



BANK OF ENGLAND

Speech

A MONIAC (not manic) economy

Speech to be given by

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It is a pleasure to be back in Leeds to give another briefing on the Bank of England's most recent *Inflation Report*. I still fondly remember a visit I made - almost exactly two years ago - when I stumbled on the MONIAC (the Monetary National Income Analogue Computer) shown in the picture below. The MONIAC is a machine simulating the flow of money through an economy by running coloured water through a series of tubes, pipes and tanks. The various flows represent different types of spending by the segments of the economy represented by tanks (such as the Treasury). Valves can be adjusted to capture "leakages" through channels such as taxes and spending on imports. The machine was created by William Phillips - who was primarily known for his work on the trade-off between unemployment and inflation that is central to my comments today. The contraption is an entertaining way to teach basic macroeconomic relationships, one that I have used for years in my classes at MIT. I was delighted to learn that not only did one of these machines still exist, but it was displayed at Leeds University, just outside where I delivered an *Inflation Report* briefing.

Figure 1. The MONIAC



A lot has happened since I saw the MONIAC. From a referendum on Scottish membership in the United Kingdom, to the largest fall in oil prices since the early 1980's, to UK inflation falling below zero for the first time since 1960, to five central banks reducing their main interest rates to below zero. And, of course, there was a UK referendum on EU membership. Although the MONIAC was designed to capture a wide range of economic events and surprises - it's safe to speculate that these were not what Phillips was thinking about when he designed his machine.

Yet, despite this series of records and major political events, a key theme of my discussion today will be how UK economic performance has been remarkably solid and stable over the past two years. GDP growth averaged 2.1% over 2015 and 2016 and has not fallen below 0.4% or risen above 0.6% in any quarter over this period (according to the Bank's backcast). This growth has been accompanied by solid gains in the labour market, with unemployment falling from 5.6% at the start of 2015 to 4.8% at the end of 2016 - the lowest rate since 2005. In fact, by many measures the UK has recently been a star performer relative to its peers. The unemployment rate is less than half that for the euro area, and the UK was the fastest growing economy in the G7 in 2016 (and a close second to the US in 2015).

Despite this solid and stable performance, there are widespread concerns about what comes next. Companies cite uncertainty, especially related to changes in the UK's relationship with the European Union, as the largest single drag on their investment plans in the year ahead.¹ Inflation is beginning to pick up

¹ See "Agents Summary of Business Conditions", Bank of England, 2016Q4.

sharply and will erode people's real incomes. Article 50 is likely to be triggered in the next month or so, potentially leading to major changes in how goods, money and people move between the UK and its main neighbour and trading partner. Will these events cause the UK's solid economic performance to wobble?

My comments today will address five questions. First, how has the UK economy performed relative to forecast? You may have heard that UK economic forecasters have recently been less accurate than weathermen. But I will show you that the Bank of England has actually done quite well - that is, if you compare the UK's recent performance to what was predicted in May based on the assumption that the UK would vote to remain in the European Union. Second, why has UK economic performance since the June vote been so resilient and not slowed as many predicted? Third, what is the economic outlook over the next three years? Fourth, what are the major risks around this outlook? Finally, what are the implications for monetary policy?

The UK Economy Relative to the Forecast

It is easy to poke fun at economists. I have a large repertoire of jokes about how many economists it takes to change a lightbulb, or how an economist opens a can when shipwrecked on a deserted island. Most recently, the jokes have shifted to how many economists it takes to make a forecast. And there is certainly fodder for criticism. The vast majority of economists and forecasters expected the UK economy to slow immediately after the UK voted to leave the European Union, with some even predicting an outright recession. Most put substantial weight on the evidence that growth, and especially investment, tends to slow sharply in the face of heightened uncertainty.² I was on the more optimistic end of the forecasters, but I still expected to see at least some softening.

But this slowdown has not occurred - and it has now been over 7 months since the June vote. GDP growth has been remarkably stable at 0.6% for three quarters in a row - the last two after the referendum. This is not only faster than the average growth rate in 2015, but probably above the economy's long-term potential growth rate. Growth may still slow as higher inflation reduces real incomes, or if negative supply effects related to the UK's departure from the European Union build over time. Signs of such a slowdown starting soon, however, are as yet few and far between.³

What is most striking is how well forecasts for the six months after the vote have performed for most real variables - that is - forecasts made before the referendum based on a Remain vote. To make this point, Figure 2 compares the most recent data for the fourth quarter of 2016 with the MPC's best collective forecast

² For a summary of the evidence on the effects of uncertainty, see "Uncertainty about Uncertainty", speech by Kristin Forbes on 23 November 2016 at: <http://www.bankofengland.co.uk/publications/Pages/speeches/2016/942.aspx>.

³ One caveat is the most recent data on retail sales, which may suggest some softening in consumer spending. This data is volatile, however, only weakly correlated with consumer spending, and particularly difficult to interpret around year-end when seasonal adjustments are challenging.

as made just before the referendum (in the May 2016 *Inflation Report*). This forecast followed the usual convention of assuming a continuation of government policy, and therefore a vote to remain.

