Monetary policy trade-offs and forward guidance

August 2013

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In the letter accompanying the 2013 remit for the Monetary Policy Committee (MPC), the Chancellor of the Exchequer asked the MPC to provide more information about the trade-offs inherent in setting monetary policy to meet a forward-looking inflation target while giving due consideration to the desirability of avoiding undue output volatility. The Committee was also asked to provide an assessment of whether it would be appropriate, given the current exceptional economic circumstances, to deploy explicit forward guidance – including intermediate thresholds – in order to meet its objectives more effectively. This document sets out the MPC's response to those requests.

The Monetary Policy Committee

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www.bankofengland.co.uk/publications/Documents/inflationreport/2013/ir13augforwardguidance.pdf

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Executive summary

At its meeting on 1 August 2013, the Monetary Policy Committee (MPC) agreed its intention not to raise Bank Rate from its current level of 0.5% at least until the Labour Force Survey (LFS) headline measure of the unemployment rate had fallen to a 'threshold' of 7%, subject to the conditions below.

The MPC stands ready to undertake further asset purchases while the LFS unemployment rate remains above 7% if it judges that additional monetary stimulus is warranted. But until the unemployment threshold is reached, and subject to the conditions below, the MPC intends not to reduce the stock of asset purchases financed by the issuance of central bank reserves and, consistent with that, intends to reinvest the cashflows associated with all maturing gilts held in the Asset Purchase Facility.

This proposition linking Bank Rate and asset sales to the unemployment threshold would cease to hold if any of the following three 'knockouts' were breached:

- in the MPC's view, it is more likely than not that CPI inflation 18 to 24 months ahead will be 0.5 percentage points or more above the 2% target;[1]
- medium-term inflation expectations no longer remain sufficiently well anchored;
- the Financial Policy Committee (FPC) judges that the stance of monetary policy poses a significant threat to financial stability that cannot be contained by the substantial range of mitigating policy actions available to the FPC, the Financial Conduct Authority and the Prudential Regulation Authority in a way consistent with their objectives.

In essence, the MPC judges that, until the margin of slack within the economy has narrowed significantly, it will be appropriate to maintain the current exceptionally stimulative stance of monetary policy, provided that such an approach remains consistent with its primary objective of price stability and does not endanger financial stability.

This approach is consistent with the MPC's objectives, as defined by its remit. The MPC's primary objective is to maintain price stability – as defined by the Government's 2% inflation target – and, subject to that, to support the Government's economic policies, including those for growth and employment. The inflation target applies at all times. The remit also recognises that the actual inflation rate will, on occasion, depart from the 2% target as a result of shocks and disturbances. In the face of such disturbances, particularly when they are large or persistent, the MPC may be confronted with a trade-off between the speed with which it returns inflation to the target and the scope for economic expansion. The remit allows the Committee to extend or reduce the period over which it intends to return inflation to the target, provided that such an approach remains consistent with meeting the inflation target in the medium term.

Unlike the first decade of the MPC's existence, the UK economy has been subject to substantial disturbances during the past six years, including not only the global financial crisis and the attendant need for significant private and public sector balance sheet repair, but also the repercussions of the continuing adjustment within the euro area and several significant cost shocks. As a consequence, output has remained depressed while inflation has been persistently above the 2% target. Moreover, employment has remained surprisingly resilient and productivity unusually weak, leading to considerable uncertainty about the supply capacity of the economy and the extent to which the deterioration in supply performance will reverse as demand recovers. As a result, the Committee has been faced with the need to balance the risk of achieving an insufficiently rapid restoration in activity against the risk that continued elevated inflation results in medium-term inflation expectations becoming less well anchored to the target. In addition, the scope for further cuts in Bank Rate has been limited since early 2009, complicating the conduct of monetary policy.

[1] To assess the likelihood of a breach of the knockout, Committee members will take the average of the probabilities of inflation being at or above 2.5% in the relevant quarters. For the August 2013 projections, 18 to 24 months ahead refers to 2015 Q1 and 2015 Q2.

The MPC has in the past provided broad guidance on its reaction function via its *Inflation Reports,* the minutes of its monthly meetings, evidence to the Treasury Committee, and speeches by individual Committee members. In the current exceptional circumstances, with both inflation and economic activity far from desirable levels, the MPC has decided to provide explicit forward guidance.

In these exceptional circumstances, explicit forward guidance can enhance the effectiveness of monetary stimulus in three ways.

1) **It provides greater clarity about the MPC's view of the appropriate trade-off between the horizon over which inflation is returned to the target and the speed with which growth and employment recover.** The forward guidance agreed on 1 August 2013 clarifies that the MPC will seek to reduce the margin of slack in the economy, if necessary by varying the speed at which inflation returns to the target, but only if that does not entail material risks to its overriding objective of price stability. In particular, the guidance is subject to two price stability 'knockouts' that, if breached, would mean that the guidance would no longer apply: first, if in the MPC's view, it is more likely than not that CPI inflation 18 to 24 months ahead will be at least half a percentage point above the 2% target; and second, if medium-term inflation expectations no longer remain sufficiently well anchored.

2) **It reduces uncertainty about the future path of monetary policy as the economy recovers.** In particular, it increases the understanding of financial market participants, businesses and households of the conditions under which the highly stimulative stance of monetary policy will be maintained. That should reduce the risk that, as the recovery gains traction, market interest rates rise prematurely and people worry excessively about early rises in borrowing costs. By so doing, it should help to secure a recovery of sufficient strength and duration to return output, employment and incomes to their full potential levels, consistent with medium-term price stability.

3) **It delivers a robust framework within which the MPC can explore the scope for economic expansion without putting price and financial stability at risk**. The trade-off between the horizon over which inflation is returned to the target and the speed with which output and employment recover is unusually uncertain at present. Moreover, the sustained period for which interest rates have been held at historically low levels means there may also be a trade-off between the support monetary policy is able to provide to the UK real economy and the risks that might pose to financial stability. Misjudging either of these trade-offs could have significant costs in the medium term. Rather than having to make a firm judgement about the extent to which it can reduce the margin of slack without prompting either of these risks, the existence of the price stability and financial stability knockouts allows the MPC to learn and update its view of the trade-offs as the economy recovers. In particular, if supply picks up strongly as demand increases, guidance can maintain the current exceptional degree of stimulus until the margin of slack within the economy has narrowed substantially. But if material risks to either price stability or financial stability emerge – such that any of the knockouts were breached – then the guidance would no longer hold and the MPC would reassess the appropriate stance of monetary policy. Importantly, the existence of the knockouts, by demonstrating the MPC's unwillingness to tolerate any material risks to price stability or financial stability, may reduce the likelihood of either risk occurring.

The MPC believes that framing guidance in terms of the likely response of monetary policy to economic developments, rather than specifying the period over which it intends to maintain the current accommodative stance of monetary policy, will make it more effective. It is important that people understand the balance the MPC is seeking to strike between returning inflation promptly to the target and providing support to the economic recovery. Linking the intended path of monetary policy to the state of the economy, rather than the passage of time, is the best way of providing that clarity.

The best collective judgement of the MPC is that the unemployment rate is the most suitable indicator of economic activity, given present uncertainties about the evolution of supply. The unemployment

rate relates directly to the amount of slack in the economy, is less volatile than some alternative measures of activity, is not prone to substantial revisions, and is widely understood. The MPC anticipates that it will be appropriate at a minimum to maintain the current stance of monetary policy at least until the LFS headline measure of the unemployment rate falls to 7%, provided that such an approach remains consistent with meeting the inflation target in the medium term. In recognition of the fact that no single variable can provide a comprehensive indication of current economic conditions, the 7% unemployment rate is set as a 'threshold', not a 'trigger': that is, reaching the threshold will not automatically result in a rise in Bank Rate. Instead, the MPC will reassess whether or not to raise Bank Rate above 0.5% in light of its assessment of the economic outlook. 7% does not represent the MPC's view of the lowest sustainable rate to which unemployment can fall. Indeed, it is likely that, over time, unemployment can fall materially lower. Rather, the MPC judges that 7% provides an appropriate point at which to reassess the state of the economy and consider whether or not it should start to withdraw the current extraordinary levels of monetary stimulus.

Price stability remains the MPC's primary objective. There are two price stability 'knockouts'. First, the MPC's intention not to raise Bank Rate above 0.5% will cease to apply if, in the Committee's view, it is more likely than not that inflation 18 to 24 months ahead will be half a percentage point or more above the 2% target. Setting this knockout at 2.5% at the 18 to 24-month horizon should allow sufficient scope to return inflation to the 2% target from its current elevated rate without derailing the recovery. But, at the same time, it underlines the MPC's determination to bring inflation back to the target in the medium term. Second, in order to ensure that the risks to price stability remain contained, the Committee's intention not to raise Bank Rate above 0.5% also applies only if medium-term inflation expectations remain consistent with the 2% target. In making this assessment, the MPC will draw on a wide range of external indicators as an independent cross-check on its own inflation projection.

Because price stability is the MPC's primary objective, either of the price stability conditions, if breached, would render the MPC's unemployment threshold no longer applicable.

In a similar vein, a judgement by the FPC, which would be made public, that the stance of monetary policy poses a significant threat to financial stability that cannot be contained by the substantial range of mitigating policy actions available to the regulatory authorities, would also knock out the Committee's guidance. That is because financial instability could have lasting effects on the economy, damaging growth and endangering price stability. In some circumstances, monetary policy has an important role to play as a last line of defence in mitigating risks to financial stability.

While the MPC's guidance is in force, the MPC will continue to meet each month to decide the level of Bank Rate and the size of the asset purchase programme. These decisions will be made in the context of that guidance. So long as the unemployment rate remains above the 7% threshold, the MPC plans that its monthly decision on Bank Rate will depend on individual members' assessments of the price stability knockouts, and on whether or not the FPC has alerted the MPC to financial stability risks. In the event that the unemployment threshold is reached, or if any of the price stability or financial stability knockouts is breached, the action taken by the Committee would depend on its assessment of the appropriate setting of monetary policy required to fulfil its remit to deliver price stability. There is, therefore, no presumption that there would definitely be an immediate rise in Bank Rate.

The MPC stands ready to undertake further asset purchases while the LFS unemployment rate remains above 7% if it judges that additional monetary stimulus is warranted. But until the unemployment threshold is reached, and subject to the price and financial stability knockouts not being breached, the MPC intends not to reduce the stock of asset purchases financed by the issuance of central bank reserves and, consistent with that, intends to reinvest the cashflows associated with all maturing gilts held in the Asset Purchase Facility.

1. Introduction

Current economic conditions are exceptional. Unlike the first decade of the Committee's existence, the UK economy has been subject to substantial disturbances during the past six years, including not only the global financial crisis and the attendant need for significant private and public sector balance sheet repair, but also the repercussions of the continuing adjustment within the euro area as well as several significant cost shocks. As a consequence, output has remained depressed while inflation has been persistently above the 2% target. Moreover, employment has remained surprisingly resilient and productivity unusually weak, leading to considerable uncertainty about the supply capacity of the economy and the extent to which the deterioration in supply performance will be reversible as demand recovers. As a result, the Committee has been faced with the need to balance the risk of achieving an insufficiently rapid restoration in activity against the risk that continued elevated inflation results in medium-term inflation expectations becoming less well anchored to the target. In addition, the scope for further cuts in Bank Rate has been limited since early 2009, complicating the conduct of monetary policy.

In the letter accompanying the 2013 remit for the MPC, the Chancellor of the Exchequer asked the Committee to provide more information about the trade-offs inherent in setting monetary policy to meet a forward-looking inflation target while avoiding undue output volatility. The Committee was also asked to provide an assessment of whether it would be appropriate, given the current unprecedented economic circumstances, to deploy explicit forward guidance – including intermediate thresholds – in order to meet its objectives more effectively.

This document sets out the MPC's response to those requests. Section 2 describes the trade-offs facing the MPC in the current environment, and sets out the challenges that those trade-offs pose to monetary policy. Section 3 discusses the role that more explicit forward guidance can play in helping the MPC to meet those challenges. Section 4 discusses various ways forward guidance could be implemented. Section 5 sets out different options for linking guidance to intermediate thresholds, and concludes with the MPC's decision.

2. Challenges facing monetary policy in the current economic environment

2.1 The current economic environment

Since 2007, inflation – as measured by the twelve-month change in the Consumer Prices Index (CPI) – has been elevated, averaging close to 3% (**Chart 1**). Inflation has been above the 2% target for around 90% of that time, and above 3% for almost half. The elevated rates of inflation have largely reflected the effects of a series of cost shocks – increases in energy prices, higher non-fuel commodity prices, and rises in VAT – and the depreciation of sterling in 2007/08. More recently, above-target inflation has also reflected an unusually large contribution from administered and regulated prices – that is, prices that are affected by government or regulatory decisions and so tend to be less sensitive to the balance of domestic demand and supply (**Chart 2**).[2]

Chart 1 Annual CPI inflation

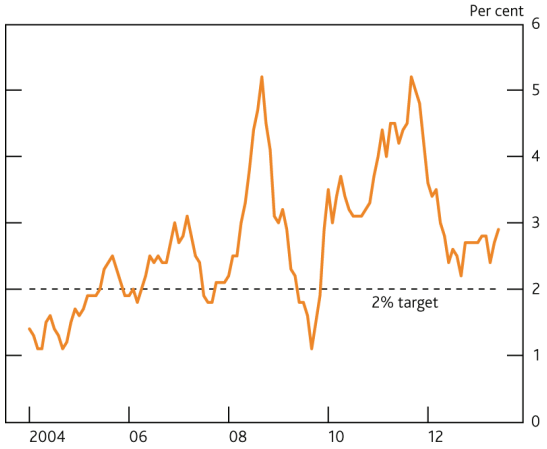
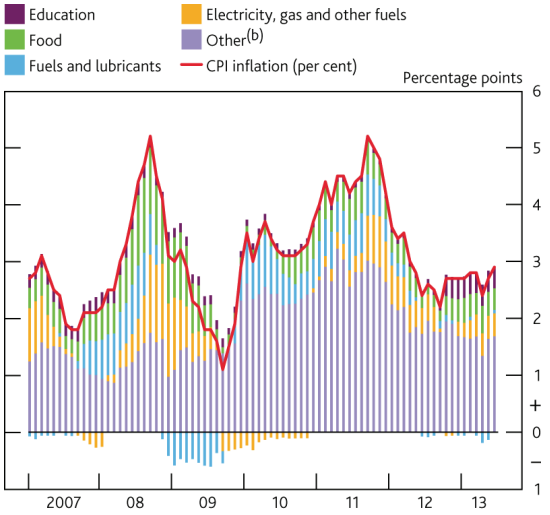


Chart 2 Contributions to CPI inflation[(a)]

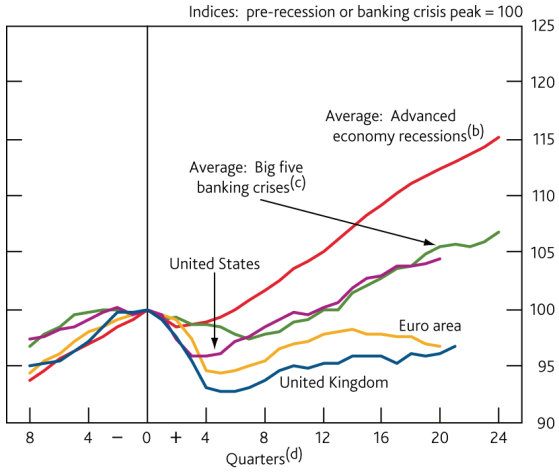


(a) Contributions to annual CPI inflation. Data are non seasonally adjusted.
(b) Calculated as a residual. Includes a rounding residual.

