PROSPECTS FOR THE UK ECONOMY

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Section 1. A post-Brexit budget for the regions

- The March Budget is expected to be focused on 'levelling up' income levels across the United Kingdom.
- This will require a concerted campaign to raise productivity in the regions after more than a decade of stagnation.
- But additional public investment of around £20 billion per year is unlikely to have more than a modest impact on productivity and is not expected to offset the negative effect of Brexit.
- The Chancellor's aim of raising UK economic growth to around 2¾ per cent a year, though welcome, seems unachievable in the current global economic context. It is not clear that endemic economic uncertainty and incipient trade frictions can be offset very quickly.
- The new set of self-imposed fiscal rules may have to be revisited if they are not unnecessarily to constrain growth-enhancing public investment.

The General Election result delivered a clear mandate to the new government to 'get Brexit done' and 'unleash the potential of our whole country'.[1] The former commitment has now been achieved in the sense that the United Kingdom formally left the European Union on 31 January. The latter commitment is widely interpreted as a promise to improve living standards around the country by 'levelling up' incomes and opportunities by tackling some of the regional disparities that are thought to have contributed to the 2016 vote to leave the European Union.

On Brexit, the government has made it clear that it wants to negotiate a deep free trade agreement with the EU by the time that the transition period ends on 31 December 2020. But the short timetable, and the government's apparent preference for regulatory divergence, is likely to result in a bare-bones agreement. As such, UK exporters will face increasingly costly non-tariff barriers to trade with the EU from next year. In the long term leaving the EU single market and customs union is expected to reduce GDP by 3–4 per cent relative to what it would have been had the UK remained in the EU (Box A).

It is possible that Brexit could contribute to the levelling up of living standards across the country by slowing down the pace of expansion in better-off regions, though our own analysis is that its negative effect will be fairly evenly spread (figure 1).[2]

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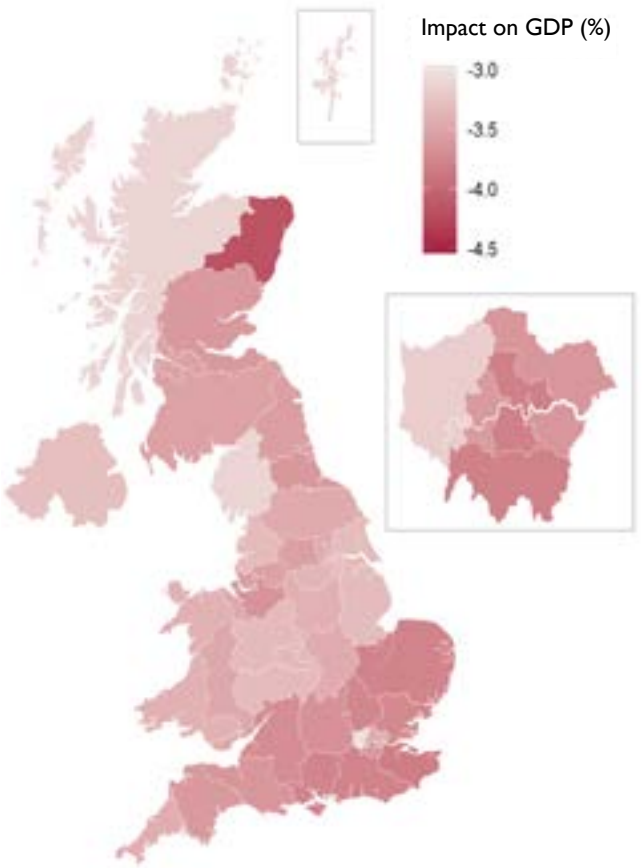
Figure 1. Regional impact of a UK-EU Free Trade Agreement



Source: NIESR, NiGEM simulation, Hantzsche and Young (2019).
Notes: Per cent of regional output relative to continued EU membership. Insets: Shetland islands and London.

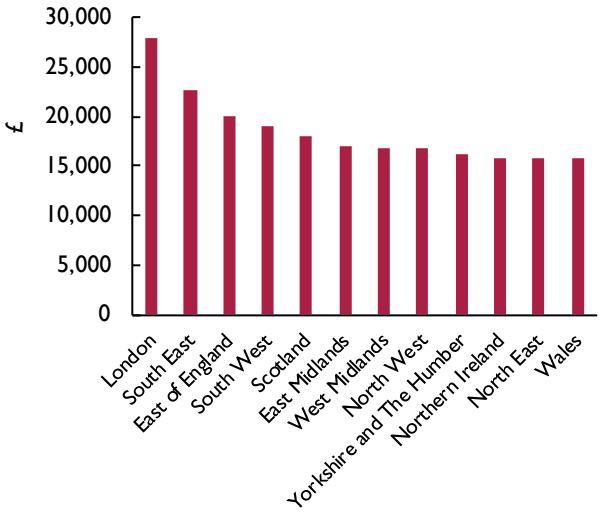
Fiscal policy will be one of the key instruments used by the government to address regional disparities and promote economic growth. The Chancellor of the Exchequer, Sajid Javid, has said that the focus for the 11 March Budget would be on 'people and place'.[3] The new regional agenda is then expected to be set out in detail in the Spending Review in the Autumn. Ahead of this, the Chancellor has said that he intends to invest more in skills and promoting infrastructure schemes in the Midlands and North. He has also said that he wants to boost the UK growth rate to around 2¾ per cent a year, around the post-war average, but significantly faster than what has been achieved in recent years.

There are significant challenges in aiming both to raise the overall growth rate and iron out longstanding regional disparities with fiscal measures that are expected to be limited in their effect and heavily constrained in their scope by rules aimed at maintaining fiscal discipline.

Regional disparities

An indication of the need for some 'levelling up' can be drawn from the substantial variation in household incomes across places in the United Kingdom. At a broad regional level, average household incomes are highest in London and lowest in the North East, Wales and Northern Ireland (figure 2). But aiming to level up at a broad regional level is not necessarily a well-targeted policy. As Haldane (2019) has emphasised, "however striking the regional differences in economic and societal health across the UK relative to historical and international standards, these conceal even more striking differences in levels of health, wealth and happiness within regions". It is also worth stressing that income 'does not necessarily buy happiness'. According to official statistics, London boroughs such as Lambeth, Hackney, Islington and Camden persistently have had some of the lowest personal well-being ratings since the ONS began measuring well-being in 2012, while some of the highest ratings have been in poorer Northern Ireland. This mismatch between measures of income and well-being likely reflects differences in pollution, crime, work-life balance and commuting. This again suggests that simply aiming to improve outcomes in poorer regions is not necessarily a well-targeted policy when there is also significant need in better-off places.

Figure 2. Disposable income per head by NUTS 1 region



Source: ONS.
Note: Gross disposable household income per head, 2017.

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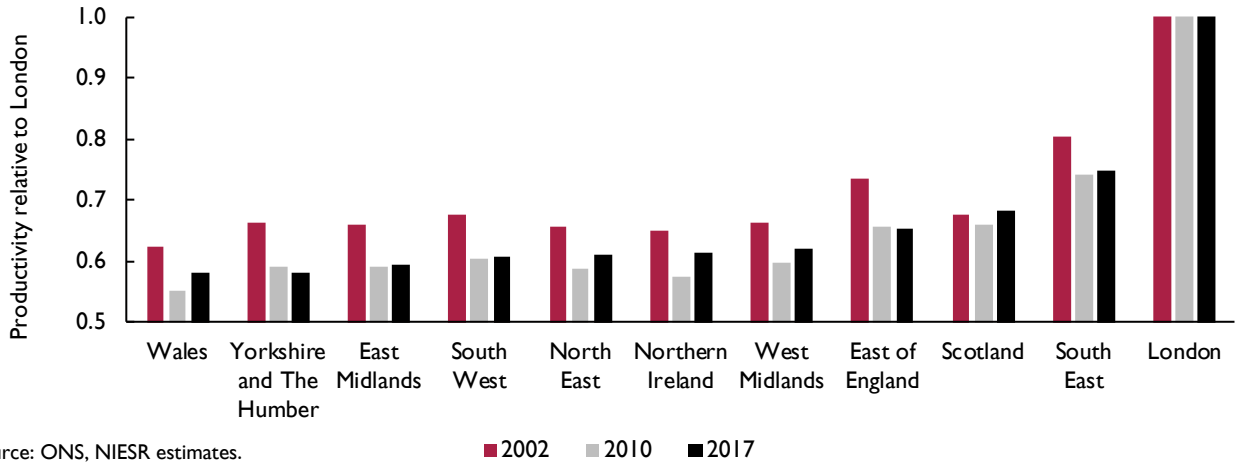
Figure 3. Regional productivity gap relative to London

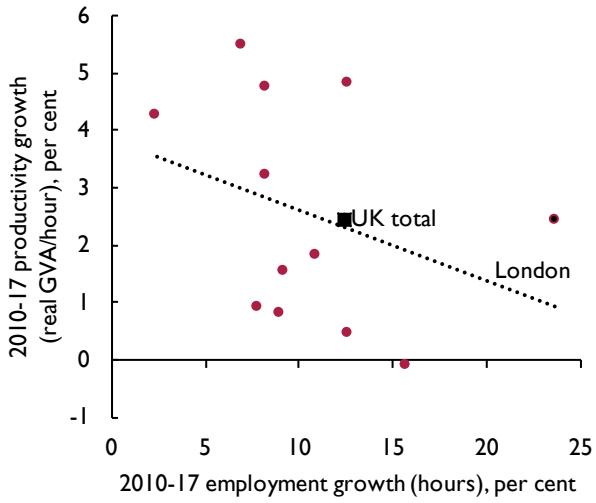


Source: ONS, NIESR estimates.
Note: Gross value added per filled job.

Attempting to raise the overall growth to around 2¾ per cent a year at the same time as levelling up the regions will require significant improvements in productivity throughout the economy, especially where productivity has hitherto been lagging.[4] Productivity is 30–40 per cent higher in London than in all other regions and UK nations (figure 3). This is a reflection of the concentration of higher-value and knowledge-intensive service industries in London. Regional differences in productivity levels have not changed much over the past twenty years despite the financial crisis impacting particularly on businesses based in London. Indeed Crafts (2004) estimated that the productivity advantage enjoyed by London was even larger a hundred years ago (Selfin, 2020).

Given the fairly limited scope for significant employment growth in the coming years, except perhaps in the North East, productivity growth will need to average close to 2½ per cent a year if the Chancellor's growth aim is to be met. To put this in context, output per hour in 2019 was only 2.9 per cent higher than at its 2007 peak. The reasons for the weakness in productivity growth have been widely debated (e.g. Oulton, 2016; van Ark, 2019). It is therefore a considerable challenge to achieve close to this rate of growth every year. This holds in particular given that past productivity advances in the UK were dependent on technological innovations made globally and on a trading environment that was more open than is currently foreseen. Nevertheless, there is clearly scope for a pick-up in productivity growth. Since the 2008–9 recession, whole economy output growth has mainly been achieved by absorbing labour market slack rather than improving efficiency. Figure 4 shows that at the regional level there has been a negative association between employment growth and productivity growth. With little labour market slack left to absorb, demand growth will increasingly need to be met by productivity growth if the economy is to grow at all.

Figure 4. Post-crisis productivity growth vs employment growth in NUTS 1 regions



Source: ONS, NIESR.
Note: Productivity defined as real GVA per hour, 2016 prices. Employment in hours.

Importantly, given the large productivity lead of London, growth in the less-productive regions contributes less to

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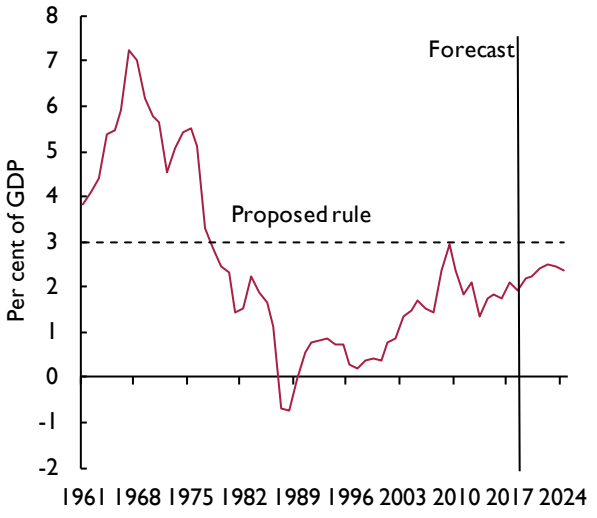
aggregate productivity growth than increases in productivity in London. This means that productivity growth would need to be faster in the poorer regions if overall growth is to meet the Chancellor's aim while the regions are levelling up. A rough calculation suggests that if productivity in the London economy were to grow by only 1 per cent a year, then it would need to grow by 3.1 per cent a year in all other regions if the UK was to achieve productivity growth of 2½ per cent a year. Only two out of 168 NUTS3 areas in the UK (mid-Lancashire and Dorset CC) achieved average annual growth rates in output per hour in excess of 3 per cent between 2010 and 2017.

Differences in productivity across regions partly reflect differences in the skills and qualifications of the labour force, innovative activity and physical and digital infrastructure.[5] In London, 57.5 per cent of the working population aged 25–64 have a university degree, compared with 33 per cent in the North East and West Midlands. London ranks lowly in terms of research and development spending as a share of GDP, but has highest per capita spending on transport infrastructure. London is also the leader in terms of the share of premises with ultrafast broadband (75 per cent), though Northern Ireland is the leader in full fibre connections (25 per cent).

Addressing growth disparities through government investment?

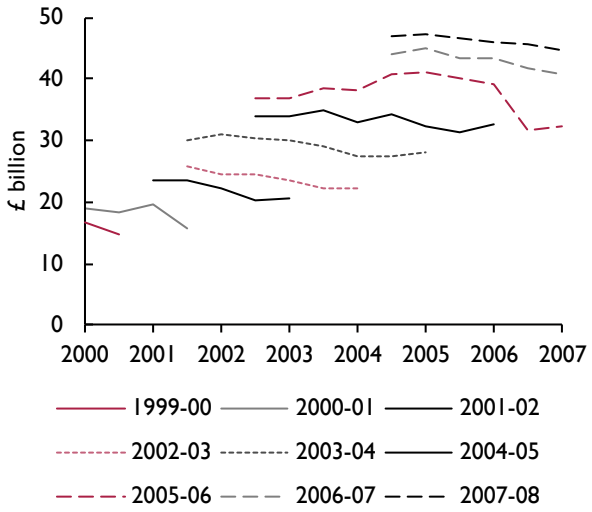
The General Election has moved the focus onto public investment and how this can contribute to economic growth. Over the past five decades, public investment has fallen from more than 6 per cent of GDP to around 2 per cent today, partly resulting from the privatisation of capital-intensive utilities companies (figure 5). The government aims to return the share of net public investment in GDP to 3 per cent, equivalent to an increase of about £20 billion per year. New rules in the way HM Treasury allocates funding across the country will enable the Chancellor to target regions that in the past have received a smaller share of public investment. The inequalities generated and reinforced by current *Green Book* rules are discussed in Coyle and Sensier (2019) who argue in favour of a strategic view taking account of the whole of the UK when regional funding decisions are made.

