PROSPECTS FOR THE UK ECONOMY

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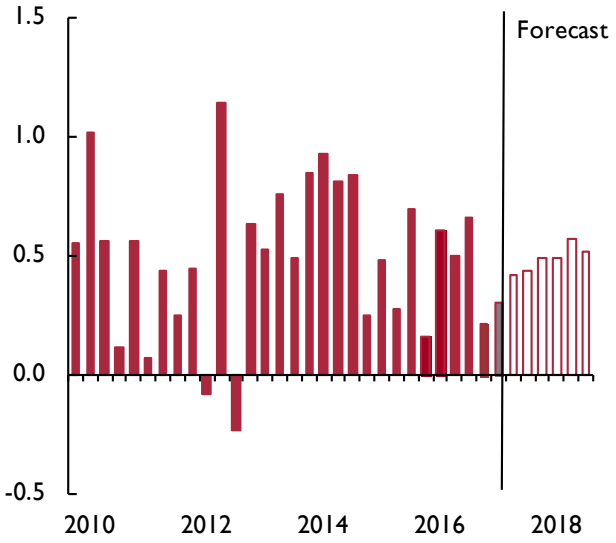
Introduction

The general election held on 8 June delivered an unexpected result. The ruling Conservative Party was widely expected to gain parliamentary seats at the cost of the main opposition Labour party and solidify its hold over parliament. Instead, they lost seats and were forced to enter into a confidence and supply arrangement with the Northern Irish Democratic Unionist Party, raising the prospect of another early general election and all this just as the UK started formal negotiations for withdrawing from the EU. The British electorate has been asked to vote in each of the past four years, starting with the Scottish referendum in 2014, a general election in 2015, the EU referendum in 2016 and the early general election this year. It is hardly surprising then that the odds for another early general election stand at 80 per cent according to the average of the three largest betting companies.

The outcome of the general election has undoubtedly raised political uncertainty in the UK, but the impact on the economy and financial markets is not entirely clear. To start with, recent history suggests something of a disconnect between political outcomes and the economy. For example, GDP growth scenarios related to exit from the EU that were at the lower end of the distribution have so far proved to be too pessimistic (Box B), but also and more specific to the general election outcome, there is a perception that the new government will look to negotiate a 'softer' exit from the EU because it is now more dependent on constituencies that are in favour of a stronger link with the EU.

The two most important changes to our forecast relate to monetary policy and inflation. We no longer believe that the Monetary Policy Committee (MPC) will wait until after the Brexit negotiation has been completed for its first rate hike. We have pencilled in our first increase in Bank Rate for the first quarter of 2018, the next in the third quarter of 2019, and a gentle path of increases thereafter, with the interest rate reaching 2 per cent in

Figure 1. Real GDP growth (per cent per quarter)



Source: Thomson Reuters Datastream, ONS, NIESR forecasts.
Note: ▭ is the preliminary estimate.

*NIESR. E–mail: a.kara@niesr.ac.uk. Thanks to Jagjit Chadha, Graham Hacche, Simon Kirby, Iana Liadze and Matteo Ramina for helpful comments and suggestions. We also thank Matteo Ramina for compiling the database. Unless otherwise stated, the source of all data reported in the figures and tables is the NiGEM database and forecast baseline. The UK forecast was completed on 26 July 2017. The production of this forecast is supported by the Institute's Corporate Members which include: Bank of England, HM Treasury, Mizuho Research Institute Ltd, Office for National Statistics, Santander (UK) plc and by the members of the NiGEM users group.

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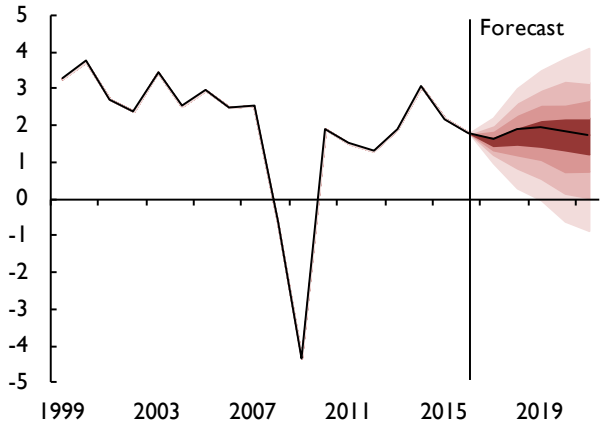
Table 1. Summary of the forecast — Percentage change

	2013	2014	2015	2016	2017	2018	2019	2020	2021
GDP	1.9	3.1	2.2	1.8	1.7	1.9	2.0	1.8	1.8
Per capita GDP	1.3	2.3	1.4	1.1	1.0	1.2	1.3	1.2	1.1
CPI Inflation	2.6	1.4	0.1	0.7	2.7	2.7	2.1	1.9	1.9
RPIX Inflation	3.1	2.4	1.0	1.9	3.5	3.3	2.8	2.5	2.5
RPDI	–0.1	1.5	3.6	1.5	–0.4	2.3	2.7	2.9	2.6
Unemployment, %	7.6	6.2	5.4	4.9	4.7	4.8	4.7	4.7	4.6
Bank Rate, %	0.5	0.5	0.5	0.4	0.3	0.5	0.6	1.1	1.5
Long rates, %	2.4	2.5	1.8	1.3	1.3	1.9	2.4	2.9	3.3
Effective exchange rate	–1.2	7.7	6.5	–9.6	–5.3	0.1	0.5	0.6	0.6
Current account as % of GDP	–4.4	–4.7	–4.3	–4.4	–3.8	–2.7	–1.3	–0.7	–0.6
PSNB % of GDP[a]	5.9	4.9	4.0	2.8	3.0	1.9	0.6	0.4	0.0
PSND[a]	82.0	84.0	84.2	86.9	90.4	89.0	86.5	78.8	75.1

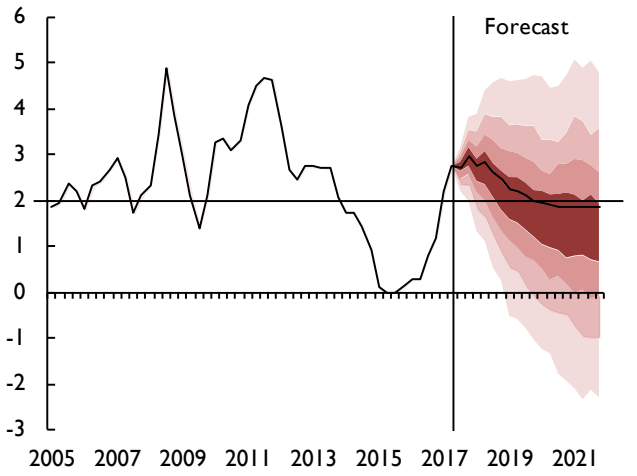
Notes: RPDI is real personal disposable income. PSNB is public sector net borrowing. PSND is public sector net debt. (a) Fiscal year, excludes the impact of financial sector interventions, but includes the flows from the Asset Purchase Facility of the Bank of England.

Figure 2. GDP growth fan chart (per cent per annum)



Source: NiGEM database, NIESR forecast and NiGEM stochastic simulations. Notes: Each bound represents a cumulative decile of the probability distribution around the August 2017 forecast.

Figure 3. CPI inflation rate fan chart (per cent per annum)



Source: NiGEM database, NIESR forecast and NiGEM stochastic simulations. Notes: Each bound represents a cumulative decile of the probability distribution around the August 2017 forecast. The Bank of England's inflation target is 2 per cent per annum.

the second half of 2022. The most proximate reason for the change is our view that the economy has performed better-than-expected ever since the stimulus measures introduced by the Bank of England (BoE) in August last year in response to EU referendum result. The *Review* contains several papers that discuss exit strategies, but more broadly, the Commentary by Jagjit Chadha raises the case for monetary policy normalisation.

We have revised our forecast for CPI inflation down this year. Where previously we had inflation peaking at 3.4 per cent in the final quarter of this year, we now see inflation at 3.0 per cent over the same period. The main reason for the revision to our forecast is recent data outturns. Annual CPI inflation for the second quarter of 2017 was 2.7 per cent, significantly below our forecast of 3.3 per cent. In addition, the oil price in sterling has

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fallen by 7 per cent since the May *Review*. Even with this forecast downgrade, CPI inflation remains above the target rate of 2 per cent until the second half of 2019, after which it stabilises at around 2 per cent.

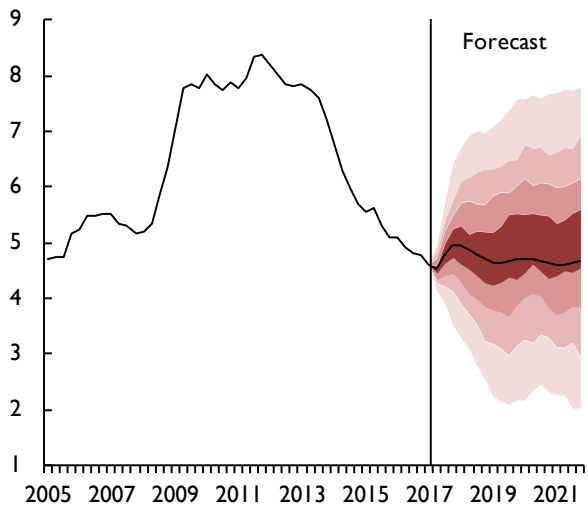
The ONS's *Preliminary Estimate* of GDP suggests that the economy grew by 0.3 per cent in the second quarter of 2017, in line with our nowcast produced in July. This suggests that the slowdown in growth apparent in the first quarter has persisted into the second, with growth below our estimate of capacity.

Our expectation for GDP remains unchanged from our previous forecast with growth of 1.7 per cent this year increasing to 1.9 per cent in the next.

The source of the projected slowdown in GDP remains weaker domestic demand, as consumption expenditure reacts to the erosion of household purchasing power as a result of elevated inflation levels. However, on the back of more optimistic survey data we have revised our projections for investment growth up this year, and as a result slightly down in the next. The most significant change to the forecast for the expenditure components of GDP is that of exports, which we have revised upwards both this year and next following a stronger outlook for the Euro Area.

In the first quarter of 2017, the saving rate dropped precipitously to a historic low of 1.7 per cent of household income despite a weaker outturn in consumption than in the final half of 2016. We forecast the household saving rate to increase both this year and next to 2.7 and 4.8 per cent of incomes respectively, indicating that households will reduce their propensity to consume from income relative to current levels. Should households choose to maintain their current levels of consumption, this would simultaneously represent both an upside and a downside risk to our projections. On one hand, this would lead to higher consumption growth than we have forecast and thus support economic activity, while on the other it implies a further build up of household debt which remains elevated at 146 per cent of income. As noted by Bunn and Rostom (2016), indebted households react more severely to adverse economic shocks, which increase the vulnerability of the economy. This is especially true given the lack of fiscal and monetary space to offset such a shock.

Figure 4. Unemployment rate fan chart (per cent of labour force)



Source: NiGEM database, NIESR forecast and NiGEM stochastic simulations.
Note: Each bound represents a cumulative decile of the probability distribution around the August 2017 forecast.

The performance of unemployment has continued to surprise, edging down further to 4.5 per cent in May, around the Bank of England's estimates of the rate that is consistent with stable inflation. The strong performance of the labour market in terms of unemployment has not supported wage growth, which continues to remain subdued. This year, we expect average earnings to grow by 2.2 per cent per annum. We predict there will be a pick-up next year to 3.1 per cent per annum but this is crucially dependent on an improvement in productivity growth. The most recent period provides no suggestion that this is yet underway. In the first quarter, labour productivity contracted by ½ per cent, returning it once more to below the pre-recession peak, ten years prior. The return of meaningful growth rates remains the key domestic risk to our forecast, not least that living standards would not increase, see article by Chadha *et al*. in this *Review*.

If the productivity puzzle were to persist, this would pose a significant risk to our fiscal projections. As productivity is a key determinant of an economy's capacity, a reduction in productivity will lower output and, as a result, increase the relative burden of debt. Even minor changes in the rate of growth can have a major effect on debt dynamics. For example, the Office for Budget Responsibility calculate that a 0.1 percentage point drop in GDP sustained over the next 50 years would, all else equal, raise the debt-to-GDP ratio by 50 percentage points.

Monetary conditions

We have revised our path for the policy rate in this forecast. Previously we had assumed that the MPC

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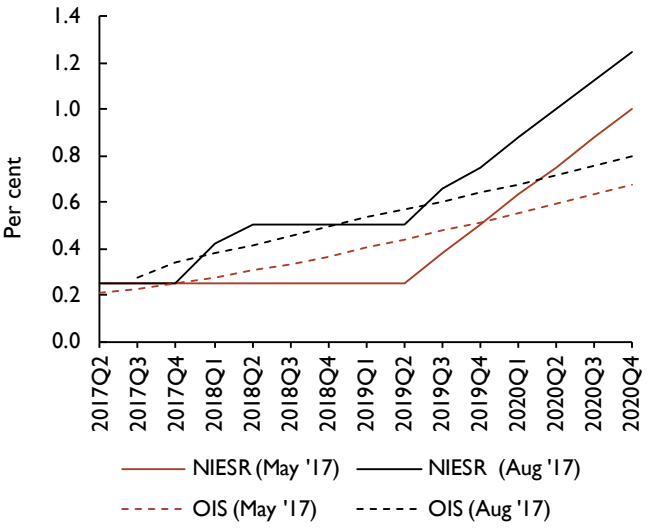
Figure 5. OIS curve and NIESR Bank Rate forecast



Source: Bank of England and NIESR.

would hold Bank Rate unchanged at 0.25 per cent until the UK exits the EU in 2019. We now condition our latest forecast on a 25 basis point increase in February next year, followed by another rate hike in the third quarter of 2019 and gentle increases thereafter, with Bank Rate reaching 2 per cent in the second half of 2022.

Figure 5 shows that our expectation of the path of monetary policy is tighter than that of financial markets, as implied by the forward overnight index swap (OIS) curve. At the time of writing, the OIS curve is pricing a 25 basis point increase at the start of 2019, a year later than our first rate hike, and a second increase in 2020. The OIS curve remains well below our conditioning path further out with the rate in mid-2022 at just 1 per cent.

The MPC has stated that it will continue to reinvest the proceeds from maturing bonds bought under its Asset Purchase Facility (APF) until the policy rate reaches 2 per cent. On our forecast, this occurs in mid-2022, at which point we expect the Bank's balance sheet to shrink as bonds mature and are not reinvested, rather than selling back to the secondary market. There are a number of complications with the unwinding of QE and the note by William Allen in this *Review* raises some of the concerns and recommends that the Bank transfers the APF gilts to the Debt Management Office to manage this process of unwinding. Also, Farmer, in this *Review*, suggests that the central bank's balance sheet should not shrink to pre-crisis levels.

This *Review* contains articles related to monetary policy exit strategies (Farmer) and broader issues related to the structure of monetary policy (Allen and Sinclair). One can also add to the various prescriptions outlined in these papers the possibility of an exit strategy where the MPC implements smaller-than-usual 5–10 basis point rate hikes, instead of 25 basis points. Smaller rate hikes have the advantage of reinforcing the message that the rate hiking cycle will be gentle, thereby limiting the impact on long-term bonds. What is more, smaller-than-usual rate hikes are not unusual from a historical perspective. After all, when the level of the policy rate was in excess of 10 per cent in the 1980s, rates were frequently changed by 50–100 basis points and as the level of the policy rate has fallen, the amount by which the MPC has changed the policy rate has also fallen.

The MPC voted 5–3 in favour of maintaining the policy rate unchanged at 0.25 per cent at its June meeting. This decision was widely expected, but financial markets were surprised that three members dissented. The minority voted instead for an immediate 25 basis point rate hike, thereby reversing the rate cut from August last year. There was a unanimous view on the committee to maintain the stock of corporate and government bonds at their current levels and the committee reinforced the message that any policy rate increases going forward will be gentle and limited. The majority of MPC members who voted to maintain the current level of stimulus to the economy cited subdued wage growth, a weakening housing market and the sharp drop in new car registrations as some of the main factors that influenced their decision.

The three hawkish members highlighted that labour productivity continues to disappoint, employment growth has surprised on the upside, spare capacity is limited and inflation is judged to remain at elevated levels throughout their forecast horizon.

In our view there is a case for withdrawing some of the additional stimulus that was injected into the economy after the 2016 EU referendum. The MPC introduced a package of stimulus measures in August last year that included a 25 basis point reduction in Bank Rate, additional QE injection through government bond (£60 bn) and corporate bond (£10bn) purchases and a generous Term Funding Scheme (TFS) for banks and building societies. Figure 6 compares the Bank of England's August 2016 forecast with subsequent data outturns and it is evident that the economy has outperformed the Bank's forecast and inflation has

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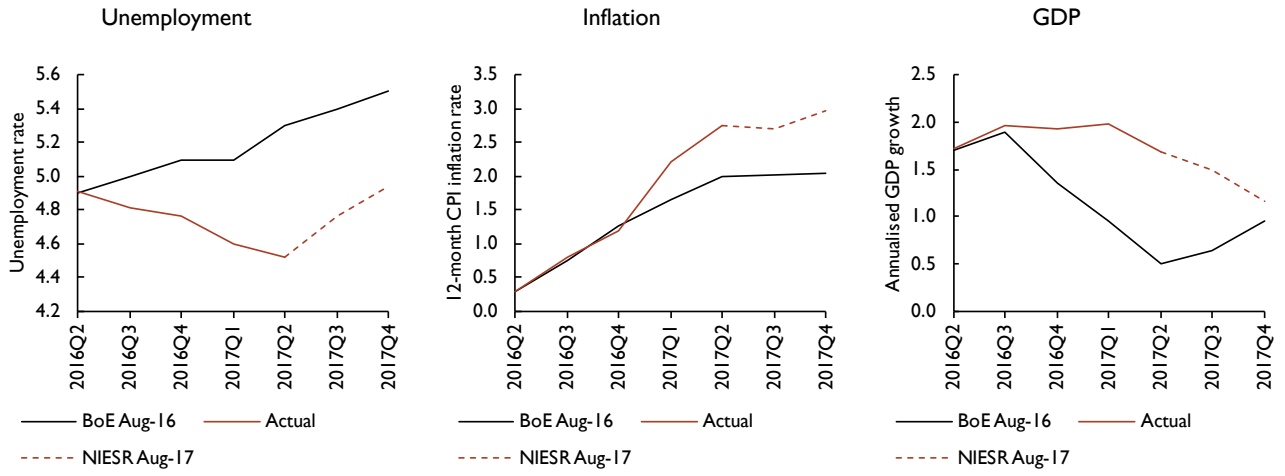
Figure 6. Bank of England's August 2016 forecast and outturns



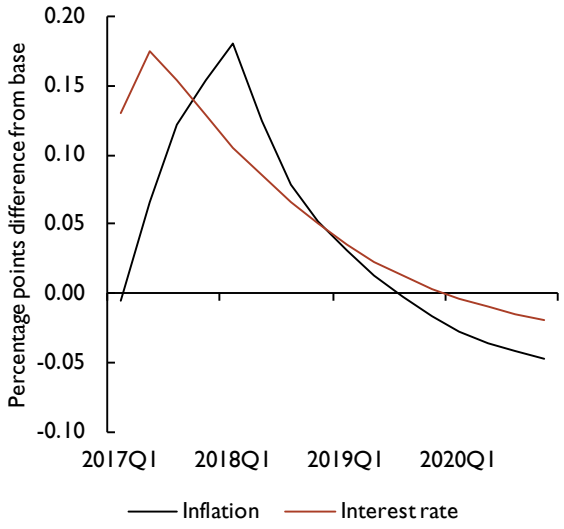
Source: Bank of England August Inflation Report, NIESR and ONS.

overshot the target by more than expected. It is against this backdrop that we anticipate and prescribe a modest rate hike. The increase we have introduced to our forecast only removes a small part of the stimulus injected into the economy, most recently in response to the 2016 EU referendum. In other words, even with this additional rate hike in 2017, monetary policy remains highly accommodative for the next few years on our forecast.