The recovery since the end of the deep recession in 2008/09 has been muted. Output growth has been weak compared with previous and current recoveries in many other advanced economies and compared with the average experience following past regional banking crises (**Chart 3**). In 2013 Q2, the level of real GDP stood more than 3% below its pre-crisis peak, and close to 20% below the level that it would have achieved had it continued to grow at its pre-crisis average rate (**Chart 4**). Although the number of people out of work has increased by less than might have been expected given the depth of the recession, the unemployment rate has been around 8% since the middle of 2009, about 3 percentage points higher than its average in the decade before the crisis (**Chart 5**).

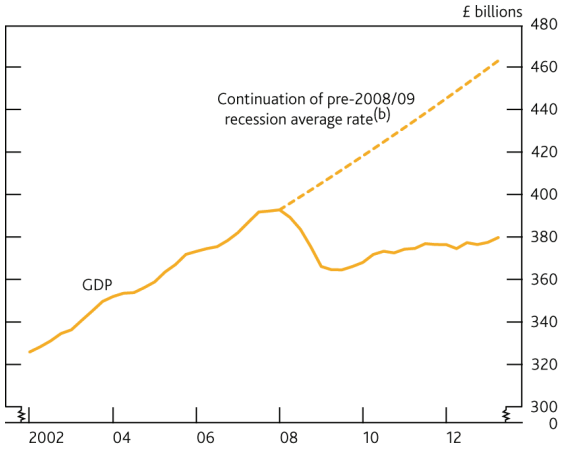
[2] More details on these shocks are provided in boxes in the February 2011 *Inflation Report* ('Estimating the impact of VAT, energy prices and import prices on CPI inflation') and the February 2013 *Inflation Report* ('The implications of higher administered and regulated prices for CPI inflation'). Recent developments in CPI inflation are discussed in Section 4 of the August 2013 *Inflation Report*.

Chart 3 Evolution of GDP around recessions and banking crises[(a)]



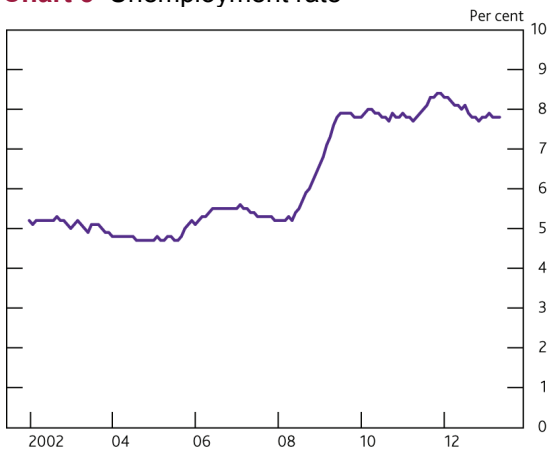
Sources: OECD, Reinhart, C.M and Rogoff, K.S (2008), Thomson Reuters Datastream and Bank calculations.
(a) Recessions are defined as at least two consecutive quarters of falling output.
(b) Covers the G20 advanced economies over the period from 1960 to 2006. For some countries, data are not available back to 1960; for those countries, the sample starts at the earliest available date.
(c) Big five banking crises are Spain (1977), Norway (1987) Finland (1991), Sweden (1991) and Japan (1992), as defined in Reinhart, C.M and Rogoff, K.S (2008) 'This time is different. Eight centuries of financial folly', Princeton University Press.
(d) Zero denotes the pre-recession peak in GDP, or the peak in GDP during the year of the banking crisis, as listed in footnote (c).

Chart 4 GDP[(a)]



(a) Chained-volume measure at market prices.
(b) The continuation of the pre-2008/09 recession average rate is calculated by projecting forward GDP from 2008 Q2 using the average quarterly growth rate between 1999 Q3 and 2008 Q1.

Chart 5 Unemployment rate[(a)]

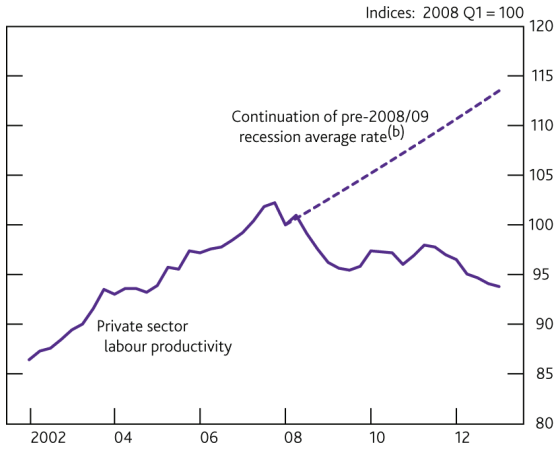


(a) Labour Force Survey headline three-month moving average measure.

The weakness of output growth is, in part, due to the cost shocks eroding the real purchasing power of households and reducing consumer spending. It also reflects the legacy of the global financial crisis of 2007/08, which has depressed domestic demand through various channels, including the effects of heightened uncertainty. The crisis has also had serious repercussions for economic activity elsewhere, which has lowered demand for UK exports – particularly from the euro area – as well as weighing on UK domestic demand through financial and confidence channels.

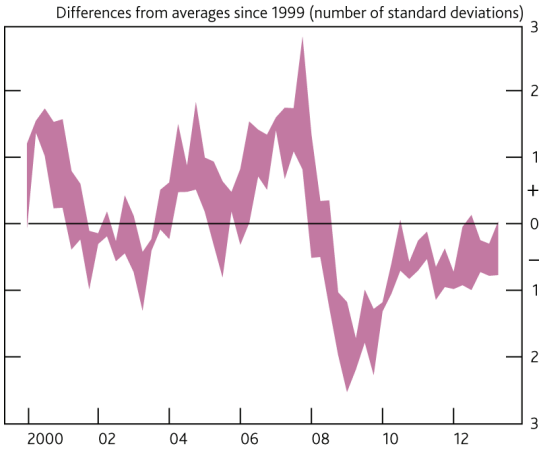
Since the onset of the financial crisis, there has been significant uncertainty regarding the evolution of the supply capacity of the economy. A period of weak output growth, such as that experienced since the start of the 2008/09 recession, would normally be expected to result in a large margin of spare capacity opening up in the economy. But that period has been associated with unusually weak productivity growth (**Chart 6**) and evidence from business surveys indicates that spare capacity within companies has narrowed since 2009 (**Chart 7**). That suggests that companies' ability to produce output – and so the supply capacity of the economy – may have been eroded in recent years. As explained in Section 3 of the August 2013 *Inflation Report*, it is uncertain how much of that weakness in productivity growth is directly related to the weakness in demand and how much reflects separate factors, such as problems in the banking sector and heightened uncertainty. Consequently, it is uncertain how productivity and supply will evolve as demand recovers.

Chart 6 Private sector labour productivity[(a)]



(a) Market sector output per hour.
(b) The continuation of the pre-2008/09 recession average rate is calculated by projecting forward labour productivity from 2008 Q2 using the average quarterly growth rate between 1999 Q3 and 2008 Q1.

Chart 7 Survey indicators of capacity utilisation[(a)]



Sources: Bank of England, BCC, CBI, CBI/PwC and ONS.
(a) Three measures are produced by weighting together surveys from the Bank's Agents (manufacturing and services), the BCC (non-services and services) and the CBI (manufacturing, financial services, business/consumer services and distributive trades) using nominal shares in value added. The BCC data are non seasonally adjusted.

Since early 2009, the MPC has had to rely on unconventional policy tools to provide additional monetary stimulus. Bank Rate was cut sharply in response to the financial crisis and the associated deterioration in the economic outlook, to 0.5% in early 2009 from 5% in the summer of 2008. Since then, the MPC has judged that further cuts in Bank Rate – including cuts that could take Bank Rate below zero – were not the preferred way of providing additional monetary stimulus. That is because there are limitations to the extent to which the rate of interest paid on reserves could be held below zero without inducing significant substitution into cash, and because lowering Bank Rate below 0.5% could also have adverse consequences on the strength of banks' balance sheets and the supply of credit, thus offsetting any expansionary impact on aggregate demand.[3] Additional monetary stimulus has instead been provided through the Committee's programme of asset purchases, financed by the issuance of central bank reserves (also known as quantitative easing). Some £375 billion of gilts have so far been purchased, equivalent to about a quarter of annual nominal GDP.

In addition, the Bank of England has used a variety of other tools to provide support to the economy since the onset of the financial crisis. For example, the Bank provided additional liquidity to the banking sector during the financial crisis through the Special Liquidity Scheme[4] and, in June 2012,

[3] The reasons underlying this view are set out in a paper on negative interest rates, sent from the MPC to the Treasury Committee on 16 May 2013. The paper is available at www.bankofengland.co.uk/publications/Documents/other/treasurycommittee/ir/tsc160513.pdf.
[4] More details on the Special Liquidity Scheme are available at www.bankofengland.co.uk/markets/Pages/sls/default.aspx.

activated the Extended Collateral Term Repo facility in order to respond to actual or prospective market-wide stress of an exceptional nature.[5] The Bank, together with HM Treasury, launched the Funding for Lending Scheme (FLS) on 13 July 2012, and extended the Scheme on 24 April 2013. The FLS provides incentives for banks and building societies to expand lending to UK households and businesses by providing lenders with an additional source of funding, with both the price and the quantity of that funding linked to their lending performance.[6] The FLS should, therefore, act to support an improvement in credit conditions and so boost economic activity.[7] The microprudential and macroprudential regulators have also taken steps to strengthen UK banks' and building societies' capital resilience and to relax liquidity requirements in order to support lending to the real economy.

2.2 Challenges facing monetary policy in present circumstances

The MPC's primary objective is to deliver price stability. Subject to that, the Committee is also required to support the Government's economic policies, including those for growth and employment. As explained in the box on pages 14-15, those objectives stem from the fact that, while monetary policy can affect both real activity and inflation in the near term, it cannot affect the long-run level of real activity, or other real variables such as employment.

The MPC's price stability objective is defined by an inflation target set annually by the Government, which is 2% as measured by the twelve-month change in the CPI. The MPC's remit specifies that the inflation target applies at all times. The remit also recognises that the economy will, on occasion, be subject to shocks and disturbances that push inflation either above or below the target while pushing output in the opposite direction. The remit therefore allows the Committee to vary the pace at which inflation is returned to the target so as to avoid generating undue volatility in output, provided that such an approach remains consistent with meeting the inflation target in the medium term and does not endanger price stability. The remit also recognises that there may be some circumstances in which attempts to keep inflation at the target could exacerbate financial imbalances and so generate risks to future financial stability, and so to price stability.

Normally, the MPC would aim to return inflation to the target in two years or so. But the current unprecedented circumstances warrant bringing back inflation to the target at a slower pace than normal, in order to provide more support to output. Given the current depressed level of output, resources in the economy are not being utilised to their full potential. And the policy actions necessary to return inflation to the target quickly would risk prolonging the period for which resources remain underutilised. In addition, there is a risk that a sustained period of depressed output could persistently reduce the potential supply capacity of the economy – and hence the wealth it can generate – in the medium term. That could happen through so-called hysteresis effects, which are explained in the box on pages 14-15. If the costs of underutilising resources are great enough, it may be appropriate for the MPC to return inflation to the target at a more gradual pace than usual.[8]

But there are also reasons why bringing inflation back to the target gradually might not be appropriate. In particular, with inflation having been elevated for a prolonged period, there is a risk that if inflation is returned to the target too slowly, individuals' medium-term inflation expectations will shift upwards. That would itself generate more persistent upward pressure on inflation, and so the MPC would then

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[5] More details on the Extended Collateral Term Repo facility are available at: www.bankofengland.co.uk/markets/Pages/money/ectr/index.aspx.

[6] For more details on the design of the FLS, see Churm, R, Leake, J, Radia, A, Srinivasan, S and Whisker, R (2012), 'The Funding for Lending Scheme', *Bank of England Quarterly Bulletin*, Vol. 52, No. 4, pages 306-20.

[7] The MPC's latest assessment is that the extended FLS will sharpen banks' incentives to lend to smaller businesses, and will help to ensure that lenders continue to have access to low-cost funding. That should act to boost lending and help support the emerging recovery. The outlook for lending is discussed in more detail in a box in Section 1 of the August 2013 *Inflation Report*.

[8] Reasons why it may be appropriate to return inflation to the target more gradually than normal are discussed in more detail in: Carney, M (2013), 'Monetary Policy After the Fall', Eric J. Hanson Memorial Lecture, University of Alberta, and in King, M (1997), 'The inflation target five years on', lecture delivered at the London School of Economics, 29 October 1997.

need to tighten monetary policy by more than it otherwise would in order to bring inflation back to the target in the medium term.

At the current juncture, therefore, it is difficult to judge how quickly to bring inflation back to the target, and for how long the exceptionally accommodative stance of monetary policy should be maintained in order to achieve that.

