Office for
Budget Responsibility

Fiscal sustainability report

July 2018

Office for Budget Responsibility
Fiscal sustainability report

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July 2018

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Foreword

The Office for Budget Responsibility (OBR) was created in 2010 to provide independent and authoritative analysis of the UK's public finances. As part of this role, legislation requires us to produce "*an analysis of the sustainability of the public finances*" once a year.

Our approach to analysing this issue is twofold:

- first, we look at the fiscal impact of ***past* public sector activity**, as reflected in the assets and liabilities that it has accumulated on its balance sheet; and

- second, we look at the potential impact of ***future* public sector activity**, by projecting how spending and revenues may evolve over the next 50 years – and the impact this would have on public sector net debt.

Broadly speaking, the fiscal position is unsustainable if the public sector is on course to absorb an ever-growing share of national income simply to pay the interest on its accumulated debt. This notion of sustainability can be quantified in several ways, which we discuss in the report. On these measures, the baseline projection in each of our reports – since the first was published in 2011 – has pointed to an unsustainable fiscal position over the long term.

It is important to emphasise that the long-term outlook for public spending and revenues is subject to huge uncertainties. Even backward-looking balance sheet measures are clouded by difficulties of definition and measurement. The long-term figures presented here should be seen as illustrative projections, not precise forecasts. Policymakers need to be aware of these uncertainties, but should not use them as an excuse for ignoring the challenges that lie ahead.

The analysis and projections in this report represent the collective view of the independent members of the OBR's Budget Responsibility Committee. We take full responsibility for the judgements that underpin the analysis and projections, and for the conclusions we have reached. We have been supported in this by the full-time staff of the OBR, to whom we are as usual enormously grateful.

We have also drawn on the help and expertise of officials across government, including the Department for Work and Pensions, HM Revenue and Customs, HM Treasury, the Department for Education, the Government Actuary's Department, the Department of Health and Social Care, and the Office for National Statistics. We are particularly grateful to the Personal Social Services Research Unit, whose latest projections of the demand for and cost of adult social care in England underpin our own projections and the discussion in Annex B of this report.[1]

[1] Wittenberg, Hu and Hancock, *Projections of demand and expenditure on adult social care, 2015 to 2040*, 2018.

We provided the Chancellor of the Exchequer with a draft set of our projections and conclusions on 29 June, to give him the opportunity to decide whether he wished to make policy decisions that we would be able to incorporate in the final version. The Government has not announced policy measures in response to these projections, but they do incorporate the Prime Minister's 18 June announcement of extra funding for the NHS. We asked the Treasury if it wished to provide any further detail about the spending announcement or how it will be financed for inclusion in our long-term projections. On the former, we were directed to publicly available information; on the latter, the Treasury told us that decisions would be announced at future fiscal events. We have therefore incorporated the higher health spending, but no offsetting tax or spending measures.

We provided a draft copy of the report on 11 July, in line with the exceptional pre-release access arrangements set out in the *Memorandum of Understanding between the Office for Budget Responsibility, HM Treasury, Department for Work and Pensions and HM Revenue & Customs*. We provided this early draft to a list of named officials, special advisers and Ministers, so that the Treasury could ensure that the relevant material could be incorporated into their response to our 2017 *Fiscal risks report*, which it has published at the same time as this report. We then provided a final copy of the report 24 hours prior to publication. At no point in the process did we come under any pressure from Ministers, special advisers or officials to alter any of our analysis or conclusions.

We hope that this report is of use and interest to readers. Feedback would be very welcome to OBRfeedback@obr.uk.

Robert Chote Graham Parker CBE Sir Charles Bean

The Budget Responsibility Committee

Executive summary

Overview

1 In our *Fiscal sustainability report* (*FSR*) we look beyond the medium-term forecast horizon of our twice-yearly *Economic and fiscal outlooks* (*EFOs*) and ask whether the UK's public finances are likely to be sustainable over the longer term.

2 In doing so our approach is twofold:

- first, we look at the fiscal impact of ***past* government activity**, as reflected in the assets and liabilities on the public sector's balance sheet; and
- second, we look at the potential fiscal impact of ***future* government activity**, by making 50-year projections of all public spending, revenues and significant financial transactions, such as government loans to students.

3 Our projections are based on current stated Government policy, but in three key instances policy formation is ongoing:

- Our projections include the impact of the Government's as-yet unfunded June 2018 announcement of increased **health spending** over the medium term. The Government has indicated that measures to finance at least part of the additional spending will be announced at some point, but has given no firm details of their size or composition.
- Following the Government's December 2017 decision not to implement the **Dilnot reforms to adult social care funding** it planned for 2020, we have removed them from our projections, reducing projected spending. The Government says it will announce new policy proposals in due course, which could push projected spending up again.
- The Government's July 2017 State Pension age (SPA) review gave greater clarity on the probable timing of future increases to the SPA and we have included the consequences of this. The Government has also said that it will review the continued operation of **triple-lock uprating of the state pension** beyond this Parliament, potentially reducing projected spending. But in the absence of a firm decision to replace the triple lock we assume that it remains in place.

4 With or without these policy changes, our projections suggest that the public finances are likely to come under significant pressure over the longer term, due to an ageing population and further upward pressure on health spending from factors such as technological advances and the rising prevalence of chronic health conditions. Under our definition of unchanged policy, the Government would end up having to spend more as a share of

national income on age-related items such as pensions and (in particular) health care, but the same demographic trends would leave government revenues roughly stable.

5 In the absence of offsetting tax rises or spending cuts, this would widen the government's budget deficit over time and put public sector net debt on an unsustainable upward trajectory. This fiscal challenge from an ageing population and from additional pressures on health spending is common to many developed nations.

6 The long-term outlook for the public finances is less favourable than at the time of our last *FSR* in January 2017. This is more than explained by the June health spending announcement, which – in the absence of accompanying offsetting tax or spending measures – increases spending by significantly more than the modest fiscal tightening implied by dropping the Dilnot reforms and accelerating rises in the State Pension age. If the higher health spending were to be fully financed by tax rises or cuts in other spending, the long-term outlook for the public finances would be little changed from our 2017 *FSR*. The latest population projections from the ONS weaken the long-term fiscal position, with prospective demographic trends slightly less favourable to the public finances.

7 Long-term projections such as these are highly uncertain and the results we present here should be seen as illustrative scenarios conditioned on particular 'what if' assumptions, not as precise forecasts. We quantify some of the uncertainties through sensitivity analyses, particularly relating to demography and health spending.

8 It is important to emphasise that we focus here on the additional fiscal tightening that might be necessary to achieve fiscal sustainability beyond our medium-term forecast horizon, which currently ends in 2022-23. Our March 2018 forecast incorporated the modest further fiscal tightening then planned by the Government over the medium term – primarily further cuts to departmental current spending as a share of GDP and cuts to working-age welfare spending. In the absence of offsetting tax or spending policies that have yet to be specified, the subsequent June health spending announcement leaves the deficit broadly flat over the medium term in the figures we use in this report, rather than narrowing.

9 While it is not for us to recommend the size or timing of any additional fiscal tightening measures, policymakers and would-be policymakers should certainly think carefully about the long-term consequences of any policies they introduce or propose in the short term, including at next year's Spending Review. And they should give thought too to the policy choices that will confront them once the current planned consolidation is complete.

Public sector balance sheets

10 We assess the fiscal impact of past government activity by looking at the assets and liabilities on the public sector's balance sheet. We look at two presentations of the balance sheet: the National Accounts and the 2016-17 Whole of Government Accounts (WGA).

11 The last three governments have set targets for the National Accounts measure of public sector net debt (PSND) – the difference between the public sector's debt liabilities and liquid

financial assets. At the end of 2017-18, PSND stood at £1,779 billion, equivalent to 85.4 per cent of GDP or £65,000 per household. Thanks in part to significant planned asset sales during 2018-19, our March forecast assumed that PSND would peak as a share of GDP in 2017-18. The medium-term debt profile in this report is little changed from that in our 2017 *FSR,* with the impact of the June health spending increase offset by the reclassification of English housing associations and their borrowing and debt to the private sector in November 2017. However, the latter does not fundamentally improve the health of the public finances.

12 National Accounts balance sheet measures do not include liabilities arising from the future consequences of past government activities, for example the pension rights that have been accrued by public sector workers. More information on liabilities of this sort is available in the WGA, which are produced using commercial accounting rules.

13 According to the 2016-17 WGA, as of the end of March 2017:

- The net present value of future **public service pension payments** arising from past employment was £1,835 billion or 92 per cent of GDP. This is £410 billion higher than a year earlier, with the rise more than explained by the use of a lower discount rate to convert the projected flow of future payments into a one-off net present value and by other changes to assumptions underpinning the value of the liabilities. (Unfortunately, the WGA do not split these out transparently.)

- The public sector's liabilities include £322 billion (16 per cent of GDP) in **provisions** for future costs that are expected (but not certain) to arise. They have increased by £17 billion since 2016-17. The three largest sources of provisions – for future nuclear decommissioning costs (particularly at Sellafield), for clinical negligence claims and for the Pension Protection Fund – all increased significantly, by £3.2 billion, £9.0 billion and £3.2 billion respectively. Repeated and often large increases in provisions suggest that these could become significant future pressures on public spending.

- £84 billion (4 per cent of GDP) of quantifiable **contingent liabilities** had been identified. These are costs that could arise in the future, but where the probability of each of them in isolation doing so is estimated at less than 50 per cent (so they are not included in the headline total of liabilities). The £20 billion reduction compared with last year was more than explained by a £30.4 billion fall in HMRC's contingent liability associated with tax litigation cases, reflecting the cessation of litigation in some cases and revised cost estimates for some ongoing cases. This reduction was partially offset by a £9.8 billion increase relating to clinical negligence (for which the WGA record both provisions and contingent liabilities), due to the use of a lower discount rate to calculate compensation claims.

14 Overall, gross liabilities in the WGA increased by £595 billion over the year to reach £4,324 billion at the end of March 2017. In part this was explained by the net deficit of £98 billion recorded during the year, as expenditure exceeded revenue, but the majority reflected the use of a lower discount rate to estimate public service pension liabilities.

15 Unlike PSND, the WGA balance sheet also includes the value of tangible and intangible fixed assets – for example the road network and the electromagnetic spectrum respectively. These are estimated at £1,181 billion or 59 per cent of GDP at the end of March 2017. They have increased by £51 billion since last year's WGA, thanks to revaluation effects and new assets under construction. Total gross assets reached £1,903 billion, up £161 billion on last year.

16 The overall net liability in the WGA was £2,421 billion or 122 per cent of GDP at the end of March 2017, up £435 billion on the previous year's restated results. This compares with a £124 billion rise in PSND to £1,727 billion. The sharper rise in the WGA liability largely reflects the discount rate effect on the public service pensions liability.

17 There are significant limits to what public sector balance sheets alone can tell us about fiscal sustainability. In particular, balance sheet measures look only at the impact of past government activity. They do not include the present value of future spending that we know future governments will wish to undertake, for example on health, education and state pensions. Just as importantly, they exclude the public sector's most valuable financial asset – its ability to levy future taxes. So we should not overstate the significance of the fact that PSND and the WGA balance sheet both show the public sector's liabilities outstripping its assets. Across countries and time, this has usually been the case.

Long-term fiscal projections

18 We assess the potential fiscal impact of future government activity by making long-term projections of revenue, spending and financial transactions on an assumption of 'unchanged policy', as best we can define it. In doing so, we usually assume that spending and revenues initially evolve over the next five years as we forecast in our most recent *EFO*. We have departed from this approach in this *FSR* by incorporating the significant increase in NHS spending through to 2023-24 announced by the Prime Minister in June (and including an assumption about its 'Barnett consequentials' for health spending outside England).

19 We incorporate this announcement both because it is very large compared to most policy announcements outside scheduled fiscal events and because health is the most important component in our long-term analysis. The Government has indicated that it will fund at least some of the health package by increasing taxes and/or reducing other spending, but in the absence of firm detail we cannot include this in our projections. It has also said that the announcement will be funded in part by a 'Brexit dividend', although our provisional analysis suggests Brexit is more likely to weaken than strengthen the public finances overall. There will be direct savings from the net contributions to the EU budget that the UK will no longer have to make, but it is unclear how much will be available after payments towards the agreed withdrawal settlement and other Brexit-related spending commitments.

20 We have not made any further judgements or assumptions about the nature of the UK's departure from the European Union beyond those that underpinned our March *EFO*.

Demographic, economic and health-specific assumptions

21 Demographic change is a key long-term pressure on the public finances. Like many developed nations, the UK is projected to have an ageing population over the next few decades, with the old-age dependency ratio – the ratio of the elderly to those of working age – rising. This reflects increasing life expectancy (particularly among older people), relatively low fertility rates, and the retirement of the post-war 'baby boom' cohorts.

22 We base our analysis on detailed population projections produced by the Office for National Statistics (ONS). In this *FSR*, we use its 2016-based population projections, which were released in October 2017. As in our 2017 *FSR*, our baseline fiscal projections use the 'principal' ONS population projection. This assumes that net inward migration falls to 165,000 a year by 2022-23 and remains at that level thereafter. We test the sensitivity of our conclusions to using different ONS variants. Relative to the 2014-based projections that underpinned our 2017 *FSR*, lower net inward migration and fewer births reduce the working age population. As a result, the old-age dependency ratio now rises more rapidly than in our previous report, despite slower improvements in future life expectancy leading the ONS to revise down the projected number of elderly people by increasing amounts.

23 As regards the economy, we continue to assume in our baseline projection that whole economy productivity growth will average 2.0 per cent a year in steady state. We have made several small changes to the long-term economic determinants we use, including revising down GDP deflator inflation by 0.1 percentage points to 2.2 per cent a year and revising down employment growth due to slower growth in the adult population. Having revised down our medium-term productivity growth forecast significantly since our previous *FSR*, we now assume it takes longer for productivity growth to return to its steady state rate.

24 In this year's report, we continue to assume that health spending rises to accommodate non-demographic cost pressures beyond the medium term and that this adds 1 percentage point a year to health spending growth in the long term. We assume that excess cost growth falls from the latest available estimates for primary and secondary care (which are higher than 1 percentage point) back to this long-term assumption steadily over the period to 2038-39. This approach and the values that we have chosen are similar to those used by the US Congressional Budget Office. It is important to emphasise that our health spending projections are not based on any bottom-up assessment of 'need', but rather embody a judgement that 'unchanged policy' is best interpreted as assuming that spending rises to accommodate demographic and non-demographic cost pressures over time.

Defining 'unchanged' policy

25 Fiscal sustainability analysis is designed to identify whether and when changes in government policy may be necessary to move the public finances from an unsustainable to a sustainable path. To make this judgement, we must first define what we mean by 'unchanged' policy over the long term for all tax and spending streams, not just health.

26 Government policy is rarely clearly defined over the long term. In many cases, simply assuming that a stated medium-term policy continues for 50 years would be unrealistic. Where policy is not clearly defined over the long term, the *Charter for Budget Responsibility* allows us to make appropriate assumptions. These are set out clearly in the report. Consistent with the *Charter*, we only include the impact of policy announcements in our baseline projections when they can be quantified with "*reasonable accuracy*".

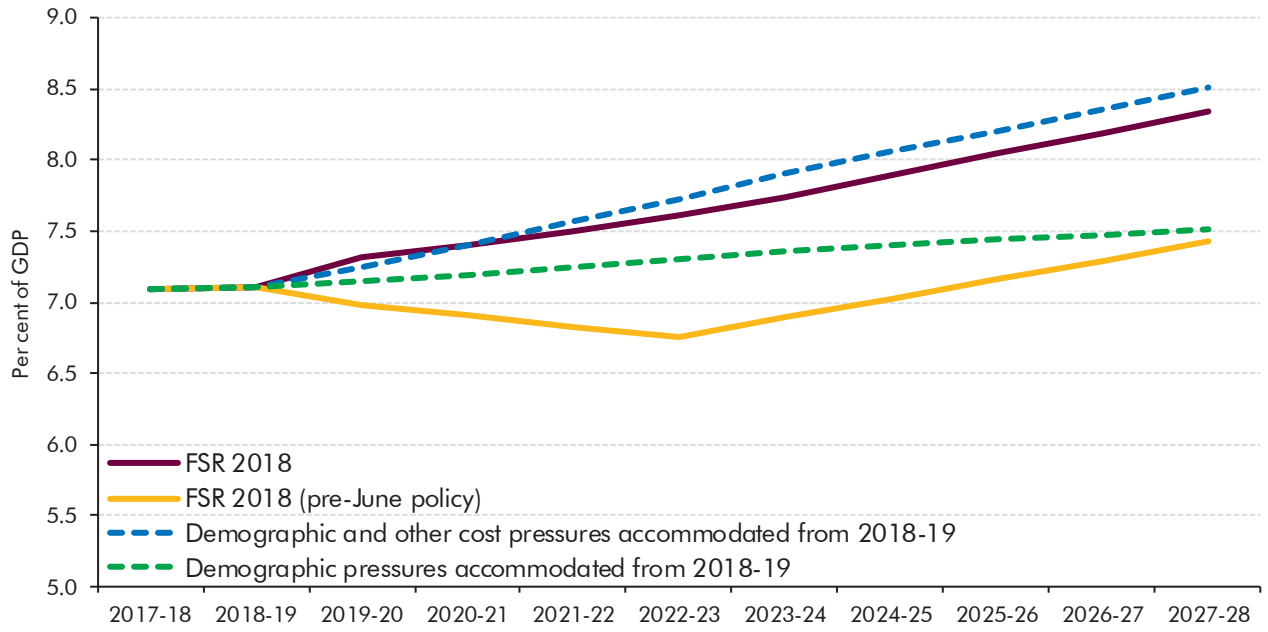
Medium-term policy changes

27 Changes in the starting point for our projections are often an important driver of changes in the long-term projections from one *FSR* to the next. The net effect of the three *EFO* forecasts since our 2017 *FSR* has been relatively minor, but the June announcement of significantly higher health spending over the medium term has had a significant effect on our projections.

28 For the largest component of UK-wide health spending – the budget of NHS England – the Government has now set out current spending plans up to 2023-24, so our long-term assumptions start from 2024-25. The June announcement implies a real terms increase in spending of £20.5 billion by 2023-24, relative to an adjusted 2018-19 baseline. In 2022-23, the resulting increase in UK-wide health spending is 0.9 per cent of GDP (£20.5 billion in *cash* terms), relative to what we assume it would have been absent the announcement. (This includes an additional £1.25 billion to cover a "*specific pensions pressure*").

29 Chart 1 shows our baseline projection for UK-wide health spending over the next 10 years with and without the June announcement. The pre-announcement path declines steadily as a share of GDP to 2022-23, based on Government plans as they stood at the March 2018 Spring Statement, at which point our long-term assumptions would have put it back on an upward trend as a share of GDP. With the June announcement, health spending is on a rising path up to 2022-23 too, reaching 7.6 per cent of GDP (£181.8 billion).

Chart 1: Impact of June 2018 NHS spending announcement



Source: HMT, OBR

30 Health spending is currently estimated at 7.1 per cent of GDP (£150.2 billion) in 2018-19, on the functional definition we use. If spending were to rise from that level to accommodate only demographic pressures, we estimate that it would reach 7.3 per cent of GDP (£174.4 billion) in 2022-23. If it rose sufficiently to accommodate other cost pressures as well, it would reach 7.7 per cent of GDP (£184.7 billion).

31 Absent the June 2018 announcement, we would have projected health spending at 6.8 per cent of GDP (£161.3 billion) in 2022-23, implying shortfalls against those two hypothetical paths of 0.5 per cent of GDP (£13.0 billion) and 1.0 per cent of GDP (£23.3 billion) respectively. The June 2018 announcement means that health spending is now projected to rise more than enough to meet the demographic cost pressures over those four years and sufficiently to meet around four fifths of the demographic and non-demographic pressures combined, leaving a shortfall of 0.1 per cent of GDP (£2.8 billion) against that counterfactual in 2022-23.

32 Given the significant uncertainty around estimates of these pressures, particularly the non-demographic ones, these paths and the gaps relative to them should be treated as illustrative. They do not represent a bottom-up assessment of the necessary level of health spending as a share of GDP, which would anyway lie beyond our remit.

33 Announcing the additional health spending, the Prime Minister said that it would be funded by a "*Brexit dividend, with us as a country contributing a little more*". As already noted, the Government has not set out the size or composition of any additional taxpayer contribution, either through higher taxes or cuts in other spending, so we have not been able to include it in our projections. As regards the 'Brexit dividend', our provisional analysis suggests that Brexit is more likely to weaken the public finances than strengthen them over the medium term, thanks to its likely effect on the economy and tax revenues. Looking more narrowly at direct financial flows with the EU, we estimated in our March 2018 *EFO* that the UK would have had to make a contribution of £13.3 billion to the EU budget in 2022-23 if we remained a member. Of that potential saving, £7.5 billion will be absorbed by the withdrawal settlement payment expected for that year, leaving £5.8 billion to be spent on other things. In principle this could cover slightly less than 30 per cent of the cost of health package in that year, but this does not take into account other calls on these potential savings, including commitments the Government has already made on farm support, structural funds, science and access to regulatory bodies. Pending a detailed withdrawal agreement and associated spending decisions, we assume in this report that the extra health spending adds to total spending and borrowing rather than being absorbed in whole or part elsewhere.

Long-term policy assumptions

34 With the notable exception of non-demographic cost pressures in health, our baseline projection assumes that underlying age-specific spending on public services rises with per capita GDP beyond 2022-23.

35 We assume that most tax thresholds and benefits are uprated in line with earnings growth rather than inflation beyond the medium term, which provides a more plausible and fiscally neutral baseline for long-term projections. An inflation-based assumption would, other things equal, imply an ever-rising ratio of tax to national income and an ever-falling ratio of benefit payments to average earnings in the rest of the economy. In the past, policy has indeed tended to evolve to offset fiscal drag in the tax system.

36 We have assumed in our baseline projection that the 'triple lock' on state pensions uprating continues to apply – and that on average it leads to the state pension being uprated by 0.36 percentage points on top of earnings growth. The Chancellor has said that the Government will review whether this commitment will continue into the next Parliament "*in light of the evolving fiscal position at the next Spending Review*" – this is expected to be in 2019. We test the sensitivity of our projections to assuming earnings uprating instead of the triple lock, as this would be a plausible alternative interpretation of unchanged policy.

Results of our projections

37 Having defined unchanged policy, we apply our demographic and economic assumptions to produce projections of the public finances over the next 50 years.

Expenditure

38 An ageing population and health-specific cost pressures put upward pressure on public spending in our baseline projection. Total non-interest spending rises from 36.4 per cent of GDP at the end of our medium-term forecast in 2022-23 to 44.6 per cent by 2067-68. This increase of 8.2 per cent of GDP is equivalent to £172.8 billion a year in today's terms.

39 The main drivers are upward pressures on age-related spending:

- **Health spending** rises from 7.6 per cent of GDP in 2022-23 to 13.8 per cent in 2067-68 as the population ages and non-demographic cost pressures mount. The starting point for UK-wide health spending in 2022-23 is 0.6 per cent of GDP higher than it was in *FSR* 2017, more than explained by the 0.9 per cent of GDP effect of the NHS announcement in that year and its knock-on effects outside England, which is partly offset by our attributing more of the Better Care Fund to social care. Applying our long-term assumptions about demographic and other cost pressures, the first of which are a little more unfavourable than in our previous report, by 2067-68 the upward revision relative to *FSR* 2017 rises to 1.0 per cent of GDP.

- **State pension costs** increase from 5.0 per cent of GDP in 2022-23 to 6.9 per cent in 2067-68 as the population ages and the triple lock raises average awards relative to whole economy earnings. This profile is a little lower than in *FSR* 2017, mostly reflecting Government decisions that accelerate the pace of SPA increases.

- **Adult social care costs** rise from 1.3 per cent of GDP in 2022-23 to 1.9 per cent in 2067-68, reflecting the ageing of the population. The projections are slightly lower

than in our previous report as we have removed the effect of the Dilnot reforms that were included in our previous report. This is only partly offset by increasing the proportion of the Better Care Fund that we attribute to adult social care.

Revenue

40 Demographic factors are expected to have much less impact on revenues than on spending. Non-interest revenues are projected to be all but flat as a share of GDP across the projection period. In our baseline projection, those revenue streams that are not affected by demographics are explicitly held constant as a share of GDP. As we have explored in previous reports, there are various non-demographic factors that may affect different revenue streams in the future, but these are not incorporated into our baseline projections.

Financial transactions

41 To move from spending and revenue projections to an assessment of the outlook for public sector net debt, we also need to take public sector financial transactions into account. These affect net debt directly, without affecting accrued spending or borrowing.

42 For the majority of financial transactions, we assume that their net effect over the long term is zero. Student loans are an important exception. Lending to students adds to net debt immediately through financing the outlays. Repayments then reduce that addition, but not completely because some of the lending is expected to be written-off rather than repaid.

43 We have revised up our projection for the effect of student loans on net debt relative to our previous report. This largely reflects policy changes announced since then. In particular, the Government has raised the threshold at which students start repaying their loans from £21,000 in 2017-18 to £25,000 in 2018-19 and it plans to uprate this with average earnings over time. This significantly reduces the repayments made by students over the lifetime of their loans and consequently increases the write-offs at the end of the 30-year loan period. At the peak, student loans are now projected to increase net debt by 12.4 per cent of GDP in the late-2030s, before falling back slightly to 11.2 per cent of GDP in 2067-68. This latter figure is 1.9 per cent of GDP higher than our previous projection last year.

44 Alongside this *FSR* we publish a working paper on the accounting treatment of student loans and the fiscal illusions that this produces.[1] This is particularly true in respect of public sector net borrowing, which is flattered in the near term by interest receipts that are accrued in full but only expected to be paid in part, and which only recognises the cost of subsidising the loans far in the future when outstanding balances are written off after 30 years.

45 The Government continues to reduce the assets held by UK Asset Resolution (UKAR) through active sales and the natural rundown of mortgages and plans to sell much of its stake in RBS. The sale of financial assets is classified as a financial transaction in the public finances statistics. Sales reduce public sector net debt directly and indirectly (via net borrowing, because interest is paid on a smaller stock of debt), but typically (and in the case of these

[1] Ebdon and Waite, *Working Paper No. 12: Student loans and fiscal illusions*, OBR, July 2017.

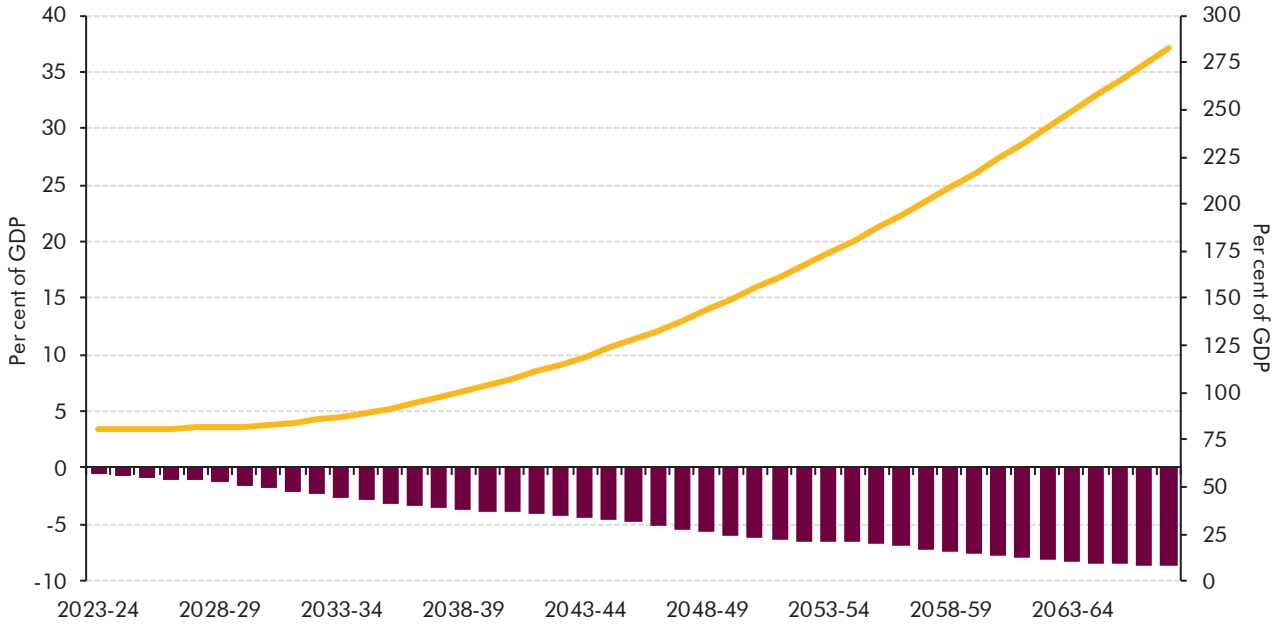
sales) the government also loses a related income stream. Over the long term, therefore, the net impact of asset sales on net debt is significantly less than the sale price. The effect on broader balance sheet measures is typically close to zero because the sales involve converting one asset (mortgages or shares) into another (cash).

Projections of the primary balance and public sector net debt

46 Our baseline projections show public spending increasing as a share of national income beyond the medium-term forecast horizon, exceeding receipts by increasing amounts over the projection period. As a result, the primary budget deficit (the difference between non-interest revenues and spending) is projected to move from 0.3 per cent of GDP in 2022-23 to 8.6 per cent of GDP in 2067-68 – an eventual overall deterioration of 8.3 per cent of GDP, equivalent to £176.5 billion a year in that year in today's terms.

47 Taking this and our projection of financial transactions into account, PSND is projected to fall from its medium-term peak of 85.6 per cent of GDP in 2017-18 to 80.0 per cent of GDP in 2022-23, before rising thereafter and reaching 282.8 per cent of GDP in 2067-68. Beyond this point, debt would remain on a rising path. Needless to say, in practice policy would need to change long before this date to prevent this outcome.

Chart 2: Baseline projections of the primary balance and PSND



Source: OBR

48 The primary deficit and PSND at the end of the projection period are considerably higher than in our 2017 *FSR* projections. As Table 1 shows, this reflects:

- **Methodology changes** to the calculation of debt interest. These do not affect the primary balance, but increase debt.

- **Classification changes**. English housing associations have been reclassified to the private sector, which has a small effect on the primary balance but a larger effect on net debt in the short term that increases over the projection period.

- More unfavourable **demographics** put upward pressure on age-related spending.

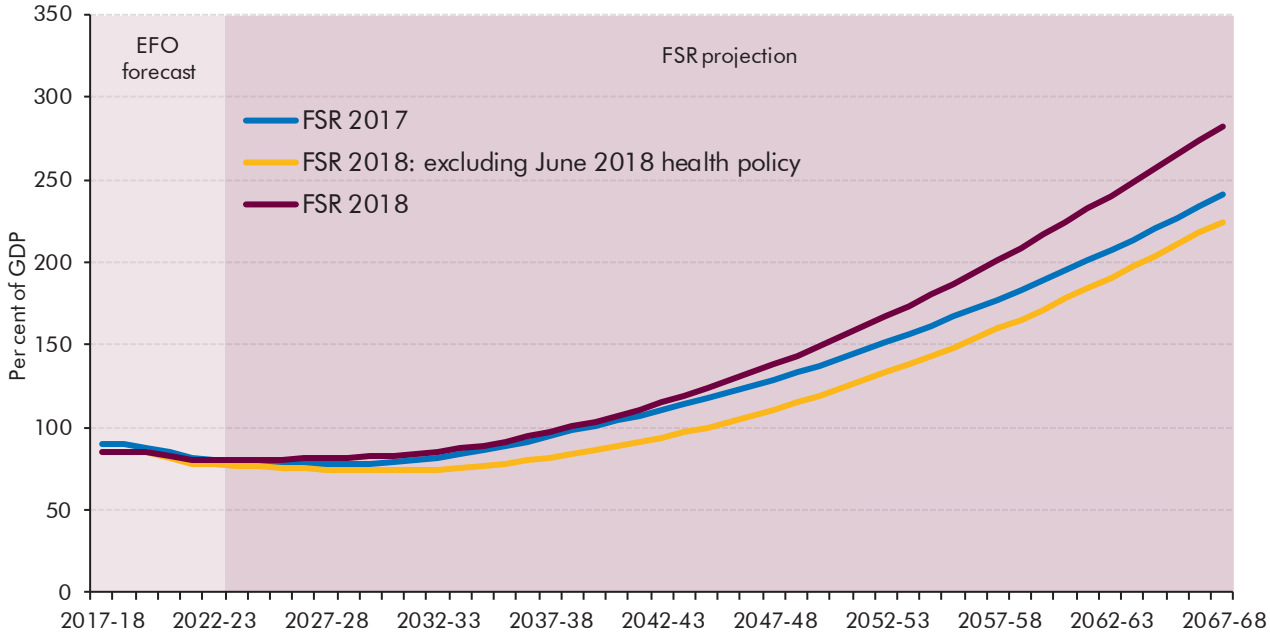
- Changes to **long-term policy** (including dropping the Dilnot reforms to adult social care and accelerating increases in the SPA) amount to a significant fiscal tightening over the long run, reducing the primary deficit by 0.4 per cent of GDP and net debt by 31.0 per cent of GDP in 2067-68. But we do not yet know what will replace the Dilnot reforms, so future policy changes could see spending and debt revised up again.

- The **June 2018 health spending announcement** increases the primary deficit and net debt at the start of our baseline projection and by increasing amounts thereafter. The effect in 2022-23 reflects the fact that the Government has specified the spending announcement in sufficient detail for us to include it in these projections, but has not provided any detail on how it will be financed (although it has indicated that tax rises are expected to finance at least some of it). The longer-term effect also includes the result of assuming that spending will continue to rise from that base to accommodate continuing demographic and other cost pressures. Overall it increases the primary deficit by 1.5 per cent of GDP and net debt by 57.9 per cent of GDP in 2067-68.

49 It may seem counterintuitive that increasing health spending in the medium term, to address some of the immediate apparent pressures on the NHS, leads to greater long-term fiscal pressures. But the June announcement can be interpreted as a crystallisation of medium- and long-term risks that we highlighted in our 2017 *Fiscal risks report*, namely that the medium-term path set out before the announcement would turn out to be politically unsustainable. In effect, the Government has now chosen to accommodate most of the demographic and other cost pressures we assume over the next five years, having not previously planned to do so. That will presumably help maintain the quality and quantity of services, but at the cost of greater long-term fiscal pressure if future governments choose to maintain the resulting higher service levels further into the future.

50 Taking all these factors into account, if left unaddressed our latest projections suggest that the primary deficit would rise to 8.6 per cent of GDP and PSND to 282.8 per cent of GDP in 2067-68 and continue rising thereafter. The big picture of upward pressure from health costs and ageing is common to many advanced economies and would still be seen in the UK even if the Government fully finances the June health announcement.

Chart 3: Decomposition of changes in the net debt projection since FSR 2017



Source: OBR

Table 1: Changes in the primary balance and net debt since *FSR* 2017

	Per cent of GDP			
	Primary deficit		Debt	
	2022-23	2067-68	2022-23	2067-68
FSR 2017	**-0.6**	**7.4**	**80.3**	**241.2**
Modelling	0.0	0.0	0.0	8.2
Classification	0.0	0.0	-3.4	-3.7
Demographics	0.0	0.2	0.0	8.9
Forecast changes up to March 2018 EFO	0.0	0.0	1.0	1.3
FSR 2018 pre-policy changes	**-0.6**	**7.5**	**77.9**	**255.9**
Long-term policy	0.0	-0.4	0.0	-31.0
June health spending	0.9	1.5	2.3	57.9
FSR 2018	**0.3**	**8.6**	**80.2**	**282.8**

51 Needless to say, there are huge uncertainties around any projections that extend this far into the future. Small changes to underlying assumptions can have large effects on the projections once they have been cumulated across many decades. We therefore test the sensitivity of the baseline projection using several different scenarios.

52 The eventual increase in PSND would be greater than in our baseline projection if long-term interest rates turned out to be higher relative to economic growth, if the age structure of the population was older, or if net inward migration (which is concentrated among people of working age) was lower than in our baseline projection.

53 Given the importance of health spending in the long-term challenge to fiscal sustainability, the pace at which non-demographic pressures push spending up is an important assumption. Faster or slower excess cost growth would see health spending rise by more or

less than in our baseline projection – by +2.5/-2.1 per cent of GDP in the ±0.5 percentage point sensitivity analyses we present.

54 Over a shorter time horizon, the Government has set itself an objective of balancing the budget by the middle of the next decade. Our projections suggest that this will be challenging in the face of ageing pressures on health, social care and state pensions spending, and if non-demographic pressures on health spending continue at close to their recent pace. That would be true even if tax and benefit thresholds were uprated in line with inflation rather than earnings beyond our medium-term forecast horizon, boosting tax receipts through fiscal drag and reducing welfare spending through the erosion of the average awards relative to average earnings.

Summary indicators of fiscal sustainability

55 In our baseline projections, and under the variants we construct, on current policy we would expect the budget deficit to widen significantly over the long term, putting public sector net debt on a rising trajectory as a share of national income. This would not be sustainable.

56 Summary indicators of sustainability can be used to illustrate the scale of the challenge more rigorously and to quantify the tax increases and/or spending cuts necessary to return the public finances to different definitions of sustainability. We focus on a measure of sustainability that asks how large a permanent spending cut or tax increase would be necessary to move public sector net debt to a particular desired level at a particular chosen date. This is referred to as the 'fiscal gap'.

57 There is no consensus on what an optimal level for the public debt to GDP ratio would be. So, for illustration, we calculate the additional fiscal tightening necessary from 2022-23 to return PSND to 20, 40 or 60 per cent of GDP at the end of our projections in 2067-68. In practice, given that expenditure pressures in our projections build up gradually over time, a phased fiscal adjustment might be considered a more realistic illustration.

58 Under our baseline projection, a once and for all policy tightening of 5.2 per cent of GDP in 2023-24 (£111 billion in today's terms) would see the debt ratio come in at 40 per cent of GDP in 2067-68. But this is less than the 8.6 per cent of GDP required to stabilise debt over the longer term, so the debt ratio would continue rising beyond the target date. Tightening policy by 1.9 per cent of GDP a decade would see the debt ratio fall more slowly to begin with, but the overall tightening would be large enough to stabilise the debt ratio at around the target level and prevent it from taking off again.

59 These estimates are slightly larger than in our previous report, as the effect of higher medium-term health spending more than offsets the long-term policy tightening due to faster SPA rises and dropping the Dilnot reforms to adult social care. Targeting debt ratios of 20 and 60 per cent of GDP would require larger and smaller adjustments respectively.

1 Introduction

A framework for analysing fiscal sustainability

1.1 This chapter sets out the framework we use in this report to analyse fiscal sustainability. We examine the fiscal consequences of:

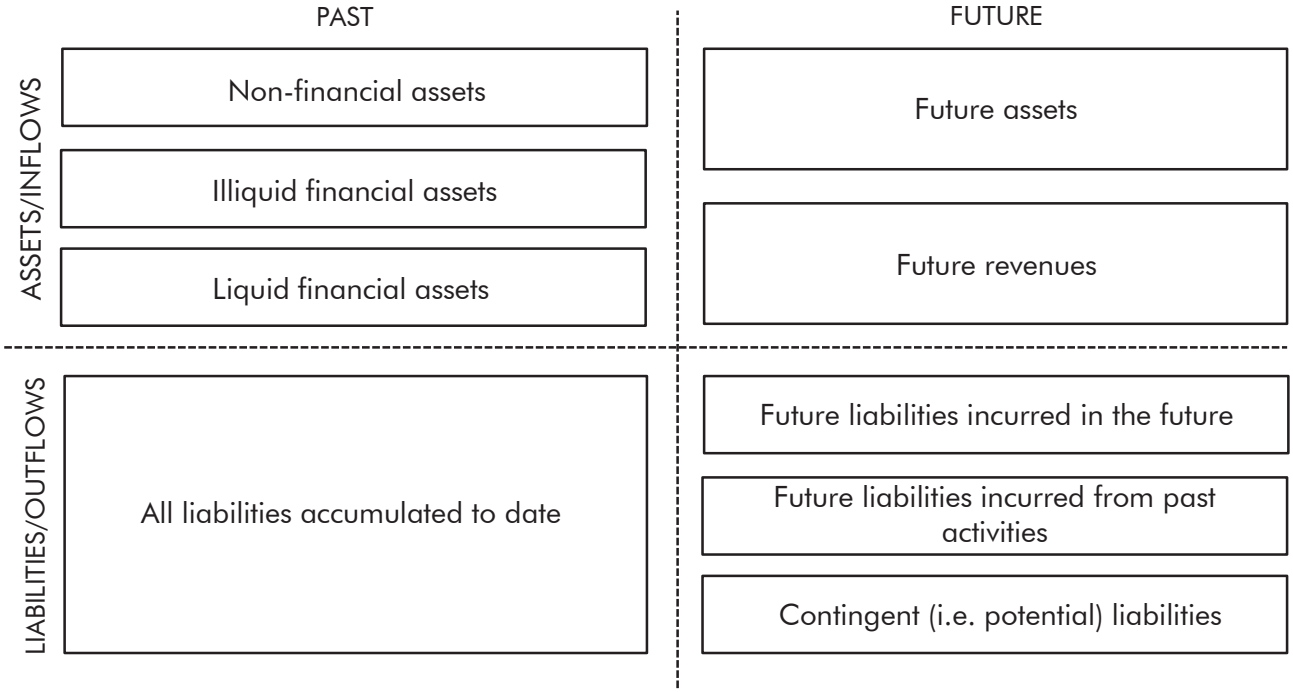
- **Past government activity**, which has led to the public sector accumulating assets (financial and non-financial) and liabilities. Past activity also creates some reasonably certain future financial flows, for example contractually agreed public service pension payments. The government's past activity also creates 'contingent liabilities', where there is a non-zero but less than 50 per cent probability that it will face some cost in the future, such as making good a loan guarantee.

- **Future government activity**, which will involve future expenditures, some for investment in assets, but mostly to pay for public services and transfer payments. It will also involve receipt of future revenues, mostly from taxation. Governments may also sell, or rent, assets. This may include assets it has not had to pay to accumulate, for example access to the electromagnetic spectrum that it can auction.

1.2 Assessing the long-term sustainability of the public finances in our *Fiscal sustainability reports (FSR)* involves summarising the fiscal consequences of some or all of this past and future activity. Figure 1.1 illustrates the potential elements.[1]

[1] Adapted from HM Treasury (2003) and International Federation of Accountants (2009).

Figure 1.1: Government activity: past and future, stocks and flows



1.3 In summarising the fiscal consequences of government activity, we can focus on flows (future revenues and spending, including those generated by existing assets and liabilities) or stocks (existing assets and liabilities, plus the present value of expected future revenues and spending). In principle, these approaches should tell the same story. In practice, they frequently do not because of the widely varying coverage of the different summary stock and flow measures used in policy presentation and discussion. In this report, we aim to use both approaches to tell a coherent story and to warn against drawing inappropriate conclusions from an unrepresentative subset of government activity.

1.4 Our analysis of stocks focuses on measures of the public sector balance sheet. These balance sheet measures provide a snapshot of the fiscal consequences of the government's past activity at any point in time, by providing information on its stock of assets and liabilities. Balance sheets provide interesting information, but their usefulness as an indicator of long-term fiscal sustainability is limited by their backward-looking nature. They exclude the future cost of known expenditure commitments and, crucially, the present value of future revenues. The greatest financial asset of any government is, of course, its ability to levy future taxes.

1.5 Transparency regarding the public sector balance sheet is very important. But in assessing fiscal sustainability, we place more emphasis on our analysis of future flows. We make projections of future government expenditure, revenues and financial transactions, and we assess their implications for fiscal sustainability, taking into account the initial balance sheet position. We then consider indicators that can be used to summarise fiscal sustainability on the basis of such projections.

1.6 Flow analysis is generally more informative as it provides a more intuitive guide to the nature of the potential policy response: the bulk of any adjustment to move the public finances from an unsustainable path to a sustainable one is likely to take the form of increasing revenues and/or reducing spending rather than selling assets or directly reducing the value of liabilities, although this can be important in crisis situations. Flow analysis also avoids sensitivity to the discount rates chosen to convert flows into one-off upfront sums. This often complicates comparison of balance sheet measures over time.

1.7 In analysing these stocks and flows, there is a trade-off between completeness and certainty. Balance sheets provide reasonably reliable estimates of assets and liabilities related to past activity (though even here there are a number of difficulties with estimation and data availability). But they are incomplete, as they do not account for many elements of future activity. Long-term projections paint a fuller picture, but are by their nature extremely uncertain and sensitive to the assumptions that underpin them.

1.8 The remainder of this Introduction explains in more detail the analytical framework around which the material in subsequent chapters of the report is structured.

Past activity: the public sector balance sheet

1.9 Chapter 2 considers four alternative presentations of the public sector balance sheet – three from the National Accounts framework and one from the private-sector-style Whole of Government Accounts (WGA).

1.10 National Accounts measures are produced by the Office for National Statistics (ONS) and have been used by the current and previous governments to assess the fiscal position. Public sector net debt (PSND) in particular has been used as a key target indicator. This is defined as the public sector's consolidated gross debt less its *liquid* financial assets – that is, those assets that could be readily sold. Public sector net worth (PSNW) is a broader balance sheet measure that compares the public sector's liabilities with *all* its assets, including the non-financial and illiquid financial assets excluded from PSND. Public sector net financial liabilities (PSNFL) sits between these, including all *financial* assets and liabilities recognised in the National Accounts but excluding *non-financial* assets.

1.11 The importance of a more comprehensive measure can be seen when considering the effect of the government selling what the statisticians regard (sometimes counter-intuitively) as an illiquid asset for what it is worth: PSND would fall, because the sale converts an illiquid asset (which is excluded) into a liquid asset (which is included); PSNW or PSNFL would be largely unchanged, giving a better picture of the genuine fiscal impact.

1.12 As shown in Figures 1.2, 1.3 and 1.4 – and explained in Chapter 2 – these three measures capture, to varying degrees, an entirely backward-looking subset of the government's activities. In particular, PSND has been criticised as a measure of the public sector's financial health (and a similar criticism would apply to PSNW and PSNFL) because it excludes future liabilities and contingent liabilities arising out of past activity. These include:

- **future public service pension payments**, where the liability to pay the pension was incurred as a result of past employment;
- **capital payments to PFI providers and other payments from previous long-term contracts**, where the National Accounts classify most PFI deals as 'off balance sheet';
- **the future costs of student loans**, to the extent that previous loans or the costs of servicing those loans are not fully recovered; and
- **provisions, contingencies, guarantees and other risks of future costs** that might materialise as a result of past activities.

Figure 1.2: Coverage of public sector net debt

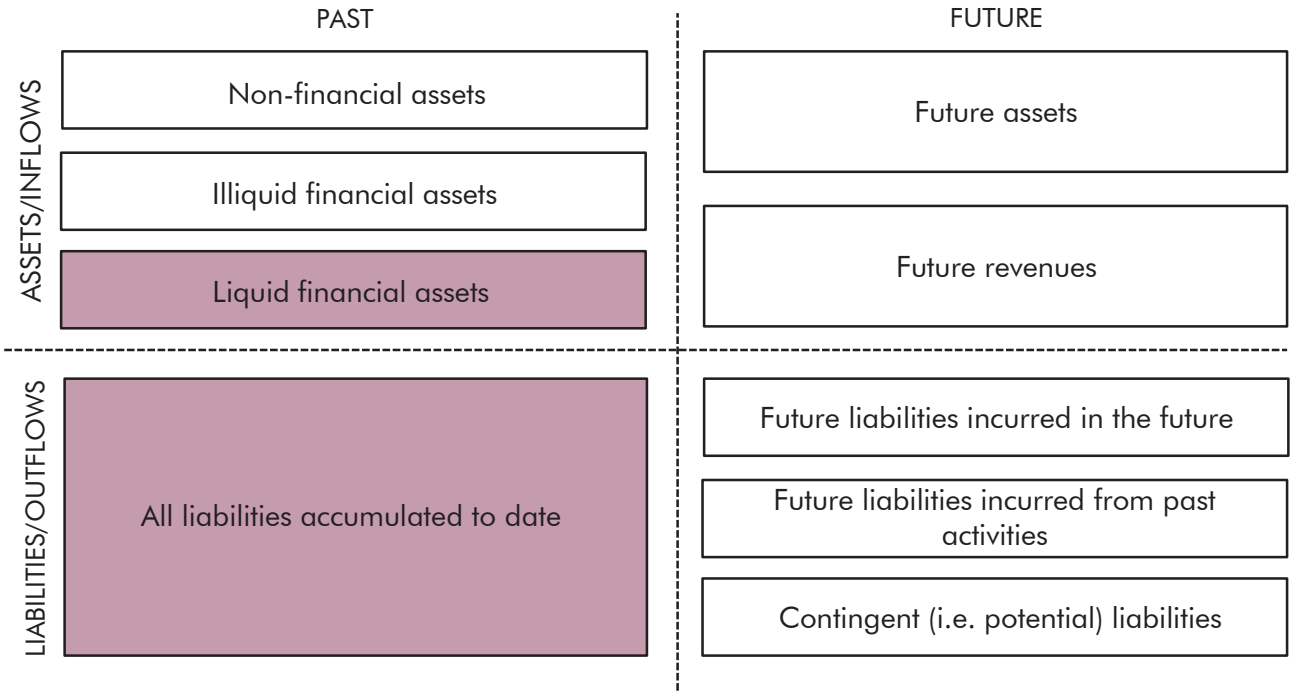


Figure 1.3: Coverage of public sector net financial liabilities

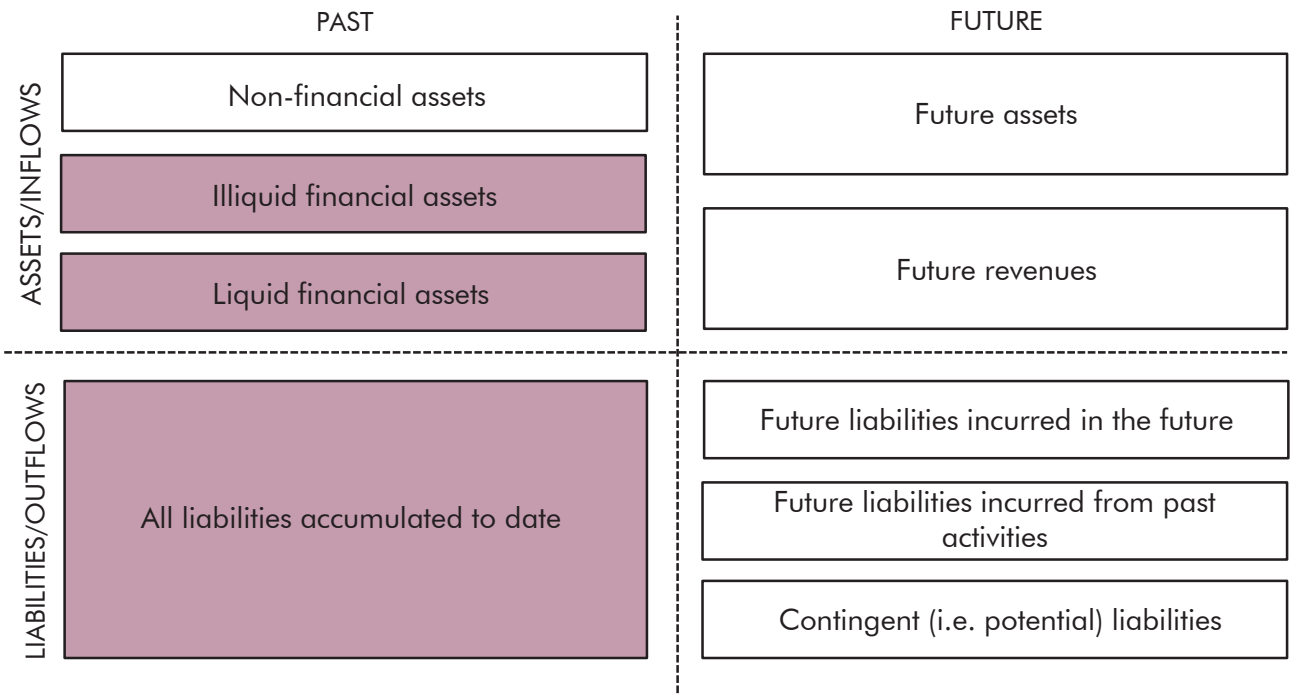
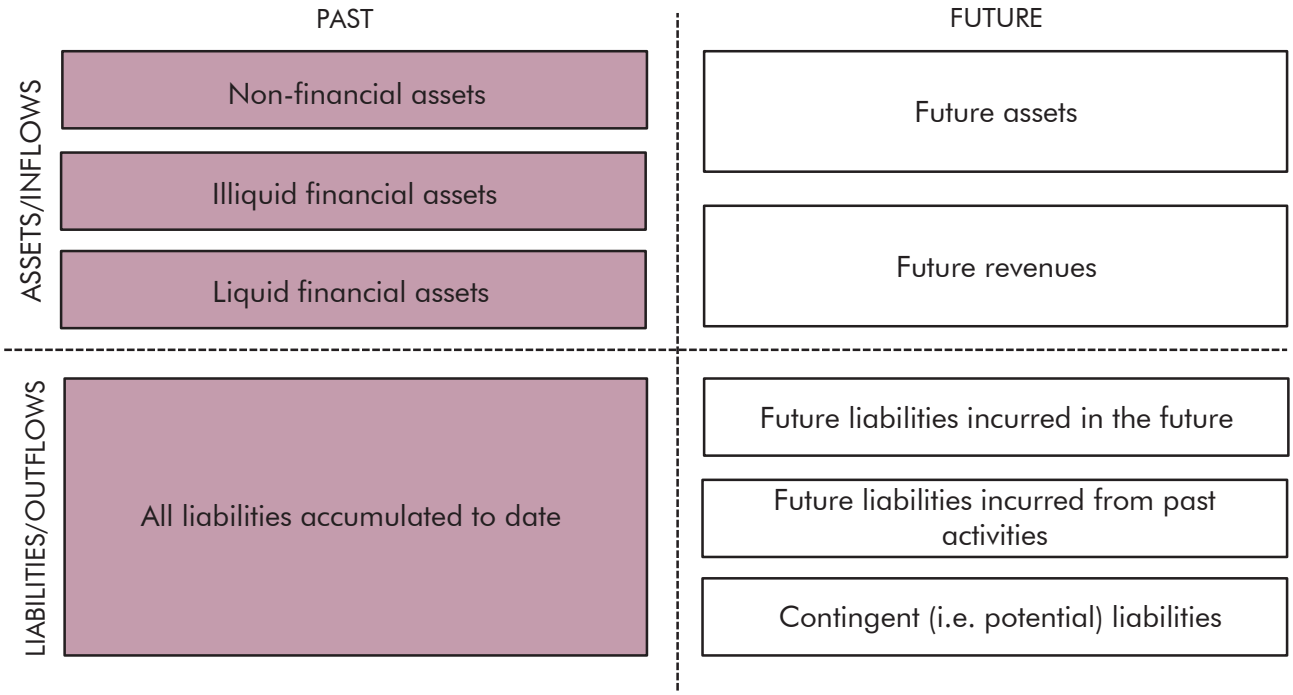


Figure 1.4: Coverage of public sector net worth



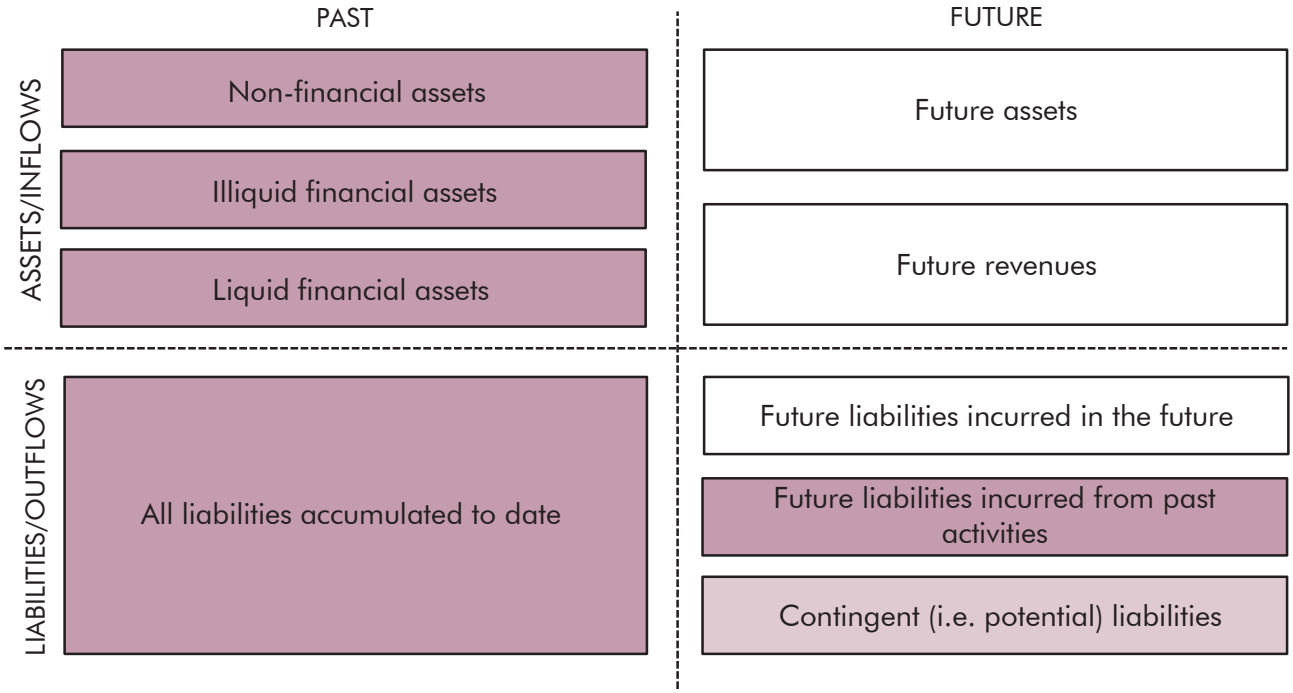
1.13 Some of these gaps are addressed in the WGA. These are consolidated financial statements for the public sector, compiled in line with international financial reporting standards as adapted for the public sector. They include an accruals-based balance sheet.

