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Stress testing the UK banking system: key elements of the 2015 stress test

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1 Background

The Financial Policy Committee (FPC) recommended in March 2013 that, 'looking to 2014 and beyond, the Bank and Prudential Regulation Authority (PRA) should develop proposals for regular stress testing of the UK banking system. The purpose of those tests would be to assess the system's capital adequacy'.⁽¹⁾ This assessment would then be used to inform both system-wide policy interventions by the FPC and firm-specific supervisory actions by the PRA.

In October 2013, the Bank published a Discussion Paper that set out the main features of the proposed stress-testing framework over the medium term.⁽²⁾⁽³⁾ The 2014 stress test was the first concurrent stress test of the United Kingdom's largest banks and building societies (hereafter 'banks'). The banks covered in the 2015 concurrent stress test (hereafter the '2015 stress test') account for around 70% of the stock of lending to UK businesses and around 75% of the stock of UK mortgage lending. The 2015 stress test builds on the 2014 approach, but is extending it in a number of ways. The key developments in this year's stress test include:

- an extension of the stress scenario designed by Bank staff to explore global as well as domestic risks;
- a traded risk scenario that has been fully developed and specified by Bank staff;
- enhanced guidance on management actions relating to real-economy lending in the stress scenario; and
- the introduction of a leverage ratio threshold as part of the hurdle rate framework.

A key difference with last year is that the 2015 stress test and methodology have been fully designed and calibrated by Bank staff, and discussed and agreed by the FPC and PRA Board. In contrast, the 2014 stress test was conducted as a 'UK variant' of the European Banking Authority's (EBA) EU-wide stress test. While the EBA is not planning to conduct a stress test in 2015, a number of other international authorities are. The Bank continues to liaise with these authorities to ensure that a joined-up approach is taken whenever appropriate. The Bank has also benefited from helpful discussions with the International Monetary Fund (IMF) as part of the periodic UK Financial Sector Assessment Program (FSAP) in designing the 2015 stress scenario.⁽⁴⁾

This document outlines two core elements of the 2015 stress test. First, the scenarios to be explored by the exercise, with Sections 2 and 3 covering the stress and baseline scenarios respectively; and second, the standards against which banks will be assessed as part of the stress test, often referred to as the 'hurdle rate', covered in Section 4. The severity of the

stress scenario and the hurdle rate framework are both key determinants of the resilience standard that the UK banking system is being held to through the stress test. A separate document published today provides banks with methodological guidance for conducting their own analysis.⁽⁵⁾

2 Stress scenario

This section starts by summarising the conjunctural context to motivate the risks explored by the stress scenario. It then outlines the scenario narrative and describes the main features of the stress. Finally, it provides further detail on the severity of the stress scenario, including by comparing it to past UK and international episodes of adverse macroeconomic conditions. Box 1 explains the key qualitative and quantitative differences between the 2014 and 2015 scenarios and Box 2 discusses the Bank's approach to traded risk in 2015.

The stress scenario is *not* a forecast of macroeconomic and financial conditions in the United Kingdom or other countries. It is *not* a set of events that is expected, or likely, to materialise. Rather, it is a coherent 'tail-risk' scenario that has been designed specifically to assess the resilience of UK banks and building societies to a deterioration in global economic conditions.

2.1 Context to the risks explored by the stress scenario

As set out in the December 2014 *Financial Stability Report*,⁽⁶⁾ the global economic environment deteriorated during the second half of 2014, with projections for global growth and inflation weakening slightly. While market reaction to the weaker outlook for nominal growth has so far been muted, further downward revisions to growth prospects could pose risks. In December 2014, the FPC judged that the potential for the global economic and financial environment to expose vulnerabilities for UK financial stability had grown.

A further downward revision to growth and inflation prospects could lead investors to question once again the sustainability of debt positions in the most vulnerable euro-area countries. This could pose risks to UK financial stability through a number of channels. For example, the euro area is the United Kingdom's main trading partner, accounting for nearly

(1) Bank of England (2013), 'Financial Policy Committee statement from its policy meeting, 19 March 2013'; www.bankofengland.co.uk/publications/pages/news/2013/013.aspx.

(2) Bank of England (2013), 'A framework for stress testing the UK banking system: a Discussion Paper'; www.bankofengland.co.uk/financialstability/fsc/Documents/discussionpaper1013.pdf.

(3) Unless otherwise stated, references to the Bank of England throughout this document include the PRA.

(4) The last UK FSAP was conducted in 2011. It is envisaged that the next assessment will be concluded in 2016.

(5) 'Stress testing the UK banking system: guidance for participating banks and building societies'; www.bankofengland.co.uk/financialstability/Documents/stresstesting/2015/guidance.pdf.

(6) Bank of England *Financial Stability Report*, December 2014; www.bankofengland.co.uk/publications/Documents/fsr/2014/fsrfull1412.pdf.

half of all UK exports. Weaker growth in the euro area could act as a drag on UK exports. Any deterioration in market confidence could also result in sharp declines in the prices of risky assets and lead to losses on banks' trading books as well as an increase in UK banks' funding costs.

Weaker nominal growth elsewhere could also pose risks to UK financial stability. The outlook for growth in Asia deteriorated during 2014 H2. The projection for 2015 growth in China was marked down in the IMF *World Economic Outlook* (WEO).⁽¹⁾ Growth is expected to moderate somewhat in 2015, as the economy makes the transition to a more sustainable path and residential investment slows further. The IMF has also noted that absent a rebalancing of growth, the risk of a shock causing financial disruption or a sharp slowdown could rise further — with large potential cross-border repercussions, given the size and openness of the Chinese economy. A further potential source of vulnerability is the large current account deficits of a number of emerging market economies. These countries could face rapid capital outflows if financial market sentiment deteriorates. In addition, corporates in a number of emerging markets are heavily dependent on US dollar-denominated borrowing, which leaves them exposed to sharp movements in exchange rates.

Low levels of market liquidity could amplify the transmission of macroeconomic shocks through a sharp increase in asset price volatility. Model-based estimates suggest that investors currently require relatively low compensation for bearing the risk of secondary market illiquidity. It is also possible that, with the global financial sector still adjusting to post-crisis regulatory interventions, levels of market liquidity may not yet have reached a new equilibrium. Recent episodes of turbulence — such as those observed in US Treasury markets in October 2014 — have highlighted the risk that liquidity can prove illusory in periods of uncertainty, amplifying market disruptions.

The combination of these factors means that risks to UK financial stability could materialise if concerns about persistent low nominal growth led to a sudden reappraisal of underlying vulnerabilities in highly indebted economies — or if a shift in global risk appetite triggered sharp adjustments in financial markets. Hence, a key part of the 2015 stress scenario examines the resilience of UK banks and building societies to a further deterioration in global nominal growth prospects, which results in a rapid deterioration in market sentiment globally and triggers latent vulnerabilities in Asia and the euro area in particular.

2.2 High-level narrative of the stress scenario

This section provides a summary of the origin and manifestation of the stress in the scenario. This is important to ensure a broad degree of coherence in the scenario. **As mentioned above, the stress scenario is *not* a forecast of**

macroeconomic and financial conditions in the United Kingdom or other countries. It is a coherent 'tail-risk' scenario that is designed specifically to assess the resilience of UK banks and building societies to a deterioration in global economic conditions.⁽²⁾

Global growth disappoints materially relative to expectations and disinflationary pressures build up further. This triggers a rapid deterioration of market sentiment globally. Risk appetite abruptly diminishes and market participants attempt to de-risk their portfolios, generating safe-haven capital flows to high-quality US assets. The dollar appreciates against a wide range of currencies, especially those of emerging market economies. Liquidity in some markets becomes seriously impaired and credit risk premia rise sharply. Commodity prices fall further, putting additional downward pressure on global inflation.

In China, policy supports a rebalancing of the economy towards consumption, but that takes time to take effect. Property prices fall sharply and, in turn, investment in residential property and associated industries contracts. Growth slows materially and the renminbi depreciates against the dollar.

In the euro area, weaker domestic demand, world trade and commodity prices lead to further disinflationary pressures and the rate of deflation increases. This amplifies the downturn in activity, as consumption and investment decisions are delayed. In combination with weak demand and business confidence, unemployment increases materially throughout the euro area. Deflation also increases the real burden of debt and increases market concerns. Although the recession is widespread through the euro area, the increases in credit risk premia are largest for the most highly indebted sovereigns, households and firms.

These global shocks have adverse implications for activity in a number of emerging market economies, especially China's major trading partners, commodity exporters and economies with large external financing needs. These countries also experience higher risk premia on foreign borrowing, which triggers a sudden stop to capital inflows and a sharp contraction of domestic credit and demand. Businesses that have issued dollar-denominated debt are particularly affected, given the appreciation of the dollar.