Figure 5. Net public investment as a share of GDP



Source: NiGEM database and NIESR forecast.

Figure 6. Public investment plans and revisions 2000–7



Sources: NIESR, HM Treasury/OBR Financial Statement and Budget Report, Economic and Fiscal Strategy Report and Financial Statement and Budget Reports, Economic and Fiscal Outlook, multiple issues.
Note: Public sector gross investment in nominal terms. Lines represent plans for a given financial year and revisions over time (forecast dates on horizontal axis).

But it may not be straightforward to raise public investment quickly when the economy is operating at around full capacity. The early-to-mid-2000s was one of the few periods when the public investment share of GDP rose as a result of deliberate government decision, outside of major recessions. In many ways, the economic backdrop was similar then to today, with GDP growth close to potential and unemployment low. Figure 6 shows revisions over time in nominal investment plans for different financial years between 2000 and 2007. It illustrates that the government's initially ambitious investment objectives

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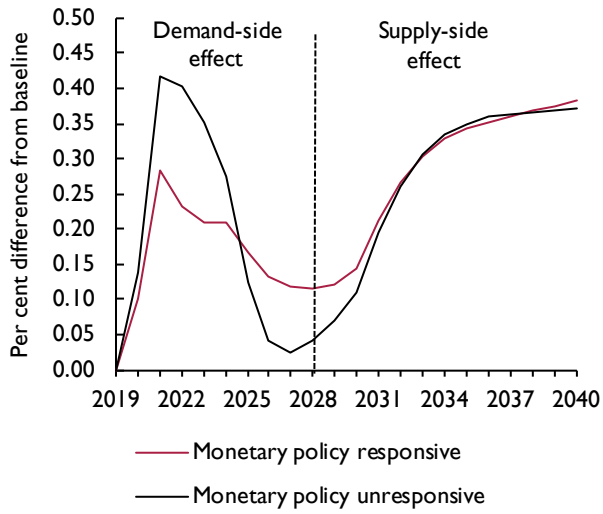
could not be met and projections had to be revised down repeatedly. One reason for this was capacity constraints in the economy delaying the use of available funds. With employment currently at a record high and elevated labour shortages, the Chancellor may find it difficult to implement ambitious public investment plans.

Suppose though that public investment could be increased sharply. Figure 7 plots the estimated dynamic response of economic output when government investment is increased by 1 per cent of GDP for a sustained 5-year period, calculated using the National Institute Global Economic Model (NiGEM). This assumes that the composition of investment is similar to historical investment projects. The dynamic impact of a government investment shock can roughly be divided into two parts: an initial boost to activity in the short term through the demand side, and a permanent boost to output through supply in the long run. In the short term, economic output would be 0.3–0.4 per cent higher for a shock similar to that envisaged by the government, but that impact would only last for about 4–5 years. The supply-side effect on the level of GDP would take much longer to materialise, reflecting the gradual boost to the stock of public sector capital. The estimated long-run impact of less than half a per cent of GDP would not be sufficient to offset the estimated 3–4 per cent loss due to Brexit.

The two lines in figure 7 show that the short-term impact would depend on the response of inflation and monetary policy and thus, on the state of the business cycle. With output close to potential, a boost to public sector investment would draw resources away from the private sector by pushing up wages, prices and interest rates. Public sector activity would crowd out activity in the private sector. This suggests that investment activity should be targeted at areas with relatively more economic slack than in the rest of the economy.[6] Not unlike in a monetary union, this would contain inflationary pressures in the economy as whole, reduce the need for monetary tightening and support overall economic growth. The unemployment rate is above the national average in the North East, Wales, the Midlands and Yorkshire and the Humber while inflation is fairly similar across regions suggesting relatively larger output gaps compared to the rest of the country (figure 8).

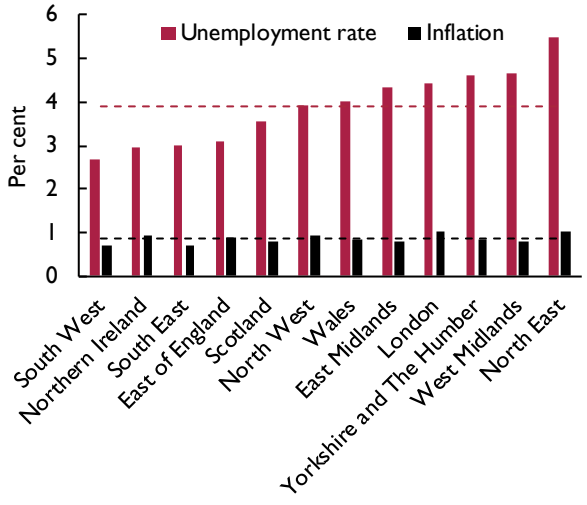
By adding to the capital stock, higher public sector investment can be supportive of productivity growth, on our estimates increasing the level of productivity by an average of half a per cent in the long run (table 1). If targeted appropriately, this could help narrow wage gaps across the country. NIESR's 2019 *Election Briefing* and November *Review* highlighted a number of policy fields in need of public investment, from education and skills development (Boshoff, Espinoza, Lisauskaite, Speckesser

Figure 7. The dynamic impact of a government investment shock on the economy



Source: NIESR, NiGEM simulation.
Note: GDP level response relative to base of an increase in government investment over the period 2020–24 of 1 per cent of GDP.

Figure 8. Regional output gaps



Sources: ONS, Datastream, NIESR CPI Tracker.
Note: Unemployment rate over 2018q4 to 2019q3. Trimmed mean (underlying) inflation, 2019 average.

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Table 1. Long-run economic impact of government investment shock

Potential GDP	0.7	Real interest rate*	0.2
Labour productivity	0.4	Business investment	–0.3
Real wages	1.3	Public net debt/GDP*	8.8

Source: NIESR, NiGEM simulation.
Note: Response relative to base of an increase in government investment over 2020–24 of 1 per cent of GDP. Average effect 2035–40. Per cent difference from base, * percentage point difference from base.

and Xu, 2019) to physical infrastructure (Jones and Llewellyn, 2019) and digital infrastructure (Aitken, Boshoff, Nguyen, Rincon-Aznar and Stochino, 2019).

On our main forecast, the sustainable rate of economic growth is in the range of 1–2 per cent. The last time economic growth was persistently above 2 per cent was in the late-1990s to mid-2000s, a period of rapid globalisation. Public sector investment could add half a per cent to the level of potential GDP, or slightly more if crowding out effects are smaller than we estimate. However, it would be unrealistic to expect potential output growth to double as a result of a relatively small boost to investment.

Constraints on fiscal policy

The Chancellor has proposed a new set of fiscal rules that make room for more public sector investment than the previous Chancellor's aim of eliminating public sector borrowing by the mid-2020s.[7] The proposed new rules are:

- Balance the current budget within three years.
- Public investment not to exceed 3 per cent of GDP.
- The ratio of debt interest cost to tax revenue to remain below 6 per cent.

Further details on the new fiscal rules are expected to be announced in the March Budget.

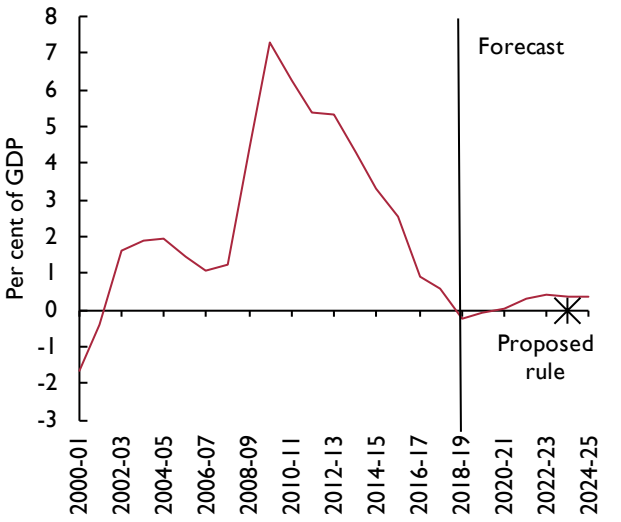
Our concern is that these rules might be excessively constraining and prevent the government from delivering on its productivity agenda.

Currently, the government has room against its new rules to increase public investment by 1 per cent of GDP, or £20 billion per annum (figure 5). As highlighted above, increasing investment quickly by this amount looks challenging and, with the economy operating close to potential, extra public investment is likely to crowd out some private sector activity. In our forecast, we assume a modest increase of public investment from 2 to 2½ per cent of GDP.

A further limitation is that the scope to raise public investment will also be constrained by limits on day-to-day spending. Most public investment projects require not only an increase in capital expenditure but also higher current spending to pay for operating costs. For instance, building more hospitals or schools will require paying for staff to run them. Against this backdrop, the government's proposed current spending rule leaves very little room. After reaching more than 7 per cent in the aftermath of the financial crisis, the current budget deficit has now fallen to zero after a decade of stringent fiscal restraint (figure 9). But, without tax rises, there will not be much scope to expand day-to-day spending and meet the balanced current budget rule, especially given the increasing demand for public services to meet the needs of an ageing society (Hantzsche and Young, 2018). This constraint is likely to limit the effectiveness of additional public investment. Our forecast assumes that there will be some slippage in the current budget target.

Another constraint on a substantial uplift in public investment is the proposed new rule limiting debt interest payments as a share of overall revenues. It is unclear exactly which definition will be used but room for additional borrowing would on all conceivable measures be limited (table 2). In our view, a plausible definition would focus on the ratio of general government interest payments to current receipts after netting off the savings

Figure 9. Current budget deficit as a percentage of GDP



Source: ONS, NIESR calculations.

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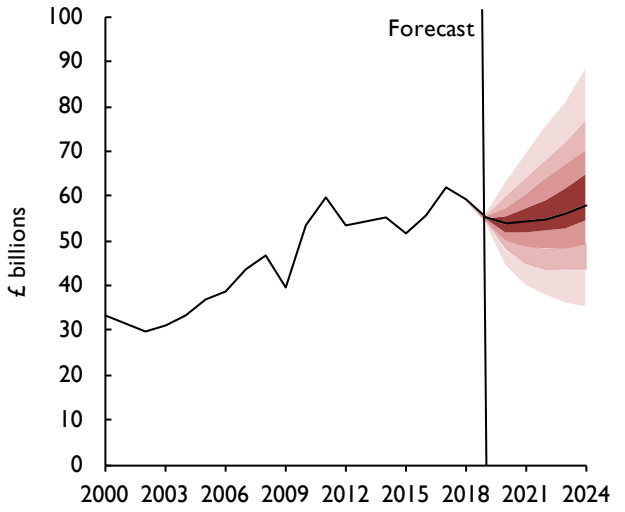
Table 2. Interest payments as a share of receipts on different measures

	Including APF transfers			Net of APF transfers		
	2018-19 ratio in %	Room against 6% (% of receipts)	Room against 6% £ billion	2018-19 ratio in %	Room against 6% (% of receipts)	Room against 6% £ billion
Public sector interest/Public sector receipts	7.0	–1.0	–7.8	5.6	0.4	3.6
Central govt interest/Central govt receipts	6.5	–0.5	–3.9	5.0	1.0	7.4
General govt interest/General govt receipts	6.2	–0.2	–1.8	4.8	1.2	9.5
Central govt interest/Public sector receipts	6.0	0.0	0.0	4.6	1.4	11.3

Sources: ONS, NIESR calculations.
Note: 2018–19 financial year. Public sector excluding public sector banks. APF is the Asset Purchase Facility of the Bank of England.

made by the public sector being able to borrow at Bank Rate through Bank of England asset purchases financed by issuing central bank reserves. On this rule, in 2018–19 there would have been room for interest payments to be higher by around £10 billion. It would cover borrowing both by the central government and local authorities. At present, with low gilt yields, this rule appears unlikely to act as a constraint on plausible investment plans. But interest payments are hard to predict, as illustrated by the wide fan in figure 10. This is partly because payments not only depend on gilt yields but also on the rate of RPI inflation through index-linked bonds and on Bank Rate which determines the interest paid on short-term debt and on funding through the Asset Purchase Facility.[8]

Figure 10. Government interest payments fan chart



Source: NIESR forecast and judgement.
Note: The fan chart is intended to represent the uncertainty around the main-case forecast scenario shown by the black line. There is a 10 per cent chance that government interest payments in any particular year will lie in any given shaded segment in the chart. There is a 20 per cent chance that they will lie outside the shaded area of the fan.

Overall, there appears to be a conflict between the government's aim of increasing public investment by as much as was promised during the election campaign and the proposed fiscal rules. This calls into question the purpose of the fiscal rules if they are likely to limit worthwhile public investment. The main constraint on public sector investment should be whether it meets sensible investment criteria and not whether it violates arbitrary, self-imposed fiscal rules.

We would make three points about the proposed fiscal rules.

First, limiting public investment to no more than 3 per cent of GDP when many projects pass well-designed cost-benefit tests is likely to force choices to be made between investment in different places. This would lead to some regions receiving less investment than they need, particularly in light of the government's ambition to address regional inequalities and raise long-run growth prospects.

Second, there is a risk that without some tax increases the new fiscal rules will be broken soon after they are applied. There is relatively little scope within them to allow for plausible changes in economic circumstances. In the past when this has happened governments have either made damaging adjustments to their spending priorities to meet fairly arbitrary self-imposed rules or changed the rules. Neither approach is a satisfactory way of running fiscal policy and adds to political and economic uncertainty.

