



BANK OF ENGLAND

Speech

Risks around the forecast

Speech given by

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Since starting my role on the MPC in July, one question which I am frequently asked is: “What has surprised you about the role?” To date, one of my biggest surprises has been the near-obsession with trying to decide the best avian classification for each MPC member. In July, it was merely a question of whether we were each a hawk or a dove. Since then, the categories have expanded to include “wise owls” and Canadian birds. I know better than to speculate what will come next.

I’ve found these categories puzzling when applied to me and other members of the MPC based on what I’ve heard during my time here. None of us do seem to have a pre-wired tendency to vote for more or less accommodative monetary policy. Instead, different MPC members focus more or less on the various risks around our current understanding of the economy and our forecast. As the economy evolves, each of us is constantly updating these assessments and risks, with direct implications for how we view monetary policy. Translating these different assessments and risk weightings directly into a “hawk” vs “dove” divide, however, is not clear.

My goal tonight is to show this challenge in the context of the Bank’s current forecast. I will begin by briefly summarizing the forecast released in November’s *Inflation Report*. Then I will discuss five risks to this assessment of the economy today and in the future – highlighting risks on which I put slightly more probability than the 3M’s (mean, median, or modal) view of the entire MPC committee – but which may or may not materialize. Most important, I’ll use a scenario analysis to assess how these different risks can affect the broader outlook and the appropriate path for monetary policy if these risks play out. This can be useful to understand exactly how some risks—although important economically or to certain segments of the population or sectors of the economy —would not imply a noteworthy monetary policy response. This series of scenarios also is intended to provide insight on how an MPC member constantly updates his or her forecast as new information on each of these risks becomes available, and why it is difficult to classify many of us as perennial hawks or doves.

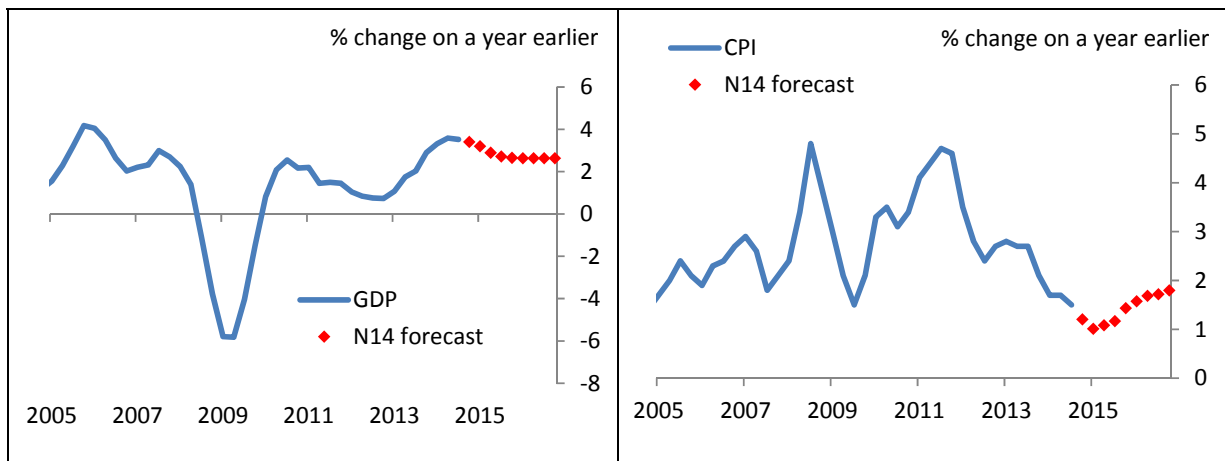
The Current Forecast

Each quarter the MPC releases an *Inflation Report*. This includes an assessment of current economic developments and a detailed forecast for the economy over the next three years. Putting the forecast together is a lengthy process, which seems to start soon after the last forecast is officially released. Putting this together for one person would be quite a challenge, given the many uncertainties involved. Getting nine individuals, often with different views, to agree can be even more of a challenge. As a result the goal is to agree on a forecast which is the “Committee’s best collective judgment”, something approximating the mean, median, or mode of the nine of us. We joke that if everyone is equally unhappy, we have probably succeeded.

