



BANK OF ENGLAND

# Speech

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## Why raise rates? Why “Limited and Gradual”?

Speech given by

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I intend to cover two topics in this speech. First, I want to explain my recent decision to vote for a 25bp rate hike. The short answer is that, with spare capacity largely used up and cost pressures rising, I believe the economy no longer needs as much stimulus as previously. Rather, we probably need to move over time to something more like neutral, in order to ensure a sustainable return of inflation to target. The second topic is to explain why – at least from my perspective – any further tightening is likely to be at a gradual pace and to a limited extent. A key point is that “gradual” need not mean “glacial”.

### **Let me turn to the first issue: why should interest rates rise?**

In the exceptional circumstances since the EU referendum, the MPC has – consistent with our remit – aimed to balance any significant trade-off between the speed at which we intend to return inflation sustainably to the target and the support that monetary policy provides to jobs and activity.

In late 2016 and much of 2017, the Committee judged that if interest rates were to follow the market path, then some limited spare capacity would remain over most or all of the 3-year forecast period (see figure 1). Given those expectations of some remaining slack, the MPC was willing to tolerate a more gradual return of inflation to target – well beyond the conventional policy horizon of 18-24 months.

With continued growth in the economy, spare capacity has fallen further. The MPC’s latest forecast, in the February IR, is that (if interest rates were to follow the market path prevailing at that stage) the remaining output gap will close over the next year or so, with the economy subsequently moving into excess demand. As a result, the Committee forecast a gradual pickup in domestic cost growth that would help keep inflation slightly above target two and three years ahead even as currency effects fade (see figures 2 and 3)<sup>1</sup>.

With the prospect that the output gap will close, the horizon at which we seek to return inflation to target shortens and becomes more conventional. Hence, the MPC judged at the February meeting that, if the economy develops broadly as expected, interest rates would be likely to rise further over time.

I share that general outlook. But I expect that capacity pressures – especially in the labour market – will probably be a bit greater than the IR base case, hence reinforcing upward pressures on pay growth and domestic costs.

The direct boost to CPI inflation from sterling’s depreciation – triggered by the Brexit vote – is starting to fade. CPI inflation remains above our 2% target but, barring significant new swings in sterling or commodity prices, inflation probably peaked with the 3.1% figure late last year. As always, we shall analyse the recent data carefully. The picture that external cost pressures are now having less impact is broadly in line with the

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<sup>1</sup> These were published in the letter from the Governor to the Chancellor, 8 February 2018.

MPC's expectations, and may not have much implication either way for the inflation outlook two or three years ahead – which is the main focus for monetary policy decisions.

That medium term outlook is driven mainly by domestic cost and capacity pressures, and these are gradually building.

Any remaining slack in the economy is now probably limited. For example, the jobless rate is at a 43-year low, with short-term unemployment around a record low, and a marked drop in under-employment<sup>2</sup> over recent years. The job vacancy rate is unusually high and indeed is up from a year ago. Taken together, business surveys point to fairly marked labour shortages across the economy (see figure 4). With increased competition for labour, the number of job-to-job moves has risen back to pre-crisis norms.

In general, measures of costs and domestically generated inflation currently give a somewhat less acute picture of capacity pressures than labour market quantities and surveys of recruitment difficulties.

Nevertheless, average earnings growth seems to be picking up above the subdued trends of recent years (see figure 5), a message also evident in surveys of pay deals. The remaining shortfall in pay growth relative to pre-crisis trends is roughly mirrored by lower productivity growth<sup>3</sup>. Other guides to domestically generated inflation also have picked up recently. In particular, inflation in CPI components that are not heavily weighted to imports – and more closely reflect domestic costs – is up from about 1¾% YoY on average in 2013-16 to about 2½% in Q1 this year, and is around a target-consistent pace (assuming a normal trend in import prices)<sup>4</sup>.

Some recent data suggest that the economy may have slowed a little in Q1<sup>5</sup>. Indeed, retail sales volumes fell sharply in March, with Q1 as a whole recording a decline of roughly 0.5% QoQ.

The significance of this apparent slowdown is, however, questionable. Economic activity in March, and especially retail sales, was hit by unusually heavy snow. Previous experience suggests that such snow effects typically reverse in the next month or two (see figure 6)<sup>6</sup>. Moreover, there has been a tendency for the

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<sup>2</sup> For example, the ONS under-employment measure shows the net balance of extra hours that people would like to work is around zero. A U-6 type under-employment measure – which includes the unemployed, involuntary part-time workers and people who would like to work but are not counted in the workforce – is below the 2000-07 average and only 0.1pp above the low-point of those years.

<sup>3</sup> Average earnings are up 2.8% YoY now (including and excluding bonuses), versus 4.0% YoY on average over 2001-07 ex bonuses and 4.3% YoY including bonuses. Trends are similar using private sector earnings. Productivity growth (per person) was 0.4% YoY in Q4-2017, versus 1.7% YoY over 2001-07. With average hours down over the last year, average earnings per hour are up 4.1% YoY now, similar to the 2001-07 average (4.2% YoY). Output per hour rose 1.0% YoY in Q4 2017, versus 1.9% YoY on average in 2001-17. The growth of unit wage costs (2.4% YoY) in Q4 2017 was slightly above the 2001-07 average (2.1% YoY), while the growth of unit labour costs was slightly below it (2.1% YoY now, 2.7% YoY on average then).

<sup>4</sup> Using inverse-import weighted CPI excluding food, drink, energy, tobacco and education.

<sup>5</sup> The first estimate of Q1 GDP data will be released on 27 April.

<sup>6</sup> Average snow depth in March was 1.4cm. Over the period 1998-17, there were six months with average snow depth across the UK of at least 1cm. One of these, December 2009, was followed by even deeper snow the next month. If we take the remaining five snow months, on average, retail sales fell by 1.9% MoM and rose 1.4% the next month. Monthly real GDP (estimated as the weighted average for industrial production, services output and construction) fell by 0.3% MoM on average in the snow months and rose by 0.3% the next month. These months are February 2009, January 2010, December 2010, January 2013, and March 2013.

ONS to release soft Q1 activity data that are subsequently revised up over time<sup>7</sup>. Other consumer guides, for example confidence and mortgage approvals, do not point to softer growth in Q1. Business surveys for Q1 point to steady underlying growth in the economy of 1½% to 2% YoY, similar to the last couple of years (see figure 7). Consistent with this, broad money and credit growth also are similar to the last few years<sup>8</sup>. Job growth has picked up slightly in recent months and, unlike some of the last few years, employment growth currently is led by full-time employees rather than more insecure forms of work such as temporary jobs or self-employment.

More broadly, the economy remains supported by accommodative financial conditions, buoyant global growth and the high return on capital. The latest Credit Conditions survey suggests that the availability of unsecured consumer credit has worsened in recent months, but that availability of mortgage loans (which account for most personal borrowing) continues to ease. With lower spreads, average fixed mortgage rates for new loans in general are little changed from levels prevailing before the recent rate hike (see figure 8). Indeed, the average interest rate on existing mortgages is still lower than it was a year ago. The Credit Conditions survey indicates that mortgage spreads are being compressed by competitive pressures as lenders seek to gain market share, perhaps reflecting the expansion of new lenders and very low rates of mortgage arrears<sup>9</sup>.

