Office for
Budget Responsibility

Fiscal sustainability report

July 2013

Office for Budget Responsibility

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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, the Budget Responsibility and National Audit Act 2011 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 examining 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 debts. This notion of sustainability can be quantified in a number of ways.

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 broad-brush projections rather than precise forecasts. Policymakers need to be aware of these uncertainties, but should not use them as an excuse for ignoring the long-term challenges that lie ahead.

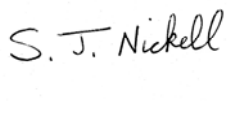
The analysis and projections in this report represent the collective view of the three independent members of the OBR's Budget Responsibility Committee. We take full responsibility for the judgements that underpin them and for the conclusions we have reached. We have, of course, been supported in this 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 our advisory board and of officials across government, including the Department for Work and Pensions, HM Revenue and Customs, HM Treasury, the Department of Energy and Climate Change, the Department of Health, the Department for Business, Innovation and Skills, the Government Actuary's Department, and the Office for National

Statistics. We have this year worked with the Personal Social Services Research Unit at the London School of Economics to inform our projections of long-term care needs and related public spending.

We provided the Chancellor of the Exchequer with a draft set of our projections and conclusions on 3 July, to give him the opportunity to decide whether he wished to make further policy decisions that we would be able to incorporate in the final version. He did not. We provided a full and final copy of the report 24 hours prior the publication, in line with the standard pre-release access arrangements. 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. A full log of our substantive contact with Ministers, their offices and special advisers can be found on our website.

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



Robert Chote Steve Nickell Graham Parker

The Budget Responsibility Committee

Executive summary

1 In the *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 These projections suggest that the public finances are likely to come under pressure over the longer term, primarily as a result of an ageing population. 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 health care. But the same demographic trends would leave government revenues roughly stable as a share of national income.

4 In the absence of offsetting tax increases or spending cuts this would widen budget deficits over time and eventually put public sector net debt on an unsustainable upward trajectory. The fiscal challenge posed by an ageing population is one the UK shares with many developed nations.

5 Separate from our central projections, this year we update our assessment of the long-term decline in North Sea oil revenues as a share of national income over the coming decades and present new analysis of trends in older people's participation in the labour market.

6 Long-term projections such as these are highly uncertain and the results we present here should be seen as illustrative broad-brush projections rather than precise forecasts. We illustrate some of the uncertainties around them through sensitivity analyses – by varying key assumptions regarding demographic trends, whole economy and health sector productivity growth, and the position of the public finances at the end of our medium-term forecast horizon.

7 It is important to emphasise that we focus here on the additional fiscal tightening that might be necessary beyond our medium-term forecast horizon. The report should not be taken to imply that the substantial fiscal consolidation already in the pipeline for the next five years should necessarily be made even bigger over that period.

8 That said, 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. And they should give thought too to the policy choices that will confront them once the current crisis-driven consolidation is complete.

Public sector balance sheets

9 We assess the fiscal impact of past government activity by looking at measures of assets and liabilities on different presentations of the public sector balance sheet. In this report, we draw on National Accounts balance sheet measures and on the 2011-12 Whole of Government Accounts (WGA).

10 The current and previous governments have both set targets for the National Accounts measure of public sector net debt (PSND) – the difference between the public sector's liabilities and its liquid financial assets. In March 2013, PSND was £1,181 billion, 75.1 per cent of GDP or £44,810 per household. Public sector net worth (PSNW) is a broader measure, which also includes physical and illiquid financial assets. PSNW fell sharply from 2008 onwards and the latest available outturn data at the end of 2011 gave a value for PSNW of minus £197 billion, which was minus 12.8 per cent of GDP. No government has used PSNW as a target, in part because reliable estimates of physical assets are hard to construct.

11 The medium-term outlook for PSND and PSNW has deteriorated since last year's *FSR*. The expected medium-term peak in PSND has risen by 9.3 per cent of GDP to 85.6 per cent of GDP, with that peak coming two years later in 2016-17. The expected trough in PSNW has fallen by 6.0 per cent of GDP to minus 27.1 per cent of GDP in 2016-17.

12 One of the criticisms often made of PSND as an indicator of fiscal health is that it does not account for future liabilities arising from past government action, for example contracted payments to Private Finance Initiative (PFI) providers and the accrued rights to pension payments built up over the past by public sector workers. The same criticism would apply to PSNW.

