

3 Macroeconomic risks

Introduction

3.1 Macroeconomic developments are one of the largest and most frequent sources of fiscal risk. Economic shocks come in many shapes and sizes and propagate through the public finances in complex ways. As elsewhere in this report, our main focus is the various downside risks to our latest medium-term forecast and to longer-term fiscal sustainability.

3.2 This chapter discusses:

- risks to the economy's **potential output growth**;
- the sources and potential consequences of **cyclical shocks**;
- shocks to **the composition of GDP growth** – both by expenditure and by income;
- **housing sector** risks;
- risks associated with **sectoral net lending and balance sheets**; and
- risks associated with the **UK's forthcoming exit from the EU**.

Risks to potential output growth

3.3 The path of potential output determines how much the economy can grow over time, abstracting from the ups and downs of the economic cycle. It is the ultimate driver of living standards and an important determinant of the health of the public finances, given the way tax and spending policies are set. Potential output can be separated into how much labour is available (i.e. labour inputs) and how much output each unit can produce (i.e. labour productivity). Unlike actual output, it can only be estimated rather than observed directly.

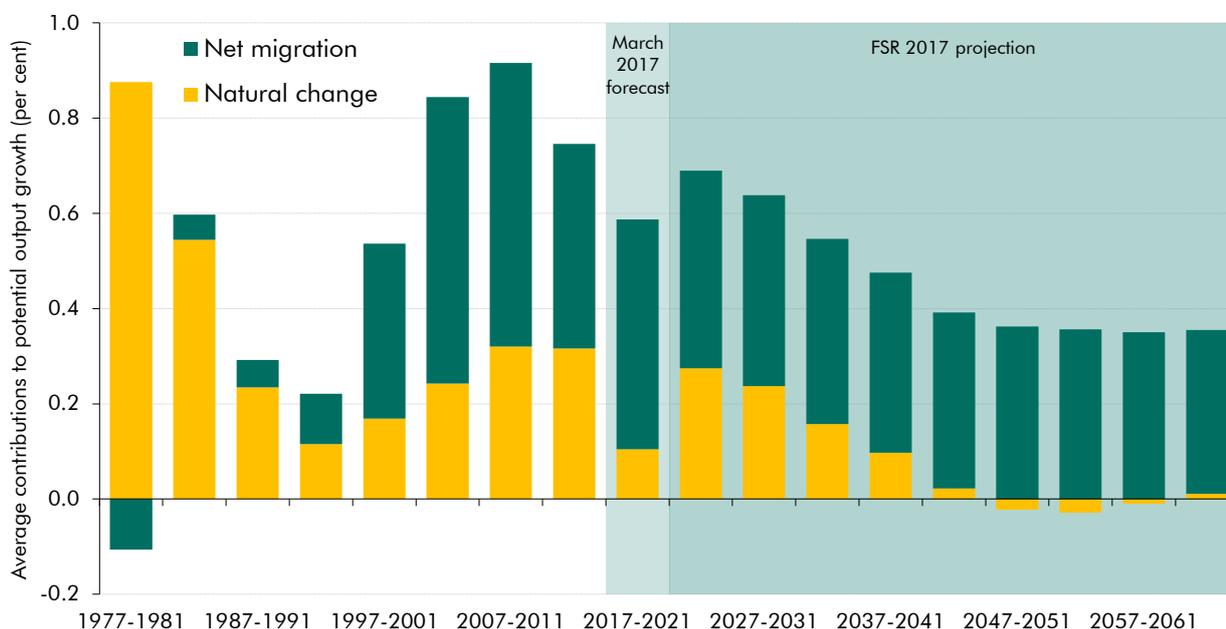
Risks to growth in potential labour input

3.4 Potential labour input is defined as the total work hours available when the economy is operating at full capacity. It is driven by the adult population, the fraction participating in the labour market, the fraction of those that can be employed sustainably and the average hours worked by those in employment. There are risks and uncertainties around each.

Adult population growth

3.5 Growth in the adult population increases the potential size of the economy. It is a key driver of tax revenues in cash and real terms, but has a less clear-cut effect on revenues per head or as a share of GDP. The population’s contribution to revenues is greatest in age groups where employment rates are highest – i.e. the ‘working-age’ population, aged between 16 and the state pension age. But population growth more broadly increases the demand for public services. Like many advanced economies, the UK has an ageing population, which is expected to place upward pressure on public spending (see Chapter 6). In recent years, high net migration has boosted the working-age population and potential output.

Chart 3.1: Contributions of adult population growth to potential output growth



Source: ONS

- 3.6 Our latest medium-term forecasts and long-term projections are based on the ‘principal’ population projection by the Office for National Statistics (ONS). This assumes net inward migration falls to 185,000 by 2021 and remains at that level thereafter. The ONS will publish updated population projections this autumn.
- 3.7 Risks to our medium-term forecast from working-age population growth are relatively small. Excluding the effects of migration, ‘natural change’ is relatively slow-moving and predictable, with the lower growth in the coming five years reflecting a fall in the number of births in the late 1990s and early 2000s (Chart 3.1). There are bigger risks associated with net migration being higher or lower than expected. This can change relatively quickly.
- 3.8 The fiscal effects of changes in net migration depend on many factors. Recent net migration to the UK has been concentrated among those of working age, boosting employment and tax revenues more than spending. We assume that migrants are as productive as natives on

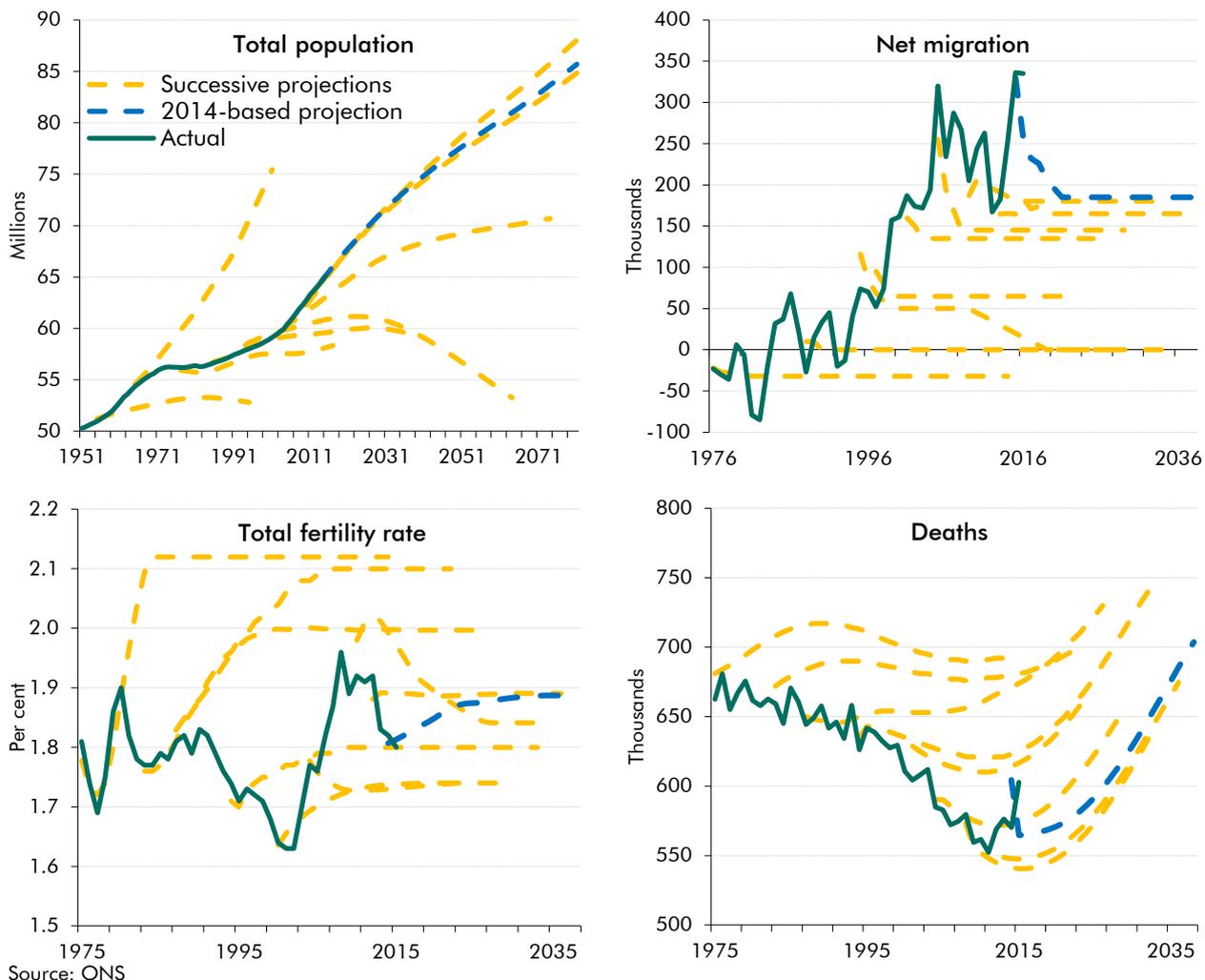
average, although this will not be true of every migrant.¹ In our March 2016 *Economic and fiscal outlook (EFO)*, we presented scenarios based on the ONS ‘low migration’ and ‘natural change only’ population variants. Relative to the final year of our central forecast, public sector net borrowing (PSNB) was 0.3 per cent of GDP higher in the low migration scenario and 0.5 per cent higher in the natural change scenario. Over longer horizons, these differences build. In our 2017 *Fiscal sustainability report (FSR)*, debt was 31 per cent of GDP higher in the ‘low migration’ variant than in our central projection by 2066-67.

- 3.9 The longer the period over which population projections extend, the greater the chance that outcomes will differ from the assumptions underpinning them. The overall effect can be large. For example, the 1955 projections under-estimated the population 25 years ahead by almost 3 million, largely because they did not foresee the baby boom of the early 1960s. Conversely, the 1965 projections over-estimated the population 25 years ahead by 9½ million because they incorrectly assumed that the baby boom would continue. More recently, higher-than-expected net inward migration has prompted upward revisions to expected population growth in the 2012- and 2014-based projections. Chart 3.2 tracks these and other surprises relative to past official population projections.²
- 3.10 Given these long-run uncertainties, in each *FSR* we test the sensitivity of our central projections to a range of population variants. Any factor that raises the old-age dependency ratio – including lower fertility, higher longevity or lower net migration (given its concentration among working-age adults) – is detrimental to the public finances over the long term. These factors either reduce potential output growth or raise public spending growth – and in some cases both. These effects are discussed in Chapter 6.

¹ We tested the assumptions underpinning how we factor the fiscal effects of net migration into our long-term projections in Annex A of our 2013 *Fiscal sustainability report*. Further discussion was presented in Box 3.4 of the following year’s report.

² For more detail, see Box 3.3 in our 2014 *Fiscal sustainability report* and Shaw, *Fifty years of UK national population projections: how accurate have they been?*, Population Trends, 2007.

Chart 3.2: The evolution of population projections since 1955



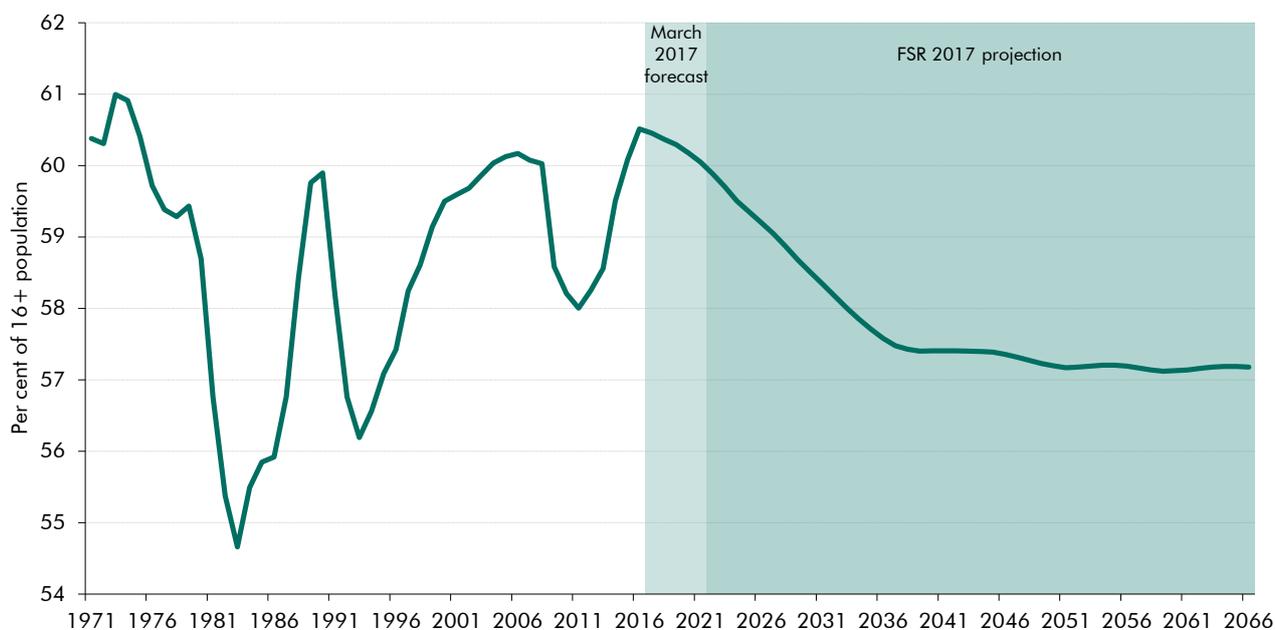
Potential participation rates and the equilibrium unemployment rate

- 3.11 Participation rates among older people have been rising, partly due to ongoing rises in the female state pension age. Among all people aged 65 or over, the participation rate has almost doubled over the past 15 years, from 5.4 to 10.5 per cent. But participation remains much lower than among working-age adults (currently 78.5 per cent), so ageing puts downward pressure on the average participation rate across the adult population as a whole. The latter effect is expected to dominate over the medium term.
- 3.12 Our medium-term assumption for the equilibrium unemployment rate is informed by an assessment of past trends in the actual unemployment rate, as well as other labour market developments. In March 2017, with wage growth still muted, we lowered our estimate from 5.2 to 5.0 per cent of the labour force. In its February 2017 *Inflation Report*, the Bank of England reduced its own estimate to around 4½ per cent.³

³ See the box 'Why has wage growth remained subdued?' starting on page 18 of the February 2017 *Inflation Report*.