The global downturn impacts the United Kingdom. Output growth turns negative as export demand falls sharply. There are additional spillovers, through financial linkages and confidence effects. The household and corporate saving rates increase due to precautionary behaviour and the

(1) IMF *World Economic Outlook*, October 2014, Chapter 1.

(2) The stress scenario and the associated macroeconomic variable profiles are owned by the Bank of England. All rights are reserved.

higher cost of credit as banks face higher funding costs. These mechanisms lead to falls in consumption, investment and property prices. The deterioration of global financial market sentiment is also evident in the United Kingdom — for example, through a sharp rise in risk premia on private sector borrowers. In this scenario, it is assumed that policymakers observe these developments as a series of unexpected shocks. Additional monetary policy stimulus is pursued, which has the effect of lowering the yield curve over the course of the stress scenario.

2.3 Detailed description of key scenario features

The scenario starts in the first quarter of 2015 and extends through to the fourth quarter of 2019. This is a longer horizon than the 2014 stress test, reflecting the fact that the vulnerabilities explored by this year's scenario are likely to be more persistent in nature.

At the onset of the scenario, global growth starts to disappoint materially relative to expectations. By the end of 2015, economic output is falling across a number of regions including the euro area, emerging market economies and the United Kingdom. This sharp downturn in economic prospects triggers, and is in turn amplified by, a rapid deterioration of market sentiment globally. Market participants attempt to de-risk their portfolios and investors demand higher risk premia across a broad range of markets and riskier assets in particular. The VIX index peaks at above 45 percentage points in the second half of 2015, compared with a peak of around 60 percentage points in 2008.

The marked reduction in global nominal demand causes a further reduction in commodity prices. The oil price troughs at US\$38 per barrel and remains low throughout the scenario. Other commodity markets also see price falls and remain very weak throughout the scenario. This puts additional downward pressure on global inflation.

In China, the policy response is balanced across providing some stimulus to the economy but also supporting a rebalancing of the economy towards consumption, the latter of which takes time. The renminbi is allowed to depreciate 10% against the US dollar by 2015 Q4. Chinese policymakers reduce the reserve requirement ratio, and cut lending rates by more than deposit rates. SHIBOR interest rates initially rise sharply and peak in late 2015, before returning to close to current levels.

Chinese residential property prices trough in 2016 at 35% below their level at end-2014. Falls in commercial property prices are more pronounced, reflecting the larger average overhang of unsold property in that market. This is associated with sharp falls in real estate investment and industries associated with construction. Real GDP growth remains positive in China, but falls to a rate of 1.7% in 2015 Q4 in the scenario.⁽¹⁾

In the euro area, output growth slows due to a combination of international spillovers and domestic amplifications. Slower world trade results in materially lower demand for exports, a channel that acts more strongly for the euro area 'core' given the greater trade linkages with Asian economies. Domestic consumption and investment also fall, and aggregate euro-area real GDP growth troughs at -2.1% in 2016 Q1. Weaker demand and commodity prices lead to further deflationary pressures. This amplifies and prolongs the downturn in activity, as consumption and investment decisions are delayed. Additional monetary policy stimulus is pursued. Aggregate euro-area GDP growth turns positive in 2017. Inflation turns positive in 2018 Q4, but remains subdued until the end of the scenario.

As elsewhere, the weaker economic conditions in the euro area lead to higher risk premia. This risk aversion causes the euro to depreciate by around 25% against the US dollar and by 15% against sterling in 2015. Within the euro area, risk premia rise most strongly in asset markets for the more highly indebted sovereigns, households and firms, given the effect that falling nominal GDP has in increasing the real burden of debt.

These global shocks have adverse implications for activity in a number of other economies. Hong Kong is particularly impacted by the downturn in mainland China given its very close trade and financial linkages, with real GDP growth reaching around -6% at its trough in 2015 Q4 in the scenario. As in China, Hong Kong also experiences large falls in property prices, returning residential and commercial property prices close to their 2010 levels. The peg of the Hong Kong dollar to the US dollar is maintained throughout the scenario.

Emerging market economies also experience a downturn in economic activity. This is exacerbated in those economies with close economic links to China in particular, as well as those that are commodity exporters. In some cases, this also exposes existing vulnerabilities. Investors demand higher risk premia on foreign borrowing, which triggers a sharp slowdown in capital inflows to affected countries. This contributes to an average depreciation of about 25% across the currencies of G20 emerging market economies against the US dollar.⁽²⁾ Brazil and South Africa are among those economies that are particularly affected by this constellation of economic shocks. The peak-to-trough fall in the level of economic output is around 7% in Brazil and 4% in South Africa. Their currencies depreciate about 40% and 35% respectively against the US dollar. These shocks particularly affect emerging market companies that have dollar-denominated debt and are not

(1) Throughout this document, GDP growth rates are defined as growth in quarterly GDP relative to the same quarter in the previous year, unless otherwise stated.

(2) This group comprises Argentina, Brazil, China, Indonesia, Mexico, Russia, Saudi Arabia, South Africa and Turkey. Emerging economies are those identified as such by the IMF (Source: IMF *World Economic Outlook*, October 2014, Statistical Appendix).

Box 1

Key differences between the 2014 and 2015 macroeconomic stress scenarios

This box compares key features of the UK and international macroeconomic stress scenarios in the 2014 and 2015 stress tests.⁽¹⁾ In 2014, the macroeconomic stress scenario for the UK stress test was a combination of: (i) the global stress scenario designed by the EBA; and (ii) the UK stress scenario designed by the Bank of England. In 2015, all elements of the stress scenario have been designed by Bank staff, and discussed and agreed by the FPC and PRA Board.⁽²⁾ The Bank has also benefited from helpful discussions with the IMF.

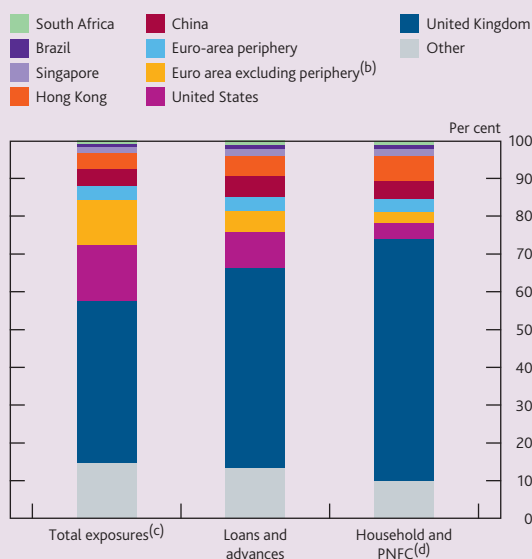
Qualitative differences in the risks explored

It is not desirable from a regulatory perspective that the banking system as a whole is only assessed against a single 'bad state of the world'. The 2015 stress test will therefore assess the resilience of the UK banking system to a different set of risks relative to the 2014 one. In this manner, the two tests complement each other, allowing the FPC and the PRA Board to gauge the vulnerability of the banking system, and individual institutions within it, to different manifestations of possible future stresses.

There are three key qualitative differences in terms of the risks explored by the 2015 stress scenario, relative to the 2014 exercise:

- First, the 2015 scenario focuses on exploring vulnerabilities stemming from the rest of the world. UK banks have large international exposures, so adverse foreign shocks could have a material effect on UK financial stability (**Chart A**). In contrast, the 2014 stress test emphasised domestic risks, especially those stemming from the UK housing market.
- Second, the 2015 scenario explores the effects of a deflationary macroeconomic environment, which — in turn — is associated with a reduction in Bank Rate and extraordinary monetary policy stimulus measures. This differs from the 2014 stress test, which included an inflationary shock in the United Kingdom and an associated tightening of monetary policy.
- Finally, the 2015 scenario places more emphasis on exploring risks stemming from UK banks' domestic corporate exposures. In contrast, the 2014 stress test considered the effects of a particularly adverse constellation of shocks to the UK household sector. The vulnerability of UK banks' corporate portfolios was identified last year as a key area where the Bank intended to increase its focus in the 2015 stress test.

Chart A Geographical composition of participating banks' exposures^(a)



Sources: Regulatory data and Bank calculations.

(a) Data are as at end-2014. Geographical exposures are based on residence of immediate counterparty. The chart data assumes that all of Nationwide's exposures are to UK residents.

(b) Euro-area periphery is defined as Cyprus, Greece, Ireland, Italy, Portugal and Spain.

(c) Total includes derivatives, equity instruments, debt securities and loans and advances. Other assets are not reported with a geographical split.

(d) 'Household and PNFC' bar shows loans and advances to households and private non-financial corporations.

Quantitative calibration of the scenario

The difference in risks explored by the two tests is reflected in the calibration of the hypothetical stress scenario.

Chart B illustrates the differences between baseline and stress projections in the 2014 and 2015 scenarios. The chart shows that, relative to last year's scenario, the hit to economic activity assumed this year is larger for the euro area and emerging market economies. The reverse is true for the United Kingdom. The shock to US economic activity is broadly similar. Overall, the hit to world GDP is slightly larger relative to the 2014 stress test.