Our last forecast was released in mid-November. Let me focus on predictions for two key macroeconomic variables – real GDP growth and inflation – shown in Figure 1. These data have changed somewhat since

the November *Inflation Report* due to new data being released and data revisions (which lowered reported growth for the first part of 2014). In order to be consistent in the scenario analysis below, however, I will continue to use these November forecasts as the baseline – which means also only using data that was available at that time.¹ The baseline forecast for the UK is a continuation of fairly strong and robust economic growth in the end of 2014, 2015, and 2016, albeit slowing gradually from its above-trend rate in 2014. More specifically, GDP growth was expected to slow from 3.5% in 2014, to 2.9% in 2015 and 2.6% in 2016.²

Figure 1: Forecasts for UK GDP Growth and Inflation from the November *Inflation Report*



This strong, albeit slowing, growth is expected to be combined with continued improvement in the unemployment rate, albeit also improving at a slower rate. After plummeting from a peak unemployment rate of 8.4% in 2011 Q4, unemployment was expected to end 2014 at 5.7%, end 2015 at 5.4%, and 2016 at 5.3%. Inflation was also expected to decline through the beginning of 2015, due to a combination of the lagged effects of sterling's recent appreciation, lower oil and commodity prices, and slack in the economy. But then inflation would slowly increase to reach the 2% target by the end of the period. (It is worth noting that this forecast was done when oil prices were at \$80 per barrel, and therefore does not capture any effect of the most recent decline in oil prices.)

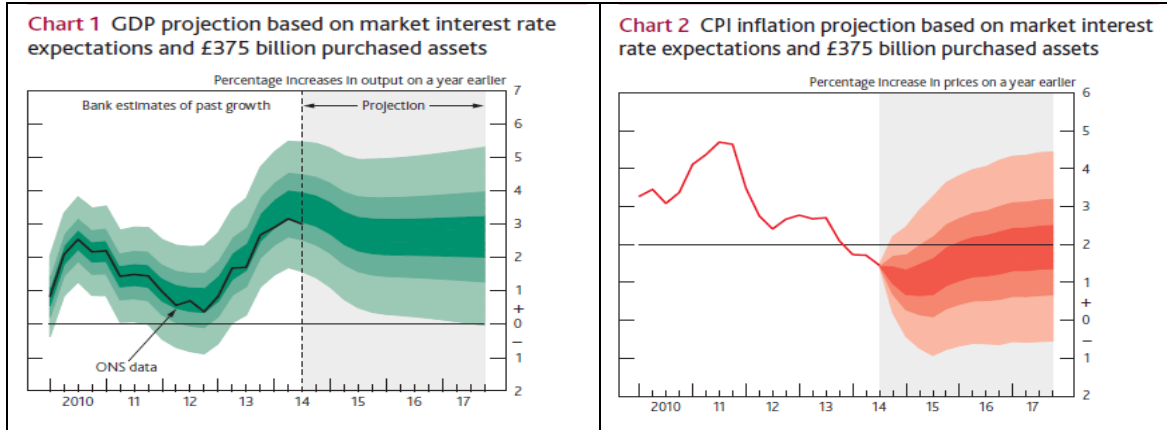
Given the many uncertainties that go into the forecast, and especially the different assessments of the risks around the paths for key variables, important components of the forecast are fan charts which indicate the range of possible outcomes. Figure 2 shows examples for the paths of GDP growth and inflation from our last forecast. I often find these fan charts even more useful than the central estimates. They highlight the substantial uncertainty around the forecast by the width of the fan. They also indicate what we view as the

¹ The Bank of England's updated forecasts that incorporate this new data and revisions will be released in the next *Inflation Report* on February 12.

² These numbers include the backcast as of the November *Inflation Report*.

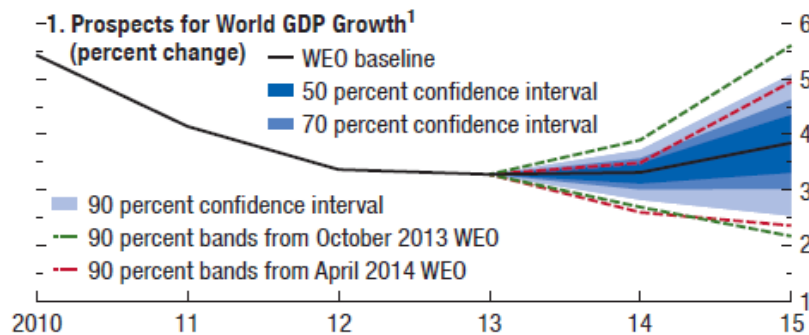
balance of risks – whether we believe they are weighted more to the upside or downside – by the relative size of the upper and lower parts of the fan.

Figure 2: Uncertainty around the UK Forecasts from the November *Inflation Report*



One challenge with these fan charts, however, is that they embody a very wide range of possible scenarios for key variables – especially as one goes further into the future. For example, as of November, we could only say with 90% confidence that GDP growth would be between 0 and 5.3% and inflation would be between -0.5 and 4.4% at the end of the forecast horizon. These wide ranges are not unusual. For example, the IMF releases something similar when it produces its semi-annual forecasts of GDP growth for the global economy. Figure 3 shows its October 2014 forecast (the last public release), in which the IMF predicted with 90% confidence that global GDP growth would be between 2.5 and 5.1% at the end of 2015. To put that in context, the IMF was basically saying that it can only predict with 90% confidence that within the next 15 months the global economy will be in a recession or grow at a rate almost a full point above its pre-crisis average of 4.2%.³

Figure 3: Uncertainty around the Global Forecast from the IMF's *World Economic Outlook*



Source: Figure 1.11. (1) from the IMF's *World Economic Outlook*, October 2014.