The BoE must in its future decisions abstract from headline growth and inflation data to make a difficult judgement on the amount of spare capacity in the economy and the underlying inflationary pressures. While we expect productivity to recover in our forecast, there is a risk that the anaemic performance of the past few years persists. After all, studies suggest that the supply capacity of the economy could be impacted adversely from trade restrictions that might emerge after the UK leaves the EU (see Kierzenkowski *et al.*, 2016). Should productivity growth not pick-up as we envisage in our forecast, this would imply a lesser degree of slack remaining in the economy. Given the long lags associated with the standard monetary policy transmission mechanism, this could lead the BoE to increase interest rates at a faster pace than we have assumed in our baseline in order to attempt to cut off inflationary pressures as they appear in the production chain.

With inflation persistently above the target, the risks to the path for the policy rate are weighted to the upside. There are a number of well-known risks, but one debate that has gained traction within government

Figure 7. Impact of 1 per cent increase in public sector wages



Source: NiGEM database and NIESR forecast.

since the June general election relates to public sector wages. The Chancellor is under pressure from some quarters to raise the 1 per cent cap on public sector pay increases that has been in force since 2013/14 (for further discussion see Box C). Would such a move trigger a rate hike by the MPC? We use the National Institute's Global Econometric Model (NiGEM) to investigate the impact that a 1 per cent increase in public sector wages would have on the evolution of the interest rate path. As depicted in figure 7, the model prescribes a very modest

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response from the MPC, less than a full rate hike of 25 basis points. It is important to note that in this scenario we assume that there are no spillovers into the private sector wage bargaining process as a result of dropping the public sector pay freeze and as such it represents the minimum pressure that could be exerted on inflation and monetary policy. Given that total public sector employment represents about 1/6 of the workforce, it follows that the overall impact on inflation is relatively limited. However, should spillovers from the public to the private sector become evident, we would expect the MPC to respond with a more aggressive tightening than that which underpins our modal forecast, especially if private sector wage growth is not accompanied by gains in labour productivity.

Although the risks to monetary policy are weighted to the upside, there are circumstances in which the MPC may yet consider further stimulus from here. One such source might be a rise in uncertainty for households and businesses, which would, for households, drive the saving ratio higher than our baseline forecast and for businesses, a spike in uncertainty could adversely impact on investment prospects.

The Bank of England has tools within the remit of the Financial Policy Committee (FPC) that can be deployed to manage the size of the banking sector balance sheet and also sectoral lending. These measures have obvious spillover effects on GDP growth, inflation and therefore monetary policy. The FPC raised the amount of capital that banks need to hold from 0 per cent to 0.5 per cent of risk-weighted assets and is set to raise it further to 1 per cent in November. Should the FPC deem the risks emanating from consumer credit to be excessive, the committee could introduce specific measures to slow lending which in turn would have an impact on consumer spending.

Prices and earnings

The depreciation of the sterling effective exchange rate between the third quarter of 2015 and the fourth quarter of 2016 has led to a gradual intensification of consumer price inflation, reaching a peak in May 2017 of 2.9 per cent. However, in June consumer price inflation dropped back to 2.6 per cent, meaning that inflation averaged 2.7 per cent in the second quarter, 0.5 percentage points below our forecast published in the May *Review*. As a consequence of the weaker than expected June inflation rate, we have revised downward our projections for inflation which we now expect to average 2.7 per cent this year, down from 3.0 in the May *Review*, and 2.7 in the next.

Our quarterly inflation profile for 2017 implies that the June outturn does not constitute the turning point for inflation, rather a temporary dip. We continue to expect inflation to peak in the final quarter of 2017, but we have however revised this down to 3 per cent, from 3.4 in our May forecast. After the end of this year, inflation is forecast to gradually moderate, returning to the Bank of England's 2 per cent target by the second half of 2019.

As was the case in May, all of the broad components of the inflation index contributed positively to the inflation rate. The largest contribution came from transport, which added 0.7 per cent to the headline number when compared with the same month a year ago. However, this sector also accounted for around half of the fall between May and June, largely driven by falling motor fuel prices, which are likely to have been pushed down by recent movements in oil prices.

Changes to our oil price projections are one of the main contributors to our revised inflation projections. After having reached a trough in the first quarter of 2016 at $32.5 per barrel, they proceeded to bounce back strongly, reaching $53.5 in the first quarter of 2017, which constitutes a rate of growth of 64.6 per cent. However, this trend stopped abruptly in the second quarter as oil prices contracted by 6.3 per cent when compared with the first. Our oil price projections, which are based on those produced by the Energy Information Administration (EIA), have been revised downwards accordingly. It is now predicted that for 2017, on average oil prices will grow by 17.2 per cent compared with 27.9 per cent in May, leading to less inflationary pressure than previously envisaged.

Inflation is also affected by exchange rate developments via import prices. As twelve months have passed since the referendum and the coinciding 10 per cent depreciation of sterling in nominal effective terms, the direct effects of this shock on import prices will have now passed. Subsequently, it should be expected that import price growth will soften throughout the rest of this year, providing disinflationary pressure onto the headline rate. Conversely, since our last forecast the effective exchange rate has depreciated by 3.6 per cent. Domestically, the tightly contested general election – held on 8 June and ending with a hung parliament – prompted the majority of the movement. The effective exchange rate peaked on 10 May, and fell steadily until two days after the election, at which point it had depreciated by 4.2 per cent. A second domestic cause was the weaker than expected inflation data outturn in June, lessening the probability of an imminent rate hike by the BoE, which

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Box A. CPI inflation forecast revised lower

We have revised lower our forecast for CPI inflation this year. Where previously we had inflation peaking at 3.4 per cent in the final quarter of this year, we now see inflation at 3.0 per cent over the same period (figure A1). To be sure, we still expect inflation to rise this year and a further squeeze in real wages and as before we see inflation easing back to the target rate of 2 per cent in 2018/20. The main reason for the revision is data outturns. Annual CPI inflation for the second quarter of 2017 was 2.7 per cent, significantly below our forecast of 3.3 per cent. Another reason is that the oil price has fallen by 8 per cent in US dollar terms in June and although sterling has depreciated over this period, the weakness is mainly against the euro rather than the US dollar and because of that the sterling price of oil is 7 per cent lower.[1]

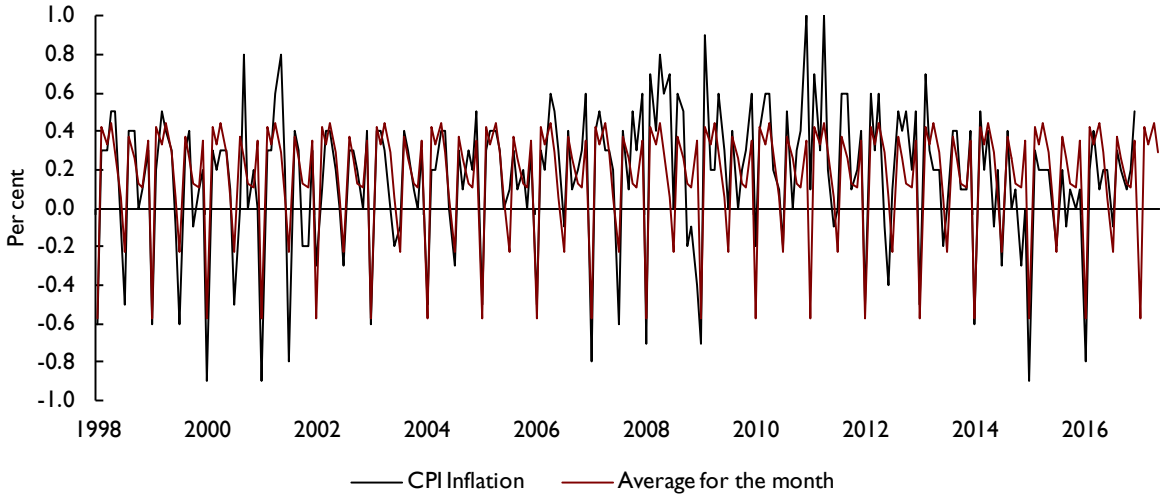
Our short-term inflation forecast is primarily driven by an off-model calculation that is based on the seasonal pattern in the monthly CPI data. The CPI data series is highly seasonal. Figure A2 below shows the monthly change in the CPI index since 1998. Monthly inflation follows a seasonal pattern. According to this data, prices have on average fallen by 0.6 per cent in January, risen by 0.4 per cent in February, by 0.3 per cent in March etc. We have included in the same figure that average monthly inflation and the large overlap between the actual data and the monthly average strongly suggests that much of the monthly change in prices can be explained by the seasonal pattern. There are, of course, a number of factors other than seasonality that drive inflation in the short term and further out we know that inflation is ultimately driven by monetary policy, but a cursory glance at the chart highlights the importance of seasonality, particularly at a short time horizon.

We use this feature and augment it with a judgement on the exchange rate pass-through to drive our near-term inflation forecast. There are number of factors that determine the size and speed of exchange rate pass-through. The historical experience in the UK is that passthrough into import price deflator inflation is high, but the effects are substantially diminished by the time we get to consumer prices.[2]

We have had two recent episodes of sterling depreciation. The currency depreciated by 15 per cent in 2007/8 as the financial crisis unravelled in the UK and actual monthly inflation from July 2007 (t=0) to July 2008 (t=12) was a little higher than the monthly average (figure A3).[3] On average, monthly inflation was around 0.16 percentage point above the seasonal average for that 12-month period.

The chart also shows the analogous experience following the 2015–16 depreciation. Sterling depreciated by 10 per cent in response to the 23 June EU Referendum. The depreciation is smaller than during the 2007/8 episode and, as the figure below

Figure A1. Monthly CPI inflation and the average monthly inflation rate



Source: ONS and NIESR calculations.

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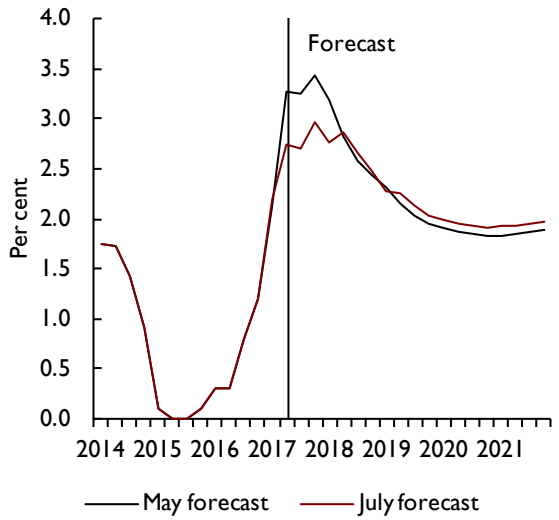
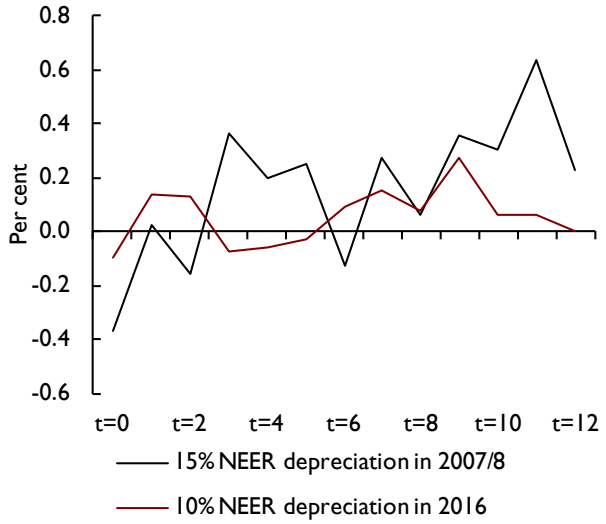
Box A. (continued)

Figure A2. UK annual CPI inflation, latest forecast and May 2017 forecast



Source: NiGEM.

Figure A3. Difference between actual and average monthly inflation following sterling depreciation in 2007/8 and 2016



Source: ONS and NIESR calculations.

shows, the monthly inflation outturns are on average just 0.06 percentage point higher compared with the seasonal pattern over the 12-month period, suggesting that the exchange rate pass-through is actually quite small.

Looking ahead, our short-term outlook for inflation is heavily influenced by the same seasonal pattern and alongside that a judgement on the residual pass-through from the 2017 depreciation and any fresh pass-through from the relatively small depreciation since our May forecast. We now expect inflation to peak at 3.0 per cent in 2017 Q4 and to gradually ease towards the target rate of 2 per cent in the first quarter of 2020.

NOTES

1 Data retrieved from FRED, Federal Reserve Bank of St. Louis.
2 Kara, A. and Nelson, E. (2003), 'The exchange rate and inflation in the UK', CEPR Discussion Paper No. 3783, February.
3 Nominal effective exchange rate data retrieved from the Bank of England.

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led to a 1 per cent depreciation. The improvement in the outlook for the Euro Area provides an external factor. As a result, the European Central Bank has dropped its preference for further accommodative policy which in turn caused the euro to appreciate on a trade-weighted basis by around 2.5 per cent in the second quarter.

In our forecast, exchange rates are determined by interest rate differentials adjusted for risk premia. Of the major central banks, the only significant change to our interest rate forecast is to that of the BoE (see Monetary Conditions section in this chapter). We now expect the Monetary Policy Committee to reverse the 25 basis point rate cut implemented immediately after the referendum by increasing interest rates by 25 basis points in February 2018. While this will lead to an appreciation of the exchange rate, it is our view that the recent depreciation will continue to outweigh this. We forecast exchange rates will have depreciated by 5.3 per cent on average this year and to be flat in the next, which will support inflation throughout 2018.

The route by which import prices reach the consumer is through the production chain, firstly into input prices, then to factory gate prices and finally to the CPI rate. Producer input price inflation peaked in January at 20.2 per cent compared with the same month in 2016 and has slowed in every month since. In June, input price inflation slowed to 9.9 per cent on an annual basis, with all subcomponents contributing positively. The moderation throughout this year has been driven by the fall in the price of crude oil inputs. Our forecast for oil prices would suggest that the producer price index should moderate further; this is however likely to be offset somewhat by the weaker outlook for the exchange rate.

For the first five months of this year, the moderation in input prices did not appear to have been passed onto output prices, with the annual rate hovering at around 3.6–3.7 per cent. In June, however, output prices dropped to 3.3 per cent; in a similar vein to input prices the drop in the rate between May and June is ascribed to petroleum products, but somewhat offset by faster price rises for electrical goods and transport products.

Underlying our forecasts for inflation is a return of meaningful rates of productivity growth, which in turn will increase growth in nominal earnings. As with our previous forecast, we assume that productivity will pick up. However, we have pushed the date at which this occurs back to 2018 rather than for a tentative return this year. This is due to the poor performance in the first quarter of this year, in which output per hour worked contracted by ½ per cent when compared with the previous quarter. We now expect whole economy productivity to grow by around 0.4 per cent this year and 1.4 per cent in the next compared with 1.1 per cent and 1.5 per cent from the May *Review*.

In the three months to May, average weekly earnings grew by 2 per cent when compared with the same three months in the previous year; this remains well below the pre-crisis average of 4.2 per cent. We expect average earnings to pick up from 2.2 per cent this year to 3.1 per cent in the next. However, this is conditional on productivity growth picking up, which represents the key domestic risk to our projections for inflation, earnings and living standards more generally. That wage growth has outpaced that of productivity growth in recent quarters implies that unit labour costs (ULC) have been relatively elevated. In the first quarter of 2017, ULC grew by 2.1 per cent on an annual basis and the fourth consecutive quarter of annual growth greater than 2 per cent and has been a key determinant in supporting inflation throughout this year.

The 1 per cent cap on public sector wage increases which has been in place since 2010 has meant that private sector wage growth outpaced that of public sector wages in recent years. The ongoing debate about lifting this cap may have positive, albeit limited, implications for our projections of overall earnings growth (see Box C, monetary conditions and public finance sections in this chapter). Our forecasts for productivity and wages therefore imply a continuation of inflationary pressure throughout the rest of 2017 before beginning to ease in 2018.

Components of demand

The ONS's preliminary estimate of GDP suggests that output grew by 0.3 per cent in the second quarter of 2017; this is in line with our nowcast, published at the start of July and slightly faster than the first quarter estimate of 0.2 per cent. Growth was driven by services, which expanded by 0.4 per cent compared to the previous quarter. Manufacturing and construction weighed strongly on output growth, contracting by 0.4 and 0.9 per cent respectively on the quarter.

Looking ahead, we expect output growth of 1.7 per cent and 1.9 per cent this year and next year. Economic growth returns to its potential rate – which we estimate to be around 2 per cent per annum – in 2019, and stays close to that rate to the end of the forecast horizon. The forecast for GDP growth is broadly unchanged from our May *Review*, but there are important revisions to some

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of the expenditure components. The main revisions relate to external trade, which is primarily driven by a more positive outlook for Euro Area growth prospects. Consistent with this, we expect stronger export volume growth. We also forecast stronger import volumes, as a result of an improvement in domestic demand conditions relating to a less pessimistic outlook for investment.