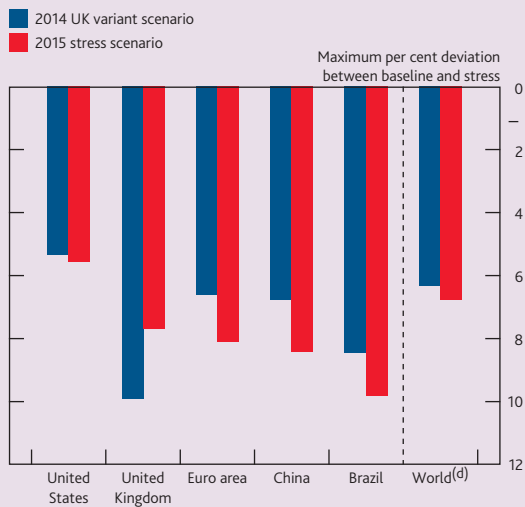
Even though the hit to real GDP in the United Kingdom is smaller than last year, the different outcomes for inflation result in materially different paths for nominal GDP. **Chart C** shows that nominal economic activity grew reasonably strongly in the 2014 stress test — but is much weaker in the 2015 stress test. Effectively, the real value of existing debt was eroded in the 2014 stress scenario, whereas this is not the case in 2015.

Finally, the UK household sector, which comprises around 60% of participating banks' UK loan exposures, experiences a

(1) The severity of the 2015 stress scenario in a broader context is discussed in Section 2.4.

(2) All references to 'the 2014 stress test' in this box refer to the combined impact of (i) the global macroeconomic and market elements of the EBA stress scenario; and (ii) the UK macroeconomic elements of the stress scenario designed by the Bank of England.

Chart B Differences in severity of GDP shocks between the 2014 and 2015 stress tests^{(a)(b)(c)}

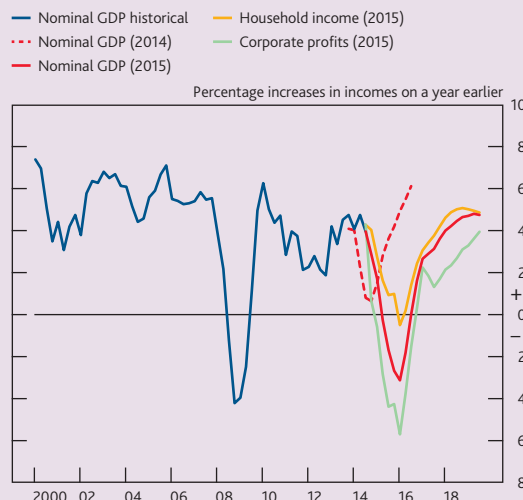


Sources: Bank of England, EBA, European Commission, IMF October 2014 *World Economic Outlook* and Bank calculations.

- (a) Chart shows the maximum deviation between calendar-year real GDP in the stress and baseline scenarios, over the three-year (2014 scenario) and five-year (2015 scenario) horizons. The date of the maximum difference can differ for each bar. For example, the maximum difference between stress and baseline in the 2015 scenario occurs in the euro area in 2019, but for world GDP this occurs in 2017.
- (b) The 2014 bars are calculated from: (i) the 2014 UK variant scenario (for the UK) and the 2014 EBA scenario (for foreign economies) in the stress, and (ii) the projections of the MPC as communicated in the February 2014 *Inflation Report* (for the UK) and the European Commission's Winter 2014 forecast (for foreign economies) in the baseline.
- (c) Baseline projections in 2015, other than for the UK, are consistent with the IMF's projections in the October 2014 IMF *World Economic Outlook*. Bank staff have quarterly interpolated the original annual series.
- (d) The calculation for the world GDP bar in 2014 is an estimate. World GDP is weighted by purchasing power parity.

much smaller shock in 2015, relative to 2014. Unemployment rises by 3.5 percentage points (compared to 4.6 percentage points in 2014), residential property prices fall by 20% in peak-to-trough terms (compared to 35% in 2014), and interest rates fall in 2015 (compared to a sharp tightening in

Chart C Annual growth in UK nominal incomes in the 2014 and 2015 stress scenarios^{(a)(b)}



Sources: ONS and Bank calculations.

- (a) Variable paths for corporate profits and household income are defined only in the 2015 scenario. These variables were not included in the 2014 UK variant scenario.
- (b) All references to 2014 and 2015 refer to the 2014 and 2015 stress scenarios respectively.

monetary policy in 2014). But the corporate sector, which comprises around 25% of participating banks' UK loan exposures, experiences a combination of shocks that are more severe in some respects than in 2014. For example, equity prices decline by around 35% peak-to-trough, compared to around 30% in 2014, and corporate profit growth turns negative (**Chart C**). The spike in corporate bond spreads is also larger than in the 2014 stress scenario, although the impact this has on corporate bond yields is to some extent offset by lower government bond yields.

fully hedged financially or do not match their liabilities with dollar assets or revenues.

The US economy suffers spillovers from the global slowdown, but is less affected than some other regions and receives safe-haven capital flows in this scenario. The peak-to-trough fall in the level of US real economic output is 0.2%. As elsewhere, risk premia increase across a range of markets. Spreads on riskier corporate bonds rise sharply, in line with the global increase in risk premia. But given the safe-haven capital flows, the increase for comparatively low-risk US assets is materially smaller than seen in other markets. Yields on high-grade US corporate bonds, for example, only rise to a little above late-2011 levels despite the slowdown in the US economy.

In the United Kingdom, output growth turns negative in 2015 Q3 as export demand falls sharply and there are spillovers through confidence effects. Financial linkages provide another channel of transmission: higher risk premia push up banks' funding costs, which are, in turn, passed on to customers through higher lending rates. Despite no additional

contraction in the supply of lending, this contributes, in combination with precautionary behaviour, to households and corporates increasing their saving rates.

The reduction in inflationary pressures from the slowing economy and falling commodity prices results in inflation turning negative for the first seven quarters of the scenario. This constitutes the largest fall in the price level in the United Kingdom for over 80 years. As elsewhere, additional monetary policy stimulus is pursued and Bank Rate is reduced to zero.

Operating conditions are particularly challenging for UK corporates in this scenario. The flow of nominal corporate profits is about 7% lower by 2016 Q2 than observed in 2014 Q4. Highly leveraged corporates come under particular stress given global financial market disruptions. Liquidity in the market for leveraged loans deteriorates rapidly and significantly. Corporates that are more reliant on exports or have large subsidiaries in the euro area, China or emerging market economies are also particularly challenged given the slowdown in world trade.

2.4 Scenario severity in a broader context

This section places the severity of the macroeconomic scenario into a broader context. There is, of course, no single variable that determines overall severity. For example, real GDP growth, nominal incomes, unemployment and asset prices all jointly influence borrowers' capacity to service debt and banks' profitability. Similarly, for any given variable, there is no single measure of severity. For example, it is important to consider both how variables develop relative to their starting points in the stress scenario, as well as relative to their baseline projections.

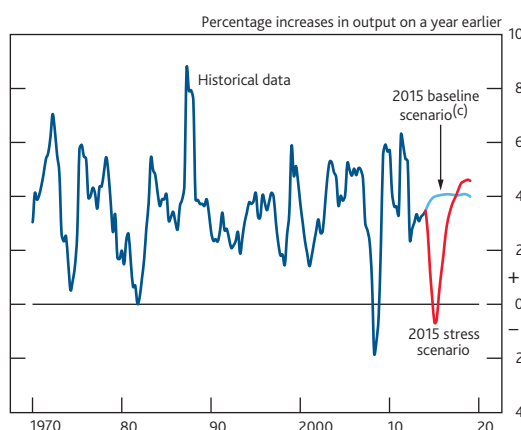
To provide a sense of the overall severity in the macroeconomic scenario, this section covers three areas in turn. First, it considers the assumed shocks to global economic activity across different dimensions. Second, it provides more detail on the shocks to other variables that are key determinants of overall severity. Finally, it compares some of the key variables for the UK economy in the stress with the Monetary Policy Committee's (MPC's) central case projections, as outlined in the February 2015 *Inflation Report*.

Global economic activity

The path for world GDP in the stress scenario is a useful summary metric to gauge the severity of the assumed shocks to activity. Calendar-year growth in real world GDP in the scenario falls to about 0.9% in 2015 and 0.7% in 2016, before starting to recover. By comparison, the IMF's October *World Economic Outlook* estimated that there was less than a 5% chance of global growth being below 2.5% in 2015. So the stress scenario clearly lies in the tail of possible future macroeconomic outcomes. But this does not mean it could not happen. For example, the shock to global growth in the hypothetical scenario is smaller than that observed during the recent global financial crisis (**Chart 1**). In the scenario, the level of real world GDP falls by 0.7% from peak to trough, which is around one third of the fall observed in the recent crisis.