³The IMF has traditionally defined a global recession as global annual real GDP growth of 3.0% or less.

These fan charts highlight the challenges of putting together economic forecasts – even for fairly short time horizons. Predicting accurately any one indicator – such as GDP growth or inflation – is hard enough. Predicting accurately the interaction of many highly uncertain variables is exponentially harder. The resulting fan charts are useful to highlight this uncertainty, but can make planning difficult. Therefore, I've found it helpful to focus not on all of the possible risks to the outlook, but instead to focus on a more limited set of risks which I think have a reasonably high probability of occurring. This is useful to understand which risks will have important implications for the economy, the forecast, and the future path of monetary policy.

Therefore, in the remainder of my comments, I will focus on what I see as five risks around the MPC's last forecast: stronger global GDP growth; persistently lower oil prices; faster pass-through from sterling's appreciation; smaller labour supply; and faster productivity growth. In selecting which risks to focus on, I am not choosing the risks that would necessarily have the biggest impact – such as a major terrorist attack that wiped out key infrastructure – if I believe they are low probability events. Instead, I will focus on what I consider higher probability events that may – or may not – significantly affect our forecast. I will also focus on how these risks would affect GDP and inflation by the middle and end of 2016 – which is the appropriate time horizon when thinking about how changes in monetary policy will affect the economy with lags. This exercise should help clarify exactly how different assessments of these five risks by different MPC members could (and could not) have a significant effect on how they view the appropriate path for monetary policy.

Before going through the five scenarios, however, let me highlight several important points so that these results are not misinterpreted. These results are based on simulations using a complicated – but still highly stylized model. They will not capture all of the complexities and interactions of the real world – especially related to financial markets. The estimates should therefore not be taken as precise. Instead, I interpret them as giving an idea of the direction and rough magnitude of different effects in order to assess whether they are meaningful or not. Also, these simulations continue to use the market-based curve for interest rates as in the November forecast, and do not incorporate any changes in monetary policy from this market-implied path. Finally, these estimates should not be taken as a preview of the new Bank of England forecasts that will be released in February. The results below are based on my own work with the staff. The February forecasts will incorporate data updates and reflect a range of different assumptions agreed upon by the full committee and incorporated simultaneously. The point of the exercise below is to highlight my own assessment of the individual effects of specific risks. This should facilitate an understanding of how a different evolution of just one of these risks – or a different weight on one of these risks by an individual MPC member – could change one's views of the economy and appropriate path of monetary policy.

Risk 1: Stronger Global GDP Growth

In November I appeared before Parliament with other members of the MPC to discuss the *Inflation Report* and the economy. At the hearing, I mentioned that one area in which my assessment of the economy differed from the forecast was that I was more positive about the outlook for US economic growth, as well as

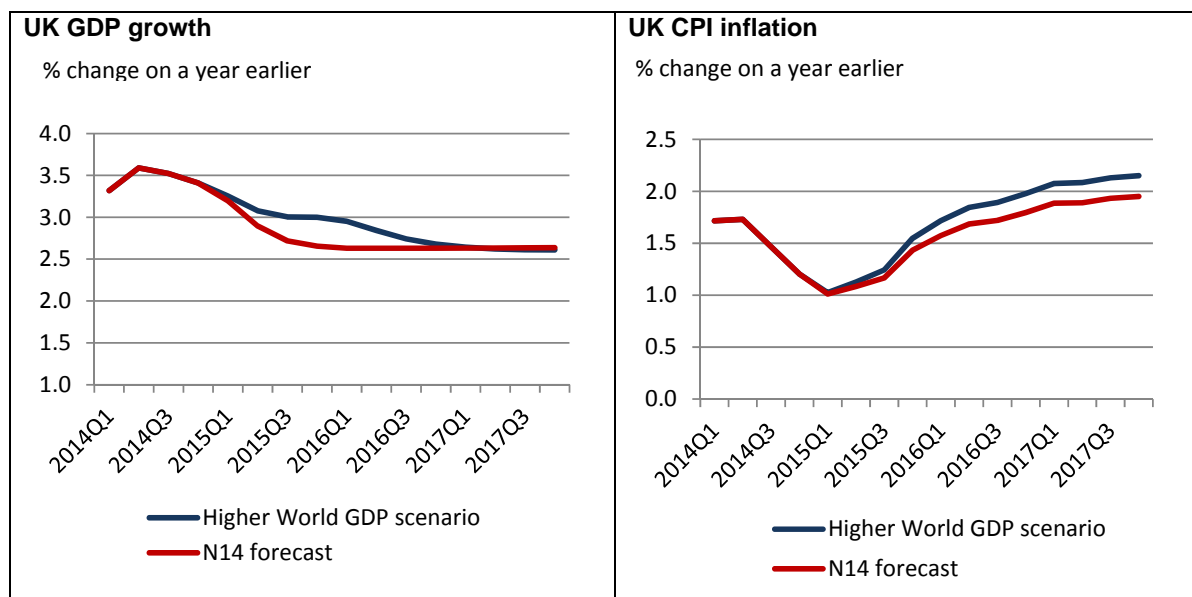
for the global economy more broadly. Since then, US GDP growth for 2014Q3 has been revised up from 3.5% at the time of the hearing to 5.0% on an annualized basis as of December 2014. Although US growth is unlikely to continue at this pace in the fourth quarter, the United States appears to be on a stronger footing for at least the end of 2014 and early 2015 than in our baseline forecast. And although the US only comprises 18% of the UK export market, it is still the largest economy and largest importer in the world, so this growth should support exports and demand in a number of economies. The US, and broader global economy, will also see an additional boost to GDP growth in the near term from the recent decline in oil prices (albeit with differential effects on different economies). Of course, continual challenges in the euro zone and oil-exporting emerging markets could also undermine these supports to global growth – but for now – I will focus on the upside.