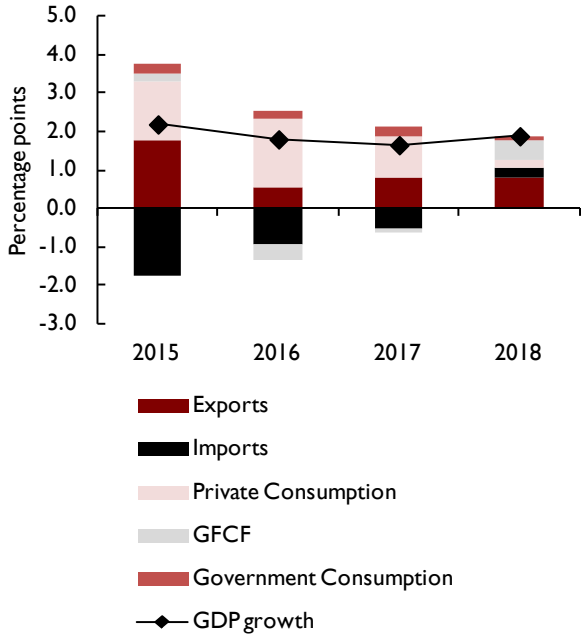
Figure 8 shows the contributions to GDP growth from each of the major demand components. Overall, we expect the net trade contribution to turn positive this year and strengthen next year, somewhat offsetting the declining contribution from consumer spending, which makes a negligible contribution next year.

This is a major turnaround because real consumer expenditure has been the main engine of growth between 2012 and 2016. After growth of 2.8 per cent in 2016, we expect real consumer expenditure growth to soften this year to 1.7 per cent, 0.3 per cent in 2018 and an average of 1.5 per cent from 2019–23.

The broad rationale for the squeeze on real consumption growth remains the same, high inflation, weak productivity and low wage growth weighing down on real personal disposable income. The impact on consumer spending has been offset to a certain extent by a sharp fall in saving rate to a record low of 1.7 per cent of nominal household income in the first quarter of 2017. Looking ahead, the scope for households to reduce their saving rates further is limited and a potential clamp down on different forms of personal credit form downside risks to our forecast. Combined with demographic developments, average real per capita consumption expenditure grew by 1.4 per cent between 2012 and 2016, a figure that remains well below the average growth rate of 3 per cent that prevailed between 1998 and 2007. The projected softening in real consumer expenditure implies that real consumption per capita will grow at 1 per cent in 2017.

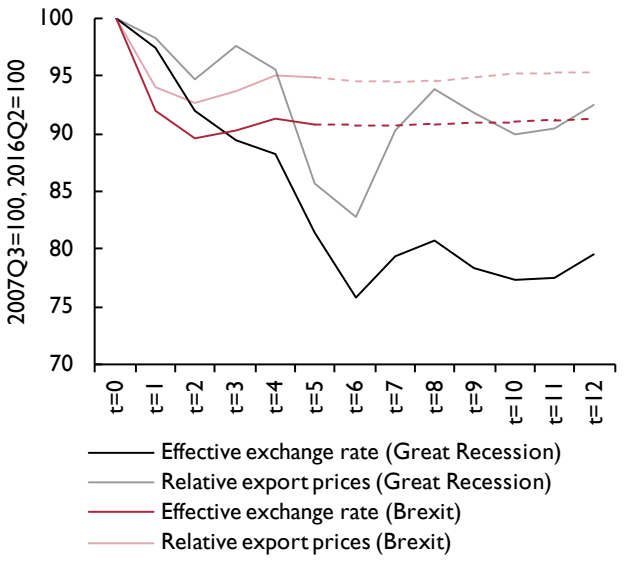
After robust growth in excess of 4 per cent since 2010, private sector investment (PSI) growth declined markedly through 2016 to 0.4 per cent, with a contraction in business investment of 1.5 per cent partly offset by growth in housing investment of 4.5 per cent. We explore this investment puzzle in Box D. Our current forecast has private sector investment to expand by 0.3 per cent this year and to return gradually to its pre-

Figure 8. Contributions to GDP growth



Source: ONS.

Figure 9. Effective exchange rate movements and export prices relative to competitors during the Great Recession and after the EU referendum



Source: NiGEM database and NIESR forecast.
Note: Series for the Great Recession start in 2007Q3, for the Brexit period in 2016Q2. Dashed lines depict forecasts from 2017Q3 onwards.

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Box B. How has the UK economy performed since the EU referendum?

The UK economy has slowed since the EU referendum last year. That slowdown was largely driven by a squeeze in household real disposable income and is broadly in line with the NIESR Brexit scenario published in May last year.

Before discussing our Brexit scenario, it is telling to compare UK economic performance over this period with the Euro Area. Figure B1 opposite shows the evolution of consensus GDP growth for 2017 from just before the referendum in June last year to the most recent reading in July this year. The figure clearly shows that GDP growth in the Euro Area and the UK have diverged – the outlook for Euro Area growth has been revised higher in contrast to the UK where the expectation is for a slowdown in 2017. Among the many factors that have influenced the UK and Euro Area GDP growth over the past year, the prospect of the UK exiting the EU is likely to have been an important one.

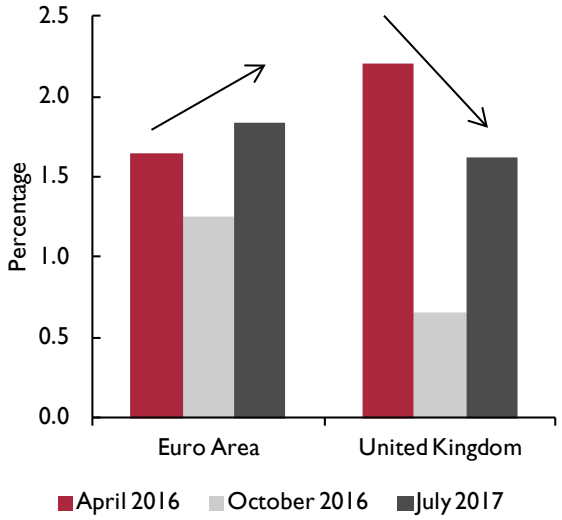
Figure B2 shows that the slowdown in output growth was remarkably gradual, from 2.2 per cent in 2015 to 1.8 in 2016 and, if consensus expectations for 2017 prove to be accurate, the economy will expand by 1.6 per cent this year.

How did the major forecasters perform? Figure B2 also shows a selection of Brexit scenario forecasts by Economists for Brexit, IMF, NIESR and OECD that were published ahead of the referendum. We have actual GDP growth data for 2016, and for 2017 we benchmark the Brexit forecast against the latest consensus forecast. All forecasters, with the exception of the 'Economists for Brexit', rightly envisaged that the economy will slow. Of these, HM Treasury had the most pessimistic outlook. The figure also highlights that the GDP growth forecasts published by OECD and NIESR were relatively accurate (see Chadha, 2016).

What made NIESR's forecast successful? If the forecast captured the broad dynamics, there was naturally some hit and some miss. One of the main contributing factors was the exchange rate pass-through. Most forecasters accurately predicted the 10 per cent depreciation of sterling compared to its main partners' currencies after the referendum.[1] But different assumptions on the speed and scale of pass-through into import and consumer prices produced more volatile inflation forecasts. As can be seen in figure B3, inflation was lower than predicted by any of the forecasters in our sample in 2016, but higher in 2017, with the exception of the IMF forecast.[2] Naturally, Brexit-driven exchange rate pass-through was not the only explanation behind the recent rise in inflation, but it was a key differentiating one among forecasts.

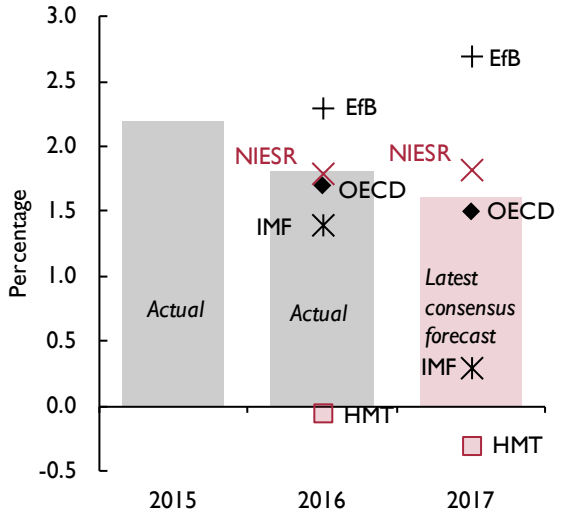
Despite the shock from the referendum result, consumption and private sector investments have surprised on the upside. In 2016, consumption grew by 2.8 per cent, which was the fastest pace since 2007. For the year 2017, NIESR

Figure B1. Consensus forecasts for 2017 GDP growth



Source: Consensus Economics.

Figure B2. Comparison of pre-referendum forecasts for GDP growth



Sources: NIESR, EfB (Economists for Brexit), HMT (HM Treasury), IMF and OECD.
Notes: The Treasury forecast represents the average of its optimistic and pessimistic forecasts. The NIESR forecast represents the average of the most optimistic and most pessimistic scenarios. The consensus forecast refers to the average of independent forecasts from HMT's June 2017 'Forecasts for the UK economy'.

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Box B. (continued)

had to revise its pre-referendum forecast for consumption growth from 1.2 per cent to 1.7 per cent and for private sector investment from a contraction of 5.1 per cent to an expansion of 0.3 per cent. As consumers' real disposable incomes have been squeezed by surging inflation, the stronger than expected consumption can be explained by a fall in the saving ratio. Indeed, the savings ratio fell to 1.7 per cent of disposable income in the first quarter (figure 12), which is the lowest point since at least 1963.

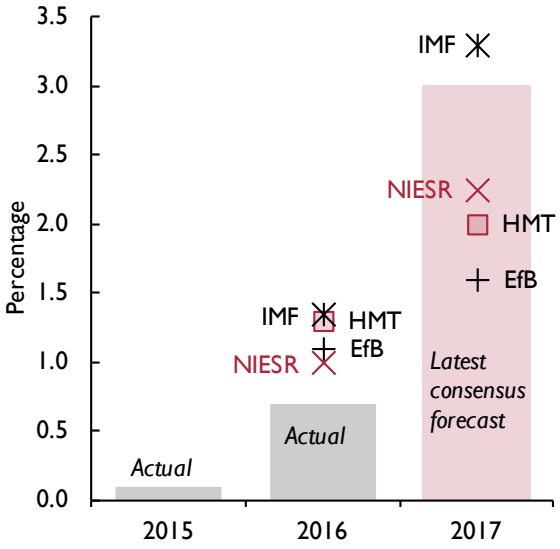
In the external sector, the rebalancing of the current account looks likely to take longer than expected. Both exports and imports are now forecast to grow in 2017, respectively, at 2.6 and 1.5 per cent in NIESR's current forecast, compared to a pre-Brexit forecast of 1.2 and –3.9 per cent respectively. The surprise resilience of imports in particular can be explained by the upside surprise in domestic demand expounded above. All in all, the negative contribution of higher imports compensates for the positive contributions of higher consumption and investment to make NIESR's headline GDP forecast reasonably accurate.

NOTES

1 The forecast range of sterling effective exchange rate depreciation was between 7.3 and 13.5 per cent, with the exception of Economists for Brexit who predicted 2.0 per cent. NIESR: 7.3, IMF: 10.0, OECD (exchange rate against the US dollar): 10.0 and HM Treasury: 13.5.
2 The OECD did not provide inflation forecasts in the case of Brexit.

This box was prepared by Amit Kara and Cyrille Lenoel.

Figure B3. Comparison of pre-referendum forecasts for inflation



Sources: NIESR, EfB, HMT and IMF.
Notes: See figure B2.

2016 expansion levels of 4 per cent by 2019. In May's *Review* we forecast growth of 4.8 per cent in 2018 and 5.5 per cent in 2019. Some of this positive revision can be explained by the strong first quarter data outturn for business investment, which indicated an expansion of 0.6 per cent after a contraction in 2016. However, the majority of the revision reflects our view that recent survey indicators suggest a more optimistic path is warranted. For example, the Bank of England's *Agents' Summary of Business Conditions* indicated investment intentions have ticked up. It is worth noting, however, that this survey was carried out before the election.

Government consumption has made a positive contribution to annual GDP growth since 2012. We have used the OBR's projections for the government's spending envelope from the *Economic and Fiscal Outlook* published in March this year as the basis for our government consumption projections. We forecast government consumption to provide a positive contribution of 0.1–0.2 percentage points to GDP growth each year for the next four years, unchanged from our forecast published in the May *Review*.

For the first time since 2011, we expect a positive contribution of net trade of 0.3 percentage points to the annual growth rate of output this year. Strong exports were responsible for most of the improvement in net trade in the final quarter of 2016. The depreciation of sterling in 2016 may, in part, be responsible, but the majority was a result of the erratic subcomponent of exports, related to non-monetary gold transactions, as explained in our May Review. The performance of the external sector is closely related to the strengthening growth of our largest trading partner, the EU, where output growth has been revised upwards by 0.4 percentage

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point in 2017. Following the depreciation, exporters face the trade-off between maintaining their margins or increasing their market share. Therefore, a risk to our forecast for exports is that exporters pass through the gain in competitiveness into export prices to a greater or lesser extent than we have anticipated. Figure 9 shows the depreciations alongside the evolution of export price competitiveness following the Great Recession and the referendum on the UK's membership of the EU. If the wedge between export prices and the effective exchange rate follows a similar pattern, we might not see the full benefits of the depreciation into increased export volumes in the following quarters. Conversely, if exporters pass more of the competitiveness gain through to prices, we would expect the net trade contribution to be higher.

Household sector

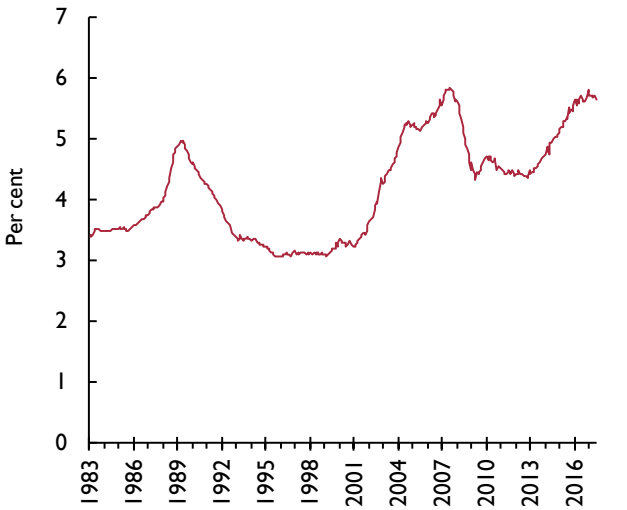
Real personal disposable income (real income henceforth) has declined in the first quarter of 2017, compared to the same quarter one year earlier. This follows a marked slowdown in real income growth, which more than halved in 2016 compared to the previous year. Since the third quarter of 2016, a pick-up in inflation has been weighing on real wages, an important determinant of real income. On a three-month on three-month basis, real wages have been flat or declining since July 2016.

The Spring Budget contained various changes likely to boost real personal disposable incomes. The minimum wage for workers aged 25 and over increased by 30 pence in April, while the personal tax allowance and the higher rate tax band have both shifted upwards to £11,500 and £45,000 per year, respectively. Additionally, the tax free Individual Savings Allowance (ISA) has increased from £15,240 in 2016/17 to £20,000 in 2017/18.

We expect real incomes to decline by 0.4 per cent in 2017 as real wages continue to be squeezed by high rates of inflation, before growing by 2.3 per cent in 2018 once the pass-through from last year's sterling depreciation is completed. Combined with ONS projections for population growth, our forecasts imply annual real income per capita growth of –1.1 and 1.6 per cent in 2017 and 2018. A key assumption underpinning our 2018 estimate is that meaningful productivity growth resumes. Failure for such productivity growth to materialise presents a downside risk to our real income and consumption forecasts.

According to the ONS mix adjusted house price index, our preferred measure, prices rose by 4.7 per cent in the 12 months to May 2017. Annual house price growth has averaged 4.8 per cent in 2017 so far, a moderate slowdown compared to average annual growth rates of 7 per cent in 2016 and 6 per cent in 2015. Both Halifax and Nationwide house price indices, which measure prices at the mortgage approval stage and act as leading indicators, show a similar pattern. It is worth noting that these aggregate numbers mask geographical divergences, for example, with London and North East markets underperforming those of East England and East Midlands, according to official data.

Figure 10. House price to earnings ratio



Source: Halifax.

Residential property transactions, which surged prior to an increase in stamp duty for buy-to-let properties and second homes in April 2017 and subsequently dropped, have more recently risen but remain lower than pre-crisis levels by 34 per cent.

Despite the apparent cooling in the housing market, the Halifax house price to earnings ratio reached a high of 5.80 in December 2016, only marginally below the pre-crisis peak of 5.83 in July 2007 (see figure 10). It has since declined somewhat, but remains very high by historical standards. This leaves households vulnerable to interest rate increases and other shocks.