- 3.13 Together, the potential participation rate and equilibrium unemployment rate determine the potential employment rate. We expect this to fall over the next couple of decades, as the ageing population reduces the average participation rate (Chart 3.3).

Chart 3.3: Employment rate



Source: ONS, OBR

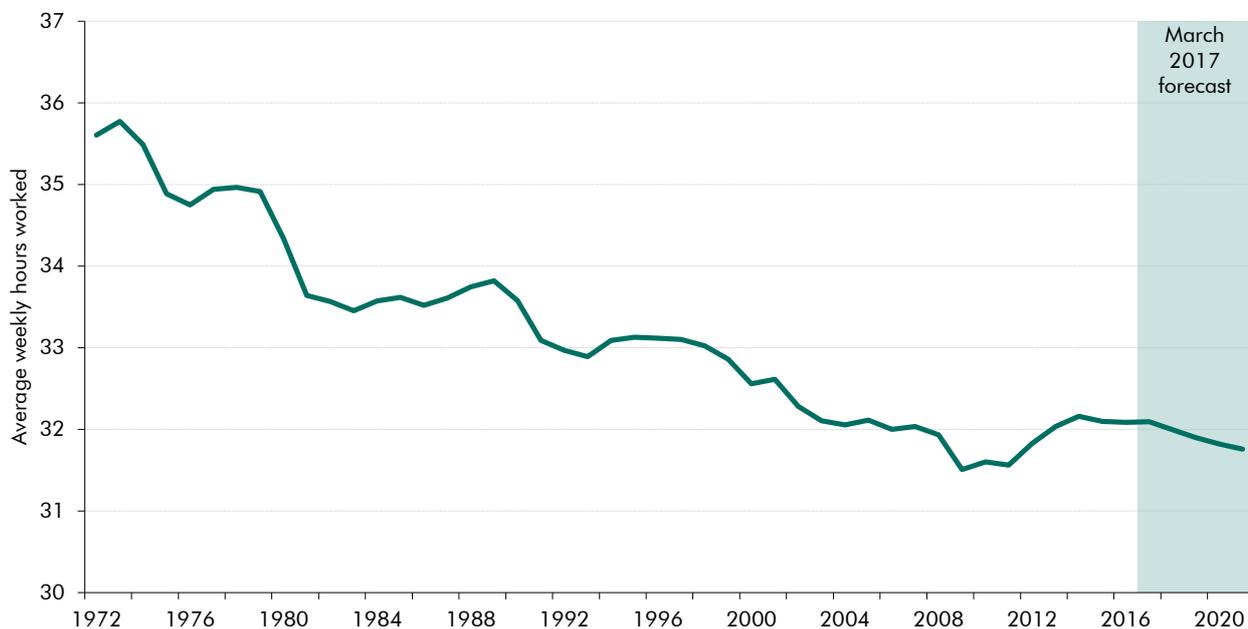
- 3.14 One source of risk to the potential employment rate – to the upside or downside – is the impact of government policy: changes in taxes, in- or out-of-work benefits, active labour market policies or minimum wages could all affect the proportion of people that are active in the labour market and employed. For example, we expect the National Living Wage – which is set to rise faster than productivity – to raise equilibrium unemployment.

Average hours worked

- 3.15 Full-time workers in 1860 worked more than 60 hours a week on average; they now work less than 40.⁴ This reflects rising incomes and the associated rise in demand for leisure. Compositional effects have also played a part, with the share of part-time workers rising, in part due to greater labour market participation among women and older workers. Chart 3.4 shows how average hours overall have fallen since the early 1970s.

⁴ Speech given by Martin Weale, External Member of the MPC, Bank of England: 'What's in a week's work?', January 2016.

Chart 3.4: Average weekly hours worked



Source: ONS, OBR

- 3.16 In our medium-term forecasts, we typically assume that the historical downward trend in average hours will continue. But, over the past few years, average hours have been relatively flat and there is a risk that the downward trend will not reassert itself. The recent trend has been attributed to people trying to make up for weak real income growth and feeling less secure in their jobs.⁵
- 3.17 The fiscal effect of average hours remaining flat rather than falling would be positive on its own, but probably negative overall if it reflected continued weakness in real income growth. Income tax receipts are more sensitive to changes in total hours worked when they reflect changes in average hours than changes in the number of people employed. That is because an extra hour worked is taxed at the marginal rate – 20, 40 or 45 per cent – whereas an extra person employed is taxed at the average rate, which will be lower mainly because of the tax-free personal allowance that currently stands at £11,500.

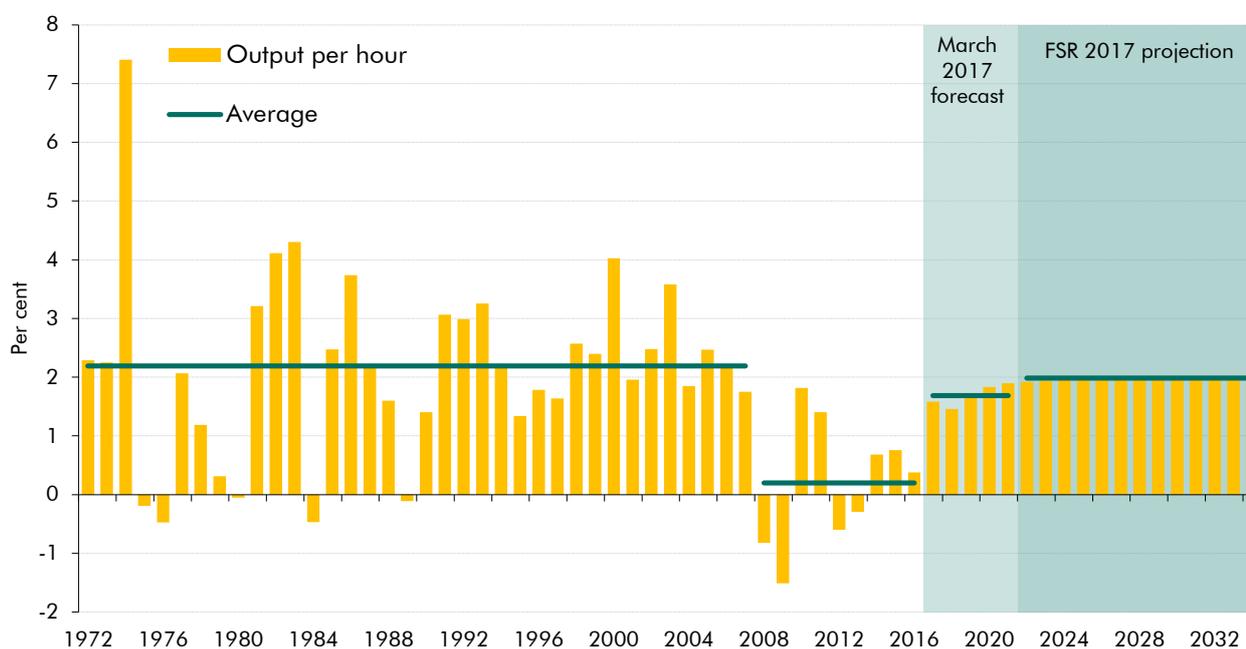
Risks to potential productivity growth

- 3.18 Having considered various risks to the total number of hours worked in the economy, the next issue is potential productivity – the average amount of output that can be produced from each hour of work. This can be decomposed into contributions from capital deepening (investment in more equipment and technology per unit of labour) and ‘total factor productivity’ (the efficiency with which labour and capital are combined to produce output). Productivity growth tends to be the biggest risk we highlight in each *EFO*.
- 3.19 Hourly productivity growth averaged 2.2 per cent a year between the early 1970s and the financial crisis and recession of the late 2000s. Since then, it has slowed significantly in the

⁵ Berry *et al*, *Trends in UK labour supply*, Bank of England Quarterly Bulletin, December 2015.

UK and in many other advanced economies – the ‘productivity puzzle’. To produce our medium-term forecasts, we have to judge whether this is a temporary (if persistent) hangover from the crisis or marks a long-term structural change – to date we have by and large assumed the former. Chart 3.5 shows how actual productivity growth (as opposed to the unobservable growth in potential productivity) has varied over time. There have been other periods of weakness, but the annual productivity growth rate since 2008 has averaged just 0.2 per cent. It picked up to 1.5 per cent in the year to the fourth quarter of 2016, but has now dropped back again to just 0.4 per cent in the year to the first quarter of 2017.

Chart 3.5: Productivity growth



Source: ONS

3.20 There are many possible explanations for the post-crisis weakness in productivity growth and views on its long-term implications. Most commentators assume that it reflects a combination of factors, with views differing on their relative importance:⁶

- **Impaired resource allocation** has slowed the speed with which labour and capital move from less to more productive firms. Survival rates have been unusually high while the share of loss-making firms has risen, possibly due to low interest rates or forbearance by lenders. The **damaged financial system** explains part of this.
- Some firms appeared to **hoard labour** in the immediate aftermath of the crisis, although the longer the period of weak productivity growth has persisted, the less plausible this seems as an explanation for continuing weakness.
- A **slowdown in investment growth** is likely to have weighed on productivity growth by reducing the amount of capital available to each worker.

⁶ For a fuller discussion see Barnett *et al*, *The UK productivity puzzle*, Bank of England Quarterly Bulletin, June 2016.

- Some of the slowdown may be attributable to **measurement issues**, including those associated with fully capturing output of the digital economy.⁷

3.21 Until November 2015, our medium-term forecasts assumed that potential productivity growth would return to its pre-crisis average rate of 2.2 per cent by the end of the forecast. In March 2016, we put more weight on the post-crisis weakness, taking our medium-term assumption down to 2.0 per cent. And in November 2016, we revised it down to 1.8 per cent in light of the expected effects of the Brexit vote. All these assumptions imply that most of the recent weakness in productivity growth results from ultimately temporary factors.

3.22 The main risk to potential productivity growth is that the post-crisis weakness continues. Robert Gordon has argued that total factor productivity growth has been weak since the 1970s, due to flagging technological advancement and a variety of supply-side headwinds, such as the cessation of improvements in educational outcomes.⁸ But others – including so-called ‘techno-optimists’ – believe the digital revolution will lead to innovations that will eventually combine to give a huge boost to productivity.⁹

Implications for the public finances

3.23 The outlook for productivity growth is central to prospects for living standards – as proxied by real GDP per head. Confronted by the unusual period of very weak productivity growth since the financial crisis, which remains hard to explain fully, we like most forecasters assume that it will recover, but take time to return towards its long run historical average. There are risks to both sides of this forecast – we may be able to sustain a period of strong ‘catch-up’ growth, but conversely the recent weakness may be the ‘new normal’. But the renewed weakness of actual productivity growth in the latest data points to the downside.

3.24 The outlook for population growth directly affects the size of the economy in both cash and real terms, but has less impact on GDP per head as it increases the number of heads as well as GDP. That said, net inward migration does tend to boost GDP per head because inward migrants are more likely to be of working age. Participation rates, the sustainable employment rate and average hours all matter for GDP and GDP per head. There are risks around all of these, with those around migration perhaps the biggest in the medium term.

3.25 But does any of this matter for the public finances? That depends on how revenues and public spending respond as GDP and GDP per head rise over time. In our long-term projections we assume – broadly in line with historical experience – that most thresholds in the tax and benefit systems on average rise in line with living standards (earnings or real GDP). Other things being equal, this implies no long-term upward or downward trend in receipts or welfare spending as a share of GDP (although there may be plenty of cyclical, policy-related and other variation). The amount the Government spends on public services

⁷ Bean, *Independent review of UK economic statistics*, 2016.

⁸ Gordon, *The Rise and Fall of American Growth: The U.S. Standard of Living since the Civil War*, 2016. See also Cowen, *The Great Stagnation: How America Ate All the Low-Hanging Fruit of Modern History, Got Sick, and Will (Eventually) Feel Better*, 2011.

⁹ See Brynjolfsson and McAfee, *Will Humans Go the Way of Horses? Labor in the Second Machine Age*, Foreign Affairs, 2015 and Mokyr, *Secular stagnation? Not in your life* in *Secular Stagnation: Facts, Causes and Cures* Edited by Coen Teulings and Richard Baldwin, 2014.

is a political choice, but it is a reasonable assumption that this too will be roughly constant as a share of GDP (adjusted for the changing age structure of the population, and with – we think – the important exception of health spending, as discussed in Chapter 6).