13 More information on future and potential liabilities arising from past government action is available in the WGA. These are produced using commercial accounting rules and they have somewhat broader coverage than PSND and PSNW, both in the accounts themselves and in the accompanying notes.

14 According to the 2011-12 WGA:

- the net present value of future **public service pension payments** arising from past employment was £1,008 billion or 65.6 per cent of GDP at the end of March 2012. This is £47 billion higher than a year earlier, primarily reflecting the pension rights accrued as a result of the latest year's employment. But the figure remains lower than the £1,135 billion reported for March 2010, reflecting the Government's decision in 2010 to uprate public sector pension payments by CPI inflation rather than RPI inflation (which tends to be higher). We discussed this change in last year's report;

- the total capital liabilities in WGA arising from **Private Finance Initiative** contracts were £36 billion, up from £32 billion a year earlier. Only £5 billion of these were on the public sector balance sheet in the National Accounts and therefore included in PSND and PSNW. If all investment undertaken through PFI had been undertaken through conventional debt finance, PSND would be around 2.1 per cent of GDP higher than currently measured – little changed from last year;

- there were £113 billion (7.4 per cent of GDP) in **provisions** at the end of March 2012 for future costs that are expected (but not certain) to arise, most significantly the hard to predict costs of nuclear decommissioning. Total provisions have increased by £6 billion since last year's WGA, mainly those related to nuclear decommissioning and clinical negligence. Around £12 billion of provisions were actually used in 2011-12, which was in line with the expectation set out in the previous year's WGA; and

- there were £101 billion (6.6 per cent of GDP) of quantifiable **contingent liabilities** – costs that could arise in the future, but where the probability of them doing so is estimated at less than 50 per cent. This figure has more than doubled from £50 billion last year, largely reflecting two factors: first, an increase in the perceived probability that the UK could be called upon to contribute capital to the European Investment Bank, which makes long-term infrastructure loans to EU countries; and second, an increase in the potential loss of revenues that could result as North Sea oil companies set off the costs of oil field decommissioning against their tax bills.

15 Overall gross liabilities in the WGA increased by £195 billion over the year to £2,615 billion at the end of March 2012. The main factors behind this increase are the net deficit recorded during the year as expenditure exceeded revenues, plus the accumulation of additional public service pension liabilities related to staff in employment during 2011-12.

16 The WGA show the government's net deficit rising from £94 billion in 2010-11 to £185 billion in 2011-12, which is in marked contrast to the fall in the current

budget deficit from £101 billion to £90 billion shown in the National Accounts. This is because the WGA estimate of expenditure was reduced by £126 billion in 2010-11 to reflect the present value of the savings that would result from the government's decision to uprate public service pension payments by CPI.

17 Unlike PSND, the WGA balance sheet also includes the value of tangible and intangible fixed assets, which are estimated at £754 billion or 49.1 per cent of GDP in March 2012. These have increased by £28 billion since last year's WGA. The overall net liability in the WGA was £1,347 billion or 87.7 per cent of GDP at end-March 2012. This compares with PSND of £1,106 billion or 72.0 per cent of GDP at the same date and to a WGA net liability of £1,186 billion or 78.8 per cent of GDP a year earlier at end-March 2011.

18 In this year's report, we have also summarised a number of recent policy announcements relating to guarantees and possible contingent liabilities. These include a number of policies that are already in-train, including NewBuy, UK Infrastructure Guarantees and the National Loan Guarantee Scheme, and those still being worked up, including Help-to-Buy: Mortgage guarantee and aspects of the Business Bank.

19 While the precise accounting treatment of these various measures will not be known until future years' WGA are published, it is possible to think through some of the broad implications for fiscal sustainability now. Most importantly, while each measure in isolation could well be considered a remote contingent liability, the probabilities of the various liabilities crystallising are likely to be correlated. In particular, the probability that the various parties to which the Government is exposed will default would increase in the event of a further economic downturn. The more serious the downturn, the greater the likelihood of a larger proportion of contingent liabilities crystallising to the detriment of fiscal sustainability.

20 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 pension provision. And, just as importantly, they exclude the public sector's most valuable financial asset – its ability to levy future taxes. This means that 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. This is usually the case.