Historically, the UK housing market displays a unique relationship between rental inflation and house price inflation. Unlike housing markets in other countries where house price and rental inflation tend to move in tandem, historically at least, prices and rental inflation have moved in opposite directions (see figure 11). The

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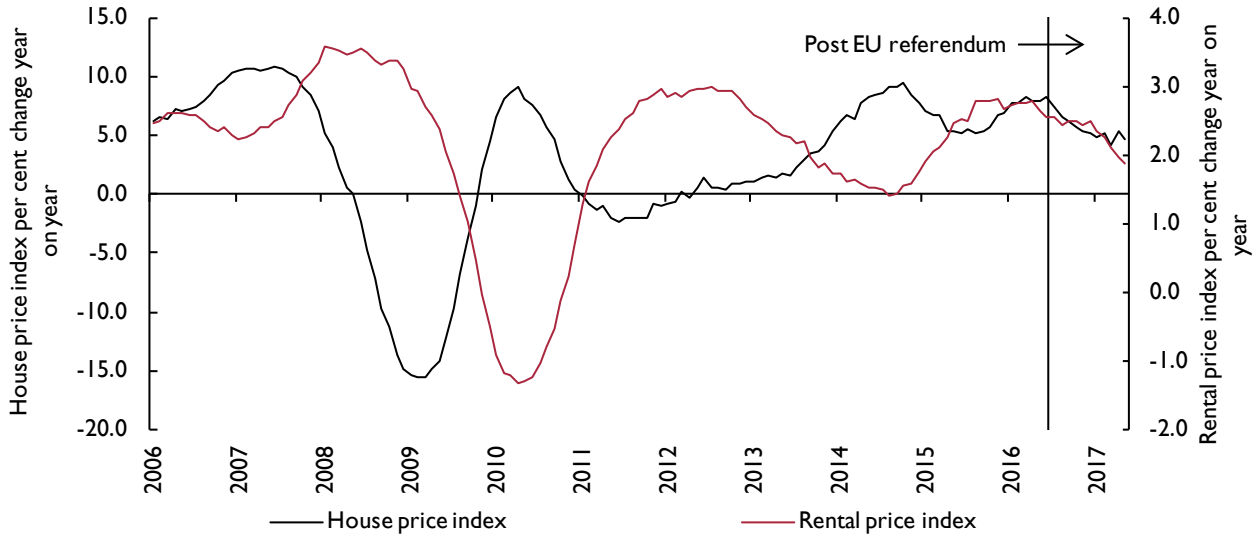
Figure 11. House price and rental price inflation



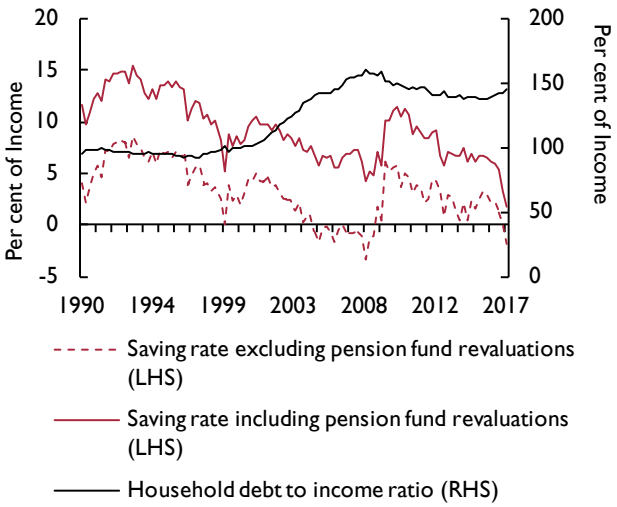
Source: ONS.

most obvious reason for this relationship is the balance between supply and demand. In a market with limited supply of homes and a fixed population where everyone needs either to rent or buy, the collective decision to purchase raises the price of buying and in this case rental inflation falls. A collective decision to rent, by contrast, achieves the opposite.

That relationship between house price inflation and rental inflation changed last year, they have started moving in tandem, and most recently followed a downward trend. One candidate explanation is that housing supply is outstripping demand. The data is not supportive. Housing completions in England (UK data covering the latest financial year is not yet available) have increased by 5.8 per cent in the financial year 2016/17, which is a slowdown compared to double digit growth rates in the previous two years. A more plausible explanation might relate to demand. Demand for housing, particularly as a second home, might have been squeezed by the tax changes introduced in 2016 by Chancellor Osborne. The squeeze in real incomes discussed above may have exerted downward pressure on rental prices and house prices. Also, net migration has fallen to its lowest level since the first quarter of 2014, further suggesting an easing of demand pressures.

Despite the developments in real incomes described above, consumption growth has been robust in recent quarters. It seems that household consumption has been funded by

Figure 12. Household saving rates and debt to income ratio



Source: NiGEM database.

a decline in saving rates (see figure 12). The saving rate (including pension fund readjustments) reached a historic low of 1.7 per cent of real disposable income in the first quarter of 2017, while the household debt to income ratio increased to 146 per cent, its highest level since 2011.

The saving ratio on a cash basis removes the adjustment for the change in pension entitlements, imputed

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rentals of owner-occupiers and charges for financial intermediation services indirectly measured (FISIM) from the calculation. In the first quarter of 2017, this measure fell by more than the national accounts saving ratio, to –4.8 per cent, its lowest level since the first quarter of 2008 when it reached –6.7 per cent.

The household debt to income ratio, while lower than during the financial crisis, remains high by historical standards at over 130 per cent. This matters because, as pointed out by Bunn and Rostom (2016), highly indebted households cut their consumption more aggressively in response to negative economic shocks. This presents another downside risk to our consumption forecast.

The ONS Retail Sales Index, which represents around a third of total consumer spending, is an early indicator of consumption. Data on the second quarter of 2017 show growth of 2.6 per cent in volume terms compared to the same quarter in 2016. This is a slight pick-up from the first quarter of this year, when retail sales grew by 2.1 per cent, but about half the average quarterly growth rate in 2016. The picture for consumption in the current quarter remains mixed, because other indicators of consumption, such as new car registrations, indicate weakness. We expect household consumption to expand by 1.7 per cent this year and 0.3 per cent next year.

Supply conditions

The unemployment rate of those aged 16 and over fell to 4.5 per cent in the three months to May 2017, its lowest level since 1975. In the same quarter, the employment rate of people aged 16–64 reached the highest rate since comparable records began in 1971 at 74.9 per cent. Economic inactivity of 16–64 year olds reached a record low of 21.5 per cent in the three months to March 2017, and has remained at that level through to the three months to May. We expect unemployment to average 4.7 per cent this year, rising slightly to 4.8 per cent in 2018 and staying at its long-run level of between 4.5 and 5.0 over the forecast horizon.

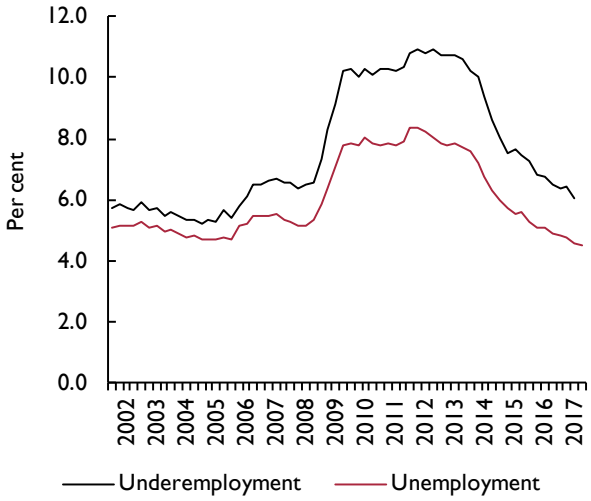
However, other indicators suggest that some slack remains in the labour market. Part-time workers as a percentage of total employees has fallen recently, but remains well above pre-crisis levels (figure 13). Self-employment as a percentage of total employment has been rising, reaching an all-time high of 15.1 per cent in the three months to January 2017, although it has fallen slightly to 15.0 per cent in the three months to May 2017. Higher self-employment can indicate hidden slack in the labour market if some of these workers would prefer to be employed within firms.

Workers who are currently in work but would prefer to work longer hours are defined as underemployed. Bell and Blanchflower (2010) suggest that underemployment might be associated with labour hoarding. Following the methodology used by Bell and Blanchflower (2013),

Figure 13. Part-time and self-employment

Sources: ONS and authors' calculations.

Figure 14. Unemployment and under-employment



Sources: ONS and authors' calculations.

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we have calculated an underemployment index which measures the excess supply of hours in the economy. It combines the hours that the unemployed would work if they could find employment with the difference between the number of hours that the employed would like to work and actual hours worked. From figure 14, we can see that the difference between underemployment and unemployment widened significantly during the Great Recession. Since then, underemployment and unemployment have both fallen, but the wedge between the two remains higher than that which pertained before the crisis, suggesting there is greater slack in the labour market than implied by the headline unemployment data.

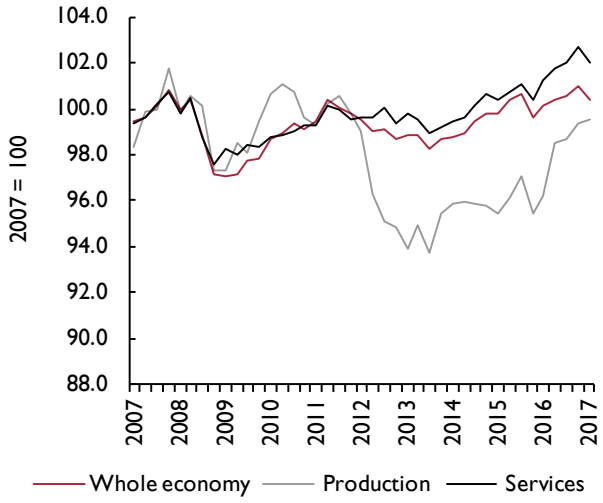
Despite the very low unemployment rate, real wage growth has been sluggish. Average real weekly earnings (excluding bonuses) declined for the fifth consecutive month on an annual basis. This may be attributed to a lack of productivity improvements in the economy. Additionally, the public sector pay cap may be limiting private sector wage growth. See the *Monetary conditions* section for further discussion as well as Box C.

Labour productivity in terms of output per hour contracted by ½ per cent in the first quarter of 2017 compared to the previous quarter. This was due to a contraction of 0.6 per cent in services productivity, while that of production grew by 0.2 per cent. Meaningful productivity growth following the economic recovery has yet to materialise and output per hour has fallen below the pre-recession peak. One possible explanation put forward for this is that capital shallowing has occurred as the low wage environment coupled with heightened uncertainty has prompted firms to substitute labour for capital.

The Bank of England's *Agents' Summary of Business Conditions* indicates that recruitment difficulties have increased in recent months, which raises concerns regarding a potential reduction in labour supply of EU nationals. Net migration has fallen substantially following the referendum on the UK's membership of the EU (figure 16). This has been largely driven by a decrease in immigration and an increase in emigration by EU citizens of 12 and 23 per cent respectively in the second half of 2016. In the absence of information on whether or not EU citizens will continue to enjoy free movement of labour within the UK following the UK's exit from the EU, we assume that the population will grow in line with the ONS' principal projection and do not assume decreased net migration from the EU. With EU nationals making up 7.3 per cent of employees in the three months to March 2017, further declines in net migration present a considerable downside risk to our employment and output forecasts.

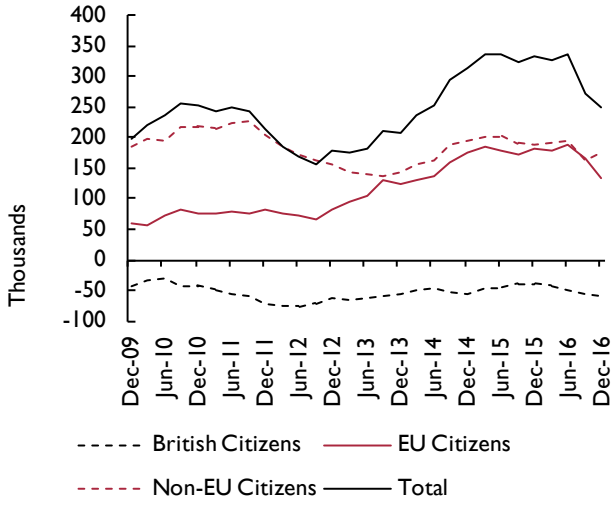
Following a weak 2016 when business investment contracted by 1½ per cent compared to the previous year, the first quarter of 2017 saw an expansion of 0.6 per cent. According to the Bank of England's *Agents'*

Figure 15. Output per hour



Source: ONS.

Figure 16. Net migration by country of origin



Source: ONS.

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Summary of Business Conditions, investment intentions in both services and manufacturing fell to a six-year low in August 2016, but have since increased steadily (see figure 17). The main factors limiting investment, as reported in the CBI *Investment Intentions Survey*, are uncertainty over future demand and low net return, cited by 47 and 45 per cent of respondents respectively. Historically, these have been the largest factors influencing investment, although the proportion citing low net return has risen sharply in the second quarter of this year, from 34 in the previous quarter and an average of 37 in 2016.

The combination of the strong outturn in the first quarter of this year and the pick-up in investment intentions has prompted us to raise our forecast for business investment this year. In terms of growth rates, we now expect much less of a rebound in 2018. We expect a contraction in business investment of 0.8 per cent in 2017 followed by growth of around 2½ per cent in 2018.

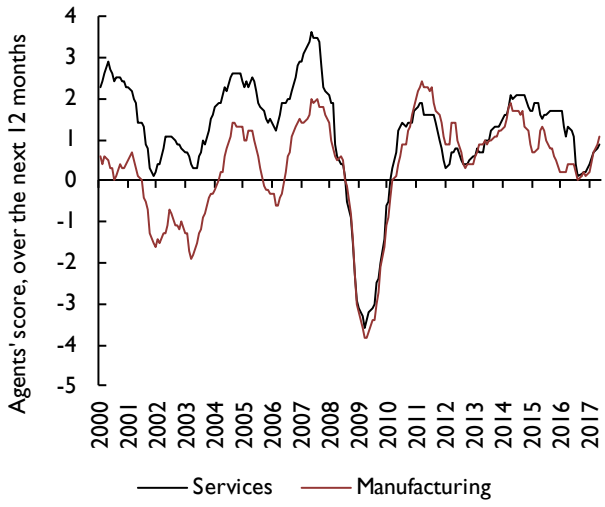
Public finances

Our public finance projections are subject to a number of macroeconomic and fiscal risks. The Office for Budget Responsibility (OBR) published its first *Fiscal risks report* in July. The report offers a comprehensive assessment of risks that can potentially derail the OBR's medium-term fiscal outlook and its assessment of debt sustainability. The report specifically identifies these risks and quantifies their impact. The *Fiscal risks report* will be published at least once every two years in line with the Charter for Budget Responsibility. The Government has one year in which to respond to the report.

The *Fiscal risks report* strongly encourages the government to address some long-term and politically difficult fiscal pressures and for the public to hold governments to account, and as such NIESR welcomes the report and its main recommendations. The risks identified in the report are diverse, wide-ranging and seemingly independent. Although the OBR has assigned a probability to many of the risks individually, the reality is that risks are correlated and a fuller understanding of the impact of risks must account for that correlation. NIESR's NiGEM model is well placed to assess the likely impact of such correlated risks through its stochastic simulations tool. Figure 18 shows the probability distribution of the path of fiscal debt relative to GDP.

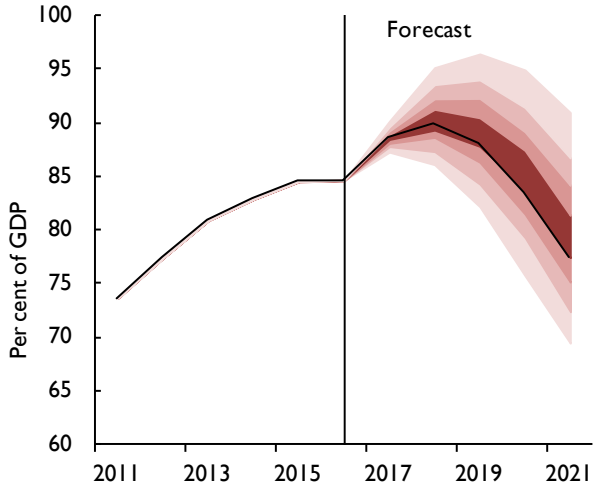
The risks identified range from macroeconomic drivers that are linked to: recession, financial crisis, Brexit, productivity and borrowing costs; to more specific policy initiatives such as the decision by successive governments to delay the hike in fuel duty and the triple lock on state pensions. They have listed other more general measures that include austerity fatigue, demographics and ageing and the concentration of tax receipts. The report also offers an estimate of contingent liabilities faced by

Figure 17. Investment intentions



Source: Bank of England.
Note: A positive (negative) score indicates a planned increase (decrease) in investment.

Figure 18. Probability distribution of public sector net debt



Source: NiGEM database, NiGEM forecast and NiGEM.

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the government such as nuclear decommissioning and medical negligence costs.

Among the different macroeconomic risks highlighted in this report, arguably the most worrying is the prospect of persistently weak productivity growth. To illustrate that point, the OBR projects that a 0.1 percentage point drop in GDP growth and tax receipts over the next 50 years, assuming an unchanged projection for spending growth, would drive the debt-to-GDP ratio some 50 percentage points higher than in a baseline case. To place this in context, a 50 percentage point increase in government indebtedness dwarfs most estimates of the EU exit 'divorce bill', which is the amount that the UK might have to pay to settle existing financial commitments to the EU. Indeed, even a bill of €75 billion would raise the debt-to-GDP ratio by just 3 percentage points in 2019 based on our forecasts. The relative magnitude of these statistics highlights, in no uncertain terms, the central importance to the fiscal position and the economy more generally of a Brexit deal that leaves productivity without major damage, and hence the growth prospects of the economy unaffected.

Turning to the fiscal rules, the Chancellor clarified at the annual Mansion House speech of June 2017 that the new government will aim to reach a balanced budget by the middle of the next decade. This is a softer stance than that of the pre-election Charter's last amendment in January 2017, to return the public finances to balance at the earliest possible date in the next Parliament, which would have begun in 2020. The interim target related to the cyclically-adjusted net balance requires the deficit to be 2 per cent of GDP, while the interim target for public sector net debt states that it must be reducing as a proportion of GDP by 2020–21, neither of these targets have been relaxed post-election.

Our fiscal projections are based on the taxation and spending plans from the 2017 Budget that was published in March. We use the spending assumptions outlined in the OBR's *Economic and Fiscal Outlook* which was published alongside the budget. Tax receipts and interest payments are endogenously determined within the model. Further out, we have also assumed that the government will no longer make a contribution to the EU budget after the conclusion of the negotiating process in the second quarter of 2019. The government has, on average, contributed net £7.1 billion to the EU from 2010 until 2014. There is an upside risk to our deficit and debt projections as a result of this assumption. We expect the budget deficit ratio to rise in the current fiscal year for the first time since 2009 to 3.1 per cent of GDP up from 2.7 per cent last year and broadly in line with the OBR's projections. Thereafter, the ratio falls again and on our current forecast the deficit is fully eliminated in 2022. As we expect nominal GDP growth to outpace that of the budget deficit, this implies that the net debt stock will peak in 2018/19 at 89.9 per cent of GDP, after which it declines throughout our forecast period, reaching around 74 per cent by 2022.

The Bank of England's term funding scheme (TFS) all but insures that public sector net debt to GDP ratio will be reducing by 2020–21. The TFS provides an alternative source of funding to UK banks. Through this scheme, the Bank will provide loans of up to £100 billion in total to eligible banks and building societies at rates close to Bank Rate for four years. The newly created central bank reserves are classified by the ONS as public sector net debt, as the loan assets are recorded as illiquid. However, the Bank will pass on the interest charged on these loans to the Treasury, reducing public sector net borrowing. As of June, £69.3 billion is already lent, which equates to approximately 3.6 per cent of GDP and 4 per cent of outstanding net debt.