Of course, there are many uncertainties, especially Brexit. The provisional agreements between the UK and EU – on the terms of exit last December and a transition period in March – have probably reduced some near-term Brexit-related uncertainties and downside risks to growth. In turn, sterling has appreciated. The expectations among households and businesses of Brexit's effects may yet change further during and after Brexit negotiations, potentially affecting both activity and asset prices.

But overall, I suspect that economic growth in the coming year or two will remain around its recent pace of 1.5%-2%, i.e. marginally above potential. Consistent with this, surveys of firms' hiring intentions suggest that labour demand will continue to outstrip labour supply (see figure 9)<sup>10</sup>. It seems likely that the labour market will tighten further, with unemployment edging down to new record lows, putting further upward pressure on domestic cost growth.

Against this backdrop, my vote at the March meeting reflected a preference for an **earlier tightening path than implied by the market curve**. We do not need to set policy in a way that will create rising spare capacity or higher unemployment. But our foot no longer needs to be so firmly on the accelerator. My vote at

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<sup>7</sup> Over the period since 1993, the first release GDP data for Q1 have averaged 0.3% QoQ, but this has been revised up to an average of 0.6% QoQ three years later. These revisions mostly occurred more than a year after the data were first published. The MPC has for many years aimed to anticipate revisions to the official GDP data, using various indicators.

<sup>8</sup> Using the M4x and M4LX measures. Within M4, household deposit growth has slowed, but this appears to reflect a portfolio shift into mutual funds, reversing the trend seen in 2016.

<sup>9</sup> The Council of Mortgage Lenders reports that the share of mortgages that are more than 3 months in arrears fell to 0.82% at end-2017, from 0.93% at end-2016 and the lowest since data began in 1994. The trend is similar measured by the share of mortgages for which arrears exceed 2.5% of the outstanding debt.

<sup>10</sup> Employment in the three months ended February was up 1.3% YoY, with workforce growth of 0.9% YoY.

subsequent meetings will, as always, depend on the data and analysis of the economy's prospects. Like other MPC members, I do expect that any further tightening will be at a gradual pace and to a limited extent.

And that brings me to my second topic, to **explain why any further monetary policy tightening is likely to be limited and gradual, at least from my viewpoint.**

The “**limited**” phrase signals that in the next few years our policy rate is unlikely to return to the pre-crisis norm of roughly 5%. This is because the neutral interest rate has fallen markedly and a material part of that decline seems likely to persist<sup>11</sup>.

The economy is affected by the whole term structure of interest rates, but my focus here is on the short-term policy rate. The neutral level of rates appears to have varied considerably over time in both real and nominal terms. During 2000-07, just before the financial crisis, the BoE policy rate averaged 4¾% in nominal terms, ranging from 3.5% (in 2003) to 6.0% (in 00/01). In real terms, the policy rate averaged roughly 3% (versus CPI inflation), and the economy's behaviour (steady growth and inflation around target) suggests that on average rates were close to neutral. In real terms, interest rates in that pre-crisis period were below the levels of the 1980s and early 1990s, but actually were quite high compared to the last 100 years or so<sup>12</sup>.

Since the financial crisis, the neutral rate appears to have fallen markedly in the UK and other advanced economies. Estimates of the neutral rate are imprecise, but – without wishing to endorse them too strongly – generally suggest that it will be around 2% for the UK in nominal terms in the next few years, and around zero in real terms with the 2% CPI inflation target. For example, the gilt curve implies that short rates will rise a little above 2% over the next 10 years (see figures 10 and 11), while the survey of UK economic forecasts by HM Treasury suggests that Bank Rate will rise to 2.1% over the next five years (see figure 12)<sup>13</sup>. Globally, yield curves suggest that nominal rates will flatten off at around 2½-3% in the US, and a little below 2% in the EA.

There is an ongoing debate over the factors behind this recent drop in the neutral rate<sup>14</sup>. It probably partly reflects some deep structural factors in the UK and globally, such as lower productivity growth, demographics, shifts in the relative price of investment, changes in the distribution of incomes, and changes in the riskiness of the economy. And it probably also reflects some cyclical factors both in the UK and globally that may be less persistent, such as fiscal consolidation, relatively wide credit spreads, risk aversion and an emphasis on balance sheet repair after the financial crisis, as well as subdued capital spending.

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<sup>11</sup> The neutral rate can be loosely defined as the level of Bank Rate needed to keep demand and supply across the economy as a whole in balance when the output gap is closed and inflation is on target.

<sup>12</sup> See Vlieghe (2017).

<sup>13</sup> The OIS curve implies a lower rate path, but is less liquid at distant horizons.

<sup>14</sup> See for example, Bean (2014), Broadbent (2014), Miles (2014), Summers (2014), Haldane (2015), Hamilton et al (2015), Rachel and Smith (2016), Goodhart and Pradhan (2017), Lisack et al (2017), Fischer (2017), Jones (2018),

The MPC has largely been a bystander in this process, because the factors that reduced the neutral rate in recent years are outside the MPC's control<sup>15</sup>. Of course, we take account of the drop in the neutral rate, aiming to provide sufficient stimulus – by setting an effective policy rate (including asset purchases) below that neutral rate – to close the output gap and ensure a sustainable return of inflation to target over time.

The neutral rate is unlikely to be totally static. Some cyclical factors that were depressing the neutral real rate have already eased somewhat, with lower credit spreads and reduced fiscal headwinds. Private sector deleveraging over 2010-15 has given way to modest releveraging since then<sup>16</sup>. In turn, market pricing for forward rates in the UK, US and EA has risen a bit since the lows in late 2016. The consensus for Bank Rate five years ahead has moved between 0.8% and 3% since mid-2012 and has recently crept up from the low end of that range.

However, given the prospect that a sizeable part of that drop in the neutral rate will persist, it seems highly likely that our policy rate in coming years will remain well below that pre-crisis average. That may not be news to people who closely follow yield curves for a living. Our guidance is not intended to prevent markets from finding their own equilibrium. Nevertheless, it seems useful for the MPC to convey that message of a lower neutral rate to households and businesses, who may not follow market pricing so closely, in order to reduce risks of an over-reaction in demand that might occur if people wrongly interpret any rise in interest rates as a sign that rates are heading back to pre-crisis norms.

Let me turn to the “**gradual**” part of our guidance.

To me this means that if, for the sake of argument, interest rates are going to reach a neutral level of around 2% over time, then this is unlikely to happen in one go, or even over two or three quarters. Rather, interest rates would be likely to rise in a series of modest and measured steps.

At first glance, this might seem surprising. If rates need to rise, why not just get on and do it, rather than drag it out?

At present, I see three main reasons why any further tightening is likely to be gradual rather than abrupt<sup>17</sup>.

The first is that it seems likely that the **neutral interest rate itself will gradually rise somewhat over time** – while remaining well below pre-crisis norms – as some cyclical factors that are depressing it fade further, for example through higher productivity growth, stronger global capital spending, shifts in fiscal policy and credit spreads, plus the declining impact on risk aversion of the financial crisis<sup>18</sup>. With slack close to being

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<sup>15</sup> See Borio et al (2017) for a contrary view.