In an effort to assess the impact of stronger growth in the US and global economy on the UK, it is possible to use the Bank's forecasting model (COMPASS). More specifically, we start with the baseline forecast from November's *Inflation Report* (summarized in Figure 1). Then we model the impact of 1 percentage point higher UK-weighted global demand growth for a year, phased in over two quarters, with growth returning to the baseline after 2016Q1.⁴ This improvement in UK-weighted global demand could occur from higher US GDP growth combined with stronger global growth from lower oil prices – assuming no major downside surprises in major oil exporters.⁵ As for all of the simulations, we assume that there is no monetary policy response and UK interest rates continue to follow the market curve (as of the November *Inflation Report*). Figure 4 shows the resulting effect on UK GDP growth and inflation. The peak impact on UK GDP growth occurs at the beginning of next year, with UK GDP growth 0.4 percentage points higher, but then it gradually slows and returns to the baseline forecast by the end of 2016. CPI inflation picks up slightly through the end of 2015, and continues to build gradually over time, so that by the end of 2016 inflation reaches 2.0% (relative to 1.8% in the baseline) and remains above target through 2017.

⁴ More specifically, global GDP growth would be 0.5 percentage points higher in 2015Q1 and 1 percentage point higher from 2015Q2 through 2015Q4, then 0.5 percentage points higher in 2016Q1 before returning to baseline.

⁵ Since the US is only 18% of UK-weighted global demand, a 1% increase in US GDP growth would only boost UK-weighted global demand directly by 0.18%, but the overall impact on UK-weighted global demand would likely be higher due to the global importance of the US economy. Moreover, the IMF predicts that the decline in oil prices could boost global demand by 0.3% to 0.7% in 2015 (<http://blog-imfdirect.imf.org/2014/12/22/seven-questions-about-the-recent-oil-price-slump/#more-8706>). A 1% boost to UK-weighted global demand is therefore an upside scenario combining both stronger US growth and stronger global growth (from lower oil prices).

Figure 4: Effects of Stronger Global Growth



Risk 2: Permanently Lower Oil Prices

Oil prices have fallen sharply since the November forecast was released – so this scenario is not just a “potential” risk around the forecast, but one which has already been realized. At the time the November forecast was “put to bed”, oil prices were around \$80 per barrel. As of January 15, they are at \$46 per barrel. This decline in oil prices will lead to a redistribution of income and demand away from net oil exporters toward net oil importers. This generally leads to higher global GDP growth and stronger global demand. But the impact on the UK would be different than simply a comparable boost to global demand (as modelled above), because it also includes a fall in the price of an important import and input into production – oil. As a result of this positive supply shock, prices and CPI inflation could fall, instead of increase, as occurs with a positive demand shock.