1.14 As Figure 1.5 shows, the WGA capture a wider – but still incomplete – range of the activities identified above. They include financial and non-financial assets and liabilities, plus some

costs incurred in the past for which the payments will occur in the future. In particular, they take account of net pension liabilities, provisions and commitments for finance leases such as PFI.

1.15 In this year's report, we focus on the latest WGA figures for 2016-17 and the restated figures for 2015-16. Prior years have not been restated, so results from previous years are not fully comparable. As noted above, when considering the evolution of WGA measures it is important to bear in mind that present value estimates of future financial flows are very sensitive to the choice of discount rates used to convert the projected flows into one-off upfront values on the balance sheet. Changes to discount rates between WGA publications can significantly change estimates of assets and liabilities, even in the absence of changes to underlying cash flows. When discount rates are very low, as they currently are, future flows are valued more highly as upfront values. Because the WGA balance sheet presents discounted future liabilities, but not discounted future assets (such as future tax revenues), the balance sheet will appear weaker than if discount rates were higher.

Figure 1.5: Coverage of the WGA measure of net liabilities



Future activity: long-term spending and revenue projections

1.16 Balance sheets contain useful information on the fiscal consequences of past government activity, including its implications for some future cash flows. But to assess long-term sustainability, we also need to understand how future government activity might affect the balance sheet. In doing so, we focus on the effect of these flows on the future path of PSND. We also provide illustrative projections of the broader PSNFL measure, while noting that the further assumptions necessary to generate those projections add another layer of uncertainty to already highly uncertain estimates.

1.17 In Chapter 3, we analyse future flows by undertaking a bottom-up analysis, aggregating long-term projections of different spending and revenue streams as shares of GDP, plus future financial transactions, on the presumption of unchanged government policy. This is a similar approach to that taken by several other fiscal bodies around the world.

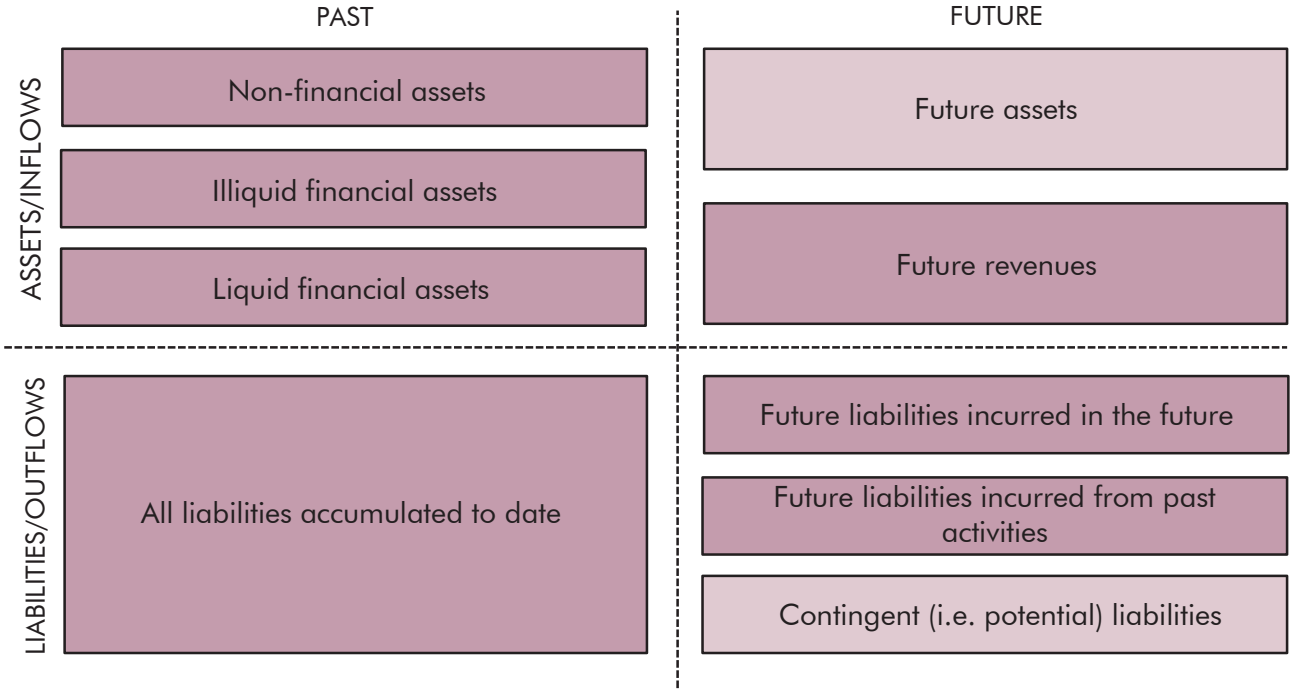
1.18 Normally, the first five years of our projections would be consistent with the our most recent medium-term forecast, to enable us to focus on longer-term influences rather than fresh revisions to our assessment of the short and medium-term outlook. But, given the size and specificity of the Government's June 2018 health spending announcement, and how significantly higher health spending affects our long-term projections, we have included its effects in our central projections. As the Government is yet to explain in any substantive way how this extra spending will be financed, we have assumed it is financed entirely through additional borrowing, which has increased borrowing, debt interest and debt relative to our March 2018 *EFO*, as shown in Table 3.6 and Table 3.7. We have made no new assumptions about how the UK's exit from the European Union will unfold, so these projections are based on the broad-brush assumptions set out in that *EFO*.

1.19 Figure 1.6 shows the coverage of our revenue and spending projections. They are more comprehensive than the backward-looking balance sheet measures, although there are still potential inflows and outflows that it is impossible to incorporate fully. These are lightly shaded in the diagram.

1.20 It is important to emphasise that, given the huge range of uncertainty around the issues and timescales covered in this report, the figures presented should be treated as illustrative projections, rather than precise forecasts. That is, they show how we would expect PSND to evolve if various assumptions about demographics and other factors were to hold over several decades rather than a central expectation of what *will* happen. Over this time horizon we are in a world of 'Knightian' uncertainty in which it would be impossible even to attach meaningful probability distributions to the various factors underpinning the central projection.

1.21 Our projections focus on the implications of future changes in the age structure of the population for particular broad categories of spending. We extend the analysis to take account of non-demographic drivers of spending and of long-term influences on different revenue streams. These include several non-demographic factors that might affect the size of particular revenue streams over the long term and have been the subject of detailed analyses in previous *FSRs*. We also look at the impact of policy changes that can alter the size of these expected flows between *FSRs*.

Figure 1.6: Content of our revenue and spending projections



Summary indicators of fiscal sustainability

1.22 In Chapter 4, we discuss various approaches to summarising the implications of our long term projections for fiscal sustainability. We consider definitions of fiscal sustainability that aim to be both rigorous and comprehensible.

1.23 Most definitions of fiscal sustainability are built on the concept of solvency: the ability of the government to meet its outstanding and future obligations. A formal solvency condition is provided by the government's inter-temporal budget constraint (IBC). The IBC will be satisfied if the projected outflows of the government – the outstanding level of public debt plus the discounted value of all future government expenditures – are covered by the discounted value of all future government revenues. This also means that, over an infinite horizon, the primary balance (government receipts less spending on items other than debt interest) must be sufficient to service the government's debt obligations.

1.24 We also investigate fiscal gaps that measure the immediate and permanent adjustment in the primary balance needed to bring the debt-to-GDP ratio to a particular level at a particular future date. We also look at more gradual ways to fill the same gaps since it is very unlikely that a government would try to offset decades worth of future demographic and other cost pressures via a single upfront adjustment.

Assumptions regarding Government policy

1.25 The goal of this report is to identify whether government policies are likely to be sustainable in the long term or whether there is likely to be a need to spend less and/or tax more in order to render them sustainable. To reach such a judgement, we first need to set out our assumptions regarding long-term policy.

1.26 Over the five-year horizon of our *EFOs,* the Government's tax and spending policies are usually publicly announced and reasonably well defined. But assuming that governments would maintain essentially the same policies for decades to come is sometimes unrealistic and might paint a misleading picture of fiscal sustainability. In the absence of a well-defined long-term policy, we have to make an appropriate assumption about what 'unchanged policy' would look like. The *Charter for Budget Responsibility* requires that *"where a long-term policy has not yet been set by the Government, the OBR will set out the assumptions it makes in its projections regarding policy transparently"*. Given the importance of these assumptions, we aim to be fully transparent about them and our reasons for choosing them. The key policy assumptions are set out in Chapter 3.

1.27 As well as these assumptions about long-term tax and spending policies, we also need to make assumptions about the policies that will be in place when the UK leaves the EU. These are unchanged since our March 2018 *EFO*.

1.28 In making long-term spending and revenue projections, we also need to decide how to deal with policies that are currently being considered by the Government but where no final, detailed announcement has yet been made. We use the same principle as in our medium-term forecast, consistent with the *Charter,* that we should include policies in our projections where final details have been announced that allow the fiscal impact to be quantified with what we judge and the Charter terms *"reasonable accuracy"*. We note significant policy commitments and aspirations not included in the central projections as fiscal risks, and where possible set out their potential impact. This includes announced policies that are likely to give rise to contingent liabilities or guarantees in WGA in the future.

Structure of the report

1.29 We use the analytical framework set out above to structure the report as follows:

- Chapter 2: analyses the fiscal consequences of past government activity through alternative measures of the public sector balance sheet;
- Chapter 3: analyses the fiscal consequences of future government activity through long-term projections of revenue and expenditure; and
- Chapter 4: considers summary indicators of fiscal sustainability.

1.30 Over the years, we have presented further material in *FSR* annexes and via supplementary tables. This year, as well as the usual supplementary material online, the report includes two annexes.

- Annex A: looks at how demographic trends have been incorporated in our central population projection and considers how alternative assumptions might affect the size and structure of the UK population; and

- Annex B: considers the implications for fiscal sustainability of factors that could affect the long-term costs of long-term care.

1.31 Alongside this year's report, we have also published a working paper on alternative accounting treatments for student loans and whether these can provide a better picture of the sustainability of policy. We will continue to apply these alternative methods in future analyses of sustainability. This can be found on our website.

2 The fiscal impact of past government activity: the public sector balance sheet

2.1 This chapter looks at the fiscal impact of *past* government activity, as reflected in the assets and liabilities on the public sector's balance sheet. We look at two presentations of the balance sheet: the National Accounts; and the Whole of Government Accounts (WGA).[1]

Balance sheet measures in the National Accounts

2.2 In this section we consider three balance sheet measures based on the National Accounts framework: public sector net debt (PSND); public sector net financial liabilities (PSNFL); and public sector net worth (PSNW).

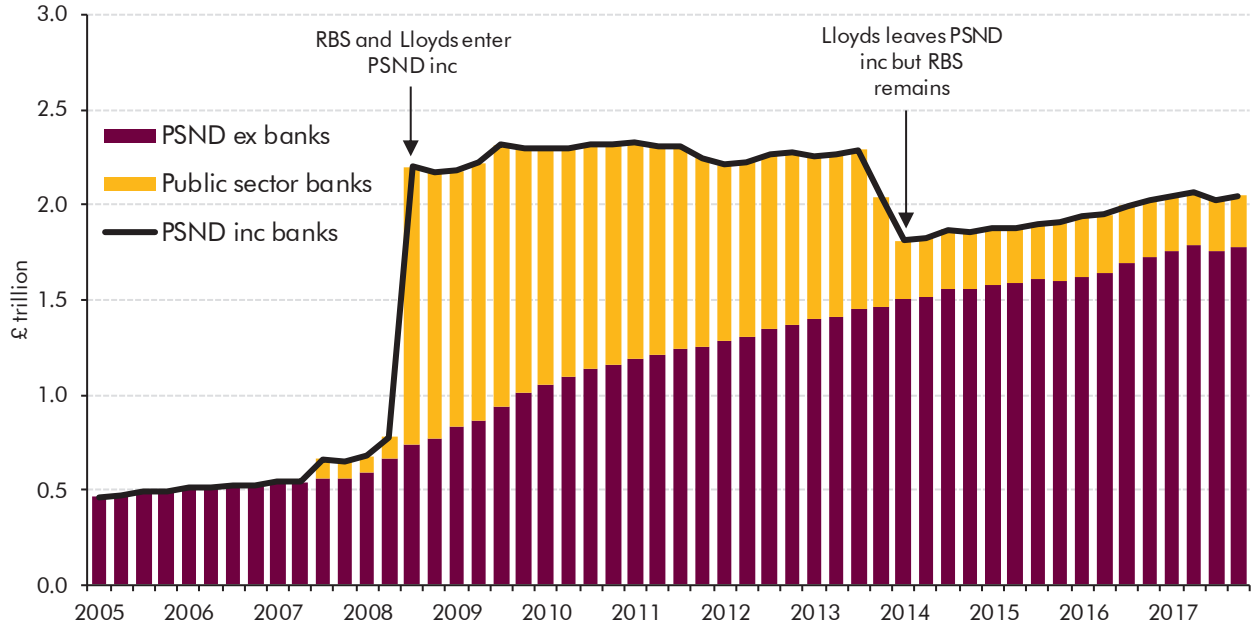
Public sector net debt

2.3 PSND is defined as the public sector's consolidated gross debt less its 'liquid' assets – that is, those that could readily be sold.[2] Successive Governments have set targets for PSND, specifically 'PSND ex' which excludes banks classified as part of the public sector.

2.4 PSND ex includes the cost to government of purchasing equity stakes in the public sector banks, but not the liabilities associated with funding those banks' assets (e.g. the deposits and other instruments that fund their mortgages and other loans). In contrast 'PSND inc' includes the full effect of the public sector banks' balance sheets (liabilities less liquid assets) on PSND. As Chart 2.1 shows, the difference between the two peaked at almost £1.5 trillion in late 2008, when RBS and Lloyds Banking Group were classified as public sector banks after the Labour Government took large equity stakes in both. Since then, as the public sector banks have reduced their assets (and the associated funding liabilities) their effect on PSND inc has diminished. When Lloyds was reclassified to the private sector, after the Government reduced its stake in the bank, PSND inc fell substantially further. It is now only £0.3 trillion higher than PSND ex. While this direct effect of the late 2000s financial crisis on PSND is now much smaller, the indirect effect via the years of large budget deficits associated with the recession and weak recovery remains large.

[1] The Treasury published its latest edition of the Whole of Government Accounts, covering the 2016-17 financial year, in June 2018. We detailed the information available in the WGA in our 2011 *FSR*. This year we give brief explanations of the main aggregates and concepts, but readers can refer back to the 2011 publication for further details.
[2] More details of how PSND is measured are available in O'Donoghue, *Economic & Labour Market Review Vol. 3 No. 7,* ONS, July 2009.

Chart 2.1: PSND including and excluding the public sector banks



Source: ONS

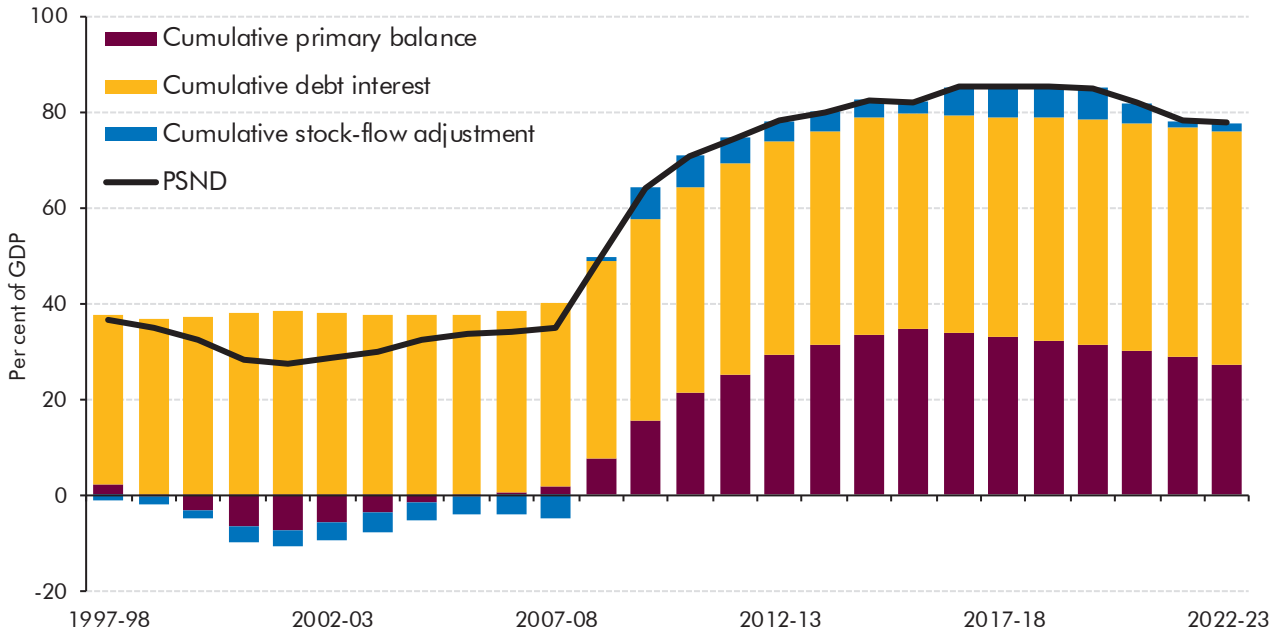
2.5 The level of PSND changes each year by the amount of public sector net borrowing (PSNB – the gap between spending and receipts), plus public sector financial transactions (such as student loans), plus balance sheet valuation changes (particularly for the recording of gilts). PSND also includes an estimate of the additional debt that the government would have had to issue if it had purchased the buildings and other assets that the public sector uses through Private Finance Initiative (PFI) deals, but only for those assets that are classified as 'on balance sheet' in the National Accounts. The measurement of PFI deals within the various balance sheet measures is discussed later in the chapter.

2.6 The 1997-2010 Labour Government's 'sustainable investment rule' stated that "*public sector net debt as a proportion of GDP will be held over the economic cycle at a stable and prudent level*", which it interpreted as keeping it below 40 per cent of GDP over the economic cycle. But the financial crisis and subsequent recession pushed PSND well above that level. The 2010-15 Coalition Government and the Conservative Governments since 2015 have set targets for PSND to fall as a share of GDP in specific years, but have not stipulated a level of PSND to be targeted.

2.7 In 1997-98 the stock of net debt stood at 36.7 per cent of GDP, almost entirely reflecting the cumulation of debt interest payments over the post-war period. Chart 2.2 shows that, in the decade preceding the financial crisis, cumulative debt interest remained broadly stable as a share of GDP while year-to-year fluctuations in the overall debt ratio were explained largely by relatively small movements in the primary balance (which excludes net interest payments) and stock-flow adjustments (things that affect debt but not the deficit).

2.8 The financial crisis then caused the primary balance to worsen significantly and the costs of financing this debt pushed up PSND. This primary balance contribution to net debt peaked at 34.7 per cent of GDP in 2015-16, but has since declined and we forecast this to continue. Despite historically low financing costs, increasing debt interest spending offsets most of this fall. Stock-flow adjustments represent all other contributions to debt, which include financial transactions (notably from financial crisis interventions, financing student loans and the Bank of England's Asset Purchase Facility) and valuation effects, especially relating to the accounting treatment of gilts. Stock-flow adjustments have usually been the smallest component, though the overall path of debt in the forecast is dependent on loans under the Bank of England's Term Funding Scheme being repaid in 2020-21 and 2021-22.

Chart 2.2: Components of PSND



Source: ONS, OBR

Broader National Accounts measures

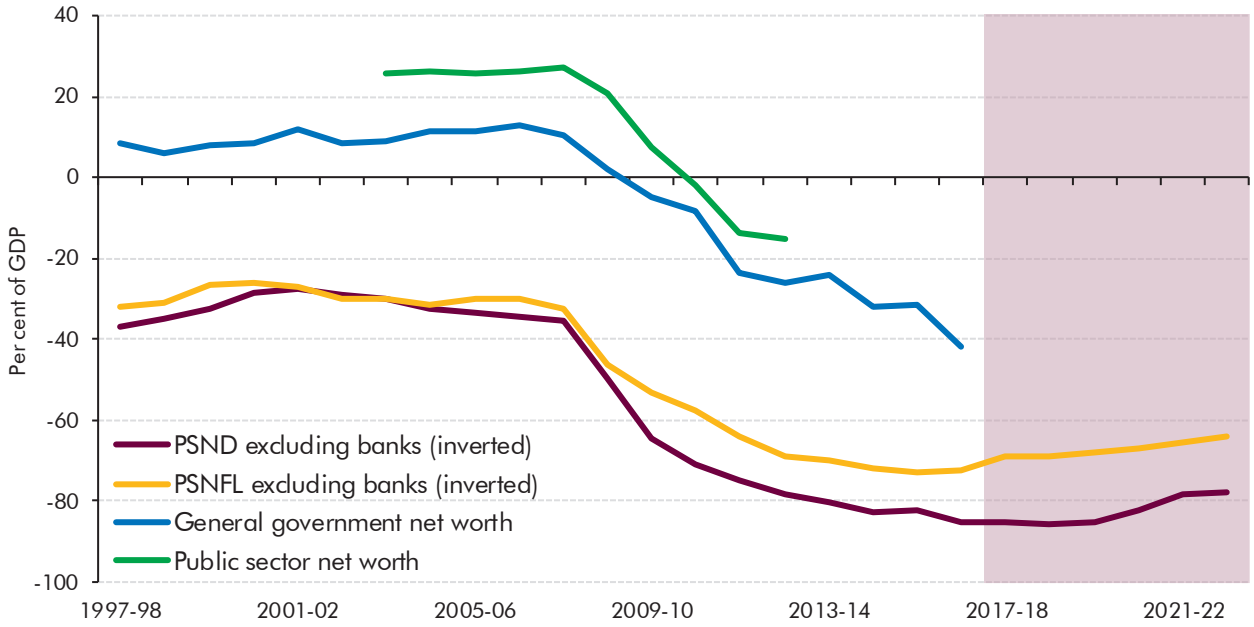
2.9 PSNFL is a wider balance sheet measure than PSND that includes all financial assets and liabilities recognised in the National Accounts. The extra liabilities include the net liabilities of public sector funded (but not unfunded) pension schemes, IMF special drawing rights and accounts payable. Additional non-liquid financial assets mainly consist of loans (especially student loans), equity assets and accounts receivable.

2.10 PSNW is a still wider balance sheet measure, which covers all assets including non-financial ones such as the roads and buildings owned by the public sector. The ONS has currently suspended its publication of PSNW pending work on improving estimates for public non-financial corporations. It plans to publish PSNW statistics again from late next year. For this report, we therefore consider general government net worth (GGNW), a narrower measure that excludes public corporations. However, valuing Government's fixed assets is tricky and so net worth is inherently more difficult to measure accurately than PSND and PSNFL.

2.11 Chart 2.3 shows the latest estimates for PSND, PSNFL, PSNW and GGNW. The measures show similar overall patterns (with PSND and PSNFL having been inverted to facilitate comparisons). All deteriorated sharply following the financial crisis. Pre-crisis, PSND and PSNFL were at a similar level but they have diverged since then, with PSNFL deteriorating less than PSND. This reflects the accumulation of considerable financial assets, including those from financial interventions and from the increased student loans book. We expect both PSND and PSNFL to fall slightly as a share of GDP over the medium term.

2.12 The sharp fall in net worth is a reflection of the extent to which borrowing in the post-crisis period was to finance current spending rather than to build up financial or real assets. The deterioration in net worth also reflects the use of market prices to value gilts in net worth, rather than nominal prices as in PSND and PSNFL. Gilt prices have risen since the crisis, increasing the market value of liabilities as recorded in measures of net worth.

Chart 2.3: Recent outturns and forecasts of PSND, PSNFL, PSNW and GGNW



Source: ONS, OBR

Balance sheet measures from WGA

2.13 The Whole of Government Accounts (WGA) are a set of financial statements for the whole of the public sector, produced by the Treasury under international commercial accounting standards, as adapted and interpreted for the public sector context. The Treasury has now published WGA for the years from 2009-10 to 2016-17. The construction of the WGA was described in detail in our 2011 *FSR*, and in the Treasury's WGA publications.

2.14 In this section, we discuss the key results from the latest WGA for 2016-17, look at changes since last year's WGA and consider the main measurement differences between the WGA and the National Accounts.

2.15 The WGA paint a broader picture of the public sector balance sheet than the National Accounts, where coverage is fundamentally backward-looking (as shown in Figures 1.2, 1.3 and 1.4 in Chapter 1). Some information on future liabilities is available in the WGA, for example on future public service pension payments associated with employment to date and payments to PFI providers. WGA also reports provisions and contingent liabilities related to risks of future costs that could, but are not certain to, materialise as a result of past activities.

Changes in WGA gross liabilities

2.16 Total WGA gross liabilities increased by £595 billion in 2016-17, reaching £4,324 billion at end-March 2017. Table 2.1 shows that the rise was mainly the result of:

- A £410 billion rise in the estimated **net public service pension liability**. This mainly reflects use of a lower discount rate to convert the flow of future pension payments associated with central government pension schemes into an upfront lump sum.

- A £28 billion **increase in government borrowing and financing**. Central government raised a net £77 billion through issuing gilts, but this was largely offset by the Bank of England Asset Purchase Facility Fund (BEAPFF) purchasing £60 billion worth of gilts. (The BEAPFF holds assets (mainly gilts) purchased from the market by the Bank as part of its past quantitative easing (QE) of monetary policy.[3]) Higher market prices also increased liabilities.

- An increase of £91 billion in **deposits held by banks and other financial institutions at the Bank of England**, largely associated with the package of monetary policy easing implemented by the Bank after the EU referendum result.

- An increase of £17 billion in **provisions**. The largest provisions relate to nuclear decommissioning and clinical negligence. We discuss provisions later in this chapter.

[3] See Box 2.1 of our 2013 *FSR* for a full explanation of how quantitative easing and APF transactions are treated in the WGA.

Table 2.1: Changes in WGA gross liabilities

	£ billion		
	2015-16	2016-17	Difference
Liabilities	3728	4324	595
of which:			
Net public service pension liability	1425	1835	410
Government borrowing and financing[1]	1261	1289	28
Deposits by banks and other financial institutions in the Bank of England[2]	325	415	91
Provisions	305	322	17
PFI liabilities (capital commitments)	39	39	0
Trade and other payable obligations	141	146	5
UKAR debt securities	5	0	-5
Other financial liabilities[3]	228	276	49

[1] These liabilities are net of government borrowing and financing held as assets within the public sector. The amounts netted off include the gilts which are held by the Bank of England Asset Purchase Facility Fund (BEAPFF) as part of the Bank's quantitative easing programme (QE). This borrowing also includes liabilities issued by the Bank of England under the Funding for Lending Scheme. But since the FLS is an asset swap scheme, this borrowing was offset elsewhere on the balance sheet.

[2] Includes the reserves created by the Bank to finance the BEAPFF's purchase of gilts.

[3] Includes banknotes in circulation, the IMF Special Drawing Rights allocation, deposits by financial institutions under repo arrangements with the Debt Management Office (DMO) and the Exchange Equalisation Account (EEA), borrowings by other entities across central and local government, financial guarantees, and foreign currency bonds issued by the Bank of England.

Changes in WGA gross assets

2.17 Total assets on the WGA balance sheet increased by £161 billion during 2016-17, to £1,903 billion at end-March 2017. Table 2.2 shows that this reflected the net effect of various increases and decreases in assets, including:

- a £51 billion rise in **fixed assets**, reflecting revaluation effects and the value of new assets under construction;
- a £58 billion rise in **other loans and deposits**, of which £55 billion was due to the Bank of England's Term Funding Scheme; and
- a £41 billion rise in **other financial assets**, of which £21 billion related to an increase in the value of the foreign currency reserves as sterling depreciated over the year.

2.18 Assets acquired as a result of interventions during the financial crisis fell sharply in 2016-17. This included a £16 billion reduction in UKAR mortgage assets through sales and redemptions of loans and a £2 billion fall in equity in RBS and Lloyds, where £3.5 billion of Lloyds shares were sold but the effect of this was partly offset by the value of the remaining shares held by the public sector increasing.

2.19 Student loans and PFI assets are discussed later in the chapter.

Table 2.2: Changes in WGA gross assets

	£ billion		
	2015-16	2016-17	Difference
Assets	**1742**	**1903**	**161**
of which:			
Tangible and intangible fixed assets[1]	1130	1181	51
Equity investment in the public sector banks[2]	23	21	-2
Student loans	64	69	5
PFI assets	39	39	0
Working capital (debtors)	155	173	19
UKAR mortgage loans	36	20	-16
Other loans and deposits[3]	74	133	58
Other financial assets[4]	176	216	41
Other assets[5]	46	51	5

[1] Net of depreciation and impairment of assets. Excluding assets financed by PFI, which are shown separately.
[2] Includes the value of the government's investments in the Royal Bank of Scotland and Lloyds Banking Group.
[3] Includes deposits made by local government to commercial institutions, plus the government's bilateral loan to Ireland, plus loans and advance from HM Treasury to financial institutions.
[4] Includes funds advanced to bank and central clearing counterparties as part of DMO and EEA operations, EEA holdings of foreign government debt securities, the UK's quota subscription to the IMF, IMF special drawing rights, equity investments in the European Investment Bank, other investments in international financial institutions and the Bank of England's holdings of foreign government securities, currencies and equity investments.
[5] Includes holdings of gold, cash and cash equivalents, inventories and assets for sale.

Differences between WGA and National Accounts aggregates

2.20 Tables 2.3 and 2.4 show the reconciliation set out in the 2016-17 WGA results between the WGA and National Accounts aggregates on the latest definitions. These tables start with the fiscal aggregates from the National Accounts, and then adjust for various differences.

2.21 Table 2.3 shows that the differences between the WGA and the National Accounts measures of net debt are mainly due to two particularly large and partially offsetting items:

- The treatment of liabilities arising from **public service pensions**. PSND only includes liabilities arising from past cash payments. The WGA debt measure includes an estimate of the net present value of future cash payments arising from past employment. The 2016-17 WGA estimate of these additional liabilities is £1,835 billion (up from £1,425 billion in 2015-16). The large increase in the pension liability recorded in this year's WGA – due to the use of a lower discount rate to generate the net present value – means that the WGA measure of net liability increased significantly more than PSND during the year.

- The inclusion of the public sector's **tangible and intangible fixed assets** that are not included in PSND offsets a large part of these additional liabilities, though to a significantly smaller extent than it did in the previous year's accounts.

2.22 The treatment of changes in asset values is one difference between the WGA and the National Accounts. In the WGA, net liabilities change each year to reflect the latest market values, and the change in value is included in the net deficit. (This is one reason why it

would be very hard to use the WGA net deficit as a policy target.) In PSND, changes in market prices are not included until assets are sold and a profit or loss is realised.

2.23 The WGA measure of net liabilities also includes future liabilities incurred to date for provisions, and amounts owed to creditors and owing from debtors. The other main items where net liabilities are measured differently in WGA and the National Accounts include the capital liabilities from PFI deals, explored in more detail later in the chapter, and the way gilts are valued. The WGA revalue the net gilt liability each year to reflect the latest market prices, whereas PSND includes the nominal value of gilts issued. This difference also applies to the gilts held by the Asset Purchase Facility.

Table 2.3: Reconciliation of public sector net debt

	£ billion		
	Balance sheet levels at end March		
	2015-16	2016-17	Difference
Public sector net debt (National Accounts)	**1,603**	**1,727**	**124**
Remove items included in National Accounts but not in WGA			
Housing Associations	-67	-70	**-3**
Add net liabilities included in WGA but not in PSND			
Net public service pensions liability	1,425	1,835	**410**
Provisions	306	322	**17**
Working capital (creditors and debtors)	-27	-39	**-12**
Add assets netted off in WGA net liabilities but not in PSND			
Tangible and intangible fixed assets	-1,169	-1,221	**-52**
Equity (including equity in public sector banks)	-50	-51	**-2**
Adjust for items measured differently			
Differences in the measurement of net debt for UKAR	-30	-24	**6**
Capital liabilities for PFI contracts	33	33	**0**
Gilts held by the Asset Purchase Facility	-50	-127	**-77**
Gilts issued	38	51	**12**
Other	-26	-15	**12**
WGA net liabilities	**1,986**	**2,421**	**435**

2.24 Table 2.4 shows that the differences between the National Accounts current budget deficit and the WGA net deficit are mainly due to:

- The inclusion in the WGA net deficit of **net financing costs associated with the public service pension liability**. This is an imputed flow, representing the net interest costs of a future liability where the spending has not yet happened.
- The WGA net deficit includes additional impairments (**write-downs of assets**).
- The classification of **capital grants** and spending on **research and development**, which count as capital spending in the National Accounts but as current spending in WGA.

- The inclusion of **provisions** in the WGA (as liabilities for the present value of future spending where the spending obligation was incurred as a result of past activity), as distinct from a liability for spending to date as in the National Accounts.

2.25 Depreciation is measured on a different basis too.[4] Depreciation used to be higher in the WGA than in the National Accounts, but ESA10 changes that classify spending on single-use military expenditure (SUME) and research and development as capital spending have increased National Accounts depreciation associated with those capital assets. Recorded depreciation is now higher in the National Accounts than in the WGA.

2.26 Net accounting losses from the sales of assets increased the WGA net deficit. By contrast, profits or losses from sales of financial assets are not included in the National Accounts accruals measures of the current deficit or net borrowing. They only affect the cash measures of the net cash requirement and PSND.

Table 2.4: Reconciliation of public sector current deficit

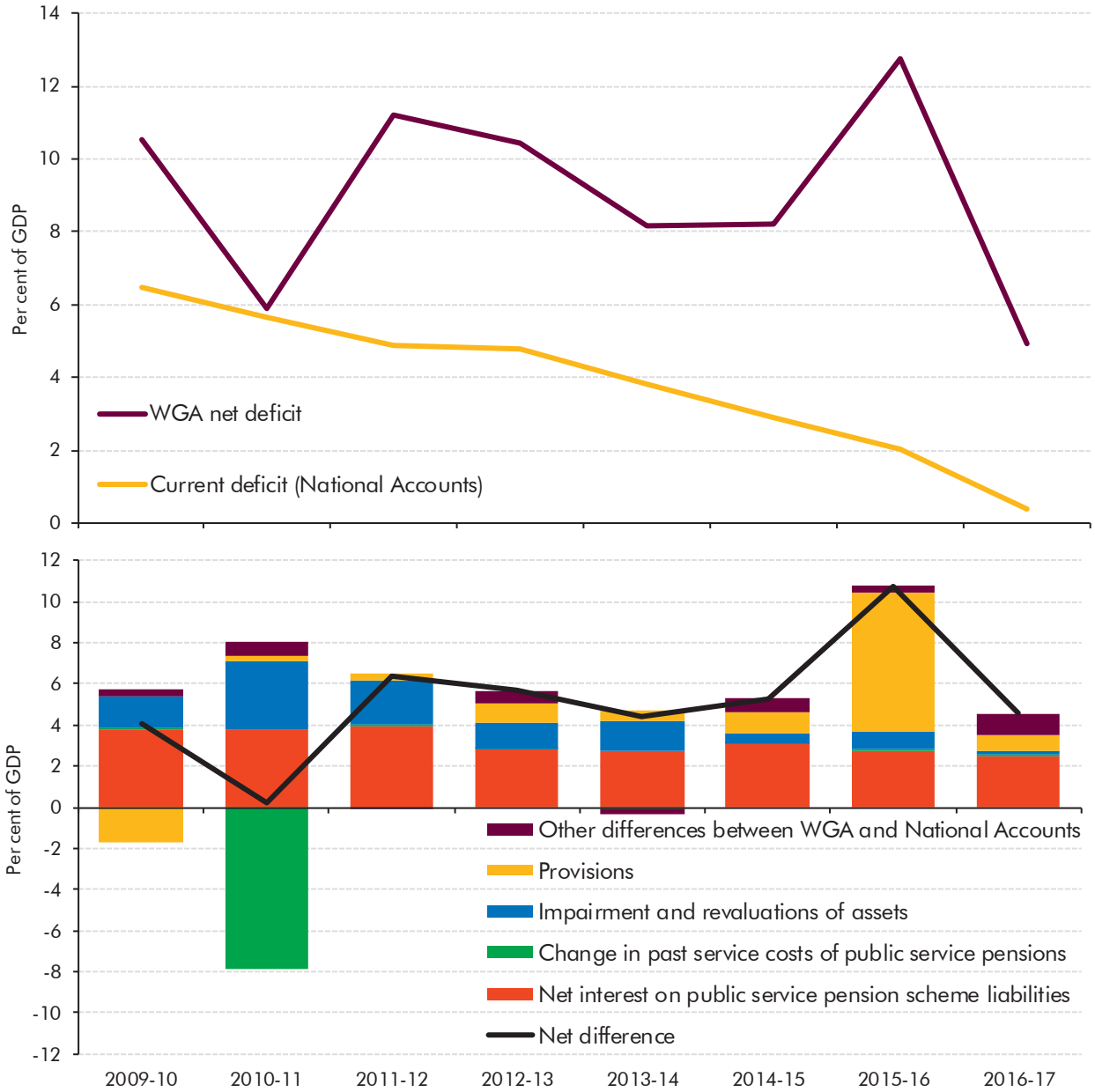
	£ billion		
	2015-16	2016-17	Difference
Current deficit (National Accounts)	**39**	**7**	**-32**
Plus additional items included in WGA net deficit			
Net financing costs of public service pension schemes	52	50	-2
Impairment and revaluations of assets	17	5	-12
Capital grants	7	9	2
Net changes in provisions	128	16	-112
Net gains/losses on sale of assets	-6	2	8
Research and development	3	2	-1
Adjust for items measured differently			
Depreciation	-8	-10	-2
Other	11	17	5
Net deficit for the year (WGA)	**244**	**98**	**-146**

2.27 WGA are now available for eight years. They are subject to discontinuities so that, unlike the National Accounts, the WGA data are not designed to be comparable across the entire time series. This is illustrated in Chart 2.4, which compares the WGA net deficit with the National Accounts current deficit. The largest changes were in 2010-11, when the WGA net deficit was reduced by 8.0 per cent of GDP as a result of the revaluation of public sector pension liabilities that followed the Government's switch from RPI to CPI inflation uprating, and in 2015-16, when a change in discount rates for some provisions increased the WGA net deficit by 6.7 per cent of GDP.

2.28 Across the full period, the WGA net deficit was 5.6 per cent of GDP lower in 2016-17 than in 2009-10. The National Accounts current deficit fell by 6.1 per cent of GDP over that period. Increasing provisions in the WGA net deficit have been broadly offset by a declining interest charge on public service pensions and lower impairments and revaluations.

[4] See paragraphs 2.42 to 2.45 of our 2011 *FSR*.

Chart 2.4: Differences between WGA and National Accounts net current deficit



Source: HM Treasury

Additional information on future liabilities

2.29 The following sections review 2016-17 WGA information on future liabilities incurred from past activities. Before taking each set of liabilities in turn, we look at student loans. These are assets rather than liabilities, but some loans will be written off over time and the WGA contain useful information on expected levels of future write-offs.

Student loans

2.30 Government loans to students appear as assets in the WGA, while the borrowing to finance them adds to liabilities. Student loans incur a cost to the public finances when the interest payments are subsidised (i.e. when the interest paid by students on the loans does not cover the government's borrowing costs) or when loans are not repaid and are instead written off. The interest charged on student loans currently exceeds the government's cost of borrowing, but expected future write-offs are large, so issuing student loans increases net liabilities.

2.31 Expected government losses are included in the WGA as balance sheet impairments when each loan is issued. This impairment is calculated as the difference between loans extended and the net present value of future expected cash repayments. In the National Accounts, the interest subsidies and write-offs are not charged to the deficit and net debt until they arise. As with pensions and provisions, the differences between the two frameworks reflect timing: the WGA include an estimate of future spending when the liability for that spending is first incurred; the National Accounts include it when the spending happens. The National Accounts method has recently attracted a certain amount of criticism and the ONS is exploring possible improvements. Alongside this *FSR*, we have published a working paper investigating some possible alternative treatments.[5]

2.32 Table 2.5 shows that the WGA estimate of student loan assets for England increased by £4.4 billion in 2016-17, to £61.3 billion at the end of the financial year. New loans issued through the course of the year, and interest charged on the loans, increased the gross value of the assets by £15.5 billion. Actual repayments of existing loans reduced assets by £2.4 billion.

2.33 Changes related to impairments on new and existing loans were £8.7 billion. This includes both impairments for the future costs of new loans issued and changes to the estimates of impairments of loans previously issued.

Table 2.5: Changes to student loan assets for England

	£ billion			
	2013-14	2014-15	2015-16	2016-17
Student loan assets at 1 April	30.7	33.4	42.2	56.9
Student loan assets at 31 March	33.4	42.2	56.9	61.3
Total change in value of student loan assets during the year	**2.7**	**8.8**	**14.7**	**4.4**
of which:				
New loans issued	9.1	10.8	11.9	13.6
Effective interest	0.3	0.2	-0.5	0.0
Capitalised interest	1.0	1.4	1.6	1.9
Subtotal of new loans issued and interest on assets	*10.4*	*12.5*	*13.0*	*15.5*
Repayments	-1.5	-1.7	-1.9	-2.4
Disposals	-0.1	0.0	0.0	0.0
Amortisation and impairments on new and existing loans	-6.2	-1.9	3.6	-8.7

[5] Ebdon and Waite, *Working Paper No. 12: Student loans and fiscal illusions,* OBR, 2018

2.34 The WGA figures, which reflect the underlying numbers in the 2016-17 accounts produced by the Department for Education, do not reflect our latest long-term economic assumptions. Nor do they include the impact of loans that governments would expect to make to future students. We take these factors into account in Chapter 3 when considering the impact of student loans on our long-term fiscal projections. In Annex B to our 2014 *FSR*, we considered the sensitivity of our results to different assumptions.

Net liabilities of public service pensions

2.35 The WGA balance sheet includes an estimate of the current net liability for the future payment of pensions for all public service pension schemes, where the liability to pay the pension was incurred as a result of past employment. It does not cover liabilities associated with future employment, so the 2016-17 balance sheet only reflects costs associated with public service employment up to March 2017.

2.36 The latest WGA results show that net public service pension liabilities increased by £410 billion in 2016-17, from £1,425 billion (75 per cent of GDP) at the beginning of the year to £1,835 billion (92 per cent of GDP) at the end of the year. This covers the liabilities of both unfunded and funded schemes. The increase over the year was dominated by use of a lower discount rate to convert future cash payments into an upfront net present value.

2.37 Table 2.6 shows the main factors that contributed to the change in the net pension liability over the six years from 2011-12 to 2016-17. It is helpful to consider these in two broad groups. First, there are those factors that routinely increase the liability each year:

- The additional future pension costs accruing from **staff employed each year**, which are partly offset by reductions in the existing liability for pensions paid out each year for the unfunded schemes and by employee contributions for the funded schemes.[6] These costs fluctuate from year to year, partly reflecting changes in the number of staff employed, but also changes in discount rates.[7]

- The **interest costs** that are added to the pensions liability each year, for the notional cost of financing the net pensions liability accrued to date. This is partly offset by the interest and dividends earned on the funded pension schemes' assets.

2.38 Second, there are other factors that can raise or lower the net pension liability in any given year – sometimes significantly. In 2016-17, two of these other factors had large effects:

- The **real discount rate** (used to convert the expected future pension payments into a one-off upfront sum) was reduced by 1.1 percentage points, reflecting a fall in yields on high quality corporate bonds. Combined with other changes in assumptions

[6] Reductions in the pensions liability for the funded schemes from pensions paid out are offset by reductions in those schemes' assets. Employees' pension contributions for the unfunded schemes have been included in staff costs since 2014-15 when they were re-classified away from Other Income. For more information, please refer to note 33 in the 2014-15 WGA.
[7] These adjustments are included because the estimates of future pension costs for the current year's employment are calculated each year based on the discount rate used at the beginning of the year, i.e. the discount rate from the previous year.

underlying the value of future liabilities, which unfortunately are not split out transparently in the WGA, this increased the net pension liability by £425 billion – more than explaining the overall increase in the liability and accounting for the majority of the overall rise in WGA gross liabilities relative to 2015-16.

- Changes to previous **actuarial assumptions**, where the latest outturns or assumptions differ from those used for previous accounts, reduced the net pension liability by £63 billion. The WGA note that these assumptions are inherently uncertain, and that corrections can lead to significant changes.

Table 2.6: Changes to net liabilities of public service pensions

	£ billion					
	2011-12 restated	2012-13 restated	2013-14 restated	2014-15 restated	2015-16	2016-17
Net pension liability at 1 April[1]	961	1,006	1,172	1,303	1,493	1,425
Net pension liability at 31 March[1]	1,006	1,172	1,303	1,493	1,425	1,835
Change	**45**	**166**	**131**	**190**	**-69**	**410**
of which:						
Future pension costs for staff employed in current year[2]	35	35	41	45	49	47
Pensions paid[3]	-31	-35	-36	-38	-40	-40
Contribution by funded scheme employers	-9	-7	-8	-9	-8	-9
Net financing costs	51	48	49	57	52	51
Change in past service costs	1	0	-1	1	1	1
Transfers in/out[4]	2	27	2	1	1	0
Changes in assumptions underlying the value of future liabilities, including the change in the real discount rate	10	57	23	151	-101	425
Corrections to previous estimates of pension liabilities to reflect events and assumptions in latest accounting period	-12	40	61	-16	-22	-63
Settlements or curtailments and restatements	-2	0	1	-1	0	0

[1] Includes gross liabilities of funded and unfunded public service pension schemes, net of assets for the funded pension schemes.

[2] The movement in these costs each year reflects an adjustment to correct the previous year's costs for the previous year's change in discount rate. So these costs rise and fall in line with the change in liabilities from the change in discount rate, but with a 1 year lag.

[3] From 2012-13 onwards, this additionally includes pensions paid for the new Royal Mail Statutory Pension.

[4] In 2012-13, this includes the transfers from the Royal Mail Pension Plan (RMPP), which was a funded pension scheme, to the new Royal Mail Statutory Pension Scheme, which is an unfunded pension scheme. Since the measure of net pension liabilities is only net of assets held by the funded pension schemes, this transfer increased net pension liabilities by the value of the RMPP assets (£28 billion).

2.39 Table 2.7 shows the discount rates used by the central government unfunded pension schemes in their accounts between 2009-10 and 2016-17.[8] These can rise or fall, reflecting movements in corporate bond yields, but have generally been on a declining path. The net pension liability is reduced or increased accordingly, but has generally been rising as a result of year-on-year changes in the discount rate.

[8] As set out in the Government Financial Reporting Manual (FReM), the discount rates are based on real yields of high quality corporate bonds. This follows the requirements of international accounting standards. The discount rates are expressed in real terms, using the price indexation used to uprate public service pensions. In June 2010, the Government changed the indexation used to uprate public service pensions from the RPI to the CPI, from April 2011.

Table 2.7: Discount rates for central government pension schemes

	Per cent						
	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Real terms (CPI basis)	2.9	2.8	2.4	1.8	1.3	1.4	0.2

The Private Finance Initiative

2.40 Most public sector capital investment involves the public sector funding and completing capital projects itself. Under the Private Finance Initiative (PFI), a private sector firm will create and/or maintain the asset at its own cost, which the public sector counterparty agrees to pay for over time.

2.41 Based on ESA10 guidelines, the capital costs of some PFI deals are recognised as liabilities on the National Accounts public sector balance sheet, but many are not. As well as lacking transparency, this generates a perception that PFI has been used to hold down official estimates of public sector indebtedness for a given amount of overall capital spending, rather than to achieve value for money.

2.42 The ONS includes an asset and any associated liability on the National Accounts public sector balance sheet if it believes that the public sector bears most of the *financial risk*. In contrast, WGA puts the asset and associated liability for capital costs on the public sector if it is judged to have *effective control* of it.

2.43 As at March 2018, PSND included liabilities of £6.0 billion (0.3 per cent of GDP) in respect of the capital costs of UK PFI/PPP deals that are on balance sheet in the National Accounts. This estimate draws on improved data from departments and the Scottish Government's 'Non Profit Distributing' (NPD) PFI model capital costs. The ONS continues to work with the Treasury to improve these estimates further, and will consider the classification of the commitments from future Private Finance Two (PF2) and NPD contracts. PF2 is the Government's updated PFI model.[9]

2.44 Table 2.8 shows the latest figures recorded on the WGA balance sheet for PFI assets and capital liabilities. It shows that the future liability estimated for capital amounts payable at end-March 2017 was £39 billion, similar to recent years. The liability will rise as new deals are signed, but will be reduced as capital repayments are made. The value of assets acquired through PFI projects was also estimated at £39 billion at end-March 2017. Existing PFI assets are revalued and depreciated each year.

2.45 As well as this liability for future capital PFI payments, the WGA contain details of the present value of obligations for future PFI payments, which cover service and interest payments as well as capital costs. (The obligations for future capital payments are higher than the future liabilities recorded on the balance sheet because the obligations cover some associated costs that are likely to materialise, but which are not sufficiently certain to be included on the balance sheet.) The latest value of these future obligations is shown in Table

[9] The ONS announced in June 2014 that it would review how the contractual arrangements in the new PF2 framework fit against the available guidance. ONS, *National Accounts Classifications, Forward Workplan,* June 2014.

2.8, broken down between capital, interest and service charge payments. The latest results show that the present value of future interest payments and service charges was lower at the end of March 2017 than a year earlier. This reflects increases associated with new PFI contracts being more than offset by decreases as previous PFI contracts ended.

2.46 These associated interest and service costs would also have been incurred over future periods if the assets had been acquired through traditional capital purchases. However, the difference with assets purchased under PFI deals is that these costs become relatively firm long-term obligations, and they therefore have the potential to reduce the flexibility for other spending in the future.

2.47 The Treasury also publishes the results of a separate data collection exercise each year, which currently covers all PFI projects funded by central government. This shows which projects would be on or off the balance sheet using the International Financial Reporting Standards used in the WGA. The data are not audited and the results are not necessarily consistent with the figures in the latest WGA. The latest Treasury data published in March 2018 cover PFI deals signed up to end-March 2017.[10] These show that, if no further deals were signed, annual cash payments on these PFI projects (covering capital, interest and service costs) would be 0.5 per cent of GDP in 2018-19. In aggregate, these annual payments are a relatively small proportion of total spending. But they are distributed unevenly across the public sector and so the potential constraint may be more binding in some areas than others. These costs will be included in departmental expenditure limits, and the budgets of individual NHS trusts, local authorities and public corporations.

2.48 These separate Treasury data suggest that future PFI liabilities recorded as on balance sheet in the WGA relate to 98 per cent of all PFI contracts, by capital value. This suggests the total potential capital liability of on and off balance sheet PFI contracts could be marginally higher than reported. It implies that, if all capital spending under PFI were to have been carried out through conventional debt financing, PSND would have been 1.7 per cent of GDP higher at end-March 2017. This difference is little changed from our last *FSR*.

Table 2.8: WGA PFI data

	£ billion					
	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
WGA data for PFI deals on balance sheet[1]						
Figures from the Statement of Financial Position (balance sheet):						
Net book value of PFI assets	39	37	39	42	39	39
Liability for future capital payments	36	37	38	39	39	39
Present value of obligations for future payments	**192**	**199**	**203**	**190**	**175**	**169**
of which:						
Capital payments[2]	38	39	40	41	41	43
Interest payments	42	42	42	40	39	37
Service charges	111	117	120	109	95	89

[1] On balance sheet on IFRS basis at end of financial year. Figures for 2009-10 to 2012-13 are as restated in following year's WGA.
[2] The obligations for future capital payments include additional costs such as contingent rents and lifecycle replacement costs.

[10] HM Treasury, *Private Finance Initiative and Private Finance 2 projects: 2017 summary data*, March 2018.

2.49 The WGA also contain details of the time periods over which the future capital and interest obligations are expected to arise, and how these obligations are split by sector (Table 2.9).

Table 2.9: Future PFI payments by time period and sector

	£ billion				
	2012-13 restated	2013-14 restated	2014-15	2015-16	2016-17
WGA data for the present value of capital and interest and service charge obligations for future periods, for PFI deals on the WGA balance sheet [1,2]	**198.8**	**202.8**	**190.3**	**174.5**	**168.6**
of which, obligations arising:					
Within one year	10.5	10.3	11.2	10.1	10.6
Later than one year, but within next five years	37.4	38.9	40.0	36.3	37.4
Later than five years	150.8	153.7	139.1	128.1	120.6
and of which, obligations by sector:					
Central government (including NHS)	121.9	124.5	114.3	103.4	101.4
Local authorities	72.8	74.3	72.1	69.3	66.2
Public corporations	4.1	4.0	3.9	1.9	1.0

[1] The obligations for future capital payments include additional costs such as contingent rents and lifecycle replacement costs.

[2] In 2009-10 the total of the WGA data for these future obligations is £164.9 billion. However no breakdown is available for the future service charge obligations by time period, or sector.

Other financial commitments

2.50 WGA net liabilities include other finance leases that are not PFI-related. As with the bulk of the PFI deals, the capital commitments are included on the balance sheet in WGA, but off the balance sheet in the National Accounts. These non-PFI finance leases carried a further capital commitment of £5.2 billion at end-March 2017, up slightly from a year earlier.

2.51 The WGA also include details of various other financial commitments that are not included on the WGA balance sheet, such as payments on finance leases, all payments on operating leases, payments on capital and other contracts. The WGA list the most significant other financial commitments in the 2016-17 accounts as the Department of Health 'Informatics' programmes, the Ministry of Justice's commitments in respect to a number of contracted out services (including the management of prisons), and the BBC's long-term outsourcing arrangements for information technology, finance support and facilities management. These commitments are expected to be incurred, but are not reported as future liabilities in the WGA until the associated capital asset or service is realised.

2.52 The present values of these expected future payments are shown in Table 2.10. The time span of the commitments varies, depending on the length of the lease or contracts, and these WGA figures show the present cost of the known current and immediate future commitments. As such, if contracts are extended, the costs recorded in the WGA will rise. Table 2.10 shows significant year-on-year changes in the 2016-17 WGA related to the present value of non-cancellable contracts.

Table 2.10: Future payments for other financial commitments

	£ billion	
	2015-16	2016-17
On balance sheet in WGA - *included in net liabilities*		
Finance leases: capital payments	**4.9**	**5.2**
Off balance sheet in WGA - *not included in net liabilities*		
Finance leases: interest payments	**19.5**	**18.8**
Operating leases	**18.2**	**18.0**
Contracted capital commitments	**48.4**	**53.0**
of which:		
MOD commitments for property, plant and equipment, and for intangible fixed assets	19.1	21.1
DfE commitments in relation to school projects	3.3	2.9
TfL contracts for transport and infrastructure projects	4.1	2.9
DFT commitments	3.9	5.1
Other capital contracts[1]	18.0	21.0
Other non-cancellable contracts	**37.6**	**43.9**
of which:		
NHS and DH IT services, purchase of vaccines and R&D	4.8	5.1
BBC outsourcing, programme acquisitions and sports rights	3.5	3.5
MOJ contracted out services, including management of prisons	3.8	3.2
Department for Education	5.5	5.4
Other[2]	20.0	26.7

[1] Other contracts, mostly of around £1 billion, or less. For the 2014-15 WGA this also includes higher education grants, and grants by the Engineering and Physical Sciences Research Council, which were more sizable, but which were not itemised separately.
[2] Payments by Department for Transport and Scottish Government.