Looking more closely at individual economies, the shocks to activity assumed in the scenario have, in most cases, been observed in recent decades. The main exception to that is China. There, growth troughs in the scenario at a level below recent historical experience. In part, this reflects China's continuing slowdown, which means that growth by the end of the baseline projection is also outside recent historical experience (**Chart 2**). But the severity of the downturn in China also reflects a key objective of stress testing, which is to explore events that have not happened in recent history, but may nevertheless be judged to be in the distribution of possible macroeconomic outcomes. In last year's stress test, for example, this same consideration motivated the assumed fall in UK residential property prices, the magnitude of which lies outside historical experience in the United Kingdom.

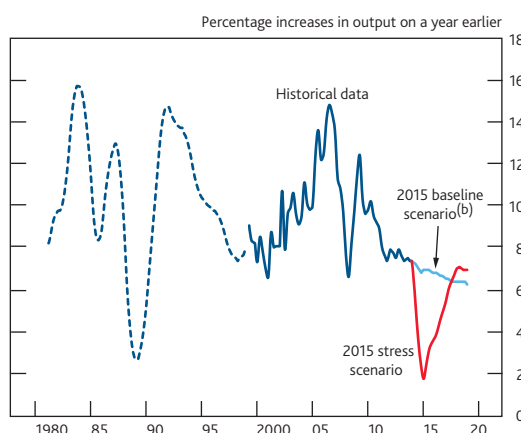
Chart 1 Annual growth in world real GDP^{(a)(b)}



Sources: IMF *World Economic Outlook* (WEO) October 2014 and Bank calculations.

- (a) Annual growth is defined as quarterly GDP relative to the same quarter in the previous year.
- (b) Historical data until 2014 Q1 are non seasonally adjusted annual growth rates. Historical data from 2014 Q2 to 2014 Q4 are estimated from interpolated annual data. Annual growth rates for 2015 Q1–Q3 of baseline and stress projections are estimated based on these interpolated data. The trough growth rate in the stress occurs in 2015 Q4.
- (c) The baseline projection is consistent with the IMF's projections in the October 2014 IMF WEO. Bank staff have interpolated the original series from annual to quarterly.

Chart 2 Annual growth in Chinese real GDP^(a)

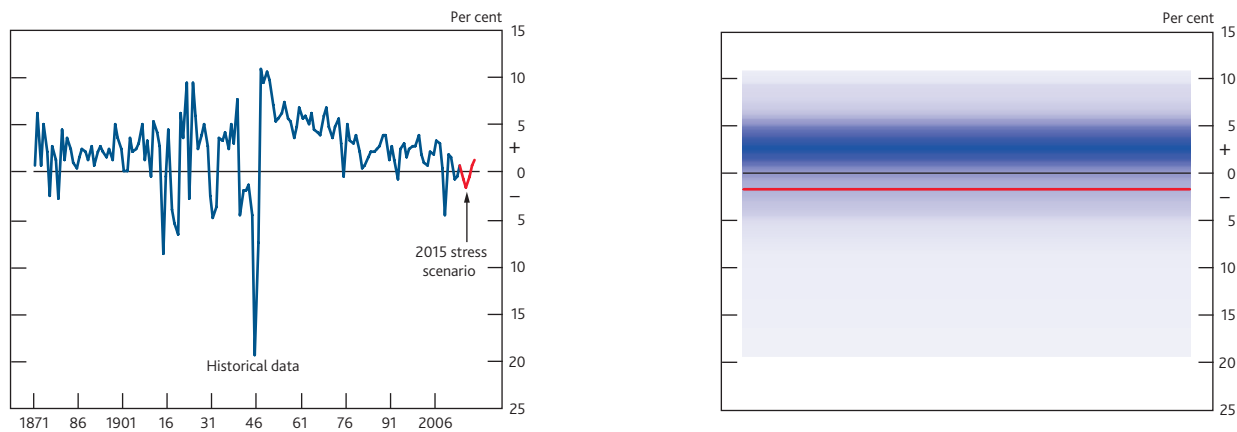
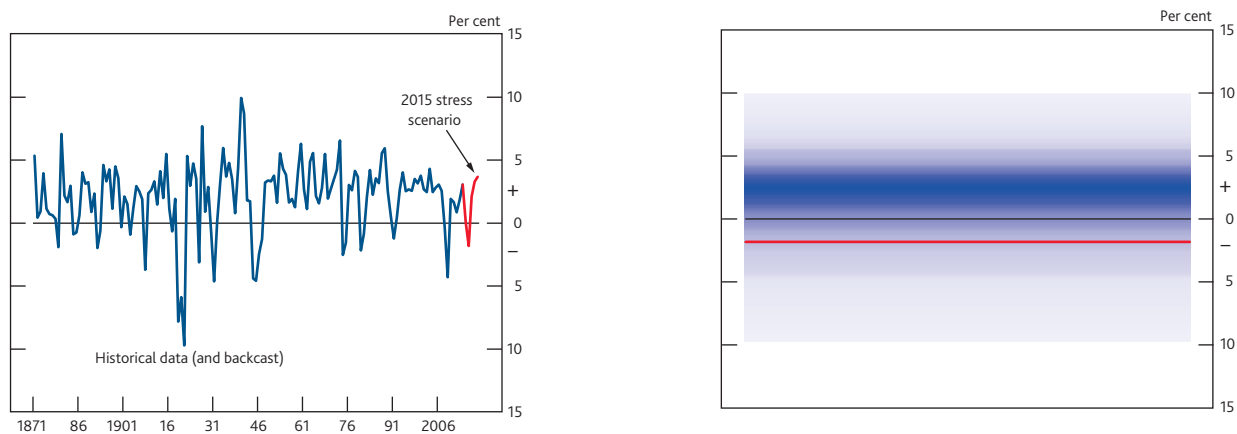
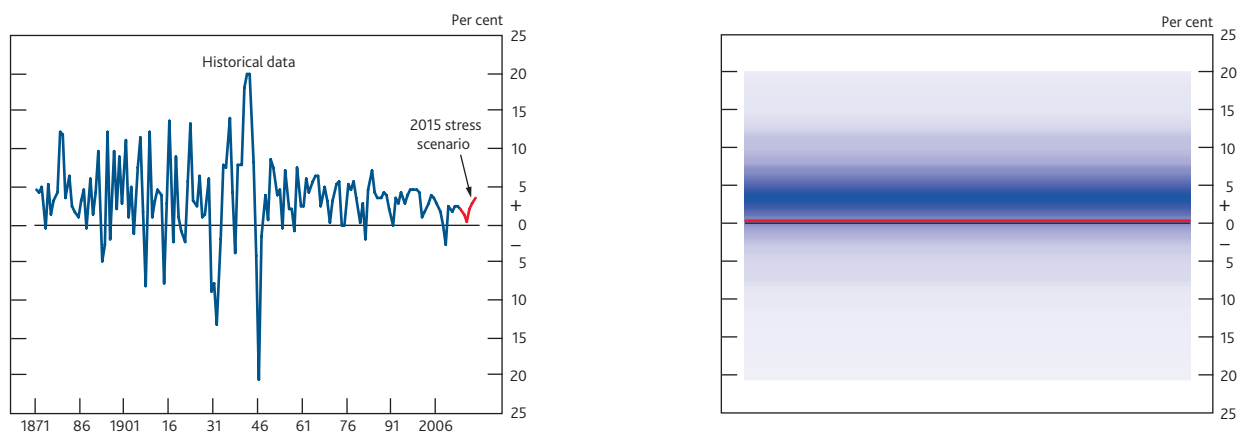


Sources: IMF WEO October 2014, National Bureau of Statistics of China, Thomson Reuters Datastream and Bank calculations.

- (a) Annual growth is defined as quarterly GDP relative to the same quarter in the previous year. Solid line is data from the National Bureau of Statistics of China. Dashed line is based on annual data from the IMF WEO database which has been interpolated by Bank staff from annual to quarterly.
- (b) The baseline projection is consistent with the IMF's projections in the October 2014 IMF WEO. Bank staff have interpolated the original series from annual to quarterly.

For other countries, the decline in economic activity in the scenario is within historical experience. **Charts 3 to 5** show calendar-year growth in real GDP for the major advanced economies since the 1870s and in the stress scenario. Of course, the structures of these economies have changed significantly over this period, and the data also includes extreme events such as wars. Nevertheless, comparison to these historical outturns is a useful gauge of the scenario's severity.

Each of the long-run GDP charts is also accompanied by a shaded diagram. The latter is a graphical representation of the historical distribution of calendar-year GDP growth since the 1870s. The shading is constructed so that the darkest point

Chart 3 Calendar-year euro-area real GDP growth since the 1870s and in the stress scenario**Chart 4** Calendar-year UK real GDP growth since the 1870s and in the stress scenario**Chart 5** Calendar-year US real GDP growth since the 1870s and in the stress scenario

Legend: Mapping between shading and percentiles of the historical distribution.