The objectives of monetary policy

The Monetary Policy Committee's (MPC's) primary objective, as defined in its remit, is to meet the inflation target set by the Government, which is 2% as measured by the twelve-month increase in the Consumer Prices Index. The remit makes clear that the inflation target applies at all times. The remit also recognises that when inflation departs temporarily from the target as a result of shocks or disturbances, attempts to bring inflation back to the target too quickly could lead to undesirable volatility in output. Indeed, subject to its primary objective of ensuring price stability, the MPC is required to support the Government's objectives for growth and employment. This box explains the effects that monetary policy is likely to have on the economy in the short, medium and long term, and so how the MPC can meet its objectives.

In the long run, monetary policy determines only the general level of prices in the economy. It cannot affect the long-run level of real activity, or other real variables, such as employment and unemployment. That is because, in the long run, real variables are determined by structural features of the economy. For example, the rate of unemployment that prevails in the long run will reflect the institutional features of the labour market, such as how costly it is to find information about available jobs, the ease with which employees can move between jobs, the level of unemployment benefits, and the willingness of those not in employment or actively seeking work to look for employment. Trying to use monetary policy to raise the long-run level of real activity would, ultimately, result only in higher inflation.

Nevertheless, monetary policy, by anchoring long-run inflation expectations around the Government's inflation target, does play an important role in facilitating long-run economic stability. That is because price stability is a precondition for ensuring that resources are allocated efficiently across the economy. Price stability can also contribute to financial stability, for example by removing distortions caused by shifts in inflation expectations over time.

It is for these reasons that the primary goal of the MPC is to ensure price stability. Delivering low and stable inflation is the best contribution that monetary policy can make to achieving long-run growth and prosperity.

Monetary policy can, however, affect the level of real activity in the short term.[1] Monetary policy primarily works by influencing the level of money spending by households and businesses. For example, if the MPC changes Bank Rate – the short-term interest rate at which reserves held by commercial banks at the Bank of England are remunerated – that will affect other market interest rates, mortgage rates, bank deposit rates, and the prices of other assets, such as bonds, equities and the exchange rate. In turn, those changes in interest rates and asset values affect the spending and saving decisions of households and companies. Changes in the amount of money spent are not matched immediately by changes in prices, because it takes time for companies to adjust the prices of the goods and services that they produce in response to changes in demand. As a result, changes in the money value of spending lead to changes in the real value of spending in the short term. But, over

time, prices gradually adjust until they match the changes in money spending, leaving real spending unaffected by monetary policy in the long run.

Monetary policy can, at times, affect real activity in the medium term. That is because the level of output that is produced today can have persistent effects on the level of output that can be produced in the future – a phenomenon that is sometimes referred to as 'hysteresis'. Unemployment is a key channel through which the future supply capacity of the economy is affected by current conditions. If demand is persistently weak, then unemployment will rise, and so too will the number of people who are unemployed for a long period of time. People who have been unemployed for a long time tend to become less able to move back into employment, for example because they lose the skills that they need to compete effectively for jobs or become disconnected from the labour market. That can lead to a persistently higher level of unemployment, which would mean that the ability of companies to increase output – that is, the economy's supply capacity – will be lower than it otherwise would have been.

Monetary policy may also affect how much output can be produced in the medium term for a given amount of employment by affecting the allocation of resources across companies. Policy has two offsetting influences. On the one hand, the current exceptionally stimulative stance of monetary policy may raise growth in the medium term, because low interest rates may help to keep companies with a viable future in business and so help prevent inefficient capital scrapping. But on the other hand, low rates may keep companies without a viable future in operation and so might hinder the reallocation of resources to more productive uses.

It is because monetary policy can affect real activity in the short and medium term that the MPC can act to support the Government's economic policies for growth and employment, provided that such an approach remains consistent with meeting its primary objective of medium-term price stability.

At times, the MPC will face a trade-off between the speed at which it seeks to return inflation to the target and supporting growth and employment. That is because the economy can be hit by shocks and disturbances that push inflation and real activity in opposite directions – for example, an increase in wholesale energy prices tends to raise inflation and reduce activity. Adjusting monetary policy to return inflation to the target rapidly in such circumstances would exacerbate the fall in output. But while the MPC can look through the direct effects of such cost shocks, it must ensure that the rise in the prices of a particular subset of goods does not lead households, businesses and financial market participants to expect the prices of all goods and services to rise more rapidly, potentially jeopardising medium-term price stability.

It is also possible that, in attempting to support real activity in the short run, monetary policy might lead to greater output and inflation volatility further ahead by generating financial instability. For example, a prolonged period of low interest rates could encourage both lenders and borrowers to take on more risk. If the microprudential and macroprudential regulators are unable to ensure that such an increase in risk-taking takes place in a safe way, then such behaviour could exacerbate financial imbalances and so endanger financial stability and hence price stability.

1. The channels through which changes in monetary policy affect the economy are discussed in more detail in 'The transmission mechanism of monetary policy', MPC (1999). For more information on how the MPC's programme of asset purchases affects the economy, see Joyce, M, Tong, M and Woods, R (2011) ,'The United Kingdom's quantitative easing policy: design, operation and impact', *Bank of England Quarterly Bulletin*, Vol. 51, No. 3, pages 200-12.

3. The role of forward guidance in present circumstances

The MPC has a duty to explain to the public and to Parliament its approach to setting monetary policy. Indeed, the MPC remit specifically requires the Committee to communicate how it views the trade-off between returning inflation to the target quickly and providing support to output growth, and how it is setting monetary policy in response to that.

The MPC provides information about its view of the outlook and the factors influencing its monetary policy decisions through its *Inflation Reports*, the minutes of its monthly meetings, evidence to the Treasury Committee, and speeches by individual Committee members. For example, in the February 2013 *Inflation Report*, the MPC said that, in response to the cost shocks hitting the economy, it intended to return inflation to the target more slowly than it had anticipated at the time of the November 2012 *Inflation Report*. The Committee also issued a statement alongside its policy decision on 4 July 2013 noting that it judged that the rise in the expected path of Bank Rate implied by market interest rates was not warranted by recent developments in the domestic economy.

At its meeting on 1 August 2013, the MPC decided to provide explicit guidance about the future path of monetary policy. Such guidance provides more information to help people understand the conditions under which the current highly stimulative stance of policy will be maintained.

In these exceptional circumstances, explicit forward guidance can enhance the effectiveness of monetary stimulus in three ways. First, it provides greater clarity about the MPC's view of the appropriate trade-off between the horizon over which inflation is returned to the target and the speed with which output and employment recover. Second, it reduces uncertainty about the future path of monetary policy as the economy recovers. And third, it delivers a robust framework within which the MPC can explore the scope for economic expansion without putting price and financial stability at risk.

3.1 Greater clarity about the trade-off

Clarity about monetary policy intentions leads to better outcomes because it lowers economic and financial uncertainty and so helps individuals to make better-informed decisions. People have to make decisions based on their expectations about future interest rates. Households' and businesses' spending and saving decisions depend on the interest rates charged on loans and offered on deposits, and these interest rates may be fixed for a period. For example, at the moment around 80% of new household mortgages have a fixed interest rate. Households' expectations about future interest rates will be better informed if the MPC is clear about how it is setting monetary policy in order to achieve its objectives.

The MPC regularly communicates to the public how it seeks to maintain price stability and, subject to that, support the growth and employment objectives of the Government. Explicit forward guidance is a way of sharpening these regular communications in current circumstances.

Given the current uncertain economic environment, it is harder for people to use their past experience to form expectations about the outlook for inflation and the future path of monetary policy. As noted in Section 2, output and productivity growth have been unusually weak since the onset of the recession and inflation has been persistently above the target since 2007. So explicit forward guidance can help the MPC communicate its likely reaction to deviations of inflation from the target more clearly.

By setting out how it is likely to set policy in the future, the MPC can help individuals understand how it intends to trade off the speed with which it returns inflation to the target against the scope for economic expansion. In addition, by explaining the reasons underlying that view, the MPC can also help individuals understand how it is likely to change policy in response to unanticipated developments as and when they occur.

3.2 Reduced uncertainty about the future path of monetary policy

Explicit forward guidance is a way of reducing uncertainty about the future path of Bank Rate for financial market participants, households and firms. The additional clarity should help to enhance the effectiveness of the current degree of monetary policy stimulus. The effect of forward guidance comes through various channels, which are discussed in the box on page 18.

Given the uncertainties surrounding supply and inflation expectations, financial market participants may misjudge how the Committee views the balance between returning inflation to the target more quickly and providing more support to real activity. That could lead them to expect Bank Rate to rise sooner than the MPC expects.

Providing explicit guidance about the future path of monetary policy might be particularly useful now, with the recovery beginning to gain traction. In part, that is because there is a risk that financial market participants overreact to signs of recovery and revise up excessively their expectations of the future path of Bank Rate. That would cause monetary conditions to tighten, potentially stifling the recovery. Additional clarity about the MPC's intentions should help to ensure that financial market participants' expectations about the timing and pace at which monetary stimulus will be withdrawn are consistent with demand recovering. It should also mitigate the risk that financial market participants react inappropriately to news from abroad – for example, as they appeared to do in June this year, when UK financial markets reacted sharply to news about the expected path of US monetary policy.

It is also important that any forward guidance helps people to understand why the Committee is setting policy in a particular way, and not just how the path of policy is likely to evolve. That is because any statement about the future path of monetary policy could be misinterpreted and so have undesirable consequences. For example, the MPC could indicate that it expects to maintain Bank Rate at 0.5% for longer than implied by forward market interest rates. That difference might reflect the fact that the MPC is aiming to achieve a different balance between the speed at which it returns inflation to the target and the support provided to activity from that perceived by financial market participants. But if that is not understood, people could instead wrongly assume that the Committee has become gloomier about the economic outlook. And that could cause spending to fall, not rise as would normally be expected given the lower future path of Bank Rate. Conversely, if the market views the MPC as trying to stimulate too much, that could cause a counterproductive rise in inflation expectations.[9]

Since early 2009, when Bank Rate was cut to 0.5%, the primary unconventional monetary policy tool used by the MPC has been the programme of asset purchases. As noted in Section 2.1, the Bank of England has previously undertaken a range of other conventional and unconventional policies to support the UK economy.

At present, the MPC judges that there is merit in providing forward guidance about both the future path of Bank Rate and its programme of asset purchases. The Committee's forward guidance signals its intention at least to maintain the current exceptionally stimulative stance of monetary policy until the margin of slack within the economy has narrowed significantly, provided that such an approach

[9] In theory, more explicit forward guidance could also be employed at the effective lower bound to demonstrate that a central bank is setting policy differently from the past. For example, as a way of injecting more stimulus, the central bank could promise to maintain its policy rate at the effective lower bound for longer than it otherwise would, which could generate an increase in activity in the near term, at the cost of higher inflation. If agents believed the announcement made by the central bank, the extent to which activity and inflation were higher would depend not only on the extra length of time that interest rates stayed at their effective lower bound, but also the difference between the path that the policy rate subsequently followed and the path that financial market participants previously expected: the larger that gap, the greater would be the boost to activity and to inflation. For a fuller exposition of these arguments, see Krugman, P.R (1998) 'It's Baaack: Japan's slump and the return of the liquidity trap', *Brookings Papers on Economic Activity*, 1998, Issue 2, pages 137-87, and Eggertsson, G. B and Woodford, M (2003) 'The zero bound on interest rates and optimal monetary policy', *Brookings Papers on Economic Activity*, 2003, Issue 1, pages 139-211.

The transmission mechanism of forward guidance

Forward guidance can operate through several channels:

- First, it can affect expectations about the path of short-term policy rates, depending on agents' views of the conditions underlying guidance.
- Second, it has the potential to reduce the uncertainty around the path of short-term interest rates.[1]
- Third, forward guidance may reduce term premia, which partly reflect the compensation paid to investors for uncertainty around the expected future path of interest rates, at longer horizons too.
- Other things equal, forward guidance could, by influencing the level and volatility of short-term risk-free rates, boost a range of other asset prices.

Forward guidance has two opposing effects on longer-term gilt yields. On the one hand, a reduction in expectations about the path of Bank Rate in the short term and a narrowing in term premia will cause longer-term interest rates to fall. But on the other hand, if forward guidance reinforces expectations of recovery, then longer-term forward interest rates may actually rise. The overall effect of forward guidance on long-term yields will depend on the balance between these two factors.

By providing greater clarity to people about the conditions under which the highly stimulative stance of monetary policy will be maintained, forward guidance should reduce the risk that, as the recovery gains traction, shorter-term interest rates rise prematurely. It should also help to make sure that people do not become more uncertain about the future path for interest rates as the recovery takes hold.

Forward guidance should therefore help to secure a recovery of sufficient strength and duration to return output, employment and incomes to their full potential levels, consistent with medium-term price stability.

The MPC judges that there is merit in providing forward guidance both about the future path of Bank Rate and about its programme of asset purchases. Further asset purchases will remain as a discretionary policy tool used to provide additional monetary stimulus if it is deemed appropriate.

Asset purchases can affect the economy through a range of channels; some of which are similar and some of which are different to those for forward guidance.

Asset purchases change the composition of the portfolios of assets held by the private sector. As those portfolios are rebalanced, asset prices are bid up. That leads to a reduction in borrowing costs and a rise in wealth. Eventually, the boost to demand diminishes but, in the short term, asset purchases should hasten the economic recovery.

Asset purchases may also affect long-term interest rates through a policy signalling effect. For example, further asset purchases by the MPC could signal its determination to provide support to economic activity, and so lead financial market participants to revise down their near-term expectations of Bank Rate. Other channels include: improving market functioning by increasing liquidity in stressed market conditions and effects from boosting confidence.

Empirical estimates provided in Joyce, Tong and Woods (2011) suggested that the MPC's first round of asset purchases predominantly affected long-term interest rates by reducing term premia.[2]

1. At present, Bank Rate is close to zero. That could mean that the probability financial market participants attach to future cuts in Bank Rate is smaller than the probability attached to future rises in Bank Rate. If so, a reduction in uncertainty is likely to be associated with a fall in mean expectations of the path of Bank Rate and hence observed interest rates.
2. Joyce, M, Tong, M and Woods, R (2011), 'The United Kingdom's quantitative easing policy: design, operation and impact', *Bank of England Quarterly Bulletin*, Vol. 51, No. 3, pages 200-12.

remains consistent with its primary objective of price stability and does not engender financial instabilities. Further asset purchases remain as a discretionary policy tool that can be used to provide additional monetary stimulus if it is deemed warranted.