Long-term projections

21 We assess the potential fiscal impact of future government activity by making long-term projections of government revenue, spending and financial

transactions on an assumption of 'unchanged policy', as best we can define it. In doing so, we assume that spending and revenues initially evolve over the next five years as we forecast in our March 2013 *EFO*. This allows us to focus on long-term trends rather than making revisions to the medium-term forecast.

Demographic and economic assumptions

22 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 ratio of elderly to those of working age rising over time. This reflects increasing life expectancy, declining fertility, and the retirement of the large age cohorts born during the post-war 'baby boom'.

23 We base our analysis on projections of the UK population produced by the Office for National Statistics (ONS) every two years. As in last year's *FSR*, we use the 2010-based population projections and the ONS's 'low migration' variant where net inward migration is assumed at 140,000 a year. We test the sensitivity of our results to a number of different demographic assumptions.

24 As regards the economy, we assume in our central projection that whole economy productivity growth will average 2.2 per cent a year on an output per worker basis, in line with the long-run average rate. We test this assumption with alternative scenarios where productivity growth averages 1.7 per cent or 2.7 per cent. We assume CPI inflation of 2.0 per cent (in line with the Bank of England's inflation target) and a long-term GDP deflator inflation rate of 2.2 per cent. The latter assumption is lower than last year, following the reassessment we made in our December 2012 *EFO*. As such, our projections are based on a lower rate of nominal GDP growth than in last year's *FSR*.

25 Since our December 2012 *EFO*, our medium-term forecasts have included greater persistence in the degree of spare capacity in the economy, represented by a substantial negative output gap at the end of the forecast. This implies scope for above-trend growth beyond our medium-term forecast period that would support the public finances. We have therefore introduced such a period at the beginning of our long-term projections, to ensure those projections do not permanently lock in that portion of borrowing in 2017-18 that is considered cyclical in our medium-term forecasts.

Defining 'unchanged' policy

26 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, it is necessary to define what we mean by 'unchanged' policy in our long-term projections.

27 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 lead to an unrealistic projection. 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 central projections when they can be quantified with "*reasonable accuracy*".

28 In our central projections, our assumption for unchanged policy is that beyond 2017-18 underlying spending on public services, such as health, rises in line with per capita GDP. We assume that most tax thresholds and benefits are uprated in line with earnings rather than inflation beyond the medium term, which provides a more 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 benefits to earnings in the rest of the economy.

Results of our projections

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

Expenditure

30 Population ageing will put upward pressure on public spending. Our central projection shows spending other than on debt interest falling from 36.7 per cent of GDP at the end of our medium-term forecast in 2017-18 to 36.1 per cent of GDP in 2020-21 as the output gap closes. It then rises to 40.6 per cent of GDP by 2062-63 as demographic trends lift spending on health, pensions and long-term care, an increase of 4.0 per cent of GDP or £61 billion in today's terms from the end of our medium-term forecast.

31 The main drivers are upward pressures on key items of age-related spending:

- **health spending** rises from 7.0 per cent of GDP in 2017-18 to 8.8 per cent of GDP in 2062-63, rising smoothly as the population ages. This is a slightly smaller rise than we projected last year, in part due to the additional overall spending cuts the Government has pencilled in for 2017-18 (which are included in our medium-term forecast) and in part due to the above-trend GDP growth we assume as the output gap closes after 2017-18;

- **state pension costs** increase from 5.8 per cent of GDP to 8.4 per cent of GDP as the population ages. The projected increase is slightly lower than last year's projection, in part due to the introduction of the Single Tier pension, which reduces spending in 2062-63 by 0.7 per cent. We assume pensions are uprated in line with the 'triple lock' beyond the medium-term

horizon. If we instead assumed pensions were uprated in line with earnings, spending would be 0.9 per cent of GDP lower in 2062-63; and

- **long-term social care costs** rise from 1.3 per cent of GDP in 2017-18 to 2.4 per cent of GDP in 2062-63, reflecting the ageing of the population and the Government's announcement of a lifetime cap on certain long-term care expenses incurred by individuals, following the Dilnot Review. This policy reform raises spending by 0.3 per cent of GDP by 2062-63.

Revenue

32 Demographic factors will have less impact on revenues than on spending. Non-interest revenues are projected to rise from 37.6 per cent of GDP in 2017-18 to 38.1 per cent of GDP in 2020-21 (reflecting the assumed period of above-trend growth) and are relatively flat through the remainder of the projection, rising to 38.8 per cent of GDP in 2062-63. The aggregate projection is not significantly different from last year's report, but the composition has changed. Income tax and corporation tax are lower, in part reflecting policy announcements and changes to our medium-term forecast, while capital taxes are higher, largely due to the period of above-trend growth as the output gap is assumed to close.