Provisions and contingent liabilities

2.53 Provisions are recorded in the WGA as if the future costs were certain and therefore the actual liability accrued in outturn is likely to be smaller than the provisions. In contrast contingent liabilities are not recorded in the WGA measure of net liabilities, so since some will undoubtedly crystallise at some point the eventual impact is likely to be greater than zero. The provisions record the net present value of the future liabilities arising from past activities, and are estimated using the relevant discount rate.

2.54 New provisions increase the net liabilities recorded on the WGA balance sheet. They are then reduced when the actual spending occurs. All the expected future spending is charged to the WGA expenditure and income account (increasing the WGA net deficit) when the future liability is initially recognised and the new provision is made. In contrast, the liabilities only appear on the National Accounts public sector balance sheet when the spending occurs. Assuming that the expected future cost materialises, this creates a timing difference between the two sets of accounts.

2.55 The notes to the WGA record various contingent liabilities, where the chances of the costs arising are judged to be less than 50 per cent. So it is possible, but not probable, that these future costs will occur. The contingent liabilities are 'off balance sheet' and they are not

included in the WGA main financial statements or the summary aggregates. They are sub-divided into 'quantifiable' and 'unquantifiable', with a separate category of 'remote' for those where the chances of the costs arising are judged to be near zero.

2.56 In principle, we would expect our forecasts to include the future fiscal costs of liabilities treated as provisions, depending on their timing. But we would not expect our forecasts to include the cost of contingent liabilities, as each individually is judged to have a less than 50/50 chance of crystallising, so would not appear in a central forecast. However, contingent liabilities are still fiscal risks, and we therefore need to consider them (and the circumstances that could cause them to crystallise) when assessing fiscal sustainability.

2.57 Table 2.11 summarises the main provisions and non-remote quantifiable contingent liabilities recorded in the 2016-17 WGA.

Table 2.11: Provisions and quantifiable contingent liabilities in the WGA

	£ billion		
	2015-16	2016-17	Difference
Future liabilities covered by provisions (on balance sheet):			
Nuclear decommissioning	181.7	184.9	3.2
Clinical negligence	57.6	66.6	9.0
Pension Protection Fund (PPF)	19.5	22.7	3.2
Taxes subject to legal challenge	5.9	7.8	1.9
Oil and gas field decommissioning	6.9	6.4	-0.5
Financial Assistance Scheme	7.2	7.3	0.1
Department of Health (NHS)	4.1	4.0	-0.1
DECC (reprocessing contracts and Coal Authority)[1]	4.9	0.0	-4.9
Equitable Life payments scheme	1.4	1.2	-0.2
Other provisions	16.2	21.4	5.2
Total provisions	**305.5**	**322.2**	**16.7**
Future levels of quantifiable contingent liabilities (off balance sheet):			
Export guarantees and insurance policies	11.6	12.8	1.2
Clinical negligence	26.7	36.5	9.8
Taxes subject to challenge	49.1	18.7	-30.4
Supporting international organisations	1.4	0.4	-1.0
Financial stability interventions	0.4	0	-0.4
Transport infrastructure projects	7.6	8.3	0.7
Military contracts	1.7	1.5	-0.2
Pension Protection Fund	1.6	1.9	0.3
Other	4.2	3.9	-0.3
Total quantifiable contingent liabilities	**104.3**	**84.0**	**-20.3**

[1] The Department for Energy & Climate Change (DECC) became part of the Department for Business, Energy & Industrial Strategy (BEIS) in July 2016.

2.58 Provisions increased by a net £16.7 billion in 2016-17, taking the present value of existing provisions to £322.2 billion at end-March 2017. The changes included an increase of £27 billion for re-estimated and new provisions, offset by a reduction of £12 billion for those used during the year. £6 billion of previous provisions were also removed because they were no longer judged likely to crystallise. A slightly lower discount rate increased the recorded value of the provisions by £11 billion.

2.59 This year saw further increases in the three largest provisions:

- The provision for **nuclear decommissioning** increased by £3.2 billion to £184.9 billion. Most relates to the Nuclear Decommissioning Authority (NDA), especially with regard to Sellafield. Smaller provisions relate to the Nuclear Liabilities Fund and the Ministry of Defence.

- The provision for **clinical negligence** increased by £9.0 billion to £66.6 billion. Changes to expected future payments increased the provision (£7.7 billion) as did changes to discount rates (£5.2 billion), while reductions came from payouts (£1.9 billion) and provisions not required (£1.8 billion).

- The provision for the **Pension Protection Fund** increased by £3.2 billion to £22.7 billion. At end-March 2017, the PPF had assets £6.1 billion greater than its liabilities.

2.60 Table 2.11 shows that the level of contingent liabilities recorded in the 2016-17 WGA fell by £20.3 billion. This reflects large changes in two particular contingent liabilities:

- that associated with **clinical negligence** has risen by £9.8 billion to £36.5 billion following changes to the discount rate; and

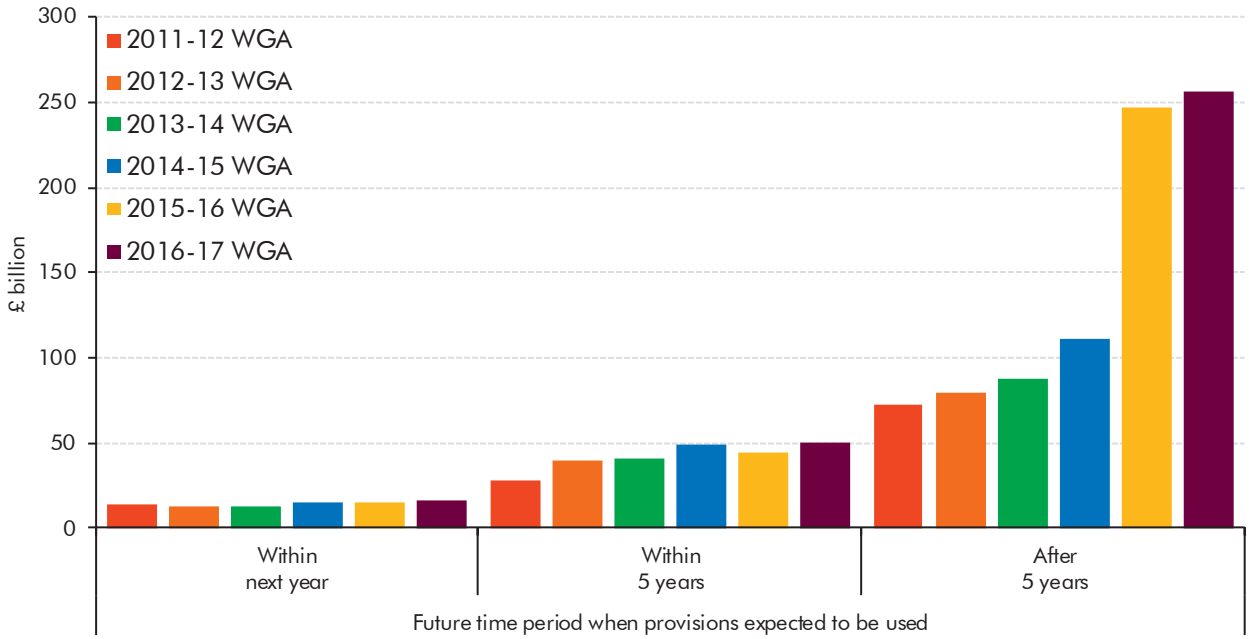
- that associated with **taxes subject to challenge** fell by £30.4 billion, following a combination of cessation of litigation and revisions to estimates for ongoing cases.

2.61 Table 2.12 presents 2016-17 WGA data on the time period over which the provisions are expected to be spent compared with restated estimates from the previous year. Chart 2.6 shows how these estimates have evolved over the past six years. It is striking that while the year-ahead and, to a lesser extent, the five-year-ahead spending associated with provisions has been relatively stable in successive WGA publications, provisions over the longer term have been rising steadily. Nuclear decommissioning and clinical negligence provisions – the largest and fastest rising – explain much of this trend. Both represent pressures on departmental budgets that our medium-term forecasts suggest will be subject to a significant squeeze over the coming years.

Table 2.12: Timing of use of WGA provisions

	£ billion				
		Provisions at end March			
	Provisions used in financial year	Future period when provisions expected to be used			Total level of provisions
		Within next year	Within 5 years	After 5 years	
2015-16	8.9	14.7	44.0	246.8	305.5
2016-17	12.1	15.6	50.4	256.2	322.2

Chart 2.5: WGA provisions by expected use date



Source: HM Treasury

Non-quantifiable contingent liabilities

2.62 Table 2.13 lists the main significant non-quantifiable contingent liabilities. These are judged unquantifiable either because the estimates of possible costs are too uncertain or because quantification would jeopardise the outcome of a legal case. The information summarised below shows the main non-quantifiable contingent liabilities listed in departments' accounts.

Table 2.13: Non-quantifiable contingent liabilities

Details of the most significant non-quantifiable contingent liabilities in the 2016-17 WGA
• Legal claims, compensation claims and tribunal cases against various WGA entities. • Commitments made by several WGA entities to fund any deficits of individual pension schemes. • HM Treasury's contingent liability for risks associated with reinsurance arising from acts of terrorism. This is the contingent liability for the risk that the losses incurred by Pool Re or Pool Re (Nuclear) exceed their available resources. • Various civil nuclear contingent liabilities in BEIS resource accounts. • Future increases in liabilities of the Financial Assistance Scheme beyond those recognised in the provision. • Contingent liability in relation to the Channel Tunnel (to return the land to a suitable condition if the tunnel ceases to operate). • Contingent liability in relation to Transport for London 's guarantees for the payments of certain of its subsidiaries under a number of other service and construction contracts. • Access to life insurance for Ministry of Defence personnel.

Remote contingent liabilities

2.63 The WGA include details of remote contingent liabilities, where the chance of the liability crystallising is thought close to zero. These are divided into quantifiable and unquantifiable.

2.64 The 2016-17 WGA show that the quantifiable remote contingent liabilities increased by £14.5 billion during the year and stood at £99.8 billion at end-March 2017. The largest liability is for £30.5 billion of callable capital in the European Investment Bank, while the largest increase came from warranties related to the sale of UKAR assets.

2.65 The WGA also list a number of non-quantifiable remote contingent liabilities including those related to Brexit, regional development banks, the NHS, UK Atomic Energy Authority and British Telecom pensions. In respect of Brexit, it simply states that "*There are a number of unquantifiable remote contingent liabilities disclosed in individual 2016-17 annual report and accounts of central government bodies reflecting the remote possibility at the reporting date that they may be required to settle any liabilities arising from changes in legislation, regulation and funding arrangements resulting from EU exit on behalf of UK Government.*"

Conclusion

2.66 In this chapter we have reviewed the latest information available from the main public sector balance sheet measures. We have seen that:

- **PSND** was almost flat as a share of GDP in 2017-18 at 85.4 per cent. In our March *EFO* we forecast that debt would peak as a share of GDP in 2017-18 and then decline across the remainder of the forecast period.

- The **WGA measure of net debt** increased by £435 billion in 2016-17 to £2,421 billion. The increase was largely explained by the use of a lower discount rate to estimate the net present value of future public service pension payments. Additional borrowing to finance the net deficit in the year, because expenditure exceeded revenues, made a smaller contribution to the year-on-year rise in WGA liabilities.

- The WGA report a significant increase in **provisions and contingent liabilities**, primarily in relation to clinical negligence settlements. These provisions will represent pressures on departmental budgets in the future, which our medium-term forecasts already suggest will be subject to a significant squeeze in the coming years. Provisions relating to the Pension Protection Fund also increased.

2.67 The measures of the public sector balance sheet reviewed in this chapter provide a useful snapshot of the fiscal impact of past government activity. But they are of limited use in assessing fiscal sustainability, as they exclude the expected impact of future government activity, notably future spending and future tax raising. We turn to this in Chapter 3.

3 The fiscal impact of future government activity: long-term fiscal projections

3.1 Chapter 2 examined the fiscal impact of *past* government activity, including some future cash flows, as reflected in measures of the public sector balance sheet. To assess long-term sustainability, we also need to estimate the potential fiscal impact of *future* government activity. In this chapter, we do this by making long-term projections for public spending, revenues and financial transactions, and then assessing their implications for the potential path of public sector net debt.

3.2 Long-term projections of this type allow a relatively comprehensive assessment of fiscal sustainability. They take into account items such as the future cost of public service pensions, but without the same degree of sensitivity to the choice of discount rate as the balance sheet approach. They also recognise that the government has many non-contractual – but nonetheless implicit – ongoing spending commitments. For example, it is likely to continue to provide state education and health care. Crucially, it recognises that the government will receive future tax revenues in the future. This is its most significant financial asset, the value of which is not incorporated in any of the balance sheet measures reviewed in Chapter 2.

3.3 Usually the first five years of the projections in our *Fiscal sustainability report (FSR)* are consistent with our most recent published medium-term forecasts. In this *FSR* we have departed from this to incorporate the Government's June 2018 announcement of higher medium-term health spending into the projections. This is because the announcement is relatively large – indeed a significant fiscal event in its own right – and because health projections are the largest driver of change in our long-term fiscal projections. We have not incorporated the fiscal effects of any other policy announcements since our March 2018 forecast or updated any other medium-term forecast assumptions for news since then.

3.4 This chapter:

- outlines the **demographic, economic, and policy assumptions** required to generate our projections, pointing out where these have changed since our previous *FSR* was published in January 2017;
- explains **how we make our baseline projections of spending and revenue**;
- presents **our baseline results**, noting significant changes since our previous report; and

- concludes with **sensitivity analyses**, focusing on the medium-term starting point, interest rates, demographic influences and health spending.

Key assumptions

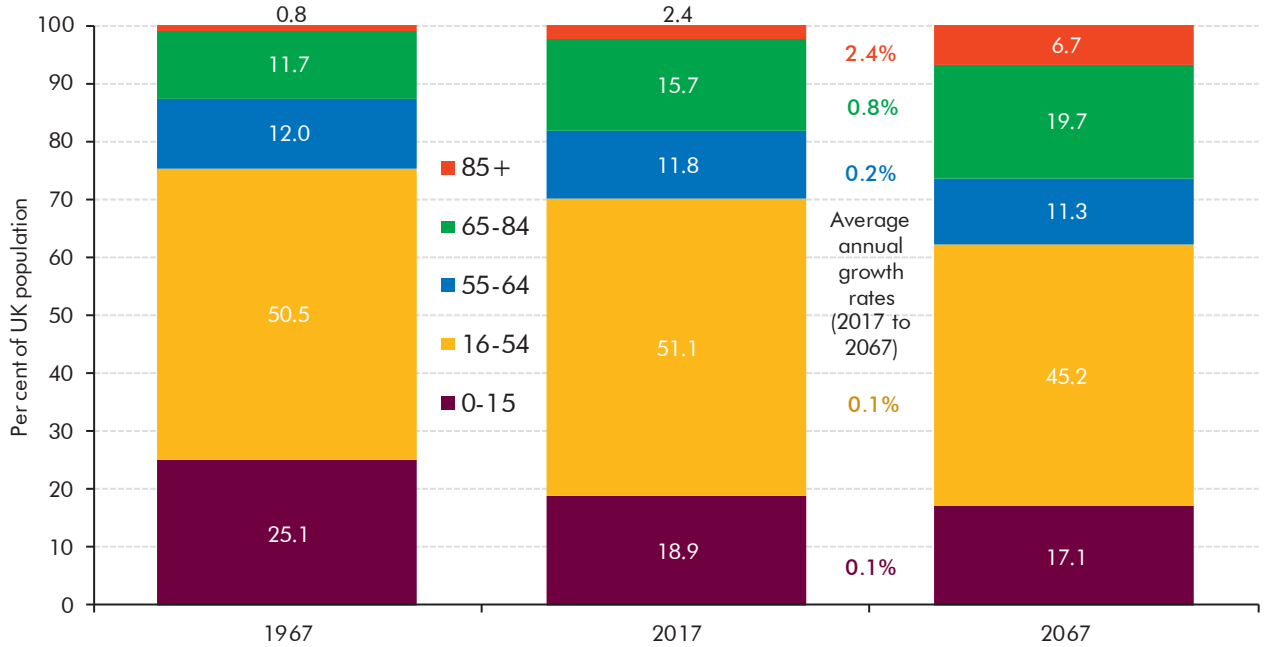
Demographics

3.5 One of the most important inputs into our long-term fiscal model is a projection of the size and age structure of the future population. This has significant implications both for the future size of the economy and for the public finances. The projected size and age structure of the population are determined by assumptions regarding fertility, mortality and net migration. As illustrated in Annex A, changes in these assumptions cumulated over a period of decades can have large effects. We therefore test the sensitivity of our projections to alternative population projections later in the chapter.

3.6 We can be reasonably certain about some developments in population structure. In particular, we can be confident that the demographic bulges created by the post-WWII and early-1960s baby booms will continue to pass through the projections as these cohorts age. In addition, past trends of declining fertility and increasing longevity have together created an 'ageing population'.

3.7 Chart 3.1 demonstrates this phenomenon by showing how the population structure has evolved over the past 50 years and how it is projected to evolve over the next 50.[1] This ageing of the population has a significant impact on prospects for the public finances.

Chart 3.1: Population structure in 1967, 2017 and 2067

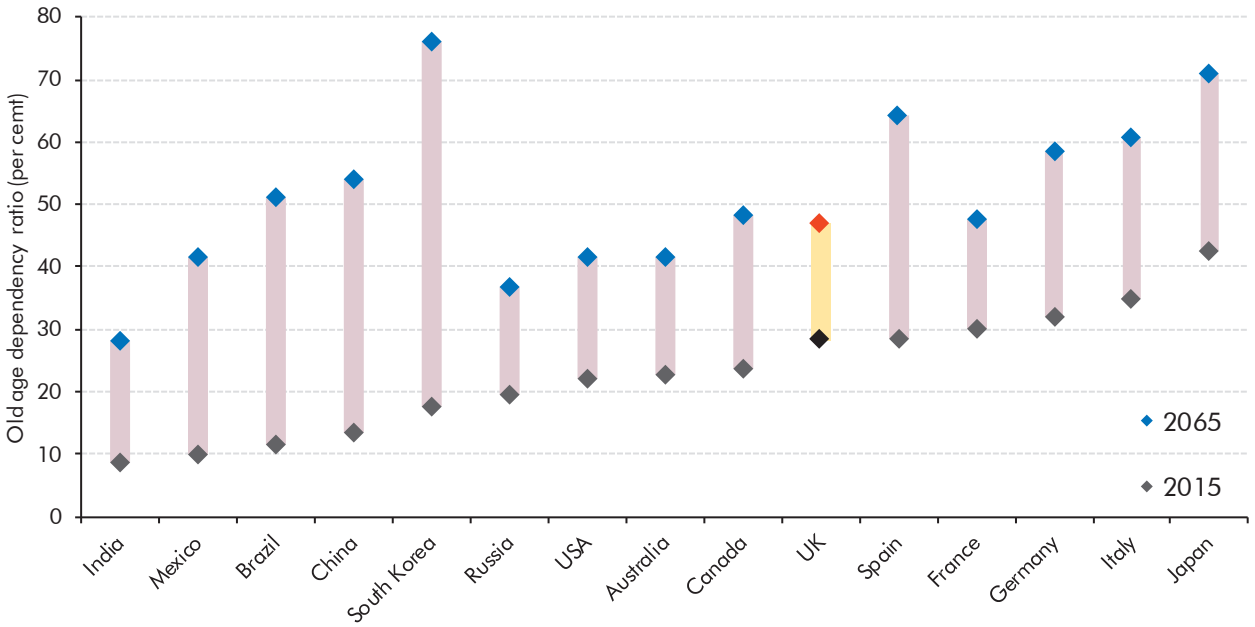


Source: ONS

[1] For more detail see ONS, *National Population Projections: 2016-based Statistical Bulletin*, October 2017.

3.8 The UK is not alone in having an ageing population. All advanced economies will face similar pressures. Chart 3.2 shows projected changes in the old-age dependency ratio, defined as the number of people aged over 65 as a percentage of those aged between 15 and 64, for various countries, derived from United Nations population projections. The chart shows that several countries currently have higher dependency ratios than the UK and that many are projected to see those ratios rise faster over the coming 50 years.

Chart 3.2: UN projections of the old-age dependency ratio



Source: UN Population Division

3.9 Since our previous report, the ONS has produced new population projections based on 2016 population data and updated demographic assumptions. We have outlined several uncertainties around the latest projections in Annex A of this report. As in our 2017 *FSR*, our projections are based on the ONS 'principal' population variant. In the latest principal variant, the UK population is projected to increase to 77.2 million in 2067, 4.6 million smaller than in the previous 2014-based projection.

3.10 Table 3.1 summarises the latest assumptions for the population variants of interest to us, while Table 3.2 reports changes since the previous projections. They show that:

- **Fertility rates** in all variants have been revised down relative to the previous projections. The long-term assumption in all variants remains below the 'replacement level' fertility rate of around 2.1 that would be required for the population to remain stable in the long term in the absence of migration or changes in mortality.

- **Life expectancy** has been revised down significantly, reflecting higher-than-expected death rates. For example, the period measure of life expectancy in 2041 has been revised down by one year (for both men and women) while the cohort measure, which factors in projected future changes in age-specific mortality rates, has been revised

down by 1.5 years for men and 1.7 years for women. Between the 1975 and 2008 population projections, deaths were systematically overestimated as the continued rise in longevity was underestimated. But since then, the ONS has revised deaths up a little in the nearer term, while leaving its long-run assumptions broadly unchanged. Annex A discusses these trends and the different measures of life expectancy in more detail.

- **Net inward migration** has been revised down, reflecting recent outturns. The long-term assumption in the principal variant has dropped from 185,000 a year in the 2014-based projections to 165,000 a year in the latest projections. Based on recent outturns, the ONS continues to assume that net inward migration is concentrated among children and younger adults, causing it to reduce the old-age dependency ratio. The age structure of migration is now a little less favourable to the public finances than in the 2014-based projections as children are assumed to make up a somewhat higher proportion in the latest projections.

Table 3.1: Population variant assumptions

	Fertility rate	Life expectancy at birth in 2041 (years)				Long-term average annual net inward migration (thousands)	Size of population in 2067 (millions)	
		Period		Cohort				
		Males	Females	Males	Females		16-65	Total
Principal projection	**1.84**	**83.4**	**86.2**	**92.7**	**95.1**	**165**	**43.6**	**77.2**
High migration	1.84	83.4	86.2	92.7	95.1	245	47.3	82.9
Low migration	1.84	83.4	86.2	92.7	95.1	85	39.9	71.5
Young age structure	1.94	81.6	84.5	81.6	84.5	245	48.7	82.6
Old age structure	1.64	84.6	87.3	101.1	103.1	85	37.5	68.7
50 per cent lower EU migration	1.84	83.4	86.2	92.7	95.1	117	41.3	73.8

Table 3.2: Changes in population assumptions since the 2014-based projections

	Fertility rate	Life expectancy at birth in 2041 (years)				Long-term average annual net inward migration (thousands)	Size of population in 2067 (millions)	
		Period		Cohort				
		Males	Females	Males	Females		16-65	Total
Principal projection	**-0.05**	**-1.0**	**-1.0**	**-1.5**	**-1.7**	**-20**	**-2.6**	**-4.6**
High migration	-0.05	-1.0	-1.0	-1.5	-1.7	-20	-2.7	-4.9
Low migration	-0.05	-1.0	-1.0	-1.5	-1.7	-20	-2.4	-4.2
Young age structure	-0.15	-0.6	-0.6	-0.6	-0.7	-20	-3.9	-7.0
Old age structure	-0.05	-2.0	-1.9	-8.7	-8.5	-20	-2.1	-5.1

3.11 Chart 3.3 shows how the latest population projections compare with the previous ones for different age groups and what they imply for the age structure of the population 50 years ahead. The total population in 2067 is 5.6 per cent smaller, reflecting lower fertility and net migration, and higher mortality. The fertility and migration effects reduce the projected size of the working-age population (which is also 5.6 per cent smaller), while the mortality effect reduces the projected size of the older population (the population aged 65 and over is 4.4

per cent smaller). The small difference in the scale of these downward revisions raises the old age dependency ratio slightly from the previous projections despite lower life expectancy. It reaches 46.8 per cent in 2067, up from 46.2 per cent in the previous projections.

3.12 Looking at specific age groups in more detail, the changes between projections include:

- For **children aged 0-15**: a small upward revision in the short term, resulting from higher net inward migration of children. From 2020 onwards, that is more than offset (and by increasing amounts) by lower fertility rates and a smaller population of adults at childbearing ages. By 2067 the population in this age group is 7.4 per cent smaller than previously assumed.

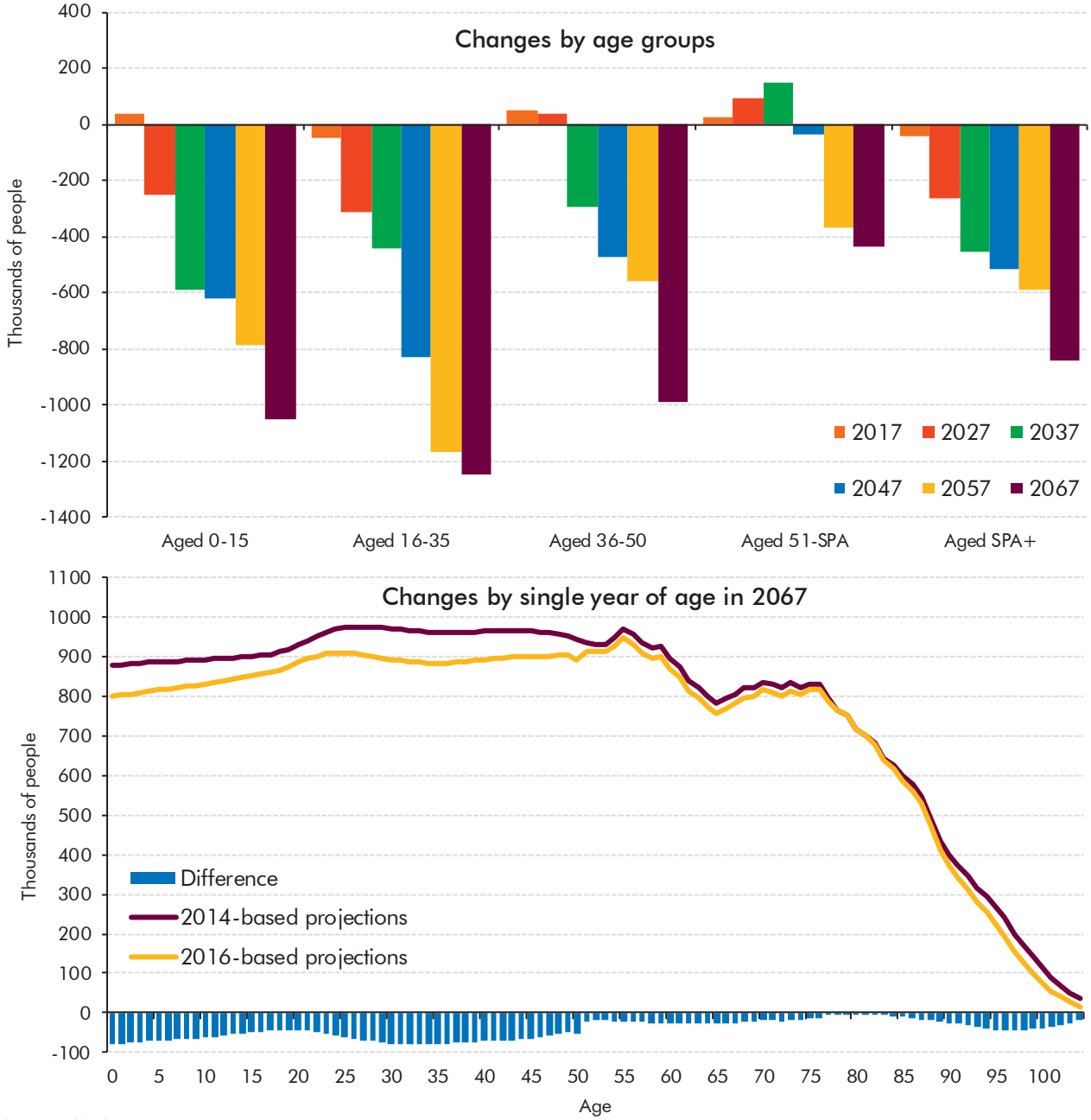
- For **young adults aged 16-35**: a downward revision in every year, which grows over time. Lower net inward migration at these ages more than accounts for the change (although net inward migration still mostly occurs within this age bracket). In the long term, this fall is increasingly amplified by cohort effects, as fewer births in previous decades feed through to the adult population. By 2067 the population in this age group is 6.5 per cent smaller than previously assumed.

- For **prime-age adults aged 36-50**: a small initial upward revision, resulting from slightly higher net migration at these ages. Again, this is outweighed in the long term by cohort effects resulting from lower net inward migration at younger ages and fewer births. As prime-age adults are the most tax-rich age group (see Chart 3.10), this has consequences for our receipts projections. By 2067 the population in this age group is 6.8 per cent smaller than previously assumed.

- For **older working-age adults aged 51 to the State Pension age** (SPA): initially an upward revision, resulting from higher net migration at this age. Cohort effects first increase this revision (due to higher migration in the preceding age bracket) and then offset it (due to lower migration in the age bracket before that). By 2067 the population in this age group is 2.7 per cent smaller than previously assumed.

- For **pensioners** aged above the SPA: a downward revision that builds over time, due to higher mortality. That is consistent with recent data showing more deaths than the previous population projections had assumed, particularly at the oldest ages. By 2067 the population in this age group is 4.6 per cent smaller than previously assumed.

Chart 3.3: Revisions to the population age-structure in the latest ONS projections



Source: ONS

Economic assumptions in the long-term projections

3.13 Our projections for GDP are informed by our view of the average trend growth in productivity or output per hour (informed by its historical path) and labour supply (based on age-specific labour market participation trends and the ONS population projections). Over longer time horizons, the difference between output growth and the real interest rate paid on government debt is also crucial in determining the dynamics of debt sustainability.

3.14 Table 3.3 lists the underlying long-term assumptions used in our projections. Our latest economic forecast shows the gap between actual and potential output closing by the end of the medium term, and we assume the output gap remains closed thereafter. In reality, actual output will fluctuate around its potential as the economy is hit by unexpected shocks, but we do not attempt to predict the scale and timing of such shocks. We illustrated the potential impact on our projections of stylised economic cycles in Box 3.2 of our 2015 *FSR* and explored the impact of cyclical shocks in Chapter 3 of our 2017 *Fiscal risks report*.

Table 3.3: Long-term economic determinants

Annual growth rate, unless otherwise stated		
Labour productivity (per hour)	2.0	OBR assumption
Prices and earnings		
Average earnings	4.2	Product of labour productivity (per hour) and GDP deflator
Public sector earnings	4.2	Assumed to grow in line with private sector
GDP deflator	2.2	Constant from end of forecast
CPI	2.0	Constant from end of forecast at inflation target
RPI	3.0	Calculated as CPI plus 1.0 percentage points
RPIX	2.8	Calculated as CPI plus 0.8 percentage points
'Triple lock'	4.6	Calculated as average earnings plus 0.36 percentage points
Interest rates (per cent)		
Gilt rate	4.7	Calculated as nominal GDP growth plus 0.2 percentage points
Bank Rate	4.7	Calculated as nominal GDP growth plus 0.2 percentage points
Employment growth		
Total employment growth	0.23	Consistent with population, participation and employment projections
Public sector workforce growth	0.23	Broadly in line with total employment growth
Memo: average real GDP growth	*2.2*	*Product of labour productivity (per hour) and employment growth*
Memo: average nominal GDP growth	*4.5*	*Product of real GDP growth and GDP deflator*

3.15 Our latest medium-term forecast runs to 2022-23, so these long-term assumptions are now applied from 2023-24 onwards. The exceptions to that are:

- **interest rates**, which are assumed to stabilise in 2037-38;
- **RPI inflation**, which is assumed to stabilise at the rate determined by the long-term wedge relative to CPI once interest rates reach a steady state in 2037-38;
- **productivity growth**, which is assumed to converge to its steady-state rate by 2030-31; and
- **average earnings growth**, which is assumed to stabilise once productivity growth reaches a steady state in 2030-31.

Productivity growth

3.16 In our November 2017 *EFO* we reassessed the hypotheses put forward to explain the weakness in productivity since around the time of the financial crisis. This led us to revise down our forecasts for trend productivity growth. We now assume that trend hourly productivity growth will rise slowly to 1.2 per cent in 2022, significantly lower than the 1972 to 2007 average of 2.1 per cent.

3.17 We assume in our long-term projections that this post-crisis weakness in trend productivity growth will ultimately fade, returning to 2.0 per cent a year after an extended period. Specifically, we assume that productivity growth will rise by 0.1 percentage points a year from 2023-24 until it reaches 2.0 per cent in 2030-31. Given our uncertainty about the causes of the slowdown in the rate of productivity growth, there is necessarily also considerable uncertainty about whether, and how quickly, productivity growth will recover. Many other paths are equally plausible.

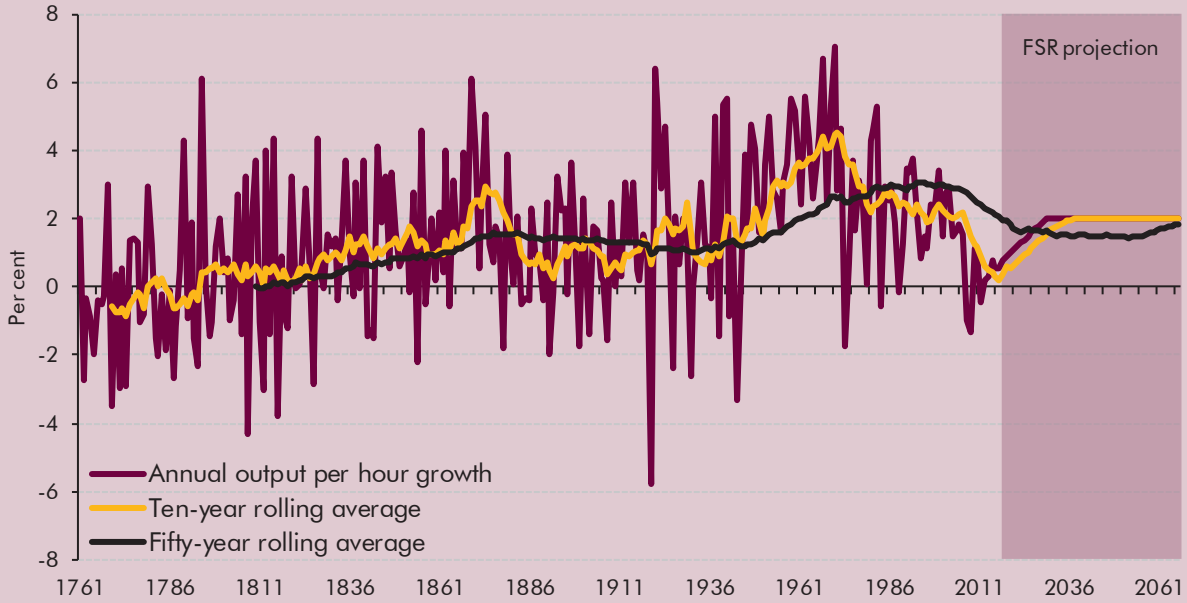
3.18 Specific sources of uncertainty around the path of potential output at present relate to the UK's exit from the European Union in March 2019, as we still do not yet know completely the post-exit policy settings or the longer-term impact of those arrangements on productivity, and the recent increases in trade barriers between some major industrialised nations and trade blocs, which could weigh on global productivity gains. Box 3.1 provides context by exploring the rises and falls in UK productivity growth over the past two and half centuries.

Box 3.1: Productivity growth in the long-term

In November 2017, we revised down our forecast for trend productivity growth following a reassessment of the arguments justifying the judgement that the enduring post-crisis weakness in productivity growth would prove temporary.[a]

Using data compiled by the Bank of England, it is possible to trace the evolution of productivity growth in the UK over the past two-and-a-half centuries. Subject to caveats around the accuracy of such long-run data, Chart A shows that there have been cases where productivity growth has been temporarily depressed, including in the late-nineteenth century 'climacteric' period. Overall, growth in annual output per hour averaged 2.1 per cent over the twentieth century, compared with just 1.1 per cent in the nineteenth. Although there have been large fluctuations from year to year, there has been a discernible upward drift in average productivity growth over the past two-and-a-half centuries, as demonstrated by the ten- and fifty-year rolling averages. That is consistent with some 'endogenous growth' models, which predict gradually rising growth over time, essentially because of increasing returns.[b] More recently productivity growth has been lower, reflecting the experience since around the time of the late-2000s financial crisis, so there is some uncertainty as to the most appropriate assumption for the next fifty years and in particular whether we should put most weight on the experience of the past decade, or the longer-run trends evident in the chart.

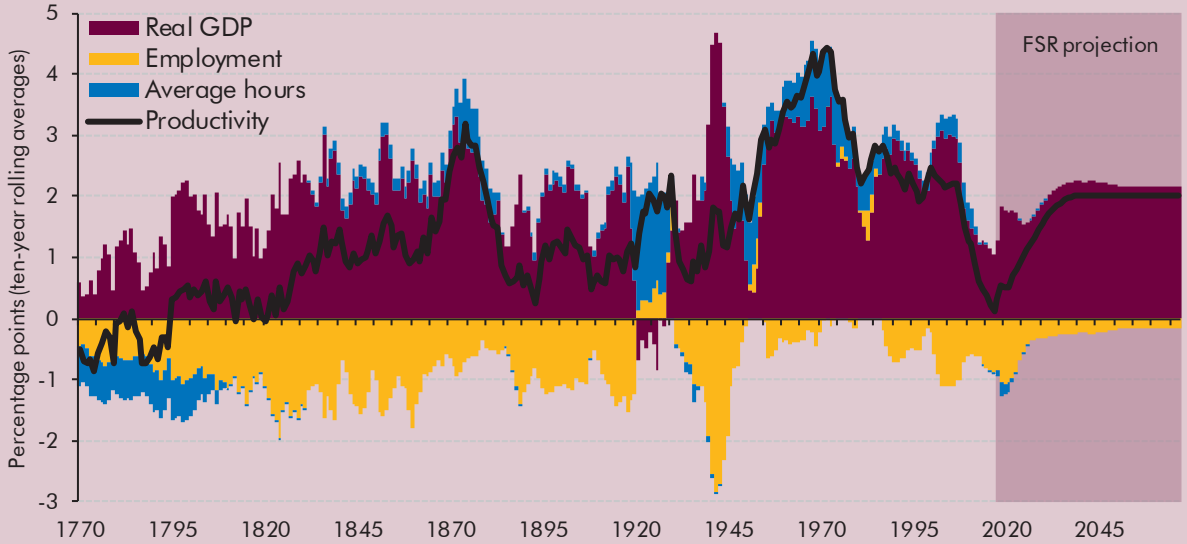
Chart A: Productivity growth over two-and-a-half centuries



Source: Bank of England, ONS

GDP growth was similar in the twentieth century and the nineteenth, averaging 2.1 per cent in both cases. Higher productivity growth in the twentieth century therefore is associated with weaker growth of total hours worked, due to a combination of weaker employment growth and falling average hours (Chart B). Over our fifty-year forecast period, productivity growth averages 1.8 per cent, somewhere between the averages in the nineteenth and twentieth centuries. GDP growth averages 2.1 per cent, again very similar to the last two centuries, with employment growth again providing a small negative contribution, albeit less so than in the past. Average hours are assumed to remain flat in this decomposition.

Chart B: Contributions to output per hour growth



Note: In the nineteenth century, productivity growth averaged 1.1 per cent, GDP growth 2.1 per cent, employment growth 1.1 per cent and average hours growth -0.1 per cent. In the twentieth century, productivity growth averaged 2.1 per cent, GDP growth also 2.1 per cent, employment growth 0.5 per cent and average hours growth -0.5 per cent.

We have not carried out a full historical sectoral breakdown, but research by the Bank of England has looked at the evolution of sectoral productivity since 2000. Productivity growth has been 1.5 percentage points lower on average since the crisis than in the pre-crisis period, with three quarters of that fall attributable to the manufacturing and financial sectors, and smaller negative contributions from ICT and professional services. Together, these four sectors are found to have been responsible for the entire productivity slowdown, despite representing only around a third of total output.[c] This partly reflects the fact that productivity growth was particularly strong in the manufacturing and financial sectors in the years leading up to the crisis, and some have argued that pre-crisis growth in the financial sector in particular was a result of leverage and risk-taking that in hindsight was unsustainable.[d]

Measured output in the financial sector will also depend on real growth of financial intermediation services indirectly measured (FISIM), which in turn is partly related to growth in the size of banks' balance sheets, as well as to the relevant interest rate spreads. It is not clear that this approach appropriately captures the value added by banks in providing these intermediation services, particularly when those balance sheets are expanding or contracting dramatically, as was the case before and after the late-2000s financial crisis.[e] We expect growth in output per hour to rise steadily towards 2 per cent over the long term, rather than assuming that the recent weakness of productivity growth, which has been driven by a small number of sectors, will persist indefinitely.

We have not produced a sensitivity analysis to show the effect of different productivity growth assumptions here. Given the way our long-term projections are produced, any alternative assumption would affect both the numerator and denominator in the debt-to-GDP ratio, so it would have only a modest effect on the fiscal projections. That is not to downplay either the uncertainty around the trend productivity assumption or its importance for economic well-being, and where our productivity assumptions are used elsewhere for purposes other than producing long-term fiscal forecasts, it will be important to take account of that uncertainty.

[a] See paragraphs 3.19 to 3.30 of the November 2017 *EFO* for a detailed explanation of these arguments.
[b] Romer, P. M. (1986) *Increasing Returns and Long-Run Growth*, The Journal of Political Economy, 94(5), page 1002-1037.
[c] Tenreyro, S. (2018) *The fall in productivity growth: causes and implications*, Bank of England speeches.
[d] Ramsden, D. (2018) *The UK's productivity growth challenge*, Bank of England speeches.
[e] For more details, see Chapter 2 of *Independent Review of UK Economic Statistics*, Professor Sir Charles Bean, March 2016.

Employment growth

3.19 Long-run employment growth combines ONS population projections with our participation and employment rate projections. We calculate an employment rate consistent with an assumed non-accelerating inflation rate of unemployment (NAIRU) of 4.60 per cent of the labour force. We have revised this down significantly from the 5.35 per cent assumption in our November 2016 *EFO* that provided the base for our previous *FSR*. We have described the reasons for revising down our NAIRU assumption in successive *EFOs* over the past year and a half. They largely reflect the continued fall in actual unemployment without signs of upward pressure on wage growth.

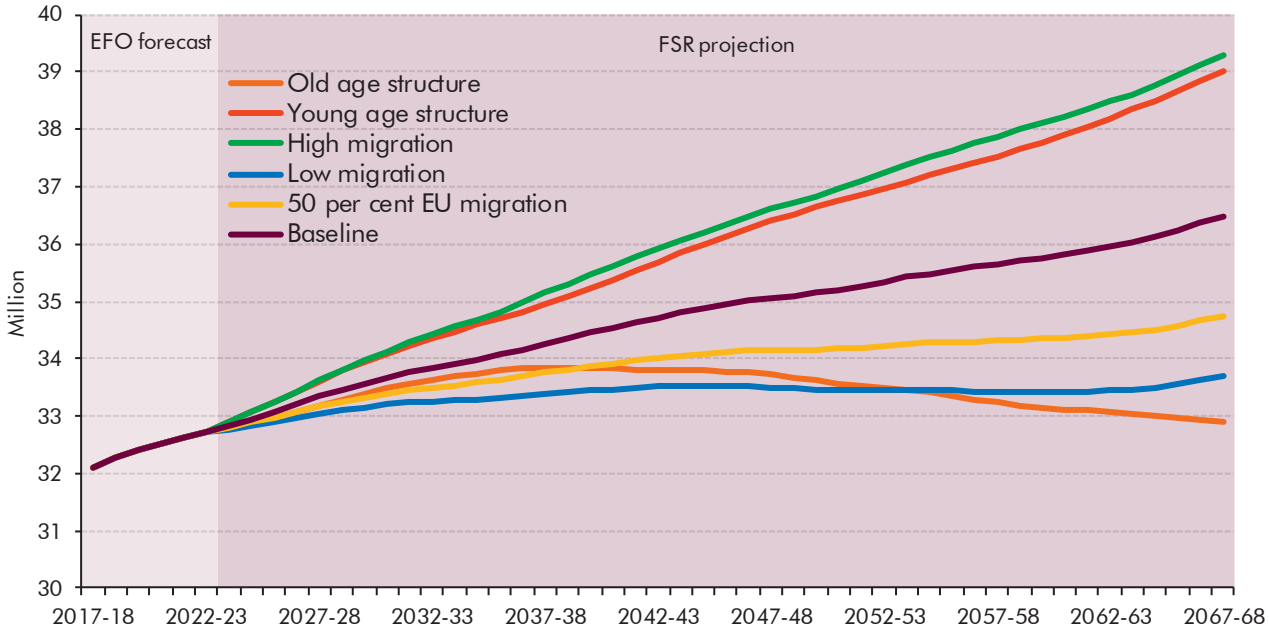
3.20 We adjust participation rates for changes in the SPA set out in Table 3.8. Even though we expect most individuals will carry on exiting the labour market either before or after they

reach the SPA, exit rates do spike around that point. We capture the effect on participation rates of raising the SPA by assuming in effect that exit rates move one-for-one with changes in the SPA, so that a 65-year old when the SPA is 66 has the equivalent exit rate to a 64-year old when the SPA is 65. As in our previous *FSRs*, we smooth this transition over earlier periods, as individuals would be expected to adapt their labour market participation choices over a longer period.

3.21 Combining the population projections with our participation and employment rate projections, we can then project future employment levels as the population ages and cohort sizes vary accordingly. These projections are shown in Chart 3.4. The biggest factor driving these projections is the size of the population rather than the smaller differences in employment rates between the variants that are shown in Chart 3.5.

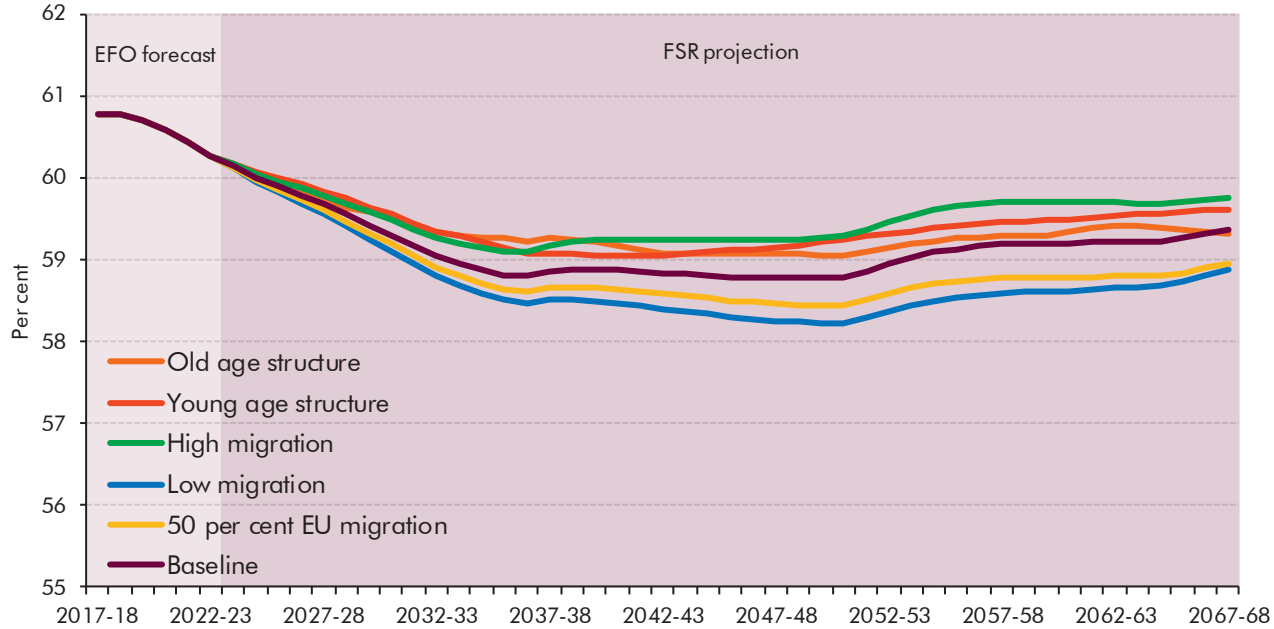
3.22 The employment rate is projected to decline at the start of the long-term projections as it did in our previous *FSR*. But it now increases slightly towards the end of the projection period. This in part reflects slightly accelerated SPA increases, as well as new data on age-specific entry and exit rates, where we use averages for the 21-year period up to 2017. Slower growth in the adult population in the latest population projections dominates these employment rate effects to leave employment growth 0.12 percentage points a year lower on average than in our previous *FSR* at 0.23 per cent a year in the baseline projection.

Chart 3.4: Employment projections (16+ population)



Source: OBR

Chart 3.5: Employment rate projections (16+ population)



Source: OBR

3.23 Table 3.4 summarises the long-term real GDP growth projections consistent with different population variants (the annual projections for each variant are available on our website). Our baseline GDP growth projections are a little weaker than in our previous report, due to the slower return of productivity growth to steady state and lower employment growth.

Table 3.4: Real GDP growth projections

	Annual GDP growth, per cent				
	2017-18 to 2027-28	2027-28 to 2037-38	2037-38 to 2047-48	2047-48 to 2057-58	2057-58 to 2067-68
OBR baseline	1.6	2.2	2.2	2.2	2.2
High migration	1.7	2.4	2.4	2.3	2.4
Low migration	1.5	2.1	2.0	2.0	2.1
Young age structure	1.7	2.4	2.4	2.3	2.4
Old age structure	1.6	2.2	2.0	1.9	1.9
50 per cent lower EU migration	1.6	2.1	2.1	2.0	2.1

3.24 We have revised our assumption for long-term growth in the GDP deflator down slightly from 2.3 to 2.2 per cent a year. This figure is constructed bottom-up using assumptions relating to each of the expenditure components of GDP. The downward revision largely reflects updated weights for the different components. We continue to assume that CPI inflation will remain at 2.0 per cent in the long term, consistent with the Bank of England's inflation target. A long-run wedge between RPI and CPI inflation of 1.0 percentage points gives a long-term assumption for RPI inflation of 3.0 per cent a year.

3.25 We assume that the labour share of national income is constant in the long run. Consequently, average earnings growth is equal to the sum of labour productivity growth and whole economy inflation. It rises at 4.2 per cent a year from 2030-31 onwards.

3.26 For the purposes of our long-term projections, we assume that the triple lock on state pensions uprating continues to apply. We have revised up the extent by which we assume that it will exceed earnings growth in the long term on average by 0.02 percentage points to 0.36 percentage points a year. This is the average additional uprating each year if the triple lock had been applied rather than earnings from 1991 to the end of our medium-term forecast in 2022-23. The small change since our 2017 *FSR* reflects outturns for 2017 and revisions to our medium-term forecasts.

3.27 We have kept the difference between the long-term nominal interest rate and nominal output growth at 0.2 percentage points, leaving interest rates close to, but a little above, our growth rate projections. As a result, we have revised down our assumption for the long-term nominal gilt rate to 4.7 per cent. This reflects the downward revisions to growth in employment and the GDP deflator discussed above. We have assumed that it will take a little longer for the forces that have depressed risk-free interest rates in recent decades to unwind than it will for productivity growth to revert to its historical average.

Policy assumptions in the long-term projections

3.28 With the notable exception of recent announcements in relation to health spending, the projections in this report assume that Government policy is unchanged from that which underpinned our March 2018 *EFO*. But Chapter 1 explained that it is often far from straightforward to characterise unchanged policy over a 50-year horizon. Table 3.5 sets out our major policy assumptions for this report.

Table 3.5: Policy assumptions in the long-term projections

Policy	Long-term assumptions in the baseline projections
Taxes	Direct tax allowances and thresholds and indirect tax duty rates uprated in line with earnings from 2023-24. All tax escalators to end by 2022-23.
Health spending	Health spending is consistent with the Government's June 2018 announcement for real terms rises in NHS England expenditure averaging 3.4 per cent a year from 2018-19 to 2023-24. We add this to our pre-announcement baseline. Our pre-announcement baseline is constructed from spending review plans up to 2019-20, plus spending announced in Autumn Budget 2017. We have reclassified more Better Care Fund expenditure away from health to adult social care spending. From 2020-21 to 2022-23 we assume NHS spending rises in line with overall spending. From 2023-24 onwards, health spending is grown by demographic and other cost pressures.
Other departmental spending	Spending by function is consistent with the latest spending review plans out to 2019-20. Functional education current spending beyond the spending review plans and up to 2022-23 are based on changes in general government consumption. From 2020-21 onwards, spending by function is grown in line with nominal GDP, apart from items subject to demographic influences.
Pensioner benefits	State Pension age (SPA) equalises at 65 by November 2018, before reaching 66 by October 2020, 67 between 2026 and 2028 and 68 between 2037 and 2039. Subsequent SPA changes are based on changes in life expectancy. Qualifying ages for other state pensions spending, such as pension credit, and pensioner-related benefits, such as the attendance allowance, rise in line with SPA. Single-tier pension (new State Pension) introduced for people reaching SPA from April 2016. Basic state pension and new State Pension uprated using the 'triple lock' mechanism. Additional pension uprated in line with CPI.
Other benefits (e.g. working age benefits)	All working age benefits uprated with earnings from 2022-23. Universal credit is rolled out to the timetable assumed in our March 2018 forecast.
Student loans	The cap on tuition fees and the repayment threshold is uprated in line with earnings from 2023-24. The pre-2012 loan book is sold, with the final sale taking place before the end of 2021-22. No changes to real interest rate applied to fees and maintenance loans (i.e. 3 per cent during study and between 0 to 3 per cent after graduation, depending on earnings).
Public service pensions	Incorporates previous policy reforms: to increase employee contributions; uprate payments with CPI; and amend scheme benefits in line with the Public Service Pensions Act 2013, including linking pension age to the SPA.

Policy changes over the medium term since *FSR* 2017

3.29 The Chancellor has delivered three fiscal statements since our last *FSR*, the Spring and Autumn Budgets in 2017 and the Spring Statement in March 2018. As Chart 3.6 shows, the overall effect of the policy announcements at these events was to reduce the deficit by £3.2 billion in 2022-23 (including the effect in Autumn Budget 2017 of departmental spending in 2022-23 being cut relative to a baseline where it remained constant as a share of GDP), but to increase it by varying amounts in every year prior to that.

3.30 More significantly, in June 2018 the Prime Minister announced the first five years of what will be a new 10-year spending settlement for NHS England. This set out real terms rises in NHS England resource spending averaging 3.4 per cent a year from 2018-19 to 2023-24 – a £20.5 billion increase in real terms from the 2018-19 baseline (£33.2 billion in cash terms). The 2018-19 baseline included the £800 million cost of the 'Agenda for Change' pay deal, thereby raising spending in every year thereafter. Finally, the announcement included an additional £1.25 billion a year from 2019-20 onwards to pay for "*a specific pensions pressure*" that was created in Budget 2016 when the Treasury reduced the discount rate that would be used to calculate future pension contributions, raising them significantly. The higher pension contributions were factored into our 2017 *FSR*, but were implicitly financed by lower spending on other things. Those implicit cuts elsewhere created the spending pressure that this part of the announcement alleviates.

3.31 What matters for our long-term projections is not the increase in spending relative to a 2018-19 baseline, but the increase relative to what health spending would have been in the absence of the announcement in 2022-23. This pre-announcement path is not fully specified, so we have constructed it from plans up to 2019-20 set out in the 2017 *Public Expenditure Statistical Analyses (PESA)*, plus spending announced in Autumn Budget 2017, less spending allocated by the NHS to adult social care through the Better Care Fund. From 2020-21 to 2022-23, we then assume that NHS spending would have risen in line with overall spending in those years.

3.32 Some further assumptions are necessary to complete a picture of how this announcement raises spending relative to our baseline. First, we assume the entire increase in NHS England's resource budget is spent on what would be classified as health in functional terms. Second, we assume the same for its 'Barnett consequentials' for Scotland, Wales and Northern Ireland. Calculated in this way, the June announcement increases health spending by £20.5 billion in cash terms in 2022-23, the end of our latest medium-term forecast. Relative to an assumption that health spending would then rise in line with our assumptions about demographic and other cost pressures, the effect would be £21.0 billion in 2023-24. That would add 0.9 per cent of GDP to the starting point in 2022-23 for health spending relative to what would otherwise have been the case.