Sources: For euro area and the United States — Maddison, A (2003), *The world economy: historical statistics*, Paris, OECD and IMF October 2014 WEO. For the United Kingdom — Dimsdale, N, Hills, S and Thomas, R (2010), 'The UK recession in context — what do three centuries of data tell us?', *Bank of England Quarterly Bulletin*, Vol. 50, No. 4, pages 277–91 and ONS. Bank calculations.

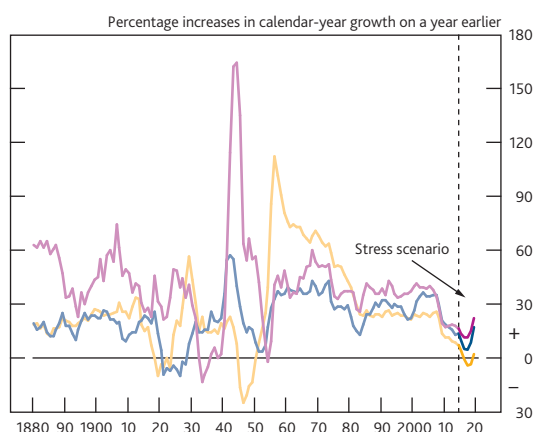
The shaded diagrams are a graphical representation of the historical distribution of calendar-year growth in real GDP over the past 144 years. The shading is constructed so that the darkest point represents the median: as many historical outcomes have fallen above that, as they have below. The shading lightens in either direction to illustrate observations further away from the median. The legend at the bottom of the panel illustrates how the shading changes at different points, or percentiles, along the distribution of historical outcomes. The red line in the shaded diagram of GDP shows the trough calendar-year growth rate in the stress scenario. Up to 1930, euro-area data includes nine large countries from the region now defined as the euro area. Two more countries are added from 1931, and from 1992 onwards data include all members of the euro area as at end-2014.

represents the median: as many historical outturns have fallen above that, as they have below. The shading lightens in either direction to illustrate observations further away from the median. The red line on the shaded diagrams shows where the trough observation in the stress scenario would lie in this distribution. Overall, **Charts 3 to 5** illustrate that the assumed shocks to GDP growth in major advanced economies lie within historical experience.

The contraction in economic activity in major advanced economies is smaller than that observed during the recent global financial crisis. This seeks to account for the cyclical position of these economies. For example, they are still recovering from the deep recessions experienced recently. And credit growth has been subdued in the wake of the crisis, while some asset prices remain below pre-crisis peaks. One illustration of the scenario's severity over a longer horizon is the ten-year real GDP growth rates implied by the scenario, as these include the effects of the recent crisis. In the scenario, the euro area's ten-year growth rate falls to a trough of -4%, compared to 5% in the United Kingdom, and 12% in the United States (**Chart 6**). In all cases, such a cumulative contraction in activity has not occurred since around the time of World War II.

Chart 6 Ten-year growth in real GDP in the United Kingdom, United States and the euro area

— Historical — United States — 2015 stress scenario — United States
— Historical — United Kingdom — 2015 stress scenario — United Kingdom
— Historical — euro area^(a) — 2015 stress scenario — euro area

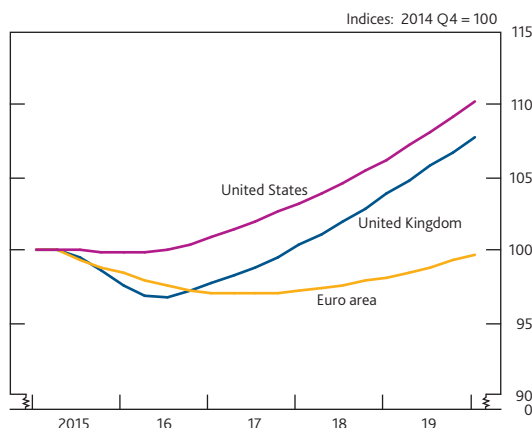


Sources: For euro area and the United States — Maddison, A (2003), *The world economy: historical statistics*, Paris, OECD and IMF October 2014 WEO. For the United Kingdom — Dimsdale, N, Hills, S and Thomas, R (2010), 'The UK recession in context — what do three centuries of data tell us?', *Bank of England Quarterly Bulletin*, Vol. 50, No. 4, pages 277–91 and ONS. Bank calculations.

(a) Up to 1930, euro-area data include nine large countries from the region now defined as the euro area. Two more countries are added from 1931, and from 1992 onwards, data include all members of the euro area as at end-2014.

This metric also makes it clear that the contraction in long-run activity implied by the scenario is bigger in the euro area, than in the United Kingdom and the United States. As well as reflecting recent outturns, that is because the downturn in the euro area in the scenario is more prolonged relative to other

Chart 7 GDP in the 2015 stress scenario for the United Kingdom, United States and the euro area^(a)



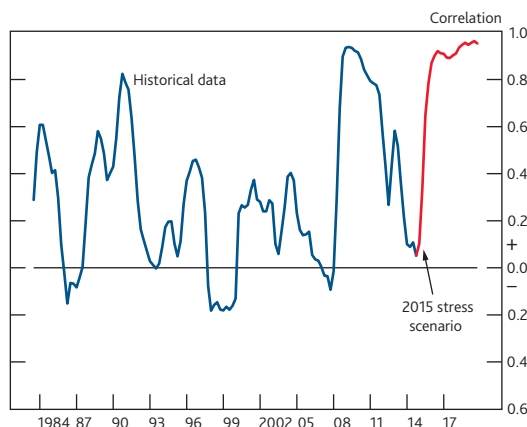
Source: Bank calculations.

(a) Chart shows the evolution in the level of real GDP for the United States, United Kingdom and the euro area over the stress horizon.

advanced economies. **Chart 7** illustrates this by showing the level of real GDP in these economies over the course of the stress scenario.

Another important feature of the scenario is that the co-ordination of shocks across countries is relatively high compared to history. The global financial crisis is the only episode in recent decades where the decline in global activity was similarly co-ordinated. This is illustrated in **Chart 8**, which shows an average of pairwise correlations in annual GDP growth rates, taken over rolling three-year windows, for the major economies in the scenario. The IMF has found that factors such as heightened uncertainty and wake-up calls that changed investors' perceptions, in addition to financial interlinkages, were important in explaining the comovement of output observed during the 2008 crisis.⁽¹⁾ The stress

Chart 8 Average correlation in GDP growth for key economies in the scenario^(a)



Sources: ONS, Thomson Reuters Datastream, Bank staff estimates and Bank calculations.

(a) Chart shows an average across pairwise correlations in annual output growth (quarter on the same quarter in the previous year) over three-year rolling windows between the United States, United Kingdom, euro area and China.

(1) IMF October 2013 *World Economic Outlook*, Chapter 3.

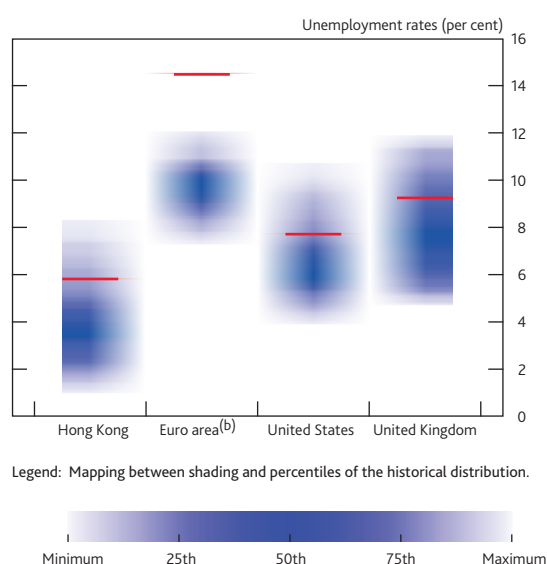
scenario is consistent with an assumption that these channels would again operate strongly. Activity in the United Kingdom is also more correlated with global GDP in the scenario than it has been on average over the past 25 years, which is consistent with the United Kingdom's experience during the global financial crisis.

Severity of other macroeconomic variables

Overall severity is determined not only by real activity, but also by other variables that influence borrowers' capacity to service debt and banks' profitability. Two particularly important variables that affect overall severity are unemployment and property prices. This section compares outturns for these variables in the scenario to history in the respective economies, as well as other past advanced economy and emerging market crises.