Figure 2. Comparison of latest data and February *Inflation Report (IR)* estimates to May 2016 *IR* forecasts

| | Variable ^(a) | May 2016 <i>IR</i> forecast for Q4 2016 | Latest data or Feb 2017 <i>IR</i> estimate for Q4 2016 | Surprise relative to May 2016 <i>IR</i> forecast |
|--|---|---|--|--|
| Demand | GDP growth | 1.9 | 2.2 | 0.3 |
| | Consumption growth | 2.4 | 2.9 | 0.5 |
| | Investment growth | 4.9 | 1.6 | -3.4 |
| | Government spending growth | 0.2 | 0.5 | 0.3 |
| Labour Market | Unemployment rate (%) | 5.0 | 4.8 | -0.2 |
| | Output gap ^(b) | about -¼% | about 0 | about ¼% |
| | Total weekly hours (million) | 1012 | 1017 | 5 |
| | Whole economy, total average weekly earnings growth | 3.1 | 2.8 | -0.3 |
| | Private sector, regular average weekly earnings growth | | 3.0 | |
| Asset prices and nominal data | Bank Rate (%) ^(c) | 0.41 | 0.25 | -0.16 |
| | Yield curve in Q4 2017 (%) ^(c) | 0.5 | 0.3 | -0.3 |
| | Credit spread ^(d) | 2.3 | 2.2 | -0.2 |
| | House price index ^(e) | 6.7 | 5.5 | -1.2 |
| | Sterling effective exchange rate ^(f) | | -11.0 | |
| | Import price deflator | 0.9 | 9.7 | 8.8 |
| | Headline CPI inflation | 0.9 | 1.2 | 0.3 |

(a) Unless otherwise stated all variables are reported as percent changes from a year ago.

(b) Percent deviation from estimated steady state output. The most recent output gap estimate does not incorporate the judgement made in the February 2017 *IR* to lower the equilibrium unemployment rate and is an approximation. Incorporating that judgement would bring the Q4 2016 output gap to close to -0.5%.

(c) These numbers are not forecasts, but the actual Bank Rate or market Yield curve at the respective date.

(d) Percentage points over Bank Rate.

(e) Average of Nationwide and Halifax house price indices.

(f) The MPC does not forecast the exchange rate, but uses a conditioning path which is an average of the exchange rate path resulting from uncovered interest parity and a random walk. The table shows that the ERI index has depreciated 11% from the monthly value at the time of the May *IR* to that at the time of the February *IR*.

Starting with demand and its components, GDP growth in Q4 was 0.3pp stronger than the 1.9% (year-on-year) we forecast in May. This outperformance is largely due to consumption - which is expected to be 0.5pp stronger in Q4 than the 2.4% predicted in May.⁴ The one demand component which is predicted to be substantially weaker than forecast is investment, which is on track for only 1.6% growth in Q4, well below the May forecast of 4.9%.

Moving to the labour market, all measures are close to our May forecast, and most a touch stronger. The unemployment rate is currently 4.8% (lower than the 5.0% predicted in May), slack is lower (this does not incorporate an adjustment to the equilibrium unemployment rate in the latest IR - which I'll explain in more detail soon) - and total weekly hours higher. The only data that is a bit weaker than predicted in May is wage growth. Whole economy total pay growth was 2.8% in Q4, somewhat below the 3.1% forecast, although private sector regular pay growth (which is a more informative measure of underlying pay pressure, but not forecast by the MPC) reached 3.0% in Q4.

Finally, moving to asset prices and the nominal data, Bank Rate, the yield curve, and most borrowing costs are lower than expected in May - which is not surprising given the Bank of England's substantial easing measures last summer. House prices have increased a bit less than expected (by 5.5% year-over-year, as compared to 6.7% forecast in May). But by far the biggest change from our pre-Brexit forecast is sterling - which is now 11% weaker than at the time of the May IR (and 18% weaker than its recent peak in November 2015).⁵ This depreciation has driven up many nominal variables - such as import prices and inflation expectations - and contributed to CPI inflation 0.3pp higher over Q4 than forecast in May. Inflation going forward is expected to increase even faster. These nominal effects of sterling's depreciation, however, have largely been in-line with the standard effects from a depreciation of that magnitude.

The bottom line: the real economy, including the labour market, have performed largely as forecast last spring. Most economic measures (except investment) have matched or slightly outperformed our May expectations based on a Remain vote. The UK economy appears to have been largely resilient to Brexit uncertainty. The main exception is sterling and the nominal data - which indicate sharply higher inflation than expected last spring. This leads to an obvious question...

Why has the UK economy been so resilient to Brexit uncertainty?

A number of factors have likely played a role in supporting demand and the labour market since June: policy responses, sterling and the global environment, and less negative effects of heightened uncertainty than expected.

⁴ ONS data for the individual components of demand is not yet available for Q4, so this comparison is based on available data and estimates in the February *Inflation Report*.

⁵ Based on monthly averages for the sterling exchange rate index.