In the meantime though, the fiscal deficit for 2017/18 is projected to rise by £12 billion in the OBR's forecast compared with the 2016/17 outturn of £58.3 billion. The data for the first quarter of the current fiscal year show a £1.9 billion increase in public sector net borrowing compared with the corresponding quarter last year, which is consistent with that projection. There are several factors that explain the projected increase in the fiscal deficit. Of these, the most important are: higher borrowing costs on index-linked bonds due to the rise in the RPI index; a delay in the payment of EU transfers from 2016/17 to 2017/18 and lower tax receipts from dividend income. Public sector net debt (excluding public sector banks) was £1,754 billion (87.4 per cent of GDP) in June 2017, an increase of £128.5 billion over the past twelve months. The Bank of England's Asset Purchase Facility accounts for £86.6 billion of this increase and the Term Funding Scheme has contributed £69.3 billion.

Saving and investment

Table A9 disaggregates the current account balance of the UK economy into three broad sectors of the economy: household, corporate and government. If investment is greater than saving for a sector, then this sector is a net borrower. The aggregation of these three sectors is the current account balance, which, if in deficit, implies that borrowing from the rest of the world is required in order to fund domestic investment plans. It is not possible to infer the optimality of the levels of capital from the

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Box C. Public and private sector wage increases – the real story

There has recently been scrutiny of public sector wage rises and the limits which have been placed on them since 2010. There is a perennial debate over the relative pay in the public and private sectors. Most public sector workers have been subject to either a pay freeze or only a 1% pay rise per annum in the past 7 years. Allowing for inflation this has meant that variously they have seen their real wages fall on average by 12% over this time period. In this box we track the course of public and private sector wage increases since 2004 and explain what Public Sector Pay Review Bodies are and how their remit has been curtailed since 2010.

The Public Sector Pay Review Bodies

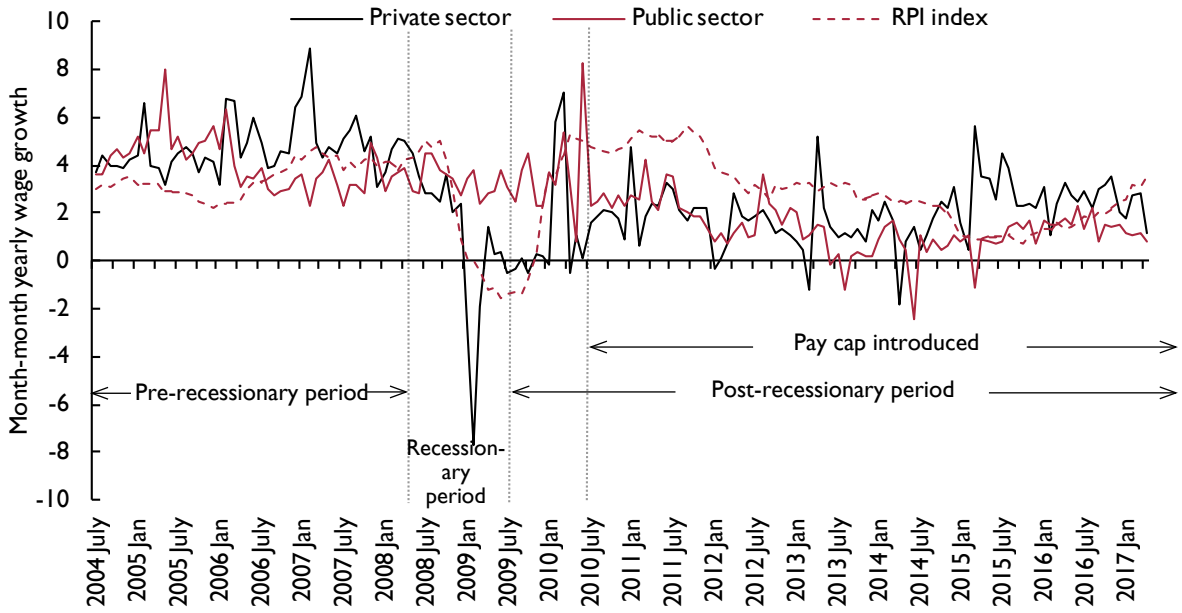
A third of all public sector workers are subject to the recommendations of the public sector Pay Review Bodies (PRBs): Armed Forces (AFPRB), Senior Salaries (SSRB), School Teachers (STRB), Doctors and Dentists (DDRB), Police, NHS workers (NHSPRB), and the Prison Service. Other public sector workers (mainly civil servants and local government officials) are not subject to the recommendations of the PRBs. These PRBs are made up of independent experts who, on an annual cycle, for the occupation in question, take evidence about: demand and supply conditions in the occupation, the extent of shortages, recruitment and retention issues, what is being paid in comparable jobs in other sectors and the evidence on inflation and cost of living changes and unemployment patterns. Each PRB then makes an annual recommendation on pay uplift to the government – which in times gone by was unfettered by the constraints of government direction. Since 2010 this pattern has changed as each PRB has been given a remit letter which determines what the pay rise will be – subject to the fiscal constraints of government spending. So in the past these independent experts made recommendations based on the evidence – coming up with a recommended pay award which took objective account of all the evidence. However, since 2010 these PRBs have been constrained by the1% pay cap.

The actual story of public/private sector pay increases

The real pattern of wage increases in the public sector is that wage increases in the public and private sector tend to follow each other with a lag. Determining whether it is public sector pay that follows private sector pay, or the reverse is true, is not a straightforward matter and would require some careful econometric analysis. What is clear is that PRBs do look at the level of the RPI and private sector wage increases in the previous year in making their recommendations. What is also likely is that higher private sector wages will have an effect on the price of goods and services and the RPI with an appropriate lag. But equally, higher public sector wages must be paid for by higher taxes, and so this will also have some effect on inflation.

It is best to consider public/private sector wage comparisons in terms of wage increases as any analysis based on levels of actual pay is fraught with comparability problems. On average public sector workers earn more than private sector workers – but they typically have very different jobs with different qualifications and years of professional training. These complexities are abstracted from if we consider changes in pay rather than the absolute level of pay.

Figure C1. Nominal public/private sector wage growth



Source: ONS AWE: Private Sector: Historic Annual Growth (%): NSA, June 2017, ONS Consumer Price Inflation time series dataset, June 2017.

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Box C. (continued)

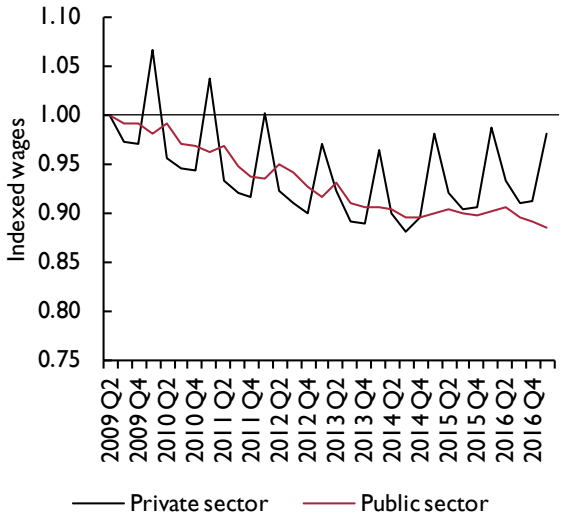
Figure C1 graphs the year-on-year growth in average weekly earnings in the two sectors by month and compares it to the basic level of price inflation as measured by the RPI. We choose 2004 as our starting point as at this time average weekly earnings growth were the same in the two sectors. We graph on the same axis the level of inflation as measured by the RPI so that it is easy to see what has happened to declining real pay in the two sectors. Notice that public sector pay, even after the 2010 pay restraint, is rising by more than 1% – this is due to the 'wage drift' associated with increment scales and the balance of the age structure in the public sector, as workers age and retirees are replaced by younger, less expensive employees. Prior to the recession public and private sectors each had a time of relative pay advantage in the sense that their pay was growing faster than inflation. During the worst years of the recession from 2008 to mid-2009, public sector wages rose by more than the private sector. Especially marked was the huge fall in private sector earnings in early 2009. In the post recessionary period all wages were falling in real terms as the RPI was higher than wage increases in both sectors. For nearly all of the past 5 years private sector wage rises have outstripped those in the public sector.

For most of the post 2010 period, public sector pay has grown more slowly than inflation and private sector pay. Hence real wages have been falling. The picture is best seen in figure C2 which graphs the cumulative loss of value of real wages in the two sectors from 2010. Measured as an index starting in 2010, we see that public sector pay is worth only around 88% of what it was in 2010. So, we can see that public sector workers have lost around 12% of their pay in real terms since 2010. The corresponding fall in real wages in the private sector is 2%. What is also clear in this graph is the huge seasonal element to private sector weekly earnings which rises at the beginning of the calendar year, every year, and then falls back. In reality the public sector pay round does not usually take place on a calendar year basis – and is different for each occupation. Hence we do not see such a big seasonal element to public sector earnings.

Total reward and pay drift

There are some important complications to this story. Firstly, public sector jobs tend to have: longer holidays, shorter working hours, less chance of redundancy and better pensions. Until recently most public sector pension schemes have been based on a final salary (defined benefit) scheme which gives retirees some fraction of their final salary based on their years of service. For example, civil servants used to have a scheme which was in 60ths – so that a worker serving 30 years could retire on half their final pay. In contrast, private sector employees were more usually in defined contribution (DC) schemes where they pay the same fraction of their earnings into a pot each year and the total is then used to buy an annuity on retirement. Typically these schemes were much less generous. In compensation, many comparable jobs are more highly paid in the private sector than their counterparts in the public sector. So there was a 'compensating wage differential' paid to private sector employees in recompense for their worse conditions of service. Typically, private sector workers are paid more, earlier in their career, but suffer later on and particularly so into their retirement. All this means that simple wage comparisons are not sensible. What needs to be done is to factor all compensation conditions into the calculation of 'Total Reward' – i.e. the value of pay and pensions and conditions of employment over the whole life cycle.[1]

Figure C2. Real indexed public and private sector wages



Source: ONS Average Weekly Earnings time series dataset (EMP).

A second complication is that in many occupations there is an increment scale which most employees advance up each year giving them a pay enhancement. This was not part of the 1% pay rise which has been talked about as the public sector 'pay cap'. So for a young teacher rising up the increment scale (from point 5 to 6 on the main scale in London) this could mean a pay rise that year of 8.5%. So – in effect – their pay was not capped. The problem comes when we look at the older worker who is stuck at the top of their pay increment scale – since they do not get an increment their nominal wage rise is capped at 1% and in real terms this means their pay has been shrinking. Taking the mix of workers who do get increments (other than cost of living rises) and workers who only get their 1% explains why – on average – public sector pay has risen by more than 1% for most years in figure C1 – this difference is part of what is called 'Pay Drift'.

Note

1 Danzer, A. and Dolton, P. (2012), 'Total reward and pensions in the UK in the public and private sectors', *Labour Economics*, 19, pp. 584–94.

This box was prepared by Peter Dolton.

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current account but rather just the immediate financing needs of the economy.

Household saving throughout 2016 gradually fell, starting at 4¼ per cent of GDP in the first quarter, it reached 2.2 per cent of GDP by the end of 2016. The first quarter of 2017 saw a further sharp fall as household saving slumped to a historic low of 1.1 per cent. This drop in the first quarter was exaggerated by an increase in taxation in income and wealth, described by the ONS as a timing issue. The counterpart of this was an unexpected improvement in government finances. Abstracting from the effects of this timing issue, the general trend for the saving ratio has been downward. Real personal income has been squeezed by inflation and, although consumer spending has slowed this year, households have resisted the full impact of the squeeze on income by saving less.

It is very likely that we will see some bounce back in the saving ratio in the second quarter, but even after allowing for this recovery, we have had to revise down the saving ratio for the whole year to 1.9 per cent of GDP down from 2.5 as published in our May forecast. Looking forward, we expect household saving to increase from its nadir in 2017 throughout our forecast period as consumption expenditures moderate due to heightened inflation, weakening purchasing power. By 2021, we forecast households to save approximately 6 per cent of GDP, about the same proportion as in 2012.

Household investment, since its trough in 2009 of 3.9 per cent of GDP, rose steadily until 2014 when it stabilised at around 5 per cent of GDP and has remained at this level since. We expect household investment to remain at around these levels in both 2017 and 2018, up from 4.7 in both years from the May *Review*. This is a result of our upward revisions to our private sector investment projections. From 2019 onwards, we expect household investment to increase in each subsequent year. By 2021, we forecast household investment to be 5.7 per cent of GDP.

The saving and investment positions of the household sector imply that in 2017 households will require 3.1 per cent of GDP in borrowing from the rest of the economy, the largest recorded with the available time series. As household saving picks up, we expect household borrowing to decrease, returning broadly to balance in 2020. By 2021, we expect households to be net lenders to the rest of the economy of 0.1 per cent of GDP. Risks to our forecast for the household net position centre around household saving. Should consumption expenditures grow at stronger levels than we have envisaged in our forecast, then household saving would be expected to be lower and the amount of borrowing required by households larger. Conversely, events such as a sharp increase in unemployment which could lead to an increase in uncertainty surrounding employment prospects could trigger a greater increase in household saving.

From the third quarter of 2003 to the third quarter of 2015, the corporate sector had been predominantly a net lender to the rest of the economy, seemingly inconsistent with economic theory. We would expect the corporate sector to use saving from the rest of the economy for productive investment purposes. In the final quarter of 2015, the corporate sector returned to the position of net borrower, requiring 1.7 per cent of GDP of finance from the rest of the economy. This shift is largely attributed to corporate saving which dropped sharply from 11.1 per cent of GDP in the third quarter of 2015, its average between 2003 and 2015, to 7½ per cent of GDP in the final quarter. Whereas, over this period corporate investment remained broadly stable between 9¼–9½ per cent of GDP. Corporate saving increased sharply throughout the remainder of the year, reaching 10.7 per cent of GDP by the final quarter, returning the sector back to that of a net lender to the rest of the economy, providing 1.8 per cent of GDP. The positive contribution has continued into the first quarter of 2017, with this sector lending 1.3 per cent of GDP to the rest of the economy.

We forecast the net lending position of the corporate sector to peak this year at 1.7 per cent of GDP; weaker GDP growth leads firms to increase saving from on average 9.4 per cent of GDP in 2016 to 10.9 per cent in 2017. As the headwinds which face consumers and firms dissipate and GDP growth recovers, we expect corporate saving to decrease gradually, and therefore also net lending, until it reaches balance in 2019. By 2021, we expect the corporate sector to borrow on average 1 per cent of GDP from the rest of the economy.

Since government sector dis-saving reached a peak in the third quarter of 2009 of 6.3 per cent of GDP, fiscal consolidation has reduced dis-saving, until it returned to positive saving in the final quarter of 2016 of 0.7 per cent of GDP. In the first quarter of 2017, government saving jumped by 1 percentage point to 1.7 per cent of GDP, the highest level since the third quarter of 2001. This sharp increase can largely be attributed to an increase in tax receipts emanating from a change in taxes on income and wealth (for more details see the Public Finances section of this chapter). As a result, we

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view this as a temporary phenomenon. We expect the government sector to return to moderate dis-saving in the second quarter which decreases through the rest of the year and returns to balance at the beginning of 2018. Thereafter, we expect government saving to increase throughout the rest of our forecast period reaching around 3 per cent by 2021.

Since 2013, government investment as a percentage of GDP has been around 2.5 per cent, which we expect will remain close to these levels in both 2017 and 2018, after which we expect a small and gradual increase. By 2021, we forecast government investment to be around 2.9 per cent of GDP. This implies that the government will require around 2.2 per cent of GDP of borrowing from the rest of the economy in 2017, falling to 1.7 per cent in 2018, and continuing to fall thereafter, until it reaches balance in 2020, and remains there in 2021.

In aggregate, this implies that the economy will be a net borrower from the rest of the world of about 3.8 per cent of GDP in 2017 and 2.7 per cent in 2018, reducing throughout the rest of the forecast period. By 2021, we forecast the UK to require 0.6 per cent of GDP of finance from the rest of the world.

Medium term projections

In table A10, we outline our view of how the UK economy transitions from its current disequilibrium. As with our previous *Reviews* after the referendum on the UK's membership of the European Union, the nature of the trading relationship between the UK and the European Union is likely to be a key determinant of the long-run equilibrium of the economy. The formal process of negotiating the exit from the EU began on 19 June, but as with our previous forecast there remains no clear indication about the nature of the final deal. The result of the general election on 9 June has muddied the water further. As no party gained an outright majority in parliament, this may imply bargaining between the parties in order to pass legislature required throughout the negotiation process. Conversely however, this may have reduced the probability of a hard exit. In the absence of further information, we maintain our assumption that the modal forecast in the long run centres on an EFTA type agreement (see Ebell and Warren, 2016, for further details). As the negotiations unfold and the relative positions of the UK and EU become clearer we will update our assumptions accordingly.

Alongside the uncertainty surrounding the nature of the final equilibrium, the path we take to get there is also uncertain, as shocks, which are by definition unpredictable, will buffer the economy away from this path. We illustrate this uncertainty in the form of fan charts. Figure 2 shows that the probability of average growth of less than 0.3 per cent this year is 10 per cent, as is the probability of average growth greater than 3.0 per cent.

The most significant change between our current forecast and that published in May concerns our path for monetary policy. We have brought the first interest rate rise of 25 basis points forward to February 2018. Rather than reflecting the beginning of the normalisation of interest rates, this is a reversal of part of the extra easing enacted by the BoE subsequent to the referendum given the better than expected performance of the UK economy in the quarters since. As with our May forecast, we expect the normalisation process to begin fully after the stated conclusion of the negotiations with the European Union with the second 25 basis point rise occurring in the third quarter of 2019. After this, interest rates are assumed to increase gradually throughout our forecast period at an average of 50 basis points a year. Between 2022 and 2026, the monetary policy rate will average approximately 3 per cent per annum, a marginally tighter path than we had previously forecast.

In NiGEM, exchange rates are determined by interest rate differentials between countries adjusted for risk premia. In the absence of any change to the expected interest rate paths for the Federal Reserve or European Central Bank, it might be expected that tighter interest rates would lead to a marginal appreciation of the exchange rate in trade-weighted terms. However, in our forecast this has been largely dominated by near-term movements in exchange rate markets. As the outlook for the European Union has improved, markets have perceived communication from the ECB to imply a tighter forward path for European monetary policy while June's lower than expected inflation outturn seemingly abated market fears of an immediate policy increase from the BoE. As a result, we expect sterling on a trade-weighted basis to depreciate by on average 5.3 per cent this year and to be broadly unchanged in the next, compared with a depreciation of 3.9 per cent and an appreciation of 1.2 in the May *Review*. From 2019 onwards, we expect the effective exchange rate to appreciate by approximately ½ per cent each year through to the end of our forecast period.