Unfortunately the Bank’s main forecasting model does not contain an explicit energy sector, so does not fully capture these various effects. We are currently analysing how lower oil prices affect different aspects of the UK economy, however, and this analysis will be incorporated in our updated projections for the February *Inflation Report*. Given that the UK is a net importer of oil, the recent fall in oil prices is likely to boost UK GDP growth and significantly reduce inflation in the short term. The boost to GDP growth is expected to occur because of the boost to global growth (which should support exports), the reduction in production costs and increase in profits (which should support employment and investment⁶), and the boost to real incomes (which should support consumption). But for the context of this discussion of risks around the forecast, it is useful to highlight the most immediate effect of lower oil prices – on UK import prices and CPI inflation. To do

⁶ The fall in oil prices is expected to support net UK investment and employment, despite a fall in extraction investment in the North Sea.

this, we model a fall in UK-import prices of 5.8%, mainly spread over 2014Q4 and 2015Q1. This 5.8% fall incorporates the roughly 40% fall in oil prices from 1 November through 15 January, as well as a smaller and slower reduction in other import prices resulting from lower transportation costs.⁷ We ignore any other channels through which CPI inflation would be affected by lower oil prices. Simulations of this fall in import prices resulting from lower oil prices show that CPI inflation falls quickly in early 2015, and by the end of 2015 could be 0.3 percentage points lower than the baseline forecast (which already incorporated the fall in oil prices up to November). This drag on the CPI, however, would quickly drop out. It is again important to highlight that this is just a partial analysis of the impact of the most recent fall in oil prices on import prices and does not capture the effects on growth and inflation that would occur through other channels – some of which would contribute to faster GDP growth and higher inflation over the medium term.

Risk 3: Stronger Pass-through from Sterling's Appreciation

A third risk to the baseline outlook is one on which I've focused since my first few weeks on the MPC – how sterling's recent appreciation is affecting the economy. In my first official speech in October, I suggested that sterling's appreciation from the spring of 2013 to summer of 2014 could have a substantial effect on GDP and inflation over the coming quarters.⁸ According to the simulations in that speech, CPI inflation could be as much as 0.8 percentage points lower at the end of 2014 and early 2015 than it would otherwise have been – simply from exchange rate effects. These numbers should be taken as rough estimates – but they still indicated a potentially much larger effect of the exchange rate on the economy than in the baseline forecast. Recent data showing a sharp fall in inflation for traded goods relative to inflation for services would support the hypothesis that sterling's appreciation is having a large effect, as does recent data showing steady (if not slightly stronger) rates of domestically-generated inflation despite the recent sharp fall in CPI inflation.⁹

In the baseline forecast in the November *Inflation Report*, the estimates of “pass-through” from import prices to inflation do not fully incorporate all the general-equilibrium effects of sterling's movements I modelled in my earlier speech. These estimates of pass-through used in the November *Inflation Report* are very protracted, with some effects still persisting five years after the exchange rate moves. Although this is not inconsistent with the academic literature, it is possible that pass-through has occurred more quickly over the past few years. Therefore, one risk to the baseline scenario is that the pass-through from import prices has been stronger and faster than currently incorporated. To capture this scenario, we assume that pass-through from import prices to the CPI is around 80% in the first year and full within 4 years.¹⁰ Figure 5 shows the

⁷ More specifically, we assume that oil prices fall 25% in 2014Q4 and another 15% in 2015Q1, with an immediate impact on fuel import prices. We also assume that transportation costs constitute 5% of all import prices, and these costs also fall 40%, so that there is an additional decline in import prices of $5\% \times 40\% = 2\%$, which is spread over the 3 quarters starting in 2014Q4.

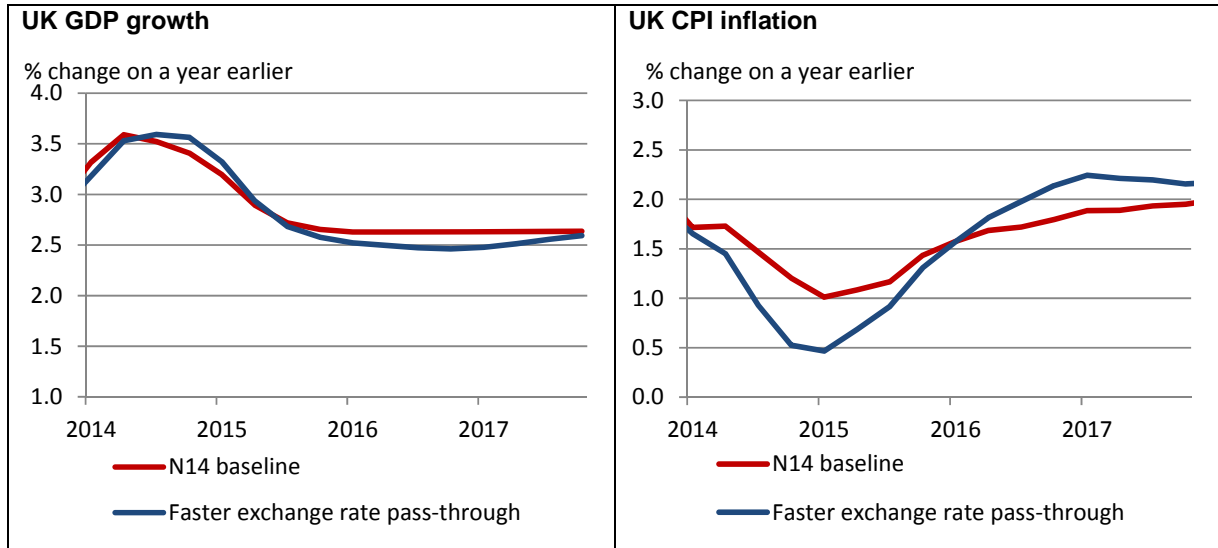
⁸ <http://www.bankofengland.co.uk/publications/Documents/speeches/2014/speech760.pdf>