Third, the proposed rules appear arbitrary and it is not clear what analytical framework lies behind them, though this may be revealed in the March budget. A

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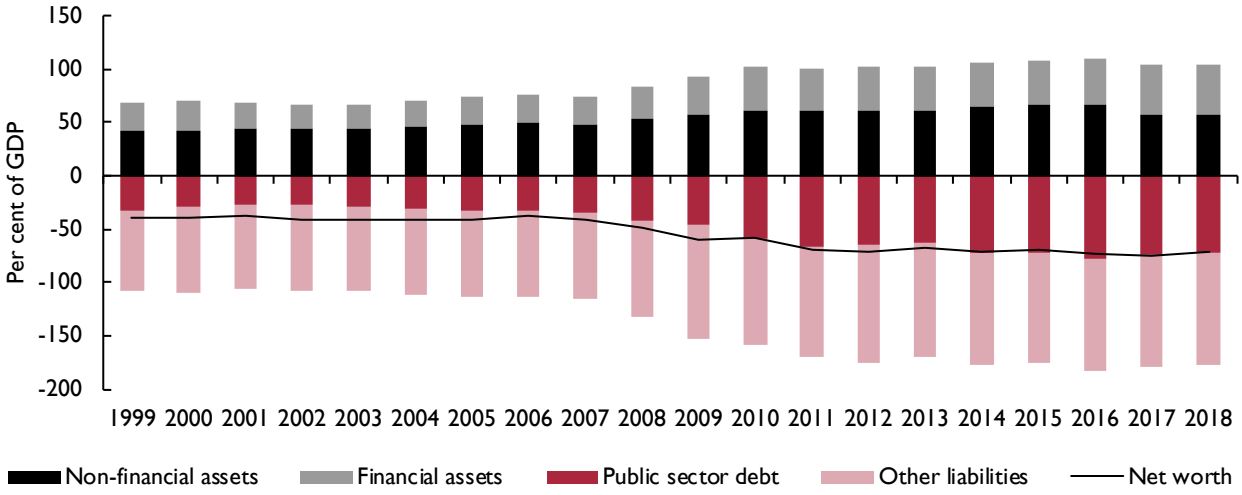
Figure 11. The public sector balance sheet



Source: ONS, International Monetary Fund's Government Finance Statistics framework in the public sector finances: Appendix E, 21 November 2019.

focus on the public sector balance sheet would allow more public sector investment to take place.

By allowing a balanced current budget and investment spending of up to 3 per cent of GDP, the new rules imply that the debt-to-GDP ratio would be stabilised at around its current level of 80 per cent of GDP. Significantly higher levels of public investment would lead to the debt-to-GDP ratio rising, but that would not be a problem provided that the investment was economically worthwhile because, in that case, it could generate future income streams that could service the debt.

In general it would be better to frame fiscal policy decisions in terms of their implications for the overall public sector balance sheet rather than public sector debt alone.[9]

The overall balance sheet takes account of the public sector assets that can generate income to service that debt, as well as other liabilities that are not included within standard measures of public sector debt. At the end of 2018–19, public sector net worth (the difference between public sector assets and liabilities) was estimated at £1,567 billion, close to the value of public sector debt securities at £1,615 billion, with other liabilities, including the estimated cost of unfunded public sector pensions, roughly offsetting the value of public sector assets (figure 11).

The public sector balance sheet, as measured by net worth, weakened following the financial crisis, reflecting a long period of borrowing in excess of net investment. A reasonable case can be made that the government should be aiming to repair the public sector balance sheet now that the economy is in a better position, especially as there are many spending priorities on the horizon associated with an ageing population. The Office for Budget Responsibility has estimated that age-related spending will need to increase by 8.7 percentage points of GDP over the next fifty years. In our own analysis, we showed how age-related demands are increasing the amount of public services that are required in the next five years (Hantzsche and Young, 2018).

But, on the other hand, a case can be made that, with long-term gilt yields below the estimated long-run rate of growth of the economy, there is ample room to run even larger current deficits without the public sector balance sheet deteriorating. Presumably, this argument is one motivation for the new debt interest rule.

The key point though is that the choice over the most desirable future path of public sector net worth can be separated from the choice over how much public sector investment to do. The latter should be determined by how many projects pass cost-benefit tests rather than how many can be fitted within an arbitrary rule limiting public investment to 3 per cent of GDP. The proposed rules confuse these different fiscal policy choices.

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Section 2. Forecast in detail

Summary of the forecast

The economy weakened towards the end of last year. We estimate that GDP in the fourth quarter was unchanged from the previous quarter. But business surveys have signalled an improvement in sentiment since the decisive outcome of the 2019 general election and a substantial reduction in the risk of a disorderly no-deal Brexit. While business surveys have provided an unreliable signal in the past, notably in the immediate aftermath of the 2016 referendum, investment and hiring intentions for 2020 are significantly higher than in recent months. There are also signs that the global manufacturing slowdown has now bottomed out and prospects are expected to improve over the course of 2020 (see the World Economy chapter of this *Review*).

On 31 January, the UK entered a transition period which maintains access to the EU single market and customs union but excludes UK policymakers from European legislative processes. For businesses this means that trade with the EU can continue for this year without additional frictions. However, uncertainty continues to be a chronic feature of the economy as details of the future trading arrangements between the UK and the EU and other major trading partners remain unclear.

In our forecast, investment and productivity growth pick up only gradually as economic and political uncertainty lifts over time. In the short term, economic conditions are therefore set to continue roughly as they have been with slow growth and output close to capacity. GDP is expected to grow by around 1½ per cent in 2020 in 2021, unchanged from 2019.

We have changed our long-term forecasting assumption regarding UK-EU trade and now assume that trade will take place on the basis of a bare-bones free trade agreement (for details see Box A). We assume the adjustment towards this new trading relationship is smooth and major disruptions to supply chains can be avoided at the end of 2020. Relative to our previous forecasts, the long-run level of labour productivity is assumed to be 1–2 per cent lower. As a result, long-run economic growth is slightly weaker than previously forecast.

The labour market remains tight and the slight softening observed since early 2019 is not expected to gain pace. The unemployment rate remains at 3.8 per cent and the number of vacancies has stabilised with levels remaining historically high. As a result, wage growth has been robust and is expected to stabilise at an annual rate of 3–4 per cent this year. With little productivity growth, this means that unit labour costs are growing at an annual rate of more than 3 per cent, although there is little sign yet of this translating into significant price pressures. With regulatory changes leading to lower prices for utilities

Table 3. Summary of the forecast — Percentage change unless otherwise stated

	2016	2017	2018	*2019*	*2020*	*2021*	*2022*	*2023*	*2024*
GDP	1.9	1.9	1.3	*1.3*	*1.3*	*1.6*	*1.6*	*1.8*	*1.7*
Per capita GDP	1.1	1.3	0.7	*0.7*	*0.7*	*1.1*	*1.1*	*1.3*	*1.2*
CPI Inflation	0.7	2.7	2.4	*1.8*	*1.8*	*2.1*	*2.0*	*2.0*	*2.0*
RPIX Inflation	1.9	3.8	3.3	*2.6*	*2.7*	*2.9*	*2.7*	*2.7*	*2.6*
RPDI	0.4	1.3	2.4	*1.0*	*2.4*	*2.3*	*2.2*	*2.3*	*2.2*
Unemployment, %	4.9	4.4	4.1	*3.8*	*3.8*	*4.0*	*4.1*	*4.0*	*4.1*
Bank Rate, %	0.4	0.3	0.6	*0.8*	*0.5*	*0.5*	*0.7*	*0.9*	*1.2*
Long Rates, %	1.3	1.2	1.4	*0.9*	*0.9*	*1.3*	*1.6*	*1.9*	*2.1*
Effective exchange rate	–9.9	–5.5	1.9	*–0.4*	*2.3*	*0.2*	*0.4*	*0.3*	*0.3*
Current account as % of GDP	–5.2	–3.5	–3.9	*–4.1*	*–3.2*	*–3.4*	*–2.9*	*–2.5*	*–2.2*
Net borrowing as % of GDP[a]	2.8	2.6	1.8	*2.2*	*2.3*	*2.8*	*2.9*	*2.8*	*2.7*
Net debt as % of GDP[a]	83.2	83.2	81.3	*80.8*	*79.1*	*77.3*	*78.5*	*78.4*	*78.4*

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. Annual averages unless stated otherwise.

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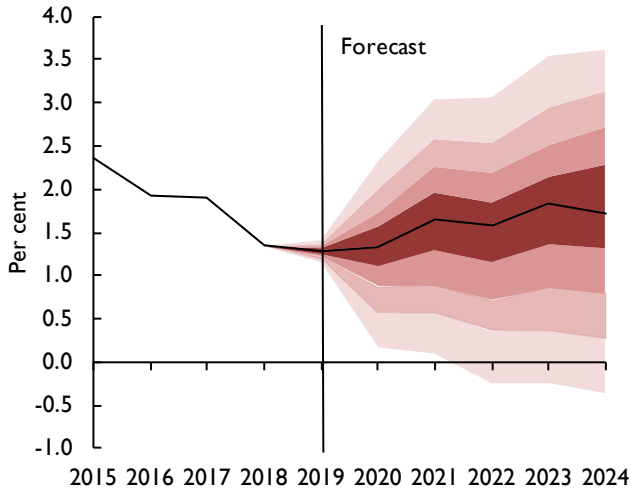
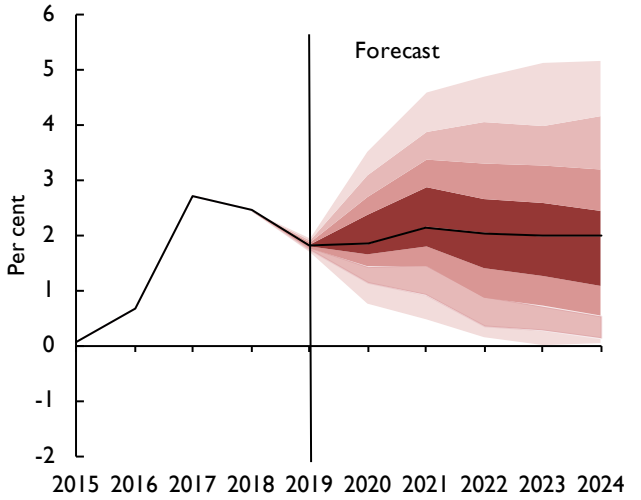
Figure 12. GDP growth fan chart (per cent per annum)



Source: NIESR forecast and judgement.
Note: The fan chart is intended to represent the uncertainty around the main-case forecast scenario shown by the black line. The main-case forecast scenario for GDP growth is close to the median of the forecast distribution. There is a 10 per cent chance that GDP growth in any particular year will lie in any given shaded segment in the chart. There is a 20 per cent chance that GDP growth will lie outside the shaded area of the fan.

Figure 13. Inflation fan chart (per cent per annum)



Source: NIESR forecast and judgement.
Note: The fan chart is intended to represent the uncertainty around the main-case forecast scenario shown by the black line. The main-case forecast scenario for CPI inflation is close to the median of the forecast distribution. There is a 10 per cent chance that CPI inflation in any particular year will lie in any given shaded segment in the chart. There is a 20 per cent chance that CPI inflation will lie outside the shaded area of the fan. The Bank of England's CPI inflation target is 2 per cent per annum.

and competitive pressures high, we forecast average consumer price inflation to remain a little below the Bank of England's 2 per cent target in 2020. Since our last forecast, the sterling effective exchange rate has appreciated by nearly 5 per cent, which further offsets domestic inflationary pressures through lower import prices.

With hard economic data remaining weak, inflationary pressures contained, and global monetary policy in easing mode, we have conditioned our forecast on the assumption of Bank Rate being cut by 25 basis points at the end of March and then remaining at 0.5 per cent until the end of 2021. This is broadly in line with market expectations. The Bank of England Monetary Policy Committee left rates on hold at its January 2020 meeting in the expectation that demand growth would soon outrun weakened supply growth.

Our forecast accounts for additional fiscal loosening which we expect to be announced in the March Budget. As discussed in the previous section, we assume that public investment growth will be lifted but expect this to be a gradual process that will not have much of an effect on the economy before the end of the calendar year.

Compared to our November update, risks around our forecast now appear to be more symmetric. This is because of a considerable reduction in the risk of a disorderly Brexit outcome in the near term, although a cliff edge scenario at the end of 2020 remains a possibility should trade negotiations with the EU fail. The global trading environment also remains uncertain. Should global trade further deteriorate this would lead us to revise down our forecast.

In our forecast, we have been cautious about the economic effects of an improvement in business sentiment at the beginning of this year and it is possible that there could be a more significant bounce in activity than we have allowed. A faster than expected pick-up in investment and productivity growth constitutes an upside risk to our forecast, as does a sharper than expected loosening of fiscal policy.

Taking downside and upside forecast risks together, we now expect there to be a chance of less than 10 per cent that average output growth is negative in 2020. This is illustrated by our fan chart and is lower than at the time of our last forecast when we thought there was a 15 per cent chance of negative year-on-year growth in 2020.

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We see the risks to our CPI inflation forecast as being roughly symmetric around the 2 per cent target.

These forecasting distributions are broadly in agreement with those set out in Box B from the Warwick Business School Forecasting System (WBSFS), which combines state-of-the-art statistical models weighted solely by the forecasting performance of each model.

Monetary policy and financial market and credit conditions

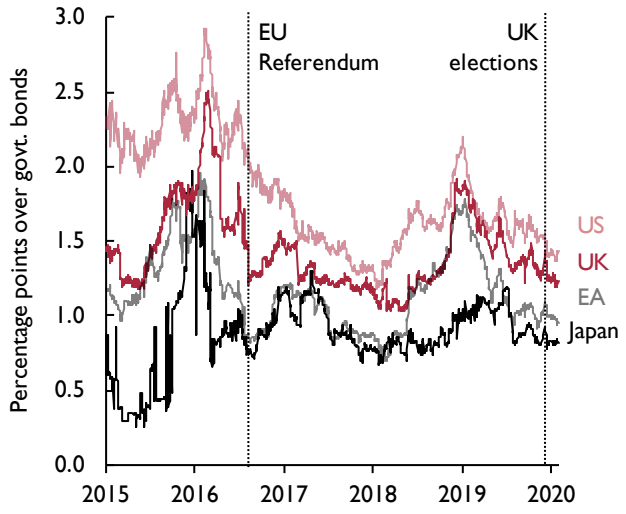
Financial market and credit conditions continue to be supportive for UK businesses and households in a low growth and below-target inflation environment.

Despite widespread expectations of a cut in the run-up to the Bank of England's MPC meeting in January, Bank Rate was held at 0.75 per cent. Nevertheless, the instantaneous forward OIS curve continues to suggest that a cut in Bank Rate to 0.5 per cent is widely expected in the first half of the year. And the ten-year government bond yield remains very low at 0.55 per cent at the end of January.

Improving sentiment about the outlook for the global economy has contributed to a gradual decline in investment-grade corporate bond spreads (figure 14). This, together with low long-term interest rates, means that businesses with access to the debt capital markets continue to face benign financing conditions. Consistent with this, respondents to the 2019 Q4 *Deloitte CFO Survey* of large corporates reported that credit is cheap (net balance of 72per cent) and available (net balance of 54 per cent).