Starting with policy, immediately after the June vote, the Bank of England announced a number of measures aimed at supporting the economy. The Monetary Policy Committee announced a four-pronged package in August that included: a reduction in Bank Rate, a term-funding scheme to support bank lending, increased purchases of government bonds, and a new purchase program for sterling-denominated corporate bonds. Other committees at the Bank of England reduced the countercyclical capital buffer that banks are required to hold and eased other macroprudential and prudential requirements. This combination of measures likely reduced borrowing costs, improved access to credit, supported financial markets, and bolstered overall confidence. The Government also provided fiscal support by adjusting its fiscal targets and moderately increasing spending, also boosting confidence, with the impact on the real economy expected to build over time. The increase in the minimum wage (which had been announced before the vote) further supported incomes for the lowest paid, segments of the population who have a higher marginal propensity to consume.

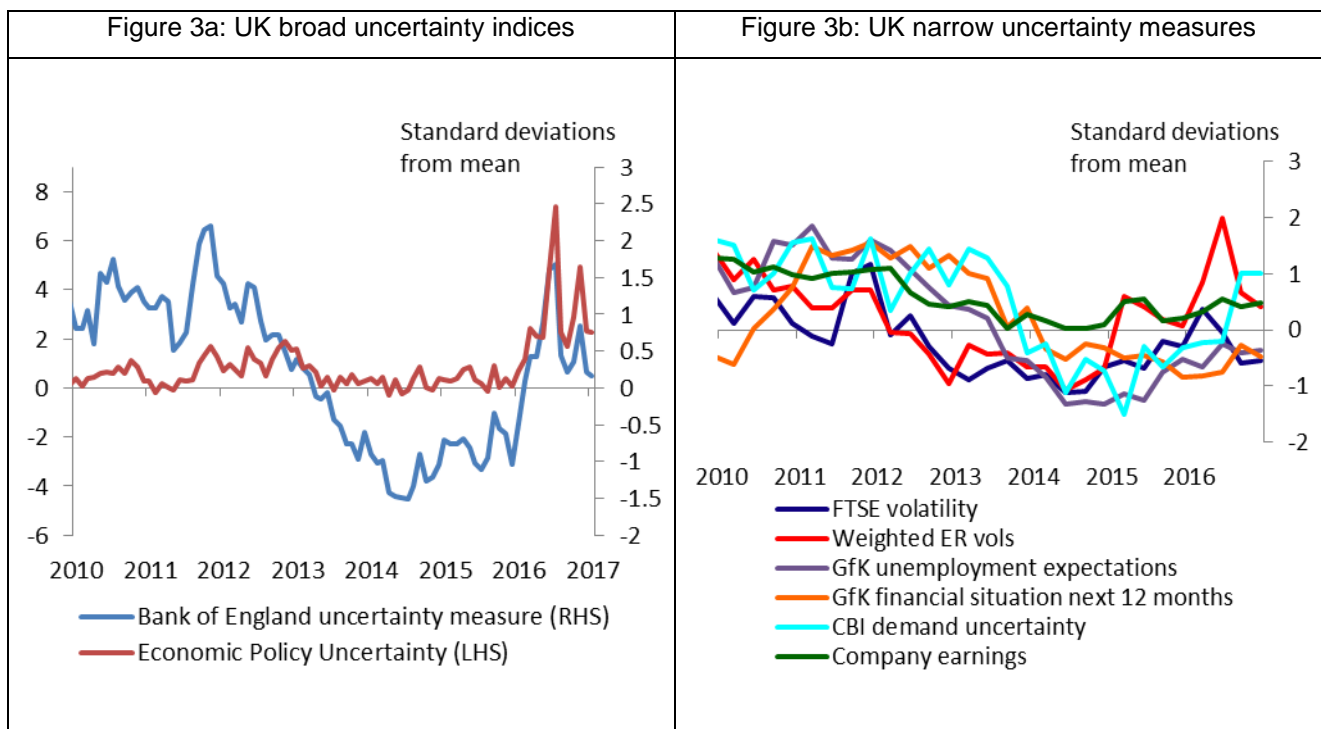
Sterling's depreciation and a supportive global economy further boosted the UK's resilience. A weaker sterling helped improve the competitiveness of UK exports, as well as of import-competing domestic producers. This included making the UK more attractive for foreigners to visit and shop. The global economy also appeared to start strengthening around the time of the vote. The global PMI data began to improve about 7 months ago, just as oil and many commodity prices began to firm. Even global goods trade has recently picked up a bit - after declining for the previous two years. Global economic growth is still subdued relative to the record rates of the mid-2000s, but the recent modest improvement has provided more support for UK exports and global financial markets than had been expected.

This combination of monetary policy, macroprudential policy, fiscal policy, a higher minimum wage, sterling's depreciation, and a stronger global economy has undoubtedly supported the UK economy since the referendum. My colleagues on the MPC, Minouche Shafik and Jon Cunliffe, have fretted about the "Series of Unfortunate Events" which were dragging on the UK economy in 2015. In contrast, the UK has benefited from a "Series of Fortunate Events" in the second half of 2016.

