



BANK OF ENGLAND

Speech

Monetary policy as the output gap closes

Speech given by

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At the June and August MPC meetings I voted to lift Bank Rate by 25bp, having voted for unchanged rates at earlier meetings. Today, I want to explain the change in my vote.

I will give you the summary first.

Summary

In the exceptional circumstances since the EU referendum, the MPC has sought the appropriate tradeoff between above-target inflation and below-potential output. The terms of that tradeoff have shifted markedly in recent quarters. Inflation has risen well above target, while spare capacity in the economy has been absorbed faster than expected. The jobless rate is now slightly below our estimate of equilibrium.

The prospective tradeoff is beyond my limits of tolerance, with the likelihood of an early elimination of slack and an extended period of above-target inflation. We do not need to be putting the brakes on so much that the economy weakens sharply. But, our foot no longer needs to be quite so firmly on the accelerator in my view. A modest rise in rates would help ensure a sustainable return of inflation to target over time.

I do not want to dismiss risks that the Brexit process might be bumpy, and could undermine business and consumer confidence. In such a scenario, inward migration might also be lower, limiting labour supply and demand. I presume asset markets would also adjust, including sterling. The monetary policy implications of this scenario are not automatic, could in theory go either way, and would depend on the combined effects on demand, supply, and the exchange rate. In my view, we should not maintain an overly loose stance as insurance against this scenario. Rather, we should be prepared to respond as needed if it happens.

The rest of this speech will give the slightly longer version. I will describe the MPC's latest central forecast, discuss areas where my views differ slightly from that central forecast, and conclude with some implications of the evolving economic outlook for monetary policy.

In the August Inflation Report (IR), the MPC projected that currency-induced cost pressures would keep CPI inflation above the 2% target throughout the forecast period, up to mid-2020. Monetary policy is not seeking to fully prevent the boost to consumer prices from sterling's Brexit-related depreciation. But nor are we indifferent to it. As required by our remit, policy is aiming for a reasonable tradeoff between above-target inflation and the amount of slack in the economy¹.

In that IR, the MPC as a whole judged that the economy currently still has a small amount of slack. The Committee projected that, if interest rates follow the market path, economic growth would remain sluggish in

¹ See Carney (2017).

the near term and pick up slightly above trend later on. As a result, the Committee forecast that at the end of the three-year forecast period the output gap will be fully closed and the jobless rate will be back at 4.5% - matching the MPC's estimate of equilibrium.

This forecast implied that the Committee would continue to face a tradeoff between above-target inflation and spare capacity in the first year or two but that there would be no tradeoff three years ahead, with continued above-target inflation but a zero output gap. Hence, the Committee warned in the August IR that, if the economy turns out roughly as expected, monetary policy could need to be tightened by a somewhat greater extent over the forecast period than implied by the market yield curve at the time.

All MPC members share the same objective, as set out in the MPC's remit. The remit does not prescribe the relative weight given to inflation control versus slack, but any differences across the committee are probably small. Differences among MPC members over the appropriate policy therefore stem primarily from different assessments of the current economic position and the outlook. My view is that we currently have limited slack and are likely to see greater tightening in the labour market than the August IR base case. As a result, I believe we probably face a somewhat more protracted inflation overshoot, and hence I judge that an earlier rise in rates is appropriate.

Broad-based rise in inflation

Recent quarters have seen a marked and broad-based rise in CPI inflation, and more than three quarters of CPI items have a higher inflation rate than a year ago². Sterling's depreciation and higher global inflation have played a major role in this, lifting prices of tradable goods and services. Nevertheless, there has also been some pick up in domestic costs and margins. As a result, inflation in CPI components that are not heavily weighted to imports – and more closely reflect domestic costs – is at a five-year high and is now around a pace consistent with the inflation target (assuming a normal trend in imported costs, see figure 1).

The recent slight dip in inflation, from 2.9% in May to 2.6% in July, probably does not mark a turning point to lower inflation. This dip mainly reflects swings in petrol prices, which are often volatile. Indeed, the median inflation rate among CPI items has risen over that period.

Looking ahead, I suspect that CPI inflation will edge back up to roughly 3% YoY in coming months and remain above the 2% target for some time. There are some hints that external cost pressures from sterling's depreciation may be peaking (see figure 2). Nevertheless, given the usual lags, the rise in external costs over recent quarters will probably continue to lift consumer prices for a while. And as domestic slack shrinks, domestic cost pressures are likely to gradually increase further - a point I shall return to.

² Using an 85-item disaggregated split of the CPI.

How much spare capacity?

There are several methods – none perfect – to gauge the level of spare capacity across the economy. The IMF, OECD, European Commission and OBR produce output gap estimates, with varying methods, aiming to measure the extent to which economic activity (ie real GDP) is above or below its non-inflationary potential. Another approach is to do a bottom-up exercise, looking at spare capacity in firms and spare capacity in the labour market (eg unemployment, discouraged workers, under-employment, shortfall between actual and desired hours).

In the aftermath of the 2008/09 recession, all these measures indicated that the economy had ample spare capacity. All estimates pointed to a large output gap, with activity well below potential. In addition, unemployment rose sharply, the participation rate fell as discouraged workers left the workforce, the numbers of people working fewer hours than they wanted surged, and surveys indicated lower capacity use in firms.

Now, after several years of steady growth, the extent of spare capacity in the economy is probably quite small. Moreover, spare capacity appears to have been absorbed faster than expected in recent quarters. For example, unemployment and under-employment have fallen quite rapidly, while the BoE Agents and other surveys show rising recruitment difficulties (see figures 3 and 4).

The evidence that slack has recently been shrinking may at first glance seem surprising given the modest pace of real GDP growth, at 0.3% QoQ and 1.7% YoY in Q2.

However, QoQ growth rates in GDP can be quite volatile from quarter to quarter, perhaps more volatile than the economy's actual underlying path. For example, weakness in Q1 GDP growth partly reflected erratic declines in pharmaceuticals output and recorded sales by small retailers, reversing equally erratic gains in late 2016. Investment in transport equipment fell unusually sharply in Q2. Such swings may tell us very little about the underlying pace of economic growth or changes in spare capacity.

In addition, it seems quite likely to me that recent GDP data will be revised up at some stage given the more solid trends in business surveys of activity and hiring intentions, as well as the jobs data³. Such revisions are a regular occurrence. Over 1993-2013, YoY real GDP growth on average has been revised up by 0.2-0.3pp from the data published at the time (see figure 5)⁴. The scale of revisions has not lessened appreciably in recent years: average YoY GDP growth for 2010-13 has been revised up by 0.6pp from the real-time data. These revisions are not uniform, and some have been especially large. For example, the real time data

³ The unusually large discrepancy between the different GDP measures (income, expenditure and output) in 2015 and 2016 also hints at the likelihood of upward revisions to GDP growth in that period. In previous years, upward revisions to GDP growth have on average been bigger when the dispersion between the GDP measures has been relatively high.

⁴ This estimate only includes revisions published in the first three years after the data are published. Revisions after that are likely to reflect methodological changes rather than greater data availability. Among expenditure components, the average upward revisions are relatively high for investment and trade flows.

showed zero YoY GDP growth in 2012⁵, but the ONS now estimate that GDP growth in 2012 was actually 1.3% YoY⁶. Note that revisions often occur more than a year after the data are first published.