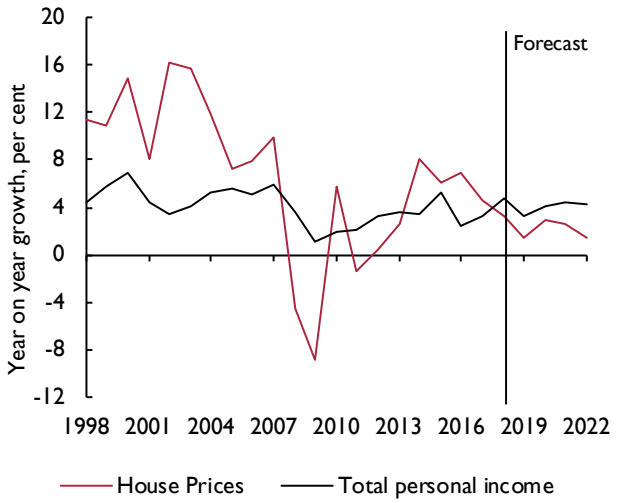
Financial and credit conditions facing households continue to be supportive, and mortgage rates remain

Figure 14. BBB Corporate bond spread



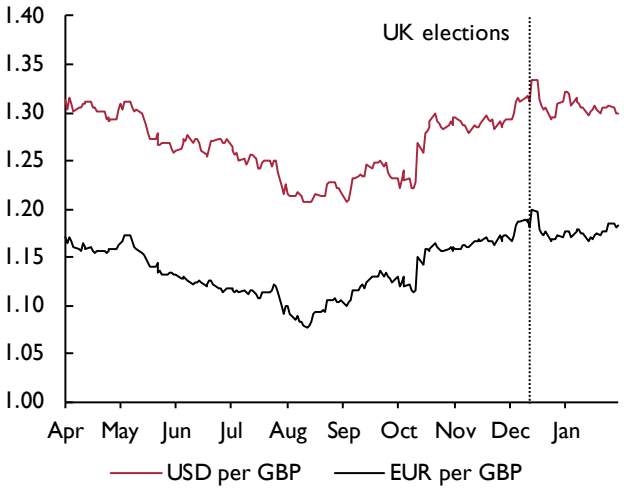
Source: NIESR, Datastream.

Figure 15. House price growth and total personal income growth



Source: NiGEM database and NIESR forecast.

Figure 16. Sterling exchange rate



Source: Datastream, NIESR.

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low, though there was some evidence of a modest tightening of consumer credit conditions with unsecured interest rates rising a little. There were some tentative signs of greater demand in the housing market following the general election, and Rightmove reported a 2.3 per cent increase in asking prices in the four weeks to 11 January. We expect house price growth of 3 per cent in 2020 as a whole (figure 15).

Foreign exchange

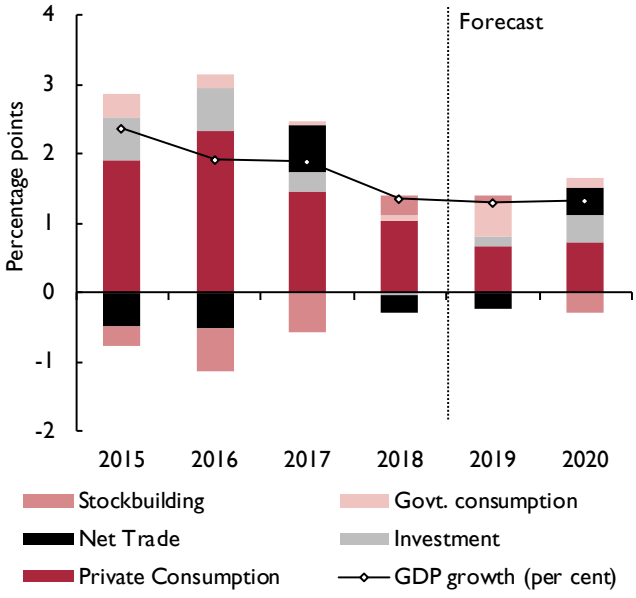
The value of sterling has continued to be buoyed by relatively elevated interest rates by global standards and returning confidence following the general election (figure 16). The effective exchange rate is 3 per cent higher than in the month running up to our last forecast in October and this is contributing to lower inflationary pressure.

Aggregate demand

Output and components of demand

UK economic activity is estimated to have stagnated at the end of 2019 but economic sentiment has turned more optimistic since mid-December following the decisive result of the 2019 General Election and signs that the global weakness in the manufacturing sector is bottoming out.

Figure 17. Contributions to GDP growth



Source: NiGEM and NIESR calculations.

According to the latest ONS data and the NIESR GDP Tracker respectively, the UK economy expanded by 0.4 per cent in the third quarter but posted zero growth in the final quarter of 2019. The nowcast of 0.0 per cent is explained by a sharp softening in service sector activity which expanded just enough to offset quarter-on-quarter falls in manufacturing and construction output.

More recent survey evidence points to a more optimistic beginning of 2020. According to the Deloitte survey of CFOs, taken after the General Election, revenue expectations for 2020 have turned positive and, for the first time since 2015, a majority of companies now intends to increase capital expenditure. This is explained predominantly by a reduction in perceived Brexit-related risks and geopolitical risks as well as a more optimistic outlook for UK demand. The January CBI Industrial Trends Survey of manufacturers also reports a sharp rise in business optimism. An IHS Markit/CIPS Flash UK Composite PMI print of 52.4 in January suggests that private sector activity expanded for the first time in five months as service providers saw output increase solidly while manufacturing activity stabilised.

It is important to note that most of the improvement in sentiment is measured against poor actual performance at the end of 2019. It may well take longer for improved sentiment to be reflected in hard data. Based on recent evidence and past trends, we expect growth of about 0.3 per cent in the first quarter of 2020. Given the low starting point and an assumed very gradual improvement in economic activity, we forecast real GDP growth of around 1½ per cent in 2020 and 2021, the same as 2019.

As in previous years, domestic demand is expected to make the largest contribution to growth in 2020, adding 1 percentage point to the growth rate of GDP (figure 17 and table A3). However, the growth contribution of domestic demand is forecast to be smaller than in 2019 when it added 1.4 percentage points. Within domestic demand, household consumption makes the largest contribution of 0.7 percentage points, the same as last year. The growth contribution of total investment, including business investment, housing and government investment, is expected to increase to 0.4 percentage points, up from 0.1 percentage point last year. Government consumption expanded strongly in the first half of 2019, lifting the contribution to growth in that year to 0.5 percentage points (details in the Public Finances section). With the starting point high and additional increases in nominal government expenditure forecast partly due to a higher government expenditure

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deflator, the contribution to real GDP growth in 2020 is forecast to fall back to 0.1 percentage point before increasing again thereafter. Stockbuilding is forecast to subtract 0.3 percentage points from 2020 GDP growth as firms continue to run down stocks built up ahead of the Brexit deadlines in 2019. For the first time since 2017, net trade is expected to add to growth in 2020 as import growth subsides more strongly than export growth.

Household and NPISH sector

Household consumption growth has weakened considerably over the past three years. In the third quarter of 2019, household consumption grew by 1.1 per cent relative to the same period in the previous year, the weakest rate of year-on-year growth since 2011. The saving ratio decreased to 5.4 per cent in the third quarter of 2019, compared with 6 per cent in the second quarter. The weakness in household consumption continued into the fourth quarter with annual growth in retail sales in the three months to December slowing to 1.6 per cent compared to 3.3 per cent in the three months to September. More recently, the GfK Consumer Confidence Index increased slightly in December while sentiment on the housing market improved in December according to the Royal Institution of Chartered Surveyors, which reports an increase on balance in the number of new buyers, the number of agreed sales and house price expectations.

The outlook for private consumption growth depends primarily on the growth rate of household income. In our forecast, real household incomes grow at an average rate of a little above 2 per cent, driven by real wage growth of around 1½ per cent per annum and employment growth of around ½ per cent per annum. Real income growth supports private consumption growth of around 1–1 ½ per cent per annum. Consistent with this consumption profile, the saving ratio is expected to increase gradually towards 9 per cent at the end of the forecast horizon, to a level it last reached in 2014.

Investment

Gross fixed capital formation growth has continued to be weak, falling from above 6 per cent in 2014 to –0.2 per cent in 2018. For 2019 as a whole we estimate fixed investment to have grown by 0.9 per cent as a renewed contraction in business investment was offset by an increase in government investment while private housing investment growth remained positive but subdued.

After four negative quarterly growth prints in 2018, business investment rose by 1 per cent in the first quarter of 2019 but has remained nearly flat in the second and third quarter. With continued uncertainty about future UK-EU trade, we expect annual business investment growth to recover only slowly, reaching just below 1 per cent in 2020 and just above 1 per cent the year after.

Whole-economy growth in fixed investment is forecast to be supported by a pick-up in government investment. We forecast government investment growth to increase from around 3 per cent in 2019 to 5–6 per cent in 2020, reaching around 8 per cent thereafter.

Private housing investment is forecast to grow at an annual rate of around 3 per cent. Taking public and private investment activity together, our forecast is for whole-economy fixed investment to grow by 2–3 per cent per annum over the forecast horizon.

External sector

As a result of stockbuilding activity and movements of unspecified goods, including non-monetary gold, import and export growth was volatile in the first half of 2019. In the third quarter of 2019, the trade deficit narrowed to 0.1 per cent of GDP, the lowest quarterly print since 1997Q4. This was driven by strong export growth of 7.9 per cent while import volumes decreased by 0.3 per cent relative to the second quarter.

With sterling stronger and global trade still weak, export growth is unlikely to pick up in the near term. We now condition our forecast on the assumption that UK-EU trade converges to a basic free trade agreement in the long run (Box A). Trade barriers associated with such a trade deal are holding back export growth towards the end of our forecast horizon.

The volatility of import volumes growth is being carried forward in our forecast, explaining a drop in the growth rate to ½ per cent per annum in 2020 before picking up to more than 4 per cent in 2021.

Aggregate supply

With economic slack still small, economic growth will need to come from an expansion of supply potential, determined by the availability of capital, labour and the efficiency with which they are used in production.

Capital stock

Estimates of the capital stock are notoriously unreliable, reflecting inherent difficulties in measurement. Since our last forecast, the ONS have revised the method with which capital stocks are estimated. Figure 17 shows the old data and our November forecast as well as data

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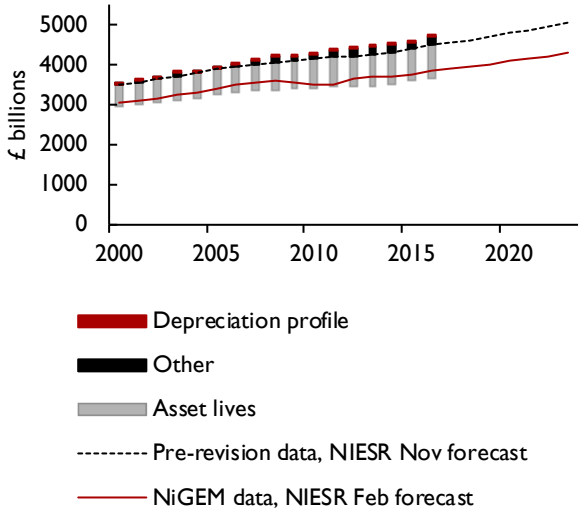
Figure 17. Net capital stock, revisions



Source: ONS, NIESR.
Note: Total net capital stock in NiGEM is represented by the variable UKK.

revisions and our revised forecast. Revised estimates show that the capital stock is about 15 per cent lower than previously thought. Revisions are almost entirely driven by methodological changes to how asset lives are estimated, better reflecting how long different assets are used before being replaced, resulting in shorter asset lives overall and thus implying faster depreciation. We have accordingly revised lower our estimate of the equilibrium capital stock used in production.

We estimate that private sector capital stock growth slowed to 1.3 per cent in 2019, down from 2.7 per cent the previous year. With business investment weak, the stock of private sector capital is forecast to grow at similar rates over the forecast horizon (table A6). By contrast, as a result of expected public investment initiatives, we forecast public sector capital stock growth to reach more than 3 per cent per annum in the years ahead.

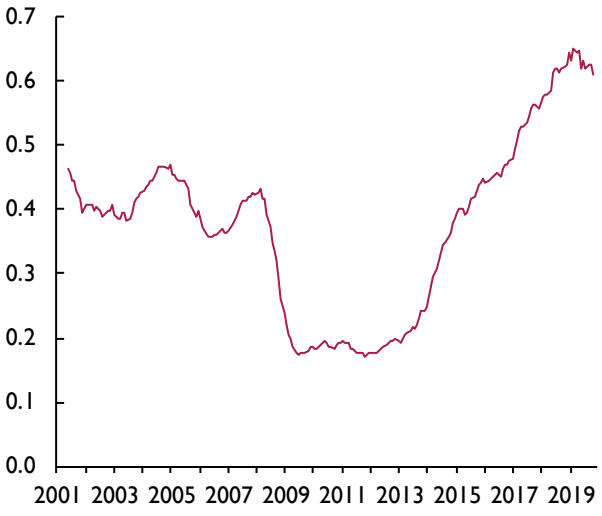
Labour market

Labour market indicators remain robust and there are signs that the slight softening observed since early 2019 is unlikely to gain pace. Unemployment remained unchanged in the three months to October and the number of vacancies stabilised at 805,000 in the fourth quarter of 2019, down 11,000 relative to the third quarter. The vacancies-to-unemployment ratio, a measure of labour market slack, is expected to have stabilised in the fourth quarter of 2019, at a level below the peak reached earlier in the year but at a historical high (figure 18). According to the KPMG and REC Report on Jobs, permanent placements rose in December for the first time in a year and temporary employment growth picked up as business confidence improved somewhat after the General Election. The Deloitte CFO survey shows that concerns about Brexit and global trade uncertainty have eased and hiring intentions are now stronger than at any time in the last four years.

Net migration continues to add to labour supply. It has remained broadly stable since the end of 2016, adding 212,000 people to the UK population in the twelve months to June 2019. Net migration from EU countries has continued to fall following peak levels in 2015 and 2016 but remains positive at 48,000. Net migration from non-EU countries, which was roughly similar to EU net migration in 2016, has increased to 229,000 in the year to June 2019 according to preliminary ONS estimates. Our population forecasts are based on the ONS' principal projections and as such take account of recent migration trends. The government plans to put a new points-based migration regime in place by 2021 and we will revisit our population and employment assumptions once details are known.

We forecast that employment growth will weaken gradually as employment approaches a peak, reaching

Figure 18. Vacancies-to-unemployment ratio



Source: ONS, NIESR.