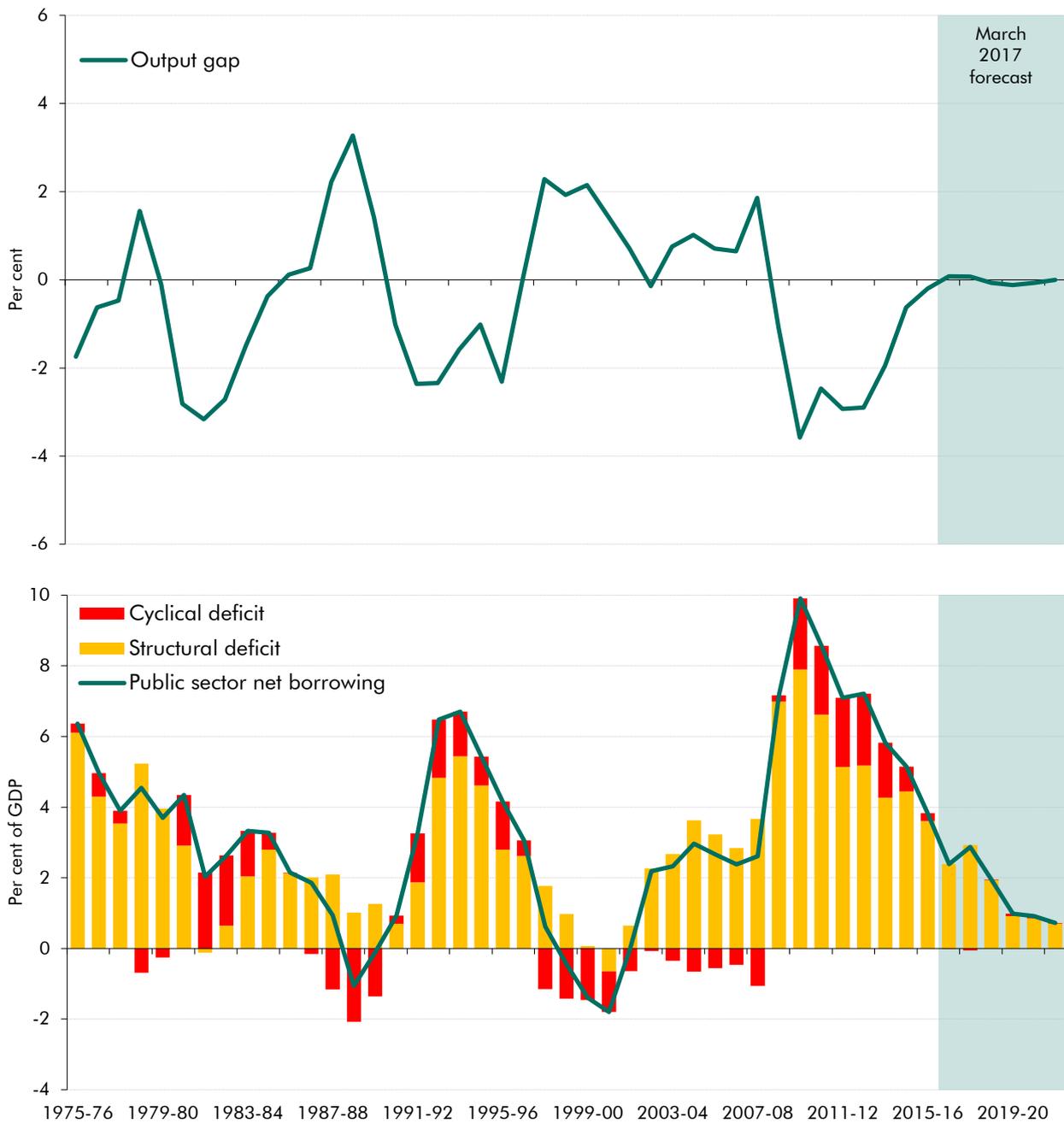
- 3.26 All this means that if a downside risk to potential GDP per head were to crystallise over the long term – say because of continued weak total factor productivity growth – this would reduce both receipts and spending in cash terms, but would have a smaller effect on them (and on the gap between them) as percentages of GDP. The impact on the quality and quantity of public services would depend on whether the productivity shortfall across the whole economy was mirrored in those services. This explains why the long-term projections in our *FSRs* are relatively insensitive to different productivity growth assumptions. We are all poorer if the downside risk materialises, in both the private and public goods we consume, but this does not translate into a big threat to fiscal sustainability.
- 3.27 The impact of weaker-than-expected potential GDP growth is greater over our medium-term forecast, because the Government has set its policy parameters over this horizon and most are not linked to changes in earnings and GDP per head. For example, public services spending totals are planned in cash terms and most tax allowances and thresholds are either determined by the policy parameters or rise with inflation. In this setting weaker GDP growth reduces cash revenues significantly and increases cash spending on debt interest and means-tested benefits somewhat. Receipts fall less as a share of GDP (because both are lower), but spending rises more because the unchanged cash plans for public services spending are higher as a share of that lower GDP.
- 3.28 The ‘weak productivity’ scenario in our November 2016 *EFO* assumed potential productivity growth of just 0.8 per cent a year, similar to the actual rate in 2015. This implied average GDP growth of around 1 per cent a year, compared to almost 2 per cent in our central forecast. After five years public sector net borrowing was £41 billion or 1.9 per cent of GDP higher than in the central forecast and net debt was 8.0 per cent of GDP higher.

Risks from cyclical shocks

- 3.29 In addition to the fiscal risks arising if potential GDP rises more or less strongly than assumed, there are additional risks from the possibility – in fact the high probability – that actual GDP will at times diverge significantly from this potential level.
- 3.30 Chart 3.6 shows the shape of the economic cycle over the past 40 years, based on our estimates of the ‘output gap’ between actual (non-oil) GDP and its potential level. It suggests there have been three complete economic cycles over this period, each comprising years with activity above potential followed by years with activity below potential.
- 3.31 Most recently, a large margin of spare capacity opened up during the financial crisis and subsequent recession of 2008-09 and we estimate that activity has only now returned to potential some eight years later. We assume in our latest medium-term forecast that the output gap will remain modest over the next five years and in our long-term projections we assume – because we are focusing on long-term fiscal drivers – that it remains negligible

throughout. In reality, however, activity is likely to continue to fluctuate around potential; we certainly cannot claim to have abolished ‘boom and bust’.

Chart 3.6: The economic cycle and its impact on the budget balance



Source: ONS, OBR

3.32 Cyclical fluctuations in GDP matter fiscally because of their impact on spending and revenues. When economic activity weakens, this reduces tax revenues (because tax bases are smaller), increases welfare spending (with higher unemployment and more households on low incomes) and increases plans for public services spending as a share of GDP if nominal GDP is weaker than expected. The opposite happens when activity strengthens.

- 3.33** We assume from the average relationship between the cycle and the public finances since the 1970s that for each 1 per cent that activity falls below potential, the cyclical budget deficit worsens by 0.5 per cent of GDP in the same year and by an extra 0.2 per cent in following year.¹⁰ Most of the deterioration comes about via spending rising as a share of GDP (because spending remains reasonably stable in cash terms while GDP weakens), with receipts falling slightly as a share of GDP (because they weaken slightly more than GDP).
- 3.34** Alongside the estimates of the output gap, Chart 3.6 shows the contribution of the corresponding cyclical deficits and surpluses to the overall budget balance. Over this period, output has ranged from 3.3 per cent above potential in 1988-89 to 3.6 per cent below in 2010-11. The cyclical budget balance has ranged from a surplus of 2.1 per cent of GDP in 1988-89 to a deficit of 2.1 per cent in 1981-82. The average cyclical balance is a deficit of 0.3 per cent of GDP – reflecting the fact that cyclical surpluses and deficits tend to balance out over time, essentially by definition. But the average absolute cyclical balance – surplus or deficit – is 1.0 per cent of GDP. This suggests that cyclical movements in the economy pose significant risks to the fiscal position over a medium-term horizon (although not to fiscal targets expressed in cyclically adjusted terms), but that they tend to wash out over longer periods – they do not constitute a significant risk to fiscal sustainability. However, as we discuss below, this ignores the fact that significant deviations from potential may themselves alter the subsequent path of potential through a process of ‘hysteresis’.
- 3.35** The estimates of cyclical surpluses and deficits shown in Chart 3.6 assume that each upswing and downswing in the economy affects the public finances in proportionately the same way, based on the average response over this entire period. However, experience shows that the impact of upswings and downswings on the fiscal position varies according to their cause, composition and severity – notably in the characteristics of particular recessions. So it is worth looking not only at average relationships, but also at particular historical experiences and scenarios. In Chapter 9 we report on a fiscal stress test scenario.

Cyclical shocks in UK post-war history

- 3.36** The ONS publishes consistent quarterly real GDP data from 1955. Defining a recession as at least two consecutive quarters of falling output, the latest vintage shows seven recessions in the past 61 years. That implies that the chance of being in recession at some point in any given five-year period – the horizon of our medium-term forecasts – is around one in two.¹¹ The recessions differed in length, depth and the time it took for output to recover its pre-recession peak (Table 3.1). The ONS also reports 20 isolated quarters of falling output.

¹⁰ Helgadottir *et al*, *Cyclically adjusting the public finances*, OBR Working Paper No. 3, 2012.

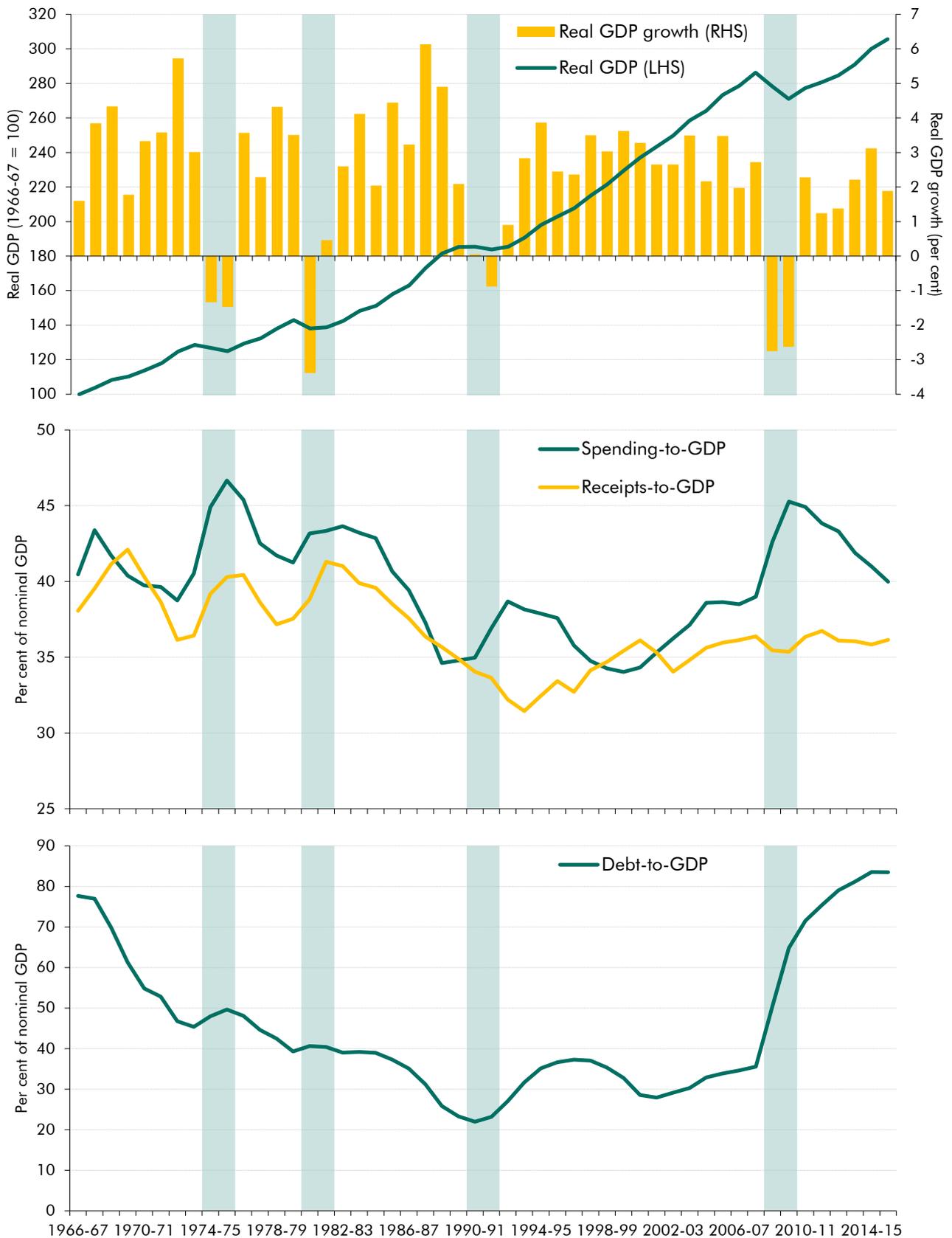
¹¹ This is the cumulative probability of a recession occurring in one of the five years. This is based on the probability of a recession in any given year (11 per cent) and a Bernoulli distribution, assuming that probability of a recession is independent in each year. The probability would be sensitive to changes in the average growth rate, since, for a given output variability, lower average growth would increase the probability of it falling below zero.

Table 3.1: UK recessions since 1955

	Number of quarters unless otherwise stated						
	Mid 1950s	Early 1960s	Early 1970s	Mid 1970s	Early 1980s	Early 1990s	Late 2000s
First quarter of falling output	1956Q2	1961Q3	1973Q3	1975Q2	1980Q1	1990Q3	2008Q2
Consecutive quarters of falling output	2	2	3	2	5	5	5
Peak-to-trough fall in output (per cent)	0.3	0.7	4.1	2.0	4.3	2.0	6.3
Quarters for output to regain pre-recession peak	1	2	13	2	13	11	22

- 3.37** Adverse cyclical shocks are not always large enough to generate a recession. A downswing might instead be confined to a period of weak, but below potential, growth. But that has been relatively rare in the UK, with growth typically falling below 1 per cent on a rolling 4 quarter-on-4 quarter basis only when there is a full-blown recession. We therefore focus on the four major recessions of the past 50 years: in the mid 1970s (with the two periods in the 1970s that meet the ‘two consecutive quarters’ definition considered together), the early 1980s, the early 1990s and the late 2000s (top panel of Chart 3.7).
- 3.38** Recessions are usually characterised by falling real incomes and consumer spending, cuts in real business investment, higher unemployment and lower asset prices. Tax revenues fall and government spending increases relative to nominal GDP (middle panel of Chart 3.7).
- 3.39** In three of the four recessions, the consequences for tax revenues and spending were sufficient to push the deficit above 6 per cent of GDP. The exception was in the early 1980s, when fiscal tightening was one factor contributing to the recession. Other than in the most recent recession, the effect on public debt relative to nominal GDP was relatively modest (bottom panel of Chart 3.7). One reason was that higher inflation boosted nominal GDP around the other three recessions, whereas it fell in the late-2000s recession.