In order for the current stance of monetary policy to be maintained, the MPC intends not to reduce the stock of asset purchases financed by the issuance of central bank reserves and, consistent with that, intends to reinvest the cashflows associated with all maturing gilts held in the Asset Purchase Facility.

3.3 Exploring the scope for expansion without jeopardising price and financial stability

As noted above, the trade-off between the horizon over which inflation is returned to the target and the speed with which output and employment recover is unusually uncertain at present. Moreover, the sustained period for which interest rates have been held at historically low levels means there is also a potential trade-off between the support monetary policy can provide to the UK real economy and the risks that might pose to financial stability. Misjudging either of these trade-offs could have significant costs in the medium term. Forward guidance provides a robust framework within which the MPC can explore the scope for economic expansion without putting either price stability or financial stability at risk.

As set out in Section 2, the UK economy has been affected by a series of shocks in recent years that have led to a sustained period of depressed demand and above-target inflation. Those shocks have been accompanied by exceptional weakness in productivity, which has fallen back to around 2005 levels. That weakness may be a direct consequence of weak demand, and so may unwind as the economy recovers. But it may also reflect other factors, such as the need to reallocate resources across different parts of the economy, which may lessen only gradually as output increases.

The scale of recent shocks, and the difficulty in knowing how effective supply capacity will respond as demand picks up, means that the trade-off between the speed with which inflation is returned to the target and the scope for economic expansion is, at present, unusually uncertain. Attempting to return inflation to the target too quickly risks prolonging the period over which the nation's resources are underutilised. That, in turn, might also erode the medium-term supply capacity of the UK economy. But returning inflation to the target too slowly might cause people to question the MPC's commitment to keep inflation close to the target. Such a loss of credibility would make it more costly to keep inflation close to the target. Either outcome would lead to significant economic costs in the medium term.

The MPC also needs to take into account the effects of monetary policy on financial stability. Bank Rate has been at its historically low level of 0.5% for over four years and, partly as a consequence, yields on ten-year UK government bonds have also been at exceptionally low levels. Such a prolonged period of low interest rates could lead to risks to financial stability. For example, it could encourage investors to seek to increase the returns they earn by allocating funds to higher-yielding but riskier instruments. That is not necessarily undesirable – indeed, the primary aim of the MPC's asset purchase programme is to encourage investors to rebalance their portfolios towards riskier assets. But if investors take on more risk than they can bear or manage, for example by taking on high levels of leverage, then they could become over-exposed to a rise in yields and a fall in asset values; such losses could disrupt the financial system more generally, with potentially significant costs in terms of economic and price stability.[10]

[10] For more details on some of the channels through which monetary policy could affect the outlook for financial stability, see the box on pages 52-55 of the June 2013 *Financial Stability Report*. For more details on the channels through which, in general, FPC tools and recommendations that affect capital requirements could influence credit conditions and so the outlook for inflation, see the box on pages 16-17 of the May 2013 *Inflation Report*.

Given the exceptional circumstances facing the UK economy, it is difficult to assess the degree of monetary stimulus the MPC can provide to the economy without posing material risks to either price stability or financial stability. This underpins one of the key roles played by the price stability and financial stability knockouts in the Committee's policy guidance. Rather than making a firm judgement about the extent to which it can reduce the margin of slack in the economy without prompting either of these risks, the knockouts allow the MPC to learn and update its view of the trade-offs as the economy recovers. In particular, if supply picks up strongly as demand increases and risk-taking behaviour in banking and financial markets remains well contained, the MPC can maintain the exceptional degree of stimulus it is providing until the margin of economic slack has narrowed substantially. But if material risks to either price stability or financial stability emerge – such that any of the knockouts is breached – then the guidance linking the stance of policy to the unemployment threshold would no longer hold.

It is also possible that the existence of the knockouts may reduce the likelihood of the risks to either price stability or financial stability occurring. The demonstration of the MPC's unwillingness to tolerate risks to medium-term inflation and inflation expectations may give people greater confidence that inflation will return to the target even if it does so only relatively slowly. Similarly, the recognition that monetary policy may adjust in response to growing risks to financial stability may temper excessive risk-taking behaviour in financial markets.

4. Implementing forward guidance

The discussion above suggests that providing guidance about the future path of Bank Rate and asset purchases could help the MPC to respond to the challenges posed by the exceptional circumstances it faces. The path that monetary policy is likely to follow will be influenced by a wide array of factors. But it would be impossible to communicate all of that information. Forward guidance therefore needs to strike a balance. It must be sufficiently simple and clear that it can be interpreted by the public. But it cannot be so simple that it conveys negligible information about how and why the Committee will respond to unanticipated developments.

In recent years, a number of other central banks around the world, having cut policy rates close to zero, have provided guidance about the likely future path of policy rates. As outlined in Carney (2013),[11] there are three main ways in which these central banks have provided forward guidance. First, the Bank of Japan, the US Federal Open Market Committee (FOMC), and the European Central Bank have provided a qualitative indication of the length of time for which policy rates are likely to remain at their current levels – sometimes referred to as 'open-ended' guidance. Second, the Bank of Canada and the FOMC have provided guidance about when they expect to raise policy rates – so-called 'time-contingent' guidance. And third, the FOMC has provided 'state-contingent' guidance – that is, guidance about the economic conditions that might lead it to raise policy rates.

The following subsections discuss the relative advantages and disadvantages of these different approaches to providing forward guidance. The international experience is discussed in the annex.

4.1 Open-ended guidance

Open-ended guidance provides qualitative information about the expected future path of policy – for example, stating that Bank Rate is expected not to rise above its current level 'for an extended period' or 'until the outlook for growth improves substantially'.

Providing such qualitative guidance would afford a high degree of flexibility in responding to unanticipated developments. But it would consequently provide very little additional information beyond what is provided in the MPC's existing communications. And there is a risk that the vague language of the guidance could cause people to misinterpret it: what is meant by 'an extended period' or by 'a substantial improvement in the growth outlook'?

4.2 Time-contingent guidance

Time-contingent guidance provides an indication of when monetary policy is likely to change – for example, stating that Bank Rate is expected not to rise above its current level until a certain date in the future. Since time-contingent guidance relates the path of monetary policy to particular dates it is relatively simple to interpret. But any change in underlying economic conditions would almost certainly lead to a change in the period of time for which interest rates should be held fixed. It is unlikely, therefore to be a completely credible policy strategy because it conveys no information about how the Committee might react to unanticipated developments in the economy.

As a result, time-contingent guidance is unlikely to be that helpful now. For example, people may understand that time-contingent guidance is conditional upon the economic outlook, and that the MPC might revise its guidance in response to unanticipated developments. But such guidance, on its own, provides no information about which shocks are most likely to result in a change in the timing of the first rise in Bank Rate, and by how much the date would be moved forwards or backwards. So it would not prevent people from overreacting to unanticipated developments, meaning that expectations about the path of Bank Rate could still move out of line with the path anticipated by the MPC, and lead

[11] Carney, M (2013), 'Monetary Policy After the Fall', Eric J. Hanson Memorial Lecture, University of Alberta.

to unwarranted moves in other interest rates and in asset prices. In addition, time-contingent guidance would not help the MPC deal with the uncertainty it currently faces about the trade-off between inflation and output growth, as it would not build in any automatic feedback between the evolution of the economy and the outlook for policy.

Moreover, if people do not recognise that time-contingent guidance is conditional upon the economic outlook, then it could, in the longer term, damage trust in the MPC. That is because if the MPC did change its guidance then people may not understand or believe the reasons why the guidance had changed: they may believe that the MPC had simply reneged on its earlier policy, rather than reassessed it in the light of developments that had not been anticipated previously.

4.3 State-contingent guidance

State-contingent guidance provides an indication of the economic conditions that might lead to a change in monetary policy – for example, stating that Bank Rate is expected not to rise above its current level until the unemployment rate reaches a certain level, or output growth exceeds a certain rate, provided that such an approach remains consistent with meeting the inflation target in the medium term.

By linking the path of monetary policy to economic conditions rather than to a date, state-contingent guidance can help people to understand how and why the Committee will respond to unanticipated developments, and to update their expectations about the future path of policy accordingly. That makes it more helpful in the current conjuncture, because it should help to prevent unwarranted movements in expectations about the path of Bank Rate. Moreover, it would create a direct feedback between the evolution of the economy and the expected path of policy: by choosing suitable variables, that should help to ensure that expectations move appropriately as the economy recovers and more is learnt about the evolution of supply and inflation expectations.

But state-contingent guidance also has drawbacks. For example, it may be less easy for the public to interpret. That is because it relies on people being aware of the current value of the economic variables referred to in the guidance, and having a view about how those variables are likely to evolve. As such, state-contingent guidance may have less effect on households' and companies' views about the outlook for policy, or the certainty with which they hold those views.

Linking the path of monetary policy to only a few indicators could also lead to expected rises in Bank Rate that were not warranted by broader economic conditions. That problem can be avoided by specifying that the guidance would require the Committee to reassess the stance of policy, rather than automatically triggering a rise in Bank Rate (see the box on page 24 for more details).

4.4 The MPC's view

On balance, the MPC judges that state-contingent guidance is more suitable at the current juncture than either time-contingent or open-ended guidance.

5. Design considerations

The MPC's remit allows it to provide support to real activity in the short term provided that such actions remain consistent with inflation being at the target in the medium term. In addition, since March 2013, the MPC's remit requires it to take account of the effects of its actions on financial stability. Any state-contingent guidance must, therefore, link the path of monetary policy to indicators of real activity, price stability and financial stability.

The MPC considered a range of real activity and price stability variables as potential indicators. For real activity, the MPC considered: the output gap; real GDP growth; the unemployment rate; and the employment rate. And for price stability: current CPI inflation; the Committee's projection for inflation; and measures of inflation expectations. A further candidate indicator was nominal GDP – either specified in terms of the growth rate or the shortfall relative to a continuation of its pre-crisis trend – as the value of nominal GDP reflects movements in both prices and real activity. For the financial stability indicator, in line with the Financial Policy Committee's (FPC's) draft policy statement,[12] the MPC decided that no single indicator provided a sufficient guide to systemic risks.

In addition to choosing indicators, the MPC needs to set conditions for those indicators and to specify what action it will take if those conditions are met. There are three actions that the MPC could take, differing in the extent to which they allow the MPC to retain flexibility over the path of monetary policy. The actions, and the associated benefits and costs, are set out in the box on page 24.

5.1 Choice of the price stability and activity indicators

The potential price stability and activity indicators were assessed against the following four broad criteria.

- First, are they central to the transmission mechanism of monetary policy? Any indicator needs to provide a good guide to the broad economic conditions that the MPC takes into account when setting policy.
- Second, how likely are they to provide a misleading signal given the uncertainty about the economy?
- Third, how useful are the available data? Estimates of some data are produced more frequently, on a timelier basis, are less volatile, or less subject to revision, than are others. If an indicator is imprecisely or infrequently measured, then it might provide a misleading guide to the true state of the economy.
- And fourth, how easy are they to communicate? In order for its guidance to be effective, any indicator must be observable, easily understood and have clear links to the MPC's remit.

5.1.1 Nominal GDP indicators

Nominal GDP growth

A nominal GDP growth indicator has some appealing characteristics in the current environment, with inflation having been raised by a series of cost shocks. That is because a nominal GDP growth indicator allows the burden of adjustment to cost shocks to be shared between output and inflation. As noted above, adverse cost shocks raise inflation and reduce output growth. Stabilising inflation immediately would require that all of the burden of the shocks be transferred onto output growth. But stabilising nominal income growth would allow a one-for-one trade-off between the burden placed on inflation and that placed on output growth.

Uncertainty about the evolution of productivity since the onset of the recession, however, makes it difficult to judge what condition should be set if the MPC were to use nominal GDP growth as its indicator. In the decade prior to the financial crisis, four-quarter nominal GDP growth was broadly

[12] 'The Financial Policy Committee's powers to supplement capital requirements: a draft policy statement' (2013).

What happens when the state-contingent conditions are met?

Once the MPC has chosen the indicators it wishes to frame guidance in terms of, and has set conditions for each, it needs to specify what happens to monetary policy when those conditions are met.

There are three actions the MPC could take, which differ in the extent to which they allow the MPC to retain some flexibility over the path of monetary policy:

- First, the Committee could indicate that it would not raise Bank Rate at least until the condition was reached. In this case, the condition is termed a '**threshold**' and MPC would need to assess whether it would be appropriate to raise Bank Rate at that point or to continue holding it at its prevailing level.
- Second, the Committee could indicate that if the condition was met for one indicator, its guidance relating to the other indicators would no longer apply. In this case, the condition is termed a '**knockout**', since breaching the condition would knock out the other conditions and guidance.
- Third, the Committee could indicate that it would begin to raise Bank Rate as soon as the condition was met, whatever the circumstances. In this case, the condition is termed a '**trigger**' and it would require the MPC to raise Bank Rate immediately it was hit.

There are costs and benefits to retaining flexibility over the path of monetary policy. The main advantage stems from the fact that it is impossible to account for every situation that might cause those conditions to be met. Linking the path of monetary policy to specific values of a few indicators could lead the MPC to change policy when it otherwise would not have done. Indeed, given the heightened degree of uncertainty about the economy, retaining some flexibility is particularly beneficial at present. The main cost of retaining flexibility is that it adds uncertainty about how the MPC will set monetary policy. The guidance may therefore have less impact if set in terms of a threshold than a trigger.

The balance between these benefits and costs is likely to be different for the activity indicators, the price stability indicators and the financial stability indicators. But in all cases, the MPC judges that it would be inappropriate to specify the condition as a trigger. That is because no single indicator can provide a sufficient summary of economic conditions, so it would be imprudent to signal an intention to raise Bank Rate automatically as soon as the condition was met.

stable at around 5%. But in recent years, nominal GDP growth has been nearer to 2.5%, largely reflecting weakness in real GDP growth rather than the rate of inflation. Given the uncertainty about productivity, it is difficult to judge how quickly nominal spending can increase without generating significant additional inflationary pressures and thus how close the condition should be set to 5%. If most of the weakness in productivity growth is related to weak demand itself, then the condition should be around 5%. But if weak productivity is due mainly to other factors, such as the impaired banking sector, then the condition should be set at a rate below its average rate in the decade prior to the crisis: setting policy so that nominal GDP grew in line with its pre-crisis average rate could cause inflation to rise further above the 2% target.