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0.6 per cent in 2020, after an estimated growth rate of 0.9 per cent in 2019 and before falling to less than half a per cent thereafter (table A7). The unemployment rate is expected to remain stable at just below 4 per cent.

Productivity

Labour productivity is estimated to be 20 per cent lower now than a continuation of the pre-financial crisis trend suggests (see article by Crafts and Mills in this *Review*, and Box A). This makes the productivity slowdown unprecedented in 250 years of UK history. According to the ONS, labour productivity, measured by output per hour, was a mere 0.1 per cent higher than a year earlier in the third quarter of 2019. Looking ahead, our forecast is for productivity growth to rise to around 1 per cent per annum from this year onwards, based on the assumption that uncertainty related to Brexit and global trade gradually fades and some substitution of capital for labour resumes (table A7).

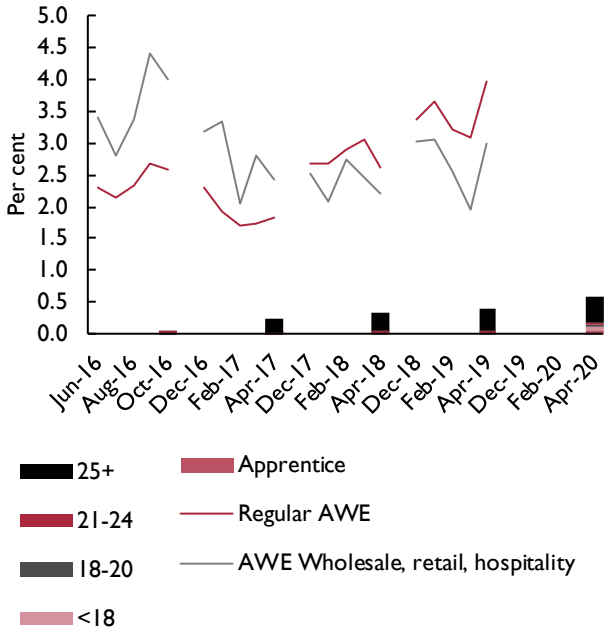
Wages and prices

Wage growth stabilised at the end of last year. Average weekly earnings excluding bonus payments expanded by 3.4 per cent year-on-year in the three months to November, and by 3.2 per cent if bonus payments are taken into account. New experimental data from the ONS based on Pay As You Earn real-time information also indicates that earnings growth weakened somewhat in the last months of 2019 after peaking in April that year. Pay settlements were unchanged in the 2019Q4 Bank of England Agents survey but were higher for staff on the National Living Wage and for roles affected by shortages of skilled labour while tight margins and weak productivity growth constrain pay growth overall.

The NIESR Wage Tracker suggests that nominal earnings growth will remain around 3½ per cent in the first quarter of 2020. Private sector wage growth is expected to remain largely unchanged while public sector wages are forecast to grow more strongly after ten years of public sector pay restraint, with average growth rates slightly exceeding those in the private sector. With consumer price inflation of around 1½ per cent in the short term, this indicates that real earnings growth may reach 2 per cent in the first quarter of 2020 for the first time since 2016. We expect similar rates of earnings growth for the remainder of the forecast horizon (table A5).

Higher National Living Wage (NLW) and minimum wage increases than in previous years could add up to 0.6 percentage points to annual earnings growth in 2020. Figure 19 shows annual average weekly earnings growth in the five months up to and including the month

Figure 19. Earnings growth contribution of minimum wage upratings



Sources: Low Pay Commission, ONS, NIESR estimates.

minimum wages were uprated in recent years. It suggests that upratings do not usually affect overall average weekly earnings growth in a systematic way. Upratings also do not seem to predict annual earnings growth in sectors with a relatively larger share of employees covered by NLW and minimum wages, like wholesale, retail or hospitality. This may be due to adjustments in working hours. With the exception of women working part-time, adverse effects of minimum wage upratings on employment tend to be very small (Aitken, Dolton and Riley, 2019). A sharp rise in hourly wages or a fall in employment in response to higher than usual minimum wage increases constitute an upside risk to our wage forecast and a downside risk to our employment forecast, respectively.

Robust wage growth together with subdued productivity growth imply that unit labour cost growth remains elevated. Figure 20 plots updated ONS estimates of annual unit labour cost growth which reached 4 per cent in the second quarter of 2019 when GDP growth weakened. On our own estimates, unit labour cost growth will reach around 3 per cent in the first quarter of 2020 and is expected to continue at similar rates throughout the year before easing thereafter as productivity growth picks up.

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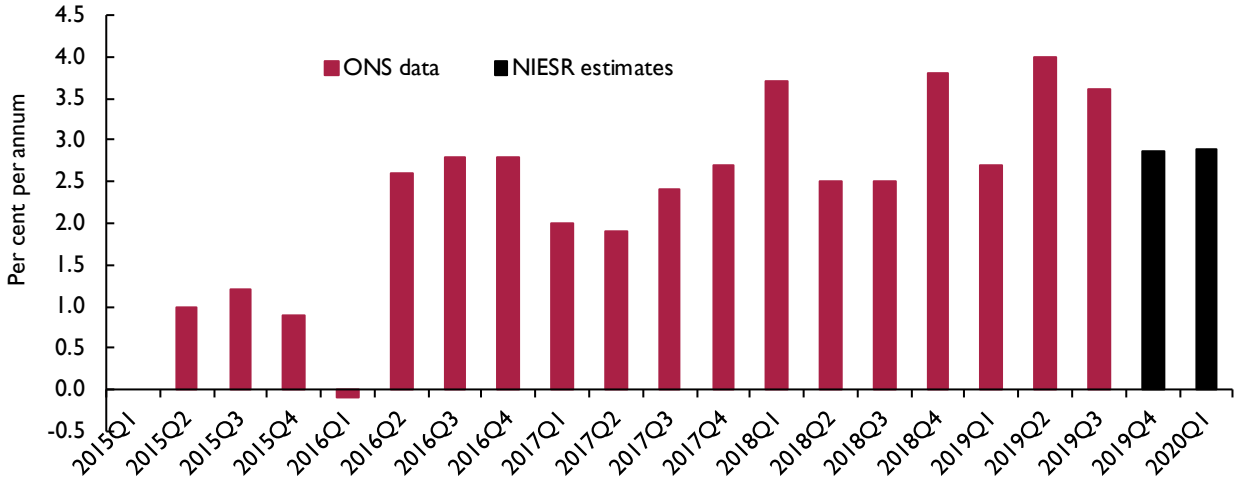
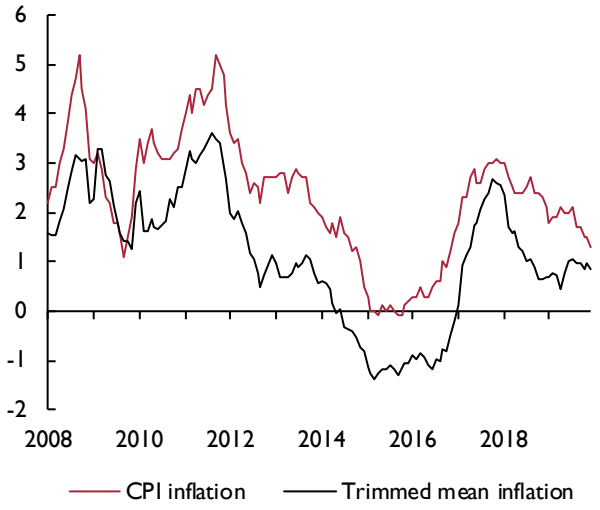
Figure 20. Unit labour cost growth



Sources: ONS, NIESR.

Figure 21. CPI and trimmed mean inflation (per cent)



Source: ONS, NIESR.

There is little evidence that higher cost pressures translate into higher prices. Headline consumer price inflation declined to 1.3 per cent in the year to December 2019. NIESR's trimmed mean measure of underlying inflation, which excludes the most extreme price changes, grew at 0.8 per cent in December, down from 1 per cent in November, such that the gap between headline and underlying inflation narrowed. The appreciation of sterling by nearly 5 per cent in effective terms since November further eases domestic inflationary pressure in our forecast as import price growth subsides. In addition, a lower price cap for energy and falling water bills are expected to reduce consumer price inflation in the first half of 2020. We forecast CPI inflation to strengthen to around 2 per cent by the end of the year and, conditional on a reduction in Bank Rate to 0.5 per cent, to remain near the Bank of England's target over the forecast horizon.

Public finances

Government spending picked up in 2019, with year-on-year growth rates of government consumption reaching a more than 10-year high above 4 per cent in the second quarter, and government investment growing at similar rates, before falling back in the third quarter as the government changed over the summer and spending decisions were put on hold prior to the December General Election (figure 22).

As a result, public sector net borrowing was higher at the beginning of the current financial year compared to the same period last year. November and December borrowing figures came in smaller than last year and borrowing in the 2019–20 financial year as a whole is expected to reach around £48 billion, £10 billion more than in 2018–19 when borrowing hit an 18-year low of 1.8 per cent of GDP.

We forecast government consumption and investment growth to pick up over the course of the upcoming

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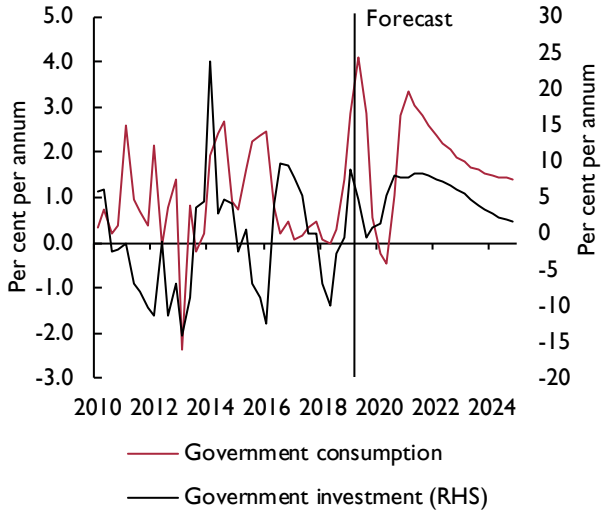
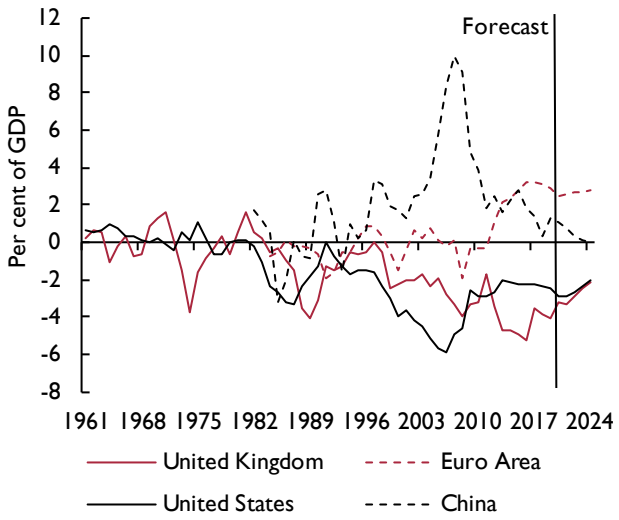
Figure 22. Government consumption and investment growth



Source: NiGEM database and NIESR forecast.

Figure 23. Current account balance, UK and major economies



Sources: NiGEM database, NIESR forecast.

financial year, with details due to be announced in the March Budget (see discussion in section 1). We account both for higher spending in real terms as well as a higher government spending deflator reflecting the expected pick-up in public sector wage growth. This should return the share of total managed expenditure in GDP to 40 per cent over the course of this Parliament, its long-run average. As a result of current spending increases, the current budget balance, now recording a small surplus, is expected to fall back into deficit (table A8). Public sector net borrowing is forecast to increase above 2 per cent of GDP while public sector net debt is forecast to remain relatively stable at just below 80 per cent of GDP over the forecast horizon.

Sectoral balances

Table A9 shows the saving and investment balances of the household, corporate and public sectors of the economy and the resulting balance with the rest of the world. If investment is greater than saving for a sector, then that sector is a net borrower. The aggregation of these three domestic sectors is the current account balance.

The current account balance as a share of GDP was volatile in 2019 as a result of stockbuilding activity ahead of the Brexit deadlines in March, April and October. The current account deficit increased to 6.8 per cent of GDP in the first quarter of 2019 before falling back to 4.4 per cent in the second quarter and dropping to 2.8 per cent in the third quarter. The UK current account has been in deficit since the early 1980s, with the exception of a few small and short-lived quarterly surpluses recorded in the mid-1990s (figure 23). Since 2012, the UK runs a larger current account deficit than the United States. Some of this can be explained by financial transactions but the trade balance has now also been in deficit for twenty years. A persistent current account deficit indicates that the value of the UK's net foreign assets has been shrinking for a long time. We expect this trend to continue but the current account deficit to reduce gradually over the forecast horizon.

Household saving has fallen to 4 per cent of GDP from 7 per cent in 2015 as households replenished their savings to maintain consumption in the face of lower real incomes and higher prices. We forecast household saving to recover to 6 per cent of GDP over the forecast horizon. Higher household saving will enable company investment to strengthen to 11 per cent of GDP from currently just above 10 per cent. Government investment is expected to pick up when the government implements announced investment plans, from below 3 per cent currently to just above 3 per cent at the end of the forecast horizon.

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NOTES

1 Conservative Party manifesto 2019.
2 Linkages between sectors and fiscal transfers mean that the direct effect of Brexit is propagated to all regions to some extent, see Hantzsche and Young (2019).
3 Interview with *Financial Time*s, 17 January 2020.
4 See the inaugural NIESR Prais lecture, 'How not to miss the productivity revival once again' by Bart van Ark (2019), for discussion of the weakness of productivity.
5 See 'Places and spaces: mapping Britain's regional divides' by Andrew Aitken, Janine Boshoff, David Nguyen, Ana Rincon-Aznar and Andrea Stochino, NIESR 2019 UK General Election Briefing.
6 The National Infrastructure Commission would be able to advise on priorities.
7 S. Javid, 'Unleash Britain's potential', speech in Manchester, 7 November 2019.
8 See also 'The Fiscal Rules' by Jagjit S. Chadha, NIESR 2019 UK General Election Briefing.
9 The Resolution Foundation has recently proposed new fiscal rules based on net worth. See Hughes, R. Leslie, J., Pacitti, C. and Smith, J. (2019), 'Totally (net) worth it', Resolution Foundation.