Chart 3.7: Past recessions and the public finances



Note: Shaded areas represent periods of recession.
 Source: ONS, OBR

3.40 The different sources and characteristics of these previous recessions help explain the varying impact they had on the public finances. Starting with the most recent:

- **Late-2000s recession** (common external and domestic shocks): the subprime mortgage crisis in the US revealed widespread problems in the financial sector, which was a catalyst for the global financial crisis and credit crunch. The UK joined many advanced economies in recession as confidence and credit availability evaporated. Domestic policy responded aggressively to try to limit the effect on GDP and employment through lower interest rates, quantitative easing and fiscal stimulus. These policies and large-scale government intervention in the banking sector resulted in sharp increases in net debt. A falling pound pushed up import prices, but domestic inflation and earnings growth remained low. Income tax receipts fell sharply. The tax-rich financial sector was hit disproportionately hard, as were housing and equity markets. Lower interest rates mitigated the impact of higher borrowing on debt interest spending. The deficit increased from 2.6 to 9.9 per cent of GDP between 2007-08 and 2009-10, while net debt doubled between 2007-08 and 2010-11.¹²
- **Early-90s recession** (a domestic policy shock): strong economic growth in the late 1980s (the so-called 'Lawson Boom') resulted in higher inflation, with RPI inflation peaking at 9.5 per cent in 1990. Controlling inflation motivated the Government to join the European Exchange Rate Mechanism (ERM) in 1990, greatly restricting the variability of the sterling exchange rate against the German deutschmark. But the Bundesbank simultaneously needed to set uncomfortably high interest rates to counteract inflationary pressures stemming from German reunification. To maintain the required exchange rate parity, the Government was forced to maintain undesirably high UK interest rates, hitting the real economy and the housing market. Overall, the resulting recession helped raise the deficit from 0.9 to 6.7 per cent of GDP between 1990-91 and 1993-94, while net debt increased by 13 per cent of GDP by 1994-95.
- **Early-80s recession** (a domestic policy shock with global elements): inflation increased significantly as a result of the doubling of oil prices in 1979, and major economies around the world experienced synchronised downturns. The UK government pursued a tight fiscal policy to contain budget deficits and focused on monetary targets to lower inflation, which peaked at 18 per cent in 1980 (on the RPI measure). Output fell sharply. The combination of tight fiscal policy and high inflation meant that net debt remained relatively flat at around 40 per cent of GDP.
- **Mid-70s recession** (an external shock): the oil crisis of 1973-74 pushed oil prices up four-fold, increasing domestic energy prices. This exacerbated the extant inflationary pressures from expansive fiscal policy and high growth (the so-called 'Barber boom'), with RPI inflation peaking at 24 per cent in 1975. Industrial disputes over pay led to electricity shortages and the three-day week. This resulted in a steep fall in output and a sharp rise in unemployment. The economy had returned to positive growth by the end of 1975, but inflation and unemployment remained high. The high budget deficit

¹² For a fuller discussion, see Riley and Chote, *Crisis and consolidation in the public finances*, OBR Working Paper No. 7, 2014.

and perception that sterling was overvalued undermined investor confidence and the UK Government was eventually forced to apply for IMF support in 1976, which helped stabilise the economy on the condition of spending cuts. During this recession, the budget deficit peaked at 6.4 per cent of GDP, but high inflation meant that net debt did not rise much relative to nominal GDP.

Can cyclical shocks have permanent consequences for the public finances?

- 3.41 The conventional approach to cyclical adjustment of the public finances assumes that a cyclical downturn is temporary and so too therefore is the accompanying cyclical deficit. But in practice effects on the public finances can and do persist. These include:
- **Cyclical deficits during downturns will result in permanent additions to public debt.** The effect on the debt-to-GDP ratio will be amplified if cycles are skewed to the downside or if the fiscal benefits of upturns are not as big as the costs of downturns.
 - **Cyclical shocks can affect potential output** and could therefore be associated with any of the risks described in the first section of this chapter.
 - **Cyclical effects on inflation have persistent effects on the price level.** This will lead to permanent effects – some positive, some negative – on those parts of the public finances that are linked to inflation. The net effect will depend on the nature of the underlying shocks and their consequences for different measures of inflation.

Persistent effects on public sector net debt

- 3.42 Cyclical shocks can be thought of as temporary deviations of output from its trend. Given that most methods of distinguishing the trend from the cycle (including purportedly structural ones) in effect draw a smoothed line through the path of actual output and treat the deviations from it as the cycle, past upswings and downswings tend to look broadly symmetric in size (if not in shape) once viewed with sufficient hindsight. That said, looking forward at any given point in time, unexpected downturns tend to surprise more on the downside than unexpectedly strong upswings surprise on the upside. And once the recession is past, the conclusion implied by most estimation techniques is often that potential was lower (and overheating greater) on the eve of the downturn than it appeared at the time.
- 3.43 Assuming that economic cycles are broadly symmetric, at least when viewed with sufficient hindsight, they will have permanent fiscal effects if the fiscal consequences of downturns are greater than that of upturns. This could result from an asymmetry in the fiscal policy response to cyclical trends – i.e. deploying deficit financing more aggressively to support the economy in a downturn versus what is saved in an upturn. History suggests that this may be the case, with surpluses becoming rarer and deficits bigger. So the past average relationship between the cycle and the public finances may not be a good guide to the future. One factor that is likely to have contributed to this is the tendency of governments to misinterpret cyclical upturns as structural improvements to growth prospects, thereby setting spending plans on the basis of permanently rather than temporarily higher revenues.

- 3.44 Non-linearities in the tax and spending systems can also play an important role – for example, the uprating of most benefits is subject to a floor of zero per cent, so if a downturn generates deflation their value will rise in real terms. The triple lock on state pensions puts a much higher floor of 2.5 per cent on uprating, so would have a bigger ratchet effect on spending during downturns (see Chapter 6 for a fuller discussion of the triple lock).
- 3.45 In our November 2015 *EFO*, we presented a ‘negative shock’ scenario, where a cyclical shock to the economy results in a peak-to-trough fall in real GDP of 2¾ per cent and a reduction in nominal GDP (as it did in 2009-10, after the financial crisis). By the end of the forecast, net debt was around 14 per cent of GDP higher than in the central forecast.

Effects of temporary downturns on potential output

- 3.46 Severe downturns or prolonged periods of slow economic growth can affect both the level and growth rate of potential output. These ‘hysteresis’ effects can operate through the labour market, for instance if long spells of unemployment lead to skills atrophying or a lessening in search intensity. Also, weaker investment during a downturn will reduce the amount of productive capital per unit of labour. Weaker investment in research and development could also lower total factor productivity growth. As the first section of this chapter showed, risks to potential output are a significant risk to the public finances.
- 3.47 The extended post-crisis weakness in productivity has stimulated interest in the potential link between downturns and potential productivity growth.¹³ One cross-country review by Blanchard and others shows that recessions with persistent effects on output are quite common – across 23 countries and 50 years, almost 70 per cent of recessions were followed by a sustained negative output gap, with the output *level* still below that implied by the pre-recession trend three to seven years later.¹⁴ Furthermore, in half of these cases, output *growth* was also lower than the pre-recession trend, implying that the growth of potential may also have been lowered, at least temporarily.
- 3.48 IMF analysis of large and persistent output shocks suggests that a 1 percentage point widening of the cumulative output gap results in a 0.2 per cent fall in potential output.¹⁵ A recent study by Ball compares estimates of potential output before and after the last recession and finds that by 2015 there was a 12 per cent reduction in potential output of the UK compared to a continuation of the pre-crisis trend.¹⁶ Our own estimate of potential output in 2015 is around 12 per cent below an extrapolation of the Treasury’s pre-crisis assumption from Budget 2008.
- 3.49 If the hysteresis effect is powerful, it creates a hard-to-quantify trade-off for policymakers. If a government chooses to undertake discretionary stimulus measures to support activity in a downturn it will help determine the fiscal risk it is exposed to over the longer term both from any cyclical borrowing, but also the possible fiscal risks arising from any impact on potential

¹³ See DeLong and Summers, *Fiscal Policy in a Depressed Economy*, 2012, or European Commission, *Impact of the current economic and financial crisis on potential output*, 2009.

¹⁴ Blanchard *et al*, *Inflation and activity: two explorations and their monetary policy implications*, IMF Working Paper No. 15/230, 2015.

¹⁵ IMF, *Estimating Hysteresis Effects*, Country Report No. 12/190 (Annex 1), July 2012.

¹⁶ Ball, *Long-term damage from the great recession in OECD countries*, NBER Working Paper No. 20185, 2014.

GDP. The more powerful any hysteresis effects, the more they would magnify the fiscal consequences of cyclical downturns.

Persistent effects from price-level shocks

3.50 A ‘pure’ cyclical output shock would see real GDP return to the same potential path once the effects of the shock had dissipated. But it would not necessarily return nominal GDP or the price level to their original paths. This can have long-term implications for the public finances, with the extent influenced by the types of inflation that accompany a shock:

- **Direct effects of inflation on the public finances** relate to parameters in the tax and spending systems that are linked to inflation. Income tax thresholds are typically linked to CPI inflation, so all else equal higher inflation reduces receipts. Excise duties are typically linked to RPI inflation, so higher inflation increases receipts. Most working-age benefits and tax credits are normally uprated in line with CPI inflation (although at present they are subject to a four-year cash freeze). State pension spending would rise if CPI inflation determined the level of triple lock uprating. And the interest that accrues on index-linked gilts is linked to RPI inflation. So higher inflation typically raises cash spending. The net direct effect on the budget balance will depend on whether a shock has the same effects on CPI and RPI inflation, and whether policy settings dampen any channels (as with the benefit freeze). In the first year, the direct effect of higher inflation is negative because the RPI link to debt interest spending is rapid. Beyond the first year, the positive and negative effects are more likely to net off.
- **Indirect effects of inflation on the public finances** depend on the nature of the underlying shocks that push inflation up or down. It is only once these have been considered that the overall effect of inflation on borrowing as a share of GDP – the relevant metric for sustainability analysis – can be discerned. For example, a positive domestic demand shock that boosts wage growth and profit margins will lead to higher inflation on the CPI and RPI measures, with direct effects on the public finances, but will also increase the growth rate of nominal GDP via its effect on whole economy inflation, which affects many nominal tax bases and boosts receipts. A key factor is that wage growth boosts income tax receipts more than the indexation of thresholds reduces them – a process known as ‘fiscal drag’. The overall effect of this type of inflation is likely to reduce the deficit – although, to the extent that it reflects unsustainable patterns in demand, that effect would be temporary. Inflation can also be raised by negative supply shocks that push up costs rather than demand. For example, high global oil prices raise production costs via higher import prices. That boosts the CPI and RPI measures of inflation more than it increases whole economy inflation and the nominal tax base. For income tax, fiscal drag would move into reverse. The overall effect of this type of inflation is likely to increase the deficit.¹⁷

¹⁷ In our March 2015 *Economic and fiscal outlook*, we looked at different types of demand- or supply-driven movements in global oil prices. As would be expected, these showed adverse fiscal consequences in the case of a negative shock to oil supply but positive consequences if the underlying shock were stronger global demand. The effects were relatively small.

- **Unexpected inflation can reduce the debt-to-GDP ratio.** While high inflation directly erodes the real value of debt, if it is anticipated by investors at the time the debt is sold, then the inflation component of debt interest payments will be correspondingly higher, adding to both the deficit and the debt stock. Unexpected inflation, by contrast, does not affect the debt interest payments on fixed-interest debt until new debt is issued, though it will affect the payments made on any index-linked debt. In the UK, around a quarter of government debt is now directly linked to the RPI, so even unexpected inflation raises debt interest spending almost immediately (see Chapter 8).

3.51 The experience during and after the late-2000s recession is instructive. Sterling fell sharply during the crisis, raising import costs. As the global recovery got underway, oil prices increased sharply, further adding to imported inflation. Between the first quarter of 2009, at the depth of the crisis, and the final quarter of 2013, before oil prices fell back, the CPI increased 5.4 percentage points more than would have been the case if inflation had been in line with the Government's 2 per cent target throughout. That was not matched by growth in average weekly earnings, which fell 5.9 per cent in real terms (relative to the CPI) over that period. This was an example of a fiscally painful upside surprise in inflation. It contributed to higher cash spending on welfare and debt interest, but the offsetting boost to excise duties from higher RPI inflation was limited by successive government decisions not to apply the default RPI indexation to fuel duty rates (see Chapter 5), and, most importantly, because reverse fiscal drag weighed on income tax receipts.

3.52 Our latest forecast factors in some fiscally painful inflation in the short term as sterling's past depreciation feeds through to import prices and the CPI and RPI. We generally assume that the Monetary Policy Committee will look through what is expected to be a temporary period of above-target inflation, so the effect on the price level is persistent. This can be seen in our November 2016 *EFO*, where we estimated that the upward revision to inflation, which peaked at around 1 percentage point in 2017 on both measures, had increased our net borrowing forecast by £2.7 billion in 2017-18 (when the effect on index-linked gilts is greatest) and around £2 billion in subsequent years (due to the persistent price level effect on other elements of tax and spending). Despite inflation being assumed to return to target later in the forecast, in line with our March 2016 forecast, the level of the CPI by early 2021 (the end of the March 2016 forecast period) had been revised up by 1.4 per cent.