Even optimistic assessments of the economic effects of these policies, however, have a hard time fully explaining the resilience of the UK in the face of what were expected to be large negative effects from heightened uncertainty. And, uncertainty by many measures did increase sharply during 2016. For example, Figure 3a shows two well-known measures of uncertainty for the UK: the Economic Policy Uncertainty measure (created by Baker, Bloom and Davis) and a principal component used by the Bank of England.⁶ Both measures of uncertainty increased in the run up to the referendum, and then spiked in the months immediately afterwards. An extensive economic literature suggests that this type of increase in uncertainty is

⁶ See Baker, Bloom and Davis (2016) for information on their Economic Policy Uncertainty index, and see Haddow *et al.* (2013) for information on the Bank of England's principal component.

traditionally correlated with significantly lower investment and growth, as well as weakness in housing markets, consumer spending, productivity, labour markets, and a range of other variables.⁷



What could explain the seemingly minimal impact of such a major increase in UK uncertainty? There are a number of factors that may have played a role. For example, the many UK voters that supported leaving the European Union may believe this will be positive for their personal economic situations, supporting spending and overall growth. Strong institutions, governance, and rule-of-law in the UK may further support confidence in how the country and system will adjust to any changes that come. The UK’s relatively flexible economy could be expected to facilitate the ability of firms and households to adapt.

In my view, however, a critically important factor behind at least some of the UK’s resilience has been how heightened uncertainty has affected the economy - and a misunderstanding of this relationship in the forecasts made immediately after the referendum. As I discussed in a November speech,⁸ although popular measures of uncertainty spiked in the UK around the time of the referendum, some of these measures have historically had weak relationships with real economic variables in the UK. For example, media references to uncertainty (which is the basis of the popular Economic Policy Uncertainty index and used in many studies showing strong negative effects of uncertainty) have some of the lowest correlations with key economic variables in the UK, including with GDP and investment. Other measures of uncertainty shown in Figure 3b - which tend to better predict how consumers and businesses behave - have not increased to nearly the

⁷ For a summary of this evidence, see “Uncertainty about Uncertainty”, speech by Kristin Forbes on 23 November 2016 at: <http://www.bankofengland.co.uk/publications/Pages/speeches/2016/942.aspx>

⁸ See “Uncertainty about Uncertainty”, speech by Kristin Forbes on 23 November, 2016 at: <http://www.bankofengland.co.uk/publications/Pages/speeches/2016/942.aspx>.

same degree. If uncertainty is measured using an index of these more informative measures, then one would not expect to see large negative uncertainty effects in the UK over the last six months.

Also important, most studies showing a negative impact of uncertainty may conflate the effects of uncertainty with the negative effects of tighter financial conditions. The two usually occur simultaneously, and it is extremely difficult to isolate their differential effects. Heightened uncertainty can cause credit market conditions to tighten, and tighter credit conditions can heighten uncertainty. Other events could cause uncertainty and credit spreads to increase simultaneously. The UK today, however, is one of the limited examples when uncertainty (by some measures) has increased, while credit conditions (by most measures) have eased. In my November speech, I show that the negative effects of heightened uncertainty are significantly attenuated if credit conditions do not tighten simultaneously.⁹ This could be what is occurring today and explain why heightened uncertainty is having a much smaller negative effect than was expected.

But will this confluence of factors explaining the resilience of the UK economy continue? Will the UK be able to continue its recent track record of solid and steady economic growth?

The MPC's Economic Forecast

The Bank of England's latest *Inflation Report*, released last Thursday, provides a detailed forecast for the UK economy. It is based on extensive analysis by the Bank's excellent staff and judgements made by the Monetary Policy Committee. The forecast represents the best collective judgement of the Monetary Policy Committee - agreeing on which is usually a challenging process as there is usually a range of views on the committee on different components of the forecast. I will not attempt to cover all of the details or views incorporated in this extremely dense 45 page *Report* today. Instead, I will briefly summarize the broad contours of the forecast - focusing on the central paths for growth, unemployment and inflation.

Beginning at a very high level, the "Series of Fortunate Events" that supported growth and employment in the second half of 2016 are still in place and should continue to bolster the economy to some degree. More specifically, the lagged effects of monetary, macroprudential, and fiscal policy, stronger wage growth for those most constrained, sterling's boost to exports and import-competing firms, and stronger global demand should all support aggregate demand and employment. Working in the other direction, the moderation in investment over the past few months, combined with the structural changes that are likely to occur as the UK transitions to a new arrangement with the European Union, are expected to reduce the supply potential of the economy over time, especially near the end of the three-year forecast horizon.

⁹ For example, in a series of simulations I show that the negative effects of uncertainty on investment fall by about half, and on GDP by about 40%, if credit conditions do not tighten simultaneously.

Figure 4a shows the resulting central forecast for output growth in black. Growth is expected to slow gradually over 2017, from just above 2% in the first half of 2017, to a touch above 1.5% by the beginning of 2018, and then to remain around that rate over the following two years. This deceleration is initially expected to occur primarily because higher inflation reduces real income growth, and eventually, consumption growth. Supply-side effects play more of a role in the later part of the forecast. This growth deceleration is expected to be more delayed and more gradual than previously forecast, with the projections from the August and November *Inflation Report* shown in the dark and light red lines, respectively.