We have revised downwards our forecasts for consumer price inflation, which now reaches a peak of 3 per cent in the final quarter of 2017 as opposed to 3.4 per cent from May's forecast. This is predominantly the result of

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Box D. The UK investment puzzle

There was a 20% fall in the real level of business investment following the global financial crisis – the largest in postwar history. This is almost 50% deeper than previous crashes in investment one year after the onset of recession, highlighting the scale of the 2007 downturn. This is to be expected, as changes in investment are closely related to changes in output in large fluctuations (Dow, 1998) and the 2007 crisis saw the largest fall in output since the Great Depression. Falls in investment tend to be more persistent for recessions caused by financial crises, partially due to restrictions in credit supply. This is indeed what we observe, in figure D1, where the recent post-crisis recovery in the level of investment spending has been one of the weakest postwar recoveries, with business investment taking five years to recover to its previous peak.

Standard economic theory says that firm investment decisions depend on the cost of capital and the availability of finance along with their predictions for current and future demand for their goods and services. Firms have an ideal capital stock which is determined based on the marginal product of capital, and firms have to invest to reach such a level and maintain this capital stock which naturally depreciates over time. To illustrate, the aggregate depreciation rate is around 5% which means that total investment – of which business investment accounts for more than half of the total – needs to be just under 10% of GDP merely to keep the capital–output ratio constant (Oulton and Wallis, 2016). Given that total investment is around 17% of GDP, over one half of investment goes towards offsetting depreciating capital with only the remainder going towards augmenting the capital stock.

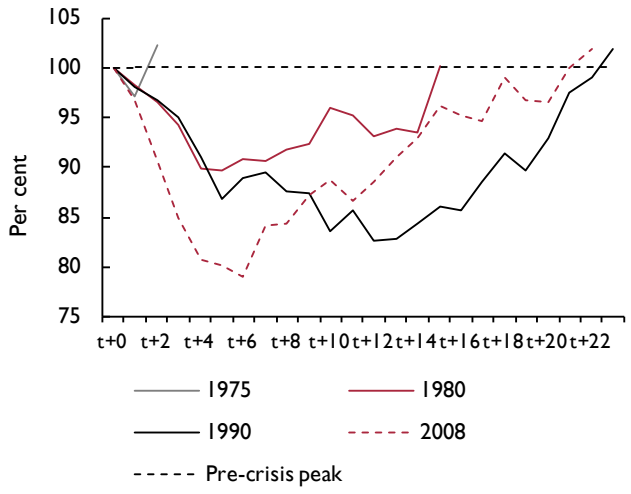
To incorporate the forward-looking nature of firm investment decisions economists consider Tobin's Q, the ratio between the market value of installed capital and the replacement cost of installed capital; if greater than one then firms invest, because the benefit of owning capital exceeds the cost of installing it and vice versa if Q is less than one. Current and expected future firm demand are reflected in the equity price of a firm, and the neoclassical theory assumes that equity prices reflect fundamentals, ignoring bubbles or irrational exuberance which may be important in application.

The cost of capital does not only include the cost of borrowing, but also costs associated with installation and training the workforce to operate the capital, the sum of these total costs is known as the user cost of capital. We estimate this using long-term real interest rates, the investment premium, the corporation tax rate and the depreciation rate of capital stock.

The neoclassical theory suggests that if investment is low then it must be because either firm-level demand is low – or is expected to be in the future – or that the user cost of capital is high. However the user cost of capital averaged 5.5% over the period 2007–15, lower than the 6.9% cost between 2000 and 2007. Neither can low demand fully account for the weakness of investment, meaning we need to consider other factors.

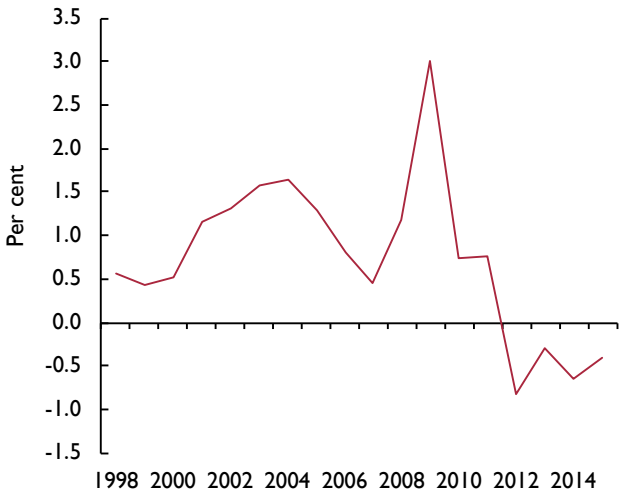
One immediate explanation for this investment puzzle is uncertainty, with a recent Bank of England (2017) survey reporting the largest "major obstacle" to investment was uncertainty and so this plays a role in explaining some of the weak investment. However, uncertainty can often be a broad and vague concept, used as a catch-all to explain everything we do not understand about

Figure D1. Post-crises recoveries in the level of real UK business investment



Source: ONS and NIESR.

Figure D2. Growth in net capital stock per employee, 1998–2015



Source: ONS.

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Box D. (continued)

investment. We therefore emphasise that our focus is on firm-level uncertainty, one measure of which is the volatility in earnings which tells us uncertainty about future demand conditions.

Uncertainty can then be incorporated into our model by considering that greater volatility in earnings will mean that firms delay investment until they know more about future revenue conditions (Dixit and Pindyck, 1994). Empirical evidence on the effects of uncertainty implies that a 10% increase in volatility of earnings forecasts would lead to a 4.4% reduction in short-run investment rates with an 8.6% reduction in the long run if the high levels of uncertainty persisted (Bond *et al*., 2005).

Fundamentally, uncertainty arises because there are multiple states of the world, and we do not know if we will end up in a high or low realisation. Hence, we highlight that the resolution of uncertainty does not mean that investment will rise, if the economy ends up in the low realisation state.

The NiGEM model uses an aggregate business investment equation which conditions on previous business investment, aggregate output, the user cost of capital, capacity utilisation and uncertainty. Estimating this equation we find that since 2010 business investment is cumulatively £36bn less than forecast, meaning business investment is some 3% lower over the 2010–16 period than we anticipated given the state of the economy. The over-prediction in the level of investment, even when accounting for uncertainty, demonstrates that there must be other causes for weak investment. This compares to business investment being £2bn less than forecast for the period 2000–10, emphasising that our missing cause of under-investment has increased in prominence during the recovery phase of the 2007 recession.

We turn to three other potential explanations for this phenomenon: investment in intangibles, balance sheet repair and investment in labour.

In the past three decades investment has shifted away from fixed assets towards intangibles – investment in brands, software and R&D – which may have reduced the traditional accelerator mechanism whereby increases in investment, stimulated by high demand, increased firm profits, permit further investment which stimulates incomes and demand further in a virtuous cycle. This mechanism is diminished when investment is directed towards intangibles, as these assets are less suitable for use as collateral and thus limit the amounts a firm can borrow to invest. Additionally, investment in intangibles is notoriously difficult to estimate and so some of the investment puzzle will merely be measurement error which has increased in recent years as the importance of intangible investment has risen (Nakamura, 2010).

A second explanation is that high investment prior to the financial crisis was funded by a rise in corporate debt and following the crisis firms have been deleveraging which may have quashed investment spending (Koo, 2014). Furthermore, pension liabilities have increased, which again limits room for firms to spend limited internal funds on investment programmes. However, there is little evidence that limited funds or the cost of borrowing is acting to inhibit investment.

The final explanation we consider is that a fall in real wages has made it profitable for firms to substitute away from capital towards labour (Blundell *et al*., 2014). This is supported by figure D2 showing growth in net capital stock per employee has turned negative in recent years. This would imply that if wage costs start to pick up as a result of strong employment results, or due to restrictions in labour supply post-Brexit, then we would see firms reverse their substitution away from capital, resulting in higher investment.

These factors will be considered further by the Institute in future research examining the investment puzzle.

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weaker than expected inflation in the second quarter, but also somewhat reflects weaker projection for oil prices. Looking forward, our inflation forecast remains broadly unchanged, with inflation somewhat supported by the most recent depreciation of sterling. From 2018 we expect inflation to decline gradually before reaching the Bank of England's 2 per cent target towards the end of 2019, where it remains around this level throughout the rest of our forecast period.

GDP growth is expected to be below its long-run potential rate which we estimate to be around 2 per cent per annum, moderating marginally to 1.7 per cent this year, from 1.8 per cent in 2016. As with our May forecast, we expect the main driver of this moderation to be private consumption expenditure, as inflation erodes the purchasing power of households. This is, however, offset by a positive contribution to GDP from net trade as more robust demand conditions in Europe lead to a pick-up in export growth, while weaker domestic demand conditions lead to lower import growth. As inflation moderates, consumption growth recovers, leading GDP to increase back to its long-run potential level by 2019, while the subsequent improvement in domestic demand conditions leads to a recovery in imports with net trade acting as a drag on GDP from 2021 onwards.

The improvement in net trade alongside the primary income account gradually returning to surplus implies an improvement in the current account balance. We expect the average deficit of the current account to be 3.8 per cent this year and to continue to shrink through to 2022 when it reaches ½ per cent of GDP. After this point, the deficit is expected to rise again as the growth in imports outstrips that of exports. Between 2022 to 2026, we expect the deficit on the current account to average 0.9 per cent of GDP. A key risk to our forecast for the current account balance emanates from household consumption; should this remain more robust than we envisage in our forecast, we would expect higher income growth, and subsequently a larger current account deficit.

Our fiscal forecasts are based on assumptions outlined in the OBR's latest *Economic and Fiscal Outlook*. Public sector net borrowing is set to decrease in each calendar year throughout our forecast, from 2.7 per cent this year before becoming a net lender in 2022, providing ¼ per cent of GDP to the rest of the economy. This implies that the public sector net debt stock peaks next year at 90 per cent of GDP before gradually falling after. Between 2022 and 2026, we forecast public sector net debt to average 68 per cent of GDP.

Since unemployment peaked in 2011, the performance of the labour market has been exceptionally robust, with unemployment reaching 4.6 per cent in the first quarter of 2017. This continued strong performance has led us to revise down our projections for the unemployment rate to 4.7 per cent this year and 4.8 per cent in the next, down from 5 per cent and 5.2 per cent reported in the May *Review*. However, given the slight softening of the economy, this implies that wages remain the mechanism by which labour market adjustment takes place. We expect average earnings growth to dip slightly this year to 2.2 per cent, down from 2.7 in the last, before recovering to 3.1 in 2018. Between 2022 and 2026, we forecast an average earnings growth of around 3.0 per cent, well below the pre-recession average.

The domestic risk to our forecasts for the economy centres around the performance of productivity, as highlighted in figure A7. The UK's productivity performance since the Great Recession has been woeful. While we project a return to meaningful rates of productivity, these have been pushed back into next year. We now expect productivity to grow by 0.4 per cent this year, increasing to 1.4 per cent next year and averaging 1.5 per cent per annum between 2022 and 2026. Should our forecasts prove too optimistic and the recent performance continue to persist, this would imply lower levels of potential output for the UK and, as a result, a less accommodative optimal path for fiscal and monetary policy. Furthermore, given that productivity is the key determinant of wages, we should expect lower wage growth and stalling living standards.

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Appendix – Forecast details

Table A1. Exchange rates and interest rates

	UK exchange rates			FTSE All–share index	Interest rates				
	Effective 2011 = 100	Dollar	Euro		3–month rates	Mortgage interest	10–year gilts	World[a]	Bank Rate[b]
2011	100.00	1.60	1.15	2587.6	0.9	4.1	3.1	1.6	0.50
2012	104.15	1.59	1.23	2617.7	0.8	4.2	1.8	1.5	0.50
2013	102.90	1.56	1.18	3006.2	0.5	4.4	2.4	1.2	0.50
2014	110.96	1.65	1.24	3136.6	0.5	4.4	2.5	1.0	0.50
2015	118.13	1.53	1.38	3150.1	0.6	4.5	1.8	0.8	0.50
2016	106.69	1.35	1.22	3102.0	0.5	4.4	1.3	0.8	0.25
2017	101.07	1.28	1.15	3505.8	0.3	4.5	1.3	1.2	0.25
2018	101.16	1.30	1.14	3397.6	0.6	4.7	1.9	1.5	0.50
2019	101.70	1.32	1.13	3321.3	0.8	4.5	2.4	1.9	0.75
2020	102.35	1.35	1.12	3351.5	1.3	4.6	2.9	2.2	1.25
2021	102.94	1.37	1.12	3438.5	1.7	4.8	3.3	2.6	1.70
2016 Q1	113.18	1.43	1.30	2891.8	0.6	4.6	1.5	0.8	0.50
2016 Q2	111.30	1.43	1.27	2987.2	0.6	4.6	1.4	0.8	0.50
2016 Q3	102.47	1.31	1.18	3227.3	0.4	4.4	0.8	0.8	0.25
2016 Q4	99.80	1.24	1.15	3301.8	0.4	4.3	1.3	0.9	0.25
2017 Q1	100.54	1.24	1.16	3467.5	0.4	4.4	1.3	1.0	0.25
2017 Q2	*101.70*	*1.28*	*1.16*	*3549.2*	*0.3*	*4.4*	*1.0*	*1.1*	*0.25*
2017 Q3	*101.02*	*1.30*	*1.14*	*3528.3*	*0.3*	*4.5*	*1.4*	*1.2*	*0.25*
2017 Q4	*101.01*	*1.30*	*1.14*	*3478.1*	*0.4*	*4.6*	*1.5*	*1.3*	*0.25*
2018 Q1	*101.01*	*1.30*	*1.14*	*3445.8*	*0.5*	*4.7*	*1.7*	*1.4*	*0.50*
2018 Q2	*101.11*	*1.30*	*1.14*	*3412.8*	*0.6*	*4.8*	*1.8*	*1.5*	*0.50*
2018 Q3	*101.21*	*1.30*	*1.14*	*3378.8*	*0.6*	*4.7*	*2.0*	*1.6*	*0.50*
2018 Q4	*101.33*	*1.31*	*1.13*	*3353.0*	*0.7*	*4.6*	*2.1*	*1.7*	*0.50*
Percentage changes									
2011/2010	–0.2	3.7	–1.1	4.6					
2012/2011	4.2	–1.1	7.0	1.2					
2013/2012	–1.2	–1.3	–4.5	14.8					
2014/2013	7.7	5.4	5.4	4.3					
2015/2014	6.5	–7.3	11.0	0.4					
2016/2015	–9.6	–11.4	–11.2	–1.5					
2017/2016	*–5.3*	*–5.7*	*–6.0*	*13.0*					
2018/2017	*0.1*	*1.9*	*–1.3*	*–3.1*					
2019/2018	*0.5*	*1.7*	*–0.5*	*–2.2*					
2020/2019	*0.6*	*2.0*	*–0.5*	*0.9*					
2021/2020	*0.6*	*1.7*	*–0.5*	*2.6*					
2016Q4/2015Q1	–16.6	–18.2	–16.9	9.2					
2017Q4/2016Q1	*1.2*	*4.5*	*–1.2*	*5.3*					
2018Q4/2017Q1	*0.3*	*1.0*	*–0.4*	*–3.6*					

Notes: We assume that bilateral exchange rates for the first quarter of this year are the average of information available to 14 July 2017. We then assume that bilateral rates remain constant for the following two quarters before moving in line with the path implied by the backward–looking uncovered interest rate parity condition based on interest rate differentials relative to the US. (a) Weighted average of central bank intervention rates in OECD economies. (b) End of period.