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Box A. Brexit-related forecast assumptions and the political backdrop

by Arno Hantzsche

'Get Brexit done' was the slogan of the Conservative election campaign in December last year. As the UK formally left the European Union on 31 January, we apply the slogan by adjusting the assumptions that underlie our forecast. This box explains the changes we have made and summarises the political backdrop. Previous NIESR forecasts incorporated a high degree of uncertainty in the short term as the future trading arrangement between the UK and the EU was being negotiated. We maintain this assumption and as a result our near-term forecast does not look much different from the forecast we published in November. However, we do adjust assumptions about the economy's long-term equilibrium in line with NIESR's analysis of the proposed bare-bones free trade agreement (FTA) the government aims to negotiate (Hantzsche and Young, 2019).

Political backdrop

With Parliament's approval of the withdrawal agreement, the UK has entered a transition period, itself an unprecedented situation. During this period, the UK retains access to the EU single market and customs union, is bound by EU regulation and retains most rights and obligations, like freedom of movement and financial contributions to the EU budget. However, the UK government and parliamentarians no longer take part in the EU's legislative procedures and have no say in EU decisions.

The withdrawal agreement specifies that the transition period lasts until 31 December 2020 unless a one-time extension is sought by 1 July. The UK government has ruled out such an extension, so this leaves less than a year for both sides to negotiate an agreement on trade and other policy areas to enter into force thereafter. Most experts expect it to take much longer to negotiate an FTA, citing the length of time the EU has taken to negotiate and implement FTAs in the past. Moreover, the President of the European Commission has stressed the difficulty of negotiating a comprehensive agreement before the deadline.[1] This opens the way for continuing uncertainty, especially the risk that the UK reverts to World Trade Organisation (WTO) rules, at least for a time, at the end of the transition ('no deal').

It also remains uncertain what the ultimate trading relationship will look like. The UK government emphasises its aim to be able to diverge from EU single market rules in the future, which according to the EU's negotiating position leaves not much room for trade integration beyond a basic FTA and substantial non-tariff barriers. Importantly, barriers in the form of bureaucratic costs would emerge once the UK gained the flexibility to diverge from rules, independent of whether the rules actually changed, simply because the UK would have left the common regulatory framework (Lowe, 2020). Another difficult area for negotiation is the EU's level playing field requirement to rule out unfair competition between trading partners with the risk that tariffs and quotas could apply even if an FTA were in place.

When analysing possible future trading arrangements it is worth bearing in mind two important characteristics of EU integration: the fact that the European Union itself is unique in its institutional set-up (*sui generis*) and that European institutions have often resulted from *ad hoc* arrangements that, although they were initially planned to be temporary, ultimately became permanent features. Similar characteristics may apply to European disintegration in the form of Brexit. It is likely that a future FTA will be different in nature from other arrangements the EU currently has with third countries, although tighter integration will most likely require more stringent obligations and *vice versa*. It is also possible that temporary solutions will be found to ease the adjustment of businesses at the end of the transition period, for instance access to parts of the single market, some of which may turn into permanent features of UK-EU trade.

Forecast assumptions

Given the difficulties of negotiating an FTA by the end of 2020, we assume that some Brexit uncertainty persists and remains a chronic feature of the UK economy. In our forecast, this holds back investment growth which only gradually picks up over the forecast horizon. This is in line with previous NIESR forecasts. We assume that a cliff-edge change is avoided at the end of 2020 and that the adjustment is relatively smooth.

Our analysis of the Prime Minister's Brexit deal (Hantzsche and Young, 2019) concludes that as a result of barriers to trade and reduced competitive pressures, productivity would be lower by 1–2 per cent in the long run, compared to continued EU membership. This contributes to GDP being lower by 3–4 per cent in the long run. We now incorporate this assumption into our forecast baseline, altering the growth rate of technological progress by applying a persistently negative residual.[2] Figure A1 illustrates the impact on the labour productivity forecast, measured by output per hour. Differences gradually build up over time to reach more than 1 per cent at the beginning of the next decade as trading patterns change, akin to a 'slow puncture' in the economy.

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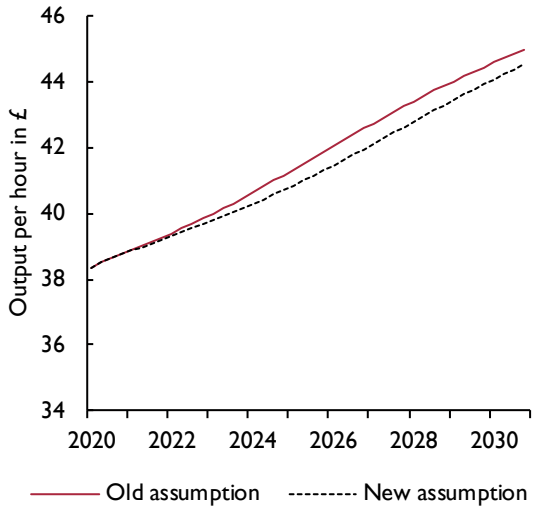
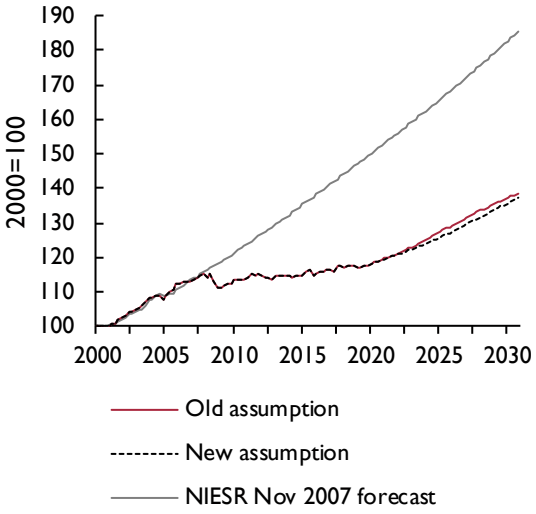
Box A. (continued)

Figure A1. Brexit-related productivity assumption



Source: NIESR.

Figure A2. Post-crisis productivity weakness



Source: NIESR.

In our November report, we stressed that the negative impact of Brexit on the economy significantly reduces welfare relative to EU membership, would be widespread across the regions and economic sectors of the UK , and would have sizeable implications for public finances. Figure A2 compares the change in our productivity assumption with the difference between the path labour productivity was expected to take prior to the financial crisis and the actual outcome. It shows that by 2019, labour productivity was around 20 per cent lower than expected in 2007. This is similar to estimates provided by Crafts and Mills in their article on pages R47–53 in this *Review*. The comparison illustrates that relative to the post-crisis slowdown, the assumed impact of Brexit on productivity is small and there will be a range of other factors affecting productivity performance over the next decade. That being said, the financial crisis was a once-in-a-century event and Crafts and Mills conclude that the ensuing productivity slowdown is unprecedented in 250 years of history.

We further account for long-term Brexit effects by judgementally adjusting downwards forecasts for export volumes. Our analysis of the Brexit deal also allowed for an impact on net migration, contributing a third to the overall Brexit impact that we estimated. For our forecast we continue relying on the ONS' principal population projections which themselves reflect recent migration developments but we will revisit our assumptions once details of a new immigration regime are known.

NOTES

1 European Commission, Speech by President von der Leyen at the London School of Economics, 8 January 2020.
2 This is applied to the variable APROD in NiGEM feeding into TECHL.

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Box B. Forecasting with a benchmark: the Warwick Business School forecasting system

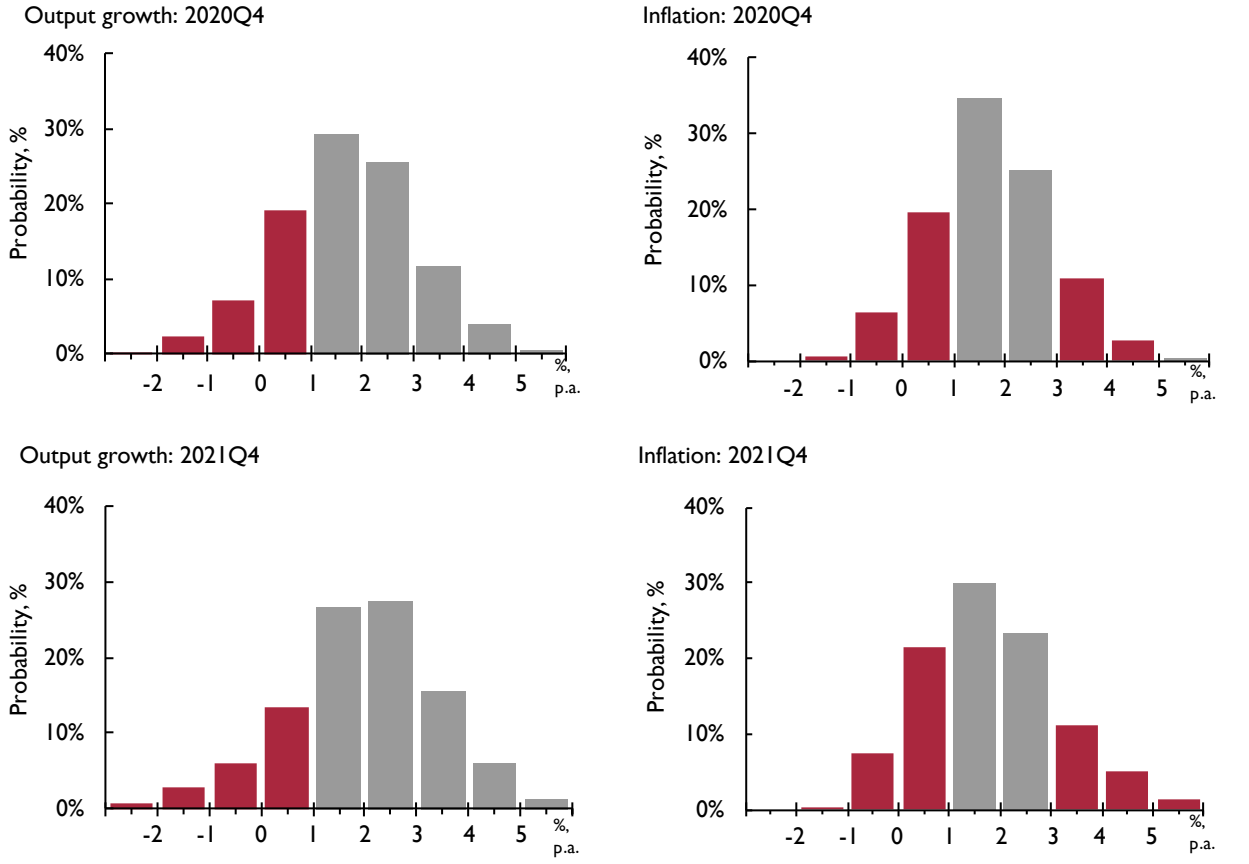
by Ana Galvão, Anthony Garratt and James Mitchell

We provide benchmark forecasts to help understand and contextualise the forecasts presented in this *Review*. The box presents density forecasts for UK GDP annual growth and inflation, and reports the probabilities of a range of output and inflation events occurring, as calculated using the Warwick Business School Forecasting System (WBSFS).[1]

To reflect the uncertainties inherent in economic forecasting, and following the practice of NIESR and other forecasters such as the Bank of England and OBR, the WBSFS provides probabilistic forecasts. The WBSFS forecasts are produced by explicitly combining density forecasts from a set of twenty four, statistically motivated, univariate and multivariate econometric models commonly used in the academic literature. The use of combination forecasts or model averaging reflects the view, supported by research (e.g., see Bates and Granger, 1969; Wallis, 2011; Geweke and Amisano, 2012; Rossi, 2013), that because any single model may be mis-specified there may be gains from the use of combination forecasts.

Comparison of the Institute's forecasts with the probabilistic forecasts from the WBSFS may be interpreted as providing an approximate indicator of the importance of expert judgement, which may include views on the underlying structure of the macroeconomy. This is because the WBSFS forecasts are computed by exploiting regularities in past data with the aid of automated time-series models; they do not take an explicit, structural or theoretical view about how the macroeconomy works; and they do not rely on (subjective) expert judgement to the same degree as those presented by the Institute. The forecasts from the WBSFS are not altered once produced; they are deemed 'simply' to represent the data's view of what will happen to the macroeconomy in the future.

Figure B1. WBSFS forecast probabilities for real GDP growth and inflation, year-on-year



Note: To aid visualisation, output growth forecast outcomes greater than 1 per cent are coloured grey, red otherwise. For inflation, grey outcomes are defined as inflation within the Bank of England's target range of 1–3 per cent, such that the Governor does not have to write a letter of explanation to the Chancellor; forecast outcomes outside that are coloured red.

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Box B. (continued)

Figure B1 presents WBSFS's latest (as of 22 January 2020) probabilistic forecasts for real GDP growth and inflation – defined as year-on-year growth rates for 2020Q4 and 2021Q4 – as histograms. The information set used to produce these forecasts includes information on GDP growth up to 2019Q3 and data on CPI inflation up to December 2019.

Table B1 extracts from these histogram forecasts the probabilities of specific output growth and inflation events. The events considered are the probability of output growth being less than 0 per cent, 1 per cent and 2 per cent, and of inflation lying outside the 1–3 per cent target range (i.e., the probability of the Bank of England's Governor having to write a letter explaining how and why inflation has breached its target range). Also reported are the individual probabilities of inflation being less than 1 per cent and greater than 3 per cent, to indicate which side of the target range is most likely to be breached.

Table B1. Probability event forecasts for 2020Q4 and 2021Q4 annualised % real GDP growth and CPI inflation (extracted from the WBSFS forecast histograms)

Year	Real GDP growth (%, p.a.)			CPI inflation (%, p.a.)		
	Prob(growth<0%)	Prob(growth<1%)	Prob(growth<2%)	Prob(letter)	Prob(CPI<1%)	Prob(CPI>3%)
			Updated Forecasts (January 2020)			
2020Q4	10%	29%	58%	40%	26%	14%
2021Q4	10%	23%	50%	46%	29%	18%
			Previous Forecast (October 2019)			
2020Q4	11%	30%	60%	35%	18%	17%

When examining the latest output growth forecasts for 2020Q4 reported in table B1, we observe small changes relative to the October forecast, as the latest ONS data show that low quarterly growth continued through 2019. The risk of 'low' growth (growth less than 1 per cent) continuing through to 2020Q4 continues to be high at 29 per cent, little changed from 30 per cent in October; we observe a 29 per cent probability of output growth being in the range [1–2 per cent], compared to 30 per cent in October; and (therefore) a 42 per cent probability of growth in 2020Q4 exceeding 2 per cent, as opposed to 40 per cent predicted in October. This suggests that the current low growth environment in the UK is likely to persist through 2020.