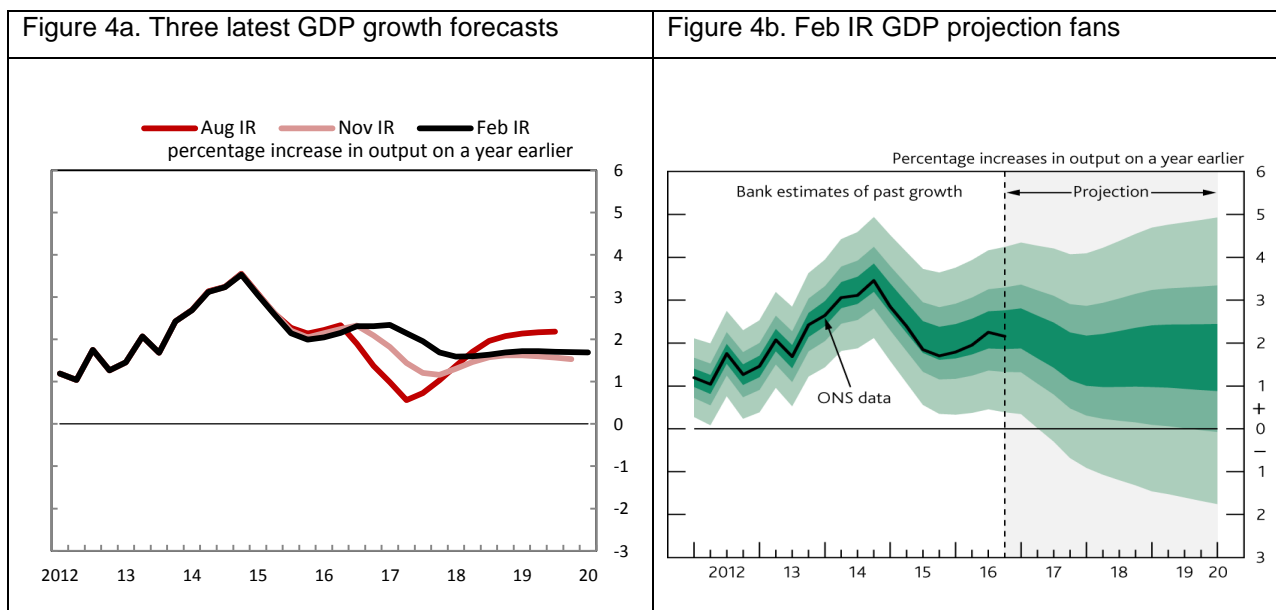
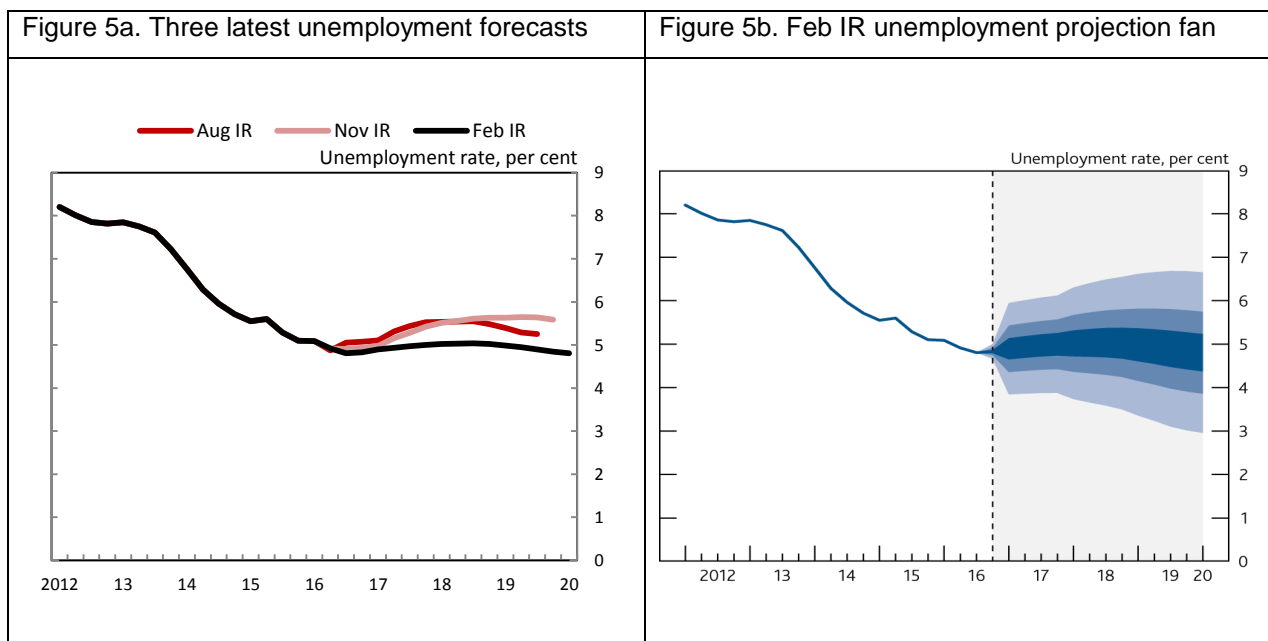