3.33 Given the size and specificity of this announcement, and the substantial impact that higher health spending has on our long-term fiscal projections, we have included the effects of this announcement in our baseline projections for this report. The Government has not set out in any detail how the extra spending will be funded, so we have not changed any other medium-term tax or primary spending assumptions in generating the starting point for these projections. Pending a detailed EU Withdrawal Agreement, and related public spending decisions, we have assumed that the additional health spending adds to total spending rather than being absorbed in part by the reduction in direct net financial contributions that we assume will be spent elsewhere in our medium-term *EFO* forecast. This means the extra spending also increases borrowing, debt interest and debt relative to our March 2018 *EFO*, as shown in Tables 3.6 and 3.7. The true effect over the medium term will not be known until the Government specifies how it will be financed.

Table 3.6: Medium-term health spending and related adjustments (£ billion)

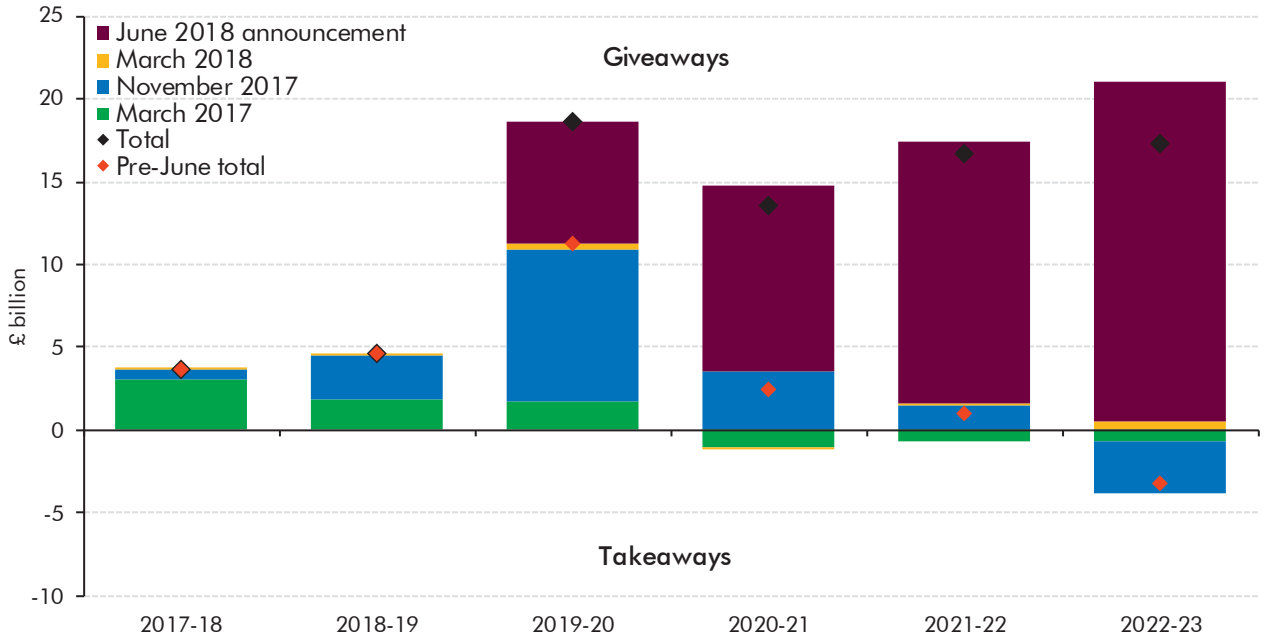
	£ billion					
	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Health spending						
Pre-announcement baseline	145.6	150.2	152.0	154.8	157.8	161.3
Post-announcement projection	145.6	150.2	159.4	165.9	173.4	181.8
Change	0.0	0.0	7.3	11.1	15.7	20.5
Net interest spending						
Pre-announcement baseline	37.2	34.2	33.5	33.3	34.0	34.6
Post-announcement projection	37.2	34.2	33.5	33.4	34.4	35.4
Change	0.0	0.0	0.0	0.1	0.4	0.7
Net borrowing						
Pre-announcement baseline	45.2	37.1	33.9	28.7	26.0	21.4
Post-announcement projection	45.2	37.1	41.2	40.0	42.1	42.6
Change	0.0	0.0	7.3	11.3	16.1	21.2
Net debt						
Pre-announcement baseline	1783	1835	1880	1868	1841	1893
Post-announcement projection	1783	1835	1887	1887	1875	1948
Change	0.0	0.0	7.2	18.2	33.7	54.3

Table 3.7: Medium-term health spending and related adjustments (per cent of GDP)

	Per cent of GDP					
	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Health spending						
Pre-announcement baseline	7.1	7.1	7.0	6.9	6.8	6.8
Post-announcement projection	7.1	7.1	7.3	7.4	7.5	7.6
Change	0.0	0.0	0.3	0.5	0.7	0.9
Net interest spending						
Pre-announcement baseline	1.8	1.6	1.5	1.5	1.5	1.5
Post-announcement projection	1.8	1.6	1.5	1.5	1.5	1.5
Change	0.0	0.0	0.0	0.0	0.0	0.0
Net borrowing						
Pre-announcement baseline	2.2	1.8	1.6	1.3	1.1	0.9
Post-announcement projection	2.2	1.8	1.9	1.8	1.8	1.8
Change	0.0	0.0	0.3	0.5	0.7	0.9
Net debt						
Pre-announcement baseline	85.6	85.5	85.1	82.1	78.3	77.9
Post-announcement projection	85.6	85.5	85.4	82.9	79.8	80.2
Change	0.0	0.0	0.3	0.8	1.5	2.3

3.34 Chart 3.6 summarises the effects of Government decisions since *FSR* 2017 on the 2022-23 starting point for our latest projections. These are dominated by the June 2018 health announcement. The profile of their effect on borrowing in the years prior to 2022-23 does not affect our projections of the primary balance, but because they represent a net giveaway across those years, they do raise net debt and, consequently, net interest spending.

Chart 3.6: Total effects of Government decisions since *FSR* 2017

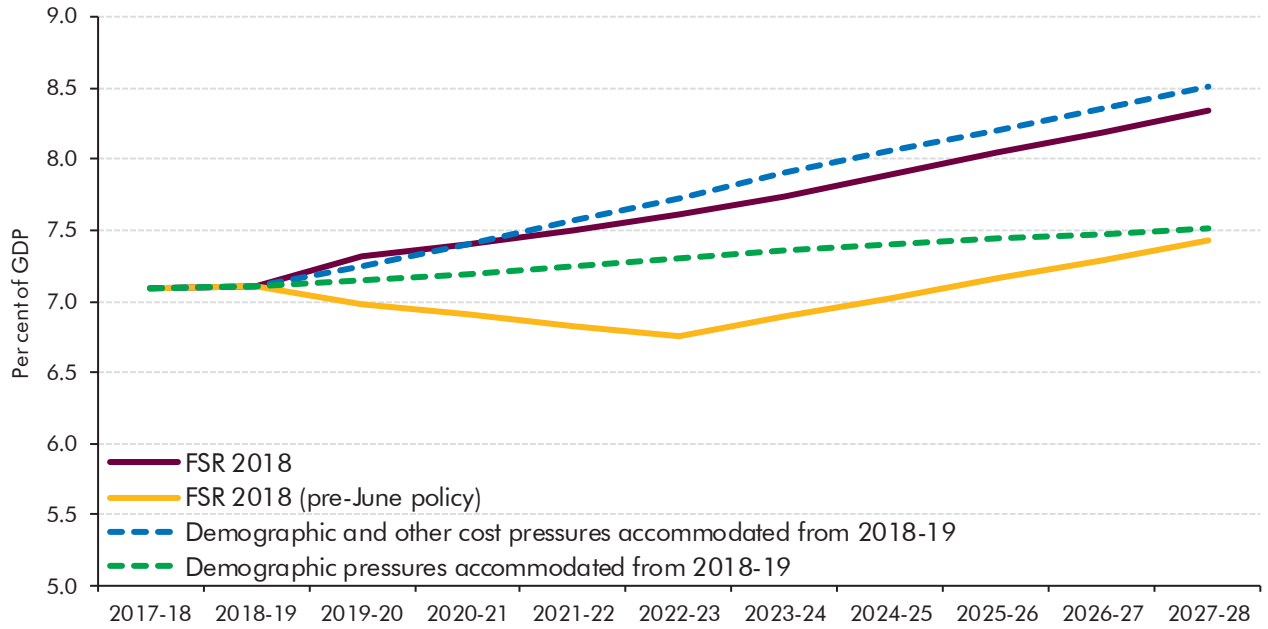


Source: OBR

3.35 Chart 3.7 shows what the June announcement implies for the overall path of health spending as a share of GDP on the assumptions described above. Rather than falling by 0.3 per cent of GDP between 2018-19 and 2022-23 as would have been the case absent the announcement, it rises by 0.5 per cent of GDP, a material difference. But how would that compare with a path for health spending that accommodated only demographic pressures over this period, while holding age-specific spending flat as a share of GDP? And with a path that also factored in other cost pressures, based on the assumptions set out from paragraph 3.49? The chart suggests that the announced increase would be sufficient to accommodate projected ageing of the population over this period (with 0.3 per cent of GDP to spare in 2022-23), but that if the assumptions we make about non-demographic cost pressures were representative of the coming years, it would fall short by 0.1 per cent of GDP in that year.

3.36 There is of course much uncertainty about the assumptions underpinning these illustrative paths – around the age structure of the population, age-specific demand for health services and particularly the extent of non-demographic cost pressures in any year or the scope for cost-saving efforts to offset them – so they should not be interpreted as a judgement about whether the proposed level of spending in 2022-23 is too high or too low relative to any absolute estimate of 'need' in that year.

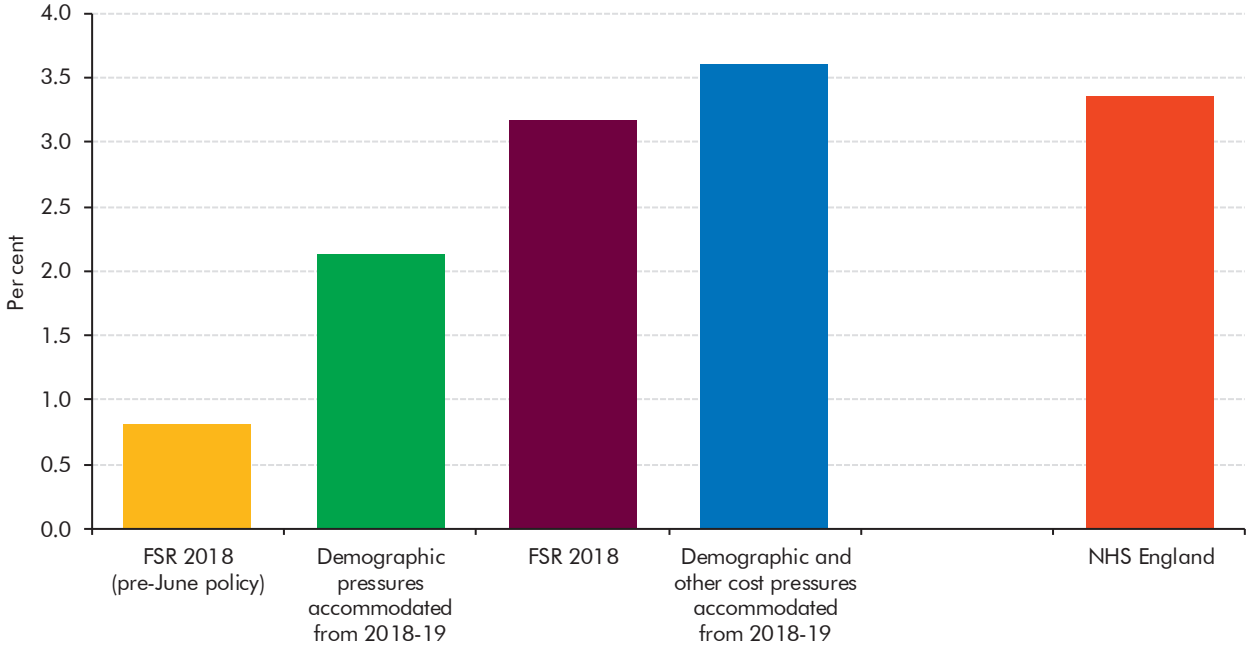
Chart 3.7: Government announcement relative to health spending pressures



Source: HMT, OBR

3.37 Chart 3.8 shows the average real growth rates between 2018-19 and 2023-24 for the same four variants shown above, plus the Government's NHS England announcement absent any of the further assumptions we have made. While NHS England's spending rises in real terms by 3.4 per cent a year on average over the period, total health spending in our baseline projection rises by 3.2 per cent a year because not all health spending on a functional basis is affected. Excluding the announcement, the total would have increased by just 0.8 per cent a year on average. The illustrative path factoring in demographic pressures rises by 2.1 per cent a year and that with non-demographic pressures too rises by 3.6 per cent a year (0.4 percentage points faster than in our baseline projection).

Chart 3.8: Average real growth in health spending from 2018-19 to 2023-24



Source: OBR

State Pension age

3.38 The Government has legislated for a review of the State Pension age (SPA) to take place at least once every six years; in effect once in each Parliament. At the review in 2017, the Government announced its intention to bring forward the SPA increase to 68 from 2044-46 to 2037-39, and to commit to 'up to 32 per cent' as the proportion of adult life people should expect to spend in receipt of state pension. The Government also announced that it did not intent to formalise policy beyond 2037-39 at this stage. Box 3.2 contains further information on the Government commissioned reports that informed the review.

Box 3.2: Reviews of the State Pension age

The Government commissioned two reports published in 2017 to assist its review of the State Pension age (SPA): an independent review by John Cridland[a] and a report by the Government Actuary's Department (GAD).[b] The GAD report explored two scenarios, each examining the SPA path implied by a different proportion of adult life an individual might expect to live in retirement. The Cridland report examined SPA sustainability more generally.

Independent review of the State Pension age: Smoothing the transition

The Cridland report was forward looking. It did not cover any existing arrangements before April 2028, which are already legislated for. The primary focus was the sustainability of the current system, life expectancies and the challenges faced by those most reliant on the state pension.

It concluded that the SPA should rise from 67 to 68 by 2039, seven years earlier than the Government's previous timetable. It estimated that this would reduce state pension spending to 6.7 per cent of GDP in 2066-67, 0.3 percentage points lower than projected in our 2017 *Fiscal sustainability report*. Intuitively, this reflects fewer state pension recipients, plus a boost to GDP

driven by a higher employment rate. The report recommended that future SPA increases should be in line with longevity expectations, although by no more than one year in each decade.

The report recommended that the state pension should remain a single-tier pension (after the equalisation of the SPA by November 2018), although it also recommended that there should be additional means-tested support one year before any SPA increase for those who are unable to work longer due to ill health or caring responsibilities.

The report also recommended that the 'triple lock' should be abolished and replaced with an average earnings link. The cost of the triple lock relative to earnings uprating reaches 1.0 per cent of GDP in the state pensions projections we set out in this *FSR*.

Periodic review of rules about State Pension age: Report by the Government Actuary

GAD produced an indicative report evaluating the impact of the 'up to a third of adult life' principle – often referred to as the longevity link. It reviewed the SPA timetable based on two separate scenarios: the previous 33.3 per cent and an alternative 32 per cent of adult life (where adult life begins at age 20). Under both scenarios, GAD found that the increase in the SPA from 67 to 68 would have to be brought forward when compared with the then current legislation.

It is worth noting that both reports were produced before the latest ONS population projections were available, so do not reflect the higher mortality assumptions in those projections.

[a] John Cridland CBE, *Independent review of the state pension age: Smoothing the transition,* March 2017
[b] GAD, *Periodic review of the rules about State Pension age: Report by the Government Actuary*, March 2017

3.39 Since our 2014 *FSR* we have incorporated the core principle announced by the Coalition Government in Autumn Statement 2013, namely that an individual should spend, on average, up to one third of their adult life (beginning from age 20) over the SPA, with at least ten years' notice provided and changes being phased in over two years.[2] We interpreted this as one third or 33.3 per cent in our baseline projections. The Government's announced intention to use a 32 per cent definition therefore reduces time spent in receipt of the state pension in our baseline projection by, on average, 1.3 percentage points of adult life relative to our previous assumption. On unchanged demographic assumptions, this would bring forward SPA increases in the coming decades. However, in our latest projection this effect is largely offset by the more pessimistic view of future improvements in mortality rates in the latest ONS population projections.

3.40 Table 3.8 shows the legislated or Government-committed SPA increases used in this *FSR* and how they have changed since *FSR* 2017. Applying the 32 per cent principle to the population projections used in *FSR* 2017, the SPA increases to 68 and 69 would both have been brought forward by more than a decade. Adding in the more pessimistic mortality assumptions, and the Government's new commitment to 2037-39 as the date for raising the SPA to age 68, pushes the subsequent increases back again. Our new baseline path is therefore little changed from the path used in our previous fiscal projections. The increase to age 70 still lies just outside our 50-year horizon in 2068, although some anticipatory effect on labour market participation has been factored into the end of our projections.

[2] DWP, *The core principle underpinning future State Pension age rises: DWP background note*, December 2013.

Table 3.8: Changes to the baseline State Pension age path since *FSR* 2017

State pension age	Year within which the rise is fully implemented			
		Variant		
	Legislated[1]	*FSR* 2017	*FSR* 2017 (32 per cent)	*FSR* 2018
66	2020	2020	2020	2020
67	2028	2028	2028	2028
68	2039	2041	2031	2039
69		2055	2042	2054
70			2056	2068

[1] The Government has announced its intention to bring forward the increase to 68 to 2039 (currently legislated to take place by 2046).

3.41 Table 3.9 sets out our projections of what the new longevity link would imply under the old age structure and young age structure variants of the population projections. As in our previous report, under the young age structure variant lower life expectancy would imply no further increases in the SPA beyond 67 over the next 50 years. By contrast, under the old age structure variant, the longevity link would imply a succession of additional increases in the SPA from the 2030s onwards, reaching 72 by the end of our projection period. In this variant, life expectancy for a 72-year old in 2067 is projected to be around 95 years, while the population would contain over 450,000 million people aged 100 and over, an increase from the current level of around 13,000 and twice those in the principal projection.

Table 3.9: Projected changes to the State Pension age over the next 50 years

State Pension age	Year within which the rise is fully implemented			
		Population variant		
	Legislated[1]	Young age	Baseline	Old age
66	2020	2020	2020	2020
67	2028	2028	2028	2028
68	2039		2039	2031
69			2054	2037
70			2068	2046
71				2054
72				2063

[1] The Government has announced its intention to bring forward the increase to 68 to 2039 (currently legislated to take place by 2046).

Expenditure on public services

3.42 One of the main sources of change in the fiscal position over our long-term projections is the path of spending on public services, such as health and education. We factor in two main sources of pressure: demographics (e.g. population ageing affecting health spending or growth in the number of children affecting education spending) and non-demographic cost pressures in the health sector.

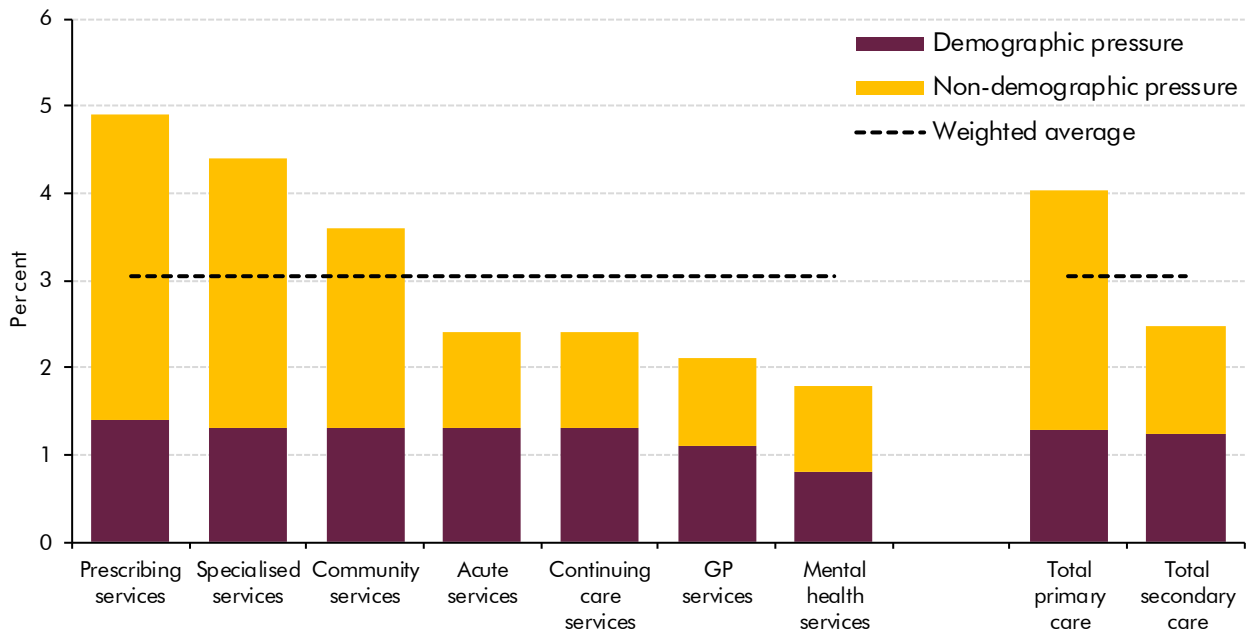
3.43 For public services, we assume an underlying real increase in expenditure per capita in line with average earnings and whole economy productivity growth (i.e. 2.0 per cent a year from 2030-31 onwards). This implies that – absent any changes in the demographic profile or assumptions about other cost pressures in health – spending would remain flat as a share of GDP. By locking in that position, we take no account of potential cyclical swings in output in later years that may lead to spending temporarily rising or falling as a share of GDP.

Non-demographic cost pressures in health spending

3.49 In our *Working paper No. 9: Fiscal sustainability and public spending on health*, we reviewed the assumptions that underpin our health spending projections against historical evidence on the drivers of health spending and against the assumptions used by international organisations and the US Congressional Budget Office. We concluded that, alongside income and demographic effects, non-demographic cost pressures have been an important driver of past health spending growth. We therefore decided to add an explicit assumption about non-demographic cost pressures in our baseline projection in *FSR* 2017.

3.50 To include other cost pressures in our long-term baseline projection, we make assumptions about the effect of such pressures in the medium term and whether they will remain constant or vary over the longer term. We have used an NHS England estimate for non-demographic cost pressures in 2015-16 – of 2.7 and 1.2 per cent for primary and secondary care respectively – as the starting point of our projections (Chart 3.9).[4] The NHS has not repeated this exercise for 2016-17 or 2017-18, so this starting point is unchanged from our previous report. We assume these pressures decline over time as health spending takes up an ever larger share of national income. Specifically, we have assumed a linear convergence for both primary and secondary care to a 1.0 per cent a year increase from 2038-39 onwards. Given the huge uncertainty and significance of these assumptions, we test the sensitivity of our results to alternatives.

Chart 3.9: Non-income-related health spending pressures in 2015-16



Source: NHS England, OBR

[4] NHS England (2016), 'NHS Five Year Forward View: Recap briefing for the Health Select Committee', May.

3.44 The starting point is an important assumption for our long-term projections. The Government set out detailed spending plans in the 2015 Spending Review, but has announced several changes since then. In our baseline projection, we start from estimates of functional spending at the end of our March 2018 forecast period in 2022-23. For health spending, we also factor in the Government's June 2018 announcement of additional spending up to 2023-24, as described above.

3.45 From our 2022-23 starting point (2023-24 for health), we apply demographic projections to capture the effect of changes in the population structure on expenditure. We do not make an explicit assumption about the level of service this implies, which will depend on factors such as public sector productivity and the demand for public services. For health spending, we assume that non-demographic cost pressures – e.g. technological advances that allow more health conditions to be treated or increased demand to treat chronic conditions – are accommodated, placing spending on a steeper upward trajectory than would be implied by population ageing alone. This is described more fully later in this section.

Tax and benefit uprating

3.46 In our medium-term forecasts, we base the uprating of income tax and NICs allowances and thresholds on stated Government policy – including its default uprating assumptions set out alongside each Budget (typically that they will rise in line with inflation) and any other policies announced at fiscal events. But because earnings are expected to rise more quickly than prices in the long term (due to productivity growth), inflation uprating would result in the average tax rate rising steadily over time as more income moves into higher tax bands. This is known as 'fiscal drag'. It would not be realistic to assume that this would be allowed to continue indefinitely. Indeed, estimates of the long-run relationship between tax revenues and GDP suggest that in practice other factors have, on average, offset fiscal drag.[3]

3.47 As in previous reports, we therefore assume that allowances and thresholds rise with earnings rather than prices beyond the medium-term horizon, turning off fiscal drag after five years. If income tax and NICs thresholds were raised in line with inflation rather than earnings between 2022-23 and 2037-38, fiscal drag would increase tax revenues by 2.4 per cent of GDP. Income tax revenues would be raised by 2.1 per cent of GDP and NICs by 0.3 per cent of GDP. The effect of fiscal drag on NICs liabilities is much smaller than for income tax, since the marginal tax rate for employee NICs falls to 2 per cent above the upper earnings limit. Fiscal drag therefore leads to lower receipts from employee NICs, offset by higher employer NICs where there is no upper limit.

3.48 A similar issue arises for welfare spending. Uprating working-age benefits with prices rather than average earnings would see the value of those benefits shrink steadily relative to the living standards of the bulk of the population. As in previous reports, we therefore assume that working-age benefits rise in line with earnings in the long term. If benefits and tax credits were uprated by inflation rather than earnings between 2022-23 and 2037-38, spending on working-age benefits would be 1.0 per cent of GDP lower.

[3] See Table 1 of Belinga *et al* (2014).

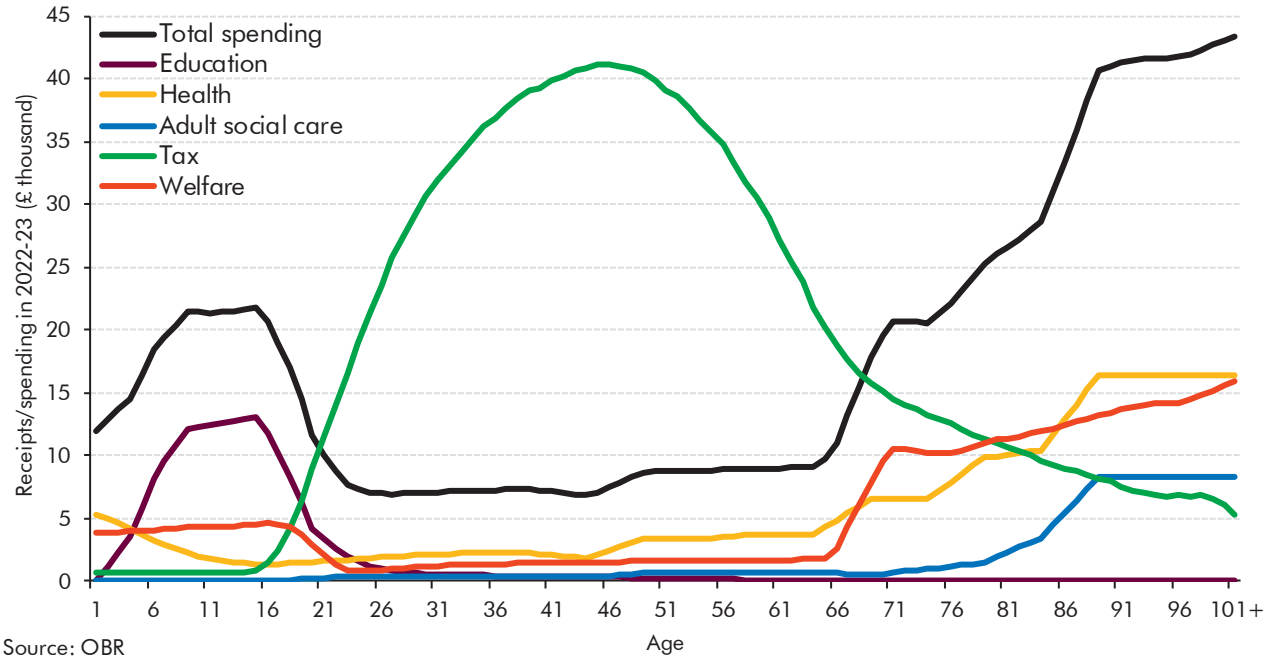
How we project the public finances

3.51 Except for health spending, our projections up to 2022-23 are consistent with our March 2018 *EFO* forecast. From 2023-24 onwards (2024-25 for health), we construct long-term projections of spending and revenue streams through an unconstrained 'bottom-up' analysis. By holding spending and tax revenues per person fixed relative to average earnings (and the labour share of income constant), borrowing would remain flat as a share of GDP in the absence of demographic changes or non-demographic cost pressures.

3.52 Key spending and revenue items are sensitive to both the size and age structure of the population, and our approach to projecting the public finances allows us to isolate the changes in both spending and revenue that would be caused by demographic changes. We make use of individual spending and revenue profiles for males and females, each capturing the age distribution of spending or revenue over a representative individual's lifetime. By applying age profiles and population projections to spending and revenue it is possible to calculate the total spending and revenue per person of a given gender and age. It is this calculation that forms the basis of our projections of the public finances. For all but health spending, these per capita allocations are raised in line with earnings over the projection horizon and combined with population projections to generate future spending and revenue streams. For health spending, per capita allocations are also increased each year to reflect our assumption that non-demographic cost pressures will be accommodated.

3.53 Chart 3.10 shows representative age profiles for public service spending items and for tax and welfare spending. These have been computed by applying the relevant age profiles to our disaggregated spending and revenue forecasts in 2022-23, including the extra health spending announced in June. It shows that in early life, children consume a relatively large amount of health care and state-funded education, while parents can claim child benefit and tax credits on their account. Children make little contribution to tax revenues through their income and spending. During working age, people tend to consume fewer public services and pay more tax, although some will be receiving welfare benefits. In later life, they consume more health care and adult social care and claim pensioner benefits – in particular the state pension – but pay less tax as their incomes and spending decline.

Chart 3.10: Representative age profiles for tax, public services and welfare spending



Source: OBR

3.54 Although we show profiles for welfare and adult social care spending in Chart 3.10, these are not used directly in our baseline projections. The Department for Work and Pensions (DWP) projects social security payments using our economic and policy assumptions. This allows us to incorporate the complexities of these benefits explicitly, including changes in the SPA that affect eligibility for many working-age and pensioner benefits. Projections for long-term care spending are provided by the Department of Health and Social Care (DHSC) based on Personal Social Services Research Unit (PSSRU) projections of demand for adult social care. These are discussed further in Annex B of this report. The Government Actuary's Department (GAD) projects unfunded public service pension payments for us, which adds to the spending covered in Chart 3.10.

3.55 As a result of using different modelling inputs, there are varying degrees of detail for different items within our projections. However, this does not mean that the results are any less subject to the uncertainties that are inherent in any projection over such a long horizon.

Spending and revenue projections to 2067-68

3.56 In this section, we present the results of our bottom-up spending and revenue projections, using the methodology and modelling assumptions outlined above. These projections are not intended to provide a forecast of the actual evolution of spending or revenue. Rather they show what would happen if policy were unchanged and if our other conditioning assumptions also held true. If the projections suggest that the public finances are on an unsustainable path, and that were indeed to prove to be the case in practice, then we would expect a future government to take appropriate corrective action at some point.

Classification changes

3.57 Since *FSR* 2017 there have been two significant changes to public finances methodology:

- The ONS has reclassified English housing associations back into the private sector following legislation relinquishing government controls. This change reduced the deficit in 2021-22 by £4.1 billion and PSND by 3.5 per cent of GDP.

- The introduction of an accruals methodology for corporation tax increased revenues in each year relative to the previous cash methodology, and thus reduced the deficit by 0.2 per cent of GDP.

Public spending

3.58 Table 3.10 shows our baseline spending projections as a percentage of GDP, excluding interest payments on government debt. (Annual series are available on our website.) We project total non-interest public spending to rise from 36.4 per cent of GDP in 2022-23 to 44.6 per cent of GDP in 2067-68. The increase of 8.2 per cent of GDP is equivalent to £172.8 billion in 2018-19 terms. The main drivers of the increase in non-interest spending are health, state pensions and pensioner benefits, due mainly to the Government's announcement of higher medium-term health spending, and the long-term pressures on health spending from an ageing population and rising non-demographic costs.

3.59 Table 3.11 shows changes since our 2017 *FSR*. We have extended the projections from that report to 2067-68 to facilitate comparison between the two sets of figures. Non-interest spending is higher as a share of GDP than projected in our previous report, with the increase between the end of the medium-term forecast and the end of the long-term projection 0.2 per cent of GDP larger. The main drivers of these changes are summarised below and are detailed by spending category later in this chapter. They include:

- Significantly higher spending on **health care** at the end of the medium term (thanks to the June 2018 policy announcement), which compounds over the long term (as ageing and other cost pressures are applied to this higher starting point).

- Higher medium-term spending on **adult social care** (thanks to categorising more Better Care Fund spending under this heading) but slightly lower spending by the end of the projection (due to removing the Dilnot reforms, which the Government has in effect dropped and not yet announced what will replace them). Higher mortality rates and lower unit costs of care also reduce spending by the end of the projection.

- Slightly higher medium-term spending on **education** largely tapers away by the projection horizon due to a lower projected fertility rate than in our previous report.

- Lower spending on **state pensions** across most of the projection period, reflecting slightly accelerated increases to the SPA and more pessimistic mortality assumptions. This is partly offset by the assumption of a higher triple lock premium.

- Higher spending on other **pensioner benefits**. Disability benefits contribute most to the rise, reflecting higher assumed disability benefit incidence in our medium-term forecast, raising the starting point for the projections. Housing benefit has been revised up because we have assumed lower home ownership rates among the elderly.

- Slightly higher spending on **public service pensions** as a per cent of GDP, thanks to the downward revision to cash spending from higher mortality and workforce growth changes being smaller than the downward revision to our GDP projections.

3.60 Lower spending as a share of GDP on adult social care and state pensions is more than offset by the increase in health, pensioner benefits and public service pensions expenditure.

Table 3.10: Non-interest spending projections

	Per cent of GDP						
	Estimate[1]		FSR projection				
	2017-18	2022-23	2027-28	2037-38	2047-48	2057-58	2067-68
Health	7.1	7.6	8.3	9.9	11.3	12.6	13.8
Adult social care	1.2	1.3	1.4	1.6	1.8	1.9	1.9
Education	4.3	4.1	4.0	3.8	3.8	3.9	3.8
State pensions[2]	5.1	5.0	5.0	5.9	6.3	6.6	6.9
Pensioner benefits	0.8	0.8	0.9	1.1	1.3	1.3	1.3
Public service pensions	2.0	2.1	2.1	1.8	1.6	1.6	1.5
Total age-related spending	**20.5**	**20.9**	**21.7**	**24.2**	**26.0**	**27.8**	**29.2**
Other welfare benefits	4.8	4.5	4.5	4.3	4.2	4.2	4.2
Other spending	11.4	11.0	10.9	11.0	11.2	11.2	11.2
Spending[3]	**36.7**	**36.4**	**37.1**	**39.4**	**41.4**	**43.3**	**44.6**

[1] Spending consistent with the March 2018 *Economic and fiscal outlook* .
[2] Includes many items in addition to the basic state pension and single-tier pension, such as pension credit, winter fuel payments and the Christmas bonus.
[3] Excludes interest and dividends.

Table 3.11: Changes in non-interest spending projections since *FSR* 2017

	Per cent of GDP						
	Estimate[1]		FSR projection				
	2017-18	2022-23	2027-28	2037-38	2047-48	2057-58	2067-68
Health	-0.2	0.6	0.6	0.7	0.8	1.0	1.0
Adult social care	0.2	0.1	0.1	0.0	0.0	-0.1	-0.1
Education	0.0	0.1	0.1	0.0	0.0	0.0	0.0
State pensions[2]	-0.1	0.0	-0.2	-0.3	-0.1	0.0	-0.2
Pensioner benefits	0.0	0.1	0.1	0.2	0.3	0.4	0.4
Public service pensions	-0.1	0.1	0.1	0.1	0.2	0.2	0.3
Total age-related spending	**-0.3**	**0.9**	**0.7**	**0.6**	**1.2**	**1.5**	**1.3**
Other welfare benefits	-0.2	0.0	0.0	-0.1	-0.1	-0.1	-0.1
Other spending	-0.6	-0.5	-0.6	-0.6	-0.5	-0.6	-0.5
Spending[3]	**-1.0**	**0.4**	**0.1**	**-0.1**	**0.6**	**0.8**	**0.6**

[1] Spending consistent with the March 2018 *Economic and fiscal outlook* .
[2] Includes many items in addition to the basic state pension and single-tier pension, such as pension credit, winter fuel payments and the Christmas bonus.
[3] Excludes interest and dividends.

Health

3.61 Table 3.10 shows spending on health rising from 7.6 per cent of GDP in 2022-23 (0.6 per cent of GDP higher than in our 2017 *FSR* projection) to 13.8 per cent of GDP in 2067-68 (1.0 per cent of GDP higher than our previous projection). The rise over the long term has therefore increased by 0.4 per cent of GDP to 6.2 per cent of GDP.

3.62 As Chart 3.11 shows, the change in health spending compared to our previous *FSR* is more than explained by the Government's June 2018 announcement that it will increase NHS England's resource budget by 3.4 per cent on average in real terms from 2018-19 to 2023-24. As detailed from paragraph 3.30 above, we have mapped this announcement and its 'Barnett consequentials' onto the UK-wide functional health spending definition used in our projections. It adds 0.8 per cent of GDP to spending in 2023-24 relative to a projection excluding the announcement. Once demographic and other cost pressures over the subsequent 44 years are applied to that extra spending, the announcement increases our projection for health spending in 2067-68 by 1.5 per cent of GDP.

3.63 It may seem counterintuitive that increasing health spending in the medium term, to address some of the immediate apparent pressures on the NHS, leads to greater long-term fiscal pressures. But the June announcement can be interpreted as a crystallisation of medium- and long-term risks that we highlighted in our 2017 *Fiscal risks report*, namely that the medium-term path set out before the announcement would turn out to be politically unsustainable. In effect, the Government has now chosen to accommodate most of the demographic and other cost pressures we assume over the next five years, having not previously planned to do so. That will presumably help maintain the quality and quantity of services, but at the cost of greater long-term fiscal pressure if future governments choose to maintain the resulting higher service levels further into the future.

3.64 Other changes to our health spending projections have been relatively small:

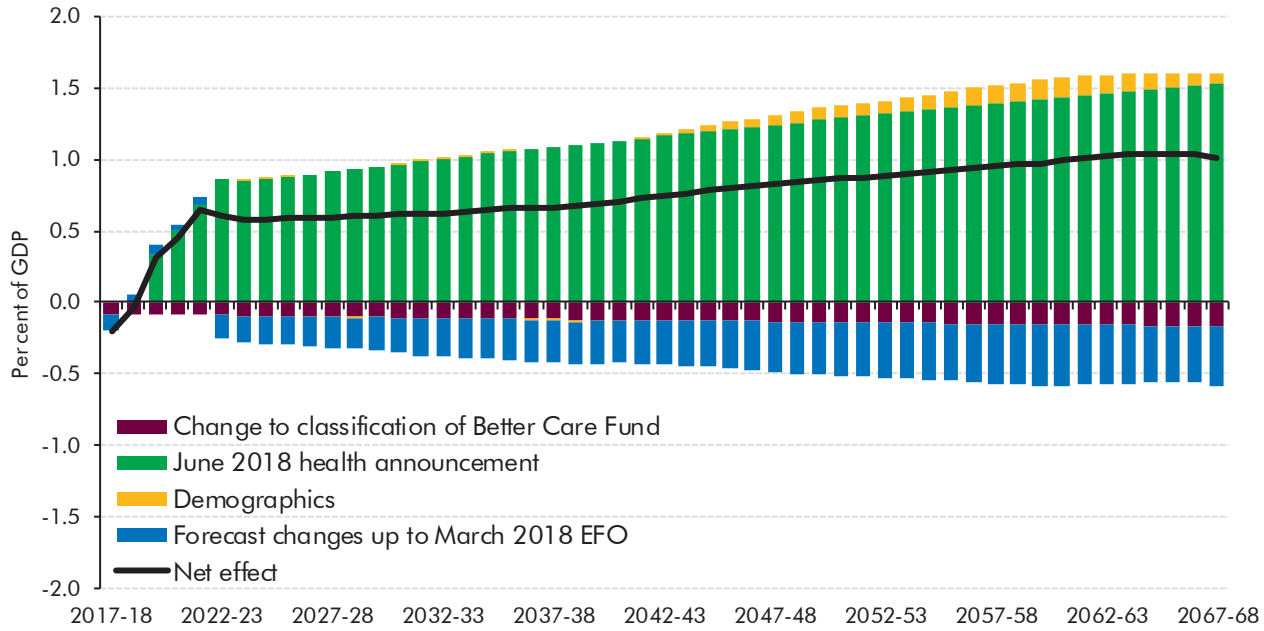
- Absent the June policy announcement, other **medium-term forecast changes** would have reduced health spending in 2022-23 by 0.2 per cent of GDP relative to our previous report. Once cost pressures are applied over the long term, this reduces spending by the end of the projection period by 0.4 per cent of GDP.

- We have shifted more **Better Care Fund** (BCF) expenditure from our health projection into the adult social care projection to better reflect how the BCF is being used. This reduces health spending by 0.1 per cent of GDP in 2022-23 and 0.2 per cent of GDP in 2067-68.

- The new ONS population projections show a **higher old-age dependency ratio**, despite a more pessimistic path for future increases in life expectancy. This adds 0.1 per cent of GDP to our health spending projection in 2067-68.

3.65 The assumptions we make about continuing non-demographic 'other cost pressures' over the long term, on top of the demographic pressures, are unchanged from our previous *FSR*. We also continue to assume that any increases in life expectancy are split evenly between extra time in good health and ill health.

Chart 3.11: Decomposition of changes to health spending since *FSR* 2017



Source: OBR

3.66 Including other cost pressures has a very large effect on our baseline health spending projection. There is significant uncertainty over the level that these cost pressures will converge on in the future and the speed at which they will reach that level. Unfortunately, no new estimates of these pressures have been produced since our previous *FSR* to allow us to test these assumptions. The sensitivity of our debt projections to different assumptions is explored from paragraph 3.118, while Chart 3.12 shows the sensitivity of our baseline projection for health spending:

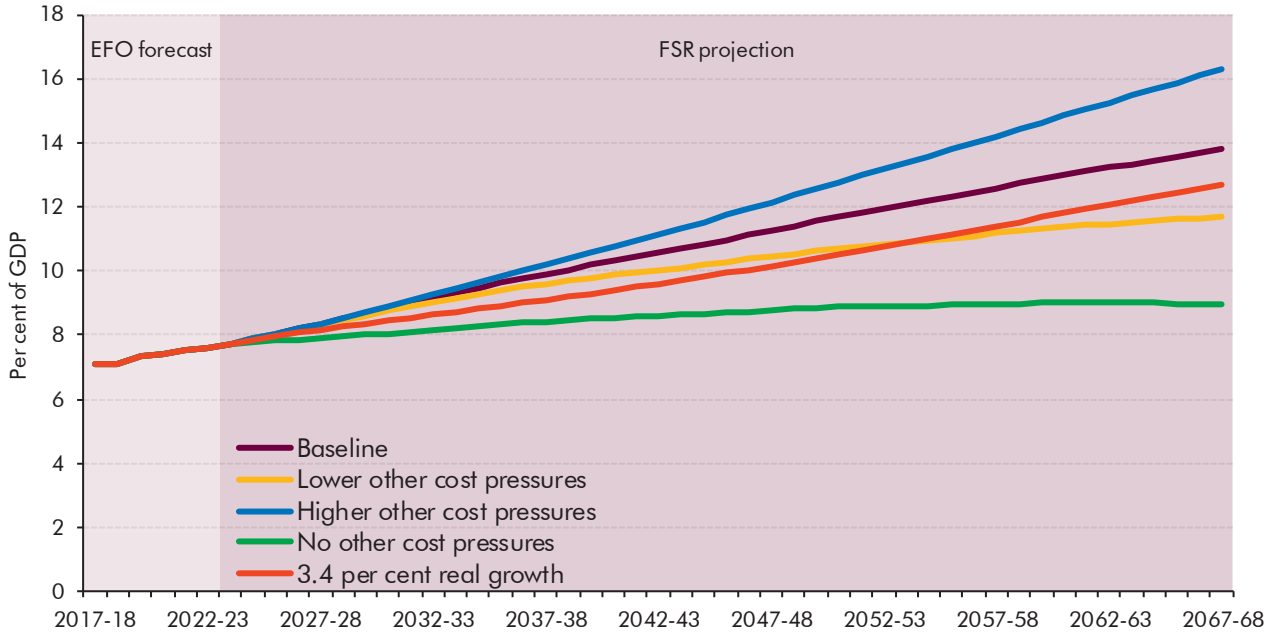
- Under **'lower other cost pressures'**, we have assumed a linear convergence towards a 0.5 per cent a year increase by 2038-39 in each activity. This is lower than assumed in our baseline projection, but reaches steady-state over the same period. Under this scenario, health spending reaches 11.7 per cent of GDP by 2067-68, 2.1 per cent of GDP lower than in our baseline projection. Health spending growth averages 3.2 per cent a year in real terms over the projection period in this scenario.

- Under **'higher other cost pressures'**, we have assumed a linear convergence towards a 1.5 per cent a year increase by 2038-39 in each activity. Health spending reaches 16.3 per cent of GDP by 2067-68, 2.5 per cent of GDP higher than our baseline projection. This gives a 3.9 per cent a year average real growth rate.

- Under **'no other cost pressures'**, health spending follows a much flatter path over the projection horizon, reaching 9.0 per cent of GDP by 2067-68, 4.8 per cent of GDP lower than our baseline projection. It implies real terms growth in health spending averages 2.5 per cent a year over the projection period.

- Under a '**3.4 per cent real terms growth**' scenario, consistent with the average over the next five years that the Government has announced for NHS England, health spending would rise steadily, reaching 12.7 per cent of GDP by 2067-68, 1.1 per cent of GDP lower than our baseline projection.

Chart 3.12: Health care spending under alternative other cost pressure assumptions



Source: OBR

Adult social care

3.67 Spending on adult social care is expected to increase from 1.3 per cent of GDP in 2022-23 to 1.9 per cent of GDP by 2067-68 (see Table 3.11). The increase largely reflects an ageing population and the rising costs of care associated with higher demand and steady increases in life expectancies of successive cohorts.

3.68 Projections for adult social care spending in England are calculated for us by the Department of Health and Social Care, based on 2015 Spending Review settlements and PSSRU projections of demand for adult social care (see Annex B for further detail).[5] We continue to assume levels of spending over the next five years that are consistent with the Spending Review plans and other policies affecting local government financing of social care. In this projection, we have included more BCF spending in our adult social care projection to reflect better how it is being used. Previously a larger proportion was categorised as health spending. This adds around 0.1 per cent of GDP to our adult social care projection.

[5] Wittenberg, Hu and Hancock, *Projections of demand and expenditure on adult social care, 2015 to 2040*, 2018.

3.69 Our medium-term projection assumes that underlying local government spending on adult social care remains flat in nominal terms between 2016-17 and 2019-20, but then incorporates the effects of additional council tax dedicated to adult social care spending, and additional baseline government funding provided through the adult social care support grant and the improved Better Care Fund. As a result, adult social care spending in our baseline projection rises by 19.0 per cent in nominal terms between 2016-17 and 2019-20.

3.70 In July 2015, the Government delayed the introduction of a cap on care costs, part of the Dilnot reforms, by four years to April 2020.[6] In December 2017, it announced that it would "*not take forward the previous Government's plans to implement a cap on care costs in 2020*" and that "*Further details of the Government's plans will be set out after we have consulted on the options*" – in effect dropping the Dilnot reforms.[7] A Green Paper on adult social care was slated for publication around the same time as this report, but was delayed to the autumn as part of the June health spending announcement. We have therefore removed the Dilnot reforms entirely from our baseline projection until such time as the Government makes its policy clear.

3.71 Our updated medium-term assumption for adult social care spending in 2022-23 is 0.1 per cent of GDP higher than in our previous report. By contrast, by the end of the projection spending is set 0.1 per cent of GDP lower than our previous report. This reflects:

- The removal of the **Dilnot reforms** lowers spending on adult social care in 2067-68 by around 0.3 per cent of GDP.
- Reclassifying more of the **Better Care Fund** to adult social care from health adds around 0.1 per cent of GDP in 2067-68.
- The new **ONS population projections** reduce spending on working age adults, and while the old-age dependency ratio has increased relative to the previous projections, the proportion of the elderly who are aged 85 and over, where spending per person is highest, has fallen slightly.
- The adoption of **new estimates of older adults' ability to contribute towards care home fees or the costs of home-based care**. This affects the estimated split between those who can afford self-funded care and those who are state-funded. The new estimates suggest a reduction in the proportion of state-supported users relative to our previous report and therefore a downward pressure on demand for publicly funded services.
- The incorporation of an explicit assumption about the unit-cost pressure generated by the '**National Living Wage**' (NLW). We have assumed that costs will rise by an additional 1 percentage point a year on top of our productivity growth rate forecast up to 2020-21, based on the proportion of the workforce who are currently on or near the national minimum wage or the NLW. Our previous projections made no explicit

[6] Department of Health (2015), 'Delay in the implementation of the cap on care costs', July.
[7] Statement to the House of Commons by the Parliamentary Under-Secretary of State for Health, 'Social Care', 7 December 2017.

assumption about these pressures, noting instead that the extent to which the NLW was expected to rise between 2016-17 and 2020-21 was less than the extent to which adult social care spending was expected to rise over the same period, once additional council tax rises had been factored in.

Education spending

3.72 Education spending is partly determined by demographics, but it is not projected to be a source of additional spending pressure over the coming decades.

3.73 Spending in 2022-23 is consistent with 2015 Spending Review plans up to 2019-20, beyond which we assume that it grows in line with our forecasts for overall government consumption and investment. From 2022-23 onwards, the latest population projections imply slightly lower spending growth over the long term, mainly due to lower fertility rates and the resulting lower young-age dependency ratio.

3.74 Funding for student loans is treated as a financial transaction rather than spending (because the loans themselves are treated as financial assets for government), so it is not included in the education line in Table 3.10. We discuss student loans later in this chapter.

State pensions

3.75 Spending on state pensions is projected to rise over the long term, from 5.0 per cent of GDP in 2022-23 to 6.9 per cent of GDP in 2067-68, driven largely by demographic trends.

3.76 As discussed earlier, our long-term policy assumptions include the impact of the Government's announced intention to bring forward the SPA increase to 68 from 2044-46 to 2037-39, and to commit to up to 32 per cent as the proportion of adult life to be spent in receipt of a state pension. The Government has not committed to any SPA policy beyond 2039, so our projection for the SPA path beyond this point is based on the latest ONS projections for future life expectancies and the 32 per cent longevity link (see Table 3.8).

3.77 As in previous *FSRs* we assume that the basic state pension and the new single-tier pension are uprated using the triple lock throughout the projection period. This states that the state pension will rise by the highest of earnings growth, CPI inflation or 2.5 per cent. The triple lock would see pension spending rise as a share of GDP if earnings growth was higher than growth in nominal GDP per person or if growth in both earnings and GDP per person were low relative to CPI inflation or 2.5 per cent, as was the case in recent years. So we assume that on average it pushes state pension awards up faster than earnings growth, which given our productivity assumption would be the highest of the three parameters in steady-state.

3.78 In this projection, the effect of the triple lock over the projection period is assumed to be equivalent to earnings growth plus 0.36 per cent a year. This figure is calculated as the average additional uprating each year if the triple lock had been applied rather than earnings from 1991 to the end of our medium-term forecast in 2022. As shown in Chart 3.13, it is in effect a weighted average of:

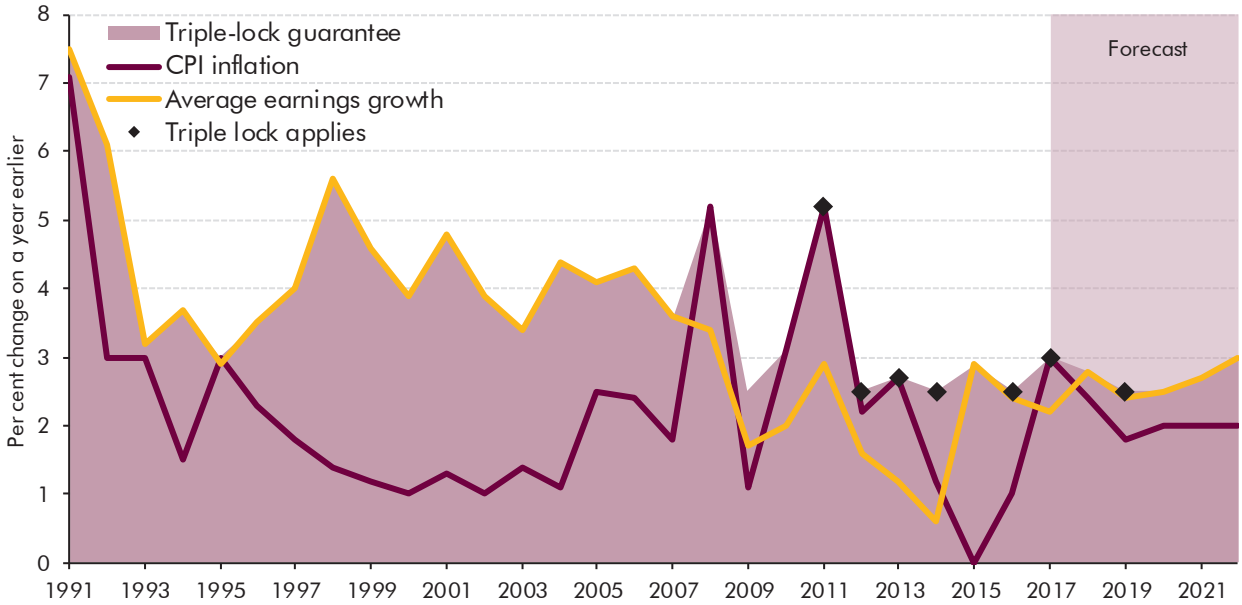
- Sixteen years of zero premium between **1991 and 2007** (with a premium of 0.1 per cent in 1995).

- Ten years in which the premium averaged 1.0 per cent between **2008 and 2017** (of which in five years it was actually in place, pushing state pensions spending up as a share of GDP).

- Six years in the remainder of our **medium-term forecast period**, when we assume productivity growth will recover sufficiently to keep earnings growth above CPI inflation and 2.5 per cent in all but two years. The triple lock applied in 2017 and is assumed to apply in 2019, with an average premium of 0.2 per cent across the two years.

3.79 The premium is a touch higher than our previous assumption of 0.34 per cent, reflecting revisions to our forecasts for earnings growth and CPI inflation since November 2016.

Chart 3.13: Triple lock premium



Note: These figures are used to uprate state pensions in the following financial year.
Source: ONS, OBR

3.80 The baseline projections presented in Table 3.10 are based on the latest population projections and triple lock assumption. Chart 3.14 shows pensions spending projections using a variety of different assumptions, reflecting the ambiguity around the definition of current policy. It shows:

- Our **2017 baseline projection**, based on the 2014-based principal population projection and a triple lock premium of 0.34 per cent above average earnings.

- Our **2018 baseline projection,** based on the 2016-based principal population projection and a triple lock premium of 0.36 per cent above average earnings. This shows how the accelerated SPA path more than offsets the increase in the old age

dependency ratio from the latest population projections to reduce expenditure by 0.2 per cent of GDP in 2067-68. Spending is now expected to peak at 7.0 per cent of GDP in the mid-2060s before dipping slightly at the end of our projection due to the anticipatory labour market effects of the projected increase in the SPA to 70 in 2068.