Looking further ahead to 2021Q4, we observe a modest positive shift in the output growth outlook. The probability of growth exceeding 2 per cent increases to 50 per cent, and 'low' growth is less likely with a probability of 23 per cent. But, overall, the two-year ahead forecast is for modest growth with elevated downside risks: negative growth has an 11 per cent probability of occurring.

In contrast, we observe sizeable changes in the inflation outlook when updating the information set from October 2019 to January 2020. The probability of inflation falling outside the [1–3 per cent] range in 2020Q4 increases from 35 to 40 per cent, mostly due to the higher probability, of 26 per cent, of inflation being less than 1 per cent. Looking out further to 2021Q4, the chances of inflation falling outside the [1–3 per cent] range increase still further, to 46 per cent. This is because of a widening of the forecast probability distribution for inflation, with higher probabilities of inflation being both less than 1 per cent and greater than 3 per cent.

NOTE

1 WBSFS forecasts for UK output growth and inflation have been released every quarter since November 2014. Details of the releases are available at https://www2.warwick.ac.uk/fac/soc/wbs/subjects/emf/forecasting/ and a description of the models in the system and of the indicators employed is available at https://www2.warwick.ac.uk/fac/soc/wbs/subjects/emf/forecasting/summary_of_wbs_forecastng_system.pdf.

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Appendix – Details of main-case forecast scenario

Table A1. Exchange rates and interest rates

	UK exchange rates			FTSE All–share index	Interest rates			
	Effective 2011 = 100	Dollar	Euro		3–month rates	10–year gilts	World[a]	Bank Rate[b]
2014	110.7	1.65	1.24	3551	0.50	2.50	0.90	0.50
2015	117.5	1.53	1.38	3566	0.60	1.80	0.80	0.50
2016	105.8	1.35	1.22	3512	0.50	1.30	0.90	0.25
2017	100.0	1.29	1.14	4011	0.40	1.20	1.30	0.41
2018	101.9	1.34	1.13	4021	0.70	1.40	2.00	0.75
2019	*101.6*	*1.28*	*1.14*	*3967*	*0.80*	*0.90*	*2.10*	*0.75*
2020	*103.9*	*1.31*	*1.17*	*4145*	*0.70*	*0.90*	*1.60*	*0.50*
2021	*104.1*	*1.32*	*1.16*	*4086*	*0.70*	*1.30*	*1.60*	*0.50*
2022	*104.5*	*1.33*	*1.16*	*4063*	*0.80*	*1.60*	*1.60*	*0.76*
2023	*104.8*	*1.35*	*1.15*	*4082*	*1.10*	*1.90*	*1.80*	*1.02*
2024	*105.0*	*1.37*	*1.14*	*4144*	*1.30*	*2.10*	*2.00*	*1.23*
2019 Q1	*102.6*	*1.30*	*1.15*	*3846*	*0.90*	*1.20*	*2.30*	*0.75*
2019 Q2	*102.0*	*1.29*	*1.14*	*3999*	*0.80*	*1.00*	*2.30*	*0.75*
2019 Q3	*98.5*	*1.23*	*1.11*	*4001*	*0.80*	*0.60*	*2.10*	*0.75*
2019 Q4	*103.2*	*1.29*	*1.16*	*4024*	*0.80*	*0.70*	*1.70*	*0.75*
2020 Q1	*104.3*	*1.31*	*1.17*	*4192*	*0.80*	*0.80*	*1.60*	*0.50*
2020 Q2	*103.7*	*1.30*	*1.17*	*4139*	*0.70*	*0.90*	*1.60*	*0.50*
2020 Q3	*103.8*	*1.30*	*1.17*	*4129*	*0.70*	*1.00*	*1.60*	*0.50*
2020 Q4	*103.8*	*1.31*	*1.17*	*4121*	*0.70*	*1.00*	*1.60*	*0.50*
2021 Q1	*103.9*	*1.31*	*1.17*	*4097*	*0.70*	*1.10*	*1.60*	*0.50*
2021 Q2	*104.0*	*1.32*	*1.16*	*4091*	*0.70*	*1.20*	*1.60*	*0.50*
2021 Q3	*104.1*	*1.32*	*1.16*	*4081*	*0.70*	*1.30*	*1.60*	*0.50*
2021 Q4	*104.2*	*1.32*	*1.16*	*4074*	*0.70*	*1.40*	*1.60*	*0.50*
Percentage changes								
2014/2013	7.6	5.3	5.4	4.3				
2015/2014	6.2	–7.2	11.1	0.4				
2016/2015	–9.9	–11.4	–11.2	–1.5				
2017/2016	–5.5	–4.9	–6.7	14.2				
2018/2017	1.9	3.6	–1.0	0.3				
2019/2018	*–0.4*	*–4.4*	*0.9*	*–1.3*				
2020/2019	*2.3*	*2.3*	*2.6*	*4.5*				
2021/2020	*0.2*	*0.9*	*–0.5*	*–1.4*				
2022/2021	*0.4*	*1.2*	*–0.5*	*–0.6*				
2023/2022	*0.3*	*1.2*	*–0.7*	*0.4*				
2024/2023	*0.3*	*1.3*	*–0.8*	*1.5*				
2019Q4/18Q4	2.0	0.1	3.2	5.7				
2020Q4/19Q4	*0.6*	*1.6*	*0.4*	*2.4*				
2021Q4/20Q4	*0.4*	*1.2*	*–0.5*	*–1.1*				

Notes: We assume that bilateral exchange rates for the fourth quarter of this year are the average of information available to 16 January 2020. 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

2016=100

	Unit labour costs	Imports deflator	Exports deflator	World oil price ($)[a]	Consump–tion deflator	GDP deflator (market prices)	Consumer prices RPI[b]	CPI[c]	CPIH[d]
2014	97.5	102.2	99.8	98.4	98.6	97.3	97.3	99.3	98.7
2015	97.9	96.9	96.0	52.1	98.6	97.9	98.3	99.4	99.0
2016	100.0	100.0	100.0	42.9	100.0	100.0	100.0	100.0	100.0
2017	102.3	105.4	104.5	54.0	101.4	101.9	103.6	102.7	102.6
2018	105.4	108.4	107.7	70.4	104.1	104.1	107.0	105.2	104.9
2019	*108.8*	*109.5*	*109.5*	*63.7*	*105.6*	*106.2*	*109.8*	*107.1*	*106.7*
2020	*112.4*	*111.5*	*110.7*	*64.3*	*107.4*	*108.7*	*112.4*	*109.1*	*108.6*
2021	*114.9*	*113.2*	*112.7*	*67.7*	*109.7*	*111.5*	*116.3*	*111.4*	*111.0*
2022	*117.3*	*114.0*	*114.5*	*70.0*	*112.0*	*114.3*	*120.2*	*113.7*	*113.2*
2023	*119.7*	*115.1*	*116.3*	*71.1*	*114.2*	*117.1*	*124.0*	*116.0*	*115.4*
2024	*122.2*	*116.6*	*118.3*	*72.2*	*116.5*	*119.7*	*127.6*	*118.3*	*117.7*
Percentage changes									
2014/2013	0.1	–3.5	–1.6	–8.7	1.5	1.8	2.4	1.4	1.5
2015/2014	0.4	–5.2	–3.8	–47.0	0.0	0.6	1.0	0.1	0.4
2016/2015	2.2	3.2	4.2	–17.7	1.4	2.1	1.7	0.7	1.0
2017/2016	2.3	5.4	4.5	25.8	1.4	1.9	3.6	2.7	2.6
2018/2017	3.0	2.8	3.1	30.5	2.6	2.1	3.3	2.4	2.3
2019/2018	*3.1*	*1.0*	*1.6*	*–9.6*	*1.4*	*2.0*	*2.6*	*1.8*	*1.7*
2020/2019	*3.3*	*1.8*	*1.1*	*0.9*	*1.7*	*2.3*	*2.4*	*1.8*	*1.8*
2021/2020	*2.2*	*1.5*	*1.9*	*5.3*	*2.2*	*2.6*	*3.4*	*2.1*	*2.1*
2022/2021	*2.1*	*0.7*	*1.6*	*3.4*	*2.0*	*2.6*	*3.4*	*2.0*	*2.0*
2023/2022	*2.1*	*1.0*	*1.6*	*1.6*	*2.0*	*2.4*	*3.2*	*2.0*	*2.0*
2024/2023	*2.0*	*1.3*	*1.7*	*1.6*	*2.0*	*2.3*	*2.9*	*2.0*	*2.0*
2019Q4/2018Q4	3.1	0.1	–0.1	–8.1	1.2	2.3	2.4	1.5	1.4
2020Q4/2019Q4	*2.7*	*2.0*	*2.0*	*4.2*	*2.2*	*2.5*	*2.7*	*2.1*	*2.1*
2021Q4/2020Q4	*2.2*	*1.0*	*1.7*	*7.1*	*2.1*	*2.6*	*3.3*	*2.1*	*2.1*

Notes: (a) Per barrel, average of Dubai and Brent spot prices. (b) Retail price index. (c) Consumer price index. (d) Consumer prices index, including owner occupiers' housing costs.

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Table A3. Gross domestic product and components of expenditure *£ billion, 2016 prices*

	Final consumption expenditure		Gross capital formation		Domestic demand	Total exports[c]	Total final expendi–ture	Total imports[c]	Net trade	GDP at market prices[d]
	Households & NPISH[a]	General govt.	Gross fixed in–vestment	Changes in inventories[b]						
2014	1217	371	320	21	1925	532	2458	545	–13	1913
2015	1253	378	332	16	1980	552	2533	575	–22	1958
2016	1299	382	344	4	2028	568	2595	600	–32	1996
2017	1328	383	349	–8	2052	602	2654	621	–19	2033
2018	1349	384	349	–2	2079	610	2689	633	–24	2061
2019	*1363*	*394*	*352*	*0*	*2108*	*623*	*2731*	*652*	*–29*	*2087*
2020	*1378*	*397*	*359*	*–6*	*2128*	*634*	*2762*	*655*	*–21*	*2115*
2021	*1399*	*409*	*370*	*6*	*2183*	*643*	*2826*	*684*	*–41*	*2150*
2022	*1420*	*418*	*382*	*6*	*2225*	*648*	*2873*	*696*	*–48*	*2184*
2023	*1443*	*424*	*393*	*6*	*2267*	*663*	*2930*	*714*	*–50*	*2224*
2024	*1470*	*431*	*402*	*6*	*2308*	*681*	*2989*	*734*	*–53*	*2262*
Percentage changes										
2014/2013	2.3	2.0	6.6		3.4	1.0	2.9	3.6		2.6
2015/2014	3.0	1.8	3.7		2.9	3.8	3.1	5.4		2.4
2016/2015	3.6	1.0	3.6		2.4	2.7	2.5	4.4		1.9
2017/2016	2.2	0.3	1.6		1.2	6.1	2.3	3.5		1.9
2018/2017	1.6	0.4	–0.2		1.3	1.2	1.3	2.0		1.3
2019/2018	*1.0*	*2.6*	*0.9*		*1.4*	*2.2*	*1.6*	*2.9*		*1.3*
2020/2019	*1.1*	*0.8*	*2.2*		*1.0*	*1.8*	*1.2*	*0.5*		*1.3*
2021/2020	*1.5*	*2.9*	*3.0*		*2.6*	*1.3*	*2.3*	*4.4*		*1.6*
2022/2021	*1.5*	*2.1*	*3.1*		*1.9*	*0.8*	*1.6*	*1.8*		*1.6*
2023/2022	*1.7*	*1.6*	*3.0*		*1.9*	*2.4*	*2.0*	*2.5*		*1.8*
2024/2023	*1.8*	*1.4*	*2.2*		*1.8*	*2.7*	*2.0*	*2.9*		*1.7*
Decomposition of growth in GDP (percentage points)										
2014	1.5	0.4	1.1	0.3	3.4	0.3	3.7	–1.1	–0.7	2.6
2015	1.9	0.3	0.6	–0.3	2.9	1.1	3.9	–1.5	–0.5	2.4
2016	2.3	0.2	0.6	–0.6	2.4	0.8	3.2	–1.3	–0.5	1.9
2017	1.4	0.0	0.3	–0.6	1.2	1.7	2.9	–1.0	0.7	1.9
2018	1.0	0.1	0.0	0.3	1.4	0.4	1.7	–0.6	–0.2	1.3
2019	*0.7*	*0.5*	*0.1*	*0.1*	*1.4*	*0.7*	*2.0*	*–0.9*	*–0.2*	*1.3*
2020	*0.7*	*0.1*	*0.4*	*–0.3*	*1.0*	*0.5*	*1.5*	*–0.1*	*0.4*	*1.3*
2021	*1.0*	*0.6*	*0.5*	*0.6*	*2.6*	*0.4*	*3.0*	*–1.4*	*–1.0*	*1.6*
2022	*1.0*	*0.4*	*0.5*	*0.0*	*1.9*	*0.2*	*2.2*	*–0.6*	*–0.3*	*1.6*
2023	*1.1*	*0.3*	*0.5*	*0.0*	*1.9*	*0.7*	*2.6*	*–0.8*	*–0.1*	*1.8*
2024	*1.2*	*0.3*	*0.4*	*0.0*	*1.8*	*0.8*	*2.7*	*–0.9*	*–0.1*	*1.7*

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, 2016 prices[b]						2016=100			% of GDP
2014	286	397	–111	247	148	99	105.9	91.7	97.6	–4.7
2015	301	413	–112	251	162	90	105.5	96.7	99.1	–4.9
2016	298	432	–134	270	168	102	100.0	100.0	100.0	–5.2
2017	317	445	–128	285	176	109	96.3	105.0	99.1	–3.5
2018	316	445	–129	293	188	105	99.4	108.8	99.4	–3.9
2019	*324*	*456*	*–132*	*299*	*195*	*104*	*98.5*	*112.4*	*100.0*	*–4.1*
2020	*332*	*464*	*–132*	*302*	*190*	*112*	*99.5*	*115.7*	*99.2*	*–3.2*
2021	*338*	*496*	*–158*	*305*	*188*	*117*	*99.4*	*120.0*	*99.6*	*–3.4*
2022	*341*	*512*	*–170*	*306*	*184*	*122*	*99.9*	*124.3*	*100.5*	*–2.9*
2023	*351*	*529*	*–179*	*312*	*184*	*128*	*100.2*	*128.8*	*101.1*	*–2.5*
2024	*361*	*548*	*–187*	*320*	*186*	*134*	*100.5*	*133.3*	*101.5*	*–2.2*
Percentage changes										
2014/2013	1.1	2.9		1.0	5.8		4.2	4.6	2.0	
2015/2014	5.4	4.1		1.8	9.1		–0.4	5.5	1.5	
2016/2015	–1.2	4.6		7.3	3.8		–5.2	3.5	0.9	
2017/2016	6.3	2.9		5.9	5.1		–3.7	5.0	–0.9	
2018/2017	–0.2	0.1		2.8	6.9		3.2	3.6	0.3	
2019/2018	*2.5*	*2.5*		*1.9*	*3.8*		*–0.9*	*3.4*	*0.6*	
2020/2019	*2.5*	*1.8*		*1.0*	*–2.6*		*1.0*	*2.9*	*–0.7*	
2021/2020	*1.7*	*6.8*		*0.9*	*–1.4*		*–0.1*	*3.8*	*0.4*	
2022/2021	*1.0*	*3.2*		*0.6*	*–1.7*		*0.4*	*3.5*	*0.9*	
2023/2022	*2.8*	*3.5*		*2.0*	*–0.1*		*0.4*	*3.6*	*0.6*	
2024/2023	*3.0*	*3.5*		*2.5*	*1.0*		*0.3*	*3.5*	*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.