<sup>16</sup> The ratio of debt/GDP for the private non-financial sector fell from 207% in Q1 2009 to 164% in Q2 2015 and has since edged up to 171% in Q4 2017.

<sup>17</sup> See also the box on pages 8-9 of the Inflation Report of February 2014.

<sup>18</sup> See Carney (2017), Vlieghe (2017), Tenreyro (2018).

eliminated, the MPC would need to track that movement in the neutral rate upwards to maintain the existing policy stance, just as the Committee allowed for the drop in the neutral rate in its policy setting over recent years.

The second is that **structural estimates of the output gap are probably more uncertain than usual, and we don't at present need to move too quickly to a neutral stance**. As noted previously, there are signs that the labour market is tight and that pay growth is picking up. Nevertheless, this follows several years when pay growth generally undershot consensus and BoE forecasts, even while unemployment fell more than expected. Those undershoots in pay cannot be fully explained by lower productivity growth and inflation expectations. The MPC's judgement is that the Phillips curve has shifted down, reflecting factors including improved education attainment, changes to the tax and benefit system, more widespread under-employment, the expansion of insecure forms of employment, and a hangover of job insecurity from the recession (see figure 13)<sup>19</sup>. Taking account of this, we have lowered our estimate for the equilibrium jobless rate ( $U^*$ ) from 5% to 4½% in early 2017 and to 4¼% in the February 2018 IR.

With the jobless rate already at 4.2%, and no evidence of significant spare capacity in firms, that  $U^*$  estimate implies there is little slack in the economy at present. Indeed, given that  $U^*$  estimate, in my view there appears to me to be a slight upside risk to our forecasts for pay growth and unit labour cost growth in the next year or two, because the jobless rate seems more likely to undershoot than overshoot our forecasts (reflecting slightly higher economic growth and/or slightly lower workforce growth).

However, uncertainty over that  $U^*$  estimate (and the overall extent of spare capacity) is quite high. The OECD currently estimate that  $U^*$  is slightly above 5%, but their  $U^*$  estimates have often been revised by a percentage point or so either way and in recent years have tended to be revised down (see figure 14)<sup>20</sup>. Personally, I am fairly confident  $U^*$  is below 5%, given that the UK jobless rate has been below 5% since late-2015 with only a modest pickup in pay growth. I agree with 4¼% as a central estimate for  $U^*$ , but it is not inconceivable that  $U^*$  is lower (or will fall further over time)<sup>21</sup>. After all, the jobless rate has been below 4% in SE England since mid-2015, and in SW England since mid-2016 (recently also East England and Northern Ireland) without, so far, strong pay growth in those regions. Indeed, some might argue that estimates of  $U^*$  and the output gap are too unstable to predict wage growth and inflation pressures over the horizon the MPC care about<sup>22</sup>.

There will inevitably be considerable uncertainty about this until we see a sustained period in which low unemployment does produce the expected pickup in pay and unit labour cost growth.

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<sup>19</sup> See Gregg and Gardiner (2015), Summers (2017), and also the Inflation Reports of February 2017 and 2018.

<sup>20</sup> Similarly, output gap estimates by the OECD and IMF also have been prone to substantial revision over time.

<sup>21</sup> See Bell and Blanchflower (2018), and Hong et al (2018).

<sup>22</sup> See, for example, Farmer (2013) and Wren-Lewis (2018).

What this means in practice is that we look at a range of data – surveys and cost and price data as well as labour market quantities – to inform our view of spare capacity, and do not treat any one structural estimate as a certain guide to policy. Moreover, our view of spare capacity should evolve gradually in response to data, acknowledging the risk that noise can be interpreted as signal. You could think of this as constructing a best estimate of the output gap from a range of variables, including cost and price data, and setting policy in accordance with that<sup>23</sup>. Hence if, for the sake of example, the growth of pay and unit labour costs were to show a sustained further pick up over time – in line with our forecasts – and other indicators continue to point to a tight labour market, then I would become more confident that there is little spare capacity and the case for moving to a neutral stance would gradually strengthen. This, like the possibility of a gradual rise in the neutral rate, could produce a gradual tightening path even if the Committee does not have a particular preference for gradualism<sup>24</sup>.

The third reason is more to do with a preference for gradualism itself, because the **economy's response to changes in interest rates, especially rises, is more uncertain than usual**.

We have reasonable estimates, based on historic experience, of how the economy usually reacts to policy rate changes (see Figure 15). These effects operate through a range of channels, including cash flow effects on debtors, intertemporal substitution among consumers and businesses, changes in asset prices and interest rate expectations and so forth.

My central expectation is that these estimates remain valid<sup>25</sup>. However, there is more uncertainty than normal over this, given that it is more than 10 years since the economy last faced rising rates, in 2006-07<sup>26</sup>. The economy's structure has changed in many ways since then.

- Retail deposit rates, which usually are a little below Bank Rate, fell a little less than the policy rate on the way down because of the perceived zero bound; in order to restore the usual spreads, they may initially rise less in response to increases in Bank Rate.
- The share of households with a mortgage is down to just 29% from 40% in 2007<sup>27</sup>, the lowest for over 35 years (see figure 16). This ratio has fallen more in the UK over this period than any other EU country<sup>28</sup>. The share of households that have a mortgage and also have low levels of liquid assets has fallen from 14% in 2011 to 8% in 2017<sup>29</sup>. These trends may reduce the impact of changing interest rates, because rate moves tend to produce a bigger adjustment in spending among

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<sup>23</sup> See Svensson and Woodford (2000) and (2002), Orphanides (2003), Orphanides and Williams (2007).

<sup>24</sup> See Goodhart (1998) and (2004) for a discussion of how the MPC has tended to move policy in response to changes in economic conditions that unfold gradually.

<sup>25</sup> See box on pages 18-21 of Inflation Report of November 2017.

<sup>26</sup> The MPC usually did not highlight uncertainty over the impact of monetary policy changes in the pre-crisis period, although the November 2003 minutes did highlight uncertainties stemming from the rise in household debt burdens.

<sup>27</sup> The latest figure is for England in 2015-16, according to the English Housing Survey.

<sup>28</sup> This ratio has fallen by 11pp in the UK. The biggest drop among other EU countries is for Denmark, a decline of between 4 and 5 pp. For the EU and Euro Area as a whole, the share of households with a mortgage has risen slightly over this period.

<sup>29</sup> For households with the head of household aged below 45 years, the share with a mortgage has fallen from 60% in 2001 and 56% in 2006 to 39% in 2015/16 (England only). Among people with a mortgage, the share with low levels of liquid assets has fallen from 39% in 2011 and 38% in 2013 to 31% in 2017.



households with a mortgage than among the rest of the population – and especially mortgagors who have relatively low liquid assets<sup>30</sup>.