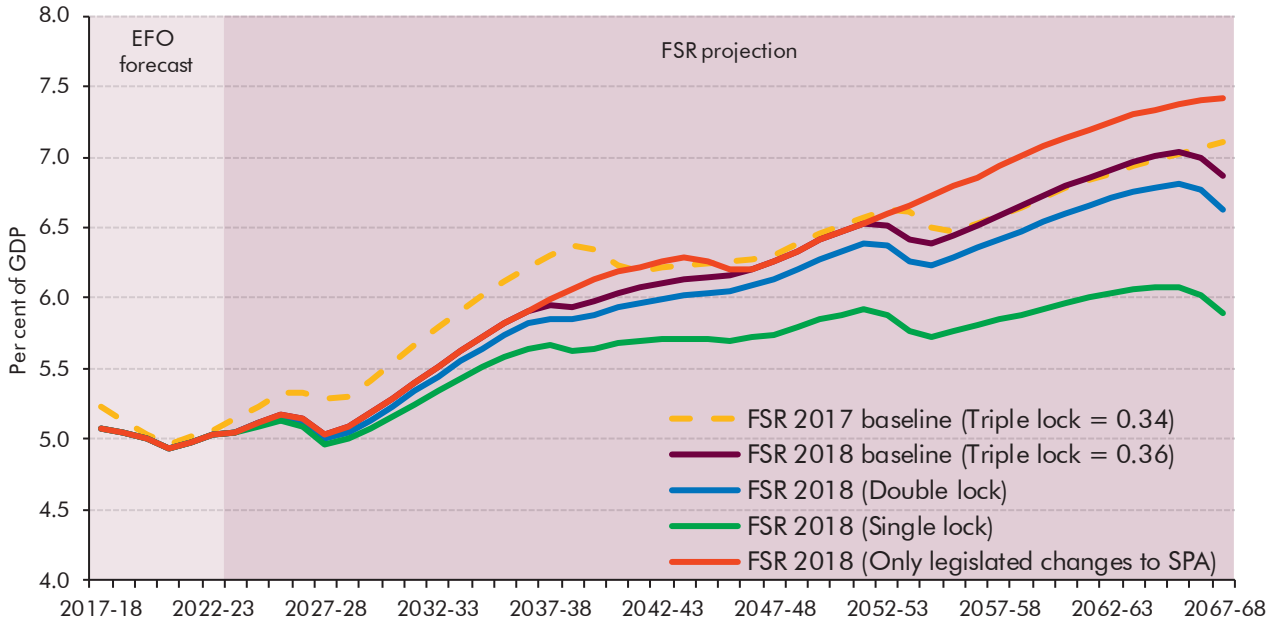
- Our **2018 projection based on a 'double lock'**. For this, we only allow pensions to be uprated by the higher of earnings growth or inflation and not the 2.5 per cent element of the triple lock. This shows that spending would be lower by 0.2 per cent of GDP in 2067-68 relative to our baseline projection and by 0.1 per cent of GDP a year on average across the period.

- Our **2018 projection based on a 'single lock'.** For this projection, we only allow pensions to be uprated by average earnings. This shows that spending would be 1.0

- per cent of GDP lower in 2067-68 relative to our baseline projection, a much greater reduction in spending relative to the 'double lock'. It would be lower by 0.5 per cent of GDP a year on average across the period. The reason for this larger fall in spending relative to the 'double lock' projection is due to the infrequency of both average earnings growth and inflation being lower than 2.5 per cent.

- Our **2018 projection based on legislated changes only in the SPA.** Although the Government has announced its intention to bring forward the increase to 68 by 2039, this particular increase is still only legislated to take place by 2046. Therefore, for this projection, the SPA reaches 68 in 2046 and stays there for the remainder of the projection period. This shows that spending would be 0.6 per cent of GDP higher in 2067-68 relative to our baseline projection, and higher by 0.2 per cent of GDP a year on average from 2037-38 onwards. This demonstrates the impact of the ageing population and the old age dependency ratio. If the SPA were fixed there would be an increasing proportion of the population in receipt of the state pension. This is a result of future pensioners living longer than their predecessors.

Chart 3.14: State pensions spending projections



Source: OBR

Public service pensions

3.81 Gross public service pension expenditure (i.e. before offsetting member contributions) is projected to fall from 2.1 per cent of GDP in 2022-23 to 1.5 per cent in 2067-68. This largely reflects reforms introduced since 2010 and the reductions to the public-sector workforce associated with cuts to departmental spending.

3.82 Our projections for cash spending are slightly lower than in our previous report. This is mainly due to our revised earnings and workforce growth assumptions. We continue to assume that the public sector workforce will rise with total employment over the long term, so have revised the growth rate down from 0.35 to 0.23 per cent a year on average in line with lower projected overall employment growth (see paragraph 3.22). The ONS's slower increases in life expectancy also reduce expenditure. However, this downward revision to cash spending is smaller than the downward revision to our GDP projections, leaving spending 0.3 per cent of GDP higher in 2067-68 than in our previous report.

3.83 Employee member contributions to public service pension schemes, which are treated as negative spending, are included in the 'other spending' line of Table 3.10. In cash terms, member contributions have been revised down from our previous report, mainly reflecting lower earnings growth in the early years of the projection. Contributions rise slightly as a share of GDP over time, with expenditure net of contributions moving from 1.7 per cent of GDP in 2022-23 to 1.0 per cent in 2067-68.

3.84 The public service pensions line in our *EFO* forecasts also nets off employer contributions. Employer contributions are a transfer from one part of the public sector to another and therefore fiscally neutral, showing up as positive departmental spending and negative public sector pensions spending. As such, any increase in employer contributions may be

considered as a switch of spending pressures from AME to DEL (reducing net pensions AME spending but increasing pressures on departmental budgets, from which employer contributions are funded). The decrease in the public service pensions discount rate that was announced in March 2016 is one such policy. It is set to increase employer pensions contributions from 2019-20. For the NHS, this has been offset by the June 2018 funding announcement: the Government committed an additional £1.25 billion a year to cover this specific DEL pressure.

Box 3.3: Age-related spending pressures in Europe

Our long-term projections suggest that, left unaddressed, the public sector finances would come under increasing pressure over the next 50 years due to rising age-related spending. Such pressures are common to almost all developed countries, as shown in the European Commission's 2018 *Ageing Report* long-term fiscal projections for EU member states.[a]

For the EU as a whole, the Commission projects that age-related spending – on pensions, health care, adult social care and education – is set to rise by 1.5 per cent of GDP between 2025 and 2065. But, as shown in Chart A, the Commission's projections point to considerable variation between Member States. In France, for example, where pension reforms are projected to have a significant effect on spending during this 40-year window, age-related spending is projected to fall significantly (from 29.9 to 27.2 per cent of GDP, on the Commission's definitions). In contrast, age-related spending in the UK is projected to rise significantly (from 23.0 to 26.2 per cent of GDP). Relative to France, age-related spending in the UK remains lower throughout the projection, largely due to spending significantly less on state pensions.

Chart C: Change in age-related spending in the EU (2025-2065)

Source: European Commission

Table A compares the Commission's projections with our own for the four main elements of age-related spending for the period between 2025 and 2065. The Commission's figures do not factor in the Government's latest health spending announcement. The table shows that:

- The projected rise in **pensions spending** is marginally higher than in our projections (by 0.1 per cent of GDP). This reflects two key differences. First, we assume the longevity link

will result in the SPA increasing more quickly than the current legislated path, whereas the Commission only includes changes that are currently legislated for in its projections. This raises the Commission's projection relative to ours. Second, we assume pensions are uprated in line with the 'triple lock', whereas the Commission assumes earnings uprating. This offsets part of the SPA-related difference.

- The projected rise in **health spending** is considerably lower than in our projections. This reflects the fact that we assume non-demographic cost pressures are accommodated over the long term, whereas the Commission does not (it tests the sensitivity of its projections to this assumption). Partly offsetting that, the Commission assumes an income elasticity of 1.1 in the short term, converging to 1 in the long run, in contrast to the implicit elasticity of 1 underpinning our projections. We both assume that age-specific health status improves over time. Finally, the Commission projections were published before the June 2018 announcement of extra funding for the NHS up to 2023-24.
- The projected rise in **long-term care spending** is higher than our projections. The Commission uses a broader definition of spending than we do, including also cash benefits that are included in our non-pensions welfare spending projections, so these figures are not directly comparable. We also project spending on benefits such as attendance allowance to rise as a share of GDP over this period.
- The projected fall in **education spending** is slightly small than in our projections. This is more-than-explained by differences in the underlying demographic assumptions.

Table A: Comparison of age-related expenditure items

	Per cent of GDP							
	Pensions		Health		Long-term care		Education	
	Level 2025	Change 2025-65	Level 2025	Change 2025-65	Level 2025	Change 2025-65	Level 2025	Change 2025-65
Ageing Report 2018	8.0	1.2	8.2	1.1	1.7	1.0	5.2	-0.1
FSR 2018	7.3	1.3	8.0	5.5	1.3	0.6	4.1	-0.3

[a] European Commission, 'The 2018 Ageing Report: Economic and Budgetary Projections for the EU Member States (2016-2070), 2018

Other welfare benefits

3.85 We project spending on other welfare benefits – largely working-age social security and tax credits plus the marginal saving associated with the move to universal credit – to fall from 4.5 per cent of GDP in 2022-23 to 4.2 per cent in 2067-68. Changes to our medium-term forecast since our previous report have left spending unchanged as a share of GDP in 2022-23.

3.86 Relative to our previous projections, spending is a little lower – by around 0.1 per cent of GDP from the late 2030s onwards. The main sources of change are:

- A large reduction in **working-age welfare benefits** of about 0.2 per cent of GDP on average across the projection period. This largely reflects the downward revisions to tax credits spending in the three forecasts published since our previous report.

- An increase in spending on working-age **disability benefits** averaging about 0.1 per cent of GDP over the projection, reflecting a higher proportion of the population expected to be in receipt of such benefits in our medium-term forecast.

3.87 The relatively flat profile of other welfare benefits from the start of the projection period reflects our assumption that most working-age benefits will essentially move in line with the share of the population that is of working age. The revision to our employment growth assumption also affects these projections, with the employment rate higher and inactivity rate lower than in our 2017 projections. A disaggregation of these projections by type of benefit is available on our website.

Other spending

3.88 Other non-age-related spending includes items such as defence and transport, where we do not assume age-specific profiles. We assume that spending on such items is constant as a share of GDP from 2023-24 onwards. The medium-term path for implied departmental spending is lower than in our previous projections.

3.89 'Other spending' also includes employee contributions to public service pensions (see paragraph 3.83) and revisions to our forecast for depreciation. The latter are offset in receipts and so are neutral for PSNB.

3.90 The 'other spending' category also includes write-offs on student loans, which only affect spending once they crystallise. Under the current 'Plan 2' student loans system, debts unpaid on loans issued after September 2012 will be written off 30 years after the student's first April after graduation, and any amounts written off increase spending at that point. We project that this will increase write-offs from the small amounts at present to around 0.4 per cent of GDP from the mid-2040s. That figure is higher than in our 2017 *FSR*, mostly due to the Government's decision at Autumn Budget 2017 to increase the repayment threshold at which students start repaying their loan. More information on the long-term impact of this policy can be found in paragraph 3.103.

3.91 The National Accounts recording of student loans introduces significant distortions into the medium and long-term projections. We explore these 'fiscal illusions' and whether alternative treatments can provide a truer picture in a working paper.[8]

Receipts

3.92 As with spending, the revenue projections from 2022-23 presented in Table 3.12 reflect changes in the absolute size and age composition of the population. Non-interest revenues are projected to be relatively flat at 36.0 per cent of GDP on average over the projection

[8] Ebdon and Waite, *Working Paper No. 12: Student loans and fiscal illusions,* OBR, 2018.

period. This profile depends crucially on our assumption that tax allowances and thresholds are uprated in line with earnings rather than prices over the longer term. Other things equal, an ageing population may be expected to increase the receipts-to-GDP ratio modestly, as older groups usually continue to pay income tax (on pensions), VAT, capital taxes and council tax, even though they contribute relatively little to measured economic output.

3.93 Compared to our 2017 projections, receipts are around 0.6 per cent of GDP lower across the projection. That reflects the net effect of downward revisions to NICs, VAT, capital taxes and other receipts, more than offsetting the upward revision to corporation tax. Income tax is little changed as a share of GDP from our previous report. These movements relate almost entirely to changes in our medium-term forecast that affect the starting point for the projections in 2022-23:

- **Income tax** is 0.1 per cent of GDP higher in 2022-23. This is driven by a higher effective tax rate on wages and salaries in our medium-term forecast. There is no change in income tax as a share of GDP in the long term.

- **National Insurance contributions** (NICs) are little changed as a share of GDP in the medium term, but are about 0.1 per cent of GDP lower in the long term. As people above the SPA do not pay employee NICs, the change in the SPA path that brings forward future SPA rises decreases the amount raised via employee NICs.

- **Corporation tax receipts** are 0.1 per cent of GDP higher in 2022-23 and this carries through into the long term. The upward revision to our medium-term forecast reflects both stronger-than-expected receipts and a change in the accounting treatment of those receipts in the public sector finances statistics.

- **VAT receipts** are 0.1 per cent of GDP lower in 2022-23. This largely reflects our medium-term forecast, where we have revised down the contribution of private consumption to GDP growth, reflecting our assumption that the saving ratio stabilises sooner.

- **Capital tax receipts** are 0.1 per cent of GDP lower in 2022-23 and this carries through into the long term. The deterioration in the medium-term forecast reflects a weaker outlook for equity and property prices, which we assume have a more than proportionate effect on capital tax receipts. Over the longer term, capital taxes are also affected by the ageing of the population, as those nearing or in retirement are assumed to sell businesses and other financial assets.

- A decrease of 0.5 per cent of GDP on average in **other receipts**. More than half of this reflects the reclassification of English housing associations to the private sector. The bulk of the remainder reflects revisions to our forecast for gross operating surpluses, which are offset on the spending side and so are neutral for borrowing.

Table 3.12: Non-interest receipts projections

	Per cent of GDP						
	Estimate[1]		FSR projection				
	2017-18	2022-23	2027-28	2037-38	2047-48	2057-58	2067-68
Income tax	8.8	9.1	9.1	9.0	9.1	9.1	9.1
NICs	6.4	6.5	6.4	6.3	6.3	6.3	6.2
Corporation tax	2.7	2.4	2.4	2.4	2.4	2.3	2.3
VAT	6.1	6.1	6.2	6.2	6.2	6.2	6.2
Capital taxes	1.5	1.6	1.6	1.6	1.7	1.7	1.7
Other receipts	10.7	10.4	10.4	10.4	10.5	10.5	10.5
Receipts[2]	**36.3**	**36.1**	**36.0**	**35.9**	**36.0**	**36.1**	**35.9**

[1] Receipts consistent with the March 2018 *Economic and fiscal outlook* .
[2] Excludes interest and dividends.

Table 3.13: Changes in non-interest receipts projections since *FSR* 2017

	Per cent of GDP						
	Estimate[1]		FSR projection				
	2017-18	2022-23	2027-28	2037-38	2047-48	2057-58	2067-68
Income tax	0.1	0.1	0.0	0.0	0.0	0.0	0.0
NICs	0.0	0.0	0.0	-0.1	0.0	-0.1	-0.1
Corporation tax	0.2	0.1	0.1	0.1	0.1	0.1	0.1
VAT	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2
Capital taxes	0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Other receipts	-0.5	-0.4	-0.5	-0.5	-0.5	-0.5	-0.5
Receipts[2]	**-0.3**	**-0.4**	**-0.5**	**-0.7**	**-0.6**	**-0.6**	**-0.6**

[1] Receipts consistent with the March 2018 *Economic and fiscal outlook* .
[2] Excludes interest and dividends.

3.94 In our long-term projections, the profile for receipts is generated using age profiles that capture the effects of ageing. We do not adjust our projections for the variety of possible non-demographic factors that may affect receipts. In past *FSRs*, we have explored several of these, some of which have also featured in our medium-term forecasts. These include:

- The **structure of the tax system** and its interaction with long-run trends. We look at the implications of fiscal drag on the income tax and NICs regimes in paragraph 3.47.
- **Technological developments** could affect fuel duty as innovation improves fuel efficiency and reduces the demand for fuel and hence fuel duty receipts.
- **Long-term behavioural change** may affect taxes such as tobacco and alcohol duties. Other taxes (e.g. landfill tax, carbon price floor) are designed to discourage certain behaviours, so they would generate less revenue if they are successful in that regard.
- **Globalisation** could affect taxes such as corporation tax and VAT. Increased mobility of capital could affect decisions by multinationals on where to declare profits, while VAT could be affected by changing consumption patterns or relative prices.

- **Oil and gas revenues** are likely to be affected as production continues its long-run decline. The path of revenues will depend on volatile oil and gas prices, but we expect production from the UK Continental Shelf to decline as it moves towards its ultimately recoverable capacity.

- **Compliance with the tax system** can affect the sustainability of revenues.

- The **structure of the economy** will affect the tax richness of activity. This could reflect changes in the sectoral splits of activity, trends in the labour and capital shares of national income, and developments in the structure of the labour market.

The implications for the public finances

The baseline projections

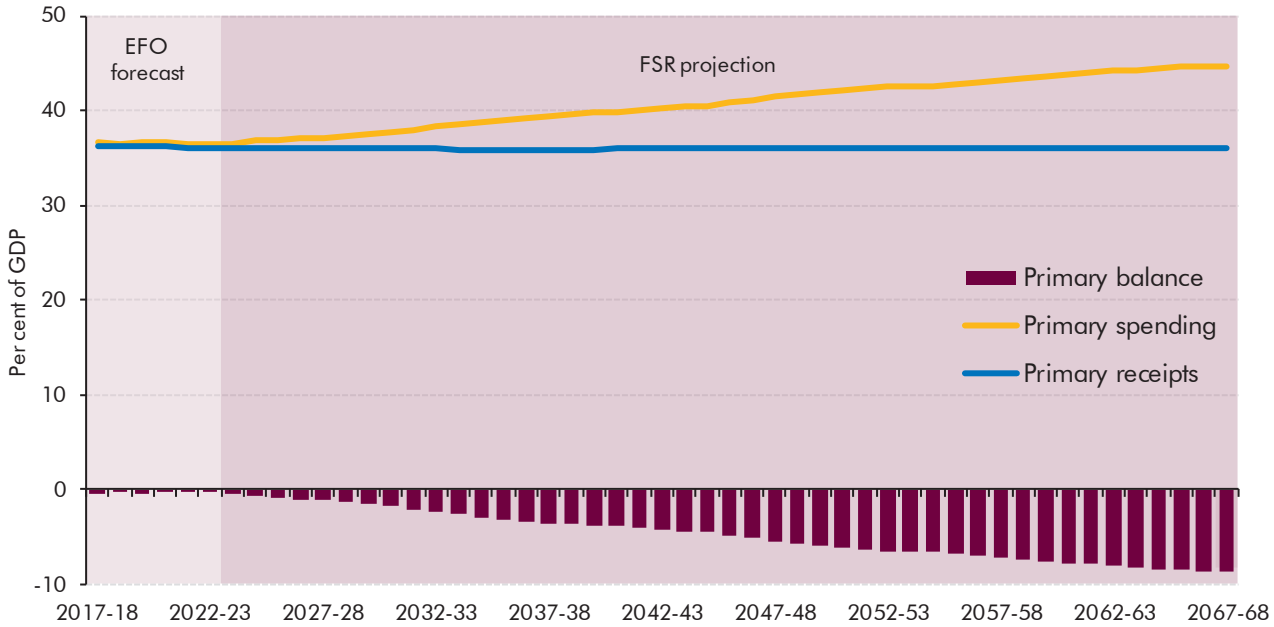
Primary balance

3.95 Our baseline projections show public sector non-interest spending increasing as a share of GDP beyond the medium-term forecast horizon, exceeding non-interest receipts in every year. As shown in Chart 3.15, the primary balance (the difference between non-interest or 'primary' receipts and spending) is projected to move from a deficit of 0.3 per cent of GDP in 2022-23 to a deficit of 8.6 per cent of GDP in 2067-68.

3.96 That overall deterioration of 8.3 per cent of GDP is equivalent to £176 billion in today's terms. Of that, 4.8 per cent of GDP (£102 billion) reflects our assumption about additional non-demographic cost pressures raising the growth of health spending. A further 3.5 per cent of GDP (£74 billion) reflects predominantly demographic pressures on the primary balance.

3.97 In effect, we project that over the best part of five decades these pressures together, including those associated with the June health announcement, would reverse most of the improvement to the primary balance of 8.9 per cent of GDP that we expected to see between 2009-10 and 2022-23 in our March 2018 *EFO*. That improvement includes the post-recession reversal of the Labour Government's fiscal stimulus package followed by the fiscal consolidations of the Coalition and then Conservative Governments.

Chart 3.15: Non-interest receipts and spending and the primary balance



Source: OBR

Student loans and other financial transactions

3.98 To see how this projected deterioration in the primary balance would feed through to public sector net debt, we also need to take into account future financial transactions. These affect net debt via their effect on the government's cash requirement, even though they do not affect public sector net borrowing.

3.99 For most financial transactions, we assume that, absent any Government policy, there is a zero net effect over the projection period, the main exception being student loans. We also allow for the winding down of historic gilt premia and the Asset Purchase Facility (APF). Projections for these other financial transactions are available in the supplementary tables on our website.

3.100 At Autumn Statement 2013, the Government announced its intention to sell part of the student loan book, which at the time it expected would raise around £12 billion over five years from 2015-16. The first sale was subsequently pushed back to 2017-18 and the first tranche of pre-2012 Plan 1 student loans was sold in December 2017 for £1.7 billion, at a discount to the face value of 51 per cent. The Government remains committed to raising £12 billion from student loans sales over the period to 2021-22, but has not yet announced the planned timing or sizes of future sales.

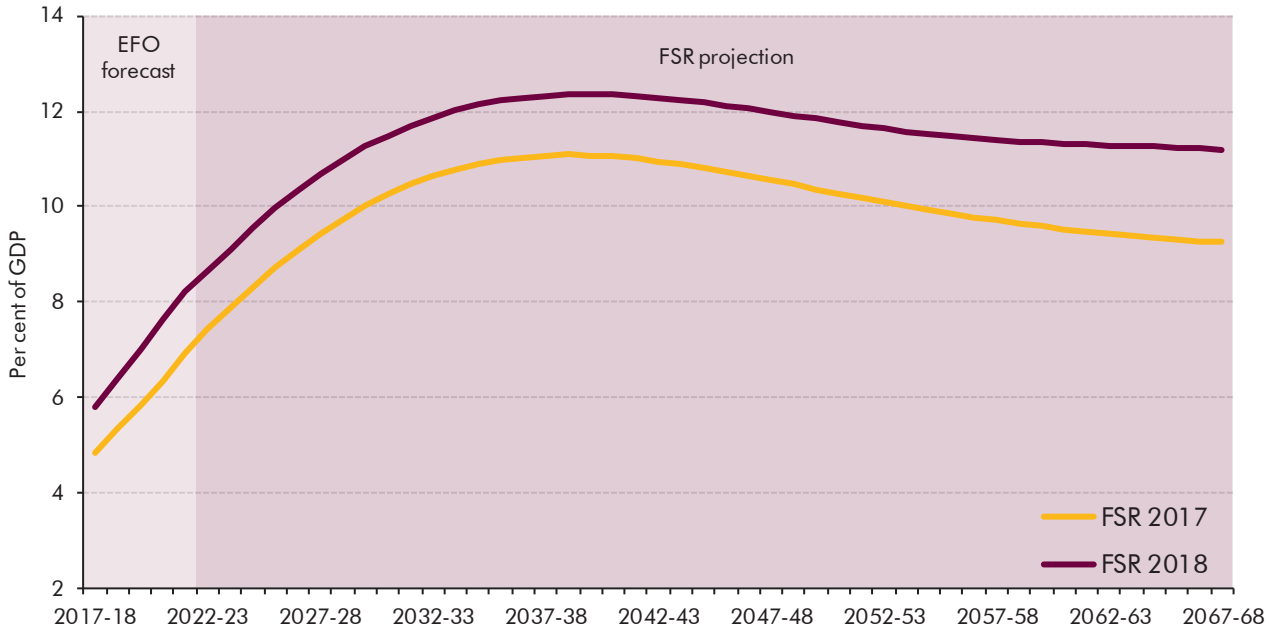
3.101 Selling the loan book affects the flow of cash to the Exchequer, with more recorded upfront as sales proceeds, and less in future years, as future loan repayments flow to the private sector instead. In effect this crystallises losses on the loans sold: the level of debt is permanently higher than if no loans had been issued, because sale prices reflect the interest rate and write-off subsidies implicit in the student loans.

3.102 Chart 3.16 shows our latest projections for the addition to net debt from student loans, reflecting loans issued, cash payments of interest and principal and the proceeds from loan sales. At Autumn Budget 2017 the Government raised the repayment threshold at which student's start repaying their loans from £21,000 in 2017-18 to £25,000 in 2018-19 to be uprated with average earnings over time. It also froze tuition fees at their 2017-18 level of £9,250 in 2018-19 (but to be uprated as normal by RPIX in future years). Shortly before this report was published, the Government announced that it would freeze tuition fees again in 2019-20. Unfortunately, we were not informed in time to include this in these projections. Freezing tuition fees has a small long-term fiscal impact, but raising the repayment threshold has a substantial impact on repayments received from students over the lifetime of their loans, and therefore the amount that is written off after the 30 years.

3.103 Chart 3.17 shows repayments and write-offs as a share of GDP under the previous policies (£21,000 repayment and uprated tuition fees in 2018-19), and our new projection (£25,000 repayment threshold and tuition fees frozen in 2018-19, but not 2019-20). It shows that under the previous policy repayments would have been about 0.6 per cent of GDP by the projection horizon, with write offs reaching a steady-state of about 0.3 per cent of GDP. Under the new policy arrangements, repayments peak at about 0.5 per cent of GDP, a 0.1 percentage point reduction, and write-offs reach a higher steady-state of about 0.35 per cent of GDP.

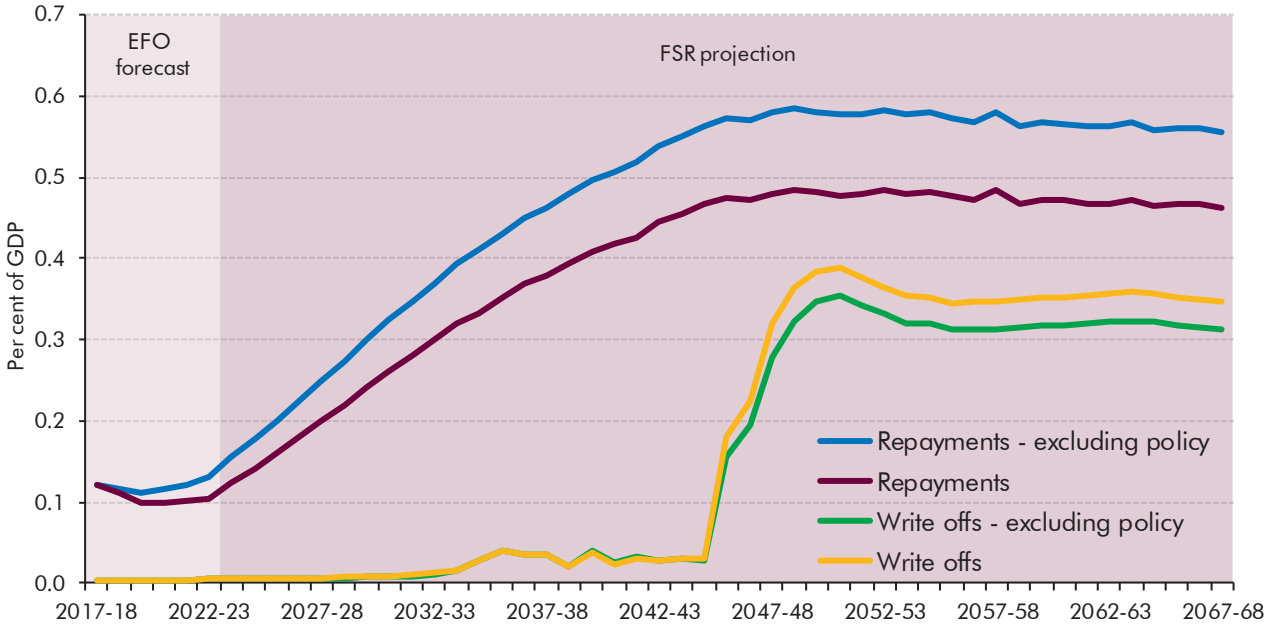
3.104 The net effect of the factors described earlier and the announced policy is to push the peak addition to net debt from student loans up to 12.4 per cent of GDP in the late-2030s. By 2067-68, this is projected to fall back slightly to 11.2 per cent of GDP but remains much higher and flatter than in our previous *FSR* projection. Overall the addition to net debt is 1.9 per cent of GDP higher in 2067-68 than in our previous projection.

Chart 3.16: Additions to net debt from student loans



Source: OBR

Chart 3.17: Impact of the Autumn Budget 2017 student loans policies



Source: OBR

Public sector net debt and net interest

3.105 With a projection of financial transactions, we can now project public sector net debt and net interest. Interest receipts that are netted off include the accrued interest on student loans, although as an accrued measure it does not directly affect net debt. These receipts represent one of the fiscal illusions discussed in our new working paper.

3.106 Relative to our 2017 *FSR*, our medium-term forecasts for net interest have been revised down slightly, mainly as a result of lower debt interest payments following further falls in government bond yields. In 2022-23, net interest is about 0.1 per cent of GDP lower than in our 2017 *FSR,* but the deterioration in the primary balance more than offsets this improvement. That results in an overall deficit of 1.8 per cent of GDP in 2022-23, 0.8 per cent of GDP higher than the deficit shown in our 2017 *FSR* projections. This is more than explained by the 0.9 per cent of GDP increase in borrowing from the Government's June health spending announcement.

3.107 The stock of debt is lower at the end of the medium-term forecast than we projected in 2017, but it rises more quickly. Moreover, we assume that the historically low interest rates prevailing at the end of the medium-term forecast rise to 4.7 per cent by 2037-38. This means the medium-term reduction in interest payments soon reverses. Net interest spending is 0.3 per cent of GDP lower than in our previous report in 2027-28, and 0.8 per cent of GDP lower in 2037-38, but 0.1 per cent of GDP higher in 2047-48 and 1.8 per cent of GDP higher by the end of the projection. These changes reflect the debt interest due on the extra borrowing that is the result of the Government's increased health expenditure and its longer-term implications when demographic and other cost pressures are applied.

3.108 In the medium term, interest and dividend receipts have also been revised down due to lower interest rates and to financial asset sales reducing the stock of assets on which government earns a return.

3.109 As Table 3.14 shows, the combined effect of a larger primary deficit and higher net interest costs causes the deficit to move above 10 per cent of GDP by the late 2040s and 20 per cent by the late 2060s. Outside of major wars, the UK has never run a deficit in excess of 10 per cent of GDP. In reality, no government could run such large deficits over a sustained period – policy would have to change to ensure that the deficit was financeable. That highlights the difference between conditional projections, which illustrate the path of borrowing and debt on the basis of a set of conditioning assumptions in order to identify whether adjustments in policies will be necessary, and unconditional forecasts that try to predict what *will* happen in the future, including any necessary policy responses. In Chapter 4 we illustrate some of the ways that the 'fiscal gaps' implied by our latest projections might be closed.

Table 3.14: Baseline projections of fiscal aggregates

	Per cent of GDP						
	Estimate[1]		FSR projection				
	2017-18	2022-23	2027-28	2037-38	2047-48	2057-58	2067-68
Primary spending	36.7	36.4	37.1	39.4	41.4	43.3	44.6
Primary receipts	36.3	36.1	36.0	35.9	36.0	36.1	35.9
Primary balance	-0.4	-0.3	-1.1	-3.6	-5.4	-7.1	-8.6
Net interest	1.8	1.5	1.4	2.5	4.8	7.8	11.6
Total managed expenditure	38.8	38.5	39.3	43.2	47.6	52.4	57.5
Public sector current receipts	36.6	36.7	36.9	37.2	37.4	37.5	37.3
Public sector net borrowing	2.2	1.8	2.5	6.0	10.2	14.9	20.2
Public sector net debt	86	80	81	97	138	201	283
Public sector net financial liabilities	69	64	64	77	116	180	262

[1] Estimates are consistent with the March 2018 *Economic and fiscal outlook* .

Table 3.15: Changes in the baseline projections of fiscal aggregates since *FSR* 2017

	Per cent of GDP						
	Estimate[1]		FSR projection				
	2017-18	2022-23	2027-28	2037-38	2047-48	2057-58	2067-68
Primary spending	-1.0	0.4	0.1	-0.1	0.6	0.8	0.6
Primary receipts	-0.3	-0.4	-0.5	-0.7	-0.6	-0.6	-0.6
Primary balance	0.7	-0.9	-0.6	-0.7	-1.2	-1.4	-1.3
Net interest	0.0	-0.1	-0.3	-0.8	0.1	1.0	1.8
Total managed expenditure	-1.0	0.4	-0.2	-0.7	0.8	1.9	2.6
Public sector current receipts	-0.3	-0.4	-0.5	-0.6	-0.5	-0.5	-0.5
Public sector net borrowing	-0.7	0.8	0.3	-0.1	1.3	2.4	3.1
Public sector net debt	-4.6	-0.1	3.6	2.6	9.4	23.7	41.6
Public sector net financial liabilities	-8.6	-3.5	3.3	3.6	10.8	25.8	43.9

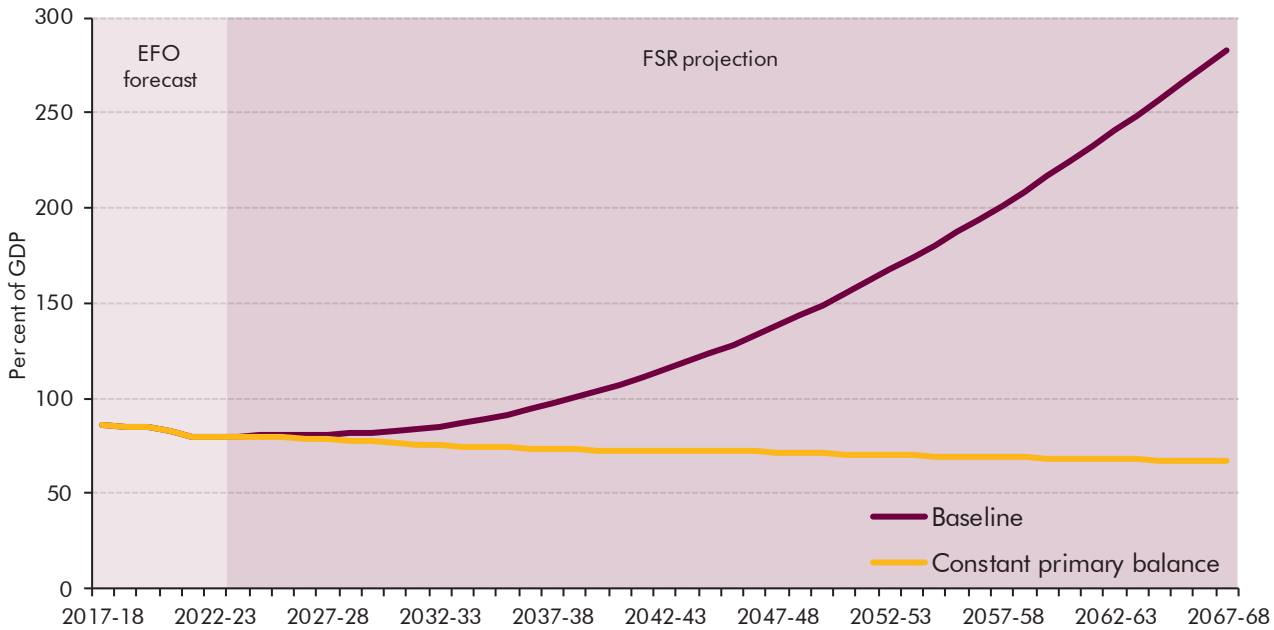
[1] Estimates are consistent with the March 2018 *Economic and fiscal outlook* .

3.110 Charts 3.18 and 3.19 show the paths of public sector net debt and net interest spending as a share of GDP in our baseline projection, comparing them to their paths were the primary balance to remain constant at its 2022-23 level.

3.111 Our projection of public sector net debt falls from its peak of around 86 per cent of GDP in 2017-18 to around 80 per cent of GDP in 2021-22, before rising to 283 per cent of GDP after 50 years. The inclusion of the Government's June announcement of higher health spending more than accounts for the increase between reports. Excluding that increase in spending from our projection, public sector net debt would reach only 218 per cent of GDP by 2067-68. Over the comparable 50-year period, our 2017 *FSR* projection, restated for modelling and classification changes, showed debt peaking at about 90 per cent of GDP in 2017-18, bottoming out at around 73 per cent in the late 2020s, and then rising to 246 per cent of GDP in 2067-68. (We have rolled forward those projections by one year to facilitate comparisons between reports.)

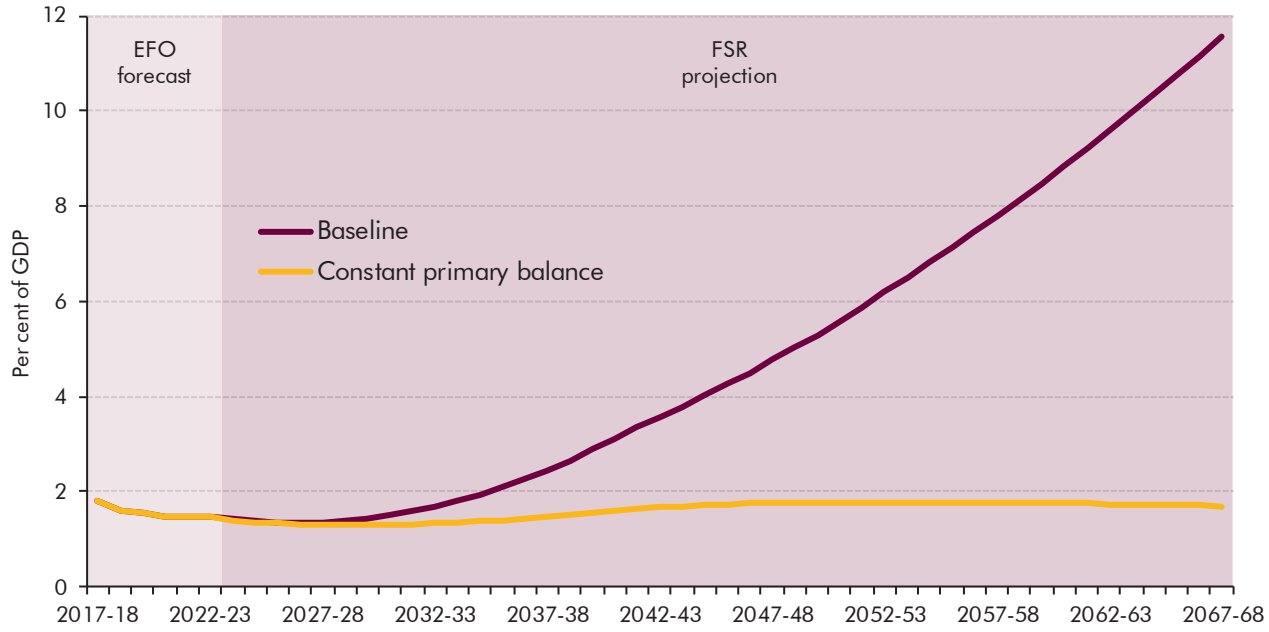
3.112 If the primary deficit remained constant at 0.3 per cent of GDP, net debt would decline slowly but not return to pre-crisis levels of around 40 per cent of GDP within our projection period. In our baseline projection, longer-term spending pressures, if unaddressed, would put the public finances on an unsustainable path. Public sector net debt would be similar to the historical peak of public debt after World War II – and still be rising – at the end of the projections. We quantify this 'unsustainability' more formally in Chapter 4. However, as we always stress, there are huge uncertainties around projections over this time horizon. Below we examine how sensitive our latest projections are to some of our key assumptions.

Chart 3.18: Projections of public sector net debt



Source: OBR

Chart 3.19: Projections of net interest payments



Source: OBR

3.113 Public sector net financial liabilities (PSNFL) – a broader National Accounts balance sheet measure, described more fully in Chapter 2 – follows a similar profile to public sector net debt, but remains at a lower level throughout the projection period. This largely reflects the build-up of student loan assets, which are recorded in PSNFL at their face value rather than reflecting the expectation that a significant proportion will be written off rather than repaid.

Changes since the 2017 *FSR* projections

3.114 Chart 3.20 provides a stylised decomposition of the changes in the primary balance over the projection period relative to our 2017 *FSR*, while Chart 3.21 shows the impacts on debt. Table 3.16 shows a more detailed split for the first and final years of the projection and the impact on debt by the end of the period.

3.115 Before turning to the explanation, it is worth noting that when decomposing the effects of large changes that interact with each other in a multiplicative way, it is not possible to present simple additive diagnostics. We have ordered and allocated the decomposition in the tables and charts in this section in the way that most usefully describes our changes, but it should be stressed that applying the assumptions in a different order would yield different results. Any residual interaction terms have been grouped in the 'other modelling assumptions' line of the table.

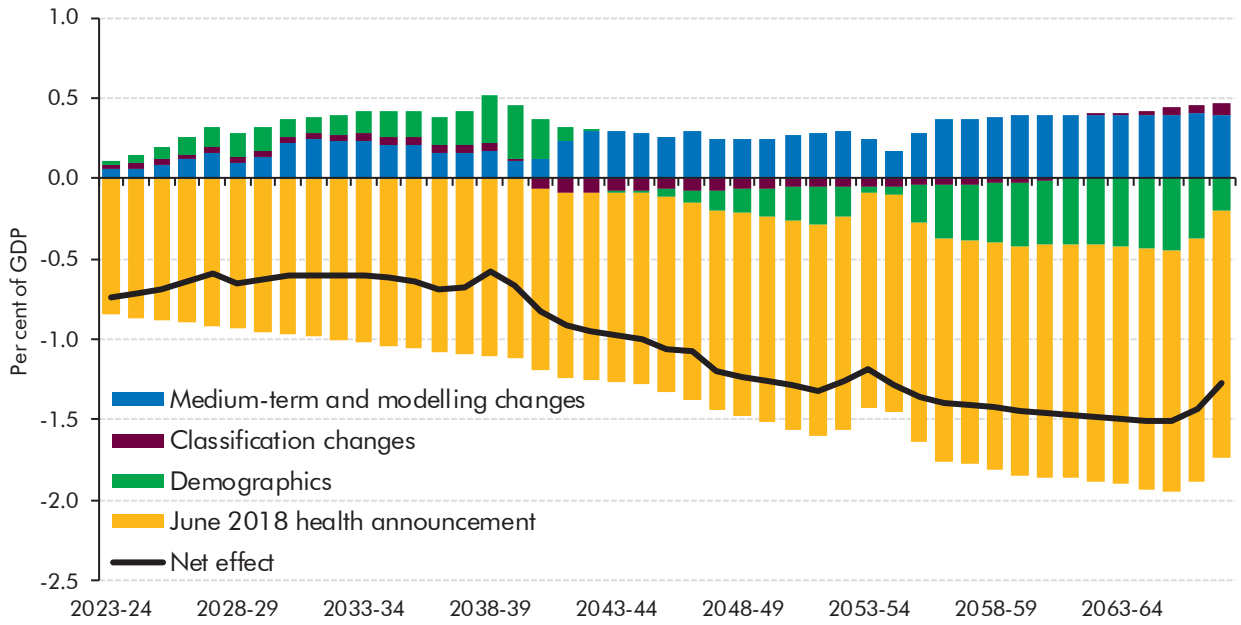
3.116 The main sources of changes to our projections relative to our 2017 *FSR* are:

- The primary deficit in 2067-68 is 1.3 per cent of GDP larger than in our previous projections. Absent further compensating tax or spending changes, the **June 2018 health spending policy** adds 1.5 per cent of GDP to the primary deficit and 58 per cent of GDP to PSND in 2067-68, more than accounting for the increase.

- **Removing the Dilnot reforms and accelerating SPA increases**, and other long-term policy, partially offsets this, reducing PSND by 31 per cent of GDP in 2067-68.

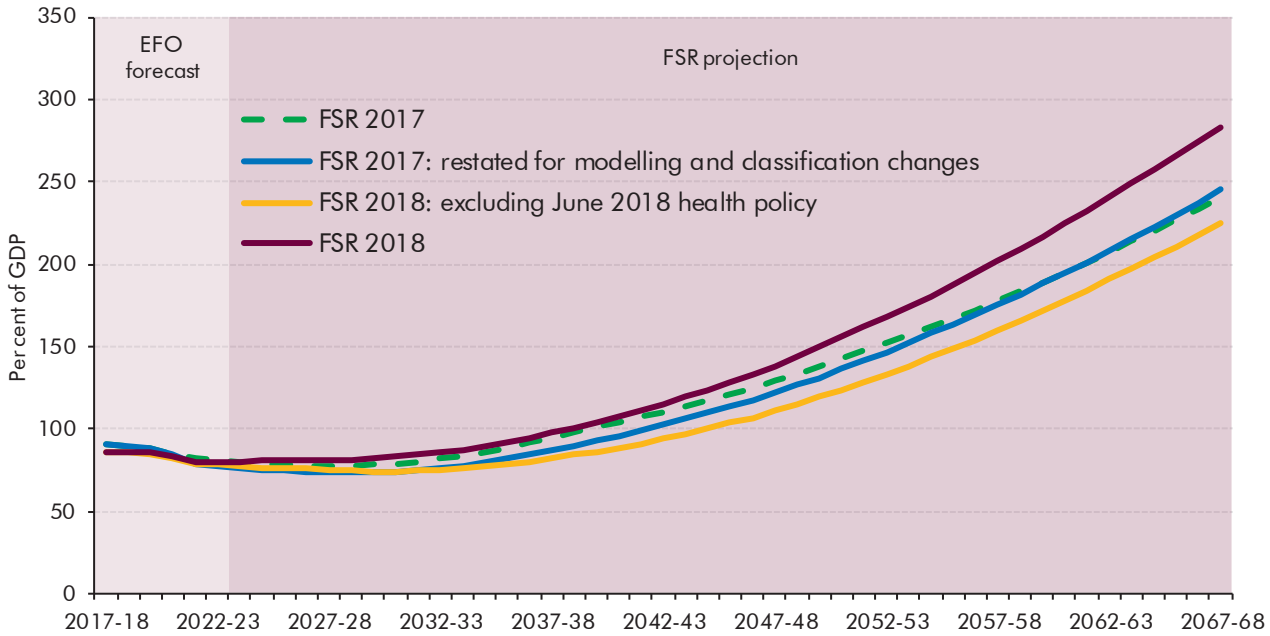
- Other changes since *FSR* 2017 are smaller but also contribute to a higher primary deficit and PSND. In particular, the latest **demographic projections** put upward pressure on spending via a higher old-age dependency ratio.

Chart 3.20: Decomposition of changes in the primary balance since *FSR* 2017



Source: OBR

Chart 3.21: Decomposition of changes in the net debt projection since *FSR* 2017



Source: OBR

Table 3.16: Changes in the primary balance and net debt since *FSR* 2017

	Per cent of GDP			
	Primary deficit		Debt	
	2022-23	2067-68	2022-23	2067-68
FSR 2017	**-0.6**	**7.4**	**80.3**	**241.2**
Modelling	0.0	0.0	0.0	8.2
Classification	0.0	0.0	-3.4	-3.7
Demographics	0.0	0.2	0.0	8.9
Forecast changes up to March 2018 EFO	0.0	0.0	1.0	1.3
FSR 2018 pre-policy changes	**-0.6**	**7.5**	**77.9**	**255.9**
Long-term policy	0.0	-0.4	0.0	-31.0
June health spending	0.9	1.5	2.3	57.9
FSR 2018	**0.3**	**8.6**	**80.2**	**282.8**

3.117 Our long-term projections do not assume the crystallisation of any of the contingent liabilities that the Government has accumulated over the recent past. In isolation, each contingent liability is judged to have a less than 50 per cent probability of being called, but it is likely that some at least will crystallise over the longer term. We explored the possibility of this further in our 2017 *Fiscal risks report,* such as the crystallisation of the multi-billion pound costs associated with nuclear decommissioning, clinical negligence and tax litigation.

Sensitivity analysis

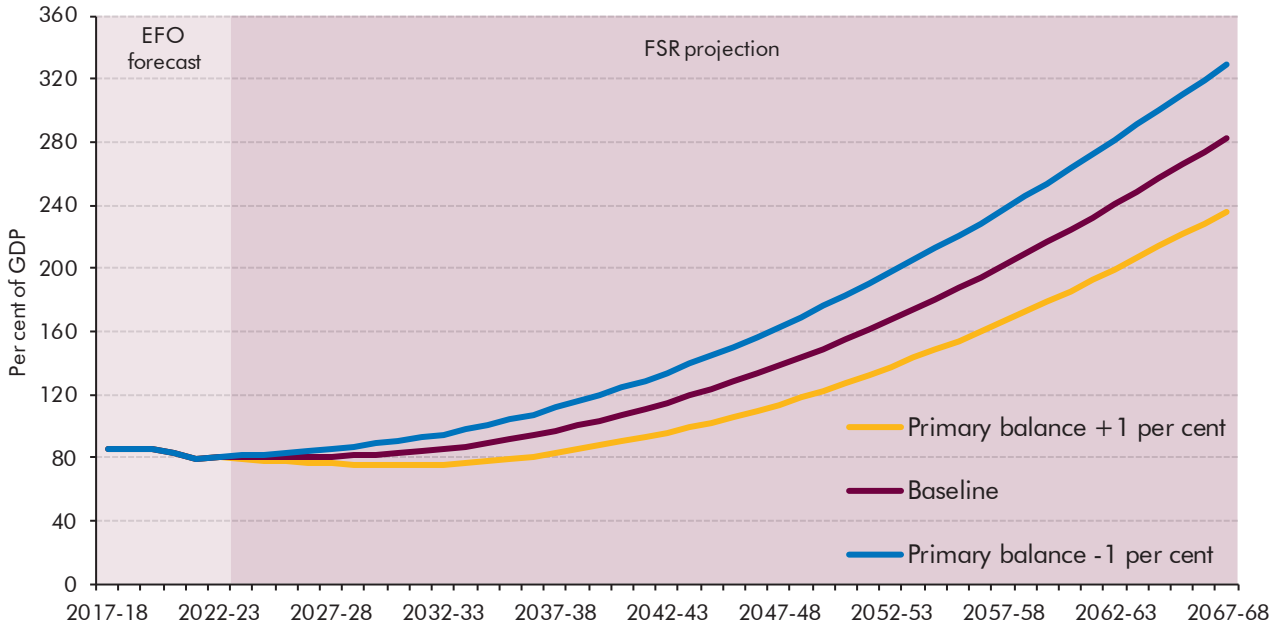
3.118 This section analyses the sensitivity of our baseline projections to the medium-term fiscal position and to our key demographic, health spending and economic assumptions.

Sensitivity to the medium-term primary balance

3.119 Our March 2018 *EFO* forecast for 2022-23, plus the additional health spending announced in June, provides the starting point for our *FSR* projections. The gap between spending and receipts at that point is locked into the long-term projections, as we assume that the economy is operating at trend thereafter.

3.120 Chart 3.22 illustrates the sensitivity to the primary balance from 2023-24 onwards. If the balance were worse by 1 per cent of GDP, then by the end of the period net debt would increase to 329 per cent of GDP rather than the 283 per cent of GDP in our baseline projections. Conversely, a primary balance that was 1 per cent of GDP better would see debt fall to around 75 per cent of GDP before beginning to rise again in the late 2030's.

Chart 3.22: Sensitivity of net debt projections to the primary balance in 2023-24



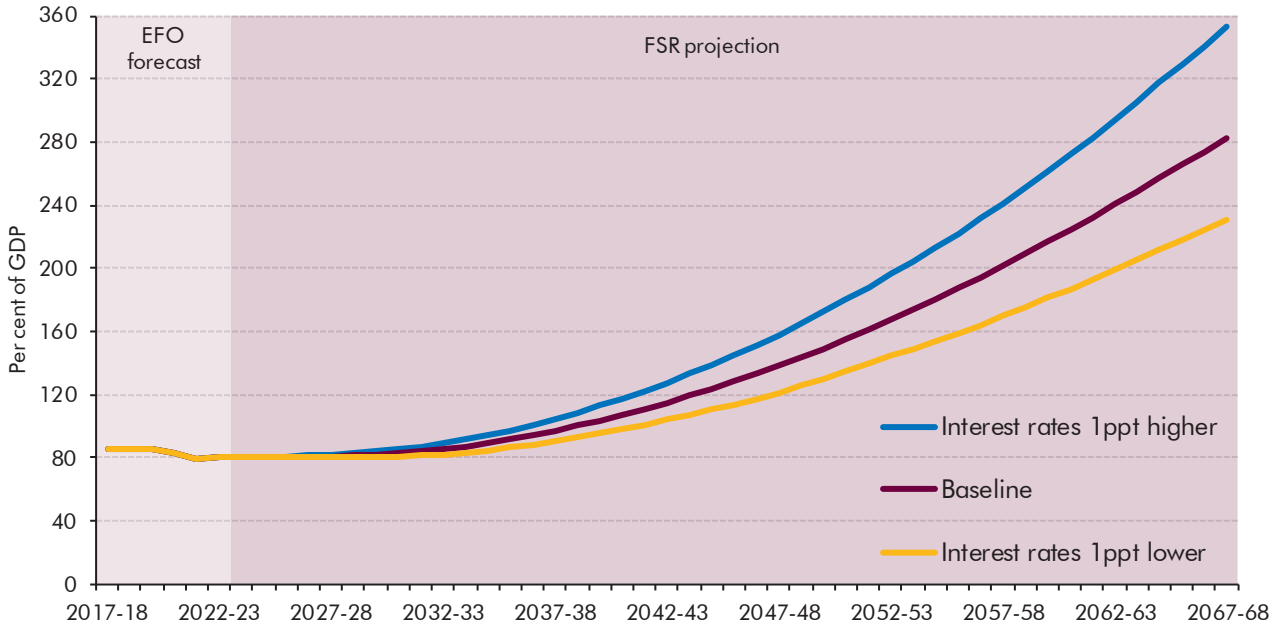
Source: OBR

Sensitivity to interest rates and growth

3.121 Another key assumption is that the interest rate the government pays on its newly issued debt gradually rises to 4.7 per cent in the long term, 0.2 percentage points above the rate of nominal GDP growth. Rather than the level of either, it is the gap between the two that is the key determinant of long-run debt dynamics. Our projected interest rates are higher than market expectations currently imply over the long term. But gilt rates could end up higher than assumed, for example if demand for safe assets were to fall if economic uncertainty receded. There is also uncertainty surrounding our baseline GDP growth projection.

3.122 Chart 3.23 illustrates the path of net debt if gilt rates were 1 percentage point higher or lower from 2023-24 onwards, but GDP growth remained the same. Over a short horizon, the impact is relatively small, as changes would only apply to new debt issued and the UK has a relatively long average debt maturity. But as the stock of debt matures, and the primary balance deteriorates, the effects would increase. In the long term, a 1 percentage point variation in interest rates would add or subtract around 60 per cent of GDP to net debt over 50 years, with debt climbing more or less steeply thereafter.

Chart 3.23: Sensitivity of net debt projections to interest rates in 2023-24



Source: OBR

Sensitivity to demographic assumptions

3.123 Table 3.1 outlined the alternative population assumptions produced by the ONS, while Chart 3.4 showed our associated employment projections. The sensitivity of our results to these assumptions is presented in Table 3.17, which shows the differences in non-interest receipts and spending compared to our baseline projection, and in Chart 3.24, which shows the impact on public sector net debt.

3.124 The demographic variants we use are the ONS 'young age structure' and 'old age structure' scenarios. We also show three ONS migration variants – 'high migration', 'low migration' and '50 per cent future EU migration'. As Box 3.3 of our 2014 *FSR* illustrated, net migration has proved one of the largest sources of errors in recent population projections. In the year to September 2017 net inward migration reached 244,000, close to the previous and latest principal population projections. Uncertainty over prospects for net migration may currently be even greater than usual following the UK's decision to leave the European Union in March 2019.

3.125 The old age structure scenario combines lower fertility and higher life expectancy with lower net migration than under our baseline projection. Linking SPA changes to life expectancy would imply that successive increases would be necessary at least once a decade throughout the projection period in order to catch up to the third-of-adult-life principle, and that the SPA would rise to 72 by the end of our projection period. Our assumptions on the labour market response to SPA changes would imply a higher employment rate for relevant cohorts than in our baseline projection. We do not assume that being in employment affects demand for public services, so age-specific spending per person is unchanged.

3.126 Given the lower fertility, spending on education would be lower, while the SPA rises would mean that payments to pensioners (mainly state pensions) would be lower as a share of GDP compared to our baseline projection. But the relative improvement would eventually dissipate, as costs associated with ageing became larger, and debt would consequently rise faster from a lower level. The primary deficit would be larger than in our baseline projection in 50 years and net debt would be higher. In effect, extending working lives over this period would be a partial down-payment on a higher public services bill in the very long term.

3.127 The young age structure scenario combines a high migration assumption with lower life expectancy and higher fertility to yield a larger working-age population. This boosts receipts growth, with receipts rising gradually as a share of GDP and reaching a level higher than in our baseline projection. Although the increase in the number of children adds to education costs, and working-age benefits also rise, total spending is lower, in line with reduced pressures on health, adult social care and pensions. The primary deficit is about 6 per cent by the end of the projection period and so net debt is lower as a share of GDP, although it still reaches 230 per cent of GDP by 2067-68.