33 We have updated our assessment of long-term trends in North Sea revenues, an area where our medium-term forecasts have been subject to large revisions due to volatility of oil prices, production and related costs. Revenues from the UK oil and gas sector fell from 0.7 per cent of GDP in 2011-12 to 0.4 per cent in 2012-13 and are forecast to reach 0.2 per cent of GDP by 2017-18. Our central long-term projection shows revenues falling to 0.03 per cent of GDP over the subsequent two decades. Sensitivity analysis suggests that this broad conclusion holds across a variety of reasonable assumptions for the sector.

34 We have also taken a closer look at the implications for personal taxes of the rising participation of older people in the labour market, which shows the positive overall impact a continuation of recent trends would be likely to have on GDP and tax receipts. Greater labour market participation by older people is, however, likely to reduce the ratio of personal taxes to national income, but for the relatively benign reason that national income is likely to be boosted proportionately more than tax receipts, thereby lowering the ratio while both rise in absolute terms.

35 In previous years' reports, we have looked at pressures on a number of revenue streams, including the effects of globalisation on corporation tax and VAT, fuel efficiency on transport taxes and trends in smoking on tobacco duties. These factors, and the decline in North Sea revenues illustrated in this report, suggest that governments will, over time, need to find new sources of revenue to maintain the overall ratio of revenue to national income.

Financial transactions

36 In order to move from spending and revenue projections to an assessment of the outlook for public sector net debt, we need also to include the impact of public sector financial transactions. These affect net debt directly, without affecting accrued spending or borrowing.

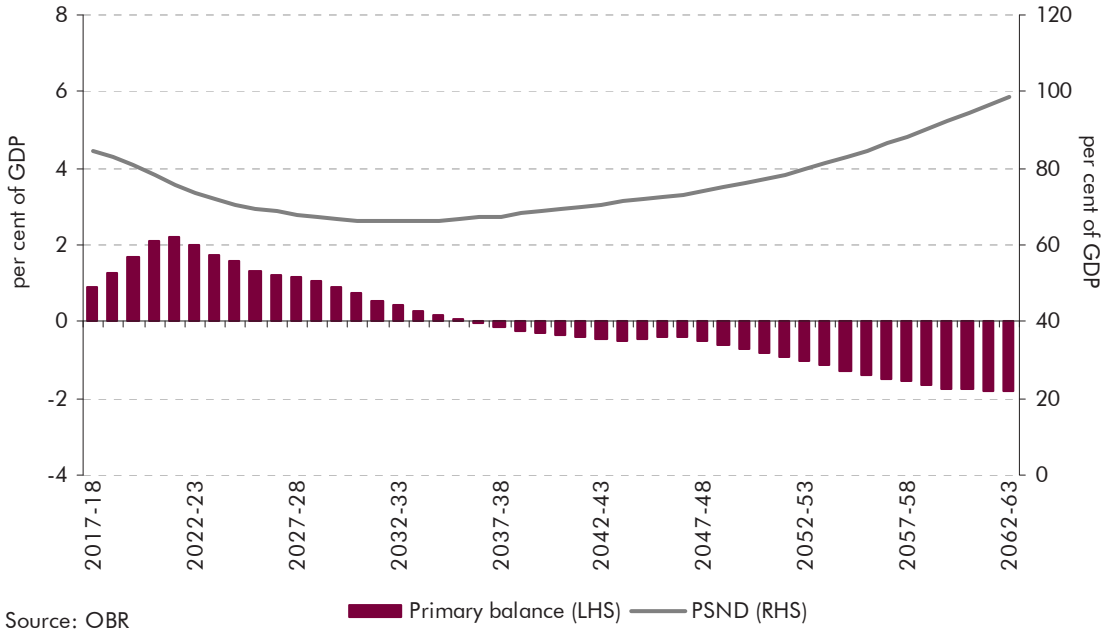
37 For the majority of financial transactions, we assume that the net effect is zero. An important exception is the impact of student loans, where the impact on net debt of the student loan portfolio is projected to peak at 6.7 per cent of GDP (£103 billion in today's terms) around the early 2030s before falling back to 5.0 per cent of GDP by 2062-63. The peak is slightly higher than the 6.1 per cent of GDP in last year's FSR, reflecting the downward revision to nominal GDP.