The paths for unemployment in the scenario are broadly consistent with historical relationships between GDP and unemployment in the respective economies. **Chart 9** illustrates how the level of the unemployment rate in the scenario compares to historical outturns in each country since the early 1980s. The shading is constructed so that the darkest point represents the median unemployment rate: as many historical outturns have been above that, as they have below. The red line shows the peak unemployment rate in the scenario for each country. This shows that for the United States and the United Kingdom the peak

Chart 9 Unemployment in the 2015 stress scenario compared to historical experience since the 1980s^(a)



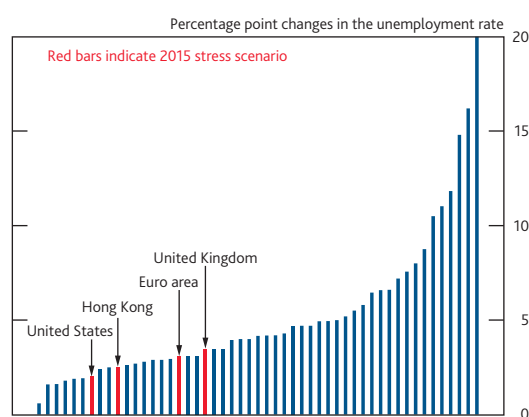
Sources: OECD Employment and Labour Market Statistics Database, ONS, Thomson Reuters Datastream and Bank calculations.

- (a) The shaded diagrams are a graphical representation of the historical distribution of the level of the unemployment rate since 1981. Data are quarterly. The shading is constructed so that the darkest point represents the median: as many historical outturns have fallen above that, as they have below. The shading lightens in either direction to illustrate observations further away from the median. The red lines show the peak unemployment rates in the 2015 stress scenario.
- (b) Up to 1990 Q2, the euro-area unemployment rate is a weighted average across major euro-area countries, interpolated to quarterly frequency (from annual) by Bank staff. Data availability varies over this period; at a minimum eleven countries are included. All euro-area data are sourced from the OECD.

unemployment rate in the scenario is within their historical experiences, albeit still significantly above the median over the past three and a half decades. For the euro area, and to a lesser extent Hong Kong, the stress is more severe when seen from that perspective. The euro area in particular, starts the scenario with an unemployment rate that is already high relative to history, which reflects the effects of the recent recession.

Structures of economies change over time, and severe downturns are infrequent, so a country's own experience may only provide a limited perspective on how future stresses might play out. Other countries' experiences can therefore provide a useful comparison for outturns in the scenario. The blue bars in **Chart 10** show trough-to-peak percentage point increases in unemployment during past advanced economy and G20 emerging market banking crises. The red bars show the same metric for key economies in the 2015 stress scenario. Of course, these are not always strictly comparable. For example, labour market structures can differ across regions and the underlying shocks to GDP were different across these episodes (and in the scenario). But **Chart 10** illustrates that, when the scenario shocks to each region are considered in isolation, they appear within international experiences during periods of severe macroeconomic stress. It is also important to consider that unemployment rates rise across regions simultaneously in the scenario, which contributes to the overall severity.

Chart 10 Rise in unemployment rates in international banking crises and in the stress scenario^{(a)(b)}

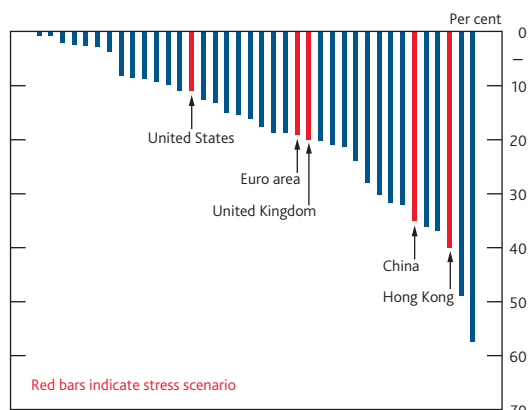


Sources: OECD Labour Market Statistics – Main Economic Indicators Database, Oxford Economics National Sources, Thomson Reuters Datastream and Bank calculations.

- (a) Trough-to-peak rise in the unemployment rate. Data are at a quarterly frequency. Unemployment is defined in the scenario only for the United States, United Kingdom, Hong Kong and the euro area.
- (b) Definition of banking crises as in Laeven, L and Valencia, F (2012), 'Systemic banking crises database: an update' and Caprio, G, Klingebiel, D, Laeven, L and Noguera, G (2005), 'Appendix: banking crisis database' in *Systemic financial crises: containment and resolution*, subject to data availability. Covers banking crises in economies that are currently classified by the IMF as 'advanced economies' and emerging markets that are part of the group of G20 countries. Only crises associated with a rise in unemployment are shown in the chart. Trough of unemployment can be up to three years prior to the start of the crisis. Time from trough to peak is limited to five years.

Property prices are another key determinant of scenario severity. Residential property prices are used in **Chart 11** as an example, but this analysis can also be extended to

Chart 11 Peak-to-trough falls in residential property prices in international banking crises and the stress scenario^{(a)(b)}



Sources: Federal Reserve Board, Halifax, Nationwide, OECD Housing Prices Database, Rating and Valuation Department – the Government of the Hong Kong Special Administrative Region, Statistics Iceland, Thomson Reuters Datastream and Bank calculations.

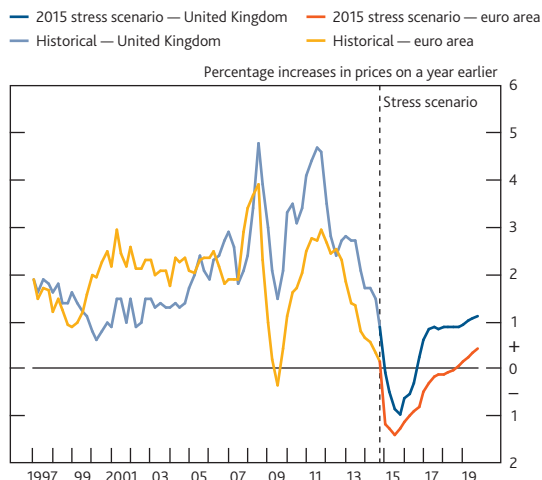
- (a) Peak-to-trough falls in residential property prices. Data are at a quarterly frequency. Residential property prices are defined in the scenario only for the United States, United Kingdom, Hong Kong, China and the euro area.
- (b) Definition of banking crises as in Laeven, L and Valencia, F (2012), 'Systemic banking crises database: an update' and Caprio, G, Klingebiel, D, Laeven, L and Noguera, G (2005), 'Appendix: banking crisis database' in *Systemic financial crises: containment and resolution*, subject to data availability. Covers banking crises in economies that are currently classified by the IMF as 'advanced economies' and emerging markets that are part of the group of G20 countries. Only crises associated with a fall in residential property prices are shown in the chart. Time from peak to trough is limited to five years.

commercial real estate prices, given the two often comove during crises. **Chart 11** shows how the stress scenario outturns compare to peak-to-trough falls in residential property prices during past advanced economy and G20 emerging market banking crises. In the scenario, peak-to-trough falls in residential property prices range from -11% in the United States, to -40% in Hong Kong. In part, this wide range reflects the fact that current risks in property markets differ. For example, some markets are still in the recovery phase following large price falls in the recent crisis, while others have recently seen very strong growth.

As with real activity, declines in property prices are highly co-ordinated across regions in the stress scenario. This is consistent with the observation by Claessens, Kose and Terrones (2011)⁽¹⁾ that downturns in housing markets are highly synchronised across countries, and that this is particularly the case during periods of synchronised recessions.

Finally, a key feature of the stress scenario is the relative persistence of deflationary pressures. **Chart 12** shows that both in the euro area and the United Kingdom, consumer price inflation remains materially below the inflation targets of the respective central banks for the duration of the hypothetical stress. The paths are also materially below historical outturns for inflation in both economies. For example, the UK inflation rate has not been as persistently negative as in the stress scenario for 80 years. Similarly, persistently negative inflation has not been observed in the euro area for the past 50 years, which covers the period of available data.

Chart 12 Consumer price inflation in the euro area and the United Kingdom historically and in the stress scenario



Sources: Eurostat, ONS and Bank calculations.

Severity of UK headline macroeconomic variables

This section compares the main UK macroeconomic elements of the stress scenario to the latest projections of the MPC as communicated in the February 2015 *Inflation Report*. The fan charts included in the *Inflation Report* and reproduced on page 13 are graphical representations of probabilities attached to different macroeconomic outcomes. In the collective judgement of the MPC, each variable would be expected to lie within the fan on 90 out of 100 occasions in any particular quarter of the forecast period.

The paths for UK real GDP and unemployment in the 2015 stress scenario lie outside these fan charts, demonstrating that these outturns are clearly in the tail of the distribution of possible future outcomes (**Charts 13 and 14**). Inflation is generally in the two lightest areas of the fan chart (**Chart 15**). The probability of an inflation outturn as low or weaker than that in 2016 Q2 in the stress scenario (the date inflation is closest to the edge of the fan) is less than 10%. And the probability of inflation being at or lower than the stress profile over all three years is much smaller still. So the scenario still comes from the lower tail of possible outcomes.