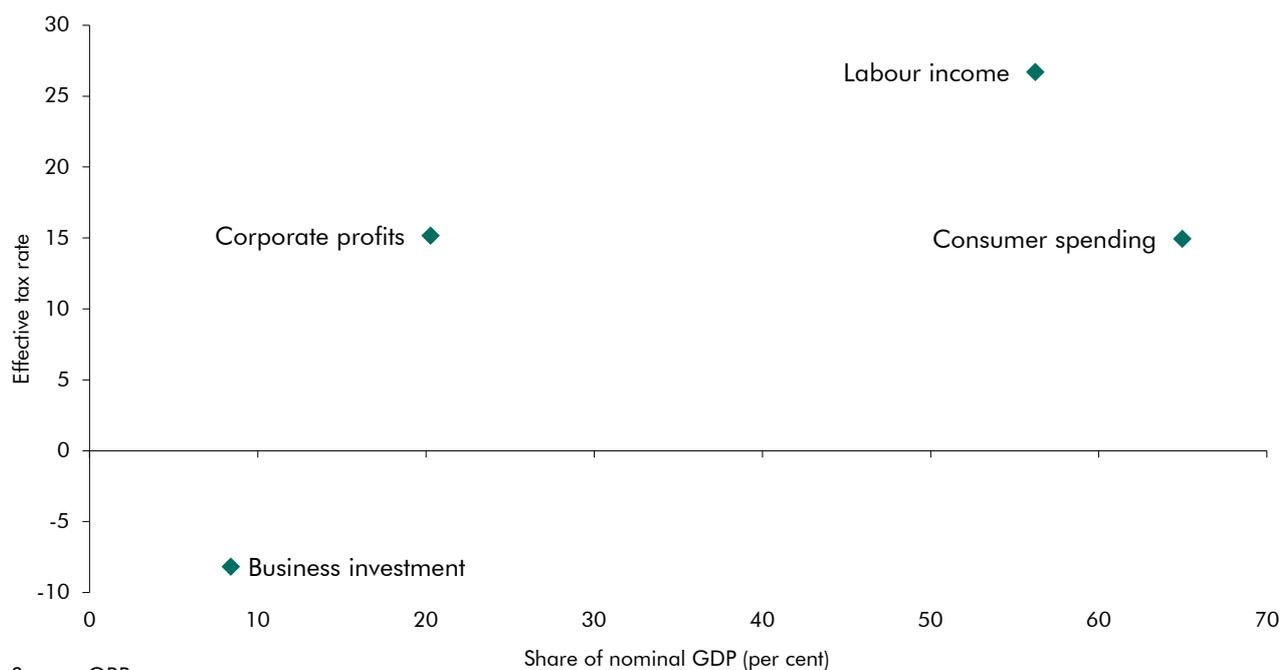
Risks from the composition of GDP

3.53 The composition of GDP can be as important to the fiscal forecast as the total, because some components generate more tax receipts per pound than others (i.e. they are more 'tax rich'). Changes to the composition of GDP can therefore have a significant impact on the public finances, even if the path of GDP itself is unchanged. And the composition of cyclical or structural shocks will determine the extent to which the public finances are affected.

3.54 Chart 3.8 illustrates the tax-richness of different income and expenditure components of GDP by assigning various taxes to each: for example, income tax to labour income and VAT and excise duties to consumer spending. Not all taxes relate to income or expenditure components of GDP – in particular those that relate to disposals or transfers of assets

(capital gains tax or inheritance tax) or balance sheets (the bank levy). These have been excluded. We have split onshore corporation tax between a negative capital allowance element assigned to investment and a notional pre-capital allowance element assigned to corporate profits.¹⁸ The chart illustrates the particular fiscal importance of labour income and consumer spending, both of which are big components of GDP and relatively tax-rich.¹⁹

Chart 3.8: Selected components of GDP and associated effective tax rates



Risks associated with the expenditure composition of GDP

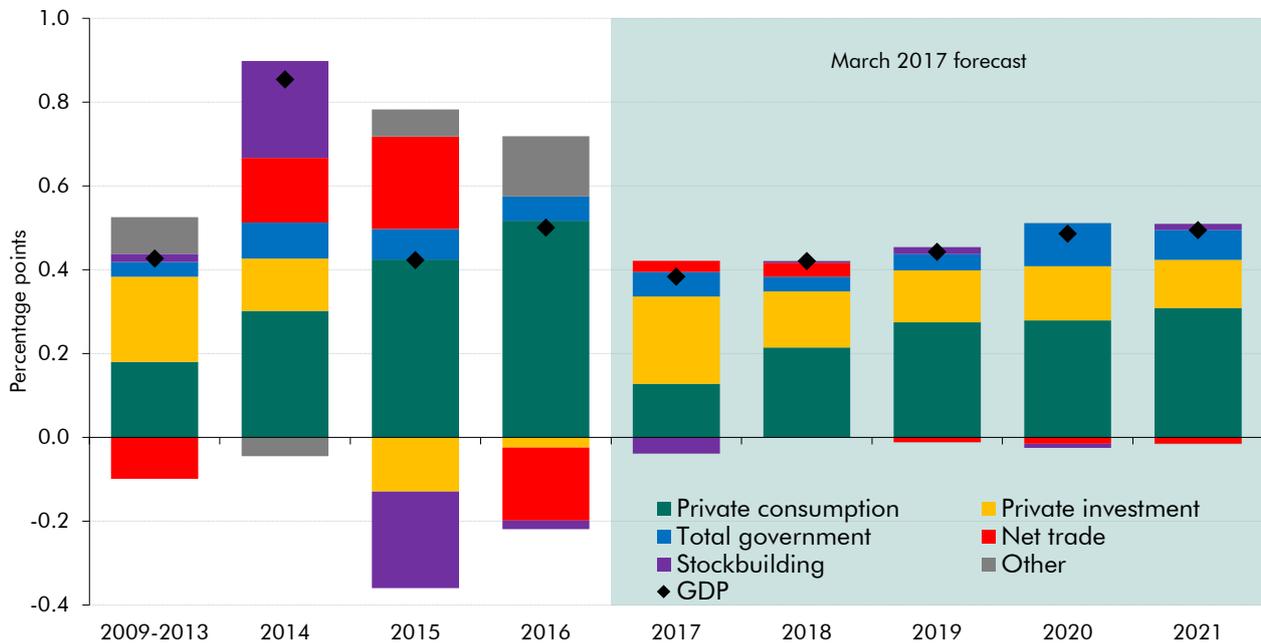
Household consumption

3.55 In 2016, consumer spending made up 65 per cent of nominal GDP by expenditure, so its sheer size makes it an important source of economic growth. As Chart 3.8 showed, it is also relatively tax-rich. It accounts for around 70 per cent of VAT receipts, for example. Over the five years to 2016, it grew at a similar rate to the economy as a whole, accounting for around two-thirds of GDP growth. We expect it to grow slightly more slowly than GDP over the next five years, but still to account for more than half of GDP growth (Chart 3.9).

¹⁸ We have not included use of North Sea capital allowances in this estimate. Almost all North Sea investment is subject to immediate 100 per cent capital allowances, but the effect on tax receipts depends on the proportion of that investment undertaken by firms with tax liabilities that can be offset. This is subject to significant uncertainty.

¹⁹ The effective tax rate calculations underpinning this chart reflect static, average effects in one year. They do not attempt to capture interactions between components or longer-term dynamic effects. Most significantly, higher business investment would be expected to boost overall receipts in the longer term via its effect on potential output growth – this would far outweigh the short-term cost of greater use of capital allowances.

Chart 3.9: Contributions to average quarterly GDP growth



Source: ONS, OBR

3.56 Owing to its high share of GDP, relatively small differences between forecast and actual consumption growth can be fiscally material. Ready reckoners suggest that a 1 per cent fall in consumption relative to forecast would reduce receipts by £³/₄ billion. A 1 percentage point fall in the consumption share of GDP – offset by a rise in business investment – would lower the tax-to-GDP ratio by 0.2 percentage points.

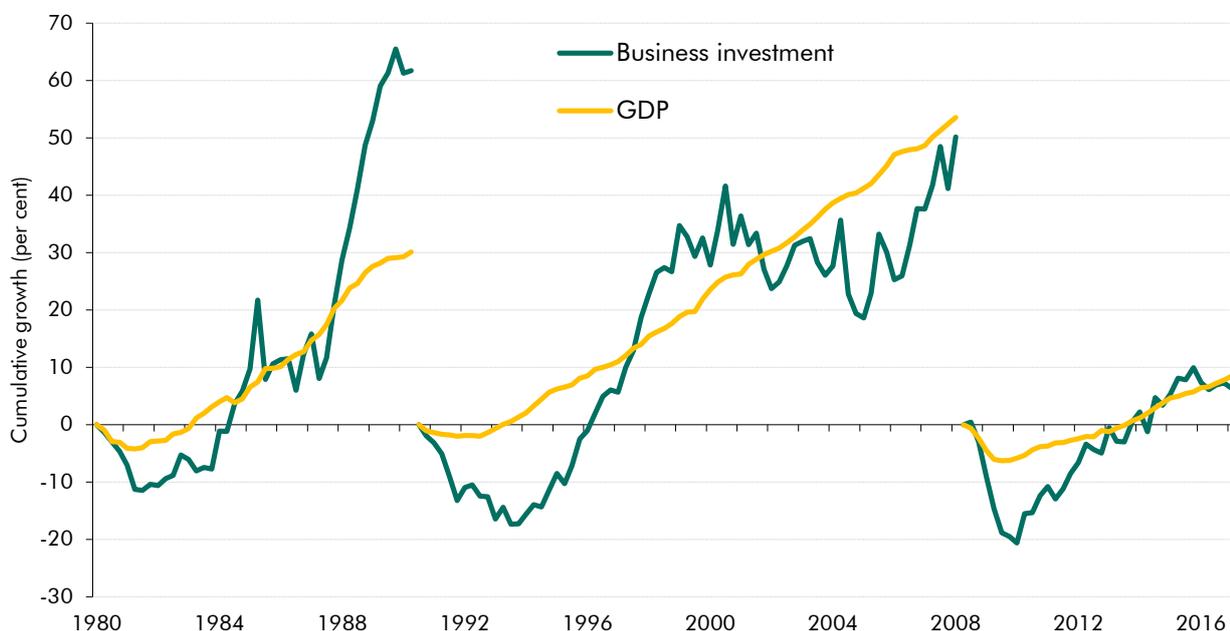
3.57 There are two key sources of risk to consumption growth: that household income growth diverges from forecast; and that more or less is saved from a given flow of household income. Both could assert themselves in different combinations, depending on the nature of the shocks – for example, the financial crisis involved both a negative shock to real incomes and a spike in the saving ratio as confidence and credit availability fell away.

Investment

3.58 Business investment makes up a much smaller share of GDP than private consumption. Investment projects deliver benefits over a long period of time and often involve large upfront costs that cannot be fully recovered if a project is subsequently cancelled. So uncertainties about how the economy will evolve may prompt businesses to put projects on hold (given the likely benefit from waiting for more or better information) or to cancel them altogether. Investment therefore rises faster than other components of GDP in good times, but falls faster in bad times.

3.59 This strongly pro-cyclical behaviour is illustrated in Chart 3.10. In the early-1980s and early-1990s recessions, its fall was both larger and more prolonged than the fall in GDP. In the late-2000s recession the fall was again larger, but not more prolonged.

Chart 3.10: Cumulative business investment and GDP growth from the beginning of past recessions



Source: ONS

3.60 In the medium term, higher business investment reduces tax receipts due to the use of capital allowances. Our ready reckoners suggest that the direct effect of a 1 per cent rise would reduce receipts by around £0.1 billion by the end of the forecast. But the indirect effect of higher business investment is likely to boost receipts in the longer term via its effect on potential output growth – this would far outweigh the medium-term cost of greater use of capital allowances.

Net trade

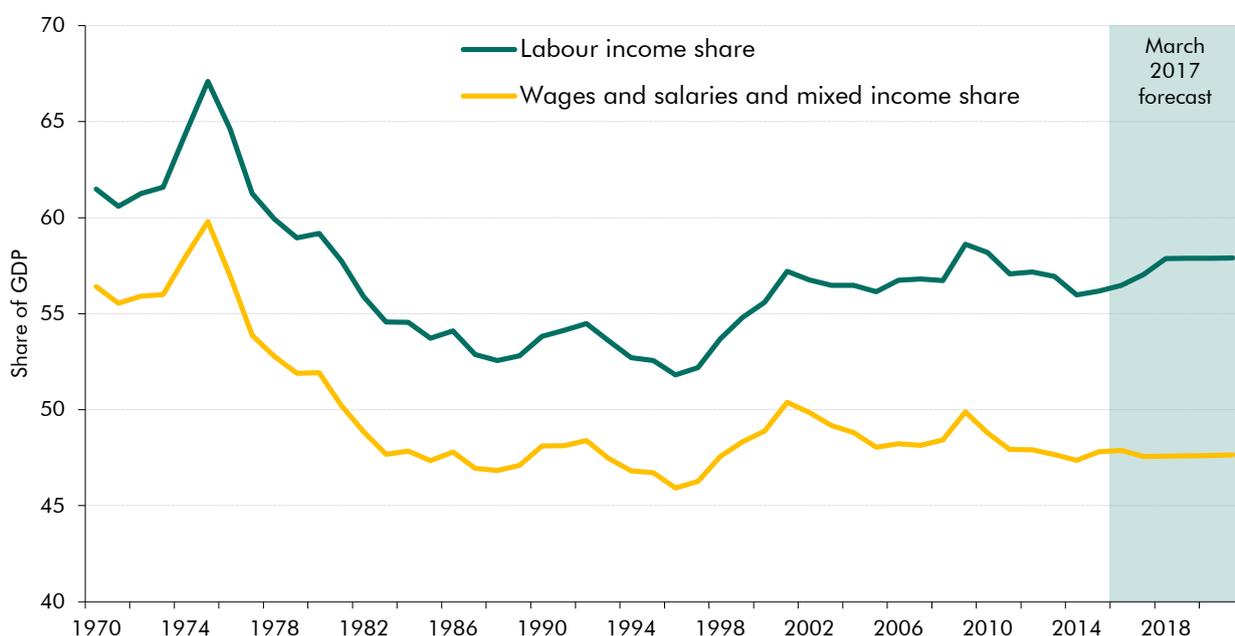
3.61 Net trade is another important component of GDP growth. There are many risks and uncertainties around its prospects, but these are hard to translate into fiscal risks as we cannot calculate effective tax rates on exports and imports. The UK does not impose export taxes and the customs duties it currently collects are treated as EU taxes. They will become UK taxes when the UK leaves the EU, but until the terms of Brexit or any changes to customs policies are known, future effective tax rates will be uncertain. More broadly, export sales finance the wages and profits of exporting firms, which are subject to various taxes.²⁰ Imports will ultimately be subject to VAT if they are finally purchased by consumers.