Projections of the primary balance and public sector net debt

38 Our central projections show public sector revenues rising as a share of national income over the long term, but by less than the expected increase in public spending. As a result, the primary budget balance (the difference between non-interest revenues and spending that is the key to the public sector's debt dynamics) is projected to move from a surplus of 0.9 per cent of GDP in 2017-18 to a deficit of 1.8 per cent of GDP by 2062-63, a deterioration of 2.7 per cent of GDP. The change from the underlying balance in 2020-21, when the output gap has closed, is greater at 4.2 per cent of GDP. This compares to an increase of 4.3 per cent of GDP over the projection period in last year's report.

39 Taking this and our projection of financial transactions into account, PSND is projected to fall from 85 per cent of GDP in 2017-18 to 66 per cent of GDP in the early 2030s before rising again to 99 per cent of GDP by the end of our long-term projection. Beyond this point, debt would remain on a rising path.

Chart 1: Central projection of the primary balance and PSND



Source: OBR

40 Since we have used the same population projections for this year's report, the changes to the primary balance and net debt projections result largely from non-demographic factors related to our medium-term forecast, the period of above-trend growth as the output gap closes and the effects of policy announcements. Higher net debt at the end of the medium-term forecast raises the debt projection. Above-trend growth from 2018-19 to 2020-21 offsets part of this increase. The remaining increase is largely offset by the positive impact of spending cuts in 2017-18 that were announced by the Government in Autumn Statement 2012 and the Single Tier pension reform. As a result, by 2062-63 PSND is higher by only around 8 per cent of GDP relative to last year's report.

41 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 these sensitivities using a number of different scenarios.

42 The eventual increase in PSND would be bigger than in our central projection if long-term interest rates turned out to be higher relative to economic growth, if long-term productivity growth was weaker, 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 central projection.

43 Given the importance of health spending in the demographic challenge to fiscal sustainability, the rate of productivity growth in the sector is also an important

assumption. If productivity growth was weaker in the health sector than in the rest of the economy, and the pace of health spending growth was to be increased to compensate, then health spending would rise by a further 1.9 per cent of GDP by 2062-63 in our illustrative scenario. This would see PSND rise substantially faster, reaching 211 per cent of GDP by 2062-63.

44 We have looked more closely at the evidence on the economic and fiscal implications of inward migration, to test the assumptions that underpin our central projections. While most recent evidence for the UK is supportive of the view that net inward migration has had a positive fiscal impact, this is largely due to the concentration of inward migration among people of working age, which is captured in our demographic projections. There is no strong evidence to suggest that inward migration has a positive or negative impact on overall productivity growth, suggesting our central assumptions are reasonable.

Summary indicators of fiscal sustainability

45 Our central projections, and several of the variants we calculate, show that on current policy we would expect the budget deficit to widen sufficiently over the long term to put public sector net debt on a continuously rising trajectory as a share of national income. This would clearly be unsustainable.

46 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.

47 Most definitions of fiscal sustainability are built on the concept of solvency – the ability of the government to meet its future obligations. In formal terms, the government's 'inter-temporal budget constraint' requires it to raise enough revenue in future to cover all its non-interest spending and also to service and eventually pay off its outstanding debt over an infinite time horizon. Under our central projections, the government would need to increase taxes and/or cut spending permanently by around 1.9 per cent of GDP (£29 billion in today's terms) from 2018-19 onwards to satisfy the inter-temporal budget constraint. This is down from 2.6 per cent of GDP in last year's FSR, reflecting a number of offsetting factors, the largest of which stems from the additional spending cuts the Government has pencilled in for 2017-18, the final year of our medium-term forecast.

48 The inter-temporal budget constraint has the attraction of theoretical rigour, but it also has several practical limitations. For this reason, sustainability is more often quantified by asking how big a permanent spending cut or tax increase would be necessary to move public sector net debt to a particular target level at a particular target date. This is referred to as the 'fiscal gap'.

49 The current government does not have a long-term target for the debt to GDP ratio. So, for illustration, we calculate the additional fiscal tightening necessary from 2018-19 to return PSND to 20, 40 or 60 per cent of GDP at the end of our projection horizon in 2062-63.