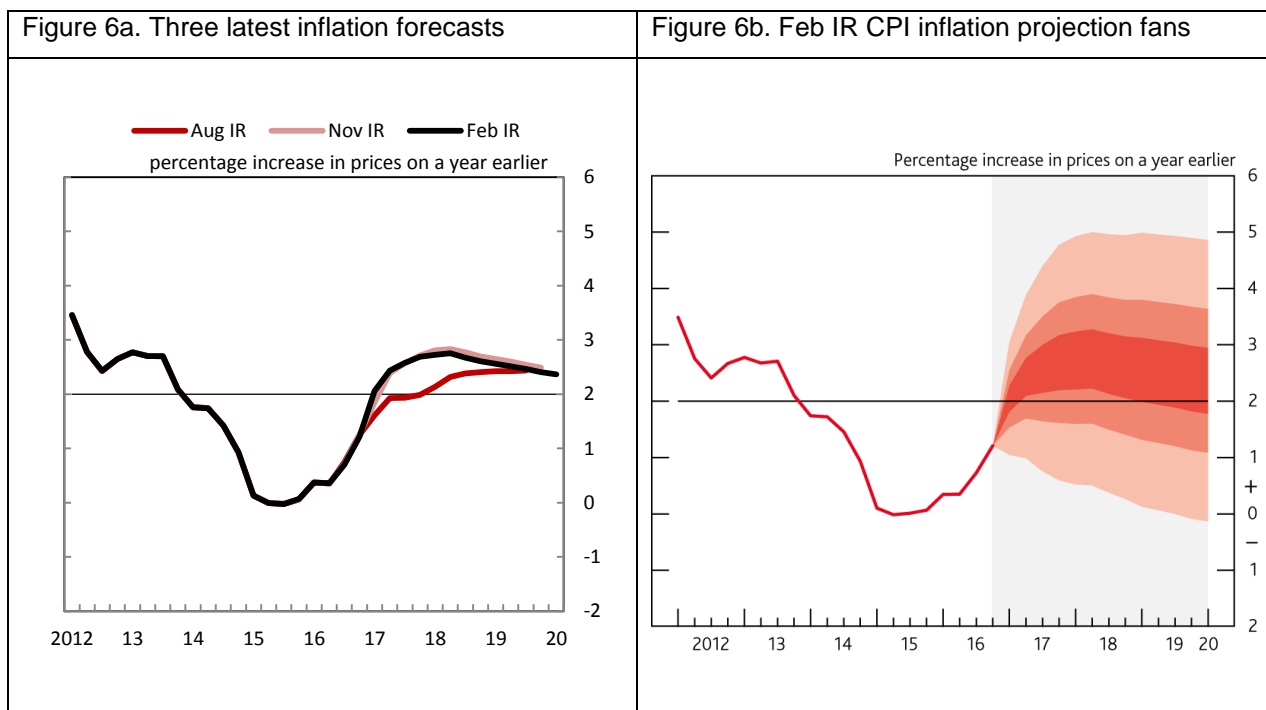
Figure 5a shows the corresponding graph for the central forecast for unemployment. Unemployment is also expected to soften somewhat over the next two years. It is forecast to increase gradually from its current 4.8% to a high of 5.0% in the second half of 2017, before falling back to its current rate by the end of 2019. To put this in context, 5.0% was previously believed to be around the UK's natural rate of unemployment - the rate below which unemployment could not fall without wages picking up to levels inconsistent with sustaining inflation around the 2% target. Unemployment at 5.0% is also below the average unemployment rate for the UK over the pre-crisis period from 1997 to 2007 (when it was 5.5%).¹⁰ Unemployment is expected to be substantially lower than forecast in August and November (and shown in dark and light red).

¹⁰ Unemployment today is even further below the 6.0% average from 1997 to 2016.



This central forecast of a moderate softening in growth, and even more moderate softening in unemployment, is combined with a central forecast for a sharp pickup in inflation. Figure 6a shows that inflation is expected to reach 2% by the end of this quarter and peak around 2.8% in 2018Q2. It then slowly decelerates through the end of the three-year forecast window, but is expected to remain as high as 2.4% in the first quarter of 2020. This path for inflation is similar to that forecast in November, despite substantially stronger output growth and employment, primarily due to two factors: 1) the dampening effect of sterling's 3% appreciation since the November *Inflation Report*;¹¹ and 2) the new assumption that there is more slack in the labour market than previously believed, and therefore less upward pressure on wages from the current level of unemployment. (I'll explain what that means in more detail in the next section on risks.) All of inflation's overshoot above our 2% target, however, can be explained by the effect of sterling's depreciation passing through to import prices and then the broader CPI. Although these effects are likely to fade over time, they are persistent enough that they should be included in the set of factors considered when setting monetary policy.

¹¹ Based on the 15-day average through to the Wednesday the week before each respective *Inflation Report*.