Moreover, potential growth is lower than it used to be, probably only 1½% YoY or so (using OECD, IMF, OBR and EC estimates), well below the precrisis norm of roughly 2½% (see figure 6). The slowdown in potential growth largely reflects lower productivity growth, linked in part to subdued investment and capital stock growth since the 2008/09 recession⁷. As a result, GDP growth of about 2% YoY - a pace that used to be considered quite soft - is now probably above trend, and implies rising capacity use.

In terms of output gaps, the OECD, IMF, OBR and EC all judge that slack has now been used up, and the economy is now operating slightly above potential (see figure 7)⁸. The conclusion that the output gap has closed would probably hold even if one allows for the softer H1 GDP data since those estimates were published. Indeed, given the frequent upward revisions to UK GDP data, the output gap estimates of the IMF and OECD - which are based on those GDP data - have tended to be revised in the direction of higher capacity use than initial estimates (see figures 8 and 9)⁹.

The same conclusion - slack is small and shrinking - also holds if we go through a bottom-up exercise. Let me go through this in detail.

(i) Capacity use in firms. A range of survey guides suggest that capacity use is high among manufacturing firms but is around average overall (see figure 10). These measures are fairly imprecise, but there is little sign of significant spare capacity.

(ii) Unemployment. The jobless rate, 4.4%, is the lowest for more than 40 years and marginally below the MPC's 4.5% estimate of equilibrium (U^*), which was lowered early this year from 5% previously¹⁰. Within that, the short-term jobless rate (below 6 months) is the lowest since data began in 1992 (see figure 11).

It is conceivable that U^* is a bit lower than 4.5% and that the wage Phillips curve will continue to shift down. After all, some parts of the UK already have jobless rates below 4%, including the South East, South West and Scotland. On average in these regions, skill shortages are rising, but pay growth remains modest. Some factors that have restrained overall pay growth in recent years probably will persist, including reforms to the UK tax and benefit system, the reduction in structural unemployment due to wider education attainment, plus the expansion of less secure forms of work¹¹. Moreover, if the economy continues to expand steadily, the

⁵ See ONS data published 25 January 2013.

⁶ The ONS reported in March this year that, with "near-final" figures for the 2017 Blue Book National Accounts publication, 2012 GDP growth is likely to be revised up to 1.5% YoY. See note data published 13 March 2017.

⁷ Indeed, recent weakness in productivity and workforce growth suggest that potential GDP growth in 2017 may be even lower than those estimates.

⁸ The same point holds using the alternative output gap methodology proposed in Coibion et al (2017).

⁹ See Orphanides and van Norden (2002), and Orphanides and Williams (2002), for broader discussion of the monetary policy effects of output gap mismeasurement.

¹⁰ See BoE Inflation Report of February 2017.

¹¹ See Saunders (2017) and Clarke (2017).

declining numbers of long-term unemployed may pull structural unemployment lower - a reverse hysteresis effect.

However, it will be hard to judge this possibility of a lower U^* for some time, given that pay growth usually responds gradually to swings in labour market slack - with most of the effect over a year or so. So far, recent trends in pay do not give good reason to lower that U^* estimate below 4.5%, with regular pay growth slightly below the MPC's forecast in Q1 but slightly above it since then.

(iii) Participation rate. The bounds of the official definitions of the workforce are quite porous. For example, more than half the gross inflow to employment in the last two years has come from people previously classed as outside the workforce (ie inactive) rather than unemployed¹². Some of those classified as inactive in official statistics should probably be regarded as part of a wide measure of labour market slack.

However, it seems unlikely in my view that the participation rate will rise rapidly enough to produce significant extra nearterm labour supply. The participation rate among people aged 16-64 years is already at a record high of 78.7%, the highest since data began in 1971, up from 76.7% six years ago. Within that, participation rates have risen particularly sharply among people aged 55-64 years and among women aged 25-29 years.

The participation rate may still edge higher over time, especially given the widening in educational attainment over recent decades. The UK participation rate remains below the highs among major European economies, especially among people aged 50+ years (see figure 12). Nevertheless, population ageing argues for the opposite, given lower average participation rates among older people. Moreover, the share of the adult population that are outside the workforce (ie currently inactive) but say they would like a job - a group which are empirically more likely to move into work than the rest of those classed as inactive - is at a record low (see figure 13).

(iv) Under-employment. The ONS publish data for the number of people that would like to work more hours (and are available) and those in work that would like to work fewer hours (for the same hourly pay)¹³. The balance between these - ie net under-employment - rose sharply early this decade, including a marked increase in people working part-time that wanted full-time work. In 2012-14, under-employment fell more slowly than the jobless rate. However, as the labour market has tightened, under-employment is now falling fast, with the number of involuntary part-time workers down 11% YoY and a marked expansion of full-time work. This net under-employment measure has now moved into negative territory, (ie more over-employment than under-employment), although less extreme than the precrisis period (see figure 14).

¹² People are counted as being in the workforce if they are employed or out of work but have been looking for work within the last 4 weeks and able to start work within the next 2 weeks. People that are out of the workforce are deemed to be inactive. They may of course be looking for work, but fail either or both the 4-week and 2-week criteria.

¹³ This combines people that are working part-time or full-time that would like to work more hours, either in the same job, a different job or an extra job.

A somewhat better approach is to allow for the fact that under-employed people say they would like to adjust their hours more than the over-employed. Allowing for this, we can estimate the “hours gap”, the net balance of under-employed hours¹⁴. This peaked at nearly 2% of total hours worked in 2013, but fell to just 0.1% of total hours worked in Q2 this year (see figure 15).

There is a further possible adjustment to this hours gap, because many people seem to overstate the number of extra hours they would like to work¹⁵. Using anonymised LFS micro data, we can track people who said they were under-employed - ie willing to work more hours - in one year and then said they were fully employed (ie neither under or over-employed) a year later. On average over the last 10 years, these people said in the first year that they would like to work an extra 11.7 hours. A year later, when they said they were fully employed, these people were only working 5.7 extra hours - roughly half what they previously said they wanted (see figure 16). In particular, people in full-time work tend to overstate markedly how many extra hours they would like to work. Likewise, people that declare themselves over-employed in the first year but fully employed in the second year on average cut their hours by less than they said they would like.

My predecessor on the MPC, Martin Weale, examined this issue a few years ago and noted (using data for 2012-13) that this gap between the desired change in hours and the actual change was greater for over-employed people than under-employed. If that was still the case, applying the appropriate discounts to the figures for people’s desired change in hours would reduce over-employment more than under-employment and hence currently increase the hours gap. However, over the last two years, both the under- and over-employed overstated their desired change in hours by similar amounts. If we apply a discount of 50% to desired hours among both the under- and over-employed, the slack from potential hours would be close to zero. If we further adjust for the fact that over-employed people tend to have higher pay¹⁶ - and presumably higher productivity - than the under-employed, then this residual hours gap could be closed with little or no extra output. Overall, it appears that slack from under-employment has been falling and is now quite limited.