A nominal GDP growth indicator performs badly against the third criterion, data reliability. Nominal GDP data are not particularly timely – the first estimate for a given quarter is published two months after that quarter ends – and tends to be revised substantially, often well after the event. That would make it harder for the public to understand the guidance, and for the MPC to be held to account.

Communicating a nominal GDP growth indicator is likely to be problematic for a number of reasons. Although nominal GDP might be relatively easy to explain to the public as 'cash spending on domestically produced goods and services', nominal GDP growth is not, at present, a widely discussed statistic. That could make it hard, at least initially, for households and businesses to form expectations about its path. In addition, nominal GDP is influenced by the prices of a wider range of goods and services (the GDP deflator) than makes up the basket for the Consumer Prices Index (CPI), the measure of inflation specified in the MPC's remit. That could make it difficult for the general public to relate movements in nominal GDP growth to the MPC's inflation target. In the extreme, a substantial wedge could open up between the rate at which the GDP deflator increased and CPI inflation – as has happened at times in the past – and that might be perceived by the public as the MPC becoming less determined to meet the inflation target.

Nominal GDP shortfall

The nominal GDP shortfall is the difference between the current level of nominal GDP and the level that it would have reached had real GDP continued to grow at its potential rate and the price of value added had increased each year at a rate consistent with the 2% CPI inflation target. This shortfall has some advantages because it has the property of 'memory', in that the future path of monetary policy would be tied directly to its performance against a target set in the past.[13] To take an example, suppose that there is an adverse shock that pushes down the current level of nominal GDP. That lower level of nominal GDP would mean that the shortfall that needs to be made up is larger than would otherwise have been the case; in other words 'bygones are not bygones'. Other things being equal, that would cause people to expect the MPC to maintain the exceptionally stimulative stance of policy for longer than they did previously, because the additional shortfall in nominal output would have to be made up. That change in the expected path of policy would help to support spending today. For this memory property to be of value, households, companies and financial market participants need to be sufficiently forward-looking and the implied path of policy sufficiently credible.

But uncertainty about the evolution of the supply capacity of the economy again makes it difficult to judge how to set the condition for the nominal GDP shortfall. It is difficult to know the appropriate starting point for projecting trend growth forward. More importantly, it is also difficult to determine what the trend rate of growth of potential output is likely to be at present, and thus what trend rate of nominal GDP growth should be used to calculate the shortfall. The trend rate of nominal GDP growth would depend on the estimated potential growth rate of real output, such that closing the shortfall would bring back real output to its potential level while ensuring that the GDP deflator rose on average each year at a rate consistent with the 2% annual CPI inflation target. If potential output growth were overestimated, then closing the shortfall would cause prices to increase by more than 2% each year on average – that is, inflation would be above the target. Conversely, if potential output growth were underestimated, then it is likely that real output would still be below its potential level when the shortfall closed.

A nominal GDP shortfall indicator also suffers from the same data reliability and communications problems as the nominal GDP growth indicator. Indeed, the communications challenges are likely to be more severe, given that it would require people to understand what is meant by the shortfall in nominal GDP and how it is calculated.

Using a nominal GDP indicator could also be interpreted as changing the MPC's price stability objective for a period. That is because if policy was not tightened until the substantial nominal GDP gap had been recovered, inflation and, therefore, inflation expectations could rise materially and the credibility of the MPC's medium-term commitment to the inflation target could be undermined. The MPC could put in place an additional inflation knockout in order to ensure that people's inflation

[13] For more details see Woodford, M. (2012), 'Methods of policy accommodation at the interest-rate lower bound', mimeo, Columbia University.

expectations remained anchored to the inflation target, but that could risk undermining the use of nominal GDP as an intermediate indicator for policy.

5.1.2 Real activity indicators

Output gap

The output gap – the difference between potential output and its current level – might seem a natural indicator to which to relate guidance. That is because it would directly relate monetary policy to reducing the margin of slack in the economy. But the large degree of uncertainty surrounding the evolution of the supply capacity of the economy makes the output gap a less desirable indicator at present. Slack in the economy can be located as spare capacity either in companies or in the labour market. The uncertainty about why productivity growth has been weak means the degree of effective spare capacity within companies is unusually uncertain, which makes it difficult to estimate the current size of the output gap. Moreover, the uncertainty about by how much, and how rapidly, productivity will rise as demand increases makes it difficult to estimate how quickly the output gap will close as the economy recovers. That makes it difficult to set a condition relating to the output gap.

If the MPC were to underestimate the size of the output gap, say because it misjudged the degree of spare capacity within companies, output could be held unnecessarily below its potential level. That risk would, however, be mitigated by setting the condition as a threshold, which would allow the MPC to reassess its estimate of the output gap and maintain the exceptional stance of policy if it believed that it had previously underestimated the amount of spare capacity.

But if the output gap were much smaller than the MPC believed, or productivity less responsive to demand, then inflationary pressure could build well before the output gap has closed. In this case, the MPC would need to rely on a price stability 'knockout' to contain the risks to price stability. Using its own projection for inflation for this knockout might, however, undermine the protection it affords, since the Committee's view of the prospects for inflation is informed by its estimate of the output gap.

In addition to these complications, the output gap does not perform well from a data or communications point of view. The output gap is unobservable and difficult to explain, and any estimate would be subject to substantial uncertainty. That would make it hard for the public to understand the guidance.

Real GDP growth

A real GDP growth indicator overcomes some of the disadvantages associated with an output gap indicator. As described by Orphanides and Williams (2002),[14] when the output gap is uncertain, it may be better to relate monetary policy to changes in the output gap rather than the level. That is because there is likely to be less uncertainty about changes in the output gap than its starting level. Provided that the supply capacity of the economy is increasing in line with its trend rate, the rate of real GDP growth would provide an indication of changes in the size of the output gap.

As noted in Section 2, however, there is likely to be substantial uncertainty about the evolution of the supply capacity of the economy at present. That makes it difficult to know how quickly the output gap will shrink as demand recovers, and so to judge what rate of growth the MPC should specify if it linked policy to real GDP growth. One way to mitigate that problem would be to set a relatively high threshold for real GDP growth, but to make clear that Bank Rate would be raised only if the MPC judged that the margin of slack had narrowed substantially. Such an approach has its advantages. For example, framing guidance about future changes in Bank Rate in terms of a threshold for GDP growth can be viewed as a sort of 'Taylor rule'. The standard Taylor rule links the level of Bank Rate to inflation and the level of the output gap. That implies that a change in Bank Rate is appropriate when output grows above its potential rate and therefore begins to reduce slack in the economy.

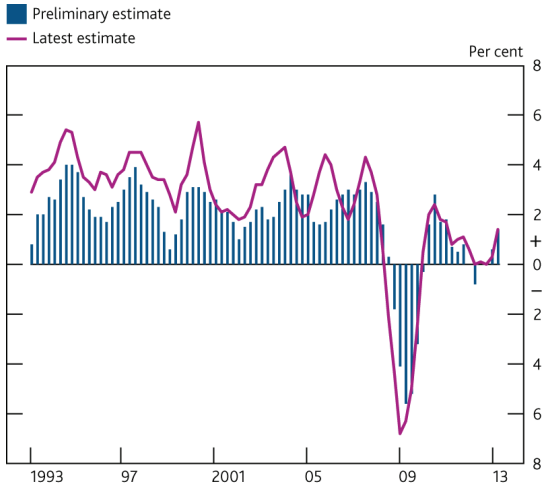
[14] Orphanides, A and Williams, J.C (2002) 'Robust monetary policy rules with unknown natural rates', *Brookings Papers on Economic Activity*, 2002, Issue 2, pages 63-118.

Real GDP growth performs well against the communications criterion. It is widely reported in the press and the MPC is required to support the Government's objectives for economic growth, subject to the maintenance of price stability. Moreover, a real GDP growth indicator, set at a rate materially above its historical average, might have a particularly powerful effect on the general public's expectations about the economic outlook, because it would demonstrate clearly the MPC's intention not to withdraw the current level of stimulus until the economy was growing at a robust rate. And that might increase the effectiveness of the guidance. In addition, the MPC already publishes forecasts for real GDP growth and so using this as an indicator would have the advantage of continuity with the MPC's past approach to policy.

The nature of the GDP data means, however, that it would be difficult to frame guidance in terms of a specific condition. In part, that is because real GDP growth is volatile – even when measured as the four-quarter growth rate rather than the quarterly rate. Moreover, it can be affected by one-off events – as was the case in 2012 with the Diamond Jubilee and Olympic Games. GDP growth can also be disproportionately affected by erratic developments in relatively small sectors of the economy, such as extraction, that are not representative of broader underlying trends. So growth might reach the condition in one quarter, only to fall back in the next. One way to guard against these problems would be to set the condition in terms of the average growth rate over a longer period. Alternatively, the MPC could try to specify the condition in terms of a measure of 'underlying' growth, for example one that excluded the effects of changes in oil and gas extraction.

In addition, data for real GDP growth are prone to revision. While the first estimate of real GDP growth for each quarter is produced one month after the quarter ends, these preliminary estimates tend to be revised substantially (**Chart 8**). Some of these revisions reflect methodological changes. But even excluding such revisions, four-quarter real GDP growth in the period between 1993 and 2010 has, on average, been revised up by around 0.2 percentage points. Moreover, the revisions often also change the pattern of growth. For example, in the period since 1993, there have been four occasions in which four-quarter real GDP growth went from below 3% to above 3% according to the preliminary release. But two of those occasions were revised away within six months. And in the latest vintage of data, there have been five occasions on which growth rose above 3%, none of which were present in the initial release (**Table 1**). So later vintages of data may show that the threshold had been reached sooner or later than indicated in the preliminary estimates. Such revisions may not pose too many problems if they happen within a few months of the preliminary release. And the MPC making clear that reaching the threshold would not lead to an automatic rise in Bank Rate would also help. But there is a risk that subsequent revisions could damage trust in the MPC's ability to set policy appropriately if, for example, the preliminary estimates indicated that the condition had been met but revisions the following year revealed that it had not.

Chart 8 Four-quarter GDP growth[(a)]



(a) Chained-volume measure at market prices.

Table 1 Number of occasions since 1993 Q1 in which four-quarter GDP growth has risen above 3% or above 3.5% in different vintages of data[(a)]

	3%	3.5%
Preliminary estimate	4	2
of which still present in the data published six months after the preliminary estimate	*2*	*2*
Latest estimate	5	7
of which present in the preliminary estimate	*0*	*0*

Sources: ONS and Bank calculations.
(a) GDP is the chained-volume measure at market prices.

Unemployment rate

The unemployment rate is an alternative indicator of slack. The output gap comprises slack within companies and slack within the labour market. And one indicator of labour market slack is the gap between the actual unemployment rate and its medium-term equilibrium rate.

Due to frictions in the labour market there is always some unemployment in the economy. But what matters for inflationary pressure is the degree of effective labour market slack – that is, how much additional unemployment there is, and how much pressure that exerts on wages. Inflationary pressures can arise for many reasons, including changes in the balance of demand and supply and changes in other cost pressures. But some factors will be more persistent than others, so the degree of labour market slack associated with any unemployment rate will depend on the horizon being considered.

As discussed in more detail in the box in Section 3 of the August *Inflation Report*, the medium-term equilibrium unemployment rate is the unemployment rate that emerges once short-run nominal rigidities have played out and once the transitory effects of certain real shocks (such as terms of trade movements) have washed out but more persistent effects remain. The gap between the actual unemployment rate and the medium-term equilibrium rate is the measure of effective labour market slack that is likely to be most relevant for assessing underlying wage pressures.

The medium-term equilibrium unemployment rate takes account of how the composition of unemployment varies over the economic cycle. For example, if demand is persistently weak then it is likely that more people will be unemployed for extended lengths of time. The longer people are out of work, the more their skills will deteriorate and as a result, their probability of finding a job tends to decrease. That is likely to mean that they will exert less downward pressure on wages.

The medium-term equilibrium unemployment rate will, therefore change over time. But it is unlikely to move sharply. So changes in the unemployment rate should provide a reasonable indicator of changes in the overall amount of effective labour market slack over short horizons.

There are also good reasons to think that the unemployment rate would provide a useful, observable indicator of movements in the amount of overall spare capacity in the economy. As demand recovers, it is likely that some of the spare capacity within companies will decline before, or at the same time as, the unemployment rate falls and slack within the labour market narrows. For example, businesses whose employees are devoting effort to generating custom while demand is weak would be more likely to switch staff back to making sales when demand recovers than to hire new employees. And companies that had asked their employees to work reduced shifts would probably increase the hours worked by their existing staff before hiring more. That seems consistent with the recoveries from the recessions of 1980/81 and 1990/91, when the unemployment rate began to fall only once spare capacity within companies, as indicated by survey measures, had been largely eliminated. It therefore seems likely that a significant fall in the unemployment rate would indicate that there is little effective spare capacity within firms.

The unemployment rate is a particularly appealing indicator variable given the uncertainties surrounding productivity at present. By using an unemployment rate indicator, the Committee could set monetary policy so that it provided enough support to activity to cause spare capacity within companies to narrow without having to make an explicit judgement about the evolution of that spare capacity. That could be particularly useful if the weakness in productivity growth was largely related to demand, as it would allow the MPC to signal its intent not to raise Bank Rate above 0.5% even in the face of strong output growth, provided that it did not entail material risks to price stability or financial stability.

Table 2 below provides an illustration of how using the unemployment rate as an indicator might allow the MPC to support the recovery in a way that allows it to test the scope for a pickup in productivity growth. The table shows a stylised example of how the unemployment rate could be affected by different paths of demand and by different assumptions about the response of productivity to demand. Moving across the columns of the table shows how the unemployment rate might be affected if four-quarter output growth averaged between 2.25% and 3.25% over the three-year forecast period. And moving down the rows of the table shows how the unemployment rate might be affected if four-quarter growth in productivity per hour averaged between 1.5% and 2.25% over the same period.