The fact that the stressed profiles for GDP and unemployment lie outside of the bands in the fan chart, and inflation within them, illustrates that the uncertainty around the inflation outlook does not just depend on the uncertainty around GDP and unemployment outlooks. The width of the inflation fan chart also reflects uncertainty around other cost pressures (such as those stemming from large shocks to oil prices or the effective exchange rate), whose movements are relatively muted in the scenario compared to some recent experience.

(1) 'Financial cycles: What? How? When?', IMF Working Paper No. WP/11/76 and 'How do business and financial cycles interact?', IMF Working Paper No. WP/11/88.

Chart 13 UK real GDP projection in the stress scenario relative to the February *Inflation Report* projection

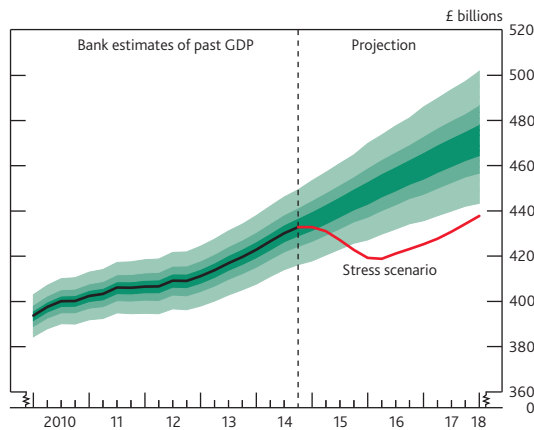


Chart 14 UK unemployment in the stress scenario relative to the February *Inflation Report* projection

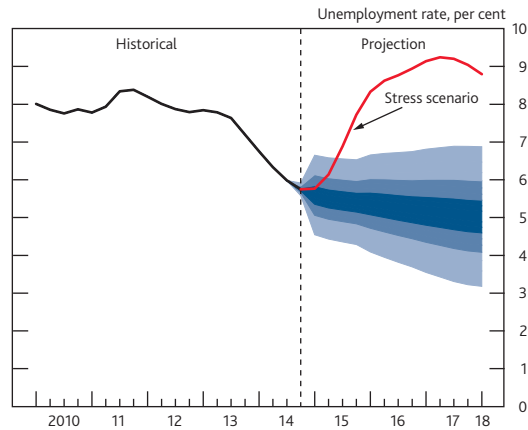
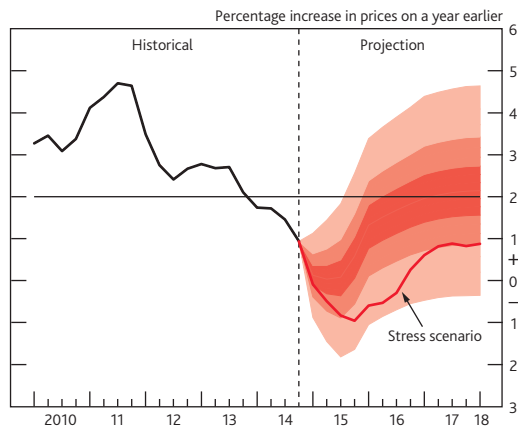


Chart 15 UK inflation in the stress scenario relative to the February *Inflation Report* projection



Sources: ONS and Bank calculations.

The fan charts depict the probability of various outcomes for real GDP, the unemployment rate and CPI inflation. They have been conditioned on the assumption that the stock of purchased assets financed by the issuance of central bank reserves remains at £375 billion throughout the forecast period and that Bank Rate follows a path implied by market interest rates in the fifteen working days to 5 February 2015. For GDP, to the left of the vertical dashed line, the black line is the Bank's best guess of the level of real GDP over the past. This line and the distribution around it take into account possible revisions to the ONS data in coming years. To the right of the vertical dashed line, for all charts, the distribution reflects uncertainty over the evolution of GDP, CPI inflation or the unemployment rate in the future. For unemployment, the fan begins in 2014 Q4, a quarter earlier than the fan for CPI inflation. That is because Q4 is a staff projection for the unemployment rate. If economic circumstances identical to today's were to prevail on 100 occasions, the MPC's best collective judgement is that CPI inflation, the unemployment rate or the mature estimates of GDP would lie within the darkest central band on only 30 of those occasions. The fan charts are constructed so that outturns are also expected to lie within each pair of the lighter coloured areas on 30 occasions. In any particular quarter of the forecast period, GDP, CPI inflation or the unemployment rate are therefore expected to lie somewhere within the fan on 90 out of 100 occasions. And on the remaining 10 out of 100 occasions they can fall anywhere outside the coloured area of the fan chart. See the box on pages 48–49 of the May 2002 *Inflation Report* for a fuller description of the fan chart and what it represents.

Box 2

Approach to traded risk

The 2015 stress test will incorporate a traded risk scenario that has been designed by the Bank. This is in contrast to the 2014 stress test which applied the EBA methodology to the trading book and other fair valued positions. This element of the 2015 stress test will principally examine the resilience of the investment banking operations of UK banks to a severe financial market shock.⁽¹⁾

The traded risk component of the 2015 stress test requires banks to apply a price shock to their positions as of 20 February 2015.⁽²⁾ This price shock is mapped to banks' profit-and-loss accounts, prudent valuations and risk-weighted assets, and will form an important element of the overall impact of the stress scenario on their capital positions.

The scenario has been designed to be consistent with the macroeconomic scenario — both in terms of the broad movements in market risk factors and the types of counterparties affected — and to take account of the liquidity of trading book positions. This box provides further details on the rationale behind these choices.

Consistency with the macroeconomic scenario

The approach to traded risk has been designed to be consistent in both severity and geographic impact with the macroeconomic stress scenario described in Section 2. This aims to enhance the coherence of the stress test and to increase the usefulness of the results to policymakers.

The market risk factors that are likely to have a material impact on banks' profit and loss (such as credit spreads and equity indices) have been calibrated to past periods of financial market turbulence which are judged to be broadly consistent with the macroeconomic scenario.⁽³⁾ For example, movements in risk factors specific to Europe have been calibrated to the 2011–12 period during which some European sovereign debt spreads reached record highs. And the shocks applied to US financial markets are of a lesser severity than those in Europe or Asia — reflecting the fact that the US economy is less affected in the macroeconomic scenario.

Market and position liquidity

The impact of a financial market shock on banks' trading books will be critically dependant on the liquidity of their positions and, in particular, how the liquidity of these positions may be reduced in a stress scenario. The Bank's 2015 approach to traded risk takes account of different liquidity horizons of banks' trading risk positions by calibrating the size of the shock to the time it would take banks to close out their positions. Other things equal, that means the size of the

shock banks will have to apply will be greater for less liquid positions that take longer to close out than for those positions which could be sold or hedged within shorter time frames.

This approach to liquidity risk within the trading book is one of the key evolutions in the Bank's approach to stress testing in 2015. It aims to increase the realism of the trading risk scenario, and provide the Bank with a set of results that are more meaningful for assessing the risks stemming from banks' trading book positions. The Bank will continue to enhance its approach to stress testing the trading book as part of the broader development of its medium-term stress-testing framework.

Counterparty default

The 2015 scenario will also test banks' ability to withstand the default of a number of counterparties. This is a key risk as banks' trading books typically contain sizable exposures to individual counterparties. Counterparty default can, therefore, have a material impact on banks' profit and loss, and ultimately their capital positions.

Consistent with the macroeconomic scenario, the 2015 stress test will examine the ability of banks to withstand the default of a number of counterparties that would be vulnerable to the macroeconomic scenario. In addition to examining the impact of the default of specific counterparties, the scenario will also test the impact of the default of a portion of counterparties falling within a specific sector vulnerable under the scenario. This aspect of the trading book stress is similar to the credit risk methodology.

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- (1) For further detail on investment banks' business models, see Balluck, K (2015), 'Investment banking — linkages to the real economy and the financial system', *Bank of England Quarterly Bulletin*, Vol. 55, No. 1, pages 4–22; www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2015/q101.pdf.
- (2) In contrast to the Banking Book, banks' year-end trading book positions may not be a good approximation of the average risks that they run on their Trading Books during the calendar year.
- (3) Banks will be asked to calibrate less material market risk factors based on the guidance provided in this document and with reference to the 'Variables paths for the 2015 stress test' publication, available at www.bankofengland.co.uk/financialstability/Documents/stresstesting/2015/variablepaths2015.xlsx.

3 Baseline scenario

In addition to the stress scenario, the 2015 test will assess projections of banks' profitability and capital ratios under a baseline macroeconomic scenario. The UK macroeconomic variables in the baseline scenario have been developed by Bank staff and are broadly consistent with the forecasts published in the February 2015 *Inflation Report*. The international macroeconomic variables are largely consistent with the IMF's October 2014 *World Economic Outlook* projections.⁽¹⁾ The remainder of this section provides a short summary of the key features of the baseline scenario.