(v) Inward migration. Over the last five years, roughly 60% of job growth and all the growth in the workforce has been accounted for by people born outside the UK, drawn by (among other things) the UK’s relatively buoyant pay and employment levels, amidst free movement of EU labour. Under those conditions, the concept of spare capacity in the UK was quite hard to pin down. In effect, labour supply has been more responsive than usual to labour demand - and since workers are also consumers, inward migration has also supported economic growth in the UK.

¹⁴ See Bell and Blanchflower (2013).

¹⁵ See Weale (2014).

¹⁶ On average, people that would like to work fewer hours earn 70% more per hour than people that would like to work more hours. This ratio has been fairly stable over time.

However, there are now signs that EU nationals are less willing to move to the UK for work¹⁷. This may reflect, among other factors, falling jobless rates in other EU countries, the shift in relative pay levels caused by sterling's depreciation, plus uncertainties over post-Brexit job opportunities and migration status for EU nationals in the UK¹⁸. For example, the number of people born in other EU countries and working in the UK rose just 2% in the last year, the lowest growth since 2010, whereas it rose 16% in the year to mid-2016 (see figure 17)¹⁹. Excluding workers from Romania and Bulgaria - for which the high recent levels of inflows probably reflect the lifting of transitional controls - the numbers of people born in other EU countries working in the UK fell 2% over the last year, whereas over the prior six years it rose by an average of 8% per year²⁰. As a result, the number of job vacancies in the three industry sectors²¹ that rely most on employing EU workers are up 10% YoY, whereas vacancies in all sectors combined are up just 1% YoY (see figure 18).

Summing up, the overall picture, I believe, is that the economy now has little or no output gap. Trends in domestically-oriented elements of the CPI are broadly consistent with this.

Outlook for economic growth and unemployment

Business surveys suggest that in the near term the economy will continue to grow at a modest but steady pace of around 2% per year, fairly similar to the last two years, with some normal variation among various surveys (see figure 19). As noted, this pace is probably a bit above the economy's current potential.

Consumer spending has slowed as the Brexit-induced weakness in sterling lifts inflation and squeezes household real incomes. The slowdown in inward migration may also be a factor. However, risks that recent weakness in real wages will cause people to mark down their future income prospects sharply and hence trigger an abrupt consumer slowdown have not, so far, materialised. For example, readings on consumers' expectations for their own finances, and intentions for major purchases, have weakened but are around their longrun averages.

And, in terms of overall economic growth, the consumer slowdown is likely to be roughly balanced by a sharp export pickup and a modest recovery in business investment.

Sterling's depreciation and higher global growth have led to a sharp pickup in export orders and export profitability since mid-2016. Export volumes (goods, ex oil and erratics) in H1 this year rose 6% on the prior half year, a pace that has not been exceeded since 2006 (when, unlike now, exports were significantly

¹⁷ See also CIPD (2017) and BoE Agents report for Q2 2017.

¹⁸ See Portes and Forte (2016).

¹⁹ By contrast, Spain reported stronger growth of employment of foreign EU nationals in Q2. Other EU countries have not yet published Q2 data.

²⁰ Similarly, the number of National Insurance numbers allocated to adult overseas nationals fell 7% YoY in Q2 2017, with a 9% drop for EU nationals and a 21% drop for EU8 nationals. See ONS data released 24 August 2017.

²¹ These sectors are accommodation and food services, administration and support, and manufacturing. Source: ONS data released 23 May 2016. These industry sectors have also seen above-average declines in unemployment rates.

inflated by MTIC-related fraud)²². Even allowing for the more sluggish trend in exports of services, and the knock-on boost from higher exports to higher imports²³, the export pickup is likely to add meaningfully to economic growth this year and the next. Moreover, the CBI reports that the net balance of manufacturers of intermediate goods reporting a rise in domestic orders hit a record high in Q2 (see figure 20), which may signal a rise in the domestic content in UK manufacturing output over time.

At the same time, firms' investment intentions have improved a bit in recent quarters, and the background drivers for investment are very strong - corporate liquidity is buoyant, and the rate of return on capital is high. Under these conditions, the approach of Brexit need not mean that investment falls: it may simply be that investment grows less than otherwise. Even with the modest investment pickup in our base case, capital stock growth in coming years is likely to be low by historic norms.

To be sure, there are uncertainties in the growth outlook. Key downside risks probably stem from Brexit uncertainties and the possibility of a sharper consumer retrenchment. But, as seen over the last year, there are also upside risks to UK growth. Monetary conditions are loose, and many other headwinds that restrained growth in recent years are fading. Credit spreads have fallen sharply, the household wealth/income ratio is at a record high, while household fears of unemployment are well below average. Faster global growth is lifting asset prices, business confidence and export prospects in the UK. There are also uncertainties over potential growth, especially productivity trends. And some issues - for example, inward migration - could affect both supply and demand in the economy.

But, overall, I suspect that the economy will not be too bad in coming quarters, probably growing a little faster than the MPC's central forecast and probably a little above trend. Consistent with this outlook and trends in business activity, firms' hiring intentions remain a bit above average, suggesting that labour demand will continue to outstrip labour supply (workforce growth is only 0.5% YoY at present), see figure 21. In contrast to the IR base case that the jobless rate will level off, my hunch is that the jobless rate will continue to edge lower in coming quarters, falling more clearly below our current 4.5% estimate of equilibrium, with further declines in under-employment as well. So to me, the outlook is for above-target inflation with the output gap closing soon, if it is not already closed. The resultant gradual rise in domestic cost pressures, including pay growth, threatens to keep inflation above target even once the currency-driven boost fades.

²² Missing Trader Intra-Community (MTIC) fraud.

²³ The import content of UK exports of manufactured goods is the second highest among G7 countries.

Implications for monetary policy

In the last few years, the UK has generally had clear evidence of ample spare capacity, or (as in 2014, 2015 and early 2016) below-target inflation, or both. Under those conditions, it was appropriate to provide considerable monetary policy stimulus to prevent inflation undershooting the target over time. As long as there was a significant output gap (and with inflation expectations reasonably anchored), monetary policy did not need to tighten promptly in response to above-trend growth and the MPC could contemplate easing if growth appeared likely to slow below trend for a sustained period.

The current position is very different. In the changed circumstances of little or no slack and above-target inflation, it is natural for monetary policy to adjust and provide less stimulus.

To be clear, my aim is to move from the current loose stance towards neutral, to ensure a sustainable return of inflation to target over time. If we are going to test whether the economy can sustain a jobless rate below 4.5% without overheating, I believe we should do so cautiously - and with less stimulus than currently - especially given the prospect of an extended period of above-target inflation.

Of course, there are always arguments for waiting to see a bit more data, in particular clearer signs of higher pay growth. However, such a strategy carries risks. Given lags, it typically takes a year or so for monetary policy to have its peak effect on economic growth and a couple of years for its peak effect on inflation and pay growth. If interest rates remain unchanged until pay growth has already reached a target-consistent pace, then the chances are the economy will already be overheating before the withdrawal of stimulus is felt across the economy. In that case, the eventual tightening might be rather less limited and gradual than desired, leading to a more abrupt and painful economic slowdown.