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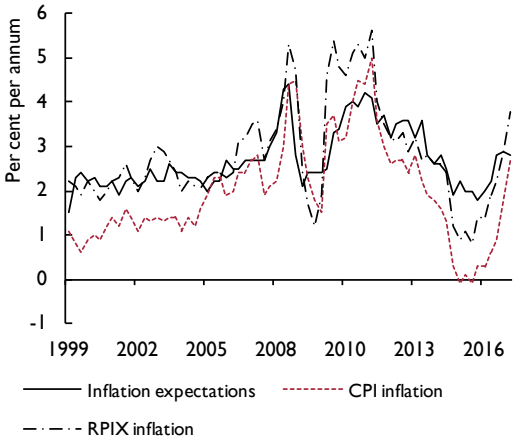
Table A2. Price indices

2013=100

	Unit labour costs	Imports deflator	Exports deflator	Whole-sale price index[a]	World oil price ($)[b]	Consump-tion deflator	GDP deflator (market prices)	Retail price index: All items	Retail price index: Excluding mortgage interest	Consumer prices index
2011	97.6	100.1	97.6	98.1	108.5	95.9	96.6	94.0	94.0	94.8
2012	98.6	99.6	97.5	99.2	110.4	97.7	98.1	97.0	97.0	97.5
2013	100.0	100.0	100.0	100.0	107.1	100.0	100.0	100.0	100.0	100.0
2014	99.3	95.9	97.4	100.9	97.8	101.7	101.6	102.4	102.4	101.4
2015	100.2	90.8	92.9	101.1	51.8	102.0	102.2	103.4	103.5	101.5
2016	102.1	94.3	96.5	102.1	42.6	103.1	104.0	105.2	105.4	102.2
2017	*103.5*	*101.6*	*103.0*	*105.1*	*50.0*	*105.7*	*106.3*	*109.0*	*109.1*	*104.9*
2018	*105.7*	*105.2*	*105.7*	*107.8*	*49.9*	*108.6*	*109.1*	*113.7*	*112.8*	*107.7*
2019	*108.2*	*106.6*	*107.7*	*109.9*	*53.4*	*111.0*	*111.7*	*117.4*	*115.9*	*110.0*
2020	*110.3*	*107.5*	*109.5*	*111.8*	*54.4*	*113.3*	*114.2*	*121.5*	*118.8*	*112.0*
2021	*111.9*	*108.9*	*111.4*	*113.2*	*55.5*	*115.5*	*116.6*	*126.3*	*121.8*	*114.1*
Percentage changes										
2011/2010	–0.1	6.8	5.8	2.8	37.6	3.6	2.0	5.2	5.3	4.5
2012/2011	1.0	–0.5	–0.2	1.1	1.8	1.9	1.5	3.2	3.2	2.9
2013/2012	1.4	0.4	2.6	0.8	–3.0	2.3	1.9	3.0	3.1	2.6
2014/2013	–0.7	–4.1	–2.6	0.9	–8.7	1.7	1.6	2.4	2.4	1.4
2015/2014	1.0	–5.3	–4.6	0.2	–47.0	0.3	0.6	1.0	1.0	0.1
2016/2015	1.9	3.9	3.8	1.1	–17.7	1.1	1.7	1.7	1.9	0.7
2017/2016	*1.4*	*7.8*	*6.7*	*2.9*	*17.2*	*2.4*	*2.2*	*3.7*	*3.5*	*2.7*
2018/2017	*2.1*	*3.5*	*2.6*	*2.6*	*–0.2*	*2.8*	*2.6*	*4.3*	*3.3*	*2.7*
2019/2018	*2.3*	*1.3*	*2.0*	*2.0*	*7.0*	*2.2*	*2.4*	*3.3*	*2.8*	*2.1*
2020/2019	*1.9*	*0.8*	*1.6*	*1.7*	*2.0*	*2.0*	*2.2*	*3.5*	*2.5*	*1.9*
2021/2020	*1.5*	*1.3*	*1.8*	*1.3*	*2.0*	*2.0*	*2.1*	*4.0*	*2.5*	*1.9*
2016Q4/15Q4	2.2	9.2	12.0	2.2	15.8	1.5	2.8	2.2	2.5	1.2
2017Q4/16Q4	*1.4*	*6.1*	*3.1*	*3.1*	*–1.5*	*2.9*	*2.4*	*4.3*	*3.7*	*3.0*
2018Q4/17Q4	*2.5*	*2.5*	*2.5*	*2.2*	*9.2*	*2.5*	*2.5*	*3.9*	*3.1*	*2.4*

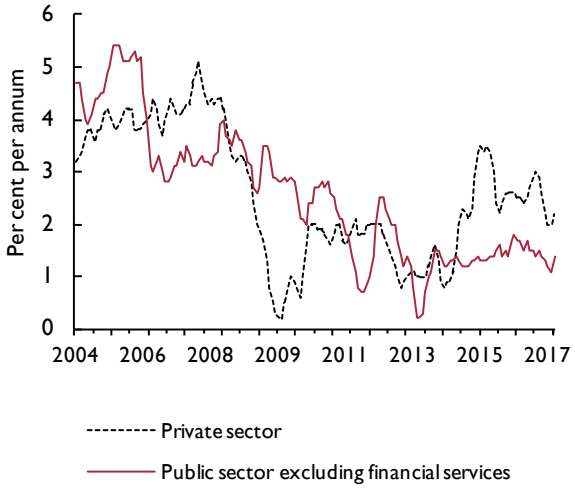
Notes: (a) Excluding food, beverages, tobacco and petroleum products. (b) Per barrel, average of Dubai and Brent spot prices.

Figure A1. Household inflation expectations for the year ahead have flattened



Source: Bank of England/NOP Inflation Attitudes Survey, ONS.
Note: Inflation expectation is for the rate of inflation 12 months ahead. Contemporaneous inflation rates are for the month available during the month of the survey.

Figure A2. Private and public sector nominal wage growth remain subdued



Source: ONS.
Note: Regular pay, excluding bonuses and arrears.

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Table A3. Gross domestic product and components of expenditure *£ billion, 2013 prices*

	Final consumption expenditure		Gross capital formation		Domestic demand	Total exports[c]	Total final expenditure	Total imports[c]	Net trade	GDP at market prices
	Households & NPISH[a]	General govt.	Gross fixed investment	Changes in inventories[b]						
2011	1102.3	342.8	265.3	–5.7	1699.1	509.1	2208.1	523.5	–14.5	1684.8
2012	1121.1	348.6	271.5	0.4	1733.3	512.2	2245.3	538.5	–26.3	1706.9
2013	1138.5	349.6	280.2	10.4	1778.8	517.6	2296.4	556.9	–39.2	1739.6
2014	1163.1	357.6	298.9	19.2	1838.8	525.2	2364.0	571.0	–45.8	1793.0
2015	1190.8	362.3	309.1	12.3	1874.5	557.0	2431.6	602.4	–45.4	1832.3
2016	1223.6	365.3	310.8	3.0	1902.8	567.2	2470.0	619.5	–52.3	1865.4
2017	*1244.1*	*369.7*	*312.1*	*–0.2*	*1925.6*	*581.9*	*2507.5*	*628.9*	*–47.1*	*1896.3*
2018	*1247.8*	*372.3*	*320.9*	*0.0*	*1941.0*	*597.1*	*2538.1*	*623.8*	*–26.7*	*1932.1*
2019	*1259.4*	*373.8*	*334.0*	*0.0*	*1967.2*	*617.4*	*2584.6*	*632.0*	*–14.7*	*1970.3*
2020	*1279.1*	*377.3*	*348.3*	*0.0*	*2004.7*	*634.6*	*2639.3*	*650.3*	*–15.7*	*2006.8*
2021	*1302.9*	*382.1*	*360.2*	*0.0*	*2045.2*	*650.5*	*2695.7*	*671.3*	*–20.8*	*2042.2*
Percentage changes										
2011/2010	–0.5	0.2	1.9		0.1	5.8	1.3	0.8		1.5
2012/2011	1.7	1.7	2.3		2.0	0.6	1.7	2.9		1.3
2013/2012	1.6	0.3	3.2		2.6	1.1	2.3	3.4		1.9
2014/2013	2.2	2.3	6.7		3.4	1.5	2.9	2.5		3.1
2015/2014	2.4	1.3	3.4		1.9	6.1	2.9	5.5		2.2
2016/2015	2.8	0.8	0.5		1.5	1.8	1.6	2.8		1.8
2017/2016	*1.7*	*1.2*	*0.4*		*1.2*	*2.6*	*1.5*	*1.5*		*1.7*
2018/2017	*0.3*	*0.7*	*2.8*		*0.8*	*2.6*	*1.2*	*–0.8*		*1.9*
2019/2018	*0.9*	*0.4*	*4.1*		*1.4*	*3.4*	*1.8*	*1.3*		*2.0*
2020/2019	*1.6*	*0.9*	*4.3*		*1.9*	*2.8*	*2.1*	*2.9*		*1.8*
2021/2020	*1.9*	*1.3*	*3.4*		*2.0*	*2.5*	*2.1*	*3.2*		*1.8*
Decomposition of growth in GDP[d]										
2011	–0.3	0.0	0.3	–0.6	0.1	1.7	1.8	–0.3	1.4	1.5
2012	1.1	0.3	0.4	0.4	2.0	0.2	2.2	–0.9	–0.7	1.3
2013	1.0	0.1	0.5	0.6	2.7	0.3	3.0	–1.1	–0.8	1.9
2014	1.4	0.5	1.1	0.5	3.4	0.4	3.9	–0.8	–0.4	3.1
2015	1.5	0.3	0.6	–0.4	2.0	1.8	3.8	–1.8	0.0	2.2
2016	1.8	0.2	0.1	–0.5	1.5	0.6	2.1	–0.9	–0.4	1.8
2017	*1.1*	*0.2*	*0.1*	*–0.2*	*1.2*	*0.8*	*2.0*	*–0.5*	*0.3*	*1.7*
2018	*0.2*	*0.1*	*0.5*	*0.0*	*0.8*	*0.8*	*1.6*	*0.3*	*1.1*	*1.9*
2019	*0.6*	*0.1*	*0.7*	*0.0*	*1.4*	*1.0*	*2.4*	*–0.4*	*0.6*	*2.0*
2020	*1.0*	*0.2*	*0.7*	*0.0*	*1.9*	*0.9*	*2.8*	*–0.9*	*–0.1*	*1.8*
2021	*1.2*	*0.2*	*0.6*	*0.0*	*2.0*	*0.8*	*2.8*	*–1.0*	*–0.3*	*1.8*

Notes: (a) Non–profit institutions serving households. (b) Including acquisitions less disposals of valuables and quarterly alignment adjustment. (c) Includes Missing Trader Intra–Community Fraud. (d) Components may not add up to total GDP growth due to rounding and the statistical discrepancy included in GDP.

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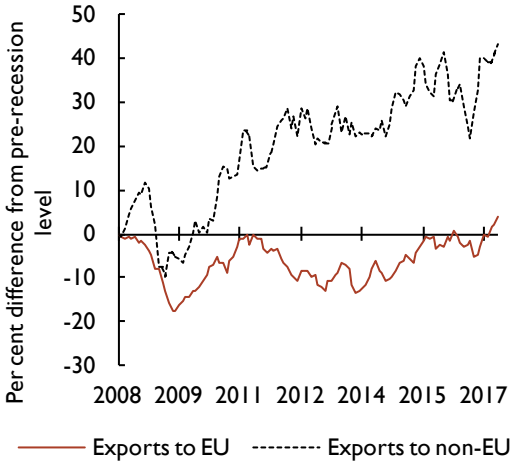
Table A4. External sector

	Exports of goods[a]	Imports of goods[a]	Net trade in goods[a]	Exports of services	Imports of services	Net trade in services	Export price competitive–ness[c]	World trade[d]	Terms of trade[e]	Current balance
	£ billion, 2013 prices[b]						2013=100			% of GDP
2011	310.6	402.0	–91.4	198.0	121.5	76.5	98.5	95.6	97.6	–1.8
2012	305.4	412.0	–106.6	206.6	126.4	80.2	99.8	97.3	97.8	–3.7
2013	303.1	423.8	–120.7	214.5	133.1	81.4	100.0	100.0	100.0	–4.4
2014	307.4	434.4	–127.0	217.7	136.6	81.2	103.2	104.5	101.5	–4.7
2015	329.5	458.1	–128.5	227.5	144.4	83.1	101.6	109.5	102.3	–4.3
2016	326.6	473.6	–147.0	240.7	146.0	94.7	96.9	113.4	102.3	–4.4
2017	*346.5*	*484.7*	*–138.3*	*235.4*	*144.2*	*91.2*	*95.6*	*117.0*	*101.3*	*–3.8*
2018	*362.0*	*481.3*	*–119.3*	*235.1*	*142.5*	*92.7*	*95.9*	*121.0*	*100.4*	*–2.7*
2019	*377.5*	*488.3*	*–110.8*	*239.8*	*143.7*	*96.2*	*96.4*	*125.1*	*101.1*	*–1.3*
2020	*389.5*	*503.3*	*–113.8*	*245.1*	*146.9*	*98.2*	*96.5*	*129.2*	*101.9*	*–0.7*
2021	*400.0*	*520.5*	*–120.5*	*250.5*	*150.8*	*99.7*	*96.4*	*133.2*	*102.3*	*–0.6*
Percentage changes										
2011/2010	6.8	1.5		4.4	–1.4		4.6	6.2	–1.0	
2012/2011	–1.7	2.5		4.3	4.1		1.3	1.8	0.3	
2013/2012	–0.7	2.9		3.8	5.2		0.2	2.8	2.2	
2014/2013	1.4	2.5		1.5	2.6		3.2	4.5	1.5	
2015/2014	7.2	5.4		4.5	5.7		–1.5	4.8	0.7	
2016/2015	–0.9	3.4		5.8	1.1		–4.6	3.5	0.0	
2017/2016	*6.1*	*2.4*		*–2.2*	*–1.2*		*–1.4*	*3.2*	*–0.9*	
2018/2017	*4.5*	*–0.7*		*–0.1*	*–1.2*		*0.3*	*3.4*	*–0.9*	
2019/2018	*4.3*	*1.5*		*2.0*	*0.9*		*0.5*	*3.4*	*0.7*	
2020/2019	*3.2*	*3.1*		*2.2*	*2.2*		*0.1*	*3.3*	*0.8*	
2021/2020	*2.7*	*3.4*		*2.2*	*2.6*		*–0.1*	*3.1*	*0.4*	

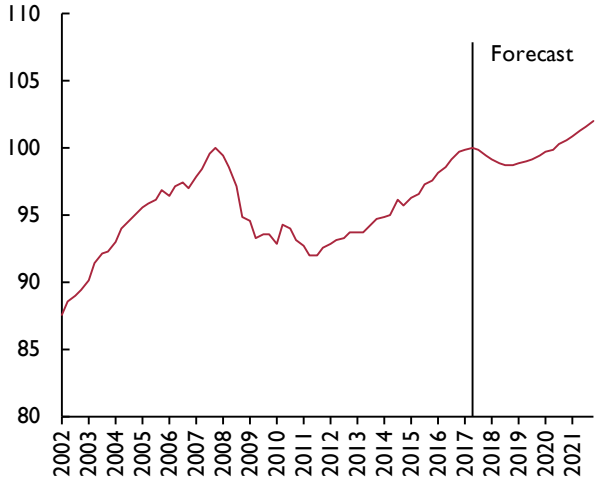
Notes: (a) Includes Missing Trader Intra–Community Fraud. (b) Balance of payments basis. (c) A rise denotes a loss in UK competitiveness. (d) Weighted by import shares in UK export markets. (e) Ratio of average value of exports to imports.

Figure A3. Goods exports volumes to the EU have surpassed levels last seen in 2007



Notes: Percentage difference is exports to EU and non–EU countries from their pre–recession level. 3–month moving averages. Volume of goods exports. Pre–recession peak is January 2008, defined by NIESR's monthly estimate of GDP.

Figure A4. Per capita consumer spending is expected to reach its pre–recession peak in 2020 (2007Q4=100)



Sources: ONS, NIESR forecast.

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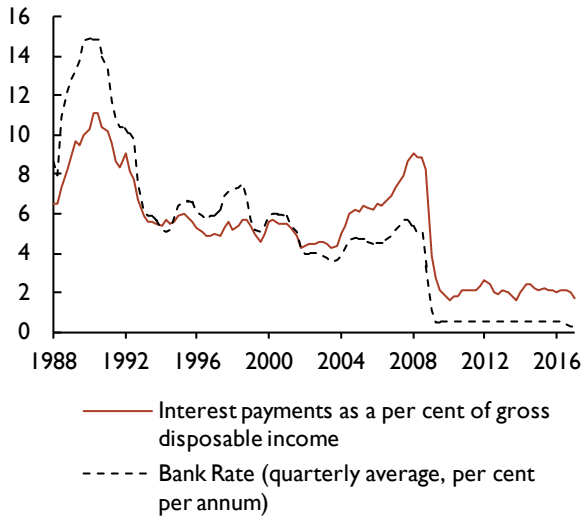
Table A5. Household sector

	Average[a] earnings	Compen–sation of employees	Total personal income	Gross disposable income	Real disposable income[b]	Final consumption expenditure		Saving ratio[c]	House prices[d]	Net worth to income ratio[e]
						Total	Durable			
	2013=100	£ billion, current prices			£ billion, 2013 prices			per cent		
2011	96.1	831.1	1412.6	1091.9	1138.6	1102.3	88.4	8.9	87.1	6.5
2012	97.9	850.5	1457.4	1136.8	1163.1	1121.1	92.2	8.3	87.8	6.7
2013	100.0	879.1	1492.0	1161.5	1161.5	1138.5	98.0	6.6	90.4	6.7
2014	100.5	899.3	1538.1	1199.2	1179.2	1163.1	104.9	6.8	97.5	7.4
2015	101.6	928.1	1602.3	1246.6	1222.1	1190.8	113.0	6.5	103.4	7.3
2016	104.4	962.6	1652.6	1279.6	1240.5	1223.6	119.7	5.2	110.6	7.8
2017	*106.7*	*992.2*	*1694.0*	*1305.5*	*1235.6*	*1244.1*	*121.3*	*2.8*	*116.1*	*7.6*
2018	*110.0*	*1032.1*	*1775.9*	*1373.2*	*1264.1*	*1247.8*	*121.3*	*4.8*	*118.4*	*7.2*
2019	*113.2*	*1077.0*	*1866.3*	*1441.9*	*1298.4*	*1259.4*	*123.3*	*6.5*	*119.8*	*6.9*
2020	*116.2*	*1118.2*	*1960.4*	*1513.3*	*1336.2*	*1279.1*	*125.6*	*7.7*	*121.2*	*6.6*
2021	*119.4*	*1155.1*	*2052.9*	*1583.0*	*1371.0*	*1302.9*	*127.4*	*8.4*	*122.2*	*6.5*
Percentage changes										
2011/2010	1.0	1.4	1.8	1.4	–2.1	–0.5	0.8		–1.7	
2012/2011	1.9	2.3	3.2	4.1	2.2	1.7	4.2		0.8	
2013/2012	2.1	3.4	2.4	2.2	–0.1	1.6	6.3		3.0	
2014/2013	0.5	2.3	3.1	3.2	1.5	2.2	7.1		7.9	
2015/2014	1.1	3.2	4.2	4.0	3.6	2.4	7.7		6.0	
2016/2015	2.7	3.7	3.1	2.6	1.5	2.8	6.0		7.0	
2017/2016	*2.2*	*3.1*	*2.5*	*2.0*	*–0.4*	*1.7*	*1.3*		*4.9*	
2018/2017	*3.1*	*4.0*	*4.8*	*5.2*	*2.3*	*0.3*	*–0.1*		*2.0*	
2019/2018	*2.9*	*4.3*	*5.1*	*5.0*	*2.7*	*0.9*	*1.7*		*1.2*	
2020/2019	*2.7*	*3.8*	*5.0*	*5.0*	*2.9*	*1.6*	*1.9*		*1.1*	
2021/2020	*2.7*	*3.3*	*4.7*	*4.6*	*2.6*	*1.9*	*1.4*		*0.9*	

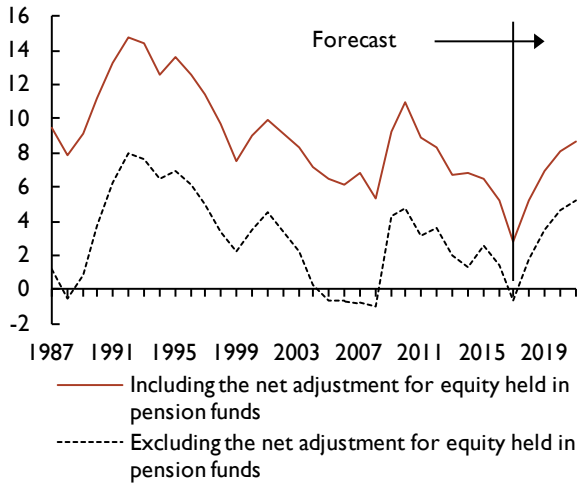
Notes: (a) Average earnings equals total labour compensation divided by the number of employees. (b) Deflated by consumers' expenditure deflator. (c) Includes adjustment for change in net equity of households in pension funds. (d) Office for National Statistics, mix–adjusted. (e) Net worth is defined as housing wealth plus net financial assets.