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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]
	2016=100	£ billion, current prices			£ billion, 2016 prices		per cent		
2014	96.4	905	1591	1256	1273	1217	9.4	97.1	6.5
2015	97.0	929	1674	1323	1341	1253	9.9	102.9	6.6
2016	100.0	968	1715	1346	1346	1299	7.2	110.1	7.1
2017	103.1	1009	1772	1383	1363	1328	5.3	115.1	7.1
2018	106.0	1054	1856	1453	1395	1349	5.8	118.8	6.8
2019	*110.2*	*1101*	*1918*	*1488*	*1410*	*1363*	*5.9*	*120.4*	*7.2*
2020	*114.2*	*1153*	*1996*	*1550*	*1443*	*1378*	*7.1*	*124.0*	*7.1*
2021	*118.3*	*1198*	*2085*	*1620*	*1476*	*1399*	*7.8*	*127.3*	*6.9*
2022	*122.4*	*1242*	*2175*	*1689*	*1509*	*1420*	*8.4*	*129.2*	*6.8*
2023	*126.6*	*1291*	*2269*	*1763*	*1543*	*1443*	*9.0*	*130.3*	*6.6*
2024	*130.9*	*1340*	*2366*	*1838*	*1578*	*1470*	*9.4*	*131.0*	*6.5*
Percentage changes									
2014/2013	1.0	2.7	3.4	3.6	2.1	2.3		8.0	
2015/2014	0.6	2.7	5.2	5.3	5.3	3.0		6.0	
2016/2015	3.1	4.1	2.5	1.8	0.4	3.6		7.0	
2017/2016	3.1	4.3	3.3	2.7	1.3	2.2		4.5	
2018/2017	2.8	4.4	4.8	5.0	2.4	1.6		3.2	
2019/2018	*3.9*	*4.5*	*3.3*	*2.4*	*1.0*	*1.0*		*1.4*	
2020/2019	*3.7*	*4.7*	*4.1*	*4.1*	*2.4*	*1.1*		*3.0*	
2021/2020	*3.6*	*3.9*	*4.5*	*4.5*	*2.3*	*1.5*		*2.7*	
2022/2021	*3.5*	*3.7*	*4.3*	*4.3*	*2.2*	*1.5*		*1.5*	
2023/2022	*3.4*	*3.9*	*4.3*	*4.3*	*2.3*	*1.7*		*0.8*	
2024/2023	*3.4*	*3.8*	*4.3*	*4.3*	*2.2*	*1.8*		*0.6*	

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.

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Table A6. Fixed investment and capital *£ billion, 2016 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]
2014	175	82	63	320	14.5	24.9	3075	667
2015	188	84	60	332	13.5	24.5	3077	667
2016	196	86	62	344	13.0	24.4	3195	697
2017	202	84	64	349	11.7	24.4	3280	632
2018	199	90	60	349	12.1	23.8	3333	647
2019	*199*	*91*	*62*	*352*	*12.1*	*23.4*	*3376*	*667*
2020	*200*	*94*	*66*	*359*	*11.8*	*23.4*	*3414*	*687*
2021	*203*	*97*	*71*	*370*	*12.0*	*23.7*	*3455*	*709*
2022	*206*	*100*	*76*	*382*	*12.2*	*24.2*	*3501*	*732*
2023	*211*	*103*	*79*	*393*	*12.3*	*24.5*	*3551*	*756*
2024	*215*	*106*	*81*	*402*	*12.3*	*24.8*	*3605*	*780*
Percentage changes								
2014/2013	6.4	5.4	8.6	6.6			1.2	2.5
2015/2014	7.2	2.3	–4.4	3.7			0.1	0.0
2016/2015	4.3	3.3	2.2	3.6			3.8	4.5
2017/2016	2.9	–2.4	3.2	1.6			2.7	–9.3
2018/2017	–1.5	6.5	–5.1	–0.2			1.6	2.4
2019/2018	*–0.1*	*1.3*	*3.3*	*0.9*			*1.3*	*3.0*
2020/2019	*0.8*	*3.0*	*5.5*	*2.2*			*1.1*	*3.1*
2021/2020	*1.2*	*3.2*	*8.2*	*3.0*			*1.2*	*3.2*
2022/2021	*1.6*	*3.2*	*6.8*	*3.1*			*1.3*	*3.2*
2023/2022	*2.3*	*3.4*	*4.3*	*3.0*			*1.4*	*3.2*
2024/2023	*1.9*	*2.7*	*2.2*	*2.2*			*1.5*	*3.2*

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

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Table A7. Productivity and the labour market *Thousands unless otherwise stated*

	Employment		ILO		Population	Productivity	ILO
	Employees	Total[a]	unemploy–ment	Labour force[b]	of working age[c]	(2016=100) Per hour	unemployment rate %
2014	25960	30754	2026	32780	40681	99.0	6.2
2015	26504	31285	1781	33066	40879	99.0	5.4
2016	26771	31744	1633	33377	41062	100.0	4.9
2017	27065	32057	1476	33533	41169	101.0	4.4
2018	27494	32439	1380	33819	41260	101.0	4.1
2019	*27646*	*32741*	*1308*	*34087*	*41343*	*101.0*	*3.8*
2020	*27923*	*32942*	*1316*	*34258*	*41436*	*102.0*	*3.8*
2021	*28001*	*33043*	*1369*	*34412*	*41524*	*104.0*	*4.0*
2022	*28071*	*33135*	*1422*	*34556*	*41596*	*105.0*	*4.1*
2023	*28218*	*33303*	*1397*	*34699*	*41662*	*106.0*	*4.0*
2024	*28327*	*33433*	*1413*	*34846*	*41728*	*108.0*	*4.1*
Percentage changes							
2014/2013	1.7	2.4	–18.1	0.8	0.3	–0.2	
2015/2014	2.1	1.7	–12.1	0.9	0.5	0.6	
2016/2015	1.0	1.5	–8.3	0.9	0.4	0.6	
2017/2016	1.1	1.0	–9.6	0.5	0.3	0.9	
2018/2017	1.6	1.2	–6.5	0.9	0.2	0.5	
2019/2018	*0.6*	*0.9*	*–5.2*	*0.8*	*0.2*	*–0.1*	
2020/2019	*1.0*	*0.6*	*0.6*	*0.5*	*0.2*	*0.9*	
2021/2020	*0.3*	*0.3*	*4.0*	*0.4*	*0.2*	*1.3*	
2022/2021	*0.3*	*0.3*	*3.9*	*0.4*	*0.2*	*1.3*	
2023/2022	*0.5*	*0.5*	*–1.8*	*0.4*	*0.2*	*1.3*	
2024/2023	*0.4*	*0.4*	*1.2*	*0.4*	*0.2*	*1.3*	

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 2016–based population projections by the ONS.

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

		2017–18	2018–19	2019–20	2020–21	2021–22	2022–23	2023–24	2024–25
Current receipts:	Taxes on income	446.3	471.4	491.5	510.1	531.8	555.8	581.1	606.8
	Taxes on expenditure	265.9	276.5	282.0	291.0	301.6	312.5	324.2	336.7
	Other current receipts	66.0	64.0	60.5	63.0	65.6	68.4	71.3	74.1
	Total	778.2	811.9	834.0	864.2	899.1	936.8	976.6	1017.7
	(as a % of GDP)	37.3	37.5	37.3	37.2	37.1	37.1	37.1	37.2
Current expenditure:	Goods and services	388.0	400.3	418.3	436.2	461.1	483.7	505.1	526.6
	Net social benefits paid	236.8	242.4	246.1	257.3	269.2	280.9	292.4	305.3
	Debt interest	62.2	56.1	56.5	54.0	54.6	55.2	56.6	58.7
	Other current expenditure	54.7	59.5	62.3	66.3	68.8	71.4	74.1	76.7
	Total	741.7	758.3	783.2	813.9	853.8	891.2	928.1	967.2
	(as a % of GDP)	35.5	35.1	35.1	35.0	35.3	35.3	35.3	35.4
Depreciation		49.0	48.8	49.6	51.4	53.3	55.5	57.8	60.1
Surplus on public sector current budget[a]		–12.5	4.8	1.3	–1.0	–8.0	–9.9	–9.4	–9.7
(as a % of GDP)		–0.6	0.2	0.1	0.0	–0.3	–0.4	–0.4	–0.4
Gross investment		91.7	91.5	98.9	104.3	112.4	118.2	121.3	125.3
Net investment		42.7	42.7	49.3	53.0	59.1	62.7	63.5	65.1
(as a % of GDP)		2.0	2.0	2.2	2.3	2.4	2.5	2.4	2.4
Total managed expenditure		833.3	849.8	882.1	918.2	966.3	1009.4	1049.4	1092.5
(as a % of GDP)		39.9	39.3	39.5	39.5	39.9	40.0	39.9	40.0
Public sector net borrowing		55.2	37.9	48.1	54.0	67.2	72.6	72.9	74.8
(as a % of GDP)		2.6	1.8	2.2	2.3	2.8	2.9	2.8	2.7
Public sector net debt (% of GDP)[b]		82.5	80.9	80.2	78.6	77.6	78.4	78.4	78.5
GDP deflator at market prices (2016=100)		102.4	104.5	106.8	109.3	112.2	115.0	117.7	120.4
Money GDP (£ billion)		2087	2163	2233	2324	2421	2524	2630	2735
Financial balance under Maastricht[c]		–2.4	–2.2	–2.2	–2.2	–2.7	–2.9	–2.8	–2.8
Gross debt under Maastricht[c]		85.6	85.1	84.2	83.2	82.4	81.8	81.1	80.6

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) Data for Q2. Seasonal adjustment applied in NiGEM results in differences between the figures here and official unadjusted PSF data. (c) 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
2014	6.7	3.7	8.0	10.8	–2.3	2.6	12.4	17.1	4.7	2.0	–1.8
2015	7.1	3.9	6.5	11.0	–1.1	2.5	12.5	17.4	4.9	2.2	–1.8
2016	5.0	3.9	7.2	11.0	0.0	2.5	12.2	17.4	5.2	2.3	–2.1
2017	3.7	4.1	9.4	10.9	1.0	2.6	14.0	17.5	3.5	1.1	–0.4
2018	4.0	4.3	8.0	10.3	1.3	2.6	13.3	17.2	3.9	1.2	–1.3
2019	*4.0*	*4.4*	*7.8*	*10.3*	*1.5*	*2.8*	*13.3*	*17.4*	*4.1*	*1.4*	*–1.5*
2020	*4.9*	*4.3*	*8.1*	*10.5*	*1.4*	*2.9*	*14.5*	*17.7*	*3.2*	*0.8*	*–0.3*
2021	*5.4*	*4.4*	*8.6*	*11.0*	*1.1*	*3.1*	*15.1*	*18.5*	*3.4*	*0.1*	*0.3*
2022	*5.9*	*4.4*	*8.8*	*11.0*	*1.0*	*3.2*	*15.7*	*18.6*	*2.9*	*–0.3*	*0.9*
2023	*6.3*	*4.5*	*8.8*	*11.0*	*1.2*	*3.3*	*16.3*	*18.8*	*2.5*	*–0.6*	*1.4*
2024	*6.5*	*4.5*	*8.9*	*11.0*	*1.3*	*3.3*	*16.7*	*18.9*	*2.2*	*–0.8*	*1.8*

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*

	2018	*2019*	*2020*	*2021*	*2022*	*2023*	*2024*	*2025–29*
GDP (market prices)	1.3	*1.3*	*1.3*	*1.6*	*1.6*	*1.8*	*1.7*	*1.3*
Average earnings	2.8	*3.9*	*3.7*	*3.6*	*3.5*	*3.4*	*3.4*	*3.2*
GDP deflator (market prices)	2.1	*2.0*	*2.3*	*2.6*	*2.6*	*2.4*	*2.3*	*2.2*
Consumer Prices Index	2.4	*1.8*	*1.8*	*2.1*	*2.0*	*2.0*	*2.0*	*1.9*
Per capita GDP	0.7	*0.7*	*0.7*	*1.1*	*1.1*	*1.3*	*1.2*	*0.9*
Whole economy productivity[a]	0.5	*–0.1*	*0.9*	*1.3*	*1.3*	*1.3*	*1.3*	*1.2*
Labour input[b]	0.8	*1.4*	*0.6*	*0.3*	*0.3*	*0.5*	*0.4*	*0.1*
ILO Unemployment rate (%)	4.1	*3.8*	*3.8*	*4.0*	*4.1*	*4.0*	*4.1*	*4.7*
Current account (% of GDP)	–3.9	*–4.1*	*–3.2*	*–3.4*	*–2.9*	*–2.5*	*–2.2*	*–1.1*
Total managed expenditure (% of GDP)	39.4	*39.5*	*39.4*	*39.8*	*40.0*	*39.9*	*39.9*	*40.5*
Public sector net borrowing (% of GDP)	2.1	*2.0*	*2.1*	*2.7*	*2.9*	*2.8*	*2.7*	*2.5*
Public sector net debt (% of GDP)	82.3	*80.9*	*80.1*	*78.4*	*77.7*	*78.4*	*78.4*	*78.6*
Effective exchange rate (2011=100)	101.9	*101.6*	*103.9*	*104.1*	*104.5*	*104.8*	*105.0*	*105.8*
Bank Rate (%)	0.6	*0.8*	*0.5*	*0.5*	*0.7*	*0.9*	*1.2*	*1.8*
3 month interest rates (%)	0.7	*0.8*	*0.7*	*0.7*	*0.8*	*1.1*	*1.3*	*2.0*
10 year interest rates (%)	1.4	*0.9*	*0.9*	*1.3*	*1.6*	*1.9*	*2.1*	*2.8*

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

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