In my view, there are considerable advantages to acting early enough to allow a gradual rise in interest rates. It is fully 10 years since the MPC last tightened monetary policy. Overall, balance sheets are much less fragile than 10 years ago, with lower debt/income ratios and higher levels of liquidity among companies and households. Banks have much stronger capital positions. A sizeable net balance of consumers - especially those with a mortgage - already expect interest rates to rise in the year ahead and hence have presumably incorporated this in spending decisions²⁴. So I do not expect a modest rise in rates will have a disproportionate effect on spending. Nevertheless, many borrowers have never faced a rate hike. It would be preferable to have the space to move gradually, observing the effects as we go. If we get behind the curve, we lose that space.

²⁴ See the BoE/TNS survey.

Conclusion

I have laid out the factors that persuaded me to vote for a 25bp rate hike at recent MPC meetings. But the path of monetary policy is not preset, and my future votes will depend on the economic data. The MPC has tools to respond either way to swings in the economy, as needed.

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Figure 1. Inverse Import Weighted YoY Core CPI Inflation Ex Education, 1997-2017

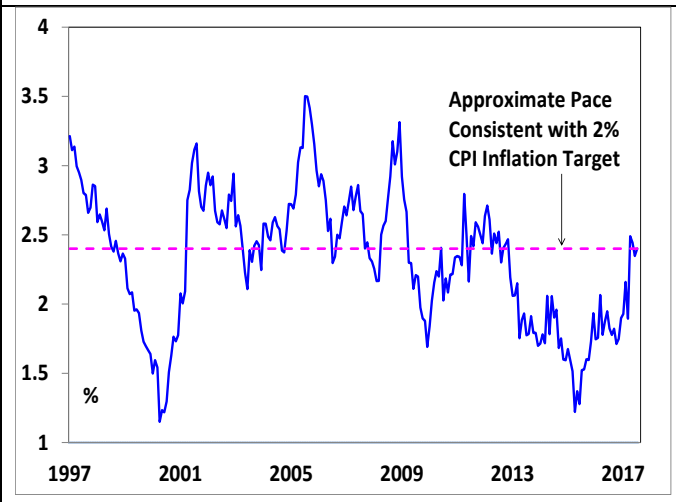
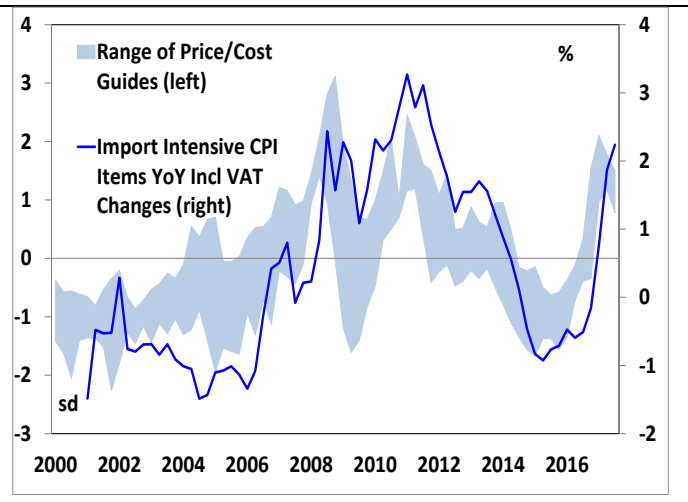


Figure 2. Guides to Inflation Pass-Through from Sterling and Global Costs, 2000-17



Note: In the left chart, the target-consistent pace assumes a normal trend in import prices. There is a range of uncertainty around this estimate. The right chart shows the weighted average inflation rate for CPI items (excluding fuel and education) with a relatively high import content, accounting for 45% of the CPI. The price and cost indicators used are CIPS manufacturing output prices, ONS output prices ex food, drink, tobacco and petrol, CBI distributive trades expected price changes among retailers, CBI expected price changes among manufacturing firms, BoE Agents index on prices of finished goods import prices. These are shown as standard deviations from average. Sources: CBI, Datastream, Markit, ONS and BoE

Figure 3. Unemployment and U6-type Under-Employment, Pct of Workforce, 1992-2017

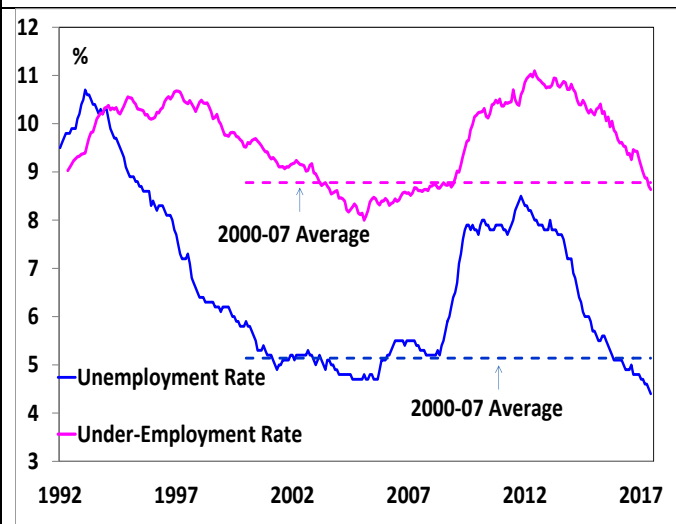
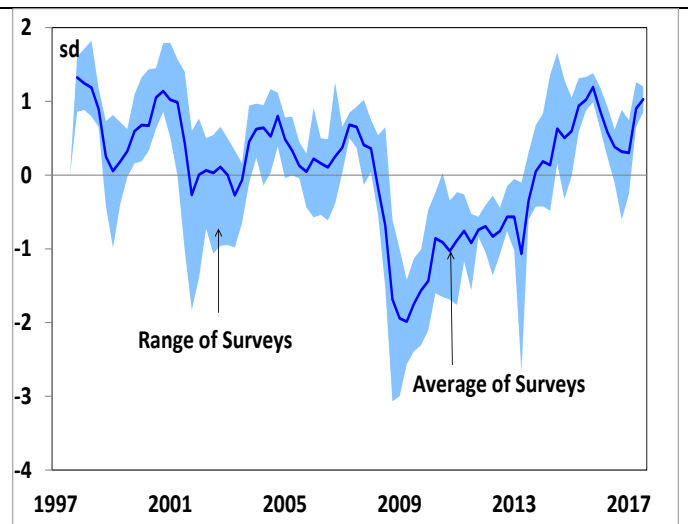
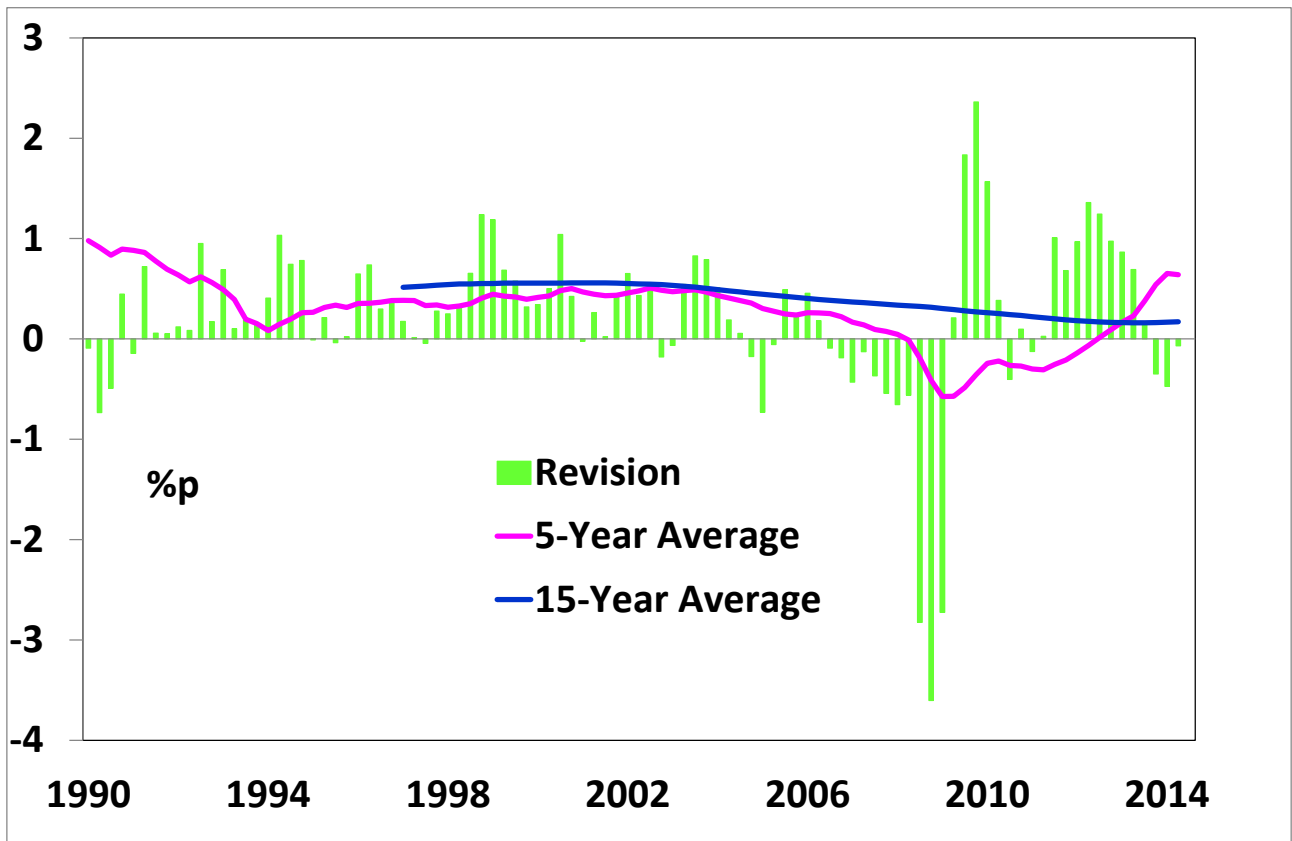