Table 2 Sensitivity of the unemployment rate to changes in output and productivity[(a)]

Unemployment rate at the three-year horizon (per cent)		**Average four-quarter GDP growth over the forecast period** (per cent)				
		2.25	2.5	2.75	3	3.25
Average four-quarter growth in productivity per hour over the forecast period (per cent)	2.25	9.6	8.9	8.2	7.5	6.8
	2	8.9	8.2	7.5	6.8	6.1
	1.75	8.2	7.5	6.9	6.2	5.5
	1.5	7.6	6.9	6.2	5.5	4.8

Sources: ONS (including the Labour Force Survey) and Bank calculations.
(a) Unemployment rate is a percentage of the economically active 16+ population. GDP is chained-volume measure at market prices. Productivity is whole economy output per hour. This highly stylised table gives a mapping between changes in output and changes in the unemployment rate, highlighting the sensitivity of that mapping to the response of productivity per hour. These numbers are only illustrative and are based on a number of simplifying assumptions about the elasticity of labour demand with respect to output, the extent to which increases in labour demand are met by increases in average hours worked rather than in the number of employees, and the participation rate.

If demand growth were to be relatively subdued over the next three years, or if productivity were to increase broadly in line with demand, then the amount of spare capacity in companies would be likely to narrow only gradually. There would, therefore, be more scope for the MPC to support the recovery while maintaining price stability. In these scenarios – shown in the upper left-hand corner of the table – the unemployment rate would be likely to remain elevated. Guidance linked to the unemployment rate would therefore help people to understand that the MPC intended to maintain the current stimulative stance of monetary policy for longer.

Conversely, if demand growth were robust in coming years or if productivity growth were weak relative to demand growth, the margin of spare capacity within companies would be likely to narrow rapidly. That would mean that there would be less scope for output to recover without inflationary pressures intensifying and so the MPC would consider raising Bank Rate at an earlier point. In these scenarios – shown in the lower right-hand corner of the table – the unemployment rate would be likely to fall markedly. So guidance linked to the unemployment rate would help people to understand that the current stimulative stance of monetary policy was likely to be withdrawn relatively quickly.

The unemployment rate could, however, provide a misleading indicator of slack in the labour market, because of changes in the participation rate (the proportion of the adult population who are working or actively seeking a job). Some of those who are currently searching for work may become discouraged

and choose to drop out of the workforce until the economic outlook improves. That would cause the unemployment rate to fall, even though the number of people potentially available for work would be unchanged. Conversely, if the participation rate rose, then so too would the unemployment rate.

The outlook for the participation rate is somewhat uncertain at present, making it difficult to judge how it might affect the unemployment rate. The participation rate has been broadly unchanged since the 2008/09 recession, whereas following previous recessions it fell. As set out in a box on page 27 of the May 2013 *Inflation Report*, recent developments in the participation rate reflect a range of structural and cyclical factors. It is difficult to disentangle these different influences on the participation rate, and therefore to judge how the participation rate is likely to evolve.

Table 3 provides an illustration of how the participation rate could affect the unemployment rate. If the participation rate were to fall from its current rate, of 63.4% in the three months to May 2013, then the unemployment rate could fall even if some jobs were destroyed. Conversely, if the participation rate were to rise, then the unemployment rate could remain at its current rate even if hundreds of thousands of new jobs were created.

Table 3 Sensitivity of the unemployment rate to changes in the participation rate and net job creation[(a)]

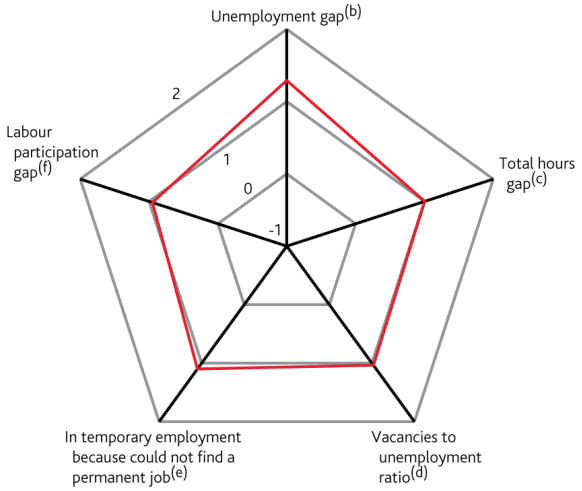
Unemployment rate (per cent)		Participation rate (per cent)				
		62.4	62.9	63.4	63.9	64.4
Net number of jobs created (thousands)	-600	8.2	8.9	9.7	10.4	11.1
	-400	7.6	8.3	9.0	9.8	10.5
	-200	7.0	7.7	8.4	9.1	9.8
	0	6.3	7.1	7.8	8.5	9.2
	200	5.7	6.4	7.2	7.9	8.6
	400	5.1	5.8	6.6	7.3	8.0
	600	4.4	5.2	5.9	6.7	7.4
	800	3.8	4.6	5.3	6.1	6.8

Sources: ONS (including the Labour Force Survey) and Bank calculations.
(a) All data are based on the 16+ population. These calculations are sensitive to the starting values used, which were data for the three months to May 2013 (unemployment rate 7.8%; participation rate 63.4%; 16+ population 50.8 million).

Nevertheless, the gap between the unemployment rate and Bank staff's central estimate of the medium-term equilibrium unemployment rate points to a similar degree of slack within the labour market as do a number of other indicators. The web diagram below (**Chart 9**) summarises these other indicators: the gap between the participation rate and its trend value (the labour participation gap); the gap between total hours worked and its trend value (the total hours gap); the proportion of those in temporary employment who reported that they could not find a permanent job; and the number of vacancies relative to unemployment (the vacancies to unemployment ratio). The red line shows the current values of these indicators: the further each point is from the centre of the web, the greater is the difference between the current value and the series' 1992-2007 average, and the wider the margin of slack. All of these indicators point to a similar margin of labour market slack.

As with the output gap, a difficulty with using the unemployment rate as the threshold is that there is uncertainty over the extent to which inflationary pressures will build as the unemployment rate falls. That is because the effect of unemployment on wages depends on the gap between the unemployment rate and the medium-term equilibrium unemployment rate, and the latter is uncertain. If the medium-term equilibrium rate were underestimated, then the unemployment condition would be set too low and inflationary pressure could begin to build well before the condition was met. Previous inflationary episodes reflected mistakes of that kind. A price stability knockout could provide some protection against this risk. But, again, using the MPC's inflation projection for this knockout might undermine the protection it affords, since the Committee's view of the prospects for inflation is informed by its estimate of the medium-term equilibrium unemployment rate.

Chart 9 Selected indicators of labour market slack in 2013 Q1[(a)]



Sources: ONS (including the Labour Force Survey) and Bank calculations.
(a) The chart shows the differences, in number of standard deviations, between the values of these indicators in 2013 Q1 and their 1992-2007 averages.
(b) Difference between the unemployment rate and Bank staff's estimate of the medium-term equilibrium unemployment rate.
(c) Percentage difference between total weekly hours worked and Bank staff's estimate of trend total weekly hours worked. The standardised data have been multiplied by -1 so that a higher number indicates more slack.
(d) Number of UK vacancies (excluding agriculture, forestry and fishing) divided by LFS unemployment. Data on UK vacancies are only available from 2001 Q2 onwards. Prior to that, UK vacancies have been projected backwards using changes in the number of vacancies at UK job centres. Data on vacancies at UK job centres for 2001 Q2 have been estimated using data for April 2001. The standardised data have been multiplied by -1 so that a higher number indicates more slack.
(e) Number of people reporting to the LFS that they are in temporary employment because they could not find a permanent job, as a percentage of the number of people in temporary employment. Data begin in 1992 Q2.
(f) Difference between Bank staff's estimate of the trend participation rate and the participation rate.

The unemployment rate performs well from a data availability point of view. The measure of unemployment most closely monitored by the MPC is the three-month headline measure derived from the Labour Force Survey (LFS).[15] This headline measure of the unemployment rate is published monthly. And the data are relatively timely: estimates of the unemployment rate for each month are published with a lag of around one and a half months. Revisions to the unemployment rate – which happen only when information from the population census is incorporated – tend to be small. In addition, the three-month unemployment rate is a relatively smooth and slow-moving variable: that reduces the chance that the threshold is met in one month but rises back above it in the following one. The uncertainty around estimates of the unemployment rate that arises from sampling variability is also small – according to ONS estimates, the 95% confidence interval around the headline unemployment measure is about ±0.3 percentage points – although that is still large enough to create some uncertainty about whether the condition has truly been met or not.

Likewise, an unemployment indicator performs well from a communications point of view. It would be widely understood. It receives widespread media coverage. And unemployment directly affects the well-being and confidence of households and businesses.

Employment rate

Rather than framing policy guidance in terms of the unemployment rate, the MPC could instead use the employment rate. As with the unemployment rate, the employment rate is related to the amount of slack in the economy. But the employment rate will not be affected if people move from unemployment into inactivity. Whether the employment rate or the unemployment rate provides the better indication of the amount of slack in the labour market, therefore, depends on why the participation rate changes. If the people who have stopped participating in the labour market could

[15] The LFS measure of the unemployment rate is calculated according to international guidelines specified by the International Labour Organisation.

start looking for employment as the economy recovers – for example, as might be the case if the weakness in demand has temporarily discouraged them from seeking work – then the number of people potentially available for work would essentially be unchanged. In that case the employment rate would provide the better indicator of slack. But if the people who have stopped participating are unlikely to start looking for work again – for example, as might be the case if they have lost the skills that they need to be able to compete effectively for jobs or if the changes reflect structural developments in the labour market – then the number of people potentially available for work would be lower. In that case, the unemployment rate would provide the better indicator of slack.

As with the unemployment rate, the employment rate would perform well from a data point of view: estimates of the employment rate are timely and not prone to substantial revision. But the employment rate may have less meaning to households and companies than the unemployment rate.

5.1.3 Price stability indicators

Current inflation rate

An indicator based on the current inflation rate has two significant drawbacks. First, monetary policy takes time to affect the economy. So in determining policy, what matters is not the current rate of inflation but the outlook for inflation around two years ahead. Second, CPI inflation can be affected by cost shocks. For example, administered and regulated prices are currently making a larger than usual contribution to CPI inflation, and that contribution is likely to remain elevated for the next couple of years or so. Increases in the rate of VAT raised inflation in 2010 and 2011. The MPC usually looks through the direct effects of such shocks because not doing so would generate undesirable volatility in output. Even though breaching a knockout would not necessitate an immediate policy action, it would not be desirable to choose an indicator that led to the knockout being breached frequently.

Using an indicator of 'core' inflation – that is, a measure that excludes the most volatile components of the CPI – would help to mitigate the latter problem. But two of the most volatile components are energy prices and food prices. These items are key components of household spending, and their prices tend to be highly visible. If the MPC were to base policy guidance on a measure of core inflation that excluded these prices, rather than the target measure of CPI inflation, then trust in the inflation target might be eroded.

An indicator based on the current inflation rate, however, performs well from a data availability point of view. CPI data are published monthly, with a lag of less than one month, and are not revised. Moreover, CPI inflation is widely reported in the media, and is integral to the MPC's remit.

The MPC's inflation projection

Using the MPC's own projection for inflation has clear advantages over current inflation. Unlike current inflation, it accounts for lags in the transmission mechanism of monetary policy, and it respresents the MPC's best collective judgement of the outlook for inflation. And it would be straightforward for the Committee to look through factors temporarily buffeting inflation.

While the MPC's inflation forecast is produced only quarterly, the minutes of the monthly policy meeting and regular speeches by individual members provide a more frequent update of the MPC's and individual members' views of the outlook. So the indicator performs reasonably well from a data availability point of view. In addition, it is consistent with the requirement for members of the Committee to set policy each month based on their individual judgements.

The MPC's inflation projection might appear less easy to communicate than the current inflation rate, because the Committee would need to explain why its view of the inflation outlook had changed. But the Committee already communicates that information, most notably through its *Inflation Reports*. There is a risk, however, that people may perceive that the MPC's forecasts would provide less protection against risks to price stability than current inflation, since the Committee's projection is

informed by its assessment of slack and so would not provide a warning signal if that view was mistaken.

Measures of inflation expectations

As well as the MPC's own projection, there is also a range of indicators of the medium-term inflation expectations of households, companies and financial market participants. It is possible to derive estimates from financial market instruments, such as inflation swaps and index-linked government bonds. In addition, there are surveys of households' and businesses' inflation expectations. And there are surveys which capture the views of professional forecasters.

As with the MPC's own inflation projection, an indicator based on any of these measures of inflation expectations would overcome many of the difficulties associated with using current inflation. It would account for lags in monetary transmission and it would allow the Committee to look through temporary factors buffeting current inflation. Moreover, using an external viewpoint of future prospects for inflation would provide additional protection against the risk that the Committee had misjudged the evolution of supply.

But issues with the data mean that there are some drawbacks. Market-based indicators of inflation expectations typically reference the Retail Prices Index (RPI) measure of inflation rather than CPI inflation. Due to differences in the way the RPI and CPI are calculated, there is a wedge between these two measures that varies over time. That means it is not possible to specify precisely what expected rate of RPI inflation implied from financial markets would be consistent with a given expected rate of CPI inflation. Surveys of households do not relate to any particular index of consumer prices, again making it difficult to use these surveys to specify a condition relating to expected CPI inflation. Surveys of companies ask about their inflation expectations three months or one year ahead, which may be insufficiently forward looking, and do not relate to CPI inflation. And surveys of professional forecasters are based on a relatively small sample size, and may not provide a good indication of inflation expectations across the wider economy.

5.1.4 The MPC's assessment for the price stability and real activity indicators

The MPC judged that it would be better to employ separate indicators for price stability and real activity, rather than combining the two by using either nominal GDP growth or the nominal GDP shortfall, because of the disadvantages of the nominal GDP indicators noted above.

For real activity, the MPC judged that the unemployment rate is the most suitable indicator given the present uncertainties surrounding the evolution of supply. Using the unemployment rate allows the Committee to set monetary policy so that it provides enough support to activity to reduce the degree of spare capacity in the economy without having to rely on an explicit judgement about the extent to which productivity will pick up as the recovery gathers pace. Moreover, unemployment data are less prone to revision and less volatile than data for real GDP growth. They are also subject to a far smaller degree of uncertainty than are estimates of the output gap. The unemployment rate is also widely understood by both financial market participants and the public.