- The adjustment to interest rate changes might be slower than previously, given that the share of mortgages with a fixed interest rate has risen from 34% on average in 2004-06 to 61% now<sup>31</sup> and the normal level of mortgage transactions for house purchases is about 40% lower than it was then.
- It is uncertain how the psychology of borrowers and lenders will respond to rising rates, given that it is so long since rates have risen and around one quarter of mortgagors have never faced a series of rate rises. Borrowers and lenders might over-react, interpreting even a modest rise in Bank Rate as a sign that interest rates are headed back to pre-crisis norms. Or, even if peoples' interest rate expectations do not change much, their spending decisions may be more sensitive to interest rate rises than previously, for example if people regard any interest rate rise as a precursor to severe weakness in the economy (as in 2008-09). Moreover, while fewer households have a mortgage, the share of new mortgages that have relatively high loan-to-income ratios has risen markedly – and hence decisions of whether to borrow may be more sensitive to changes in interest rate expectations<sup>32</sup>.

So far, recent evidence does not suggest that monetary policy changes have a bigger effect on the economy than usual. The boost to growth from the mid-2016 easing seemed to be roughly as expected. The pass through to household interest rates from the late-2017 tightening so far has been broadly in line with historic experience, although this has been partly offset by the drop in mortgage spreads noted above. There has been little change in the share of people that believe lower interest rates would be good for themselves or the overall economy, and no repeat of the strains evident in 2006-07 (see figure 17). Household interest rate expectations have risen only modestly, and do not anticipate a return to pre-crisis levels of interest rates (see figures 18 and 19). The balance of households that believe it is a good time to save – a measure that has been quite sensitive to interest rate changes in the past – has risen roughly in line with the trends seen in prior episodes of rising Bank Rate (see figure 20).

Nevertheless, it is still early days and the evidence is not clear cut. For example, even with Bank Rate at just 0.5%, this “good time to save” measure is the highest since 2008 and back to its long run average (see figure 21). We have also seen that sharp – albeit probably weather-related – drop in retail sales in Q1. And it is unclear if the responses to a second rate hike will be the same as the first, or if a second hike would trigger a bigger change in interest rate expectations and spending.

In general, these “policy multiplier” uncertainties favour a gradual approach to interest rate changes<sup>33</sup>. When the impact of changing monetary policy is more uncertain than usual, aggressive interest rate moves would increase the likelihood that inflation ends up a long way from target. Conversely, a gradual adjustment in

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<sup>30</sup> See Cloyne, Ferreira and Surico (2016)

<sup>31</sup> Based on data for mortgage lending by bank and building societies.

<sup>32</sup> In Q1 2007, 30% of new mortgages had a high loan to income ratio, defined here as at least 4x income for a single person or 3x joint income for more than one borrower. That share is now up to 45%.

<sup>33</sup> In other words, the economy may face multiplicative uncertainty, see Brainard (1967), Batini, Martin and Salmon (1999), Svensson (1999), Sack and Wieland (2000), Bernanke (2004). The preference for gradualism assumes a quadratic loss function.

monetary policy reduces risks of undesirably large deviations in output from potential and inflation from target. In other words, Brainard conservatism applies.

Note that uncertainty over the effect of monetary policy changes may not always imply gradualism. For example, if inflation tends to be very persistent, or inflation expectations are not well anchored, then policy probably should be more aggressive in reacting to changes in the outlook<sup>34</sup>. So far, inflation expectations do seem well anchored. But it is important to keep an eye on this issue.

Academic research suggests that there may be cases when financial stability arguments imply gradual interest rate changes, to reduce risks of abrupt swings in asset prices or debt service burdens<sup>35</sup>. These issues are not playing a major role in my monetary policy votes at present, other than the general policy multiplier uncertainty noted above. The FPC, rather than the MPC, is the first line of defence against financial stability problems, and the FPC's stress tests for the banking system aim to ensure stability even in the event of sizeable interest rate changes<sup>36</sup>.

Let me **summarise with a few key points**.

First, the MPC's guidance of "limited" and "gradual" reflects factors outside our control that affect the economy's behaviour and in turn influence the appropriate monetary policy.

Second, the extent to which economic conditions push down on the neutral rate, or imply a case for gradual policy changes, is not fixed and may well vary over time. For example, the appropriate degree of gradualism might weaken somewhat if pay growth rises faster than expected or data increase our confidence that the economy's response to rising interest rates are working as expected (the opposite also applies).

Third, "gradual" does not imply that the MPC can only raise rates at a very low frequency, such as once per year. Nor does "gradual" mean that the MPC cannot tighten faster than markets price in. Since BoE independence, the MPC has made four tightening cycles, with rates on average rising by 100bp over eight months (ie roughly 40bp per quarter)<sup>37</sup>. There is quite a wide range of paths that would qualify as gradual relative to that experience.

Fourth, "gradual" does not necessarily mean that the exact timing of rate changes must be totally predictable or signalled in advance. The MPC does not intend to create unnecessary uncertainty, and gives guidance – based on our economic forecasts – on the expected general outlook for interest rates. But I doubt that we will regularly use code words to effectively pre-announce policy decisions from meeting to meeting.

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<sup>34</sup> See Soderstrom (2000), Goodhart (2004), Moessner (2005). Angeloni et al (2003) argue that if the degree of inflation persistence is unknown, then it is preferable to assume it is more rather than less persistent.

<sup>35</sup> See, for example, Bernanke (2004).

<sup>36</sup> See BoE (2018).

<sup>37</sup> See Carney (2015).

Finally, the MPC's forecast that any further tightening is likely to be gradual and limited would not prevent the Committee from responding promptly if needed – I stress, *if needed* – in the event of a rapid change in the economic outlook. As always, the Committee has tools to react to changing economic conditions as required.

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## Charts

Figure 1. MPC Comments on Prospects for Spare Capacity in Successive Inflation Reports since August 2016	
August 2016	“Overall, however, demand falls relative to supply so that unemployment and slack are projected to increase over the next year or so before falling back somewhat.”
November 2016	“Supply growth remains subdued so unemployment and slack increase only modestly.”
February 2017	“Taking demand and supply together, relative to the November projection, there is judged to be a little more slack in the economy at the start of the forecast period, but a little less by the end.”
May 2017	“In the MPC’s latest projections, there is such a trade-off through most of the forecast period, with a degree of spare capacity and inflation remaining above the 2% target. In the final year of the forecast, however, the output gap closes and inflation rises slightly further above the target.”
August 2017	“Through most of the forecast period, the economy operates with a small degree of spare capacity and CPI inflation is well above the target. By the end of the forecast, that trade-off is eliminated. Spare capacity is fully absorbed, and inflation remains above the target.”
November 2017	“Over the MPC’s forecast period, conditioned on a path for Bank Rate that rises to 1% by the end of 2020, demand is projected to grow at a pace that uses up the remaining slack in the economy.”
February 2018	“In the MPC’s projections, the stronger pace of demand growth is sufficient to absorb the limited degree of spare capacity sooner than in the November projections, with the economy moving into excess demand by early 2020”.