Figure 4. Surveys of Firms' Recruitment Difficulties, Standard Deviations from Average, 1997-2017



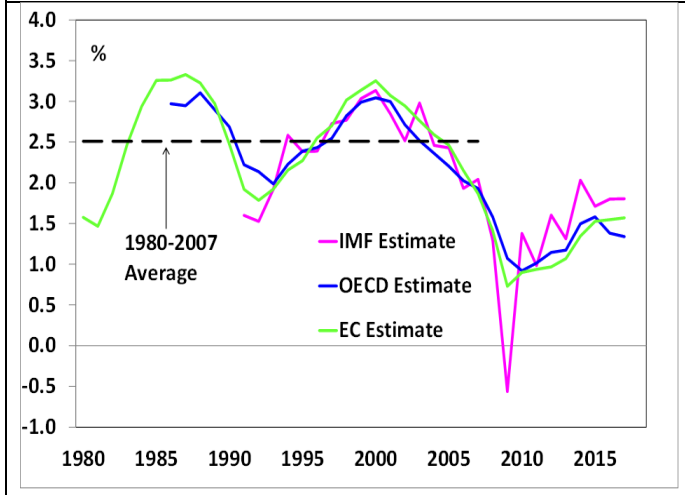
Note: The under-employment rate measures people that are working part-time but would like a full-time job, and those that would like a job but are marginally attached to the labour force. In the right chart, the data are measured as standard deviations from the average for 2000-17. Sources: Datastream, ONS and BoE

Figure 5. Revisions to YoY GDP Growth from First Release Data, 1990-2014Q2



Note: We only show revisions in the first three years after the data are published. Sources: ONS and BoE