²⁰ The OECD estimates that around half the UK's gross export sales in 2011 represented 'value added' for UK exporters (i.e. wages and profits), while another quarter was value added for domestic firms in exporters' supply chains (see the 'trade in value added' database).

Risks associated with the income composition of GDP

- 3.62** Changes to the income composition of GDP are also fiscally important. The two most important components are household income and corporate profits, with the former significantly larger and more tax rich per pound than the latter.
- 3.63** Income tax and National Insurance contributions (NICs) are the most important taxes on household income, with the contribution from wages and salaries dominating. In line with historical experience, we typically assume that earnings rise broadly in line with productivity (on an output-per-worker basis) and whole economy inflation. This implies that wages and salaries will be broadly stable as a share of GDP, as indeed they have been in recent decades (see Chart 3.11). If the share of labour income were to fall, the tax-to-GDP ratio would fall too. A 1 percentage point fall in the labour share (weighted equally between earnings and employment) and rise in the profit share would be associated with a 0.2 percentage point drop in the tax-to-GDP ratio. Labour income also includes employers' social contributions, which we expect to increase over the next few years as pension auto-enrolment is rolled out further. Employers may try to offset this increase in their costs by reducing the wages they pay, which could reduce the tax take on labour income.

Chart 3.11: Labour income share of GDP



Source: ONS

- 3.64** The breakdown of labour income between that earned by employees (wages and salaries) and the self-employed ('mixed income' in the National Accounts) is also important for the public finances. A 1 per cent fall in wages and salaries would reduce PAYE income tax and NICs receipts by about £3½ billion in the first year, while a 1 per cent fall in self-employment income would reduce self-assessment receipts by £¼ billion, with a one-year lag. The difference largely reflects the fact that wages and salaries are about six times the size of self-employment income, but the former is also taxed more heavily.

- 3.65 We assume a rising share of self-employment in our medium-term forecast, at a slightly slower pace than in recent years. This has been related to a sharp rise in the number of people setting themselves up as a single-director company rather than working as an employee or unincorporated self-employed worker. This issue and the associated fiscal risks are explored in Chapter 5. The distribution within labour income is also fiscally important because the income tax system is progressive. Chapter 5 discusses recent trends in the income distribution and the risks associated with policy changes having led to receipts being more concentrated on a small number of taxpayers with the highest incomes.
- 3.66 Understanding the risks associated with the changing composition of employment income between employees, self-employed and incorporations is complicated by the available data. Our economy forecast is based on ONS data, while our fiscal forecast includes adjustments based on HMRC data and analysis. The ONS has announced that Blue Book 2017 will include revisions based on HMRC data and forecasts (consistent with our own) on the dividend income earned by incorporated individuals. These will show much higher dividend income than previously estimated.²¹ One implication for our economy forecast is that more of what is recorded as profit should be interpreted as being similar to labour income. The implications for our receipts forecast are likely to be more complicated (see Chapter 5).
- 3.67 Non-North Sea, non-financial company profits are a key determinant of our corporation tax forecast. Nevertheless, corporate profits are subject to a lower effective tax rate than labour income. All else equal, a higher share of profits in GDP, and a correspondingly lower share of labour income, will imply a weaker path for tax receipts, although the inverse relationship between the share of profits in GDP and the share of labour income is not a perfect one, given that other elements also enter the income measure of GDP (such as imputed rent, and taxes and subsidies on products and production).
- 3.68 Existing evidence suggests that profit margins over marginal costs are positively correlated with the economic cycle,²² and our forecast of the path of profits as a share of nominal GDP is partly informed by our forecast of the output gap. Cyclical shocks to the economy may therefore be associated with shocks to the path of the profit share, relative to our central forecast, with possible implications for the aggregate effective tax rate depending on how other elements of income evolve. Our forecast of profits is also conditioned on the latest available data, which can often be subject to significant volatility and revision: the most recent ONS outturns are often subject to sizeable quarterly ‘alignment’ adjustments used to bring the income measure of GDP more closely into line with other measures. Recent data movements can have significant implications for our near-term forecast of annual profit growth, and therefore our forecast of corporation tax receipts. To the extent that such data are subject to significant uncertainty, this also poses a risk to our corporation tax forecast.

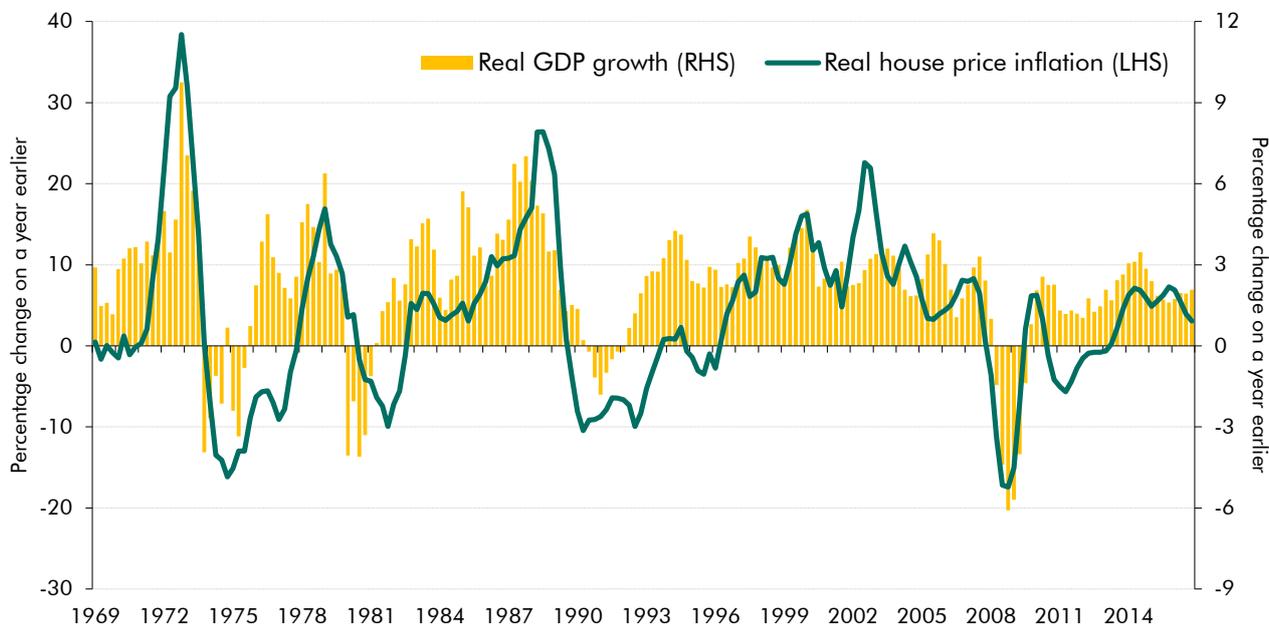
²¹ ONS, *National Accounts articles: Impact of Blue Book 2017 changes on the Sector and Financial Accounts, 1997 to 2012*, April 2017.

²² Macollan *et al*, *The cyclical nature of mark-ups and profit margins for the United Kingdom: some new evidence*, Bank of England Working Paper No. 351, 2008.

Housing sector risks

- 3.69 In addition to different categories of spending and income, GDP can also be broken down by the contribution of different industrial sectors – services, manufacturing, construction and agriculture, and their component parts. Some of these can be particularly important sources of fiscal risk, either because they are prone to shocks or because they are fiscally important. Two stand out: the financial sector (which we discuss in Chapter 4); and the housing sector.
- 3.70 The housing sector accounts for more than two-thirds of stamp duty land tax (and land and buildings transactions tax in Scotland), around a third of inheritance tax, a sixth of capital gains tax and less than 5 per cent of VAT. Housing construction also contributes around 2 per cent of PAYE income tax and NICs²³ and around 3 per cent of corporation tax. Altogether, around 4 per cent of taxes are therefore linked to the housing sector.
- 3.71 The housing sector is relatively volatile, with large pro-cyclical swings in prices and activity and real terms falls in prices around each of the last four recessions. Various common drivers – such as interest rate rises or shocks to confidence and income expectations – affect both the housing market and the broader economy. The fiscal risk posed is illustrated by the recent post-crisis experience: SDLT receipts from residential properties fell from £6.7 billion in 2007-08 to £3.0 billion in 2008-09, as the number of property transactions halved.²⁴

Chart 3.12: Growth of real GDP and real house prices



Source: ONS, OBR

²³ Close to 90 per cent of income tax and NICs receipts are collected through PAYE, so this is broadly representative of the total.

²⁴ HMRC, *UK Stamp statistics 2015 to 2016*, September 2016.

- 3.72 Other housing market developments are important too. Property transactions are volatile and heavily taxed (and, as discussed in Chapter 5, in recent years receipts have become more concentrated at the top of the house price distribution). Housing tenure – whether people own or rent their home – also affects public spending. While less volatile from year to year, home ownership rates have been on a downward trend since the late 2000s.
- 3.73 Housing market shocks are often correlated with other shocks in the economy and have wider indirect effects. For example, consumption and house prices are highly correlated because they are affected by common factors, including income expectations and credit conditions. There may also be causal effects from housing to consumption, for example because housing wealth can be used as collateral for borrowing.²⁵ And moving house is associated with higher expenditure on consumer durable goods, so there is a link from property transactions to consumption and VAT receipts, with small effects on GDP.²⁶
- 3.74 The proportion of households renting their home – and within that the proportions in the private- and social-rented sectors – is a key driver of spending on housing benefit, which we estimate will cost £23.4 billion in 2017-18. A small proportion of housing benefit is closely linked to the cycle because it is ‘passported’ to those in receipt of jobseeker’s allowance, but most is received by claimants of other benefits – e.g. incapacity benefits or tax credits – that are less closely linked to the economic cycle. The greater the share of households that rent their home, the greater the number of people potentially eligible for housing benefit. In our 2014 *Welfare trends report* we showed how the rise in private renting – where average rents are higher than in the social-rented sector – had been an important driver of recent growth in housing benefit spending. Growth in rents can also affect the average amount of housing benefit paid per recipient, but rents are less volatile than house prices and limits are set on ‘eligible rent’ that further reduce the sensitivity of spending to changes in market rents.
- 3.75 As the public sector is the major provider of social housing through housing associations and local authorities, it is also exposed to movements in rents, construction costs and other trends in housing. For example, in a downturn it may receive lower rental income.
- 3.76 There are also a large number of government-backed schemes to encourage housing supply and home ownership, including various Help to Buy schemes. As discussed in Chapter 7, these could be a source of fiscal risk.

Risks associated with sectoral lending and balance sheets

- 3.77 The National Accounts framework underpinning our economic forecast allows us to forecast each sector’s net lending or borrowing from the other sectors. These must sum to zero – for each pound borrowed, there must be a pound lent. Our forecasts of these balances are the consequence of judgements and assumptions about other flows, since each sector’s net lending follows arithmetically from our forecasts of income and expenditure. We use the

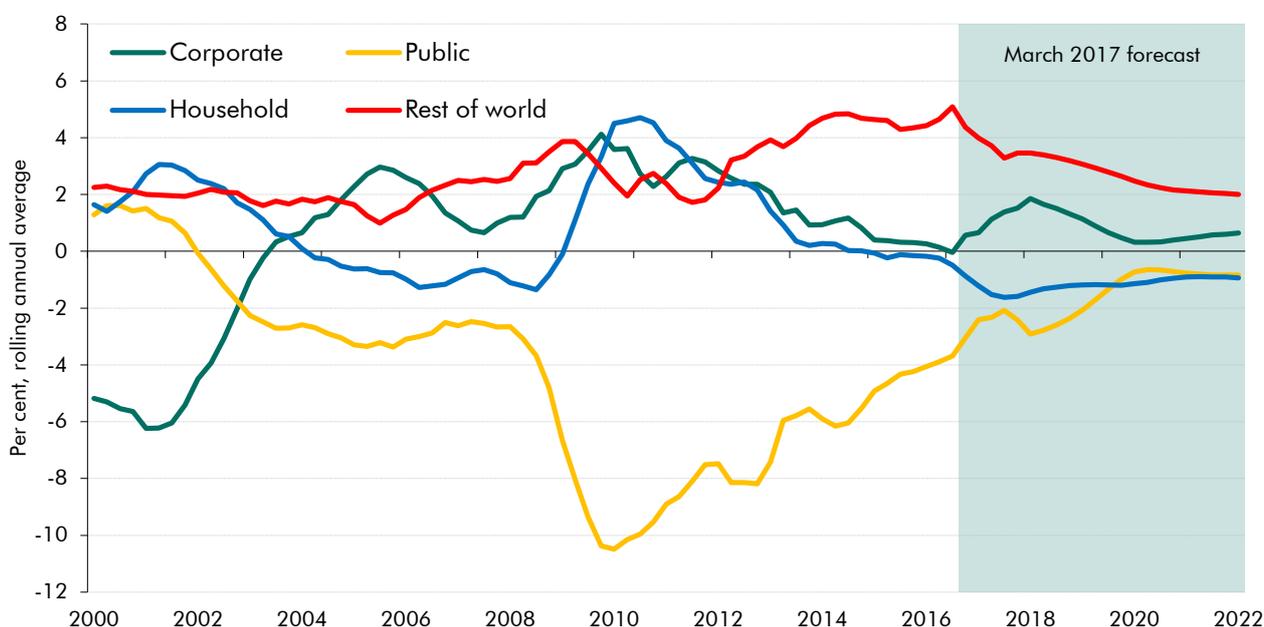
²⁵ Benito *et al*, *House prices and consumer spending*, Bank of England Quarterly Bulletin, June 2006.