Risks to the Forecast

There are a number of uncertainties and risks to this forecast that could cause growth, unemployment and inflation to veer from these central paths. The wide fans around the forecasts for GDP growth, unemployment, and inflation (shown in Figures 4b, 5b, and 6b) from the *Inflation Report* are intended to capture these risks. They show the range of outcomes for these different variables that we think would materialise with about 90% probability. This type of uncertainty always exists to some degree in these types of forecasts.¹²

Today, however, the risks incorporated in these large fans seem particularly imposing. They include uncertainty around how companies and workers adjust to new trading arrangements and the broader negotiations on the UK's relationship with the European Union. They include risks from the global economy, such as increased protectionism and vulnerabilities in major emerging economies, any of which could derail the tentative global turnaround. They incorporate risks that uncertainty increases in measures other than media citations, i.e., measures that have a more meaningful impact on demand. They also include the risk that recent upside surprises in a range of nominal data, and record increases in price expectations in some survey data, continue (such as in the most recent data for CPI headline inflation, core inflation, and private sector regular wages, as well as the record increase in PMI input prices). This could imply stronger underlying price pressures than incorporated in the forecast.

¹² See Martin Weale, "What's going on? Uncertain data and uncertain outcomes", Speech given on 13 May 2016.

In my assessment, however, the greatest risks to this forecast are in three underlying (and extremely difficult) assumptions: how sterling's depreciation affects inflation dynamics, how wages evolve, and how consumers respond to slower real income growth.

How much and how quickly sterling's 18% depreciation (since its recent peak in November 2015) passes through into import prices and consumer prices is critical to inflation dynamics. The MPC's forecast currently assumes that about 60% of sterling's depreciation passes through into import prices, and over time this will pass-through to about 30% of the CPI. My analysis suggests that our pass-through assumptions are largely on track so far; the earlier stages of sterling's depreciation corresponded to shocks that generate slightly less pass-through (which is what we saw through November), but the later stages of the depreciation corresponded to shocks that generate more pass-through (which we started to see in December's data).¹³ The magnitude and speed of sterling's depreciation also suggests that its effect on consumer prices could be somewhat faster than has traditionally occurred - an assessment that is already built into the MPC's best collective forecast.¹⁴ These predictions will bear close monitoring, however, as there are risks in either direction, as well as risks that sterling could significantly strengthen or weaken from its current level. Any of these factors could have first-order effects on inflation dynamics.

A second assumption in the forecast about which there is substantial uncertainty is of the equilibrium unemployment rate - or U^* for short. Since I have been on the MPC, the Committee has assumed that U^* was around 5%. This implied that the more by which unemployment exceeded 5%, the more slack existed in the economy, and the less upward momentum would be expected in wages (controlling for other factors, such as productivity growth). As part of our annual assessment of regular supply-side conditions this January, Bank staff presented several pieces of analysis that suggested U^* may be lower than 5% today.¹⁵ The majority of the MPC voted to lower our estimate of U^* to 4.5%, based partly on the persistent weakness of wage growth over the past few years after accounting for other factors in our models. My own assessment, however, suggested that although U^* was likely lower than 5% today, it is likely not as low as 4.5%. If true, this would suggest that there is less slack in the economy than in the MPC's central forecast, and wage growth and inflation could pick up faster than expected. Against that, however, uncertainty related to Brexit negotiations could make firms more cautious about raising wages, thereby dampening wage growth no matter where unemployment is relative to its equilibrium. Moreover, even if we could accurately measure the level of U^* in the economy today, it could easily change over the next few years as the labour force adjusts to any changes in the movement of labour between the UK and European Union.

A final forecast assumption around which there are substantial risks is the path for UK consumption. Faster inflation is most likely going to erode real income growth. How will consumers respond to this in the context

¹³ For more details on the framework for these calculations, see Forbes, Hjortsø and Nenova (2015).

¹⁴ This is supported by a number of recent analyses suggesting that pass-through is greater after larger or persistent currency movements, such as Caselli and Roitman (2016) or Bonadio *et al.* (2016).

¹⁵ My MPC colleague, Michael Saunders, has also argued that U^* may be below 5%, such as in "The Labour Market", Speech given by Michael Saunders on 13 January 2017.

of a record number of people working, private sector regular wages growing at the strongest pace in over a year, easy access to cheap credit, and heightened uncertainty as the UK transitions out of the EU? In the baseline scenario incorporated in the *Inflation Report*, consumer spending only tapers gradually, with slower real income growth partially balanced by reduced savings and increased borrowing. Households can justify this, at least to some extent, based on low borrowing costs, wealth gains, strong employment prospects, confidence in the future, and a belief that any real income shock is temporary.

But there are other possible scenarios for the path of consumption. One is that household spending briefly continues at levels unsupported by real incomes, but when consumers suddenly realize this is unsustainable, they suddenly and sharply reduce spending and growth plummets. This is sometimes referred to as the “Wile E. Coyote” scenario - capturing the moment in the Roadrunner cartoons when the coyote realizes he has gone off a cliff and gravity is about to take hold. Another possibility is that consumers see the coming squeeze from higher inflation, but are confident enough in the future and their jobs that they demand higher wages. Companies agree due to concerns about labour shortages. Wage growth picks up faster than expected, consumption growth does not slow, and inflation accelerates even more quickly than forecast. Each of these scenarios for consumption is possible. Each has starkly different implications for growth, inflation, and monetary policy.