Figure 6. Estimates of UK Potential GDP Growth, YoY, 1980-2017



Sources: IMF, OECD, European Commission, OBR and BoE

Figure 7. Estimates of UK Output Gap, Pct of Potential Output, 1980-2017

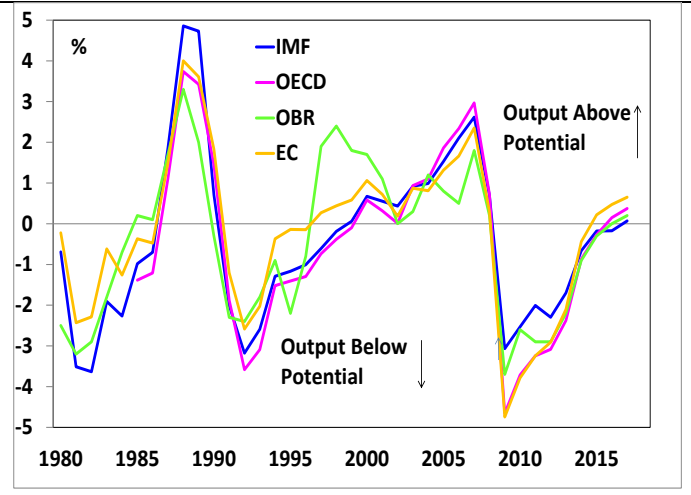
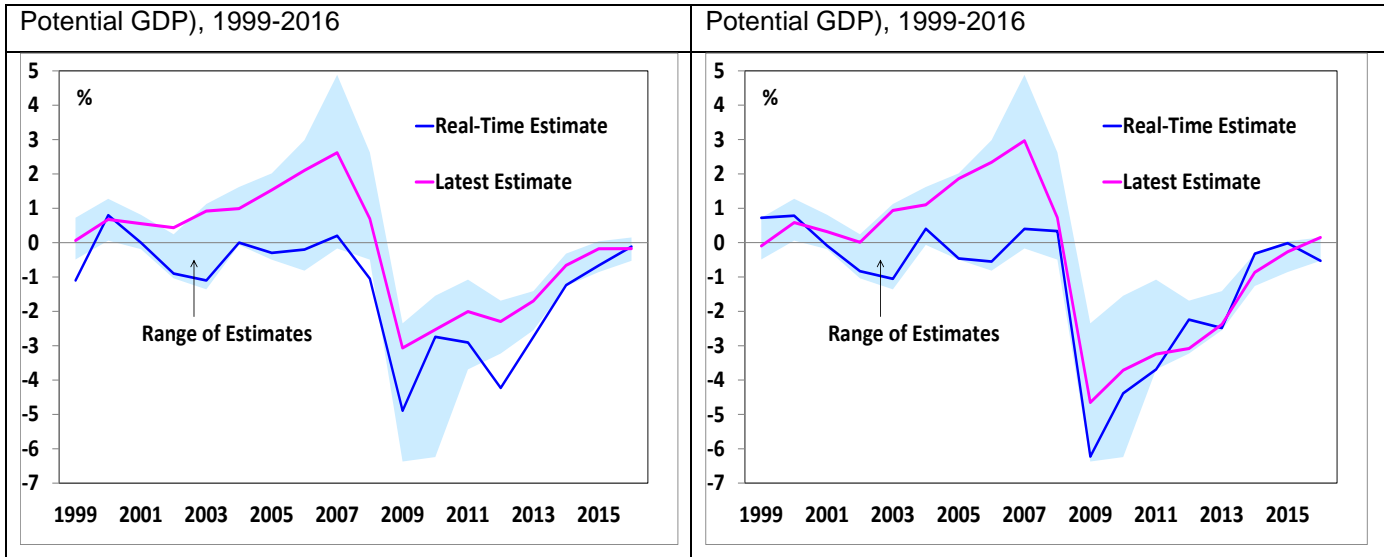
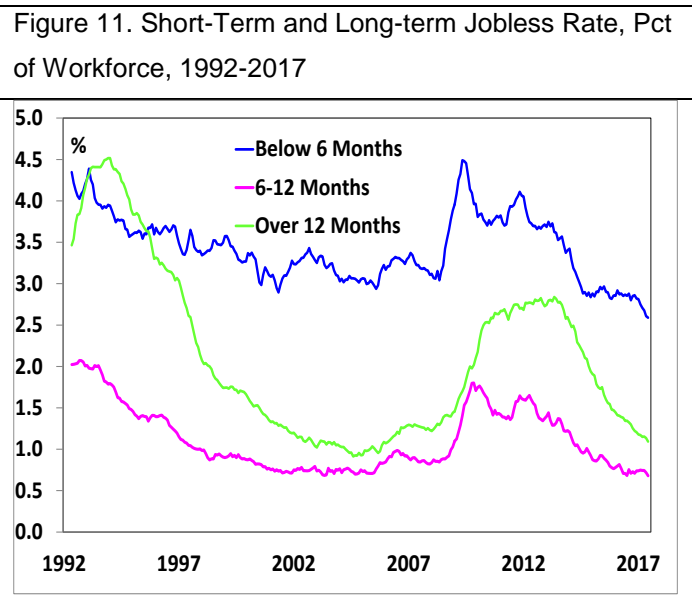
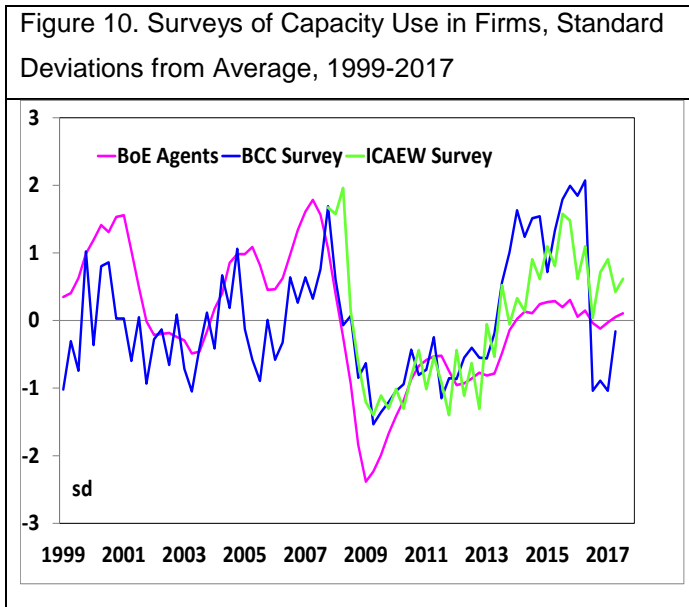


Figure 8. IMF Estimates of UK Output Gap (as Pct

Figure 9. OECD Estimates of UK Output Gap (as Pct



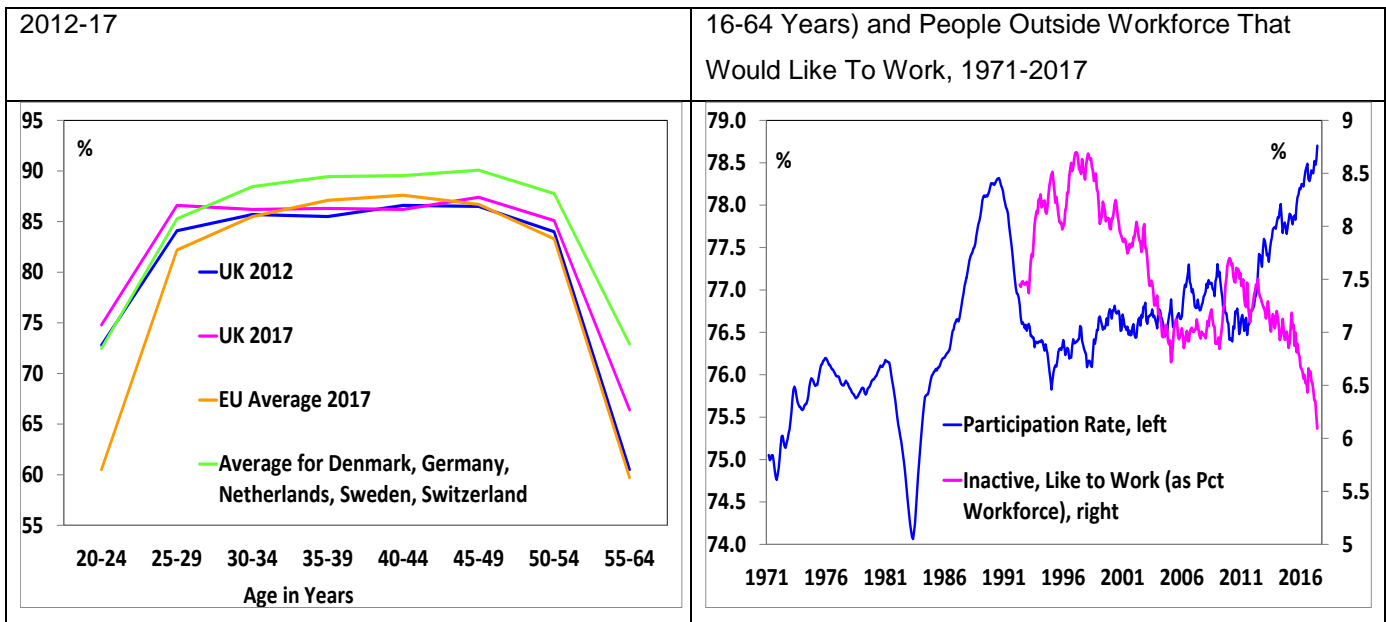
Note: For both charts, the real-time estimate is that published at the end of each calendar year for the same year. The range of estimates show figures for the output gap in each year published after that year. Sources: IMF, OECD and BoE