²⁶ Benito and Wood, *How important is housing market activity for durables spending?*, Bank of England Quarterly Bulletin, Summer 2005.

profiles of sectors’ net lending as an important overall diagnostic on the coherence of the economic forecast. They can also point to potential risks around our central forecast.

3.78 Chart 3.13 shows our March 2017 forecasts. These included a narrowing of the public sector deficit, offset by a narrowing of the rest of the world surplus (i.e. a narrowing current account deficit) and a widening of the corporate deficit. The household sector is expected to remain in deficit throughout the forecast period. The persistent household deficit and the assumed narrowing in the current account deficit are key potential sources of fiscal risk. If the household sector moved into surplus – or the current account deficit did not narrow – it is unlikely that the public sector deficit would narrow as much as we forecast.

Chart 3.13: Sectoral net lending



Source: ONS, OBR

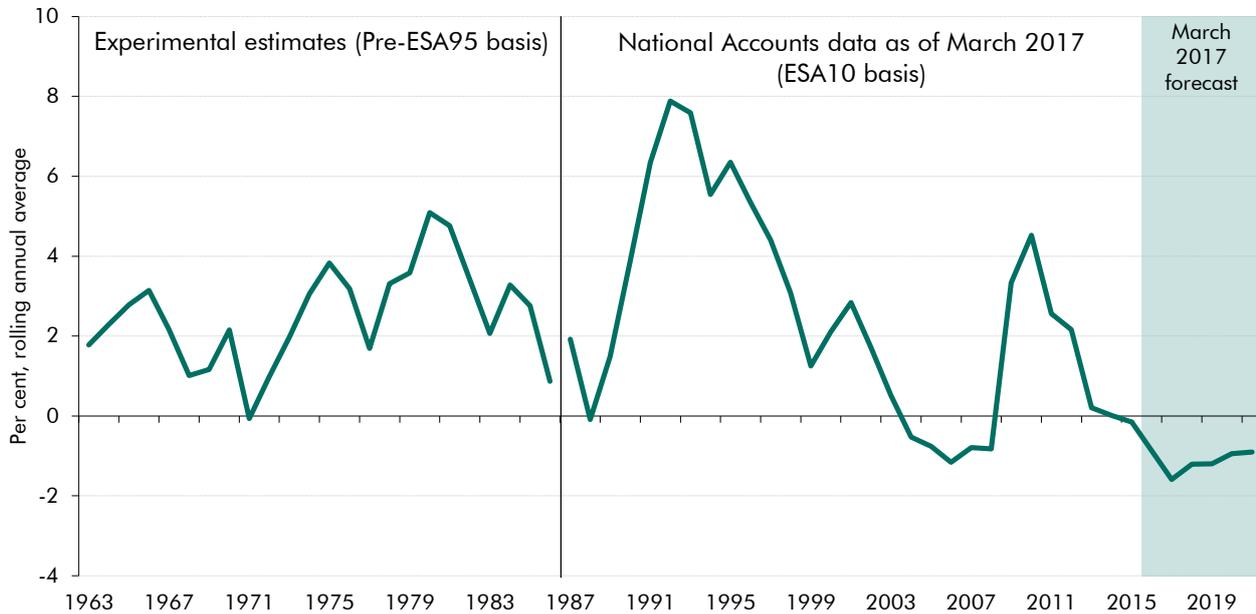
Household deficit and debt

3.79 The household saving ratio stood at 1.7 per cent in the first quarter of 2017, down from 9.2 per cent in mid-2012. (The latest figure is the lowest on record, but it was heavily influenced by tax-related shifting of dividend income.²⁷) After factoring in households’ investment spending, their overall financial position is in deficit. Our forecast that they will remain so over the next five years is underpinned by the highly accommodative monetary policy upon which the forecast is conditioned. But it would be historically unprecedented. Official and experimental data back to the 1960s²⁸ suggest that sustained periods of relatively large household sector deficits are rare (Chart 3.14). The household sector was typically in surplus up to the early 2000s, while the deficits recorded between 2004 and 2008 averaged 0.8 per cent of GDP – smaller than the average of 1.2 per cent of GDP in our central forecast.

²⁷ For a description of this, see Box 4.3 of our March 2017 *Economic and fiscal outlook*.

²⁸ Thomas and Nolan, *Historical estimates of financial accounts and balance sheets*, January 2016.

Chart 3.14: Historical estimates of the household sector balance

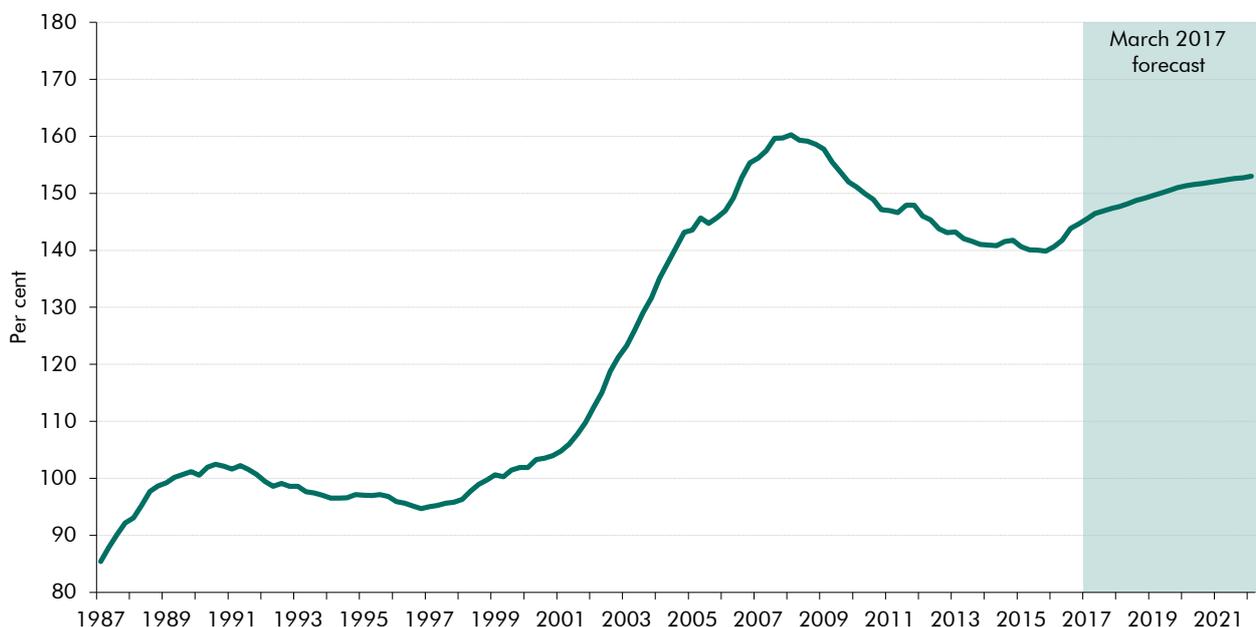


Note: Latest sector accounts data extends back to 1987 on a consistent basis. Prior to this point estimates are on an experimental basis, and are taken from Thomas, R. and Nolan, L, *Historical estimates of financial accounts and balance sheets*, January 2016.

Source: ONS, OBR

3.80 A persistent household deficit has implications for household debt. Having fallen steadily since the crisis, households’ gross debt has started to rise again relative to their income. Consumer credit net lending has been on an upward trend since 2012, increasing by around 10 per cent in the year to May. Much of this has been attributable to car finance, although credit card lending has also played a growing role. Given the sustained deficit, we expect households to continue to accumulate debt and that their gross debt to income ratio will rise over the next five years (Chart 3.15), but not by enough to top its pre-crisis peak.

Chart 3.15: Household gross debt to income



Source: ONS, OBR

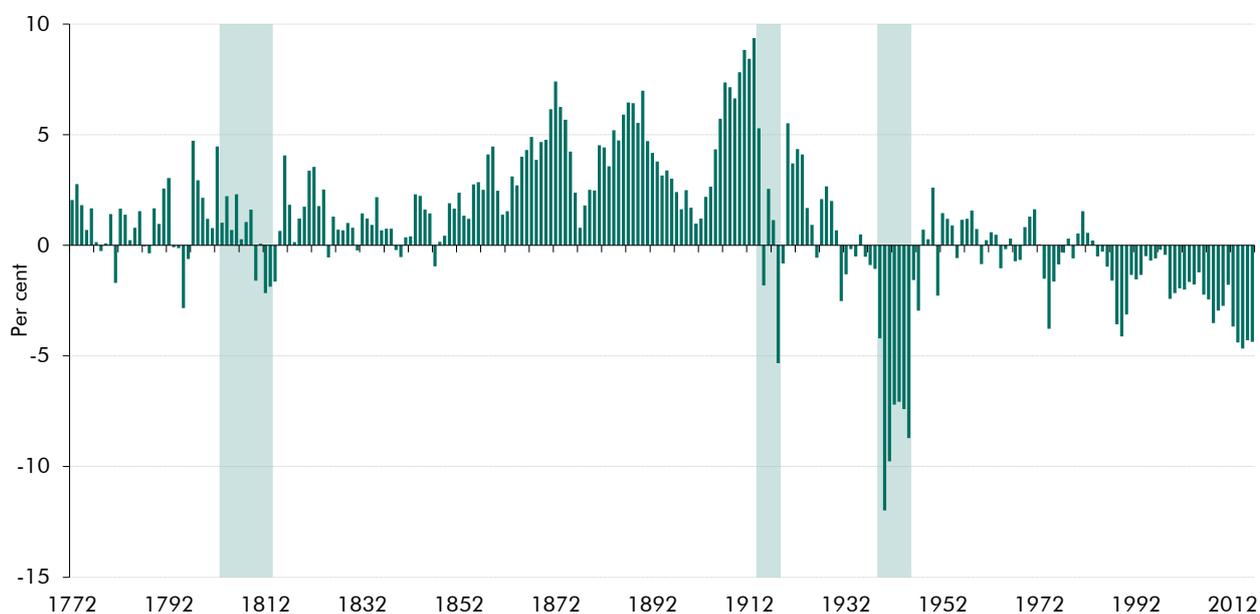
- 3.81** Given the historically unprecedented nature of the household deficit in our central forecast, we have considered the risks associated with a sharper adjustment to consumer spending than we are assuming. In our March 2017 *EFO* we looked at a ‘consumer bust’ scenario, where households were assumed to retrench by reducing consumption relative to incomes. With the labour share of nominal GDP assumed to be unchanged from our central forecast, household incomes fell in line with GDP. But the fall in consumption was proportionately greater, lifting the saving ratio. The fiscal effects were concentrated in lower receipts, due to lower consumer spending, which increased the deficit and net debt.
- 3.82** Our March 2017 forecasts for household saving and net lending are subject to important data-related uncertainties. Forthcoming revisions in Blue Book 2017 will increase household dividend income, implying a higher saving ratio and improved net lending position. (This relates to trends in self-employment and incorporation discussed above and in Chapter 5.) The ONS has signalled that it will use HMRC data and forecasts (which in turn are consistent with our tax forecasts) rather than estimates based on proportions of income to estimate dividend income. It calculates that this will raise the saving ratio by an average of 0.7 percentage points between 1997 and 2012, although the effect is generally larger in later years. The rising incidence of incorporations means that dividend income is likely to have risen more quickly than overall household income in recent years, so the upward revision to household saving is likely to rise further beyond 2012. It is also likely to be volatile in the most recent years due to the large amounts of dividend income shifting that occurred ahead of the pre-announced dividend tax rise in April 2016 (discussed in Box 4.3 of our March 2017 *EFO*).

Current account deficit

- 3.83** Our most recent forecast is also conditioned on a modest narrowing of the historically large current account deficit. The 4.7 per cent of GDP deficit in 2014 was the largest in peacetime since at least 1830. The deficit remained above 4 per cent in 2015 and 2016 (Chart 3.16).
- 3.84** The UK has run a trade deficit for many years. Much of the recent deterioration in the current account reflects a weaker income balance. In the decade prior to 2012, the income balance averaged a surplus of 1.3 per cent of GDP; since 2013, it has averaged a deficit of 1.1 per cent of GDP. This has been driven by a deterioration in the net rate of return the UK earns (i.e. the rate of return earned on its assets relative to the rate of return earned by overseas investors on their UK assets) as well as an increase in the stock of liabilities.²⁹

²⁹ See Hardie, Hamrroush and Hendry, *An analysis of Foreign Direct Investment, the main driver of the recent deterioration in the UK’s Current Account*, ONS article, 2016.

Chart 3.16: Historical estimates of the current account balance



Note: Shaded areas represent major wars.

Source: Bank of England, ONS

- 3.85** The gradual narrowing of the current account deficit in our central forecast relies on an improvement in the income balance. This in turn reflects a continued recovery in the rates of return on euro area and other assets, which are assumed to normalise by 2020, and the recent depreciation, which increases the sterling value of the income on overseas assets. The assumption that rates of return recover to more normal levels is particularly uncertain, not least because there is uncertainty around why they have fallen so far in the first place.
- 3.86** Our forecast for the current account is conditioned on an exchange rate forecast that is determined by the 'uncovered interest parity' condition. For our March 2017 forecast, this implied a relatively stable outlook for sterling. The large current account deficit means that overseas investors are acting as net lenders to the UK, which could pose a risk to the exchange rate if their confidence in the UK economy was to recede. This could lead to a sharper, demand-led narrowing of the current account deficit than we currently assume.
- 3.87** Sectoral net lending analysis is a useful diagnostic tool, but it is ultimately an arithmetic relationship and a shock to any one sector may feed through to the others in complicated ways. A stronger household balance (if consumers retrench) would have pretty clear fiscal consequences via lower expenditure tax receipts. But if a slower-than-expected current account improvement resulted from lower rates of return on overseas investments, that might be offset more in the corporate sector balance than in the government sector one.