World PPP-weighted GDP has grown at an average rate of about 3½% since its 2009 trough. In the baseline projection, world GDP growth is projected to rise somewhat from 2015, averaging 4% through the five-year horizon. Advanced economies continue to recover, albeit at different rates. The United States is projected to grow strongly, with growth peaking at 3.9% in 2015. Growth in the euro area is weaker, peaking at 1.8% in 2016. In the near term, recent declines in oil prices push down on inflation globally. Euro-area inflation remains low through the horizon, reaching 1.5% by the end of 2019.

Chinese growth slows through the projection, declining to around 6.2% by the end of 2019. But recovery in advanced economies supports a broader pickup in growth for other emerging markets through the five-year horizon. For example, growth in Brazil and South Africa reaches 3% and 2.6% respectively by end-2019, compared to outturns of -0.2% and 1.3% respectively in the latest data.

In the United Kingdom, growth remains robust in the near term, averaging 2.9% over 2015 and 2016, before moderating to an average of 2.6% thereafter. Unemployment continues to fall but at a reduced pace compared to recent outturns, reaching close to 5% by end-2017. Inflation falls further in the near term, as recent declines in energy prices continue to be passed through to petrol prices and utility bills. But in the second half of 2015, those and other temporary effects drop out, and inflation begins to increase. These projections are consistent with those presented in the Bank's February 2015 *Inflation Report*. Consistent with robust growth, asset prices continue to rise through the baseline scenario.

4 Hurdle rate framework

The results of the stress test will be used to: (a) inform the PRA's judgement on the capital adequacy of individual institutions, and the appropriate supervisory response; (b) inform the PRA's judgement on banks' risk management and capital planning processes and the appropriate supervisory response; and (c) inform the FPC's judgements on the

resilience of the banking system as a whole and, in doing so, aid formulation of system-wide policy responses. As was the case last year, the FPC and PRA Board will evaluate banks on their overall resilience over the whole period of the stress.

The 2015 stress test will include two key capital adequacy thresholds in the stress: one expressed in risk-based capital terms and one expressed in leverage terms. The former will be set at 4.5% of risk-weighted assets (RWAs), to be met with common equity Tier 1 (CET1) capital. The latter will be set at 3% of the Leverage Exposure Measure, to be met with Tier 1 capital, where relevant additional Tier 1 instruments would be permitted to comprise up to 25% of this requirement. More details around the appropriate definitions of capital, RWAs and the Leverage Exposure Measure are set out in instructions to banks.

The evaluation of stress test results will allow only for a limited set of credible management actions that banks could realistically take in a stress. Improving stressed capital ratios through deleveraging (in particular relative to banks' baseline plans) would be constrained, especially if it led to a material decline in aggregate credit supply. Box 3 provides further details.

If a bank's capital ratio was projected to fall below the 4.5% CET1 risk-weighted capital ratio or the 3% Tier 1 leverage ratio in the stress, there is a strong presumption that the PRA would require the bank to take action to strengthen its capital position over a period of time to be agreed between the bank and the PRA. Banks that are already taking action to strengthen their capital position may not be required to take further action if, after considering the results of the stress test, the PRA is satisfied that the measures currently in place, or taken since the submission of the data on which the stress test was performed, are sufficient.

If a bank's capital ratio was projected to remain above the 4.5% CET1 risk-weighted capital ratio and the 3% Tier 1 leverage ratio in the stress, the PRA may still require it to take action to strengthen its capital position. Examples of factors the PRA might take into consideration in deciding whether action is needed include, but are not limited to: the bank's Tier 1 and total capital ratios; Pillar 2A capital requirements; the extent to which the bank had used up its CRD IV buffers (eg the SIFI and capital conservation buffers); the adequacy and quality of its recovery and resolution plans; and the extent to which potentially significant risks are not quantified adequately or fully as part of the stress.

The FPC will consider the stress-test results as it evaluates the overall capital adequacy and resilience of the UK financial

(1) Bank staff have adjusted the IMF October 2014 *WEO's* euro-area inflation profile to take account of oil price news since then.

Box 3

Aggregate lending profiles in the stress

In the 2014 stress test, the FPC agreed a general principle that banks' proposed management actions to change the size of their loan books would not be accepted, unless driven by changes in credit demand that would be expected to occur in the stress scenario. This reflected a key macroprudential objective of stress testing which is to ensure that the banking system is sufficiently capitalised to maintain the supply of financial services in the face of adverse shocks.

In line with the FPC's general principle, the 2015 stress test incorporates three features:

- first, the FPC's principle has been reflected in the calibration of the macro scenario;
- second, the Bank has published paths for aggregate bank lending in the United Kingdom that are consistent with the macro scenario; and
- third, banks will be required to identify any proposed deviations from the FPC's principle in their balance sheet projections.

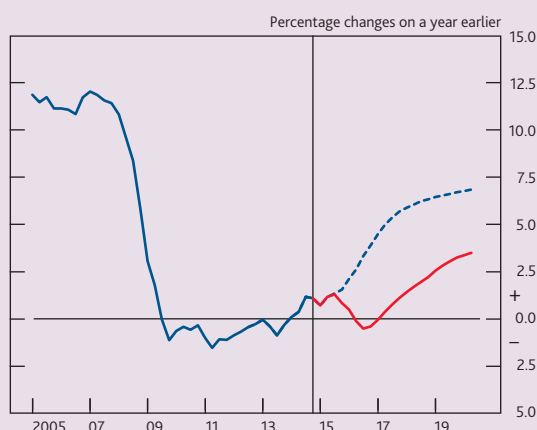
The rest of this box outlines these three features in more detail.⁽¹⁾

The stress scenario is one in which the banking system maintains the supply of financial services to the real economy. The calibration of the hypothetical stress assumes that interest rates on bank lending follow a path implied by bank funding costs. Funding costs rise relative to risk-free rates in the first half of the scenario, but are assumed to fall back thereafter. In aggregate, banks are not assumed to reduce the flow of lending as a means of preserving capital through changes in prices relative to their funding costs or through non-price terms.

The growth rate of bank lending is weaker in the stress scenario than in the baseline. The weaker path of nominal demand reduces the demand for credit. Although it is partly offset by a lower risk-free rate, the short-term rise in bank funding costs relative to risk-free rates, is passed through to customers, further reducing the demand for credit.

The scenario includes consistent paths for aggregate bank lending to UK individuals and private non-financial corporations (PNFCs). Annual growth of bank lending to UK individuals and PNFCs would be expected to trough at -0.5% in 2016 Q2 (**Chart A**) and, by the end of the scenario, the level of bank lending to UK individuals and PNFCs in the

Chart A Lending to UK individuals and PNFCs^(a)



Sources: Bank of England and Bank calculations.

(a) To the right of the vertical line, the red solid line represents the stress projection. The dashed line represents the baseline projection. These projections have been produced by Bank staff. The baseline projection is designed to be broadly consistent with the forecasts published in the February 2015 *Inflation Report*.

stress is around 16% lower than in the baseline. However, reflecting the constraint that banks do not take actions to reduce the supply of credit, bank lending to the real economy increases by 9% through the course of the scenario.

Guidance has been provided to banks on their balance sheet modelling. The Bank of England will ensure that the projected growth of banks' balance sheets in the stress is, in aggregate, consistent with the aggregate projections described above. Individual banks may propose reductions in lending as potential management actions. These will be considered on a case-by-case basis together with other management actions proposed by banks. In line with the stance taken by the FPC in 2014, proposed management actions to change the size of banks' loan books could be accepted by the PRA Board in idiosyncratic cases. For example, if the actions proposed by banks would (i) not have a material impact on the market as a whole and (ii) not be correlated with actions of other banks operating in the same market.

(1) See 'Stress testing the UK banking system: guidance for participating banks and building societies'; www.bankofengland.co.uk/financialstability/Documents/stresstesting/2015/guidance.pdf.

system. In making these judgements, the FPC will be looking at, among other things, the number of institutions that suffer very sharp declines or very low capital or leverage ratios post stress; indications that system-wide bank behaviour in a stress could adversely affect the macroeconomy or the stability of other parts of the financial system; and widespread sectoral concentrations in losses. If the exercise reveals inadequate systemic resilience, the FPC will consider a variety of actions, depending on the sources of potential problems. These may include Recommendations to the PRA and FCA, using its powers of Direction over sectoral capital requirements and leverage ratio tools, and its responsibility to set the countercyclical capital buffer (CCB), in order, among other things, to put banks into a better position to withstand stress.

Under the baseline scenario, the PRA expects banks to meet a 7% CET1 risk-weighted capital ratio and a 3% Tier 1 leverage ratio. More details around the appropriate definitions of capital, RWAs and the Leverage Exposure Measure are set out in instructions to banks.

5 Publication of results

The results of the 2015 stress test will be published alongside the *Financial Stability Report* in 2015 Q4. The Bank intends to disclose at least as much bank-specific information as it did in the 2014 stress test.