⁹ More specifically, in December goods price inflation was -1.0%, while service price inflation was 2.3%

¹⁰ We assume that the CPI basket has 36% imported content, in line with the 2010 import intensities published by the ONS. This determines the extent by which changes in import prices affect the broader CPI. The November forecast has substantially slower pass

simulated effect on UK GDP and inflation. The estimated effects on GDP growth are fairly small – but the estimated effects on inflation are significant. CPI inflation is predicted to fall faster in late 2014 and early 2015, reaching as much as 0.5 percentage points lower in the start of 2015 than in the November baseline. Inflation then bounces back faster, however, so that by the end of 2016 it would be higher than in the baseline and above the 2% inflation target.

Figure 5: Effects of Faster Pass Through from Sterling’s Appreciation



Risk 4: Smaller Labour Supply

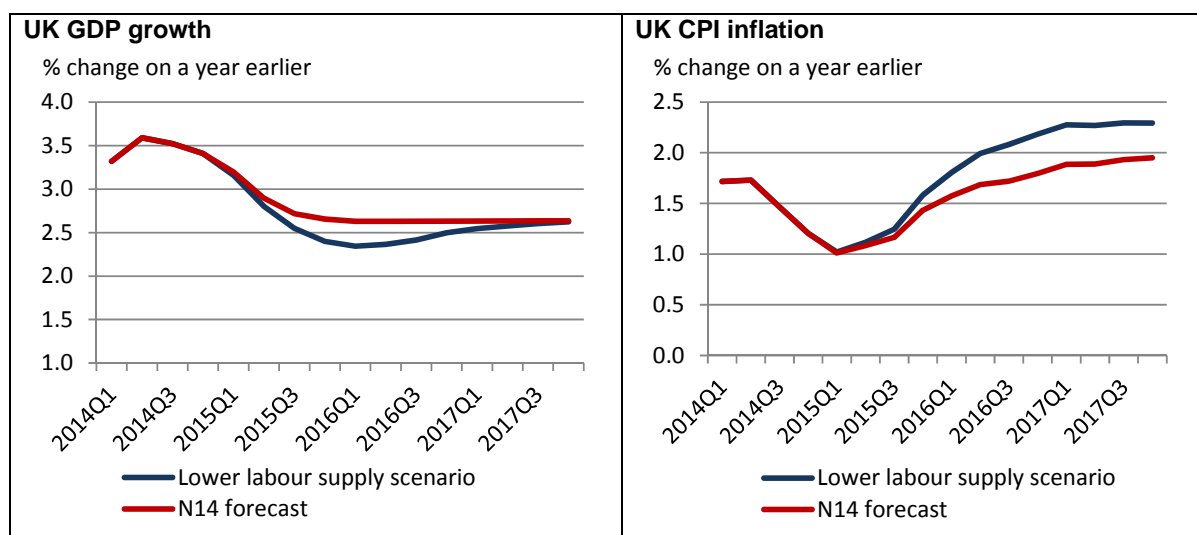
One issue that has been subject to extensive debate on the MPC is the appropriate assumptions for labour supply. Forecasts for potential labour supply after the crisis tended to be too pessimistic. Partly in response to evidence that more people were choosing to work than expected, the MPC sharply revised up its estimates of labour supply this summer, just as I was joining the committee. Recent data revisions and data outturns, however, suggest that although some upward revision was merited, the magnitude of the adjustment to our assumptions may have been too optimistic. Not only has the upward trend in labour force participation stalled recently (falling from 63.7% in the three months ending in May to 63.2% in the three months ending in November), but wage growth has recently started to pick up more than expected (with private sector regular pay growth up 2% over the last three months on an annualized basis). Several conversations I’ve recently had with businesses around the UK suggest that many companies are expecting to give more substantial wage increases at the start of 2015, and a number of companies have expressed concerns about skill shortages in certain sectors. These anecdotes may indicate that there is less slack in

through from sterling’s recent appreciation, partly due to its incorporation of the lagged effects of sterling’s depreciation in 2008. The scenario outlined above does not include these lagged effects of the 2008 depreciation (as it assumes faster pass through), which also drives the different paths for predicted inflation in 2013 in the figure.

the labour market than currently believed. If this risk plays out, the output gap could be smaller than in our November forecast, and holding all else constant, wages could pick up faster than expected.