Source: Bank of England Inflation Reports

Figure 2. UK – MPC Central Forecasts for the Trade-off at Year 2 in Successive Inflation Reports

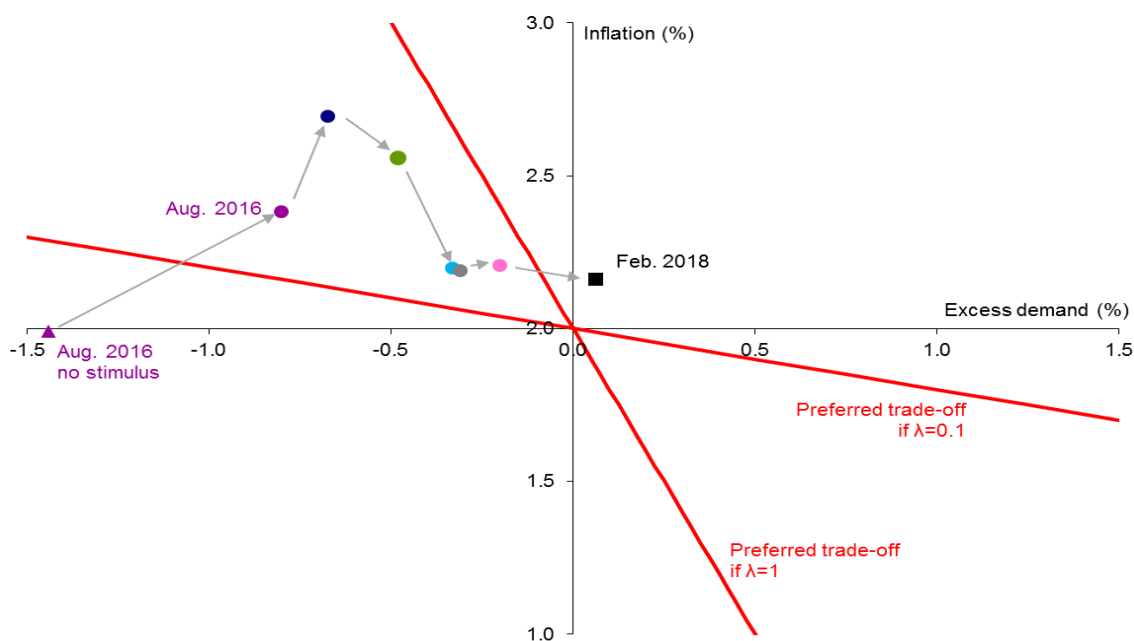
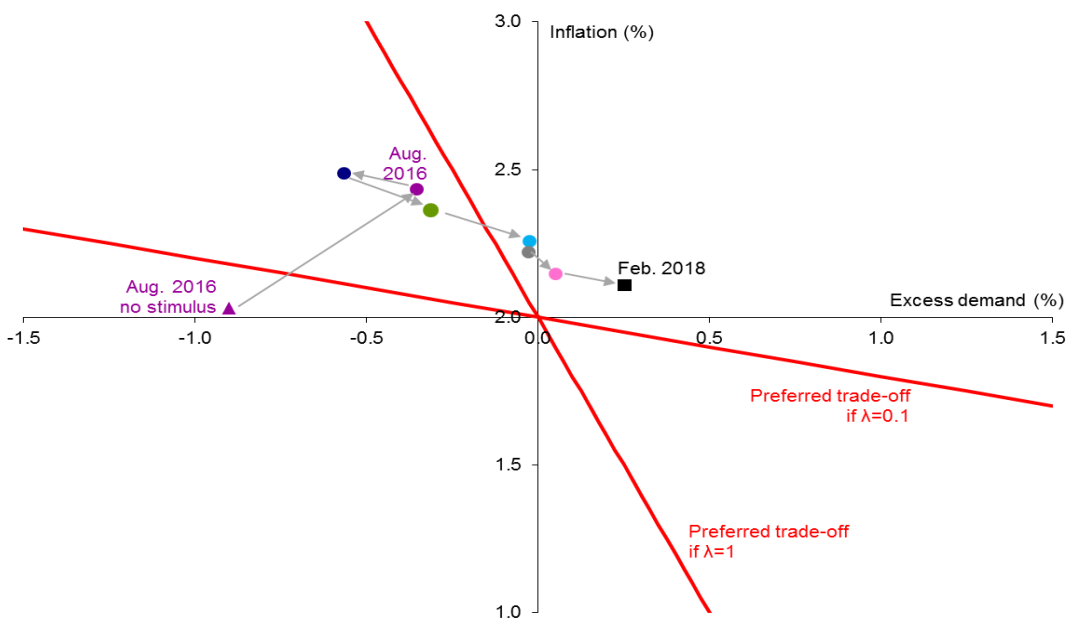


Figure 3. UK – MPC Central Forecasts for the Trade-off at Year 3 in Successive *Inflation Reports*



Notes: The top chart shows the central projection for spare capacity or excess demand at the end of the second year of the forecast period on the horizontal axis against the central projection for YoY CPI inflation at Year 2 on the vertical axis from successive Inflation Reports. The bottom chart shows the Year 3 forecasts. The left-most observation (labelled "Aug. 2016 no stimulus") is a counterfactual version of the August 2016 Inflation Report forecasts with the effect of the MPC's Bank Rate cut, Term Funding Scheme and Asset Purchases removed. See Carney 2018 for further details and discussion.

Figure 4. UK – Measures of Labour Market Slack, 1997-2018

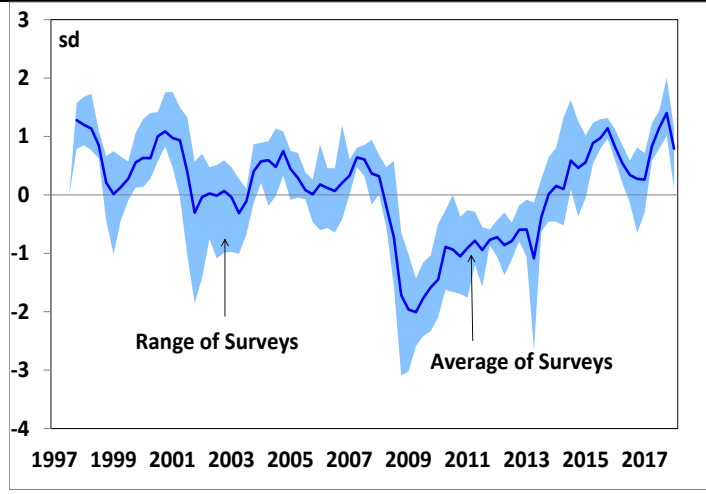
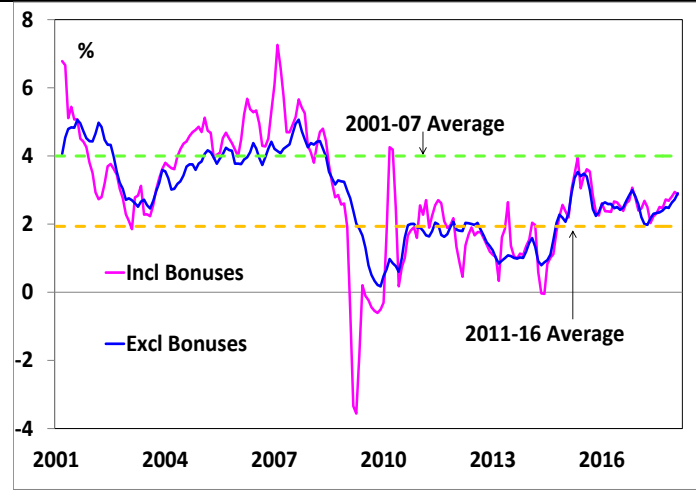