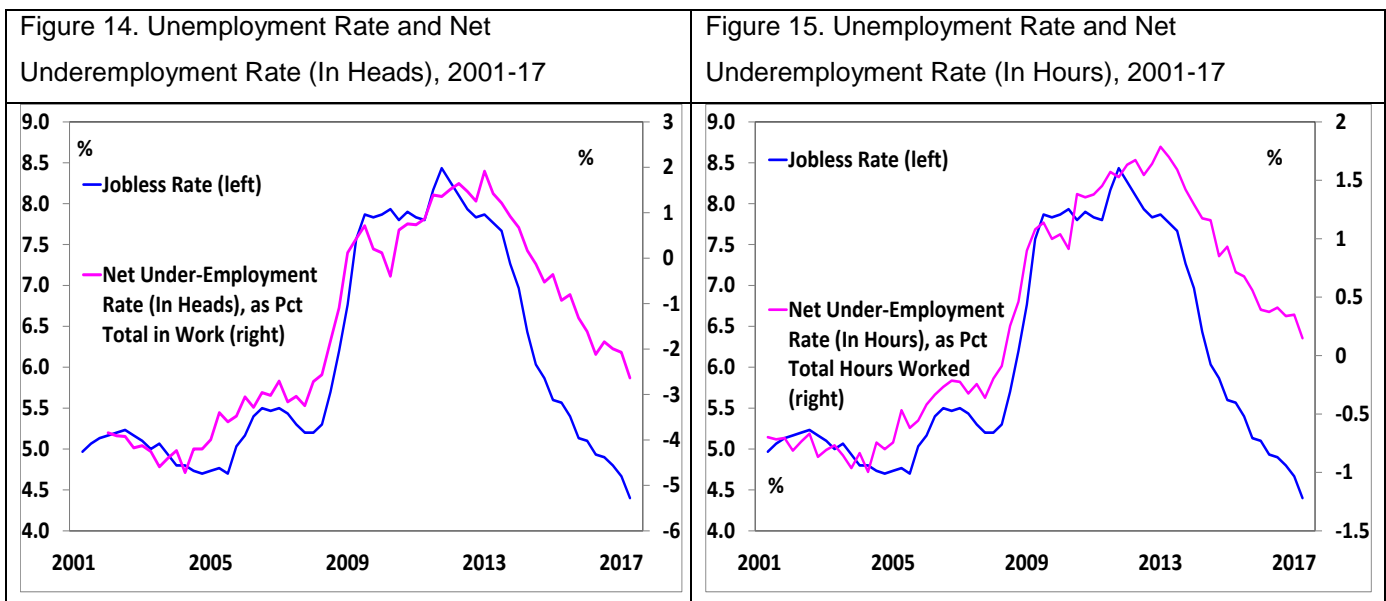
Note: In the left chart, the BCC and BoE agents are weighted averages of industry sectors and measured as standard deviations from the average for 2000-17. The ICAEW survey is measured over the average since the survey began in Q4-2007. Sources: ONS, BCC, CBI and BoE

Figure 12. Workforce Participation Rate By Age Group,

Figure 13. Workforce Participation Rate (People Aged

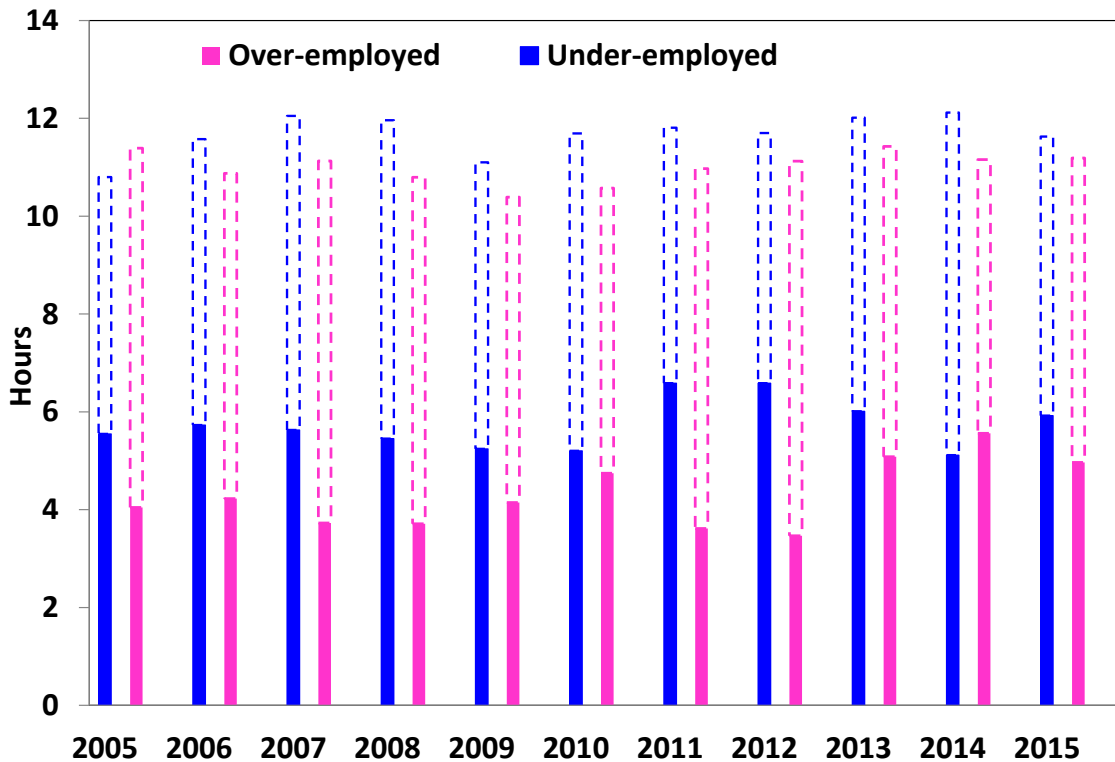


Note: In the left chart, data are measured in Q1 each year. Denmark, Germany, the Netherlands, Sweden and Switzerland have the highest participation rates for people aged 25-64 years among major European countries (ex UK). Sources: Eurostat, ONS and BoE



Note: The charts show the net balance between under-employment and over-employment. The left chart uses the number of under- and over-employed people, the right chart uses the desired change in aggregate hours of the under- and over-employed. Sources: ONS and BoE

Figure 16. Desired and Actual Change in Hours Worked Among People Moving From Being Under-Employed and Over-Employed to Fully Employed, 2005-15



Note: The data show people who judge themselves to be under- (or over-) employed in each year and fully employed a year later. The dotted bars show the averaged desired change in the first year in hours worked, the solid bars show the actual change in hours worked from year one to year two. Sources: ONS and BoE

Figure 17. YoY Growth in Employment in the UK of People Born in EU (Ex UK) (as Pct Total in Work), 1999-17