3.128 The migration scenarios illustrate that inward migration reduces upward pressure on debt over our 50-year projection period. Inward migrants are assumed to be more concentrated among those of working age than the population in general, therefore reducing the old-age dependency ratio slightly. We discussed the impact of net migration on our long-term projections – and the simplifying assumptions on which that impact is based – in detail in Annex A of our 2013 *FSR* and in Box 3.4 of our 2014 *FSR*. For example, we assume that, on average, migrants have the same age- and gender-specific labour market participation rates and productivity as the native population. No doubt that assumption would not hold for all migrants – for example, average labour market characteristics of migrants from different countries can differ substantially – but we believe it provides a reasonable guide to the aggregate effects of net migration in our long-term projections.

3.129 Our baseline projection assumes long-term average net inward migration of 165,000 a year. If net inward migration was in line with the ONS high migration scenario at 245,000 a year – more in line with the average flows seen over the past decade – then we estimate that this would reduce the primary deficit by 0.8 per cent of GDP and net debt by 30 per cent by 2067-68, relative to our baseline projection. If instead net inward migration was in line with the low migration scenario at 85,000 a year, the primary deficit would increase by 1.1 per cent of GDP and net debt by 39 per cent by 2067-68 relative to our baseline projection.

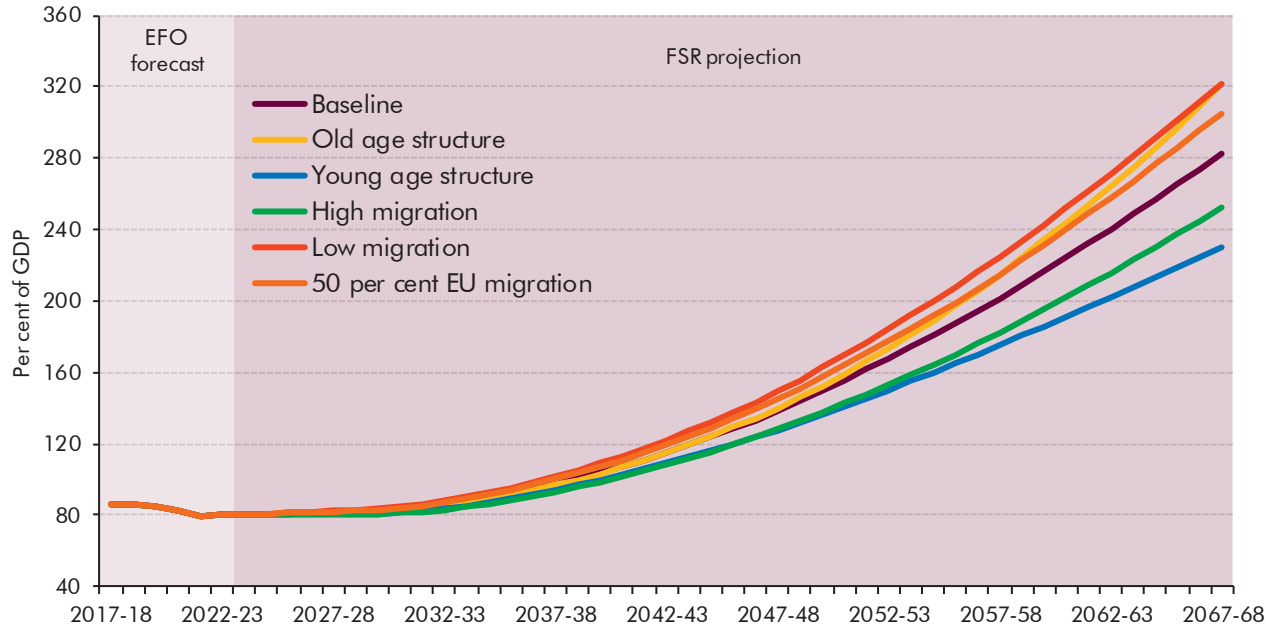
3.130 These scenarios should not be construed as an argument that the Government needs to pursue a particular policy towards immigration in order to achieve (or avoid) a particular outcome for the public finances. Governments doubtless choose their policies towards immigration for a whole variety of social and economic reasons and they could choose to offset their direct fiscal impact with tax and spending policy decisions. Such choices are likely to represent an important source of uncertainty over the next few years.

Table 3.17: Non-interest receipts and spending for demographic variants

	Difference from baseline projection, per cent of GDP						
	Estimate[1]		FSR projection				
	2017-18	2022-23	2027-28	2037-38	2047-48	2057-58	2067-68
Old age structure							
Receipts	0.0	0.0	-0.1	-0.4	-0.3	-0.3	-0.3
Spending	0.0	0.0	-0.1	-0.7	-0.1	0.9	2.0
Young age structure							
Receipts	0.0	0.0	0.0	0.1	0.0	0.1	0.3
Spending	0.0	0.0	-0.1	-0.2	-0.9	-1.5	-2.2
High migration							
Receipts	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.1
Spending	0.0	0.0	-0.1	-0.3	-0.6	-0.8	-0.9
Low migration							
Receipts	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Spending	0.0	0.0	0.1	0.3	0.7	1.1	1.2
50 per cent lower EU migration							
Receipts	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Spending	0.0	0.0	0.1	0.2	0.4	0.6	0.7

[1] Estimates are consistent with the March 2018 *Economic and fiscal outlook* .

Chart 3.24: Sensitivity of net debt projections to demographic variants



Source: OBR

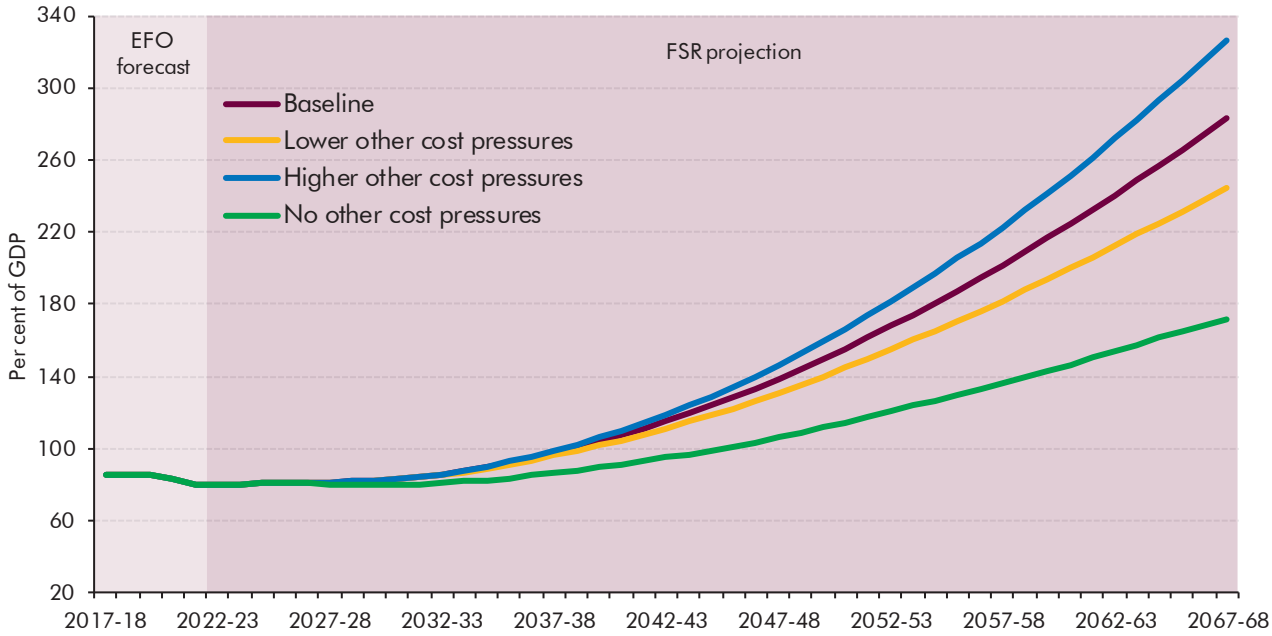
Sensitivity to other cost pressures in the health care sector

3.131 Spending on health is the largest component of age-related spending in our projections, thanks to both demographic and non-demographic cost pressures. Given its importance, in previous reports we have shown various alternative scenarios using different assumptions about productivity growth in the health sector, morbidity and other cost pressures. We discussed these in more detail in our *Working paper No. 9: Fiscal sustainability and public*

spending on health, which led us to change the assumption used in our baseline projections. One conclusion of that paper and of our previous sensitivity analysis is that the effect of alternative morbidity assumptions on health spending is much smaller than the effect of alternative assumptions about productivity or other cost pressures.

3.132 Chart 3.25 illustrates the sensitivity of our debt projection to assumptions about the pace at which the accommodation of non-demographic cost pressures raises health spending (see Chart 3.12). Under the 'higher other cost pressures' scenario, PSND would increase to 326 per cent of GDP by 2067-68, 43 per cent of GDP higher than our baseline projection as the relative difference in annual growth compounds over time. Similarly, under the 'lower other cost pressures' scenario PSND would reach about 244 per cent of GDP in 2067-68, 39 per cent of GDP lower than in our baseline projection. All three scenarios demonstrate the material impact of other cost pressures in the baseline projection: in the 'no other cost pressures' scenario, PSND rises to 172 per cent of GDP by 2067-68, some 111 per cent of GDP below our baseline projection.

Chart 3.25: Sensitivity of net debt projections to health-specific assumptions



Source: OBR

The budget balance in the next decade

Implications for the Government's fiscal objective

3.133 According to the *Charter for Budget Responsibility*, the Government's fiscal objective is to "*return the public finances to balance at the earliest possible date in the next Parliament*". At the time this objective was set, the 'next Parliament' was expected to run to from 2020-21 to 2025-26, so the 'earliest possible date' could have been anywhere up until 2025-26. Similarly, the 2017 *Conservative Manifesto* committed to returning the public finances to a "*balanced budget by the middle of the next decade*". We can use our latest projections to

illustrate the challenge that the Government might face in eliminating borrowing by 2025-26. We also illustrate what might happen if we interpreted 'unchanged policy' beyond our latest medium-term forecast horizon of 2022-23 in a manner that is more akin to those forecasts than to our long-term projections.

Borrowing by the middle of the next decade: long-term projections approach

3.134 In our March 2018 *EFO*, we forecast that borrowing would reach 0.9 per cent of GDP in 2022-23. This forecast was based on policies in place at the time, so did not reflect the additional funding for NHS England announced by the Prime Minister in June (described from paragraph 3.30 above), nor any as-yet unspecified means of financing it. For the purposes of our latest long-term projections, in the absence of clarity on how the extra spending will be financed we have assumed that it leads to higher borrowing. This increases the 2022-23 starting point for these projections by 0.9 per cent of GDP relative to our March forecast (largely reflecting the higher NHS spending, plus its 'Barnett consequentials' for Scotland, Wales and Northern Ireland, but also the associated higher debt interest spending).

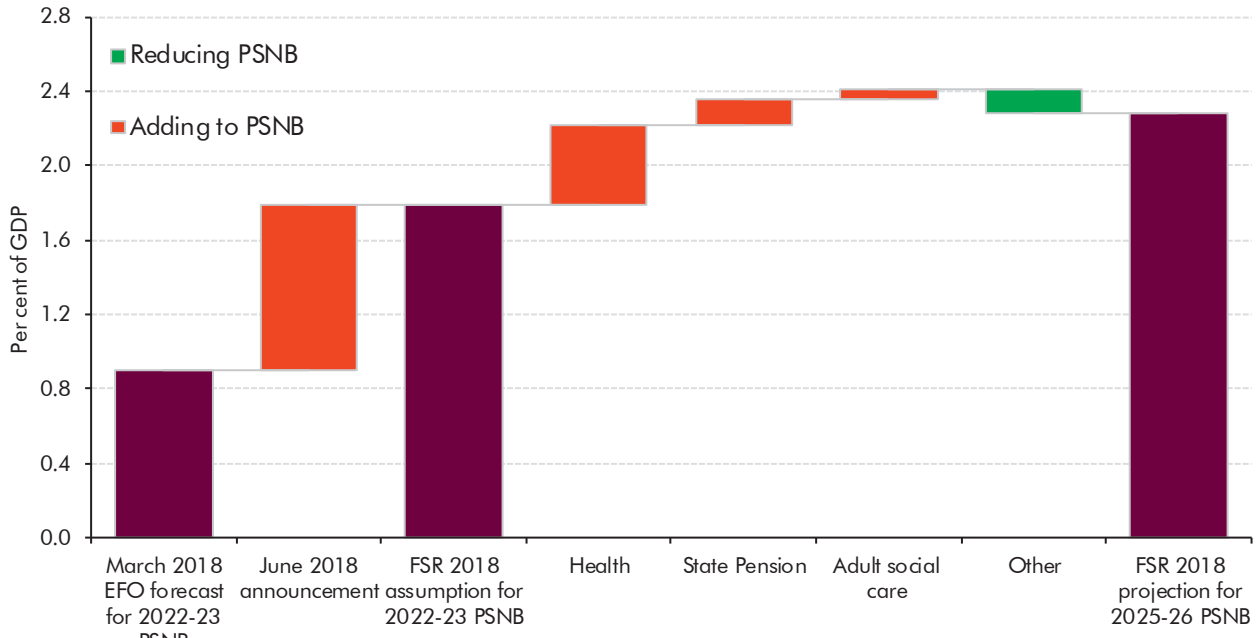
3.135 Additionally, as described earlier in this chapter, our long-term projections are built around demographic drivers of spending and receipts, with most other features of the tax and spending system assumed to evolve in a way that would lead to them neither rising nor falling as a share of GDP in the absence of demographic pressures. Two notable exceptions are the assumption that non-demographic cost pressures will put further upward pressure on health spending and incorporation of the triple lock on state pensions uprating, which also raises spending as a share of GDP over our 50-year horizon.

3.136 Chart 3.26 shows that the deficit is projected to be 1.4 per cent of GDP higher in 2025-26 than at the end of our March *EFO* forecast. The sources of this difference are:

- The **June health spending announcement** increases the starting point for this *FSR* projection in 2022-23 by 0.9 per cent of GDP relative to our March forecast.
- Continuing demographic and other **cost pressures on health spending** add a further 0.4 per cent of GDP to borrowing between 2022-23 and 2025-26. Of this 0.2 per cent of GDP is due to ageing and 0.2 per cent of GDP to other costs.
- **State pensions spending** rises by 0.1 per cent of GDP. The State Pension age is due to remain stable at 66 for men and women until 2025-26, having reached 66 in October 2020. Ageing adds 0.1 per cent of GDP to pensions spending in 2025-26, with less than 0.1 per cent reflecting our assumption that the triple lock will on average push up state pension awards faster than earnings growth.
- **Long-term care spending** rises by 0.1 per cent of GDP, also due to ageing.

- **The cumulative effect of a number of smaller other factors**, including lower welfare payments due to a falling share of children in the population cause the deficit to fall by 0.1 of GDP.

Chart 3.26: Baseline projection for borrowing in 2025-26



Source: OBR

3.137 Announcing the additional health spending, the Prime Minister said that it would be funded by a "*Brexit dividend, with us as a country contributing a little more*". As already noted, the Government has not set out the size or composition of any additional taxpayer contribution, either through higher taxes or cuts in other spending, so we have not been able to include it in our projections. As regards the 'Brexit dividend', our provisional analysis suggests that Brexit is more likely to weaken the public finances than strengthen them over the medium term, thanks to its likely effect on the economy and tax revenues. Looking more narrowly at direct financial flows with the EU, we estimated in our March 2018 *EFO* that the UK would have had to make a contribution of £13.3 billion to the EU budget in 2022-23 if we remained a member. Of that potential saving, £7.5 billion will be absorbed by the withdrawal settlement payment expected for that year, leaving £5.8 billion to be spent on other things. In principle this could cover slightly less than 30 per cent of the cost of health package in that year, but this does not take into account other calls on these potential savings, including commitments the Government has already made on farm support, structural funds, science and access to regulatory bodies. Pending a detailed withdrawal agreement and associated spending decisions, we assume in this report that the extra health spending adds to total spending and borrowing rather than being absorbed in whole or part elsewhere.

Borrowing by the middle of the next decade: extended medium-term forecast approach

3.138 We can also illustrate what might happen if we interpreted 'unchanged policy' up to the middle of the next decade in a manner more akin to our medium-term forecasts. While we consider our long-term assumptions to be the most appropriate way of assessing fiscal sustainability over a 50-year horizon, they may be less suited to assessing prospects just a few years beyond our medium-term forecast horizon. If we interpreted 'unchanged policy' over that period in a manner more in keeping with our medium-term forecasts, and where the June 2018 health spending announcement were fully financed, would the Government be on course to meet its fiscal objective?

3.139 Chart 3.27 starts from our baseline *FSR* projection in 2025-26. Borrowing stands at 2.3 per cent of GDP. It then shows how borrowing would be affected employing alternative assumptions about unchanged policy over the three years to 2025-26. We have not changed our assumption that demographic and other cost pressures will push up spending on health, long-term care and state pensions, as doing so would be to assume away the particular challenge we seek to illustrate. Not all the effects of different assumptions help the Government to meet its objective, but on balance they would reduce the expected deficit in 2025-26 by around a third:

- If **income tax and NICs** allowances and thresholds are assumed to rise in line with current policy (the personal allowance and higher rate threshold rising by CPI inflation and the additional rate threshold fixed at £150,000), receipts would be 0.4 per cent of GDP higher. But that would also see the share of all taxpayers subject to the higher and additional rates continuing to rise.

- If non-pensioner **social security and tax credits** awards were uprated with CPI inflation rather than average earnings, spending would be 0.2 per cent of GDP lower. At the same time, average awards of benefit recipients would fall by around 5 per cent relative to average earnings over the three years to 2025-26, on top of the 14 per cent drop expected in our current *EFO* forecast (relative to average earnings). The latter is larger due to the cash freeze on most working-age awards in the four years to 2019-20.

- Due to lower borrowing, and the lower interest rates derived using our medium-term forecast approach, **debt interest spending** would also be lower – by 0.1 per cent of GDP.

- If **capital taxes** thresholds are uprated in line with current policy for the end of the medium-term forecast – flat in cash terms for stamp duty land tax and rising by CPI inflation for most of the thresholds in inheritance tax and capital gains tax – receipts would be 0.1 per cent of GDP higher. In our medium-term forecasts, we assume that capital gains tax receipts rise as a share of GDP, reflecting the gearing of receipts to rising asset prices. Such rises influence the likelihood that a taxpayer will dispose of an

asset as well as the value of the gain itself, so receipts move more than one-for-one with asset prices. This effect would also boost receipts out to 2025-26.

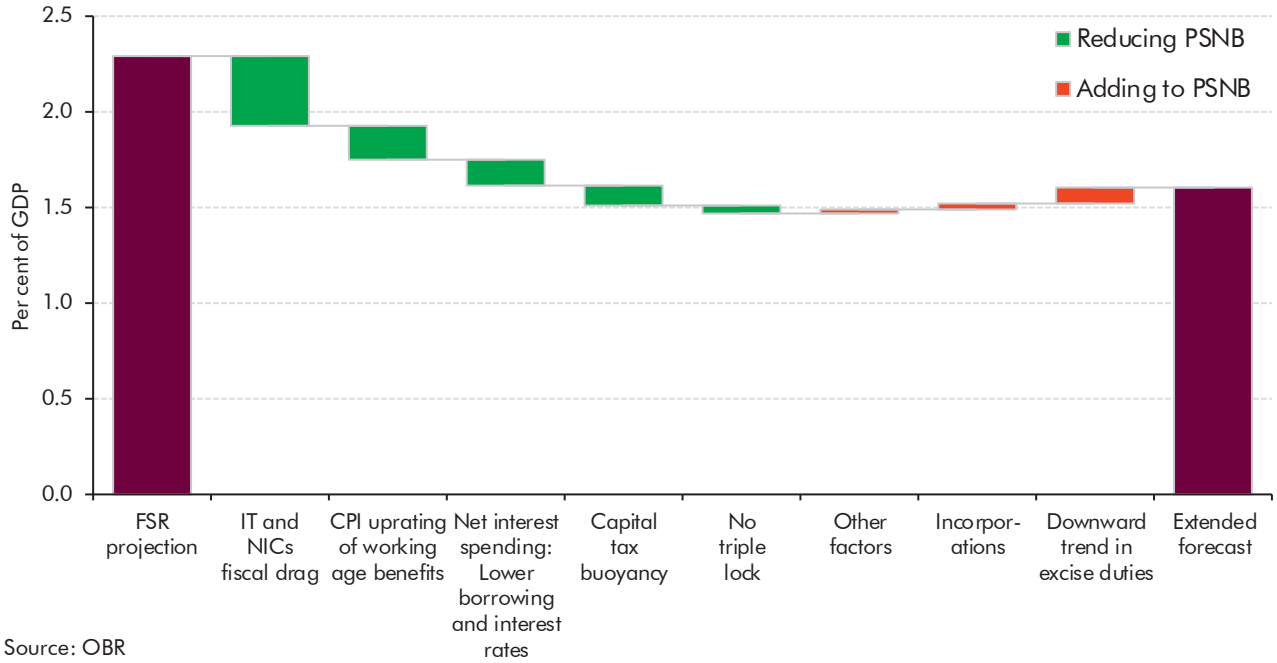
- If the **triple lock on state pensions uprating** is assumed not to be applied beyond the end of the current Parliament in 2022-23, spending would rise by less than 0.1 per cent of GDP less.

3.140 Partly offsetting these effects:

- If the tax bases for **excise duties** were assumed to fall relative to GDP as we assume in our medium-term forecasts (due to rising fuel efficiency of cars and the reduced propensity to smoke and consume some forms of alcohol), receipts would be 0.1 per cent of GDP lower by 2025-26. This projection is based on the Government's stated policy assumption that the main fuel duty rate will rise in line with RPI inflation from April 2019 onwards, although the rate has now been frozen in every year since 2011.

- If the trend towards **incorporations** was assumed to continue – even at half the pace assumed in our medium-term forecast – the shift from higher-taxed employment income to lower-taxed corporate income would reduce receipts by less than 0.1 per cent of GDP. **Other factors** would increase borrowing by less than 0.1 per cent of GDP. These include both methodological and other policy differences between our bottom-up, medium-term approach and our demographically driven *FSR* projection.

Chart 3.27: Extended forecast for borrowing in 2025-26



Source: OBR

3.141 Even under this alternative approach to defining 'unchanged policy' and assuming the health announcement did not hit the deficit, the Government would still have a deficit of 0.6 per cent of GDP to close in order to meet its fiscal objective. That reflects the demographic

and other cost pressures on health, long-term care and state pensions spending offsetting the boost from fiscal drag and less generous welfare awards. There are many choices that this or a future Government could make in order to address these pressures or to offset them with other tax or spending policy changes. But this does illustrate the virtue of addressing these longer-term pressures sooner rather than later.

Conclusion

3.142 The long-term projections in this chapter are highly uncertain and the results presented here should be seen as illustrative projections that reflect particular conditioning assumptions, not precise forecasts of what we expect *will* happen. We have quantified some of the uncertainties through sensitivity analyses.

3.143 The difference between this and our previous *FSRs* stems from the Government's June announcement of higher NHS spending, which raises our estimate of UK-wide health spending in 2022-23 by 0.9 per cent of GDP and at the projection horizon of 2067-68 by 1.5 per cent of GDP, based on the assumption that demographic and other cost pressures will be accommodated to maintain the quantity and quality of health services over the long term. In all, this adds 58 per cent of GDP to net debt in 2067-68, more than explaining the overall 42 per cent of GDP increase in net debt since our previous report. The effect of other changes is more modest. Faster SPA rises and the removal of the Dilnot reforms to adult social care spending reduce debt in 2067-68 while the higher old-age dependency ratio in the latest population projections raises it somewhat.

3.144 As with our projections in previous *EFOs*, the uncertainties to which our assumptions and projections are subject should not be used to disguise the fact that the public finances are projected to come under pressure over coming decades. This is primarily as a result of an ageing population and the non-demographic pressures that have pushed up health spending over the past and are likely to continue to do so in the future. The June announcement of higher health spending can be interpreted as policy accommodating such pressures over the medium term. These conclusions are unrelated to any assumptions about how the UK exits the EU. Under our definition of unchanged policy, the Government would end up having to spend more as a share of national income on age-related items such as health, pensions and adult social care – particularly so on health. But demographic trends would leave government revenue stable as a share of national income.

3.145 In the absence of offsetting tax increases or spending cuts, the pressures we have identified would increase the budget deficit sufficiently to put public sector net debt on an unsustainable upward path. As discussed in previous *FSRs*, such a path could lead to lower long-term economic growth and higher interest rates, worsening the fiscal position further.

3.146 The analysis in this chapter does not tell us the size or timing of the policy adjustment needed to put the public finances back on a sustainable path in the face of these pressures. For that we need to look at some more formal indicators of fiscal sustainability, which is the subject of Chapter 4.

4 Summary indicators of fiscal sustainability

Introduction

4.1 In Chapter 3, we set out illustrative long-term projections for UK public spending and revenues, and the implications that these would have for the health of the public finances. On current policies, our baseline projection shows that public sector net debt and debt interest would eventually rise continuously as shares of GDP, due largely to the prospective ageing of the population and the upward pressure on health spending from other non-demographic cost pressures.

4.2 This trajectory would clearly be unsustainable, but it would also probably be common to most advanced economies. In this chapter, we discuss two widely used indicators that define the concept of sustainability more rigorously and quantify the scale of tax increases and/or spending cuts that might eventually be required to move the public finances back onto a sustainable path.

Indicators of sustainability

4.3 In this *Fiscal sustainability report (FSR)*, we have deviated from our usual practice of holding the first five years of the projection unchanged from our most recent medium-term forecast as we have incorporated the Government's so-far unfunded June 2018 health spending announcement. This has resulted in a substantial increase in projected debt and borrowing across our 50-year horizon. The indicators of fiscal sustainability estimated in this chapter are calculated for 2023-24, taking into consideration the higher health spending but not the Government's commitment to pay for some as-yet unspecified portion of it with other measures. If the Government adheres to this commitment, part of the fiscal gaps we identify in this chapter would be closed.

The inter-temporal budget gap

4.4 Most definitions of fiscal sustainability are built on the concept of solvency – the ability of the government to meet its current and future obligations. In formal terms, this solvency condition is given by the government's inter-temporal budget constraint. Satisfying this condition requires that, over an infinite time horizon, the government raises enough revenue to cover all its non-interest spending and also to service its debt obligations. This requirement is normally expressed in stock rather than flow terms, namely that the present value of future government receipts should be equal to or greater than the sum of its outstanding debt plus the present value of all its future spending.

4.5 If a government is not on course to satisfy the inter-temporal budget constraint, then – unless the government defaults – either a reduction in spending or an increase in taxes (or both) will at some point be necessary to put the public finances back onto a stable trajectory, thereby restoring solvency. Clearly there are many paths that could do this, but a simple measure of the extent of the adjustment needed is provided by the 'inter-temporal budget gap', defined as the immediate and permanent increase in taxes and/or cut in public spending as a share of GDP that would be just sufficient to ensure the government's inter-temporal budget constraint is satisfied.

4.6 The primary balance required to satisfy the inter-temporal budget constraint depends on not only the stock of debt outstanding but also the gap between the (nominal) interest rate that the government has to pay on its debt and the long-run (nominal) growth rate of the economy. The higher the interest rate, the faster debt will accumulate; but the higher the growth rate, the easier it is to service.

4.7 If the interest rate paid on government debt were to remain below the rate of growth, then net debt could still fall as a share of GDP even if the government were to run a primary budget deficit. Conversely, if the interest rate exceeds the economic growth rate (as it normally does) then in the long run the government will need to raise more in revenue than it spends on things other than debt interest (i.e. to run a primary budget surplus) in order to meet the debt obligations it has already accumulated. The greater the amount by which the interest rate exceeds the growth rate, the larger the primary surplus required.[1]

4.8 In our projections, we assume that the long-run interest rate is close to but higher than the long-term growth rate of the economy (4.7 per cent versus 4.5 per cent). We also assume that borrowing for financial transactions is relatively small. This implies that an adjustment only a little larger than the size of the primary deficit at the end of our projection would be sufficient to stabilise the debt-to-GDP ratio in the long term.

4.9 As the inter-temporal budget gap is calculated from revenue and spending flows over the indefinite future, we need to make some assumptions about their behaviour beyond our 50-year projection horizon. For simplicity, we hold them constant as proportions of GDP.

4.10 Relative to the fiscal position in 2023-24 assumed in our baseline projection, the UK's inter-temporal budget gap is 8.6 per cent of GDP. In other words, under our central projection the Government would need to increase taxes and/or cut spending by 8.6 per cent of GDP (£181 billion in today's terms) from 2023-24 onwards to satisfy the inter-temporal budget constraint with an immediate and permanent adjustment. This is 1.6 per cent of GDP larger than the gap reported in our 2017 *FSR*, as current or future governments will now not only have to offset long-term spending pressures, but also the extra health spending announced in June, if they wish to stay on a sustainable path over an infinite horizon.

[1] Specifically, if there are no financial transactions, then the debt-to-GDP ratio will be stable if, and only if:

$$s = \frac{i-n}{1+n}d$$

where s is the primary balance as a share of GDP, d the debt-to-GDP ratio, i the nominal interest rate, and n is the nominal growth rate.

4.11 By accommodating most of the demographic and other cost pressures expected over the next five years, in contrast to the previous spending plans, this extra health spending adds 0.9 per cent of GDP to borrowing in 2022-23, but 1.5 per cent of GDP in 2067-68 thanks to the compounding effect of demographic and other cost pressures applying to that higher starting point. This explains the overall deterioration in the inter-temporal budget gap since our previous projections.

4.12 The inter-temporal budget constraint has the advantage of providing a rigorous accounting framework, but it also has limitations as a practical guide to policy. Revenue and spending projections over 50 years are uncertain enough; projections over an infinite horizon are clearly even more so. The inter-temporal budget constraint might also be thought insufficiently constraining. Countless fiscal paths that would not look particularly sustainable over our 50-year horizon, would nonetheless satisfy this measure. For instance, rather than being met through an immediate and permanent adjustment, the intertemporal budget constraint would allow governments to run large fiscal deficits for extended periods provided there were sufficiently large fiscal surpluses assumed at some point in the potentially far distant future. Moreover, no government could credibly commit itself and its successors to such a path of long-deferred virtue. As a result, alternative criteria are usually used to judge sustainability, the most common being the 'fiscal gap'.

Fiscal gaps

4.13 Fiscal gaps are judged over a pre-determined finite horizon. The fiscal gap is the immediate and permanent change in the primary balance needed to achieve a chosen debt-to-GDP ratio in a given year.

4.14 One of the main strengths of fiscal gaps is that they are intuitive and can be interpreted easily in the context of any policy rules on the level of government debt relative to GDP. But there is no consensus regarding the optimal debt ratio and how quickly one should aim to return to it if the public finances move off course. Indeed, since the last 'sustainable investment rule' was dropped in 2008, no UK government has targeted a specific debt-to-GDP ratio – although all have been subject to that specified in the Stability and Growth Pact, which applies to all EU member countries. Governments since 2010 have instead targeted the profile of the debt ratio from year to year. It is also important to remember that while a fiscal gap of zero implies that the public finances are sustainable for a given debt target and timetable, this does not necessarily mean that the fiscal policy setting is optimal or is sustainable after the target date.

4.15 In the absence of a policy rule that dictates the choice of target year, the aim is normally to pick a date far enough ahead to capture the most significant (typically demographic) future influences on the public finances, but not so far ahead that the projections are subject to any greater uncertainty than necessary.

4.16 Table 4.1 shows fiscal gap calculations for the demographic and health spending variants discussed in Chapter 3. As with the inter-temporal budget gap calculation, the primary balance necessary to achieve a given level of debt as a share of GDP depends on the

difference between the interest rate and the long-term economic growth rate. We therefore show the gaps not only for our central assumption that the long-run interest rate exceeds the long-term economic growth rate by 0.2 percentage points, but also under alternative assumptions where the difference between the interest rate and the growth rate is 1 percentage point higher or lower.

Table 4.1: Fiscal gap estimates

	Adjustment in primary deficit, per cent of GDP			
Target year	2067-68	2067-68	2067-68	2057-58
Target debt to GDP ratio (per cent)	20	40	60	40
Baseline projection	-5.7	-5.2	-4.8	-4.6
Baseline projection (gradual progress)[1]	-2.0	-1.9	-1.7	-2.0
Pre-June health policy	-4.4	-4.0	-3.6	-3.4
3.4 per cent real growth in health care	-4.8	-4.3	-3.9	-3.8
No other cost pressures in health care	-3.3	-2.8	-2.4	-2.7
Lower other cost pressures in health care[2]	-4.8	-4.4	-4.0	-4.0
Higher other cost pressures in health care[3]	-6.6	-6.2	-5.7	-5.2
Interest rate 1 percentage point higher	-5.7	-5.3	-5.0	-4.8
Interest rate 1 percentage point lower	-5.6	-5.1	-4.6	-4.4
Old age structure	-6.1	-5.7	-5.3	-4.7
Young age structure	-4.7	-4.2	-3.8	-3.9
High net migration	-5.2	-4.7	-4.3	-4.1
Low net migration	-6.3	-5.8	-5.4	-5.1
50 per cent lower net EU migration	-6.0	-5.6	-5.2	-4.9

[1] Adjustment required each decade.
[2] Other cost pressures converging to 0.5 per cent annual growth by 2038-39.
[3] Other cost pressures converging to 1.5 per cent annual growth by 2038-39.

4.17 Table 4.1 shows that to return the debt-to-GDP ratio to its pre-crisis level of around 40 per cent of GDP in 2067-68 would require a permanent increase in taxes and/or cut in spending of 5.2 per cent of GDP (£111 billion in today's terms) in 2023-24. Around a quarter of this gap relates to the Government's June health spending announcement.

4.18 Since it is very unlikely that a government would try to offset decades worth of future demographic and other cost pressures via a single upfront adjustment, a more realistic alternative adjustment is illustrated via the 'gradual progress' variant, which would require a series of tax increases or spending cuts worth an additional 1.9 per cent of GDP (£39 billion) each decade. Again, around a quarter of this is down to the June announcement.

4.19 These estimates are larger than in our 2017 *FSR*, with the increase more than explained by higher medium-term health spending and the compounding effect of applying demographic and other cost pressures to it. Absent the June announcement, bringing debt to 40 per cent of GDP would have required a 4.0 per cent of GDP one-off adjustment, slightly smaller than in last year's report. Targeting debt ratios of 20 and 60 per cent of GDP would require larger and smaller adjustments respectively.

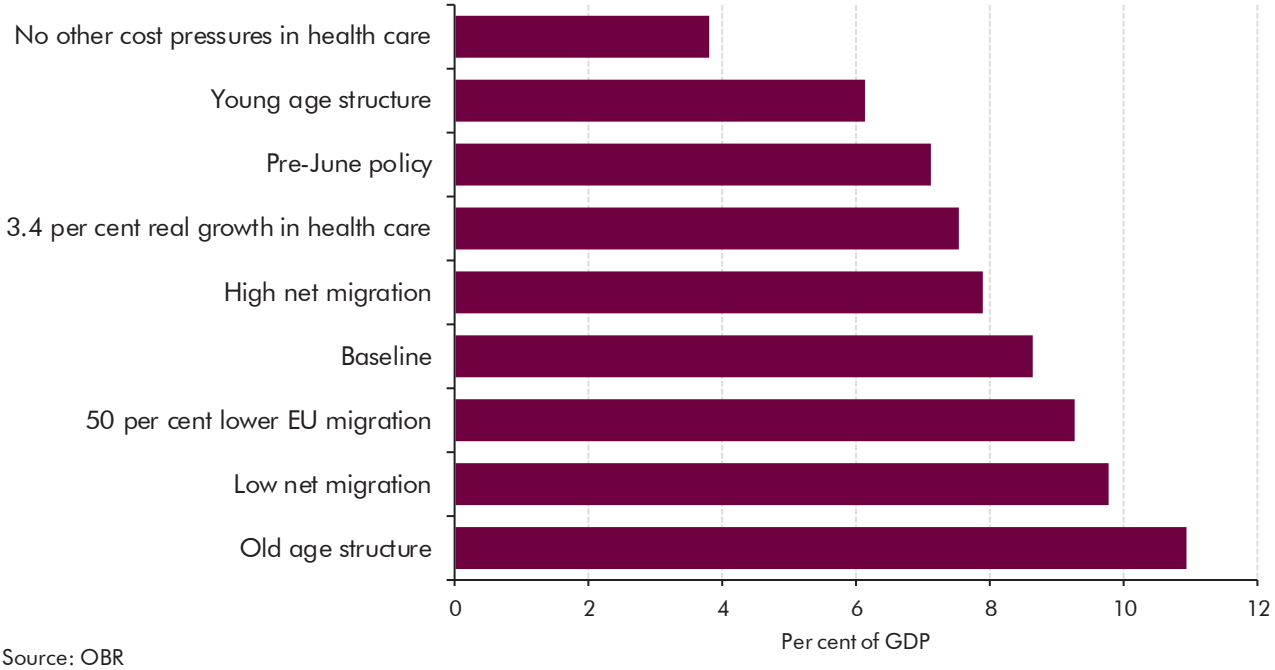
4.20 It should be emphasised that this would be an additional tightening on top of the fiscal consolidation, which has already improved the primary balance by 8.2 per cent of GDP between the peak deficit in 2009-10 and 2017-18. It is also additional to announcements that are expected to affect the public finances over a longer horizon and that are included in our baseline projection, such as linking changes to the State Pension age to life expectancy.

4.21 The adjustment needed to hit any given debt target would be larger if the pace of excess cost growth in the health sector was greater than we assume in our baseline scenario, if the long-term interest rate were to exceed the economic growth rate by more than we assume, or if migration flows were lower than in our central projection. Of the scenarios shown in Table 4.1, by far the largest adjustment would be required where we assume that 'unchanged policy' is consistent with other cost pressures in the health sector growing at 1.5 per cent a year in the long term rather than the 1.0 per cent in our baseline projection. In this case, the required adjustment to get debt back to 40 per cent of GDP would be a one-off 6.2 per cent of GDP in 2023-24. Conversely, under the 'no other cost pressures' scenario, the one-off adjustment required to bring debt down to 40 per cent of GDP by 2067-68 is equal to 2.8 per cent of GDP in 2023-24.

4.22 Table 4.1 also shows what would be required to achieve a debt to GDP ratio of 40 per cent ten years earlier, in 2057-58. This would generally require a smaller adjustment, but debt would continue to rise as a share of GDP in subsequent years so would be above 40 per cent in 2067-68. More broadly, the focus on a particular target year means that the path of the primary balance and net debt beyond this point is ignored. Ultimately, given our assumptions on interest rates and GDP growth, a small primary surplus is required to prevent net debt continuing on an upward trajectory.

4.23 Chart 4.1 shows the primary balances at the end of the projection period under the different variants, ordered from high to low. The ranking shown in the chart is similar to that implied by the fiscal gap calculations. Comparing Chart 4.1 and Table 4.1 shows that none of the one-off fiscal gap estimates to bring debt down to 40 per cent of GDP would be sufficient to keep the ratio at that level further ahead.

Chart 4.1: Primary deficit in 2067-68



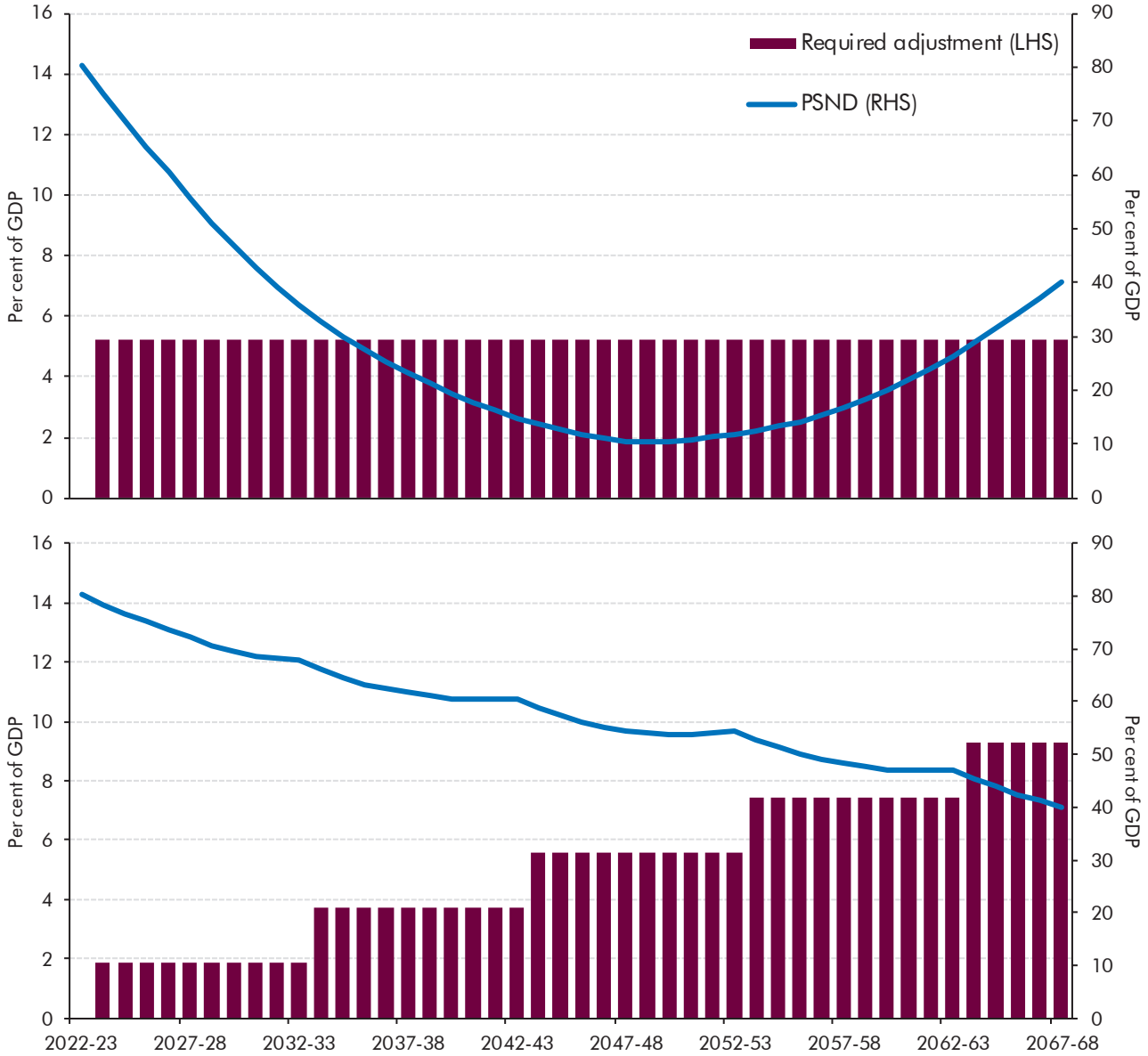
Source: OBR

4.24 Chart 4.2 illustrates the difference that the choice between a one-off permanent adjustment and an initially smaller, but ultimately larger, cumulative decade-by-decade adjustment makes to the path of net debt *en route* to the target date. It shows that:

- A **once-and-for-all policy tightening** of 5.2 per cent of GDP in 2023-24 would see the debt ratio fall below 40 per cent of GDP in the early-2030s, reach a trough of 10 per cent of GDP towards the end of the 2040s and then rise back to 40 per cent of GDP in 2067-68. But the tightening would be smaller than the 8.6 per cent of GDP required to stabilise the debt ratio over the longer term and so the debt ratio would continue rising beyond the target date.

- A **cumulative policy tightening** of 1.9 per cent of GDP a decade would see the debt ratio fall more slowly, reaching 40 per cent near the end of the projection period. By the target date, the cumulative tightening since 2023-24 would have reached 9.3 per cent of GDP.

Chart 4.2: Alternative reductions to the primary deficit and the implied path of net debt if targeting a debt to GDP ratio of 40 per cent in 50 years



Source: OBR

4.25 These differences highlight the fact that even if policymakers have chosen where they want the debt ratio to end up, there are further choices to be made about the desirable path to get there. They also illustrate the challenge of trying to capture long-term fiscal sustainability in a single measure or gap. In the run-up to the late 2000s financial crisis, several countries endeavoured to 'pre-fund' the costs of an ageing population by tightening fiscal policy sufficiently to bring their net debt to GDP ratios considerably lower. The intention was that, when the costs of ageing materialised, they could allow the debt ratio to rise again rather than having to impose much larger spending cuts and tax increases.

Conclusion

4.26 In our baseline projection and the many variants we consider in Chapter 3, we would eventually expect to see public sector net debt on a continuously rising trajectory as a share of GDP. This would be unsustainable. But the fiscal challenges of an ageing population and non-demographic health spending pressures are common to many countries and our conclusions are similar to those of a variety of international institutions and other bodies.

4.27 In this chapter, we have examined the scale and timing of potential policy responses that could return the UK's public finances to a sustainable position, given different definitions of what such a position might be. There is no consensus regarding an optimal debt ratio or how quickly a government should try to return to it when the public finances move off course. So the targets and paths that we have set out here should be regarded as purely illustrative; they are not recommendations. As we have demonstrated, even if policymakers do have a target for a particular debt ratio in a particular year, they have many options for the timing of the response and the path of debt in the meantime.

4.28 Clearly it would be unrealistic for any government to set out a fiscal strategy for 50 years and have anyone expect that it would be in a position to implement it all. The main lesson of our analysis is that future governments are likely to have to undertake some additional tightening beyond the fiscal plans in place for the next five years in order to address the fiscal costs of an ageing population and upward pressures on health spending. Leaving all or part of the June 2018 health spending announcement unfunded would simply require greater action later.

4.29 Our interpretation of current policy results in public spending growing faster than the economy as a whole. This results from the continuation of longstanding trends, such the accommodation of cost pressures within the health system and ageing, and from policies, such as the 'ratchet effect' of the triple lock on state pensions spending. Other components of public spending, including defence and development, have recently been subject to commitments to hold them constant as a share of national income, which is what we assume for all non-age-related spending in our central projections. This suggests that unless such spending policies change in the future, satisfying the measures of fiscal sustainability outlined in this chapter without increasing taxes would require implausible reductions in the few remaining components of public spending not subject to these sorts of commitments.

4.30 Our findings imply that policymakers and would-be policymakers will need to think carefully about the long-term consequences of any policies they introduce in the short term. And they should give thought too to the policy choices that will confront them once the current planned consolidation is complete.

A Population projections

Introduction

A.1 Population projections illustrate how the population would evolve under particular demographic assumptions. The seven *Fiscal sustainability reports* (*FSRs*) we have now produced since 2011 have used five different iterations of the Office for National Statistics' (ONS) National Population Projections (NPPs), culminating in the 2016-based projections used in this report.

A.2 For each vintage of its population projections, the ONS produces several variants based on different assumptions for births, deaths, and migration, as well as a 'principal' projection. For the purposes of our *Economic and fiscal outlooks* (*EFOs*) and *FSRs*, we choose the variant that seems to us to offer the best central projection, given current policy settings and other domestic and external factors. But, as the ONS itself highlights, future demographic trends will certainly differ from those assumed in any particular variant and this means that population projections become increasingly uncertain over longer horizons. The scale of this uncertainty is clear when looking back over decades of previous population projections.[1]

A.3 To examine the effect that changing demographic projections have had on our fiscal projections and provide an indication of the inherent uncertainties at play, this annex:

- examines how **trends in migration, fertility, and mortality** have been incorporated in different *FSRs*;
- illustrates the **effects on the public finances**; and
- highlights **sensitivities to alternative demographic assumptions**.

Demographic trends

A.4 The NPPs use a cohort component methodology, calculating population change between any two years by adding a new cohort of projected births, and using age-specific death rates and net migration projections to estimate changes for existing cohorts. The principal projections for these components incorporate assumptions that reflect recent patterns of migration, fertility, and mortality, as well as expert advice.

[1] See Box 3.3 of our 2014 *Fiscal sustainability report* for a discussion of official UK population projections produced since 1955.

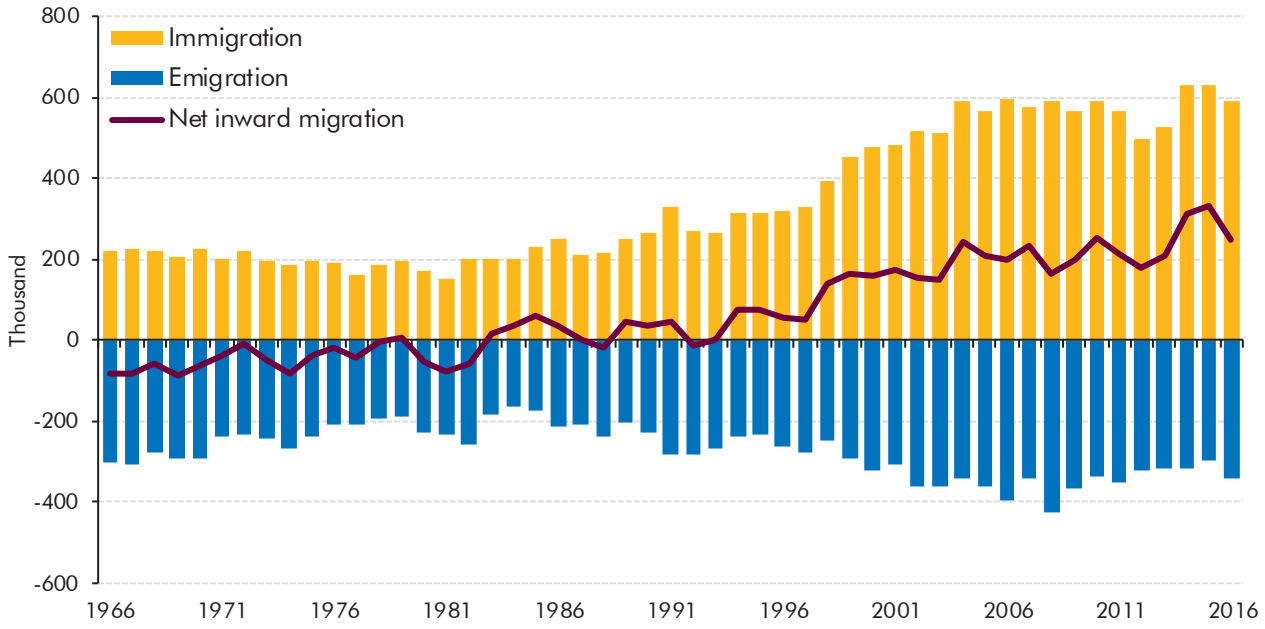
A.5 Consistent with our fiscal projections, this annex focuses on the UK as a whole. However, the NPPs also contain projections for the four nations of the UK. Box A.1 discusses how demographic trends differ at this level of aggregation from those for the UK as a whole.

Migration

A.6 For the purposes of the projections, an international migrant is defined as someone who changes their country of usual residence for at least a year. The ONS projects both immigration and emigration, although it is the net flow that is most important for our fiscal projections, due to its direct impact on the size and age structure of the population. The central net inward migration projection is not policy-based (due to a lack of reliable available data). Instead, it assumes net inward migration will move from current levels to a long-term average level over a period of years. The ONS assumes a long-term age distribution of migrants equal to the average recorded over the past five years. Top-down variants assuming higher and lower migration are also provided, alongside a handful of other migration variants.

A.7 Through most of the second half of the 20th century, net migration flows to the UK were small and emigration exceeded immigration. Net outflows averaged a little under 25,000 people a year from 1966 to 1991. But since the early 1990s, immigration has increased significantly while emigration has increased only modestly. This has led to positive and increasing net inward migration, which has exceeded 100,000 every year since 1998.

Chart A.1: Long-term international net inward migration



Source: ONS

A.8 Higher net inward migration partly reflected changes in economic and social conditions in the 1990s and subsequently. But it also reflected changes in the legal environment and in policy, such as the 1992 *Maastricht Treaty*,[2] which expanded the freedom to stay in the UK from EU workers to all EU citizens. Following the expansion of the EU in 2004, inward migration of EU nationals increased, peaking at 269,000 in 2015.

A.9 Since 2010, the Government has had an "*objective*" to reduce annual net migration to the "*tens of thousands*",[3] but numbers have remained consistently higher than this. Prior to our March 2015 *EFO* and 2015 *FSR*, our central fiscal projections were underpinned by the ONS low migration variant population projections, which we judged appropriate given the international economic environment and direction of policy (although these never showed the Government's ambition being met). With net inward migration consistently exceeding these projections, in 2015 we switched to using the principal population projection. In the absence of the EU referendum result, and the consequent weakening of 'pull factors' encouraging net inward migration, we would have revised our net migration assumption again in our November 2016 *EFO* by switching to the ONS high migration variant.

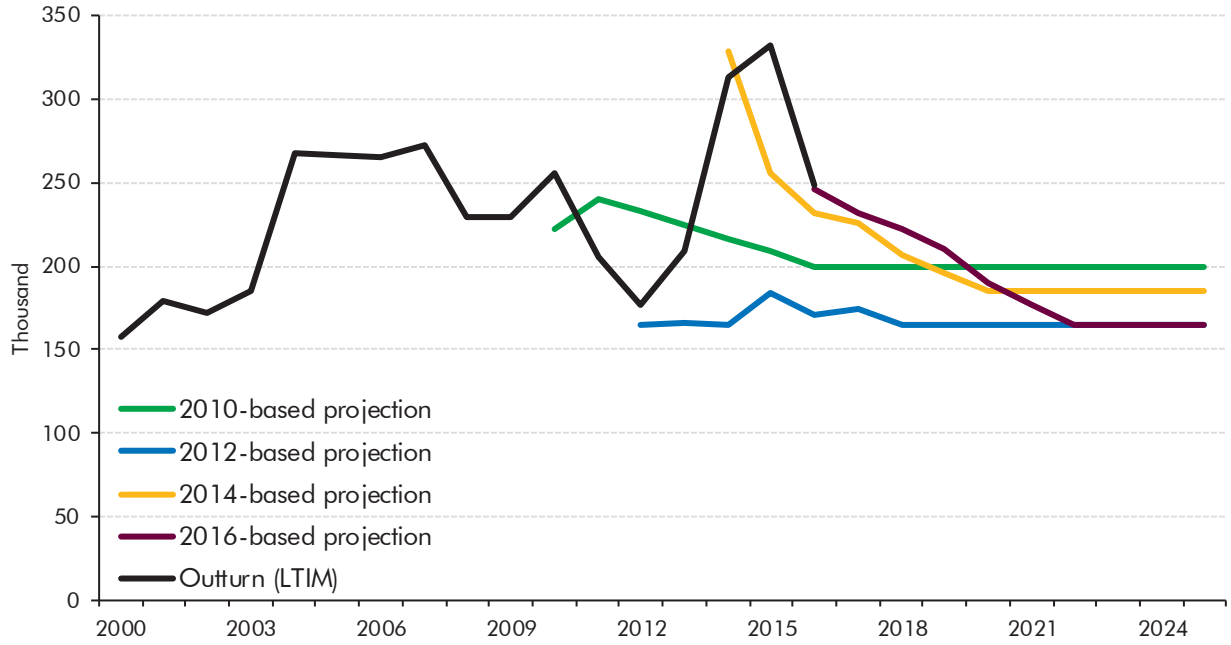
A.10 Net inward migration has fallen significantly since the June 2016 referendum, broadly in line with the principal projections we have been using. After peaking at over 330,000 in 2015, the fall of around 100,000 from that level over the year ending September 2017 was the largest since records began. This is likely to reflect weaker pull factors, such as the fall in the real wages migrants can now expect to obtain in the UK relative to what they could obtain elsewhere due to the weaker pound. Expectations of tighter future migration policy and reporting about attitudes to migration are also likely to have influenced would-be migrants' decisions about whether to move to the UK. Consequently, we have continued using the principal projections.

A.11 As migration responds to economic and social conditions, policy and the law in both the UK and in the rest of the world, it is hard to forecast and can be volatile from year to year. To illustrate the responsiveness of our fiscal projections to changes in these uncertain assumptions, we report what our fiscal projections would look like under higher and lower paths for net migration. To highlight uncertainties associated with the UK's exit from the EU, in this report we have also run the '50 per cent lower EU migration' variant that the ONS included alongside its latest projections.

A.12 As Chart A.2 shows, the most recent principal projection assumes that net inward migration will fall more-or-less linearly from its March 2017 level to a constant long-run level of around 165,000 a year by 2022-23. This is calculated as a 25-year average of past international migration flows (mid-1992 to mid-2016). So, while the medium-term net migration projection reflects the impact of nine months' worth of lower inward migration following the EU referendum, the NPPs do not contain explicit judgments about the likely future course of post-Brexit migration policy. As this level is held constant, net migration falls slightly as a share of the growing UK population.

[2] Council of the European Communities, *Treaty on European Union*, 1992.
[3] For instance, The Conservative Party, *The Conservative and Unionist Party Manifesto 2017*, May 2017.