The unemployment rate is specified as a threshold, because the Committee judged that the additional flexibility would be valuable for the activity indicator, given the uncertainty about both the equilibrium unemployment rate and how movements in the unemployment rate map into movements in the overall amount of slack. If the threshold condition were met, that would not result in an immediate rise in Bank Rate. Instead, the MPC would reassess whether or not to raise Bank Rate above 0.5% in light of its assessment of the economic outlook.

For price stability, the MPC decided to use two indicators. First, the Committee believes that it is appropriate to frame its policy guidance in terms of its own assessment of the inflation outlook. The Committee recognises, however, that its projection provides only partial protection against the risks to price stability because it is informed by the Committee's assessment of slack. It will be important,

therefore, for the MPC to update its view of slack and inflationary pressures as the recovery takes hold. Second, the MPC will also require that external measures of inflation expectations remain sufficiently well anchored. To do this, the Committee will monitor a range of indicators, summarised in the box on pages 36-37.

The MPC's view is that it is appropriate to specify these price stability indicators as knockouts. That is because price stability is the MPC's primary objective. As such, the MPC would continue with forward guidance only if it did not endanger price stability. So if either of these conditions were to be breached, then the Committee's guidance relating to the unemployment rate would no longer apply.

5.1.5 The financial stability indicator

A period of financial instability could have lasting effects on the economy, damaging growth and endangering price stability, so it is also appropriate to specify the financial stability indicator as a knockout. The MPC would maintain its forward guidance only if it did not generate material risks to financial stability and so threaten price stability. To that end, the FPC will alert the MPC publicly if the stance of monetary policy poses a significant threat to financial stability that cannot be contained by the substantial range of mitigating policy actions available to the FPC, the Financial Conduct Authority (FCA) and the Prudential Regulation Authority (PRA) in a way consistent with their objectives.

The FPC has a broad set of policy actions available to it to meet its objectives, under the Bank of England Act 1998 as amended by the Financial Services Act 2012. It can make Recommendations to anybody. It can make Recommendations on a comply or explain basis to the PRA and the FCA about the exercise of their functions. And it can direct those regulators to adjust either the countercyclical capital buffer or sectoral capital requirements (on exposures to residential property, commercial property, and other parts of the financial sector).[16] These powers of direction apply to any UK incorporated bank, building society or large investment firm.

Given the different frequencies with which the FPC and MPC meet, the FPC's formal judgement would initially be made privately to the MPC. It would be published, along with the MPC's response to it, no later than the minutes of the next MPC meeting. The FPC would subsequently make public the analysis underlying any judgements.

5.2 Setting the unemployment rate threshold

The role of the unemployment rate threshold is to convey the MPC's intention at least to maintain the current exceptionally stimulative stance of monetary policy until the margin of spare capacity in the economy has narrowed significantly, provided this does not threaten price or financial stability. The appropriate level of the unemployment rate threshold is influenced by the equilibrium unemployment rate,[17] and by the uncertainties about the evolution of the supply capacity of the economy and the outlook for inflation expectations.

Since the medium-term equilibrium unemployment rate depends on the composition of unemployment, it will change over time. Bank staff estimate that the medium-term equilibrium unemployment rate is presently in the region of 6.5%. But there is a considerable degree of uncertainty around that central estimate.

That medium-term equilibrium unemployment rate is a different concept from the long-run equilibrium unemployment rate: the latter is the rate to which unemployment will trend towards in the long run once all of the short and medium-term effects have dissipated. That long-run equilibrium rate will reflect the institutional features of the labour market, such as the degree of labour market flexibility,

[16] Although the FPC already has a power to change sectoral capital requirements, it will not receive a power to set the countercyclical capital buffer until CRDIV is implemented in the UK, expected on 1 January 2014. Parliament could, in principle, give the FPC further power powers to set directive tools, by implementing the necessary secondary legislation.
[17] Measures of the equilibrium unemployment rate are discussed in detail in a box in Section 3 of the August 2013 *Inflation Report*.

and the extent to which potential employees are aligned with vacancies in terms of skills, location and occupation. Over time, the medium-term equilibrium unemployment rate should converge towards the long-run rate. Current estimates of the long-run equilibrium rate are significantly below estimates of the medium-term equilibrium rate.

To ensure that CPI inflation remains on track to return to the 2% target, the Committee will need to withdraw some of the monetary stimulus before the unemployment rate falls back to its medium-term equilibrium. The unemployment rate threshold therefore needs to be set somewhere between the current unemployment rate of 7.8% in the three months to May 2013 and Bank staff's estimate of the medium-term equilibrium rate of around 6.5%.

On the basis of these considerations, the MPC decided to set the threshold for the unemployment rate at 7%. That does not represent the MPC's view of the lowest sustainable rate to which unemployment can fall in the longer term. Indeed, it is likely that, over time, unemployment can fall materially lower – although monetary policy cannot affect the long-run equilibrium rate of unemployment. Rather, the MPC judges that 7% provides an appropriate point at which to reassess the state of the economy and consider whether or not it should start to withdraw the current extraordinary levels of monetary stimulus.

5.3 Setting the price stability knockouts

The MPC has set two knockouts relating to price stability. One is based on its own assessment of the inflation outlook and the other is based on external indicators of inflation expectations. These price stability knockouts play an important role in ensuring that the stance of monetary policy remains consistent with the MPC's primary objective of price stability. The knockouts should, therefore, be set in a way that demonstrates clearly the MPC's determination to return inflation to the target in the medium term, but still gives the Committee the capacity to look through the temporary effects of shocks.

When considering the horizon for the knockout, the MPC needs to take account of two issues. First, the knockout should not be set at too short a horizon. In part, that is because it takes time for monetary policy to have an effect on the economy. In addition, inflation is currently close to 3% and is expected to remain so for much of the rest of this year. The policy actions needed to return inflation to the target over a short horizon would risk derailing the recovery. But second, the knockout cannot be set too far ahead. In the past, the MPC has typically sought to bring inflation back to the target over a horizon of two years or so. Although the current circumstances are exceptional, setting the knockout beyond that horizon could lead people to suspect that the MPC had become less determined to return inflation to the target in the medium term.

In considering the level of the knockout there are again two competing considerations. First, as noted in Section 2, inflation has averaged close to 3% over the past six years. In June 2013, CPI Inflation stood at 2.9% and is expected to remain close to that level over the next six months, reflecting the past impact of increases in import prices and the persistent contribution of administered and regulated prices. That recent inflation performance suggests setting the knockout somewhat above 2%, so that the Committee would retain the capacity to look through further unanticipated shocks without the risk of frequently breaching the knockout. But the MPC's primary objective is to achieve the 2% inflation target. So the knockout cannot be set too much above 2% either. Setting the knockout much above 2% might cause people to think that the Committee had become less determined to return inflation to the target, which could have a deleterious effect on inflation expectations.

On the basis of these considerations, the MPC has chosen to set its knockout at 2.5% at the 18 to 24-month horizon. While there is a range of views as to whether the knockout horizon should extend out to two years, the MPC's best collective judgement is that an 18 to 24-month horizon strikes an appropriate balance between not bringing inflation back to the target so quickly as to threaten the

recovery, while demonstrating the MPC's determination to bring inflation back to the target over the medium term. The knockout is framed in probabilistic terms, such that it would be breached if, on average, it is more likely than not that the Committee's projection for inflation 18 to 24 months ahead is half a percentage point or more above the 2% target.[18]

As now, individual MPC members will make their own assessments of the inflation outlook. As such, it is possible that individual members would judge that the price stability knockout had been breached – and therefore that the forward guidance should no longer apply to their policy decision – even if the MPC's best collective view was that the knockout had not been breached. Again, as now any differences of views among Committee members would be communicated in the MPC minutes and speeches.

For the second price stability knockout, the MPC will monitor whether or not the medium-term inflation expectations of households, companies and financial market participants remain sufficiently well anchored. In making its assessment, the MPC will consider: developments in the levels of, and changes in, inflation expectations; movements in uncertainty about future inflation; and the extent to which inflation expectations respond to economic news. The box on pages 36-37 describes how the MPC will make this assessment. Again, individual members could judge that this knockout has been breached even if the MPC's collective view is that it has not.

These two price stability knockouts should give the MPC additional scope to minimise the risk that resources remain underutilised for a protracted period without an adverse shift in inflation expectations. That is because monetary policymakers can achieve a better balance between price stability and output volatility when inflation expectations are well anchored than when they are not. For example, Orphanides and Williams (2005)[19] show that looking through the effects of shocks that push inflation away from the target temporarily in order to avoid volatility in output is more costly when inflation expectations are less well anchored, because the deviation of inflation from the target is liable to be misinterpreted as a change in the central bank's inflation objective. The price stability knockouts may help the MPC to communicate more clearly its willingness to accept: a longer period of above-target inflation, in return for stronger growth in output, provided that does not endanger price stability. That should reduce the risk that inflation expectations become less well anchored.

Monitoring medium-term inflation expectations

Inflation expectations may become less well anchored if people believe that the MPC has become more tolerant of persistent deviations of inflation from the target, or if they doubt the determination of the MPC to return inflation to the target in the long run. As set out in an article in the 2013 Q2 edition of the Bank's *Quarterly Bulletin*,[1] if people's expectations about inflation were to become less well anchored, then that might become apparent in one of three ways: the levels of inflation expectations might change in ways that are not consistent with developments in the economy; uncertainty about future inflation might increase; and expectations might become more responsive to economic news. The MPC uses a wide range of indicators to monitor for evidence that these symptoms are materialising. This box summarises the indicators monitored.

Changes in the level of medium-term inflation expectations

A range of data provides information about the level of inflation expected by different groups, such as households, professional forecasters and financial market participants, in the medium term. For

[18] To assess the likelihood of a breach of the knockout, Committee members will take the average of the probabilities of inflation being at or above 2.5% in the relevant quarters. For the August 2013 projections, 18 to 24 months ahead refers to 2015 Q1 and 2015 Q2.

[19] Orphanides, A and Williams, J.C (2005) 'Imperfect knowledge, inflation expectations, and monetary policy' in The Inflation Targeting Debate, Ben Bernanke and Michael Woodford (eds.), Chicago: University of Chicago Press pages 201-234.

example, surveys of households and professional forecasters ask respondents about expected inflation. And instruments traded in financial markets, such as inflation swaps or conventional and index-linked bonds, can give an indication of the rate of inflation expected by financial market participants.

The size of changes in the level of medium-term inflation expectations may, in some instances, provide evidence of expectations shifting away from the target. For example, if individuals' inflation expectations were to become less well anchored, such that they expected developments in the economy to have a more persistent effect on inflation than in the past, then their inflation expectations might change by more than is consistent with those developments.

One way to gauge whether movements in medium-term inflation expectations can be explained by recent developments is to compare those changes with the MPC's judgement of how developments in the economy have affected the outlook for inflation. The latter will be captured by changes in the MPC's projections for CPI inflation, published each quarter in the Bank's *Inflation Report*. An alternative method of assessing whether movements in inflation expectations appear consistent with developments in the economy is to use statistical techniques that estimate the effect that various economic developments have had on inflation expectations in the past.[2]

Uncertainty about future inflation

Even if central expectations of medium-term inflation do not change, individuals may become less certain about how the MPC will react to current or future developments in the economy that push inflation away from the target. That uncertainty might manifest itself either in greater disagreement across individuals about what inflation is likely to be in the future, or in greater uncertainty for any one individual about the range of possible outcomes.

A range of indicators can be used to monitor uncertainty about inflation in the medium term. Measures of dispersion of inflation expectations, such as the interquartile range, derived from surveys of households and professional forecasters, provide evidence on differences in views across individuals. The Bank of England's survey of forecasters provides evidence on the extent of individual uncertainty because it asks each forecaster to attach specific probabilities to a range of different outcomes for future inflation. Options prices, which can be used to estimate the weight that market participants collectively attach to different future inflation outturns, are likely to contain information about both: they will be influenced by the uncertainty of any one individual trading in the options market and by the variation in views between different market participants.

The responsiveness of expectations to news

An increase in the responsiveness of medium-term inflation expectations to news about the economic outlook might be indicative of expectations becoming less well anchored. If individuals were to expect deviations of inflation from the target to be more persistent, then they may revise their expectations of inflation in the years ahead when they receive news about a temporary deviation of inflation from the target.

A simple indicator is the change in the response of implied measures of inflation expectations derived from financial instruments to information about CPI inflation on the day that data are published. If inflation expectations were to become less well anchored, it is likely that the correlation between changes in expectations and CPI news would increase.

1. For more information on the indicators that the MPC monitors, see Maule, B and Pugh, A (2013), 'Do inflation expectations currently pose a risk to the economy?', *Bank of England Quarterly Bulletin*, Vol. 53, No. 2, pages 110-121.
2. One statistical technique discussed in the *Quarterly Bulletin* article is a structural vector autoregression.

5.4 Setting the financial stability knockout

In line with the FPC's draft policy statement (2013),[20] the MPC decided that no single indicator provides a sufficient guide to systemic risks. Instead, consistent with the division of responsibilities between the two Committees, the FPC will alert the MPC publicly if the stance of monetary policy poses a significant threat to financial stability that cannot be contained by the substantial range of mitigating policy actions available to the FPC, the FCA and the PRA in a way consistent with their objectives.

Given the different frequencies at which the FPC and MPC meet, the FPC's formal judgement would initially be made privately to the MPC. It would be published, along with the MPC's response to it, no later than the minutes of the next MPC meeting.

5.5 The MPC's monthly policy decision under forward guidance

During the period over which the MPC's policy guidance is in force, the MPC will continue to meet each month to determine the level of Bank Rate and the size of the asset purchase programme. These decisions will be made in the context of that guidance. While the unemployment rate remains above the 7% threshold, the MPC's monthly decision on Bank Rate will depend on individual members' assessments of the price stability knockouts, and on whether or not the FPC has issued an alert to the MPC. In the event that the unemployment threshold is reached, or if either of the price stability knockouts or the financial stability knockout is breached, the action taken by the Committee would depend on its assessment at that time of the appropriate setting of monetary policy required to fulfil its remit to deliver price stability. There is, therefore, no presumption that there would definitely be an immediate increase in Bank Rate.

The MPC stands ready to undertake further asset purchases if it judges that additional monetary stimulus is warranted by the outlook for activity and inflation. But until the unemployment threshold is reached and, subject to the price and financial stability knockouts not being breached, the MPC intends not to reduce the stock of asset purchases financed by the issuance of central bank reserves and, consistent with that, intends to reinvest the cashflows associated with all maturing gilts held in the Asset Purchase Facility.