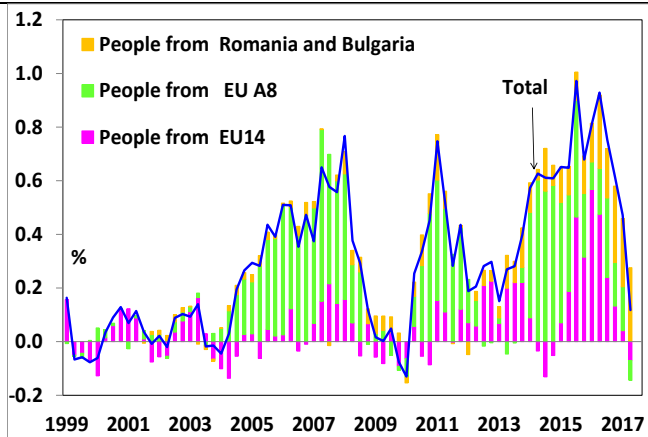
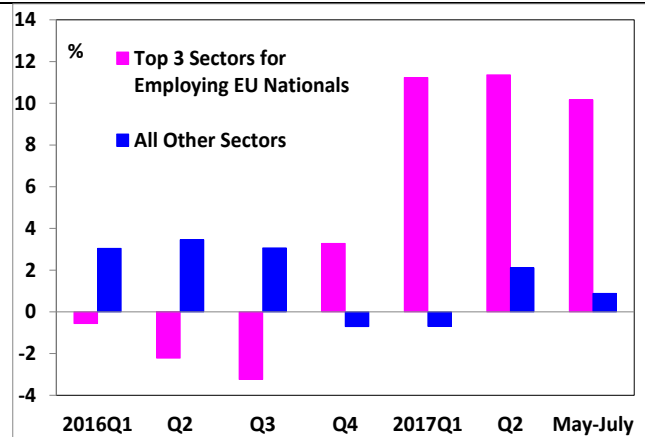


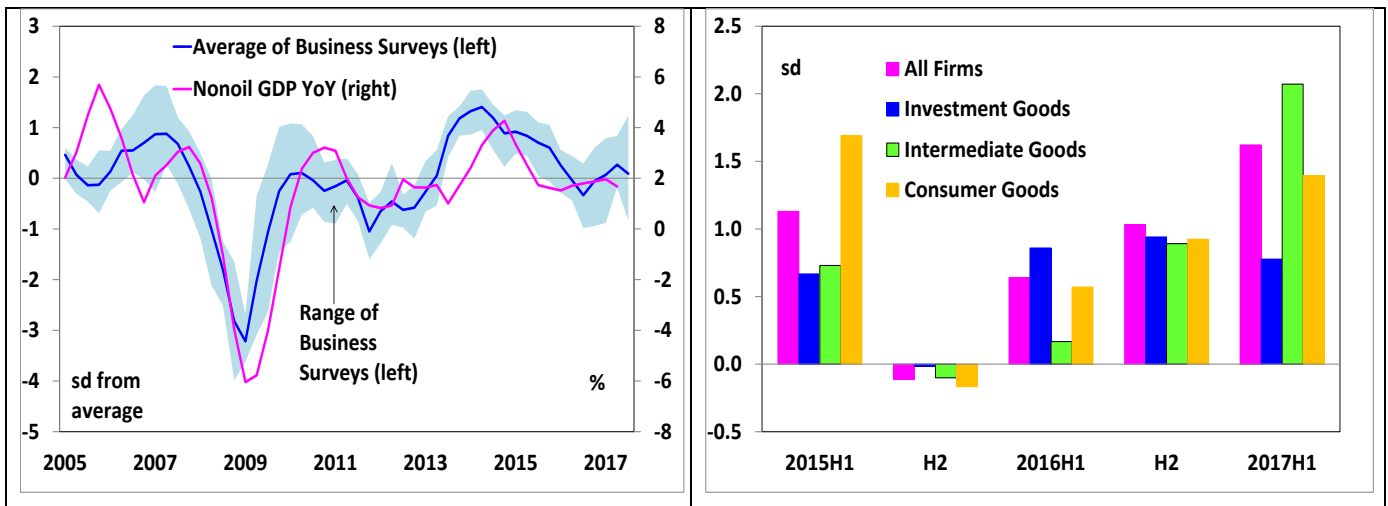
Figure 18. YoY Growth of Job Vacancies By Industry Sector, 2016-17



Note: In the right chart, the three industry sectors with the highest share of employment of EU nationals are manufacturing, accommodation and food services, and administrative and support services. Sources: ONS and BoE

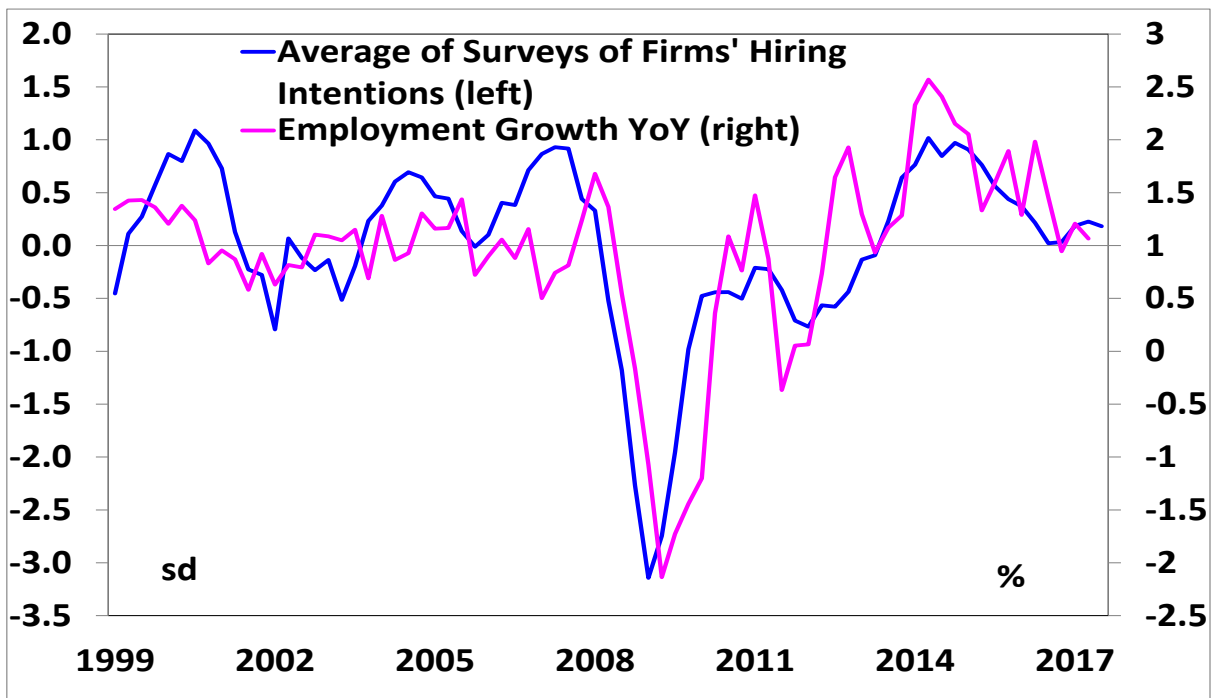
Figure 19. Survey Guides to Economic Growth, 2005-17

Figure 20. Net Balance of Manufacturing Firms Reporting Rise in Domestic Orders, 2015-17



Note: In the left chart, the survey guides used are the Composite PMI (average of activity and expectations), BCC deliveries and orders, BoE agents activity readings, European Commission ESI, Lloyds Business Barometer, ICAEW business confidence, all measured quarterly and as standard deviations from average. In the right chart, the data are shown as standard deviations from the average for 1997-2016. Sources: CBI, BCC, Manpower, REC, Lloyds Bank and BoE

Figure 21. Survey Guides to Firms' Hiring Intentions (standard deviations from average), and Job Growth YoY, 1999-17



Note: We use a range of survey guides to firms' hiring intentions, shown as standard deviations from the average for 2000-17. Sources: CBI, BCC, REC, Markit, Manpower and BoE.