Chart A.2: Successive net inward migration projections

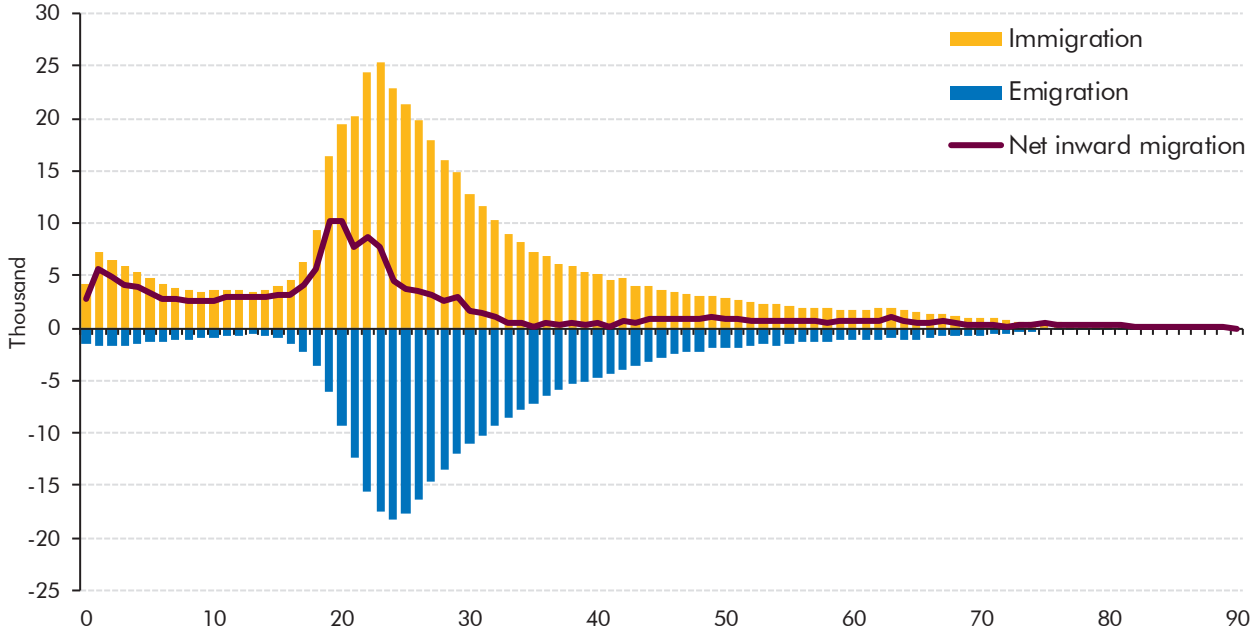


Source: ONS

A.13 The NPPs track the population as a whole, not the stock of migrants within it. As a result, they implicitly assume that migrants on average are as likely to give birth, to die or to emigrate as the native population (conditional on age and gender). Our fiscal projections make a similar simplifying assumption – that migrants are on average no more or less productive than the existing workforce. However, as net migration is concentrated among younger adults (in their 20s and early 30s) and children, migration tends to raise the proportion of the population that is of working age and also the stock of future workers. In our 2013 *FSR*, we showed that consequently net inward migration had a positive overall impact on the sustainability of the public finances over our 50-year horizon. We discussed these conclusions further in Box 3.4 of our 2014 *FSR*.

A.14 The assumed age distribution of migrants over the long term in the 2016-based projections is shown in Chart A.3. At younger ages there is little emigration and so immigration dominates. Both immigration and emigration peak in the mid-20s, after which they taper away to similar levels. As a result, *net* migration is largely confined to children and young adults with relatively small numbers in the over 30s.

Chart A.3: The age-distribution of net inward migration



Source: ONS

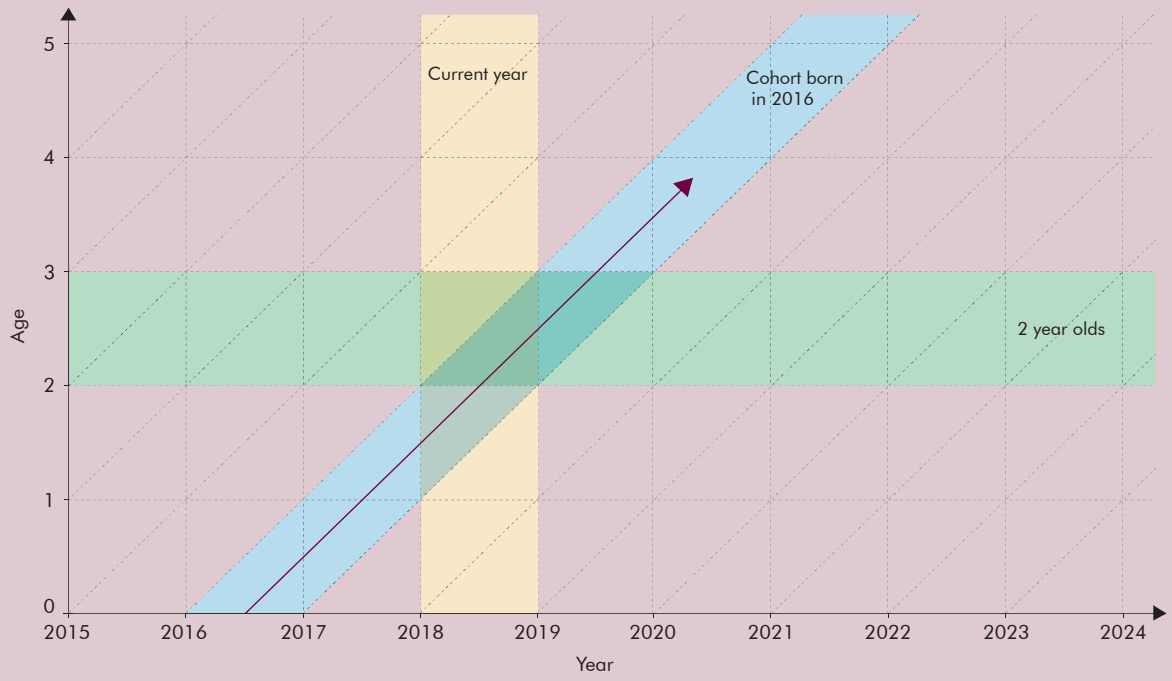
Box A.1: Period cohort measures of fertility and mortality

Considering only past trends in births and deaths could paint a misleading picture of future population change. Even if fertility and mortality at each age do not change over time, numbers of births and deaths can increase if the population is growing or its age structure changing. To control for this, the ONS projections are underpinned by age- and gender-specific fertility and mortality rates, calculated as the proportion of the relevant population of a given age that gives birth or dies in a given year.

Figure A shows how a 'Lexis diagram' can be used to illustrate how these age-specific rates can be used to generate summary measures of fertility or mortality for specific periods or cohorts. The likelihood of each demographic event depends both on time (or 'period', the columns along the horizontal axis) as well as the age of the person to whom it is occurring (the rows along the vertical axis). Moving along the diagonal illustrates that the demographic characteristics of each 'cohort' will evolve as it ages.

The ONS takes into account trends along all these dimensions: its mortality rate projections incorporate the downward trends in mortality over time, while assuming mortality will remain higher at older ages than young, and higher for men than for women. For instance, the probability of an 80-year old woman dying before her 81st birthday is expected to fall from 4.2 per cent in 2016 to 2.1 per cent in 2066. For men, the equivalent probability falls a little more but from a higher starting point – from 5.7 to 2.8 per cent. These improvements are assumed to affect different cohorts differently: for example, prior to the 2016-based projections, the ONS assumed that mortality improvements would continue to be particularly favourable for the 'golden cohort', born between 1923 and 1938, who are now in their 80s and 90s. Based on more recent evidence, that assumption has now been dropped.

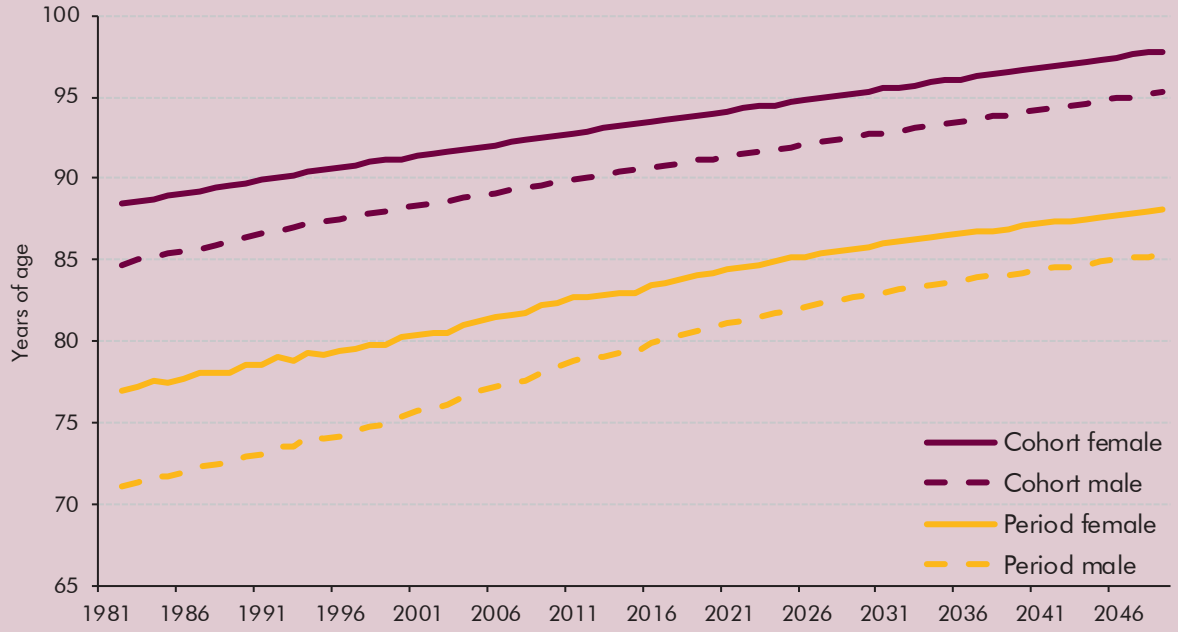
Figure A.1: Lexis diagram



To understand high-level trends in fertility and mortality, it is often helpful to summarise age-specific fertility and mortality rates using a single metric. This is done in two ways: cohort measures look at a particular cohort across time and period measures look across cohorts at a particular point in time.

Cohort life expectancy (CLE) indicates how long an average individual born in a particular year can expect to live. For instance, the CLE of someone born in 2016 (who will be aged between one and two in 2018) is constructed using the mortality rates they are projected to experience over the course of their life: the blue area in Figure A. Period life expectancy (PLE) in 2018 indicates the expected lifespan of a hypothetical individual who experienced 2018's age-specific mortality rates in each year of their life: the yellow area. As Chart A shows, both measures are projected to continue rising over the coming decades, because age-specific mortality rates are projected to continue falling over time. This also means that CLE is higher than PLE in any given year, because the PLE measure does not reflect future improvements in mortality.

Chart A: Period and cohort measures of life expectancy



Source: ONS

Similarly, completed family size (CFS) is a cohort measure of fertility. It indicates the average number of children a woman aged 30 in that year is projected to have over the course of their life.[a] The total fertility rate (TFR) is a period measure of fertility. It illustrates how many children, on average, a hypothetical woman who experienced that year's age specific rates might expect to have throughout her childbearing years.

Period measures are more volatile in outturn, as they are more affected by conditions in the year they are measured. For fertility, this is partly because the TFR is affected by transitory factors relating to the number of births to each cohort, the average age of bearing children and the knock-on effects of migration flows. But in part it is because the CFS measure for these cohorts must be projected, since women born after 1970 are yet to complete their childbearing years.

Period measures are, however, more timely, highlighting shorter-term developments, such as the effect of higher mortality at older ages in recent years.

Cohort measures are most relevant to our long-term projections – in particular, the CLE incorporates anticipated improvements in mortality and so provides a more forward-looking indication of the impact of increasing longevity on the public finances. The Government uses CLE projections to determine the proportion of adult life future cohorts can expect to spend in retirement in order to calculate the timing of future State Pension age increases implied by the longevity link.

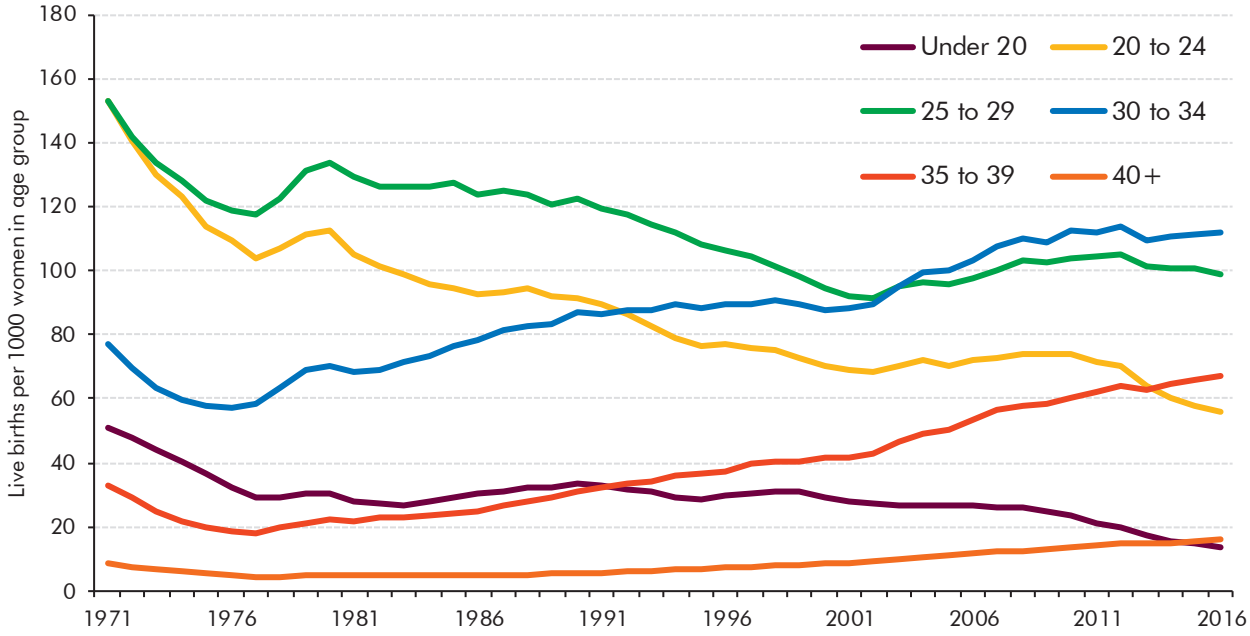
[a] The ONS uses age 30 because that is the approximate mid-point of childbearing ages.

Fertility

A.15 Over much of the past century, successive generations of women averaged fewer children. Completed family size fell from 2.3 for women born in 1943 to 1.9 in 1972 (the last cohort of women to have passed through their childbearing years). This has been driven by falling fertility at younger ages, as well as an increasing share of women remaining without children. The percentage of the cohort of women born in 1971 who had no children is 18 per cent, compared to 11 per cent for the generation born in 1944.

A.16 The number of births in a year depends not only on the number of offspring each cohort has over the course of their lives, but also on the specific stages of life at which those births occur. One important trend that affects this is falling fertility rates at younger ages and rising rates at older ages. This shift will have created a (mostly temporary) reduction in population growth. As Chart A.4 shows, for the first-time in almost 70 years women are having more children after 40 than before 20. This has been attributed to economic and social factors, including increasing levels of education and greater labour market opportunities, which have led women to marry later and to postpone motherhood. The average age of mothers at the birth of their child has increased by one year in each of the last four decades, from 26.4 in 1976 to 30.4 in 2016.

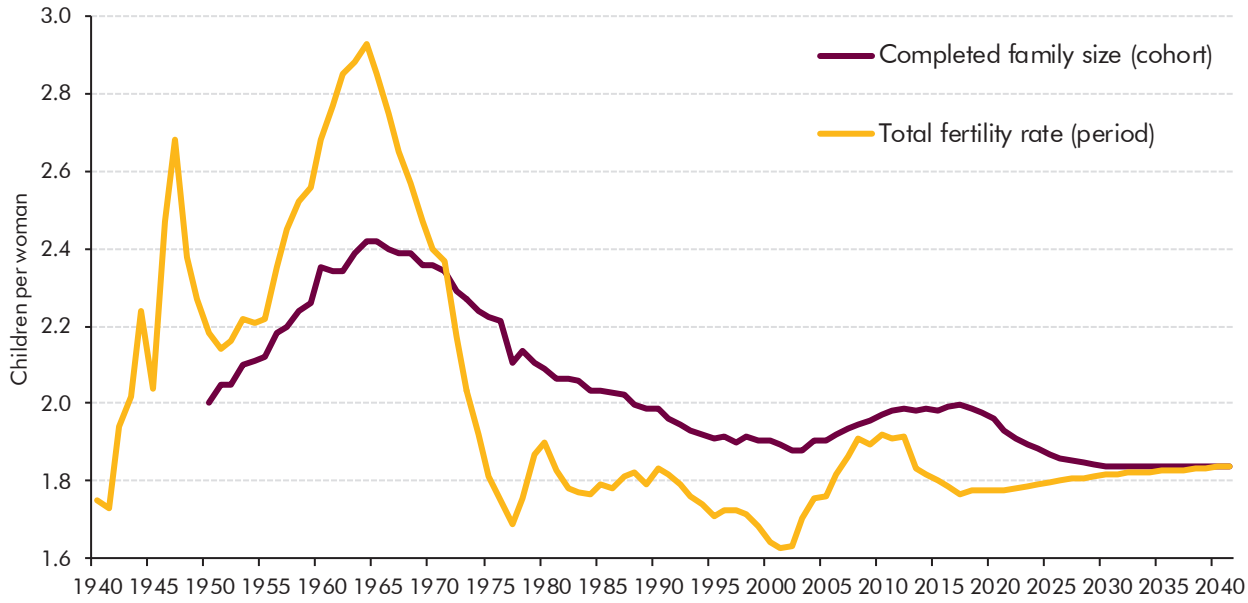
Chart A.4: Age-specific fertility rates



Source: ONS

A.17 As well as gradual changes in education and the labour market, the timing of births can be influenced by major events. So, while trends in fertility are relatively smooth when viewed through a cohort lens, the number of births in each year tends to be more volatile, resulting in differences in the sizes of successive cohorts. Correspondingly, the total fertility rate, which measures period fertility, can vary significantly over time. As Chart A.5 shows, the end of the war led to sharp increases in total fertility rates. There was an even larger 'baby boom' in the 1960s, with the total fertility rate reaching almost three children per woman in 1963 in England and Wales.

Chart A.5: Cohort and period fertility



Note: Before 1973 data is England and Wales only. Completed family size refers to cohort of women born 30 years earlier.
Source: ONS

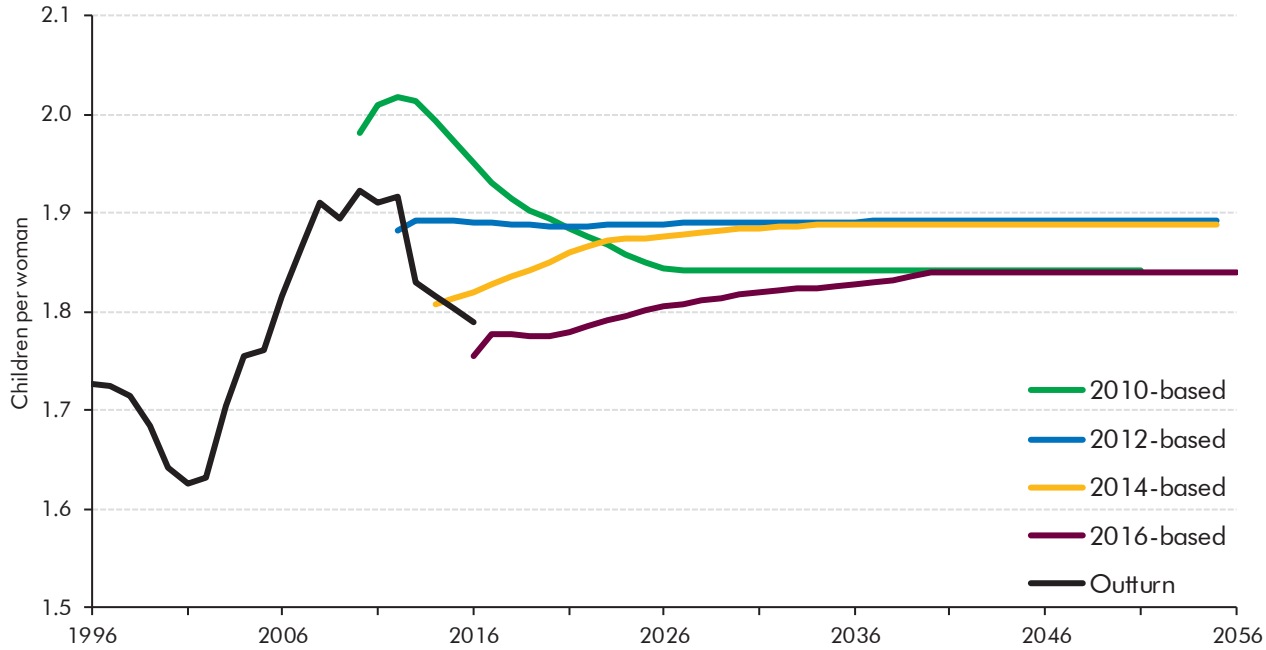
A.18 Both period and cohort measures started to fall in the mid-1960s, partly reflecting wider use of the contraceptive pill and the legalisation of abortion (in Great Britain), and have remained at low levels since, with the TFR staying between 1.63 and 1.92 children per woman since 1974. Both measures of fertility have stayed below the 'replacement rate' of approximately 2.1 children per woman, that is needed to keep the population stable in the absence of net migration. (The replacement rate is above two because some women die before their childbearing years are over and because male births are about 5 per cent higher than female births.)

A.19 The total fertility rate in England and Wales fell to its lowest recorded level in 2001, a trough of 1.63. Since then, it has recovered, to a peak of 1.94 in 2010. This partly reflects increasing education levels in the early 2000s, which led to later family formation. It is also likely to reflect high immigration in recent years, both because immigrants are more concentrated at childbearing ages than the resident population and because total fertility rates are a little higher for non-UK-born women. However, there is significant variation in fertility rates across non-UK-born women. For instance, the total fertility rate of women born in North Africa is estimated to have been 3.9 at the time of the 2011 census, compared with 1.9 for women born in the EU, 1.8 for UK-born women, and 1.3 for women born in Australasia.

A.20 To project fertility forwards, the ONS uses age-specific fertility rate projections. These make assumptions about how rates are likely to evolve for specific cohorts. For instance, as women born in the 1980s have achieved more births by the age of 30 than the cohort that preceded them, their completed family size is projected to be higher. But, as teenage fertility has fallen for cohorts born from the 1990s onwards, it is assumed that the fertility of these cohorts is unlikely to entirely 'catch up' with the higher projected fertility of women born in the 1980s.

A.21 The projections also account for gradual changes in the timing of births. Broadly speaking, over the first 25 years of the projections, age-specific fertility rates are projected to continue in line with recent trends – increasing for women above 30, declining slightly for women in their 20s, and falling for those under 20. From the 25th year of their projections, the ONS assume age-specific fertility rates are constant – this causes completed family size and the total fertility rate to equalise (as there are no more changes in the timing of births). As Chart A.6 shows, in its 2016-based projections, the ONS assumes that the total fertility rate will recover a little from its current level to stabilise at around 1.84. This is 0.05 children per woman lower than in their previous projections.

Chart A.6: Successive projections of the total fertility rate



Source: ONS

A.22 The central scenarios in all our reports have used the ONS's principal projection for fertility rates. However, we have also used the young and old scenarios in all our reports. These vary fertility rates alongside migration and life expectancy.

Deaths

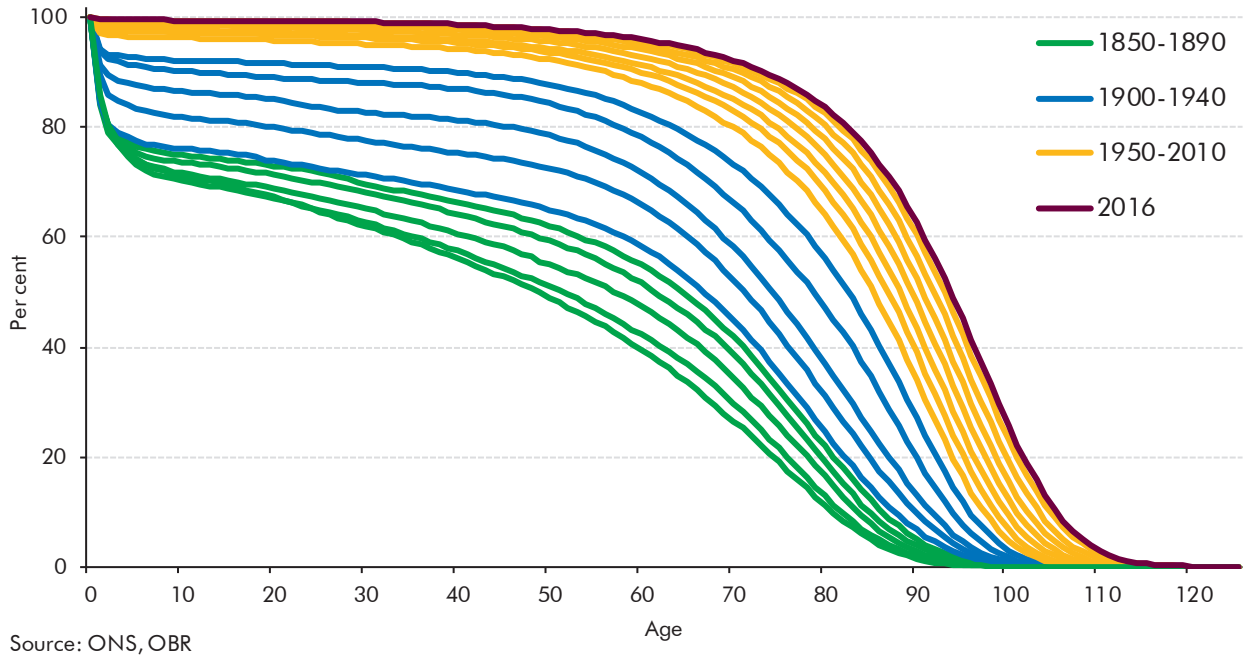
A.23 Life expectancy has increased for both men and women over the last two centuries. This period saw near continuous improvement in living standards as well as significant improvements in the field of medicine. Cohort life expectancy has been estimated at 44 years for an average woman from England and Wales born in 1850 and 41 years for an average man. In the ONS's most recent projections, life expectancy at birth has increased by just over 49 years for men and just under 48 years for women – more than doubling – over the intervening 166 years, an increase of about 3.5 months every year.

A.24 Chart A.7 shows that improvements in mortality at younger ages were the main driver of this increase over the first half of the 20th century. This led to particularly rapid life expectancy gains between 1900 and 1950 (27 years for men and 25 for women). The probability of someone born in the UK dying before their 15th birthday fell from 25 per cent in 1900 to about 4 per cent by 1950. This was particularly due to fewer deaths from infectious diseases. The probability that someone born today dies before the age of 15 is currently projected to be about 0.5 per cent.

A.25 Over the second half of the 20th century, with mortality already low for the young, most of the improvement in life expectancy came from lower mortality at older ages. Cohort life expectancy at 50 is projected to have increased from 82 years for women from England and Wales born in 1950 to 92 for those born in 2016 (and likewise from 77 to 89 for men).

The ONS's central projection now suggests that over a quarter of the population born in 2016 will reach 100, compared to 5 per cent of those born in 1950 (and 0.4 per cent of those born in 1900).

Chart A.7: Survival rate to different ages for different cohorts



Source: ONS, OBR

A.26 A 'life expectancy gap' between men and women is partly attributable to underlying biological and genetic factors, which result in better resistance to ageing for women. However, economic and social trends widened the gap for cohorts born before 1920, such as advances in maternal healthcare and the higher proportion of men working in occupations most associated with long and short-term health risks, such as operating heavy machinery and the armed forces. Moreover, male smoking rates peaked earlier than female ones (in the 1940s as opposed to the 1960s) and at a higher level.[4] As smoking rates have fallen, and labour market behaviours have become more similar, so some of these effects have started to unwind, narrowing the life expectancy gap.

A.27 There remains a 2.6 year gap in projected cohort life expectancy at birth between the cohorts of men and women born in 2016 (and a 3.7 year gap in period life expectancy). Life expectancy also differs significantly within the UK, with the gap between male period life expectancy at birth standing at 10.3 years in the local areas with the lowest and highest longevity during 2014 to 2016 (Glasgow City and Kensington and Chelsea).[5] The equivalent gap for women stood at 7.9 years (West Dunbartonshire and Camden).

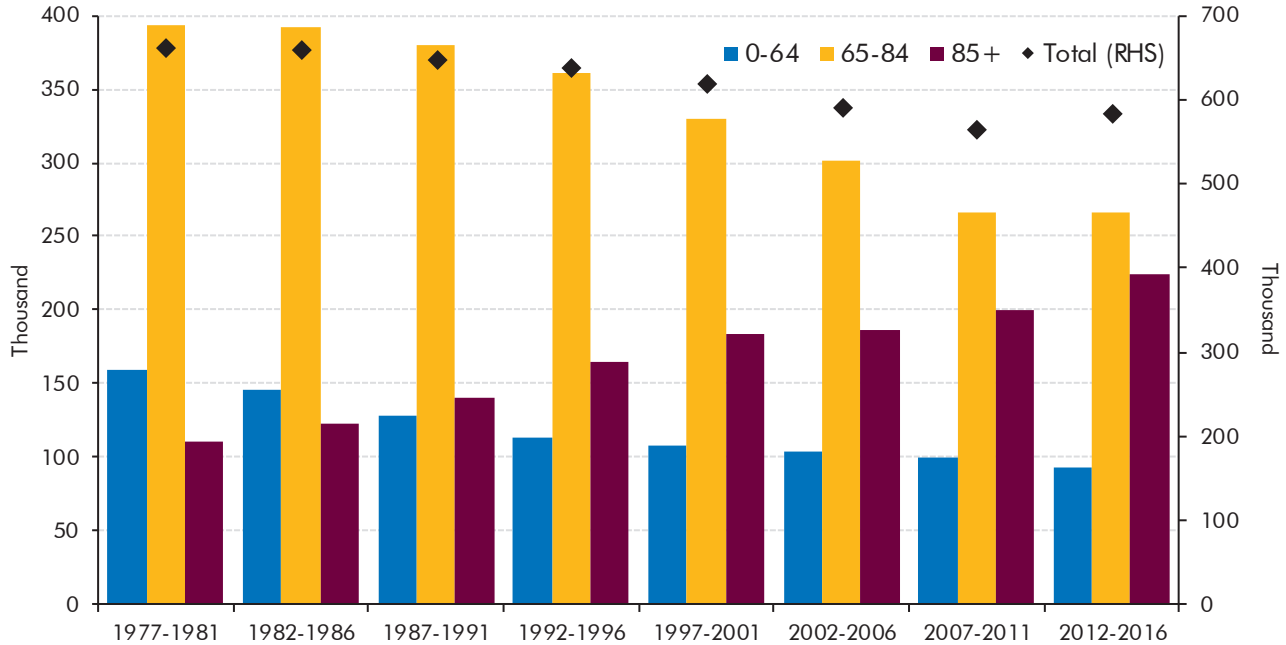
A.28 The ONS projects mortality forwards in the long run by assuming that mortality rates will improve by about 1.2 per cent per year at almost all ages for both men and women from the 25th projection year onwards (2041 in the most recent release). This assumption is little

[4] Forey et al., *International Smoking Statistics: a collection of worldwide historical data – United Kingdom*, 2016.
[5] ONS, *Health state life expectancies, UK: 2014 to 2016*, December 2017.

changed from previous projections, and reflects the continuation of the long-term trend of falling mortality rates. In the ONS's most recent projections the gap between male and female life expectancy continues to narrow slightly, with male cohort life expectancy increasing by 6.8 years to 96.1 years over the 50 years to 2066, compared to a 6.2 year increase to 98.1 years for female life expectancy.

A.29 However, since 2011, and in contrast to the previous trend, deaths have increased slightly, averaging around 583,000 per year over the five years from 2012 to 2016, compared with 566,000 from 2007 to 2011. This increase is more than explained by an increase in deaths at the oldest ages, with average annual deaths at 85+ increasing by 25,000. Moreover, this is no longer being offset significantly by falling deaths for those aged 65-84.

Chart A.8: Trends in deaths at different ages

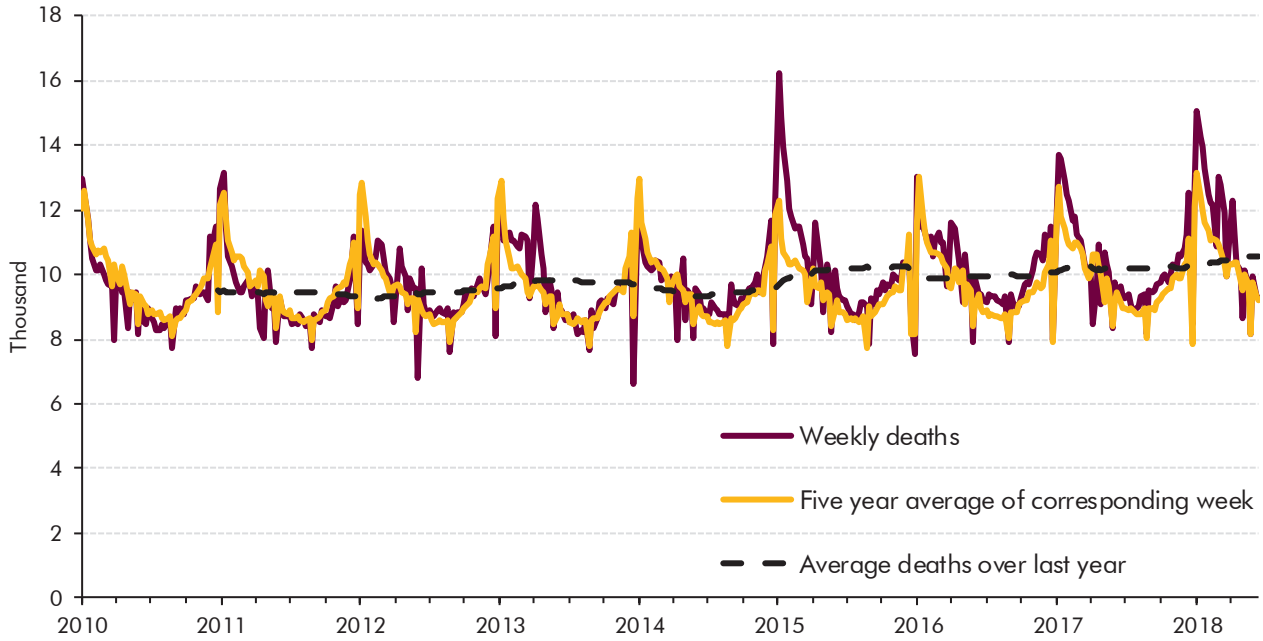


Source: ONS, OBR

A.30 Part of the increase in deaths is explained by population growth and the ageing population, and part by extreme weather conditions and changing patterns of illness and disease. Chart A.9 demonstrates that significantly more deaths occur over the winter months, with this pattern particularly pronounced in 2014-15 (in part because the then-circulating strain of flu was more resistant than usual to that year's vaccine).[6] Although December 2017 and January 2018 were both relatively mild, weekly deaths were still significantly higher than their five-year averages. (In contrast, colder-than-usual weather in March and February 2018 is likely to have contributed to the higher-than-usual deaths in those months.)

[6] Pebody et al., *Effectiveness of seasonal influenza vaccine in preventing laboratory-confirmed influenza in primary care in the United Kingdom: 2014/15 end of season results,* Public Health England, September 2015.

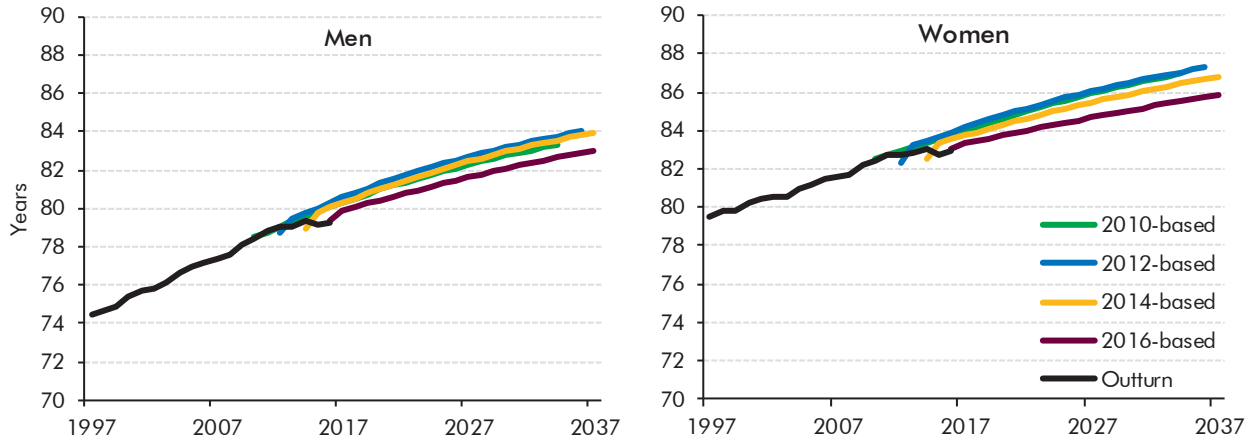
Chart A.9: Weekly deaths since 2010 in England and Wales



Source: ONS, OBR

A.31 Incorporating recent higher mortality means that, although projected life expectancy still increases, it increases more slowly and from a lower level, than previously expected. The resulting total reduction in projected cohort life expectancy at birth compared with the 2014-based projection reaches 1.5 years for men and 1.7 years for women by 2041. Male cohort life expectancy at birth in 2016 is now projected to be 1.3 years lower than 2014-based projections predicted and increases by 0.2 fewer years over the following 25 years. Likewise, female cohort life expectancy starts 1.6 years lower and increases by 0.1 fewer years than in the previous projection. As Chart A.10 shows, period life expectancy, which is more heavily affected by deaths in the year it is measured, actually fell slightly in 2015, although it is still expected to increase significantly over the next 50 years.

Chart A.10: Period life expectancy projections: men (LHS) and women (RHS)



Source: ONS

A.32 All our reports to date used the ONS's principal mortality projection in their central fiscal scenario. However, we have looked in each report at the sensitivity of our fiscal projections to variant population assumptions, including ones which alter mortality projections (while also changing fertility and migration assumptions).

A.33 One important assumption in our fiscal projections regards morbidity – the incidence of poor health. For instance, the ONS estimates that during 2014 to 2016 period life expectancy for a 65-year old man was 18.6 years but that healthy life expectancy was only 10.4 years.[7] Our fiscal projections require us to predict how morbidity will change as life expectancy increases and we took an in-depth look at this assumption in our *Working Paper No. 9: Fiscal sustainability and public spending on health*.[8] In line with international institutions, we have assumed some 'compression' of morbidity from our 2017 report onwards – namely that half of all increases in life expectancy will be spent in good health and half in ill health.

The effect of these trends on the population

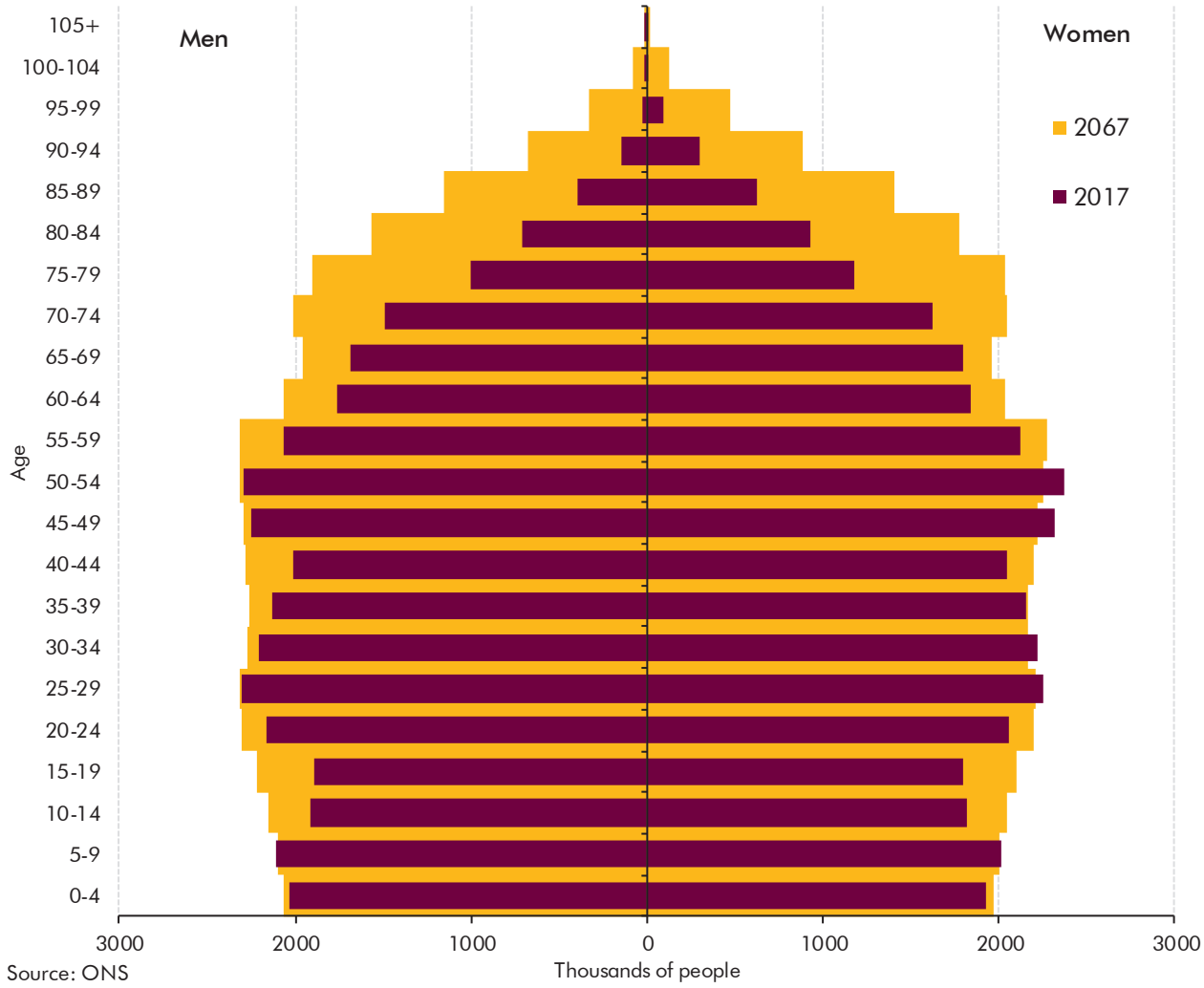
A.34 Rising longevity and positive net migration, partly offset by falling fertility, have led to a growing population over the last 50 years. The relative importance of the different components has shifted over time. Natural change has been positive in every year except 1976. However, net migration has had an increasingly important influence since the 1990s and is now the main driver of population growth. Births net of deaths continue to exert a positive influence on population size, despite below-replacement fertility, because a relatively high proportion of the population is still concentrated at relatively fertile ages.

A.35 Over the 50 years from 2017 to 2067, three-quarters of the increase in the population is projected to come from net migration (with the remainder from natural increase). However, once the impact of net migration on the age structure of the population (and hence future fertility) is accounted for, population growth is entirely due to net migration from the mid-2030s onwards. Without net migration, the population would shrink over the 50-year horizon we look at.

A.36 As Chart A.11 shows, trends in period fertility and life expectancy affect the relative sizes of different cohorts. The retirement of the relatively large baby-boomer cohort will lower the working-age share of the population. Combined with further improvements in mortality at older ages and continuing low fertility, this means that much of the increase in the population over the next 50 years is expected to be at older ages. By 2067, the overall population is projected to have increased by 11.1 million people to 77.2 million, with the 65+ population rising by 8.4 million to 20.4 million. Growth at the very oldest ages is expected to be particularly strong, with the number of centenarians rising from 13,000 to 232,000 over this horizon.

[7] ONS, *Health state life expectancies, UK: 2014 to 2016*, December 2017.
[8] Licchetta and Stelmach, *Working Paper No. 9: Fiscal sustainability and public spending on health*, OBR, 2016.

Chart A.11: Population pyramid



Source: ONS

Box A.2: Demographics of the constituent nations of the UK

This annex focuses on the effects of demographics at the UK level. But the principal population projections used by the ONS also have separate demographic assumptions for each constituent country of the UK. The majority of the UK population currently lives in England, and whilst the populations of Scotland, Wales and Northern Ireland will all continue to grow, they will grow more slowly England's. As set out in Chart B, this will result in their shares of the total UK population declining. The decrease in the relative size of their populations has some fiscal consequences. The devolved administrations' current expenditure is determined by the Barnett formula and formulas set out in the Scottish and Welsh Governments' fiscal frameworks, all of which adjust for overall population size.

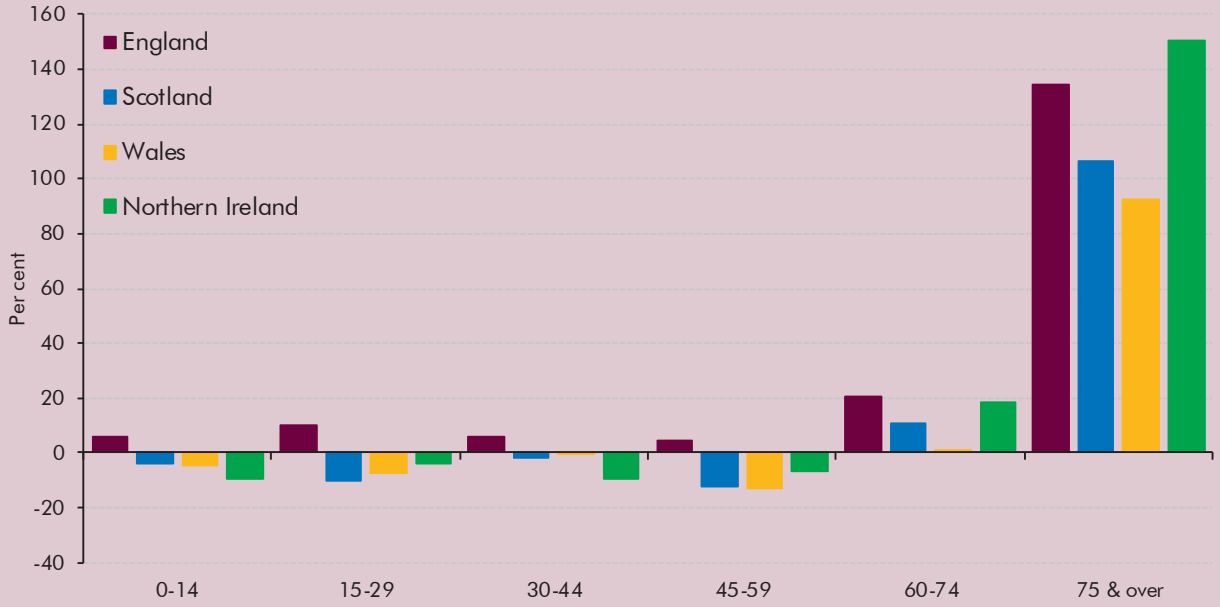
Chart B: Scottish, Welsh and Northern Irish share of total UK population

Source: ONS

The age distribution of the population is projected to change differently between the constituent countries of the UK over the next 50 years. All four countries will see an ageing population, with the population over 75 roughly doubling in all four countries. But in Scotland, Wales and Northern Ireland, unlike in England, the population under 60 is expected to decrease in absolute (as well as relative) terms.

It is not easy to quantify precisely how ageing-related pressures on the public finances might differ between the nations. This would require age-specific tax and spending profiles disaggregated to that level, which are currently not available. Nevertheless, as we set out in Chart 3.10, revenues are generally higher at working ages, while expenditure is higher at older ages. This suggests that countries ageing more rapidly might experience greater fiscal pressures. But these pressures may be partly mitigated by the fact that the larger age-specific expenditures, such as the state pension, are still reserved by the UK government, as are most tax revenues.

Chart C: Percentage change in population between 2017 and 2067



Source: ONS

A.37 The 2016-based projections show similar demographic trends to previous iterations: fertility remains below replacement levels, the population still ages, and there is a constant long-run level of net immigration. However, to take on the effects of higher-than-previously-expected deaths and lower-than-expected births and immigration, the ONS have made changes to their net migration, fertility, and mortality assumptions.

A.38 The ONS already produces a series of scenarios that vary these assumptions. These scenarios provide an impression of how the projected population might respond to demographic trends evolving differently to their central projection. Our analysis uses a new tool the ONS has developed, that lets us vary net migration and fertility and mortality rates and examine how this changes the projected size and structure of the population. However, the resulting projections are not produced as part of the ONS's biennial population projections, and are not disaggregated for the constituent countries of the UK. The method used in the tool is simpler than that used for the ONS's official projections. This means that although the results tend to be similar at the national level, they should be considered less robust than the projections discussed elsewhere in this report.

A.39 In Chart A.12, we use this tool to decompose the effects of changes since the 2014-based projections on the size and structure of the population, using the ONS's assumptions for components of change:

- Changes to the **baseline population** in 2016 are relatively small. These result from the ONS updating their 2014-based estimate of the 2016 population.

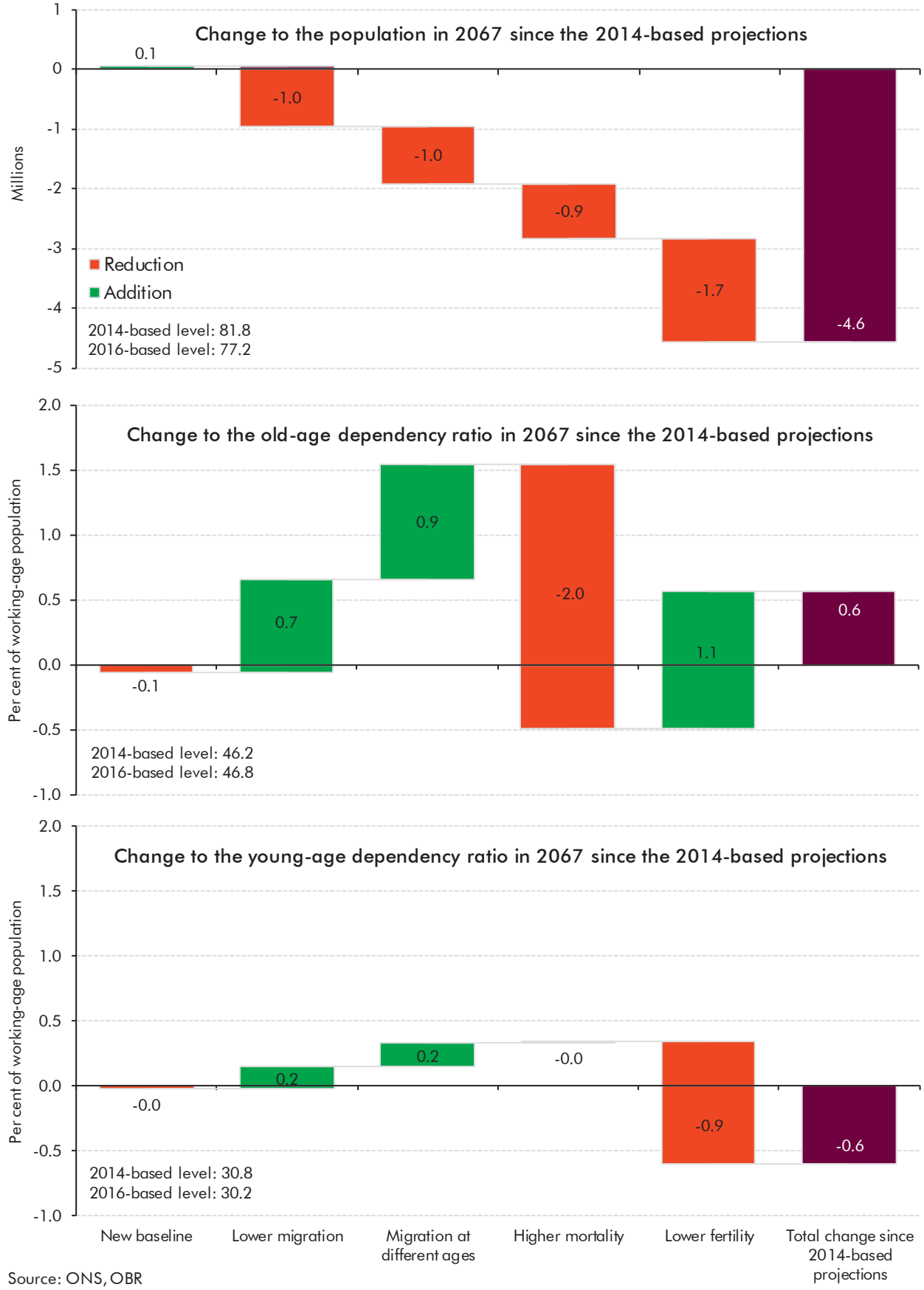
- Changes to net **migration** reduce the population in 2067 by around 2.0 million people. This reduction can be decomposed into the direct effect of a lower level of net migration and the indirect effects of a less favourable age structure of net migration (which reduces natural change over our 50-year horizon). Both effects increase the old-age dependency ratio (which expresses the population aged 65 or above as a proportion of those between 16 and 64).

- Lower **fertility** decreases the size of the population in 2067 by around 1.7 million people, by lowering the number of births in the intervening years. Like lower and less favourable migration, this increases the old-age dependency ratio. Changes to fertility have a larger effect on the young-age dependency ratio than any other component.

- Like lower fertility and migration, higher **mortality** reduces the 2067 population by about 0.9 million people. However, as this change reduces the proportion of the population at older ages, it places downwards pressure on the old-age dependency ratio (although this still increases due to the offsetting effects of lower fertility and migration).

A.40 As changes to fertility, migration, and mortality all interact and compound over time, presenting a unique decomposition of their effects is impossible. Although Chart A.12 provides an illustration of their relative impacts, their precise impacts will depend on the order in which they are applied. If they were applied in a different order the decomposition shown below would yield different results.

Chart A.12: Illustrative effects of changes since the 2014-based NPPs



Source: ONS, OBR

Fiscal implications

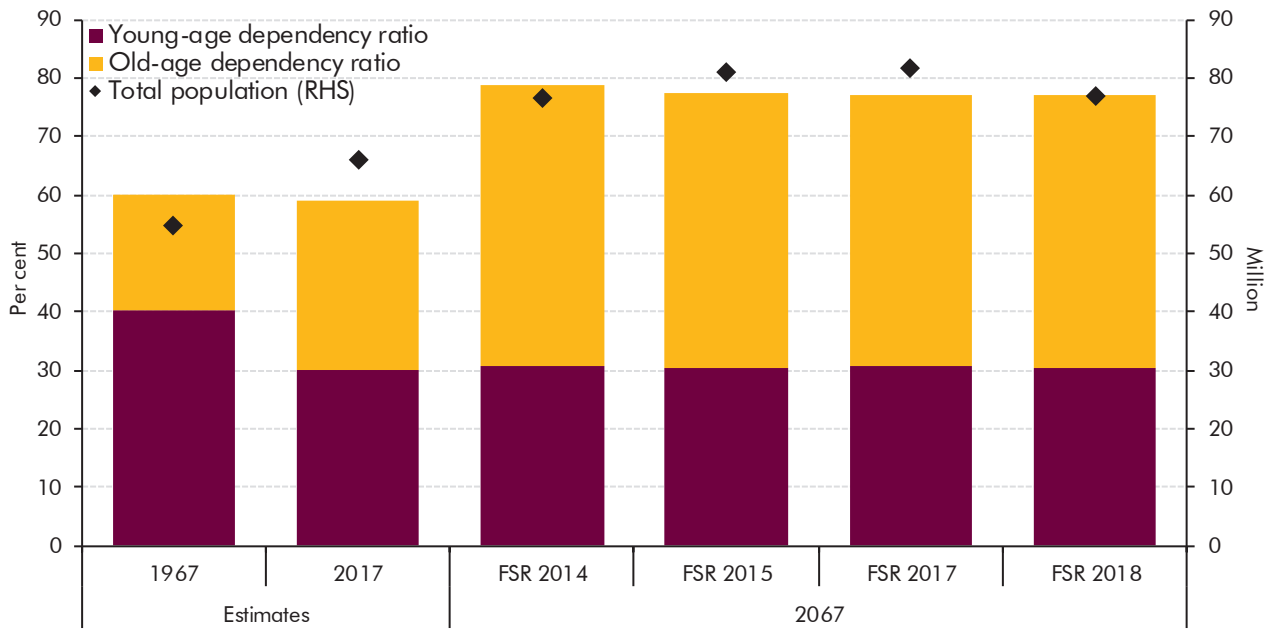
A.41 Demographic changes can have a significant impact even within the shorter horizon of our medium-term forecasts. We discussed these impacts in our November 2017 *EFO*. Moving to the 2016-based NPPs increased our forecast for public sector net borrowing (PSNB) by £0.1 billion in 2017-18, widening to £0.7 billion by 2021-22. This increase was due to lower receipts, partly offset by lower welfare payments. This took account of slower population growth, as well as a changing age structure.