Figure A5. Household income gearing



Sources: ONS, NIESR forecast.

Figure A6. We expect households' propensity to save to rise over the medium term (per cent of gross disposable incomes)



Sources: ONS, NIESR forecast.

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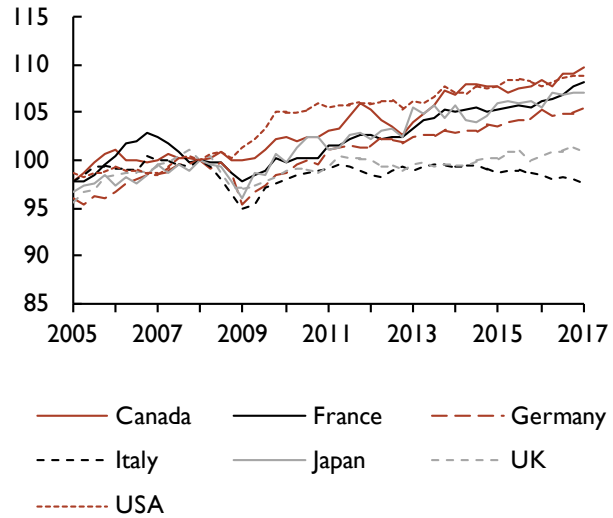
Table A6. Fixed investment and capital — *£ billion, 2013 prices*

	Gross fixed investment				User cost of capital (%)	Corporate profit share of GDP (%)	Capital stock	
	Business investment	Private housing[a]	General government	Total			Private	Public[b]
2011	147.6	64.0	54.0	265.3	13.7	23.9	3140.9	897.2
2012	158.2	63.1	50.2	271.5	13.4	23.4	3160.3	901.9
2013	162.3	69.3	48.6	280.2	12.9	23.9	3180.8	909.8
2014	168.6	78.6	51.6	298.9	12.7	24.6	3211.6	948.6
2015	177.2	81.0	50.9	309.1	11.5	24.3	3249.5	964.1
2016	174.5	84.6	51.7	310.8	12.2	23.9	3273.3	997.0
2017	*173.1*	*86.9*	*53.0*	*312.1*	*11.8*	*25.1*	*3295.9*	*1024.4*
2018	*177.6*	*89.8*	*53.6*	*320.9*	*12.3*	*26.2*	*3323.9*	*1050.7*
2019	*183.7*	*95.7*	*54.7*	*334.0*	*12.9*	*27.0*	*3361.4*	*1077.4*
2020	*188.2*	*102.1*	*57.9*	*348.3*	*13.0*	*27.8*	*3406.8*	*1106.6*
2021	*192.0*	*108.2*	*60.0*	*360.2*	*13.3*	*28.3*	*3458.5*	*1137.1*
Percentage changes								
2011/2010	4.3	3.3	–5.6	1.9	–0.6	2.6	0.4	0.5
2012/2011	7.2	–1.5	–7.0	2.3	–2.4	–1.7	0.6	0.5
2013/2012	2.6	9.8	–3.2	3.2	–3.7	1.9	0.6	0.9
2014/2013	3.9	13.4	6.3	6.7	–1.3	3.1	1.0	4.3
2015/2014	5.1	3.0	–1.3	3.4	–9.2	–1.5	1.2	1.6
2016/2015	–1.5	4.5	1.4	0.5	6.0	–1.7	0.7	3.4
2017/2016	*–0.8*	*2.7*	*2.5*	*0.4*	*–3.7*	*5.3*	*0.7*	*2.7*
2018/2017	*2.6*	*3.3*	*1.3*	*2.8*	*4.9*	*4.4*	*0.9*	*2.6*
2019/2018	*3.4*	*6.6*	*2.0*	*4.1*	*4.3*	*3.1*	*1.1*	*2.5*
2020/2019	*2.5*	*6.8*	*5.8*	*4.3*	*0.7*	*2.8*	*1.4*	*2.7*
2021/2020	*2.0*	*5.9*	*3.7*	*3.4*	*2.3*	*2.0*	*1.5*	*2.8*

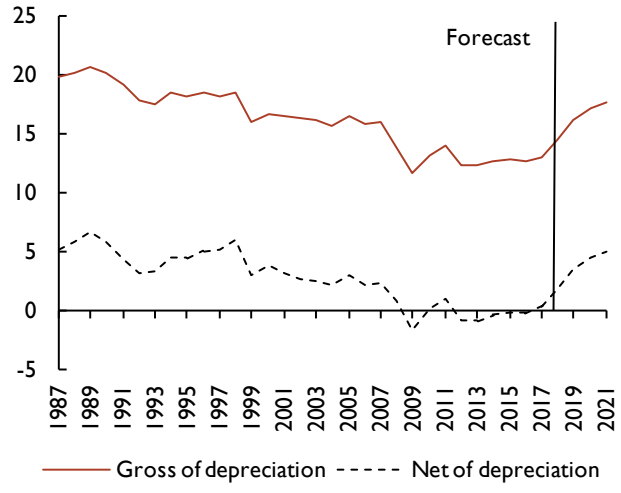
Notes: (a) Includes private sector transfer costs of non–produced assets. (b) Including public sector non–financial corporations.

Figure A7. Productivity in the UK has just surpassed pre–recession levels



Source: NiGEM database and forecast.
Notes: 2008Q1 = 100. GDP at market prices, per person hour.

Figure A8. National saving rates (per cent of GDP)



Source: NiGEM database and forecast.

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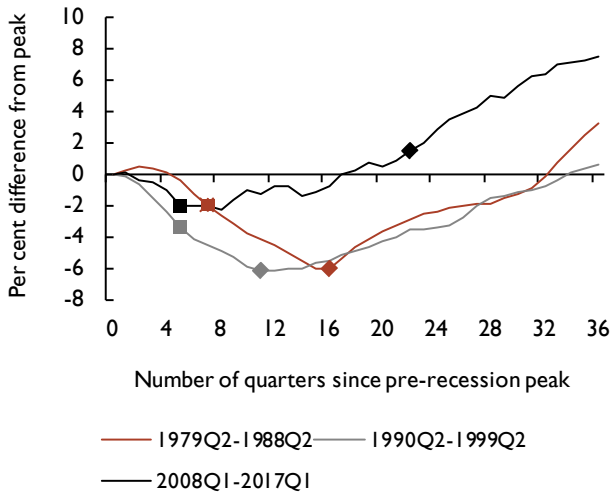
Table A7. Productivity and the labour market

Thousands

	Employment		ILO unemploy–ment	Labour force[b]	Population of working age[c]	Productivity (2013=100)		Unemployment, %	
	Employees	Total[a]				Per hour	Manufact–uring	Claimant rate	ILO unem–ployment rate
2011	25117	29376	2593	31969	40944	101.3	102.6	4.7	8.1
2012	25213	29697	2572	32269	40880	100.4	100.4	4.7	8.0
2013	25515	30045	2474	32519	40915	100.0	100.0	4.2	7.6
2014	25962	30755	2026	32781	41037	100.6	100.9	3.0	6.2
2015	26505	31284	1781	33064	41241	101.5	100.0	2.3	5.4
2016	26760	31727	1633	33360	41396	101.9	100.6	2.2	4.9
2017	*26986*	*31979*	*1580*	*33559*	*41527*	*102.3*	*104.1*	*2.3*	*4.7*
2018	*27239*	*32186*	*1633*	*33819*	*41620*	*103.7*	*107.3*	*2.5*	*4.8*
2019	*27623*	*32493*	*1588*	*34082*	*41707*	*104.8*	*110.6*	*2.4*	*4.7*
2020	*27920*	*32716*	*1604*	*34321*	*41812*	*106.1*	*114.0*	*2.4*	*4.7*
2021	*28081*	*32940*	*1594*	*34534*	*41900*	*107.2*	*117.4*	*2.3*	*4.6*
Percentage changes									
2011/2010	0.4	0.5	3.8	0.8	0.6	0.9	2.7		
2012/2011	0.4	1.1	–0.8	0.9	–0.2	–0.9	–2.1		
2013/2012	1.2	1.2	–3.8	0.8	0.1	–0.4	–0.4		
2014/2013	1.7	2.4	–18.1	0.8	0.3	0.6	0.9		
2015/2014	2.1	1.7	–12.1	0.9	0.5	0.9	–0.9		
2016/2015	1.0	1.4	–8.3	0.9	0.4	0.4	0.6		
2017/2016	*0.8*	*0.8*	*–3.2*	*0.6*	*0.3*	*0.4*	*3.5*		
2018/2017	*0.9*	*0.6*	*3.3*	*0.8*	*0.2*	*1.4*	*3.1*		
2019/2018	*1.4*	*1.0*	*–2.7*	*0.8*	*0.2*	*1.1*	*3.0*		
2020/2019	*1.1*	*0.7*	*1.0*	*0.7*	*0.3*	*1.2*	*3.0*		
2021/2020	*0.6*	*0.7*	*–0.7*	*0.6*	*0.2*	*1.1*	*3.0*		

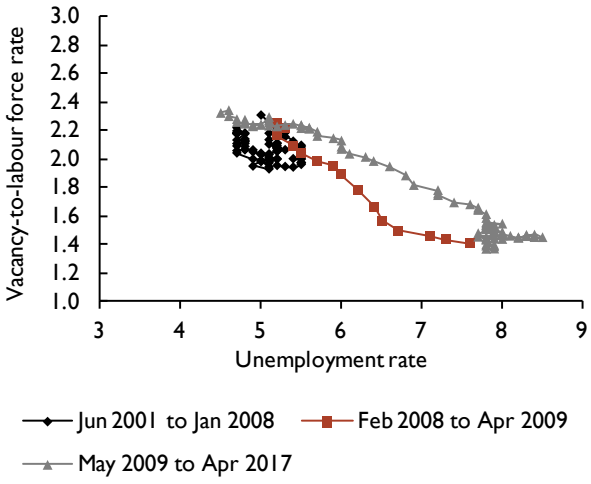
Notes: (a) Includes self–employed, government–supported trainees and unpaid family members. (b) Employment plus ILO unemployment. (c) Population projections are based on annual rates of growth from 2014–based population projections by the ONS.

Figure A9. In 2017Q2 GDP was 8.9 per cent higher than its pre–crisis peak and employment is estimated to be 7.8 per cent higher



Source: NIESR calculations.
Note: Peak is defined by GDP. The lines refer to the evaluation of the level of employment. A square indicates trough of recession; a diamond indicates recovery of pre-recession GDP peak.

Figure A10. The Beveridge curve



Source: NIESR calculations.
Notes: Population aged 16–64. Dates refer to pre–recession, the Great Recession and the post Great Recession periods, as defined by NIESR's monthly GDP estimates.

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Table A8. Public sector financial balance and borrowing requirement *£ billion, fiscal years*

		2014–15	2015–16	2016–17	2017–18	2018–19	2019–20	2020–21	2021–22
Current receipts:	Taxes on income	389.3	406.0	433.1	437.4	463.5	494.6	518.4	545.7
	Taxes on expenditure	230.9	241.4	249.8	253.8	262.4	272.4	282.4	293.3
	Other current receipts	25.4	24.9	25.5	22.2	22.1	23.0	24.0	24.9
	Total	645.6	672.2	708.4	713.4	747.9	790.0	824.8	863.8
	(as a % of GDP)	35.1	35.6	36.1	35.0	35.1	35.5	35.6	36.0
Current expenditure:	Goods and services	359.3	364.6	370.2	378.5	383.2	386.6	395.1	404.9
	Net social benefits paid	228.6	230.8	232.0	230.3	234.6	239.6	250.9	262.1
	Debt interest	33.6	34.7	36.3	34.4	34.6	35.5	37.6	39.5
	Other current expenditure	50.1	49.0	49.4	51.7	53.4	55.2	57.2	59.1
	Total	671.6	679.2	687.9	694.9	705.9	716.9	740.8	765.6
	(as a % of GDP)	36.5	36.0	35.1	34.1	33.1	32.2	32.0	31.9
Depreciation		37.0	38.0	39.0	40.4	41.9	43.4	45.2	47.4
Surplus on public sector current budget[a]		–63.0	–45.0	–18.5	–21.9	0.1	29.6	38.7	50.8
(as a % of GDP)		–3.4	–2.4	–1.0	–1.1	0.0	1.3	1.7	2.1
Gross investment		64.5	69.0	75.7	80.1	82.8	86.8	94.1	98.3
Net investment		27.5	30.9	36.7	39.7	40.9	43.3	48.9	50.9
(as a % of GDP)		1.5	1.6	1.9	1.9	1.9	1.9	2.1	2.1
Total managed expenditure		736.1	748.2	763.6	775.0	788.8	803.7	834.9	864.0
(as a % of GDP)		40.0	39.7	39.0	38.0	37.0	36.1	36.1	36.0
Public sector net borrowing		90.6	76.0	55.2	61.6	40.8	13.7	10.1	0.1
(as a % of GDP)		4.9	4.0	2.8	3.0	1.9	0.6	0.4	0.0
Financial transactions		9.3	14.9	–56.5	–37.3	–11.7	–11.0	29.2	20.1
Public sector net cash requirement		81.3	61.0	111.7	98.9	52.5	24.7	–19.0	–19.9
(as a % of GDP)		4.4	3.2	5.7	4.9	2.5	1.1	–0.8	–0.8
Public sector net debt (% of GDP)		84.0	84.2	86.9	90.4	89.0	86.5	78.8	75.1
GDP deflator at market prices (2013=100)		101.8	102.5	104.6	107.0	109.7	112.3	114.8	117.1
Money GDP		1838.6	1886.1	1960.4	2037.6	2130.3	2223.7	2314.1	2402.4
Financial balance under Maastricht (% of GDP)[b]		–5.6	–4.3	–2.9	–2.0	–2.4	–1.1	–0.7	–0.3
Gross debt under Maastricht (% of GDP)[b]		88.1	89.0	89.3	87.6	85.8	82.9	80.0	77.0

Notes: These data are constructed from seasonally adjusted national accounts data. This results in differences between the figures here and unadjusted fiscal year data. Data exclude the impact of financial sector interventions, but include flows from the Asset Purchase Facility of the Bank of England. (a) Public sector current budget surplus is total current receipts less total current expenditure and depreciation. (b) Calendar year.

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Table A9. Saving and investment *As a percentage of GDP*

	Households		Companies		General government		Whole economy		Finance from abroad[a]		Net
	Saving	Invest–ment	Saving	Invest–ment	Saving	Invest–ment	Saving	Invest–ment	Total	Net factor income	national saving
2011	6.4	4.1	11.8	8.8	–4.1	2.9	14.1	15.8	1.8	–1.2	1.0
2012	5.9	4.2	11.0	9.2	–4.5	2.6	12.4	16.1	3.7	0.1	–0.7
2013	4.7	4.6	10.5	9.6	–2.8	2.5	12.3	16.7	4.4	0.5	–0.8
2014	4.7	4.9	10.7	9.9	–2.6	2.6	12.8	17.4	4.7	1.2	–0.3
2015	4.5	4.9	9.7	9.8	–1.3	2.5	12.9	17.2	4.3	1.3	–0.2
2016	3.5	5.0	9.5	9.6	–0.4	2.4	12.7	17.0	4.4	1.1	–0.2
2017	*1.9*	*5.0*	*10.9*	*9.4*	*0.3*	*2.5*	*13.1*	*16.8*	*3.8*	*0.5*	*0.4*
2018	*3.3*	*5.0*	*10.2*	*9.4*	*0.8*	*2.4*	*14.2*	*16.9*	*2.7*	*0.1*	*1.6*
2019	*4.4*	*5.2*	*9.4*	*9.5*	*2.1*	*2.5*	*15.9*	*17.2*	*1.3*	*–0.3*	*3.3*
2020	*5.3*	*5.5*	*8.9*	*9.5*	*2.7*	*2.6*	*16.9*	*17.6*	*0.7*	*–0.6*	*4.2*
2021	*5.8*	*5.7*	*8.5*	*9.5*	*3.1*	*2.7*	*17.4*	*17.9*	*0.6*	*–0.8*	*4.7*

Notes: Saving and investment data are gross of depreciation unless otherwise stated. (a) Negative sign indicates a surplus for the UK.

Table A10. Medium and long–term projections *All figures percentage change unless otherwise stated*

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022–26
GDP (market prices)	1.9	3.1	2.2	1.8	1.7	1.9	2.0	1.8	1.8	2.0
Average earnings	2.1	0.5	1.1	2.7	2.2	3.1	2.9	2.7	2.7	3.0
GDP deflator (market prices)	1.9	1.6	0.6	1.7	2.2	2.6	2.4	2.2	2.1	2.1
Consumer Prices Index	2.6	1.4	0.1	0.7	2.7	2.7	2.1	1.9	1.9	2.0
Per capita GDP	1.3	2.3	1.4	1.1	1.0	1.2	1.3	1.2	1.1	1.4
Whole economy productivity[a]	–0.4	0.6	0.9	0.4	0.4	1.4	1.1	1.2	1.1	1.5
Labour input[b]	1.8	2.8	1.5	1.4	1.3	0.6	0.9	0.7	0.7	0.5
ILO Unemployment rate (%)	7.6	6.2	5.4	4.9	4.7	4.8	4.7	4.7	4.6	4.6
Current account (% of GDP)	–4.4	–4.7	–4.3	–4.4	–3.8	–2.7	–1.3	–0.7	–0.6	–0.9
Total managed expenditure (% of GDP)	41.1	40.6	39.8	39.1	38.2	37.3	36.3	36.1	36.0	36.0
Public sector net borrowing (% of GDP)	5.5	5.5	4.2	3.3	2.7	2.2	0.9	0.5	0.1	0.1
Public sector net debt (% of GDP)	80.9	82.9	84.5	84.6	88.7	90.0	88.1	83.6	77.4	68.3
Effective exchange rate (2011=100)	102.9	111.0	118.1	106.7	101.1	101.2	101.7	102.3	102.9	104.4
Bank Rate (%)	0.5	0.5	0.5	0.4	0.3	0.5	0.6	1.1	1.5	2.9
3 month interest rates (%)	0.5	0.5	0.6	0.5	0.3	0.6	0.8	1.3	1.7	3.1
10 year interest rates (%)	2.4	2.5	1.8	1.3	1.3	1.9	2.4	2.9	3.3	3.9

Notes: (a) Per hour. (b) Total hours worked.

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