reid, M (1982), *The secondary banking crisis, 1973–1975*, Macmillan Press.

Reinhart, C and Reinhart, V (2008), 'Capital flow bonanzas: an encompassing view of the past and present', *NBER Working Paper No. 14321*.

Reinhart, C and Rogoff, K (2009), *This time is different: eight centuries of financial folly*, Princeton University Press.

Reserve Bank of India (2010), *Financial Stability Report*, March.

Rule, D (2001), 'The credit derivatives market: its development and possible implications for financial stability', *Bank of England Financial Stability Review*, June, pages 117–40.

Schularick, M and Taylor, A (2012), 'Credit booms gone bust: monetary policy, leverage cycles, and financial crises, 1870–2008', *American Economic Review*, Vol. 102, No. 2, pages 1,029–61.

Senior, S and Westwood, R (2000), 'The external balance sheet of the United Kingdom: implications for financial stability?', *Bank of England Quarterly Bulletin*, November, pages 351–64.

Shin, H and Shin, K (2010), 'Procyclicality and monetary aggregates', *NBER Working Paper No. 16836*.

Sinha, A (2011), 'Macroprudential policies: Indian experience', speech at Eleventh Annual International Seminar on Policy Challenges for the Financial Sector on 'Seeing both the forest and the trees — supervising systemic risk', co-hosted by the Board of Governors of the Federal Reserve System, the International Monetary Fund and the World Bank in Washington DC, 1–3 June.

Swiss National Bank (2013), 'Countercyclical capital buffer: proposal of the Swiss National Bank and decision of the Federal Council', 13 February 2013.

Tarullo, D (2013), 'Evaluating progress in regulatory reforms to promote financial stability', speech at the Peterson Institute for International Economics, 3 May, 2013.

Tucker, P (2009), 'The debate on financial system resilience: macroprudential instrument', available at www.bankofengland.co.uk/archive/Documents/historicpubs/speeches/2009/speech407.pdf.

Tucker, P (2011), 'Macroprudential policy: building financial stability institutions', available at www.bankofengland.co.uk/publications/Documents/speeches/2011/speech492.pdf.

Tucker, P (2012a), 'National balance sheets and macro policy: lessons from the past', available at www.bankofengland.co.uk/publications/Documents/speeches/2012/speech547.pdf.

Tucker, P (2012b), 'Competition, the pressure for returns, and stability', available at www.bankofengland.co.uk/publications/Documents/speeches/2012/speech611.pdf.

Tucker, P, Hall, S and Pattani, A (2013), 'Macroprudential policy at the Bank of England', *Bank of England Quarterly Bulletin*, Vol. 53, No. 3, pages 192–200.

Turner, A (2011), 'Debt and deleveraging: long-term and short-term challenges', available at www.fsa.gov.uk/library/communication/speeches/2011/1121_at.shtml.

Glossary

BBA – British Bankers’ Association.	LBG – Lloyds Banking Group.
BCBS – Basel Committee on Banking Supervision.	Libor – London interbank offered rate.
BIS – Bank for International Settlements.	LTI – loan to income.
CCB – countercyclical capital buffer.	LTV – loan to value.
CCP – central counterparty.	MAG – Macroeconomic Assessment Group.
CDS – credit default swap.	MFI – monetary financial institution.
CGFS – Committee on the Global Financial System.	MPC – Monetary Policy Committee.
CML – Council of Mortgage Lenders.	NBFI – non-bank financial institution.
COREP – common European capital reporting.	OECD – Organisation for Economic Co-operation and Development.
CPSS – Committee on Payment and Settlement Systems.	OIS – overnight index swap.
CRD IV/CRR – Capital Requirements Directive and Regulation.	ONS – Office for National Statistics.
CRE – commercial real estate.	OTC – over the counter.
EBA – European Banking Authority.	PNFC – private non-financial corporation.
ECB – European Central Bank.	PRA – Prudential Regulation Authority.
EEA – European Economic Area.	RBI – Reserve Bank of India.
ESRB – European Systemic Risk Board.	RBS – Royal Bank of Scotland.
EU – European Union.	RoA – return on assets.
FCA – Financial Conduct Authority.	RPI – retail prices index.
FISIM – Financial Intermediation Services Indirectly Measured.	S&P – Standard & Poor’s.
FPC – Financial Policy Committee.	SCAP – Supervisory Capital Assessment Program.
FSA – Financial Services Authority.	SCR – sectoral capital requirement.
G20 – The Group of Twenty Finance Ministers and Central Bank Governors.	SME – small and medium-sized enterprise.
GDP – gross domestic product.	
GMAC – General Motors Acceptance Corporation.	
HBOS – Halifax Bank of Scotland.	
HSBC – Hong Kong and Shanghai Banking Corporation.	
IFRS – International Financial Reporting Standard.	
IMF – International Monetary Fund.	
IOSCO – International Organization of Securities Commissions.	
IPD – Investment Property Databank.	
IRB – internal ratings based.	