Implications for Monetary Policy

The central forecast in the *Inflation Report* indicates a trade-off for monetary policy today. On one side, and assuming interest rates follow market expectations, quarterly GDP growth is expected to slow from 0.6% at the end of 2016 to 0.4% for most of the next three years, while unemployment is expected to increase by 0.2pp to remain at 5.0% through all of 2018. This expected softening in the real economy, in and of itself, might provide a basis to ease monetary policy. On the other side, annual CPI inflation is expected to increase to 2.8% in the second quarter of 2018, and remain elevated so that it still averages 2.5% over 2019. This persistent overshoot of inflation above the 2% target, in and of itself, might provide a basis to tighten monetary policy. Balancing these considerations is the “difficult situation” for monetary policy that the MPC warned might occur after a vote for the UK to leave the European Union.

Further complicating any assessment of the appropriate stance for monetary policy is uncertainty about how a number of variables critical to evaluating this trade-off will evolve - especially how sterling’s depreciation affects inflation dynamics, how wage growth and other domestic costs develop, and how consumers respond to slower real income growth. The MPC will be closely monitoring a wide set of variables and indicators in order to assess if they are evolving in a manner consistent with the corresponding assumptions in the forecast.

But in the meantime, we must set monetary policy based on what we know today. And I am beginning to grow uncomfortable with the trade-off embodied in our current forecast, especially when accounting for my

assessment of the different risks to this forecast and several recent developments in the UK and global economy.

More specifically, in my view, an overshoot of inflation to almost 3% was just tolerable when combined with a substantially larger deterioration in unemployment and demand than expected today. I have consistently voiced concerns about whether the economy would prove stronger than in earlier MPC forecasts - largely due to a scepticism (based on the evidence discussed above) that heightened uncertainty would have as large a drag on growth as predicted in the short term. But I also could not dismiss the arguments made for why the economy could slow by as much as in the best collective forecast. Even more important, given the low levels of headline inflation and subdued domestic cost pressures over 2016, I saw little risk to waiting for hard data to better understand if the forecasted weakness in the real economy was actually occurring.

I have waited, and we now have the hard data. The forecasted sharp deterioration in unemployment and growth in the immediate aftermath of the referendum has not transpired. Moreover, other timely data releases do not indicate a sharp deterioration in growth or unemployment is likely to start in the next couple of months. In the most recent *Inflation Report*, the economy is only expected to moderate gradually. Unemployment is expected to remain well below its pre-crisis average for all of the next three years.¹⁶

An equally important development is the most recent news on the other side of this difficult trade-off for monetary policy: inflation. Nominal data suggests that inflation is largely picking up as expected given changes in energy prices and sterling's depreciation. Some tentative recent data suggests this pickup might be accelerating slightly more rapidly than expected. Granted, the upside surprises in the nominal data for December (discussed above) and sharp increases in some survey data of price expectations may not continue and could just be noise or a challenge with seasonal adjustments in this month. There is a chance, however, that these recent upside surprises are a precursor to more evidence that inflation is accelerating faster than expected and will overshoot the 2% target by more than in the MPC's consensus forecast.

If these trends in both the real and nominal data are solidified, it will become increasingly difficult for me to justify tolerating such a large and likely overshoot of inflation - especially when compared to such a small and uncertain softening in growth and unemployment.

My tolerance of such an inflation overshoot has also recently diminished due to changes in the UK and global economy that have reduced several earlier concerns. For example, I had been more concerned about downside risks to the real economy related to very low levels of inflation, secular stagnation, weakness in the global economy, and the effectiveness of our policy tools when rates were near zero. These risks have all recently decreased somewhat, however, due to the pickup in UK and global inflation and stronger UK and global economy. The effectiveness of our August package - which has appeared to provide more stimulus to

¹⁶ Pre-crisis average calculated over 1997-2007 is 5.5%.

date than we had predicted - has also reduced my concerns about the MPC's ability to provide additional support for the economy if merited when Bank Rate is near zero.

These risks could easily re-emerge, however, and the UK economic outlook could also deteriorate faster than expected. The dynamics of the UK's negotiations with the European Union will likely continue to drive movements in sterling and confidence. The economy could also slow over the medium term as supply adjusts to any structural changes, including any changes in the UK's trading arrangements.

Monetary policy, however, should not go on hold simply due to heightened uncertainty and volatility. It may take many years for a new regime to be agreed on and a new equilibrium to be reached. As a result, I believe that the MPC should be nimble and willing to quickly adjust the appropriate path for monetary policy in either direction as needed throughout this period - even if it means reversing recent adjustments to Bank Rate. In my view, if the real economy remains solid and the pickup in the nominal data continues, this could soon suggest an increase in Bank Rate. It is worth highlighting that an increase in interest rates, however, given today's extremely low level of Bank Rate, and the substantial amount of monetary stimulus that is already in place through a variety of programs, would still leave a substantial amount of monetary support for the economy.

To conclude, the MONIAC machine of the UK economy has been resilient to a series of unprecedented events. GDP growth and the labour market have been remarkably solid and stable over the last two years. Sterling has depreciated sharply, and inflation and most other nominal data are picking up quickly. The economy still appears to function largely as would be expected according to the standard relationships incorporated into Phillips' original MONIAC machine. The levers of monetary policy still seem to work as nimbly as Phillips' valves, and I will not hesitate to support using these levers if merited. Despite the series of records and major political events that have occurred over the last two years, the UK economy has not gone manic. It is still a standard MONIAC economy.

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