Figure 5. UK – Average Earnings Growth YoY (3-month averages), 2001-18



Note: In the left chart, we use a weighted average for manufacturing and services. In the right chart, the period averages are for average earnings ex bonuses, and are slightly higher including bonuses. Sources: CBI, British Chambers of Commerce, REC, ONS and Bank of England

Figure 6. UK – Average MoM Changes in Retail Sales and Monthly GDP Around Previous Months With Heavy Snow, 1998-17

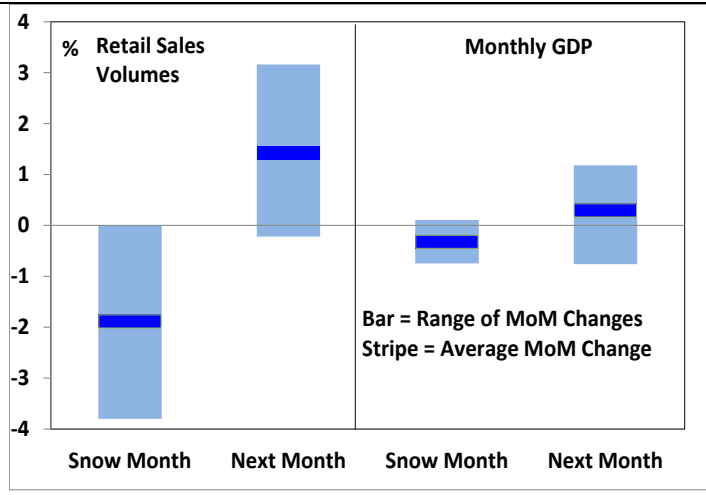
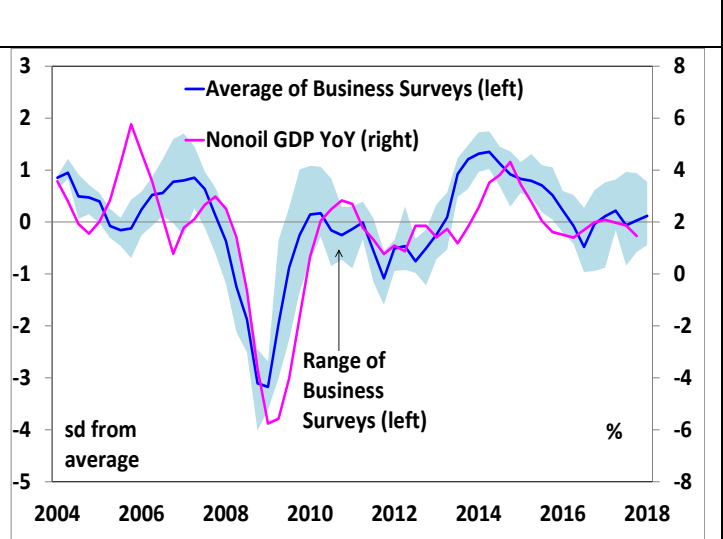


Figure 7. UK – Business Surveys and NonOil GDP YoY, 2004-18



Note: The left chart shows the average (and range of) changes in retail sales volumes and monthly GDP in months with average snow depth of at least 1cm. These months are February 2009, January 2010, December 2010, January 2013, and March 2013. Snow depth also exceeded that mark in Dec-09, but we have excluded that month because it was followed by even deeper snow in January 2010. Sources: ONS, European Commission, British Chambers of Commerce, Markit, Lloyds Business Bulletin, ICAEW and BoE

Figure 8. UK – Spreads on Fixed Mortgage Rates, 1995-18

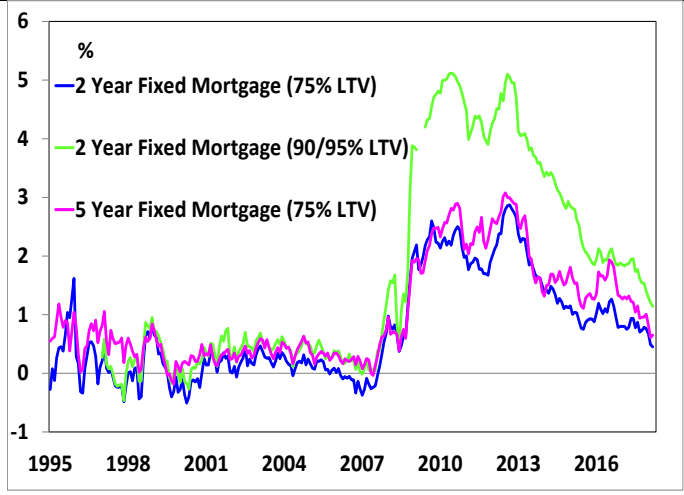
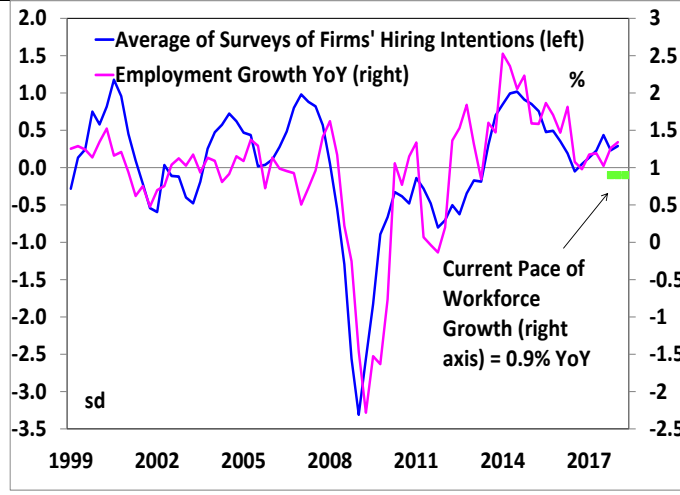


Figure 9. UK – Surveys of Firms' Hiring Intentions, and YoY Employment Growth, 1999-2018



Note: The left chart shows spreads between the average quoted rates on new mortgages and swap rates of the relevant maturity. Spreads versus OIS rates have fallen even more markedly in recent years. The high LTV series is for 95% LTV loans to April 2008, 90% LTV loans since then. The right chart shows a weighted average of hiring intentions from various surveys. Sources: Manpower, British Chambers of Commerce, REC Survey of Jobs, CBI, ONS and BoE