[20] 'The Financial Policy Committee's powers to supplement capital requirements: a draft policy statement' (2013).

ANNEX: International experience of forward guidance at the zero lower bound

1. Introduction

In recent years, a number of other central banks around the world have provided forward guidance about the likely future path of policy rates when they have been at, or close to, the zero lower bound on nominal interest rates. This annex reviews the experiences of these other central banks. It begins by detailing the types of forward guidance employed, before drawing on the academic literature to review its effects.

2. Where and when forward guidance at the zero lower bound has been provided

As set out in Carney (2013), the experiences of central banks that have provided forward guidance about the likely future path of policy rates when those rates have been at, or close to, the zero lower bound can be categorised into three generations of guidance (**Table A**). Moving through the generations, the guidance provided became increasingly explicit and more closely tied to economic conditions: first came open-ended guidance; then time-contingent guidance; and, most recently, state contingent threshold based guidance. The following subsections provide more details about the types of guidance that were issued.

Table A International experience of forward guidance about policy rates at the zero lower bound

Central Bank	Date adopted / modified
Open-ended guidance	
Bank of Japan	April 1999; April 2013
Federal Reserve	August 2003; December 2008; March 2009
European Central Bank	July 2013
Time-contingent guidance	
Bank of Canada	April 2009
Riksbank	April 2009
Federal Reserve	August 2011; January 2012; September 2012
State contingent threshold based guidance	
Federal Reserve	December 2012

2.1 Open-ended guidance

The first generation of guidance was open-ended in nature. Such guidance provides qualitative information about the future path of monetary policy, alongside a broad indication of the circumstances under which the central bank expected the stance of policy to change. The first central bank to adopt open-ended guidance was the Bank of Japan (BOJ), in 1999: having lowered the policy rate to 0.15% in February 1999, the BOJ indicated in April 1999 that it would maintain it at that rate until 'deflationary concerns' were 'dispelled'.[21] In April 2013, the BOJ published new forward guidance to indicate that it would continue with its programme of 'qualitative and quantitative easing, aiming to achieve the price stability target of 2 percent, as long as it is necessary for maintaining that target in a stable manner'.[22]

In the United States, the Federal Open Market Committee (FOMC) has also provided open-ended guidance. It did so in August 2003, when, with policy rates approaching zero, the FOMC stated that it

[21] Minutes of the 9 April 2001 meeting (English translation prepared by Bank of Japan staff based on the Japanese original).
[22] Bank of Japan, press release 'Introduction of the "Quantitative and Qualitative Monetary Easing"', 4 April 2013.

believed that 'policy accommodation' could 'be maintained for a considerable period'.[23] Throughout 2004, the FOMC also provided guidance about the pace at which it expected monetary policy to be tightened – for example, indicating in January 2004 that it could 'be patient in removing its policy accommodation',[24] and in May 2004 stating that accommodative policy could 'be removed at a pace that is likely to be measured'.[25] The FOMC continued to include open-ended guidance in its statements until late 2005.

More recently, the FOMC reintroduced open-ended guidance in response to the specific challenges faced by its policy rate being at its effective lower bound. In December 2008, the FOMC reduced the target for the federal funds rate to a range of 0% to 0.25% and, in the accompanying statement, said that it anticipated that 'weak economic conditions' were 'likely to warrant exceptionally low levels of the federal funds rate for some time'.[26] And in March 2009, it changed that to 'for an extended period'.[27]

The European Central Bank (ECB) provided open-ended guidance in July 2013. In his opening statement at the press conference that followed the meeting of the Governing Council, the President of the ECB said that the 'Governing Council expects the key ECB interest rates to remain at present or lower levels for an extended period of time'.[28]

2.2 Time-contingent guidance

The second generation of guidance went further by providing an explicit conditional commitment about the date at which the accommodative stance of policy would begin to be reversed, rather than leaving it to individuals to form their own interpretation of policy statements. The Bank of Canada (BOC) adopted such 'time-contingent' guidance in April 2009. With its policy rate at an effective lower bound of 0.25%, the BOC announced a commitment to maintain it at that level until 2010 Q2, conditional on the outlook for inflation. It reinforced that by extending the horizon of its exceptional liquidity provision for the anticipated duration of the conditional commitment.[29]

In Sweden, the Riksbank also adopted such time-contingent guidance in April 2009. Its Executive Board decided to cut the repo rate to 0.5% and indicated that 'the repo rate is expected to remain at a low level until the beginning of 2011'. In July 2009, when the repo rate was cut to 0.25%, the Executive Board amended its guidance and indicated that 'the repo rate is expected to remain at this low level until autumn 2010'.

In August 2011, the FOMC moved from issuing open-ended guidance to time-contingent guidance. Whereas in its June 2011 statement the FOMC had indicated that economic conditions were likely to warrant the target range for the federal funds rate remaining exceptionally low for 'an extended period', in the August statement it indicated that it expected these conditions to persist 'at least through mid-2013'.[30] The FOMC updated its guidance in subsequent statements: to 'at least through late 2014' in its January 2012 statement; and to 'at least through mid-2015' in its September 2012 statement.[31]

2.3 State contingent threshold based guidance

The third generation of guidance tied the outlook for monetary policy to economic conditions, rather than to a moment in time. The US Federal Reserve is, thus far, the only central bank to have issued explicit state contingent threshold based guidance about its policy rate. It first did so in December 2012,[32] when the FOMC specified thresholds for the unemployment rate and its inflation forecast. In

[23] US Federal Reserve, press release, 12 August 2003.
[24] US Federal Reserve, press release, 28 January 2004.
[25] US Federal Reserve, press release, 4 May 2004.
[26] US Federal Reserve, press statement, 16 December 2008.
[27] US Federal Reserve, press statement, 18 March 2009.
[28] Introductory statement to the press conference, 4 July 2013.
[29] Bank of Canada, press release, 21 April 2009.
[30] US Federal Reserve, press release, 9 August 2011.
[31] US Federal Reserve, press releases, 25 January 2012 and 13 September 2012 respectively.
[32] US Federal Reserve, press release, 12 December 2012.

particular, it stated that it anticipated that the exceptionally low level of the federal funds rate would 'be appropriate at least as long as the unemployment rate remains above 6-1/2 percent, inflation between one and two years ahead is projected to be no more than a half percentage point above the Committee's 2 percent longer-run goal, and longer-term inflation expectations continue to be well anchored'. The FOMC has continued to provide state contingent threshold based guidance since December 2012, using the same criteria in subsequent statements.

The FOMC has, however, made clear that its policy decisions will not be based solely on these few variables, and has provided information on the broader economic conditions that it expects will lead to a change in the stance of policy. It has set out some of the other information that it would consider when deciding how long to maintain the highly accommodative stance of monetary policy. And it has stated that it expects that the low level of the federal funds rate will 'remain appropriate for a considerable time after the asset purchase program ends and the economic recovery strengthens'. Moreover, it has provided some guidance about how policy is likely to change after the thresholds have been reached, stating that 'when the Committee decides to begin to remove policy accommodation; it will take a balanced approach consistent with its longer-run goals of maximum employment and inflation of 2 percent'.[33]

3. The effectiveness of forward guidance

The central banks that have provided forward guidance about the likely future paths of their policy rates when at the zero lower bound have done so in order to help households, businesses and financial market participants to understand how they intend to set monetary policy. This section draws on the academic literature to review the effects this guidance has had on expectations about the future path of policy rates.

The evidence on Japan's experience of open-ended guidance is mixed. For example, Okina and Shiratsuka (2004) examine the behaviour of the yield curve following the introduction of the guidance. Their findings suggest that the guidance stabilised financial market participants' expectations about the path of short-term interest rates, and so reduced longer-term interest rates and caused the yield curve to flatten. But Bernanke, Reinhart and Sack (2004) find only limited evidence that the zero interest rate policy, including open-ended guidance issued in 1999 and similar guidance issued in 2001 related to the BOJ's purchases of Japanese government bonds, affected financial market expectations.

Studies of Canada's time-contingent guidance find stronger effects. Chang and Feunou (2013) show that the guidance reduced uncertainty about the future path of interest rates in Canada, as measured by implied volatility computed from options on interest rate futures, and realised volatility computed from intraday prices of interest rate futures. He (2010) uses vector autoregressive models to form projections of monthly interest rates, monthly inflation and unemployment rates for Canada and United States during the period for which the BOC implemented time-contingent guidance. Canadian one-year Treasury bill rates and one-year forward three-month rates were generally lower than what the model would have implied after April 2009, while the difference between actual rates and the model-implied rates for the United States over the same period was much smaller. In addition, He finds that the interest rates on government bond yields with maturities of two, five, and ten years were below their model-implied values, although the differences get smaller as the maturities lengthen. These findings indicate that the BOC's guidance may have lowered Canadian interest rates relative to that implied by their historical relationship with inflation and unemployment rates. The findings, however, are subject to a number of caveats – for example, the results are sensitive to the choice of inflation variable.

[33] US Federal Reserve, press release, 12 December 2012.

Campbell, Evans, Fisher and Justiniano (2012) explore the effects of the FOMC's open-ended and time-contingent guidance. Following a method developed by Gürkaynak, Sack and Swanson (2005), the authors use factor analysis to identify two separate influences on expected short-term interest rates at various horizons, as measured using federal funds futures contracts and Eurodollar futures contracts, on the days that the FOMC issued guidance. The first factor, which is identified by assuming that it has a similar effect on expectations at all horizons, is interpreted as the impact of changes in the current policy rate on expectations. The second factor, which is identified by assuming that it does not affect expectations for the current month but affects them at other dates, is interpreted as the impact of changes in market participants' expectations of future policy that are independent of changes in the current policy rate. Campbell *et al.* then regress these factors on changes in asset prices on those days. They find that the second factor has a significant effect on longer-term Treasury bond rates and corporate bond yields.

Swanson and Williams (2012) investigate the effects of the zero lower bound on interest rates of different maturities by estimating how the high-frequency sensitivity of interest rates to macroeconomic news has changed over time. Their findings indicate that yields on US Treasury securities with a year or more to maturity were not significantly less responsive to news between 2008 and 2010, when the federal funds rate was at the zero lower bound, than they were previously. It was only from late 2011 onwards – around the time that the FOMC moved from open-ended to time-contingent guidance – that the sensitivity of these yields fell closer to zero. The authors draw two conclusions from these results. First, it appears that until late 2011 financial markets consistently expected the federal funds rate to rise within two to four quarters. And second, the FOMC's forward guidance, together with its large-scale asset purchases and expectations that the FOMC would continue with such policies, has helped to offset the effects of the zero bound on medium and longer-term rates after late 2011.

There are very few studies that compare the effects of open-ended and time-contingent guidance. One, by Chehal and Trehan (2009), compares the BOC's time-contingent guidance of 2009 with the FOMC's open-ended guidance of 2008. The authors examine how expected interest rates moved on the day of announcement and how they evolved subsequently. They find that while the BOC's commitment affected interest rates initially, the effect did not appear to have persisted. Furthermore, the close correlation between Canadian and US forward rates either side of the expiry date of the BoC's guidance in mid-2010 seems to suggest that the announcement of a fixed end date did not, in and of itself, significantly affect expectations of monetary policy in Canada differently from the announcement of open-ended guidance in the United States. That is consistent with financial market participants understanding that both open-ended and time-contingent guidance would ultimately be influenced by the economic outlook, and updating their expectations as that outlook changed.

Indeed, studies generally suggest that financial market participants' expectations of the future path of policy rates do not move exactly in line with time-contingent guidance. That is, participants appear to attach some probability to central banks changing the path of policy before the point they have indicated that they are most likely to do so. For example, in the case of Canada's experience of forward guidance in 2009, Woodford (2012) finds that it had an instantaneous effect on market expectations across the whole of the yield curve. Moreover, the yield curve flattened, which would be consistent with expectations of policy rates at longer maturities falling by more than expectations of policy rates at shorter maturities, and with the guidance reducing uncertainty about the path, so reducing term premia. But the rates for ten to twelve-month maturities did not fall to 0.25%, even though the guidance implied that the policy rate would remain at 0.25% for at least twelve months. Woodford comes to similar conclusions for the time-contingent guidance issued by the FOMC and the Riksbank. These results could indicate that time-contingent guidance becomes less credible as the period for which it is offered extends further out, because financial market participants understand that time-contingent guidance is always conditional on the economic outlook, and attach some probability to shocks coming along that would cause the guidance to be reviewed.

Some studies have tried to investigate whether forward guidance affects interest rates because it contains information about the central bank's view of the economic outlook, or because it indicates that the central bank is setting a different stance of monetary policy for a given economic outlook than in the past. Campbell *et al.* (2012) explore this issue in their paper on the FOMC's experience. In order to distinguish between the two channels, they examine how expectations about unemployment and inflation, as measured by the Blue Chip Economic Indicators forecast survey, changed when the FOMC issued open-ended guidance. They find that positive innovations in future federal fund rates are associated with downward revisions to unemployment forecasts, and upward revisions to inflation forecasts, in the survey taken the month after the FOMC statement. This is not what one would expect if a higher expected path of the federal funds rate was related to a shift in the FOMC reaction function towards tighter policy, but it is consistent with the FOMC having a view that the economy would improve. This suggests that the guidance was perceived to contain news about the FOMC's assessment of the future strength of the economy, rather than about how the FOMC was setting policy.

Raskin (2013), however, finds the opposite result for the FOMC's time-contingent guidance. He investigates this issue by using distributions of investors' short-term interest rate expectations derived from interest rate options, together with measures of macroeconomic news derived from surveys. He finds that the FOMC's time-contingent guidance of August 2011 led to a 'statistically significant and economically meaningful change in investors' perceptions of how the FOMC was setting the stance of policy', while the language of January 2012 did not have statistically significant effects.

There has, thus far, been little assessment of the FOMC's more recent state contingent threshold based guidance in the academic literature, perhaps because such guidance has been in place for a relatively short period. There was little response of interest rates on the day that the FOMC's state contingent threshold based guidance was announced. But that is not necessarily evidence that the guidance did not affect expectations. Instead, it could indicate that financial market participants did not think that the FOMC had changed its view on the appropriate stance of policy, but was rather trying to clarify how it formed that view. Indeed, the statement issued by the FOMC noted that the new guidance was 'consistent with its earlier date-based guidance'.

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