Economic risks associated with Brexit

- 3.88 The vote to leave the EU has introduced a new set of uncertainties and risks regarding the economic and fiscal outlook that overlays those discussed in the rest of this chapter. These include uncertainty about the outcome of the Brexit negotiations and those with other trading partners, and about the economic implications of the eventual outcomes.
- 3.89 We have published two forecasts since the Brexit vote – in November 2016 and March 2017. In both cases we concluded that we had no meaningful basis on which to predict the precise outcome of our negotiations with the European Union and other trading partners, so we made a series of broad-brush adjustments to the pre-crisis forecast that would be consistent with a number of possible outcomes. But there have also been some concrete developments, notably the fall in the exchange rate (14 per cent by November compared with our pre-referendum forecast, which had eased back to 10 per cent by March) and evidence of weakening business investment both before and after the vote.
- 3.90 Potential Brexit effects on the economy – and thus on the fiscal position – are diverse:
- In our post-referendum forecasts, we assumed that the UK's exit from the EU would lead to a somewhat less open economy, with a broadly equal effect on **exports and imports**. Our assumption was based on an average of external estimates, but the effect will no doubt be different from what we have assumed. For example, a more restrictive trading regime with the EU could lead to both lower exports and lower imports, but a more open regime including free trade agreements with countries outside the EU could boost them. The net effect on trade flows in both directions could be more or less than currently assumed in our forecast. And the effect could be asymmetric across exports and imports, in which case it would affect GDP via the composition of expenditure.
 - Some external analyses published ahead of the referendum vote suggested that a more restrictive post-Brexit trading regime would lead to lower **productivity** than would otherwise have been the case, whereas others assumed that it would rise because of the resulting scope to deregulate in some areas.³⁰ As described in paragraph 3.18, the expected return of productivity growth toward historical norms is the most important uncertainty in our forecast, given its persistent weakness in recent years and its importance for wider GDP growth and the fiscal position. Brexit only adds to this uncertainty. Any factors that affect productivity growth over the medium or long term would have significant fiscal implications. Just 0.1 percentage points less productivity growth each year over a 50-year horizon would leave the economy 4.8 per cent smaller than would otherwise be the case, which is equivalent to £97 billion in today's terms. Given a tax-to-GDP ratio of 37 per cent, it would also imply tax receipts £36 billion lower in today's terms.

³⁰ The study by the London School of Economics' Centre for Economic Performance (Dhingra *et al*, *The impact of Brexit on foreign investment in the UK*, CEP Brexit Analysis No. 3, March 2016) was one of those that predicted a bigger hit to productivity from leaving the EU. At the opposite end of the spectrum the Economists for Brexit study (*The economy after Brexit*, April 2016) predicted that productivity and therefore GDP would be boosted by leaving the EU.

- **Business investment** fell by 1.5 per cent in 2016, probably related to heightened uncertainty before the referendum, as businesses delayed investment ahead of the vote, and after, as they digested its implications. In our post-referendum forecasts, we expected heightened uncertainty to continue to weigh on investment in the near term, but assumed that it would gradually dissipate as the Brexit negotiations move towards their conclusion and future policy settings become clearer. In any negotiation, however, there is the possibility of brinkmanship and conflicting signals. That could result in further uncertainty and investment volatility. Weaker business investment is favourable to the public finances in the near term, but negative in the longer term.
- Uncertainty remains over the post-Brexit rules governing **migration**, which will directly affect the size of the population and therefore the number of people paying taxes and benefiting from government spending. It will also affect the ease with which UK businesses are able to hire staff. For any given immigration regime, there are further risks around how firms and individuals respond to changing economic conditions.³¹ The composition of net migration by age or skills is also relevant in determining its fiscal impact. Similar to many examples in this section, the Brexit-related uncertainty around future migration flows only adds to existing uncertainty in this area.
- There are a number of sector-specific risks where Brexit is likely to be a factor. The UK's large **financial sector**, for example, could be affected if there are changes to the terms on which UK businesses can access EU markets. Over time, there is also a possibility that globally active firms move operations in or out of the UK. Firms review these decisions on an ongoing basis, so Brexit and the subsequent economic and regulatory environment further complicate those decisions. Possible changes to immigration rules may also have particular impacts on sectors that had previously employed a high proportion of migrant workers. We discuss possible implications for the health and social care sectors in Chapter 6.

Characteristics of economy-related fiscal risks

3.91 This section summarises the characteristics of the fiscal risks identified in this chapter, using the criteria set out in Chapter 1 (namely whether they are discrete or continuous, isolated or correlated, and exogenous or endogenous to government action) and our assessment of the probability that they will crystallise. We would expect whole economy shocks to be bigger fiscal risks than compositional shocks to GDP (by expenditure, income or output), and persistent/permanent effects to be bigger issues for fiscal sustainability than temporary shocks. But sudden effects may well be more difficult for policymakers to manage than bigger, slow-burn effects – they have to tolerate the immediate effects and deal with the consequences later, whereas longer-term effects can be treated as they build up.

³¹ Forte and Portes, *Macroeconomic Determinants of International Migration to the UK*, GLO Discussion Paper No. 69, 2017.

Potential output

- 3.92 Risks to potential output are generally continuous. Small changes in potential output growth can build up over time to deliver significant effects on the size of the economy and therefore the size of the tax base and the affordability of public spending plans. They are frequently correlated with other risks, as they often occur alongside a major cyclical downturn or financial crisis. And though they may be exogenous – for instance reflecting a decline in the rate of technological innovation – they may also be endogenous to government action as policy could affect the equilibrium unemployment rate, the capital stock or migration.
- 3.93 In our November 2016 *EFO* we presented a ‘weak productivity’ scenario in which potential productivity grew by 0.8 percentage points. In this scenario, public sector net debt (PSND) as a share of GDP was 8 per cent higher in 2021-22. Viewed in five-year averages, productivity growth has averaged 0.8 per cent a year around 20 per cent of the time since 1976, but nearly 80 per cent of the time since 2008. On this basis we judge the likelihood of this risk materialising as medium, although the latest data paint a gloomier picture.
- 3.94 Similarly, in our March 2016 *EFO* we presented a ‘low migration’ scenario, reducing population growth and therefore potential output growth. In this scenario, net migration fell to 105,000 per year by 2021 (compared to 185,000 in the central forecast). The impact is smaller than that of the ‘weak productivity’ scenario – with PSND up 1.4 per cent of GDP after five years. It is difficult to conclude from history the likelihood of this scenario occurring, as net migration has varied substantially from year to year as the policy setting and macroeconomic outlook has changed. But overall, we judge the likelihood as low.
- 3.95 The impact of these risks builds up over time. In our 2017 *FSR*, net debt was 31 per cent of GDP higher in the ‘low migration’ variant than in our central projection after 50 years. The long-term projections in our *FSRs* are relatively insensitive to different productivity growth assumptions – because we assume, broadly in line with historical experience, that most thresholds in the tax and benefit systems on average rise in line with living standards (earnings or real GDP). If instead we consider a scenario where spending is the same as the in the *FSR* but productivity growth is 0.1 percentage points lower every year, net debt would be 49 per cent of GDP higher after 50 years.

Cyclical shocks

- 3.96 Large cyclical shocks are discrete events, but the same factors that cause recessions can trigger many other risks. Such risks can be exogenous with respect to government action – with the mid-1970s recession predominantly due to higher global oil prices – or endogenous. As stated above, risks caused by cyclical shocks may well be correlated to others as they may occur alongside risks to potential output or the financial sector.
- 3.97 There have been seven recessions (i.e. two or more consecutive quarters of falling real GDP) in the last 61 years. This implies a probability of a recession in any given year of 11 per cent. We judge that there is a medium risk of at least one recession in the next five years.

- 3.98 The fiscal impact of a recession will vary according to its size and characteristics. One illustration of the potential cost is the ‘negative shock’ scenario in our November 2015 *EFO*. In this scenario, a cyclical shock to the economy opens up a negative output gap and a peak-to-trough fall in real GDP of around 2¾ per cent – similar to the average peak-to-trough fall in past UK recessions. By the final year of the forecast, the debt-to-GDP ratio was around 14 per cent of GDP higher. A more severe illustration is the fiscal stress test reported in Chapter 9, which increases net debt by 34 per cent of GDP after five years.
- 3.99 Our long-term projections do not incorporate an economic cycle, but if we were to assume that there will be an average-sized recession every 10 years – and that only half their effect were offset by booms – the cumulative addition to net debt would be 35 per cent of GDP.

Composition of GDP

- 3.100 Many of the risks associated with the composition of GDP differing from our forecast are continuous in that this is likely to be case most of the time. But there are also discrete risks with this effect that only crystallise occasionally, such as natural disasters. Global factors can be considered as beyond the control of the UK government and exogenous. This is less clear for domestic expenditure or the income composition of GDP, which can be influenced by policy. Some composition risks are correlated with other developments in the economy.
- 3.101 We can assess the implications for the public finances of different expenditure and income compositions of GDP by considering their different effective tax rates. A one percentage point fall in consumption over two years, offset by higher business investment, would raise PSND by 1 per cent of GDP in 2021-22 – a relatively small effect with perhaps medium probability. A one percentage point fall in compensation of employees alongside a one percentage point fall in consumption would raise PSND by 2½ per cent of GDP in 2021-22. Again, a relatively small effect with perhaps a medium probability.
- 3.102 We generally hold the composition of GDP broadly constant in our long-term projections, but over longer time horizons, there is clearly scope for larger changes in the composition of GDP than we would usually expect to see in the medium-term. During the 1960s, for example, both income and consumption fell as a share of GDP by around 5 percentage points. A similar fall today would raise net debt by 8 per cent of GDP.

Housing sector

- 3.103 The risks associated with the housing sector are discrete, as they are generally associated with unexpected cyclical shocks. They can be highly correlated with other economic risks, reflecting common drivers such as a fall in household incomes. They are endogenous to government policy, as the impact on the public finances will be amplified by government schemes. Macroprudential policies could reduce the likelihood and impact of shocks.

Flow of funds and sector net lending

- 3.104 As with many of the risks relating to expenditure or income, those associated with the flow of funds and sector net lending are continuous. Many factors that affect the current account

are global and therefore largely exogenous to government policy, but other risks could be considered partly endogenous: individual government policies can affect the income and expenditure of particular sectors, and the path of sector net lending will be influenced by the overall stance and trajectory of fiscal policy. Many of these risks are correlated in so far as shocks rarely affect one sector in isolation.

Conclusions

3.105 This chapter has considered the various ways in which macroeconomic risks can affect the public finances. History suggests that these are some of the high-impact fiscal risks most likely to crystallise over the medium term and, more particularly, over the long term:

- **Risks to potential output growth** are the most important long-term macroeconomic risks. They can stem from many underlying drivers, reflecting the different sources of potential growth: population growth (including net migration), the proportion of the population working (reflecting participation rates and the sustainable unemployment rate), the number of hours worked by those in employment and, most important of all, the amount produced per hour worked (i.e. potential productivity growth). Small changes in potential output growth can build up over time to deliver large effects on the size of the economy and therefore the size of the tax base and the affordability of public spending plans. In a world in which thresholds in the tax and benefit system are assumed to rise with living standards over the long term – and most public services spending is assumed broadly constant as a share of GDP – weaker potential output growth leaves everyone poorer (especially if driven by weaker productivity growth) but does not itself pose a threat to fiscal sustainability. It poses more of a fiscal risk over the medium term, when public services spending is planned in cash terms and when thresholds and benefit levels are more often linked to inflation than living standards.
- **The risk of a cyclical downturn** is reasonably high over any five-year horizon, but well-nigh inevitable over 50 years. Since 1970, no decade has passed without a recession. Each was different, but three pushed the budget deficit over 6 per cent of GDP (the exception being the early 1980s, when fiscal tightening was one factor contributing to the recession). The impact of recessions on net debt depends importantly on the pace of the recovery that follows them. Recessions with lasting negative economic effects – like the most recent one – are associated with the greatest fiscal costs. Recessions are rarely foreseen, and they tend to surprise forecasters more on the downside than booms surprise them on the upside. Recessions are discrete events, but many other risks can be triggered alongside them. Given their near inevitability, but unpredictable timing, there is little policymakers can do in advance beyond recognising that they are likely to have to tolerate their fiscal costs at some point in the future. This is one reason why academic research and IMF advice says that governments should aim to create fiscal space in normal times.
- **Risks associated with the sectoral composition of activity** can be important, but are generally much less significant than those affecting the whole economy. Two sectors have featured prominently as sources of fiscal risk in the UK's post-war history: the

financial sector (discussed in Chapter 4) and the housing market. Risks emanating from the housing market are often closely correlated with broader cyclical risks. All UK recessions have been associated with falling real house prices. This is more likely to reflect common underlying causes than the housing market being the source of wider economic downturns. The housing sector is relatively tax-rich, so fiscally important.

- **Risks associated with the expenditure or income composition of GDP** can similarly be important, but much less significant than whole economy risks. Different components of expenditure and income are taxed at different rates, so changes in composition affect the tax-to-GDP ratio. The labour share of income is the most important source of risk, given the relatively high tax rate on employment income and the relatively low rate on profits. On the expenditure side, consumer spending drives VAT receipts and excise duties, whereas business investment attracts capital allowances that reduce receipts in the short term but may boost them over the longer term.
- **Brexit-related uncertainties** overlay many of these risks. Will new trading arrangements affect potential productivity growth? Will new migration policies affect working-age population growth? Will there be a period of cyclical weakness around the exit date?

For the Government's response

3.106 In this chapter we have highlighted a number of issues that the Government is likely to wish to consider when managing its fiscal risks. Among them:

- The sources of weak post-crisis productivity growth and the risk of this continuing;
- The near-inevitability of future recessions – and the risk of persistent effects from them;
- The different effective tax rates imposed on different components of GDP;
- The Government's fiscal exposure to the housing sector;
- The persistent household financial deficit and current account deficit; and
- The economic risks associated with Brexit.

3.107 When assessing the macroeconomic outlook and its interaction with fiscal risk over the medium and long term, does the Government regard these or other issues as important for its risk management strategy and, if so, how does it intend to address them?