Figure 10. UK, US and Euro Area – Implied Forward Rates as of 16 April 2018

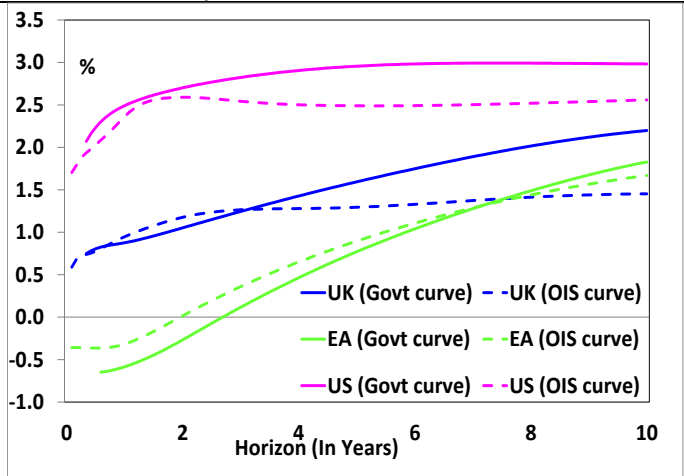
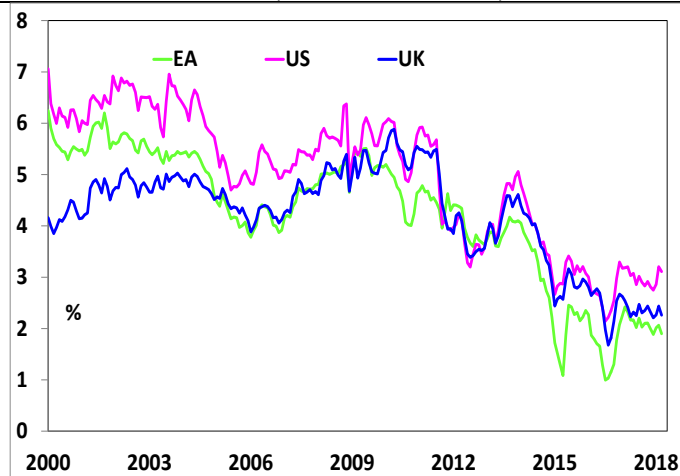


Figure 11. UK, US and Euro Area – Implied Forward Rate 10 Years Ahead (From Govt Curves), 2000-18



Sources: Bank of England

Figure 12. UK – External Forecasters Expectations for Bank Rate Five Years Ahead, 1998-2018

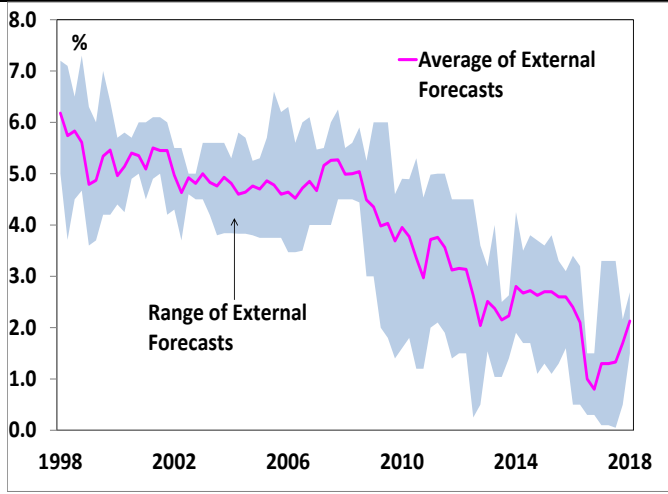
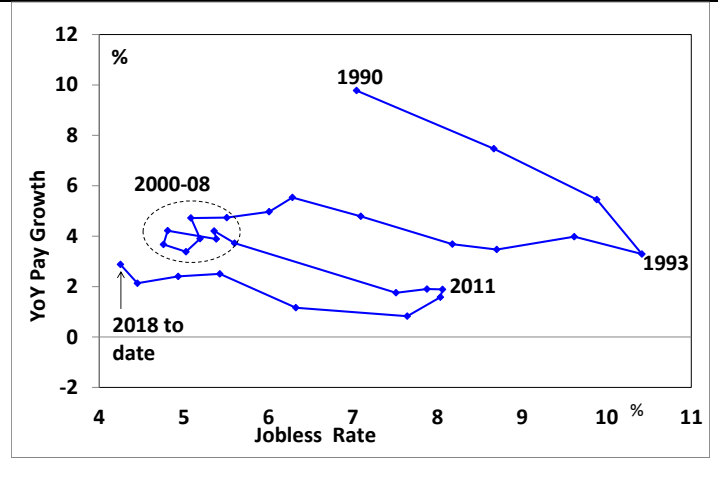


Figure 13. UK – Jobless Rate and Pay Growth, 1990-2018



Note: In the right chart, pay growth is measured by the YoY growth of average earnings excluding bonuses. The 2018 figure is based on pay growth and unemployment to end-February.

Sources: HM Treasury, ONS and BoE

Figure 14. UK – OECD Estimates of UK NAIRU, 2001-19

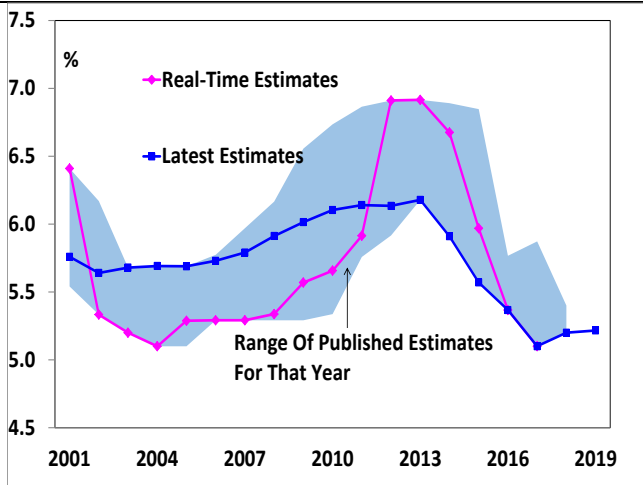
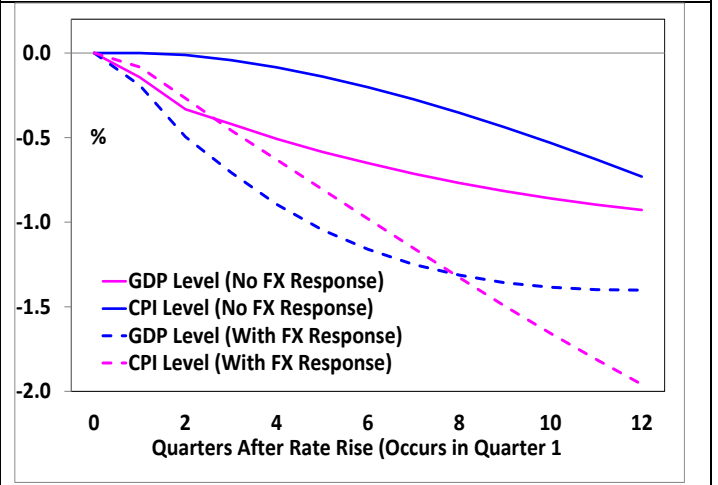


Figure 15. UK – Estimated Impact of 100bp Rise in Bank Rate on Real GDP and CPI Inflation



Note: In the left chart, the real-time estimates are those made in the middle of each year. The shaded area shows the range of estimates for the NAIURU in each year published by the OECD in different editions of the Economic Outlook. In the right chart, the simulations assume that the change in interest rates unwinds over the subsequent 3 years.