In order to assess how a smaller labour supply affects the forecast, we assume a “downside scenario” to labour supply, in which the total number of desired hours worked increases more slowly throughout 2015 than currently expected. This results in a labour supply level that is 0.4% lower by 2016 relative to the baseline November forecast. (This could occur because there are fewer workers, or because people chose to work fewer hours, or some combination of the two.) Figure 6 shows the simulated effect on GDP and inflation, once again assuming no monetary policy response. GDP growth would initially be lower, by as much as 0.3 percentage points at the end of 2015, but this effect would largely dissipate by the end of 2016. The more significant, albeit more lagged, effect would be on CPI inflation. Prices would increase at a faster rate, with the effect building slowly in 2015 and generating CPI inflation 0.4 percentage points higher than the baseline and above the 2% target by the end of 2016.

Figure 6: Effects of Smaller Labour Supply



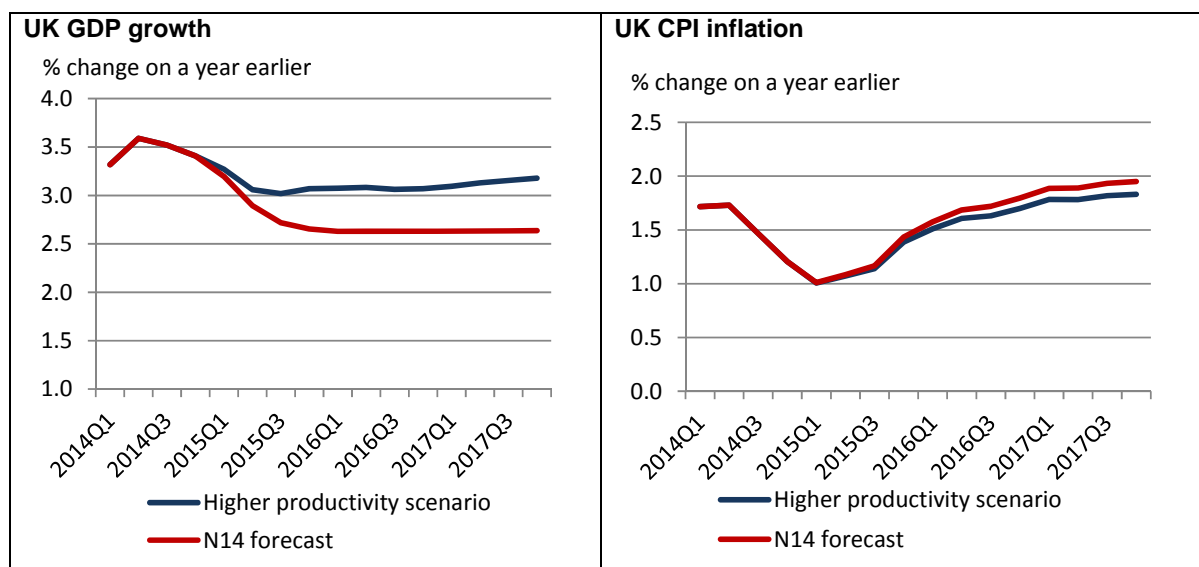
Risk 5: Faster Productivity Growth

One major puzzle about the recent evolution of the UK economy is its low productivity growth. Much has already been written about this puzzle.¹¹ The Bank of England (and most other forecasters) have continually been too optimistic in their projections, and continually revised down their productivity forecasts. In the November *Inflation Report*, the MPC lowered its productivity growth forecasts again, predicting that productivity growth would only reach 0.7% at the end of 2015 and 1.5% at the end of 2016. There is substantial uncertainty, however, about the future path of productivity, and a number of reasons why

¹¹ Examples include: “The UK Productivity Puzzle,” *Bank of England Quarterly Bulletin*, 2014Q2 and speeches by MPC members Ben Broadbent, Ian McCafferty, David Miles and Martin Weale, each of which focus on different aspects of this puzzle and are listed in the references.

productivity growth may finally start to improve. More specifically, key forces which may have been holding back productivity growth may now have faded, such as: low business investment during the crisis; a weak banking system that was inefficiently allocating capital; and limited labor market mobility which inefficiently allocated workers. The most recent data also suggests that productivity growth may have finally begun to improve, although this data is volatile and subject to large revisions, so that it may be some time before we can identify if there is any persistent improvement.¹²

Figure 7: Effects of Stronger Productivity Growth



In order to assess the impact of stronger productivity growth on our forecast, we return to the November baseline. We now assume that productivity growth is 0.5 percentage points higher in 2015, 2016, and 2017 than in the November forecast. (For comparison, productivity growth in the November forecast was 0.7% in 2015, 1.5% in 2016, and 1.8% in 2017.) Before the crisis, productivity growth averaged 2.3% from 1990 to 2007 – so that under this more optimistic scenario, productivity growth would only reach its pre-crisis trend by 2017 and would never exceed it. Figure 7 shows the simulated effect on UK GDP and inflation. By the end of 2016, UK GDP growth is almost 3.1% – about ½ percentage points higher than the baseline forecast. CPI inflation is 1.7%, slightly lower than the baseline.