A.42 But while the size of the population matters for tax and spending in cash terms, age structure is more important in our long-term projections. Partly this is because many receipts and spending categories are assumed to grow in line with GDP (other things being equal) which in turn grows with the working-age population. However, some elements, particularly spending on health, social care and education are heavily dependent on age structure.

A.43 When considering the fiscal impact of the structure of the population it is helpful to consider the life cycle of an individual, which can broadly be split into three distinct stages. Firstly, from birth until leaving full-time education an individual is likely to be a net fiscal cost, due to the costs of providing education and other services. Then, once an individual enters the labour market they are likely to make a net fiscal contribution, as taxes paid tend to exceed the cost of services consumed. While true for the cohort as a whole, the magnitude of the contribution for any given individual will depend on their employment status, level of earnings, and their consumption of public services. Finally, upon retirement a typical individual is likely again to be a net recipient, as they will receive the State Pension and make greater use of health and social care services.

A.44 Chart A.13 shows that although population size is projected to increase over the next 50 years by about the same amount as in the past, the age structure is projected to evolve very differently. The proportion of the population in full time education and in retirement are shown (relative to the working age population) by the young and old-age dependency ratios. Over the last 50 years, an increasing old-age dependency ratio has been offset by falling young-age dependency. However, the expected increase in the old-age dependency ratio over the next 50 years is not just larger, it is also no longer offset, resulting in a demographic headwind.

Chart A.13: Past and projected dependency ratios in NPPs



Source: ONS, OBR

A.45 To illustrate the fiscal implications of these changes in the population structure, we have used the age profiles shown in [Chart 3.10]. In order to compare how age-related fiscal pressures over the next 50 years are projected to differ from those experienced over the past 50 years, we have assumed unchanging tax and spending policy consistent with the real per head levels in 2022-23. Chart A.14 shows that:

- From 1967 to 2067, age-related pressures increase **spending** per person by around 20 per cent. However, three quarters of this increase is expected to occur over the next 50 years. For most components of public spending, these pressures were greatest in our 2014 *FSR*, which used the ONS's low migration projection.

- Despite an increase in overall spending, **education** spending falls by around a quarter over this 100-year period (although all but one-fifth of this fall has already occurred).

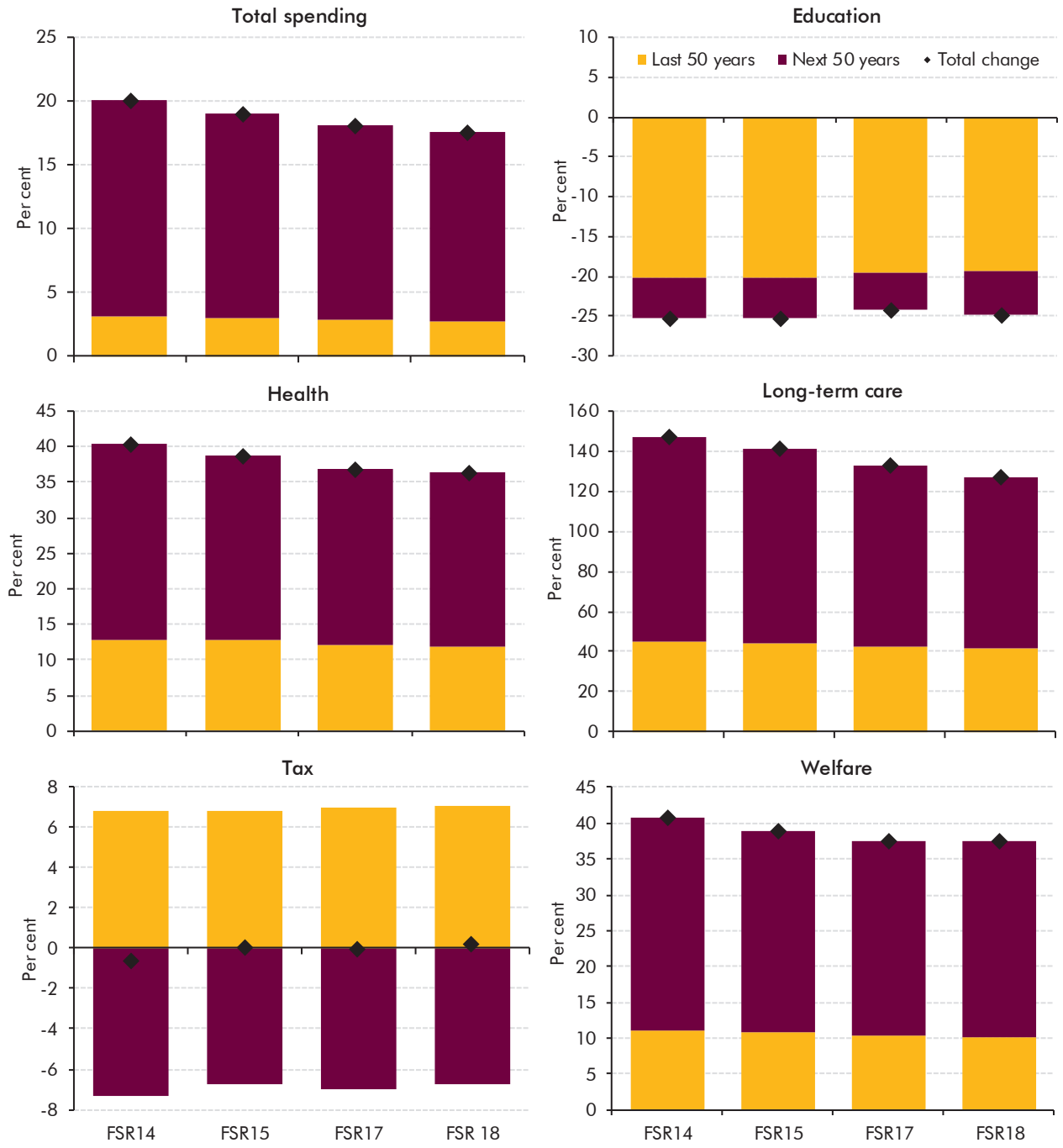
- Age-related pressures increase **health** spending by 36 per cent by 2067, with just over two-thirds still to occur. Notably, this figure does not consider the non-ageing related pressures in our central health projection. For instance, in our central projection, non-demographic cost pressures increase health spending by around 50 per cent, with an increasing number of years spent in good health life partly offsetting this.

- The percentage increase in **long-term care** spending is significantly larger than any other item of spending, with per capita spending roughly doubling over the next 50 years. But this is a smaller component of public spending than healthcare, so it will have a less significant impact on the public finances as a whole. This comparison does not take account of more complex influences on social care, including the very different demographics of the disabled.

- The impact of ageing on **tax receipts** over the hundred years from 1967 to 2067 is balanced. Ageing swelled per capita receipts by around 7 per cent over the last 50 years as the proportion of the population at young ages fell. But this increase will be undone by ageing over the next 50 years. (As a share of GDP, our central projection remains broadly flat across the coming decades, because as the population ages, the employment rate falls, reducing the tax-to-GDP ratio.)

- Like most other components of public spending, per capita **welfare spending** is expected to increase more in the future than the past. This includes increasing State Pension spending, but without incorporating the mitigating effects of State Pension age increases beyond 2022-23, which partially offset these pressures in our central projection. In practice, our central projections for welfare spending involve changing age-profiles, precisely to incorporate these sorts of complexities.

Chart A.14: Implied age-related fiscal pressures between 1967 and 2067



Source: OBR

Sensitivity of NPPs to alternate demographic assumptions

A.46 We consider the ONS's central projection a reasonable reflection of potential future changes to the size and composition of the population. Nevertheless, it is important to acknowledge that population projections are characterised by significant levels of uncertainty. That is why we present our long-term fiscal projections based on several different variant projections. It is as important to understand the implications of different population projections as it is to consider the message from the central projection.

A.47 Our 2014 *FSR* highlighted sources of errors in previous NPPs, including failures to anticipate turning points in demographic trends and difficulties in recognising underlying structural trends. It showed that average projected growth differed from actual annual population growth in 2011 by over 100,000 per year in every projection since 1977, with net migration making the largest contribution to this error.

A.48 The ONS's current estimate of the population provides another important source of uncertainty. Their 2016 estimate comes from the 2011 census, adjusted for recent estimates of births, deaths and net migration. As we move towards the next census, currently planned for 2021, this will become increasingly uncertain. In the 2012-based projections, the first to incorporate the 2011 census, the difference in size of the population from the previous rolled forward population estimate was around 500,000.

A.49 Moreover, while the ONS provide projections 100 years into the future, they tend to focus only on the first 25 years – as these are less subject to uncertainty. As the time horizon is extended, the projections should be treated with ever greater caution, as relatively minor changes to the assumptions will compound. Nonetheless, our fiscal projections employ a 50-year horizon in our projections, so that we can examine largely known and fiscally-important demographic trends, like the retirement of the large 'baby-boomer' cohort.

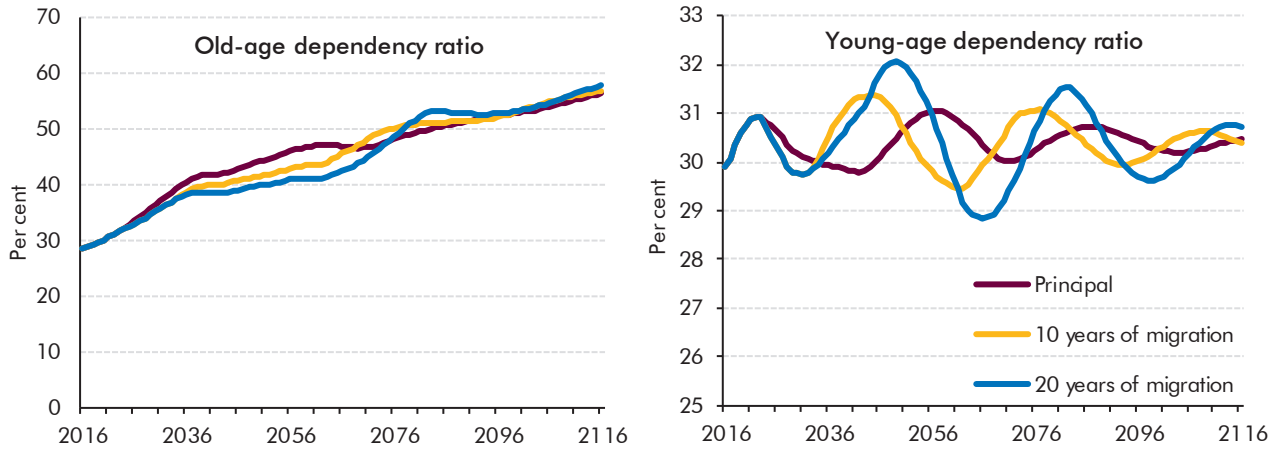
A.50 As well as compounding over the long term, changes to demographic assumptions can interact in complex ways. Table A.1 uses the tool discussed in paragraph A.38 to show differences in the projected size of the population in 50 years under the ONS's alternate fertility and migration assumptions. For instance, in the high fertility scenario the long-run total fertility rate increases by 0.1 children per woman, whereas the low fertility scenario decreases it by 0.2. Similarly, the high and low migration scenarios each vary the long-run level of net migration by 80,000. If fertility rates are the same as in our central scenario, then moving from the central to low migration variant subtracts 5.7 million people from the 2067 population. Moving from the low to the high migration assumption adds 11.3 million people. However, if fertility increases to the high variant, the impact of this extra migration also increases – to 11.6 million people – due to its indirect impact on the numbers of births and deaths. Similarly, the impact of extra migration falls to 10.9 million people when fertility is lower.

Table A.1: Sensitivity of population in 2067 to demographic assumption

		Change in the size of the population in 2067 (millions)		
		Net migration variant		
		Low	Central	High
Fertility variant	Low	-10.4	-4.9	0.5
	Central	-5.7	0.0	5.7
	High	-2.8	3.0	8.8

A.51 As well as the overall level of net migration, cohort effects resulting from temporarily high migration can affect the age structure of the population. For instance, Chart A.15 uses the tool to show the impact of an extra 100,000 net migrants aged 25 for ten years, starting in 2024. This lowers the old-age dependency ratio for 40 years, before increasing it slightly as these migrants pass into retirement. More working age adults initially lower the young-age dependency ratio too, although it then increases as migrants have children, falls as these children mature, and then rises again as migrants reach 65. These patterns are then echoed when the children of migrants reach childbearing age.

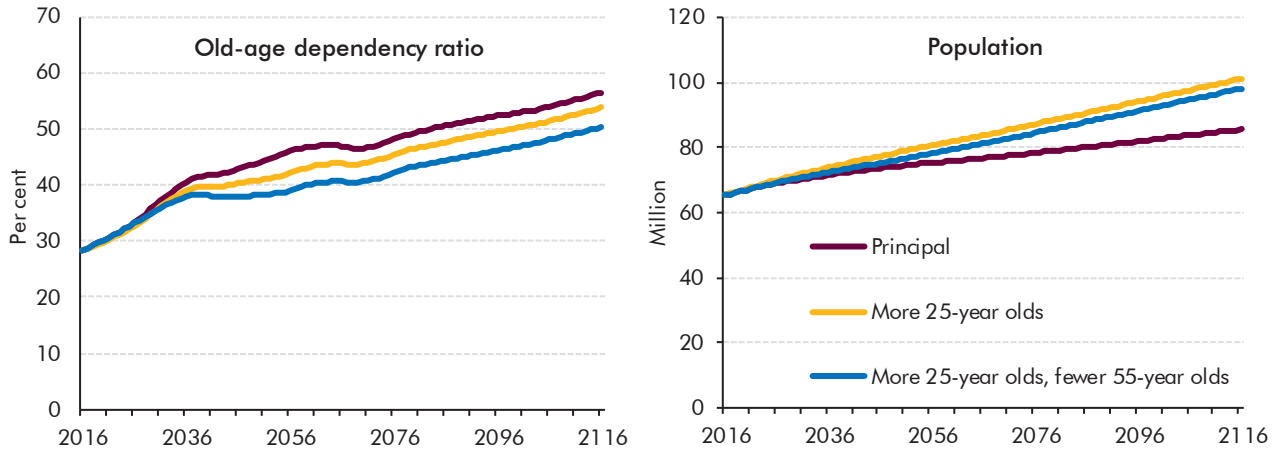
Chart A.15: How a temporarily higher level of migration affects dependency ratios



Source: ONS, OBR

A.52 Similarly, Chart A.16 demonstrates the impacts of an alternate age-profile for net migration. A permanent 80,000 person increase in net migration at age 25 would leave the population larger and old-age dependency ratio lower. A second scenario also increases immigration at age 25 but correspondingly lowers net migration at 55 (leaving overall net migration unaffected). This has a relatively small effect on the size of the population and young-age dependency ratio, but significantly depresses the old-age dependency ratio as working-age migrants now leave the UK before they reach retirement age.

Chart A.16: The effect of migrants' ages on the size and structure of the population



Source: ONS, OBR

Conclusions

A.53 This annex has highlighted the ways in which trends in fertility, mortality and migration have affected the size and structure of the population, as well as how these trends have changed in recent years.

A.54 Looking forwards, it suggests that demographic pressures are likely to be a greater challenge in the future than the past. They will put greater pressures on public spending than in previous decades, while leaving tax-to-GDP little-changed. Moreover, demographic tailwinds that have supported the public finances over the last 50 years will turn to headwinds as the baby-boomers retire. If future governments are to continue meeting the increased demand for public services implied by ageing, they will need to reduce non-age-related spending, increase taxes or borrow more.

A.55 All our *FSRs* have incorporated changing trends in fertility, mortality, and net migration and these have sometimes amplified and sometimes dampened the age-related pressures over the next 50 years. But the big picture remains unchanged. This is because the most important drivers of impending ageing-related pressures, like those resulting from the retirement of the baby-boomers and from increasing longevity, though large in impact, take place only slowly, and are to a large degree predictable.

A.56 Nonetheless, population projections themselves remain highly uncertain. We have tried to highlight some of the more relevant uncertainties in this annex and demonstrate how sensitive the NPPs are to them. Changes to demographic assumptions that do not significantly alter cumulative fiscal pressures over a 50-year horizon, can result in different fiscal pressures over the intervening years. And plausible changes to demographic assumptions, might have significant fiscal consequences 50 years from now. Elsewhere in this report, we have shown how sensitive our projections are to alternate demographic assumptions. We will continue to do so in future *FSRs*.

B Adult social care spending

Introduction

B.1 Adult social care (ASC) covers a wide range of services delivered to those requiring assistance in activities related to daily life, stemming from physical or mental disability, or from old age. Care can be provided in many settings and by different providers, from family help at home to professional services provided in residential care homes. Local authorities are the primary source of public spending on ASC, but informal provision by family and friends is by far the largest source of care.[1]

B.2 The Government is currently preparing a Green Paper on the future of ASC in England. Originally slated for publication around the same time as this report, it was recently postponed to the autumn.[2] With previously planned reforms – known as the 'Dilnot reforms' – having in effect been dropped, but with new proposals pending, our latest baseline projection is based on existing policy continuing. On that basis, spending rises from 1.2 per cent of GDP in 2019-20, the end of the current Spending Review period, to 1.9 per cent of GDP in 2067-68. Our remit prohibits us from considering alternative policy settings, but it seems highly likely that public spending on ASC will be higher than assumed in these projections once new proposals are brought forward.

B.3 We discussed the ASC system in Chapter 6 of our 2017 *Fiscal risks report (FRR)*, so we do not repeat that discussion here. Instead, as context for the current debate about future ASC policy, this annex describes recent trends in ASC spending, the modelling approach we take in our long-term projections and the sensitivities to which our baseline projection is subject. These include key modelling assumptions that could be affected by future policy changes.

B.4 There are broader fiscal issues raised by ASC that are not addressed in this annex. For example, the pressure it places on local authorities' already squeezed budgets or the knock-on effects to the health service, where lack of ASC capacity leads to patients spending longer in hospital beds than would otherwise be the case. We reviewed these in the *FRR*.

Context

B.5 Chart B.1 shows how ASC spending in England has evolved over the decade from 2009-10. Having grown by around 5 per cent a year in real terms in the preceding decade,[3] it

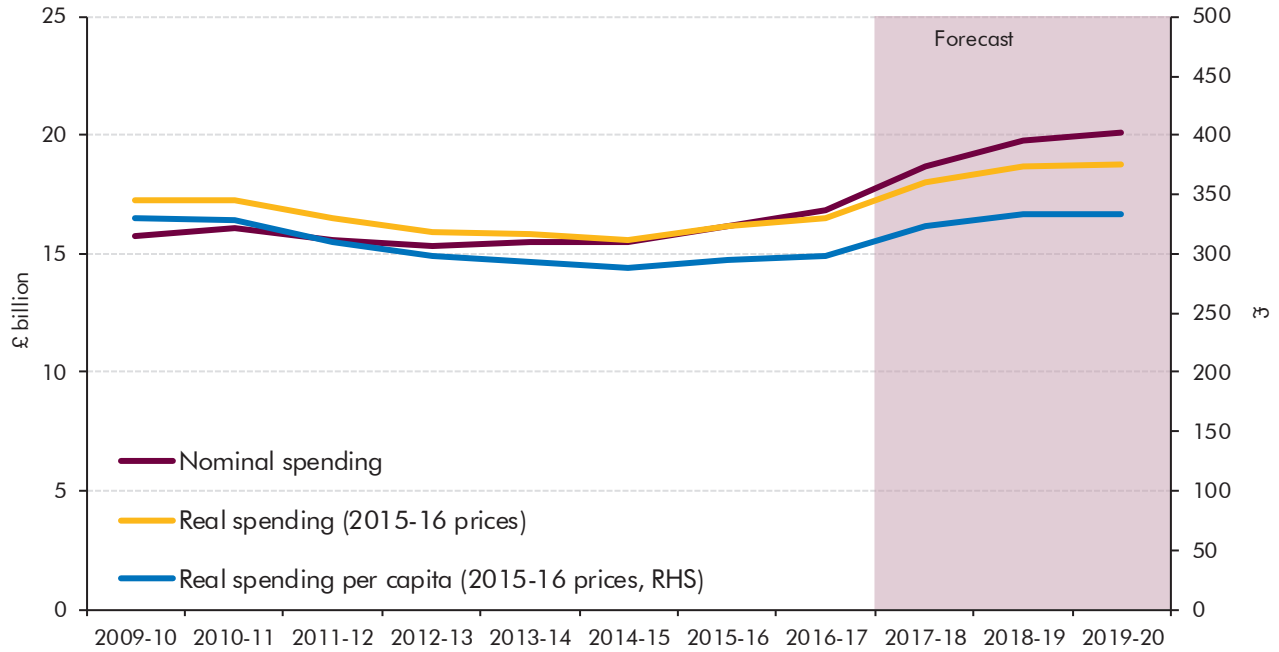
[1] For instance, the National Audit Office's 2018 report on *The adult social care workforce in England* notes that in the UK "*most care is provided unpaid by family and friends*" and that estimates "*by the Office for National Statistics and Carers UK, respectively, of the value of informal care range from £57 billion to over £100 billion per year*". The bottom end of this range is more than double our estimate of publicly provided care in 2017-18.
[2] Department of Health and Social Care, *Secretary of State's oral statement on the NHS funding plan*, 2018.
[3] Institute for Fiscal Studies, *Public spending on adult social care in England*, May 2017.

declined slightly in real terms between 2009-10 and 2016-17, reflecting the squeeze on local authority finances over the period. Indeed, if it had been cut in line with other local authority spending the decline would have been more severe. Given the growing population, real spending per person fell by 10 per cent between 2009-10 and 2016-17.

B.6 Over the three years from 2017-18 to 2019-20, real spending is expected to rebound, as central government policy towards financing these services has shifted. Boosts to ASC funding have come from three main sources: via the adult social care precept, which allows local authorities to raise council tax by larger amounts so long as the funds are spent on ASC; via the NHS, where the Better Care Fund (BCF) aims to support people to live in their communities rather than call on hospital care; and via grants, such as the improved Better Care Fund (iBCF) and the adult social care support grant, which provides local authorities with more dedicated central government ASC funding.

B.7 With this additional funding, real spending on ASC in 2019-20 is expected to be 13.5 per cent higher than in 2016-17, but only 8.7 per cent higher than in 2009-10. This implies an 11.4 per cent rise in real spending per person between 2016-17 and 2019-20, but on this per capita basis it would stand only 0.7 per cent above its level in 2009-10.

Chart B.1: Spending on adult social care in England



Source: NHS, OBR

B.8 One upward pressure on the *cost* of ASC provision has been the introduction of the National Living Wage (NLW), with around two in five workers in the social care sector estimated to have been affected by the most recent NLW rise.[4] This means that increases in real spending per person are unlikely to translate one-for-one into a greater volume of care being provided.

[4] Skills for Care, *Pay in the adult social care sector*, 2018.

Modelling adult social care spending

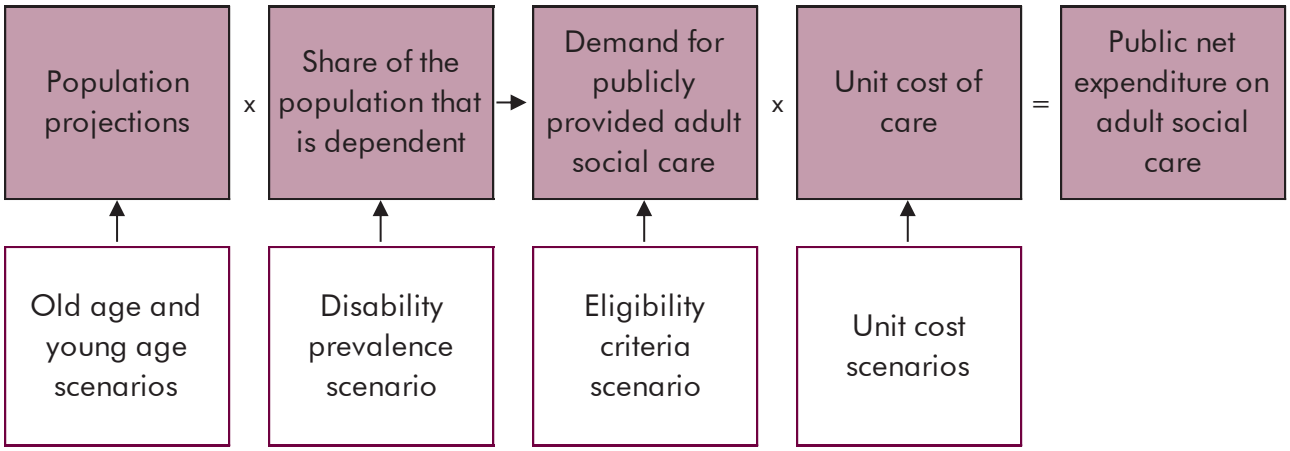
B.9 Our projections for ASC spending are produced by the Department of Health and Social Care, and are underpinned by modelling carried out by the Personal Social Services Research Unit (PSSRU) based on assumptions and judgements that we provide. PSSRU's model projects ASC activity and expenditure under the current system in England.[5] We then scale up the results to the UK level via a relatively simple adjustment.

B.10 Figure B.1 shows the key steps required to produce these projections. They include:

- **Population projections**: we use the latest Office for National Statistics (ONS) population projections to capture demographic changes – one key determinant of the projected number of people in need of adult social care, since demand increases with age.
- **Share of the population of a given age and gender that is dependent**: this is primarily based on estimates of the prevalence of disability in the population – the other key determinant of the number of people potentially in need of care.
- **Demand for publicly provided ASC**: we estimate the share of those needing care that will qualify for publicly provided care under the current eligibility criteria. This requires assumptions about home-ownership rates.
- **Unit costs of care**: we estimate the cost of providing a 'unit' of care. Real unit costs are assumed to rise by 2 per cent a year, in line with our long-term assumption for whole economy productivity and real wage growth. We increase this slightly in the short term to reflect the above-earnings rises in the NLW that will raise labour costs in the sector.

B.11 Several other factors are taken into account too, including the duration of care for service users and marital status. Our assumptions are set out in Table B.1 at the end of this section and were discussed in more detail in Annex B of our 2013 *Fiscal sustainability report (FSR)*.

Figure B.1: Adult social care projections framework



[5] Wittenberg, Hu and Hancock, *Projections of demand and expenditure on adult social care, 2015 to 2040*, 2018.

Forecast for the Spending Review period

B.12 Our medium-term forecasts do not contain the functional spending categories that we use in the *FSR*. We therefore make assumptions for functional spending that are consistent with outturn trends and government policy. In this *FSR*, we assume that, in 2015-16 prices, ASC spending in England will rise from £16.5 billion in 2016-17 to £18.8 billion up to 2019-20. Of this:

- **Local government core spending** remains flat in cash terms, in line with recent trends. In real terms, it falls from £14.2 billion in 2016-17 to £13.5 billion in 2019-20.
- We assume **BCF funding** is kept flat in real terms up to 2019-20, in line with NHS England commitments for the current Spending Review period. The Improved Better Care Fund (iBCF) was first set out to 2019-20 in the 2015 Spending Review. These add £1.8 billion and £1.7 billion respectively in real terms in 2019-20.
- We assume **local authority spending funded by the ASC council tax precept** will remain constant as a proportion of the maximum possible amount that could be raised under the terms set by central government. This adds £0.4 billion to real spending in 2016-17, rising to £1.7 billion in 2019-20.
- The **ASC support grant** adds £230 million to real spending in 2017-18 and £140 million in 2018-19. On current policy, it does not extend to 2019-20.

Long-term projections

B.13 Our modelling splits the provision of ASC between two groups: the working-age population, aged 18 to 64; and the older-age population, aged 65 plus. We project that the number of adults receiving publicly funded adult social care services will reach 1.46 million in 2067-68 (2.7 per cent of the adult population), of which around two thirds will be older people. The number of disabled older people in England is estimated to have stood at around 1.7 million in 2015 (18 per cent of the 65-plus population).[6] This is projected to rise to 3.8 million in 2067-68 (22 per cent of older adults). Despite there being a much higher number of older people requiring care, expenditure is roughly equal between the two groups across our projection. This is because working-age recipients of care generally have greater needs and are more likely to qualify for public provision.

B.14 We set out our approach to the long-term projection of ASC spending in Annex B of our 2013 *FSR*. We use 2019-20 as a baseline from which to project growth in state-funded user numbers and public spending in the ASC system. Our projections are based on several assumptions, including future mortality rates and disability rates. The England figures are then scaled up to a UK total, taking into account differences in population and spending per person between England and the rest of the UK. The main assumptions used for this report

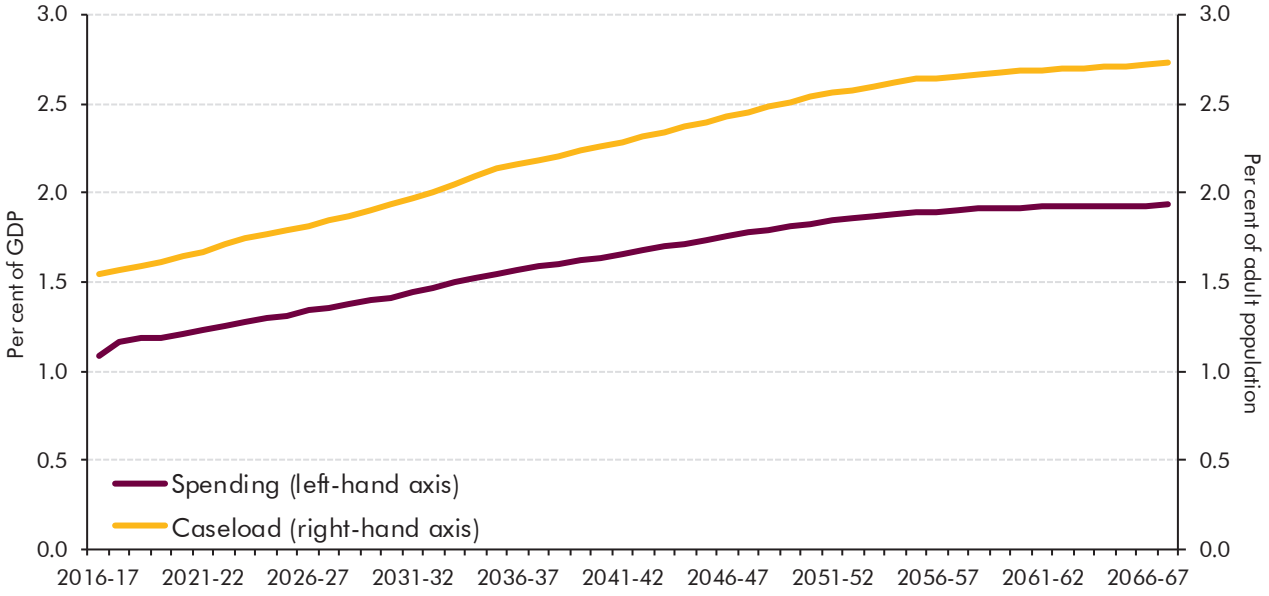
[6] See Wittenberg, Hu and Hancock, *Projections of demand and expenditure on adult social care, 2015 to 2040*, 2018.

are set out in Table B.1. In our baseline projection set out in Chart B.2, adult social care spending is set to rise from 1.1 per cent of GDP in 2016-17 to 1.9 per cent in 2067-68. This is largely explained by a rising share of the adult population being in receipt of publicly funded ASC as the population ages.

Table B.1: OBR assumptions

	Assumption used
Population	Based on our baseline assumption, the ONS's principal population projection.
Unit costs	Unit costs rise by 2.0 per cent a year in real terms.
Disability prevalence	Disability prevalence rates are held constant by year of age and gender, except for learning disabilities which are assumed to rise in line with projections by the Centre for Disability Research.
Care provision	The proportion of people by age, gender, disability and household composition receiving informal care, formal care and disability benefits are held constant.
Home-ownership	Rising rates of home ownership among older people, on an assumption that current older owner-occupiers continue to be owner-occupiers in the future.
Marital status	Rates change in line with GAD 2008-based marital status and cohabitation projections. Rates for those with learning disabilities remain constant.

Chart B.2: Baseline adult social care spending and caseload projections



Note: Caseload shows adults receiving publicly funded adult social care services in England as a share of the 18+ population.
Source: OBR

Sensitivities

B.15 These long-term projections, like all projections in this *FSR*, are surrounded by considerable uncertainty. We can highlight these uncertainties through sensitivity analyses, by altering some of the key assumptions that drive our projections, including our interpretation of current government policy.

B.16 In this section, we examine some of the pressures facing the ASC system over the next 50 years by looking at the sensitivity of spending to:

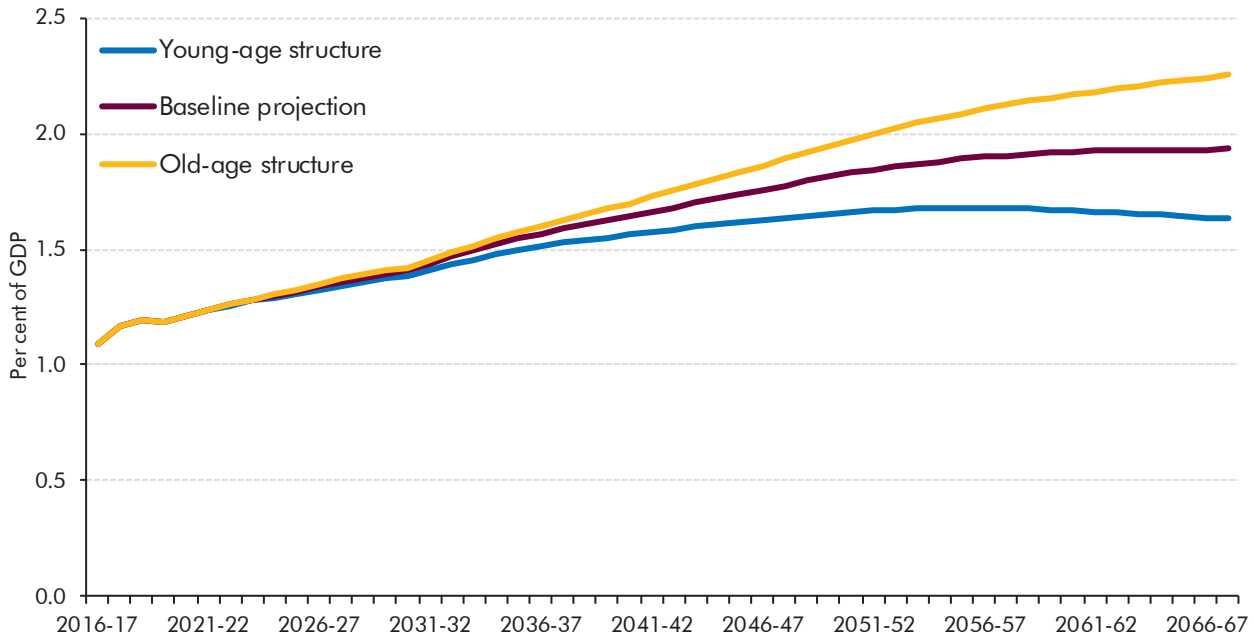
- changing the underlying ONS population projections to reflect a different **age structure** for the overall population;
- changing the assumed rates of **disability** within the population;
- changing the **unit costs** of care;
- changing the **eligibility criteria** in the care system; and
- changing the projections to include the **Dilnot reforms**.

Old-age and young-age structure variants

B.17 With care needs and the drivers of changes in demand differing substantially between working-age and older people, we project the two groups separately. The ONS projects that between 2017 and 2067 the number of people aged 65 plus will increase by 70.1 per cent, from 12.0 to 20.4 million, while the number of people of between 16 and 64 will increase by only 4.9 per cent, from 41.6 to 43.6 million. As a result, the proportion of people of working age in the population falls from 62.9 to 56.5 per cent.

B.18 In the 'old-age structure' scenario, where an older population profile is generated through lower fertility, net inward migration and mortality rates, the demand for ASC increases more rapidly. By 2067-68, ASC spending in this scenario would be 0.3 per cent of GDP higher than in the baseline at 2.3 per cent of GDP. In contrast, the 'young-age structure' scenario would leave spending 0.3 per cent of GDP lower than in the baseline by 2067-68.

Chart B.3: Sensitivity of ASC projections to age structure scenarios



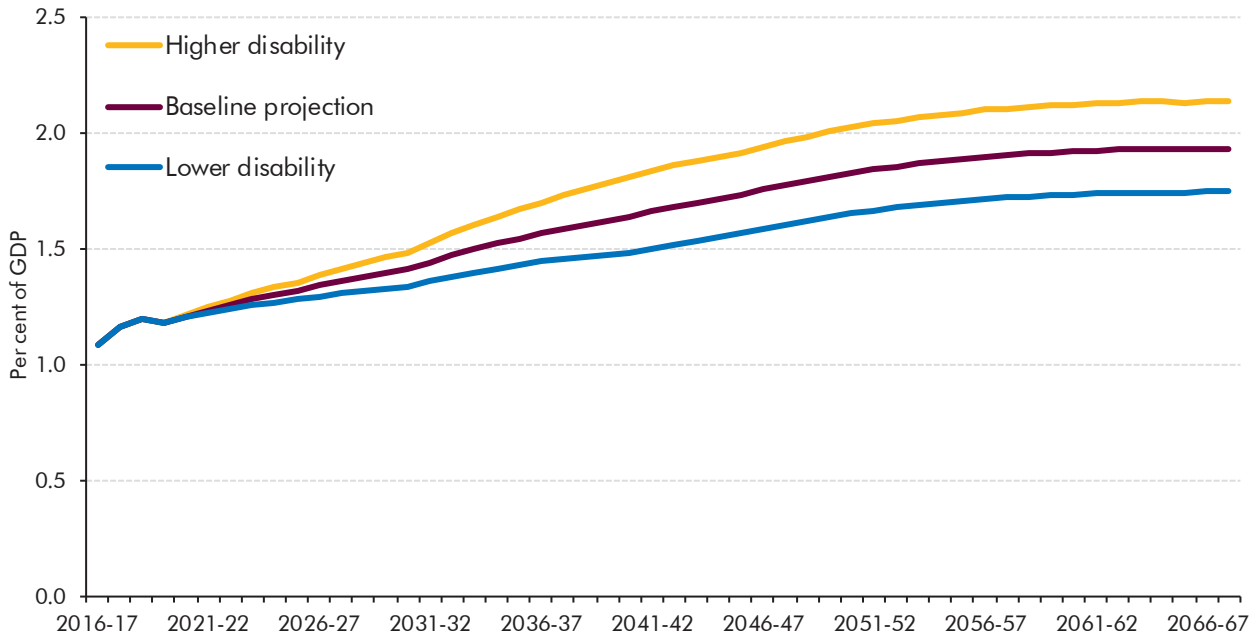
Source: OBR

Disability

B.19 Future prevalence of disability in the population is uncertain. Our baseline assumption is for constant age- and gender-specific disability rates, although rates could fall or rise. While survival rates for serious conditions are generally improving, leading to higher disability rates, other trends such as reductions in smoking could lead to disability rates falling.

B.20 We have modelled the impact of a 'higher disability' scenario where disability rates rise by 0.5 per cent per year. We also increase service use in the working-age population. (This points to increasing prevalence of disability because most working-age care recipients are disabled). Alongside this, we have modelled a symmetric 'lower disability' scenario. Spending in 2067-68 is 0.2 per cent of GDP higher than the baseline in the higher disability scenario and 0.2 per cent of GDP lower in the lower disability scenario.

Chart B.4: Sensitivity of ASC projections to trends in disability prevalence



Source: OBR

Unit costs

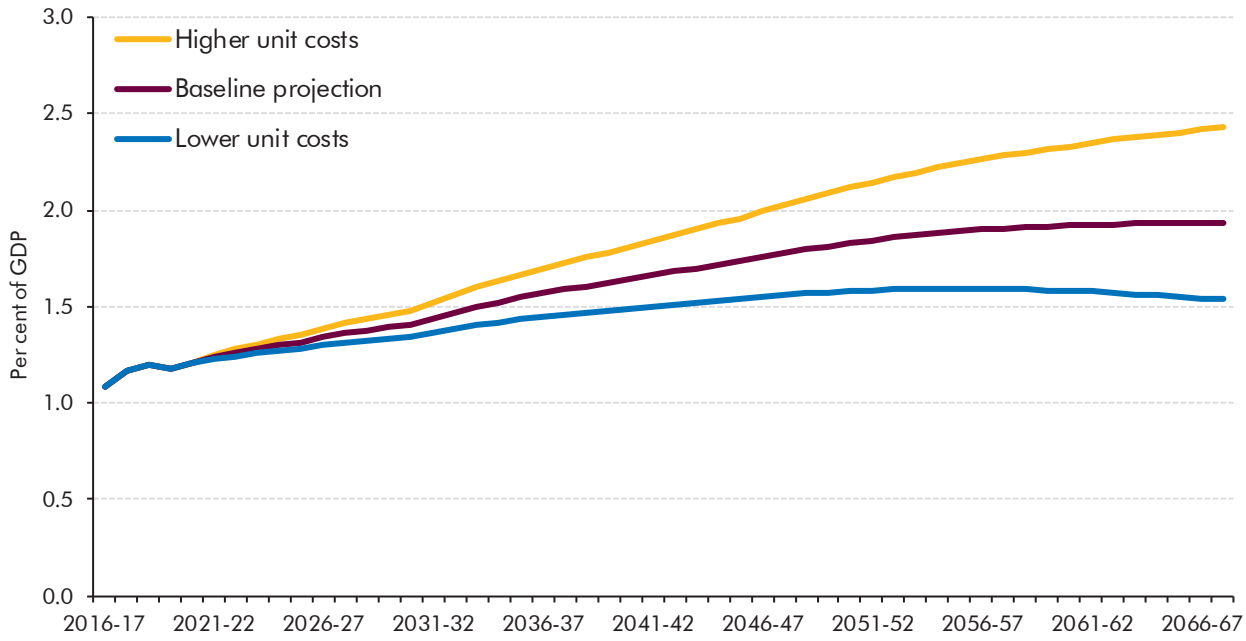
B.21 Our projections for ASC spending do not directly make assumptions regarding productivity in the sector and instead only project forward the cost of providing a 'unit' of care. However, the ONS's latest estimates show that ASC productivity fell by an average of 0.7 per cent a year between 1997 and 2016 – weak relative to the rest of the economy. This reflects the labour-intensive nature of the sector and is likely to continue to add to cost pressures over time, absent a significant change in the capital-labour mix in the sector.

B.22 The sector also faces significant cost-pressures from the National Living Wage. Wage pressures may also increase post-Brexit if it becomes more difficult to recruit care staff. Skills

for Care estimates that just over 220,000 of the ASC workforce in England (17 per cent) were born outside this country, of which around 95,000 (7 per cent) were born in the EU.[7]

B.23 All this means that there is significant uncertainty around our assumptions for trends in unit costs. If growth in costs was 0.5 percentage points higher each year than in the baseline projection, then spending in 2067-68 would be 0.5 per cent of GDP higher. Conversely, if it was 0.5 percentage points lower than in the baseline, spending would be 0.4 per cent of GDP lower in 2067-68.

Chart B.5: Sensitivity of ASC projections to trends in unit costs



Source: OBR

Eligibility criteria

B.24 Unlike health care, ASC in the UK is not universally provided free at the point of use (although personal care is available free to the over-65s in Scotland, subject to an assessment of need). In England, an individual's eligibility for financial support from their local authority depends on the severity of their need and their financial circumstances. Until the Care Act 2014, eligibility was at the discretion of local authorities (who could choose a level of need from a national framework). But the Act then set a minimum level of need above which people are entitled to support and below which support is at the discretion of their local authority. Means-test thresholds have been frozen in cash terms since 2010, rather than increasing in line with inflation, reducing the number of people who qualify.

B.25 The Care Act 2014 requires local authorities to provide ASC services for those who meet the eligibility criteria (those who we define to have 'severe' needs). Most now only provide services to people with this level of need, whereas prior to the Act service provision varied

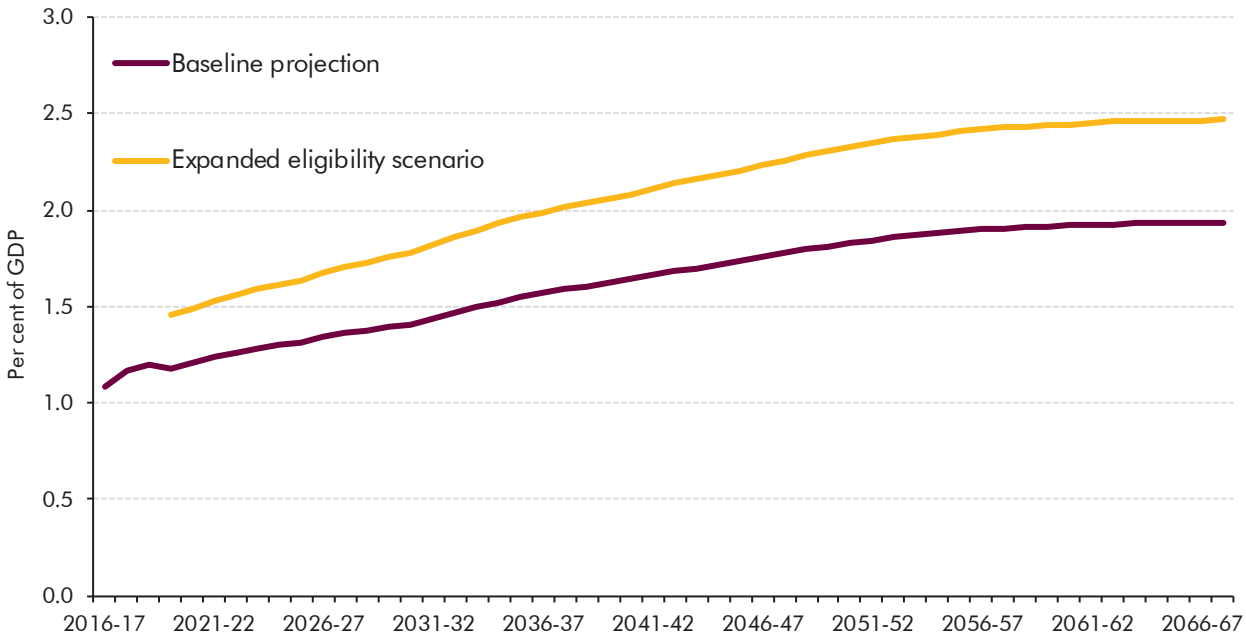
[7] Skills for care, *The state of the adult social care sector and workforce in England*, 2017.

more by level of need. In our baseline projection we assume that local authorities' behaviour is unchanged from that exhibited since the Care Act came into force.

B.26 In this scenario we model the potential impact on spending if English local authorities, in aggregate, were to expand the level of care they provide to those with 'moderate' needs as well as those with 'severe' needs. This expanded provision is assumed to start in 2019-20. This leads to a substantial increase in the number of recipients of home care in England: a 160 per cent increase for older-age users and a 111 per cent increase for those of working age.

B.27 Consistent with the scaling assumptions used in our baseline projection, the increase in spending in England is assumed to be accompanied by a proportionate increase in ASC spending in the rest of the UK. Overall, this results in a 0.5 per cent of GDP increase in ASC spending in 2067-68 relative to the baseline projection.

Chart B.6: Sensitivity of ASC projections to eligibility criteria



Source: OBR

Dilnot reforms

B.28 The independent Commission on Funding of Care and Support – the 'Dilnot Commission' – reported in July 2011.[8] Based on its recommendations, the Coalition Government announced reforms to ASC in England. At Budget 2013 it pledged to "*implement the £72,000 cap on reasonable social care costs, …and extend the means test to give more people access to financial support for their residential care costs from April 2016*".

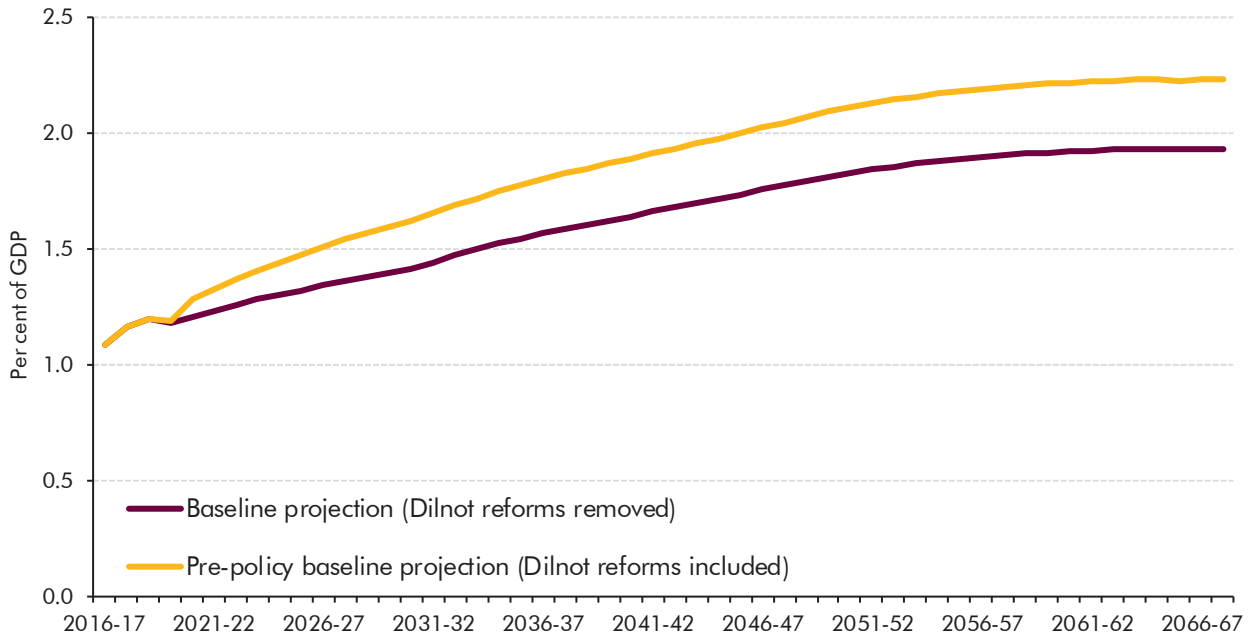
B.29 In 2015, the Government announced that the introduction of these reforms would be delayed until April 2020. In December 2017, it announced that it would "*not take forward*

[8] Fairer care funding, *The Report of the commission on funding of care and support*, 2011.

the previous Government's plans to implement a cap on care costs in 2020" and that "*Further details of the Government's plans will be set out after we have consulted on the options*" in effect dropping the Dilnot reforms.[9] A Green Paper on adult social care was slated for publication around the same time as this report, but was delayed to the autumn as part of the June health spending announcement. We have therefore removed the impact of the Dilnot reforms entirely from our baseline projection until such time as the Government makes its policy clear.

B.30 Our 2017 *FSR* was produced on the basis of the Dilnot reforms being implemented in April 2020. In order to calculate the effect on our latest projections of not going ahead with the reforms we have produced a scenario that incorporates all our updated baseline assumptions except the removal of the Dilnot reforms from 2020. Chart B.7 shows that spending would be higher across the projection. The reforms would have increased the means-test threshold, expanding eligibility and so public provision. After a few years, the cap on total lifetime contributions would have further raised public provision. In 2067-68, spending would be 0.3 per cent of GDP higher than in our baseline projection. This type of ASC system would be sensitive to variations in the levels of home-ownership and unit costs.

Chart B.7: ASC projection restated for Dilnot reforms



Source: OBR

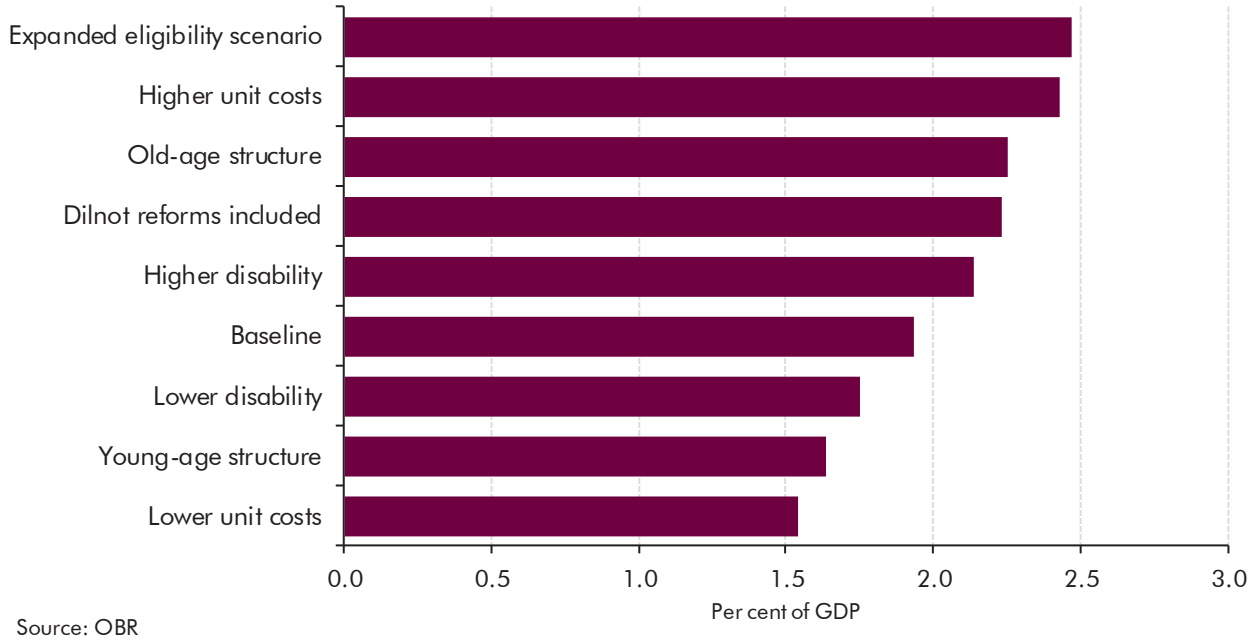
Summary of scenarios

B.31 Chart B.8 shows ASC spending in 2067-68 in our baseline projection and all the sensitivities presented in this section. It is of course possible that several differences from our baseline assumptions could materialise at once. If they were all to push in the same

[9] Statement to the House of Commons by the Parliamentary Under-Secretary of State for Health, *Social Care*, 7 December 2017.

direction, rather than offsetting each other, spending could rise more significantly than shown in any one of these scenarios.

Chart B.8: Adult social care spending in 2067-68



Source: OBR

Conclusions

B.32 The ASC sector faces several challenges over the long term. Its recent history has been defined by growing pressures that appear to have been only partially addressed by a series of policy announcements that have boosted funding. For example, the Competition and Markets Authority concluded in 2017 that *"Many care homes, particularly those that are most reliant on LA funded residents, are not currently in a sustainable position."*[10]

B.33 Public provision has been constrained by tightening eligibility and the Dilnot reforms that would have expanded eligibility and increased the public cost of ASC have in effect been dropped pending consideration of further options for reform. In the short term, the Government has responded to the pressures on the sector by increasing funding directly and giving local authorities the ability to increase council tax further. But ASC spending remains well below pre-crisis levels in real per capita terms. Current policies could return spending to previous levels and our long-term projections assume that these short-term fixes persist, but further pressure for the Government to increase publicly funded provision of ASC and to enhance integration of health and social care appears likely.

B.34 The Government itself has stated that *"further reform is required to ensure that the system is prepared to meet the challenges of the increasing numbers of over 75s"* and that it will *"work with partners at all levels, including those who use services and who work to provide care, to bring forward proposal for public consultation"*. The delayed Green Paper may

[10] Competition and Markets Authority, *Care homes market study: summary of final report*, 2017.

represent the start of this further reform, although the experience with the Dilnot reforms cautions that that may not necessarily be the case.

B.35 Our baseline projection shows ASC spending rising from 1.1 per cent of GDP in 2016-17 to 1.9 per cent in 2067-68. Were the Dilnot reforms to have gone ahead as previously planned, spending would have risen to 2.2 per cent of GDP. There are many other sources of uncertainty around these projections, as we have illustrated in this annex.

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