Sources: HM Treasury and BoE

Figure 16. UK – Housing Tenure, 1981-2015

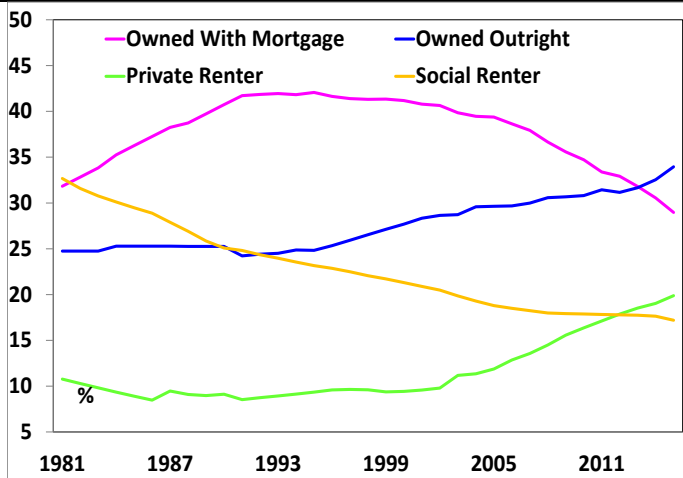
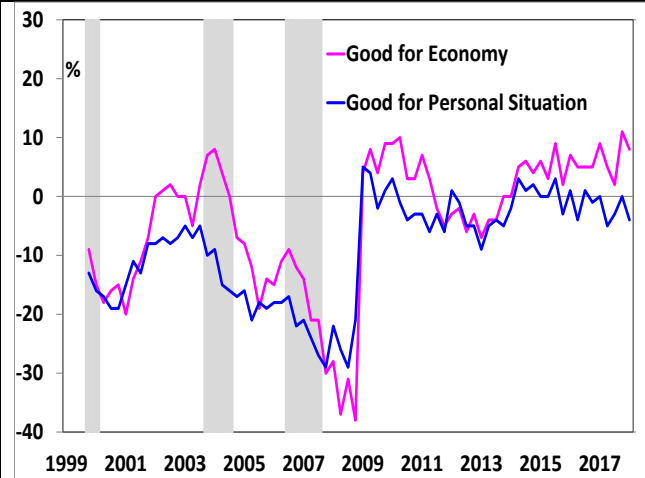


Figure 17. UK – Net Balance of People That Believe Higher Interest Rates Would Be “Best for the British Economy” and “Best for You Personally”, 1999-18



Note: In the left chart, data are for the proportion of households in each category. The latest figure is for England only. In the right chart, the shaded periods denote the MPC tightening cycles of 1999/2000, 2003/04 and 2006/07. Sources: DCLG and BoE/TNS Inflation Expectations Survey.

Figure 18. UK – Pct of People Who Expect BoE Policy Rate To Be at 0-1%, 1-2% etc in One Year’s Time, 2016-18

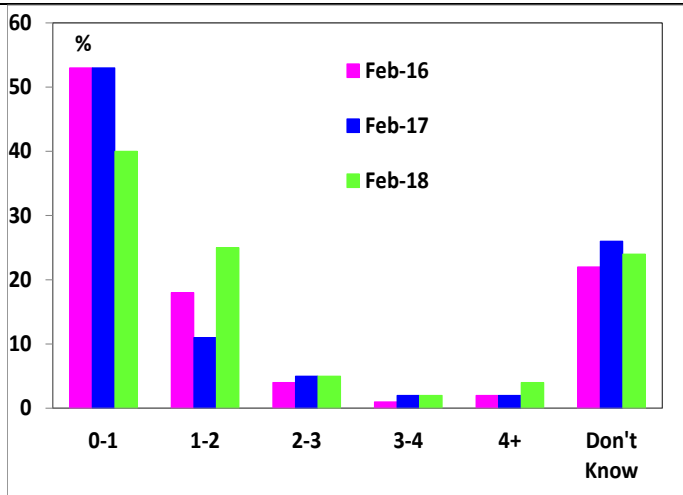
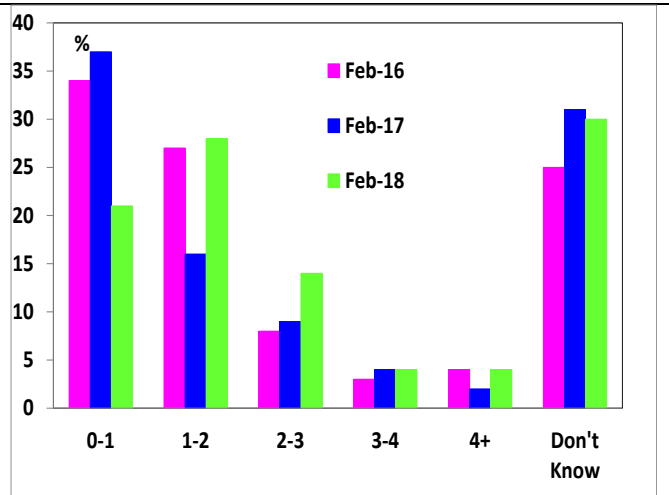


Figure 19. UK – Pct of People Who Expect BoE Policy Rate To Be at 0-1%, 1-2% etc in Two Years’ Time, 2016-18



Source: BoE/TNS Survey, 2016-18

Figure 20. UK – Change in Net Balance of People Who Judge it Is “A Good Time to Save” During Periods Of Rising BoE Policy Rate, 1997-2018

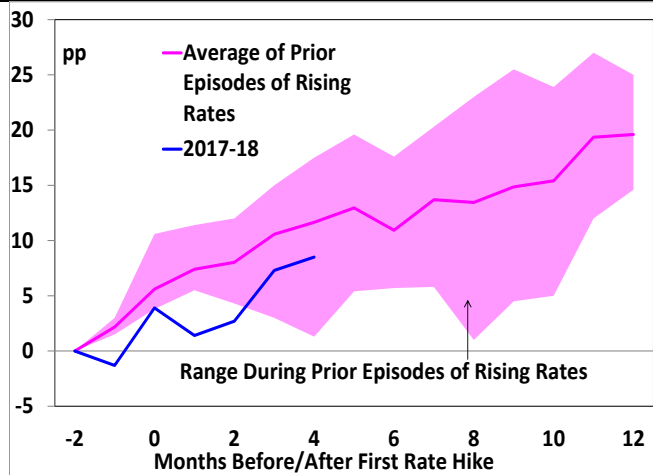
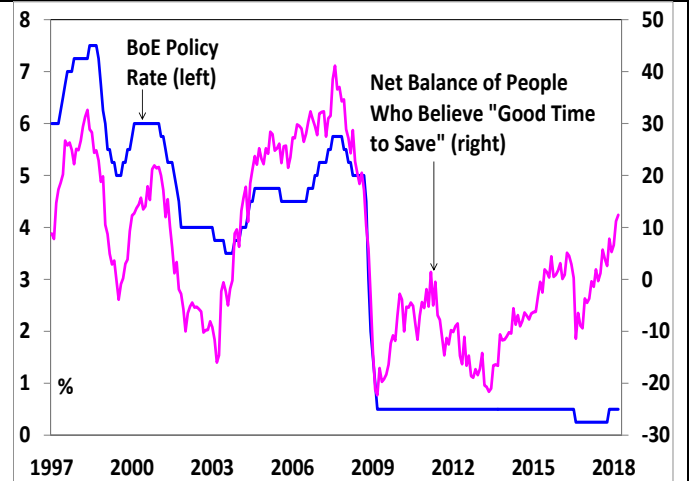


Figure 21. UK – BoE Policy Rate and Net Balance of People Who Judge it Is “A Good Time to Save”, 1997-2018



In the left chart, we take the change in the survey reading from two months before the first hike in each episode of rising rates. Sources: European Commission