Tying it All Together

So what do these different scenarios mean for the economic outlook and appropriate path for monetary policy? As I mentioned before – but a point that is so important that I would be derelict if I did not mention it again – I would not focus on the exact point estimates from any of these simulations. They are all based on a

¹² Labour productivity growth was 0.3% in 2014Q3 after -0.6% in the previous quarter. Productivity growth is also likely to be weighed down by cohort effects in Q4.

stylized model and the estimates can change substantially based on the underlying assumptions and parameters. Instead, they are useful to give a sense of the relative direction and magnitude by which different risks would affect (or not affect) key economic variables. They also all assume that “everything else is held constant” – which we all know never occurs in this dynamic world. With these important caveats, reviewing these scenarios with this broad brush leads to several themes.

First, UK growth would be stronger under most of these scenarios. More specifically, if global growth is higher, oil prices are permanently lower, and/or productivity growth strengthens relative to the baseline, then UK GDP growth would be stronger, and potentially substantially stronger if more than one of these risks plays out. Any such boost to growth could be partially counteracted if the labour supply is smaller than expected – but this offset would be much smaller than the support to growth from the other scenarios.

Second, UK inflation in the short term would be substantially lower under two of the scenarios – of lower oil prices and faster pass through from sterling’s earlier appreciation. This drag on inflation could be slightly counteracted by a boost from stronger global growth and/or a smaller labour supply, but any such offsets would be much smaller in magnitude and take longer to play out, and therefore be overwhelmed by the forces dragging down on inflation.

Third and finally, UK inflation in the medium term would be higher under three of the scenarios – of faster global growth, faster pass through, and smaller labour supply – with effects from any one of these scenarios potentially large enough that inflation could end up above target in two years (assuming market expectations for interest rates as of the time of the November forecast). This boost to inflation over the medium term could be slightly moderated if productivity growth was stronger than expected – although any such offset would likely be much smaller than the forces boosting inflation. The medium term effect of lower oil prices on inflation is unclear and would depend on a number of factors that require a fuller analysis – including how oil price movements affect consumption, production, and growth.

Will any of these five scenarios play out? It is impossible to know. Putting together an economic forecast is difficult in the best of times. It is particularly difficult today given the legacy of the recent crisis and the resulting uncertainty about the structure of the economy. But if any of them did play out – they could have important implications for monetary policy. Several of the scenarios would imply a faster rate of growth and higher rate of inflation in the medium-term than currently expected. These scenarios, if they occur, would imply an earlier increase in interest rates than currently expected, especially in order to ensure that any subsequent interest rate increases are slow and gradual. On the other hand, some of these risks – especially low oil prices and faster pass through – imply a substantially lower rate of inflation in the short-term, so that even when inflation does start to pick up, it would begin from a very low level and take some time before reaching the 2% target. These two scenarios would imply that there is no urgency to start tightening monetary policy today – and that any subsequent increases in interest rates could be gradual, even given the lags until any such increases fully affect the economy.

But while these drags on inflation will lower the starting point from which inflation increases, and initially slow the rate at which prices increase, they should not derail the combination of other forces that are supporting growth, core inflation, and a normalization of monetary policy in the United Kingdom. Granted, the MPC will need to be vigilant against any signs that inflation expectations are becoming unmoored, that consumers or businesses are delaying purchases because they believe prices will be lower in the future, or that measures of core inflation or domestically-generated inflation are unusually low or high. On these risks, however, I place a lower probability than for the five scenarios outlined above. Instead, the scenarios on which I place a higher probability would imply that inflation would fall more in the next few quarters than in the November forecast, and then pick up more in the medium term. But none of these risks on which I am focusing may play out, as could only a subset of the scenarios that provide less support for inflation in the medium term. And, of course, there are many additional risks that I have not even discussed here and which contribute to the wide ranges in our fan charts of the possible paths for growth and inflation.

Finally, this discussion of various risks around the forecast, and how they could affect the outlook for the UK economy and monetary policy, can hopefully provide some insight on how different MPC members think about monetary policy and the perennial “hawk vs. dove” debate. Depending on which of these risks they place a greater probability, they will be more or less worried about inflation in the medium term, and therefore could sound more “hawkish” or “dovish”. But whatever each member’s priors and probabilities on the various risks, each one of us is constantly revising our views on the outlook – and risks around the outlook – as new information emerges. We then adjust our views on the forecast and the appropriate path of monetary policy, no matter what our avian preferences.

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