50 Under our central projections, the government would need to implement a permanent tax increase or spending cut of 0.8 per cent of GDP (£13 billion in today's terms) in 2018-19 to get debt back to 60 per cent, 1.2 per cent of GDP (£19 billion in today's terms) to get it back to 40 per cent and 1.7 per cent of GDP (£26 billion in today's terms) to reduce it to 20 per cent of GDP. In last year's report, the fiscal gap to returning debt to 40 per cent of GDP was 1.1 per cent of GDP. The gap in this year's report is slightly larger than last year, reflecting the slightly higher debt ratio projected for 2062-63.

51 These calculations depend significantly on the health of the public finances at the end of our medium-term forecast. If the structural budget balance was 1 per cent of GDP weaker or stronger in 2017-18 than we forecast in the *EFO*, the necessary tightening would be bigger or smaller by the same amount.

52 The sensitivity factors that we identified in the previous section as posing upward or downward risks to our central projections for PSND similarly pose upward or downward risks to our estimates of fiscal gaps. The most dramatic would be the scenario of weaker productivity in the health sector pushing up spending per person. In the scenario we illustrate, this would increase the necessary permanent policy adjustment in 2018-19 to between 3.2 per cent and 4.0 per cent of GDP depending on the target debt level.

53 Governments need not respond to fiscal pressures with a one-off permanent tightening, of course. As an alternative to the tightening of 1.2 per cent of GDP in 2018-19 necessary to meet the 40 per cent target, governments could opt for a series of tax increases or spending cuts worth an additional 0.5 per cent of GDP each decade. A more gradual adjustment would mean a smaller fall in the debt to GDP ratio in the early years before PSND stabilises around the target level.

1 Introduction

A framework for analysing fiscal sustainability

1.1 This chapter sets out the framework we use to analyse fiscal sustainability in this report. We examine both the fiscal consequences of past government activity and the potential fiscal consequences of future government activity:

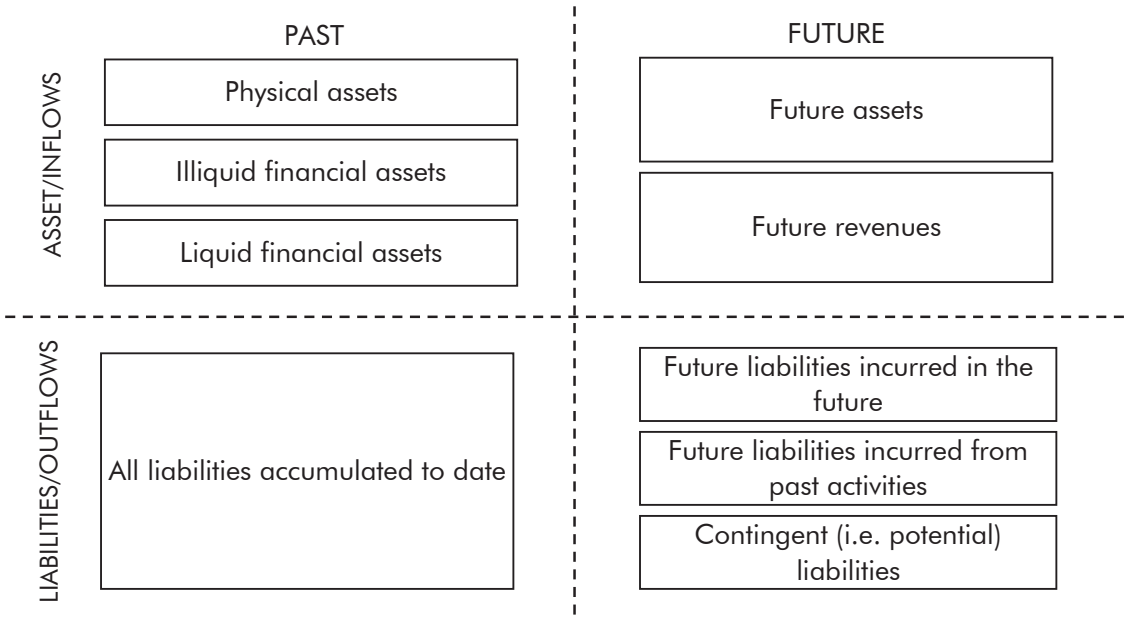
- as a consequence of its past activity, the government has accumulated assets (physical and financial) and liabilities. Past activity also creates some reasonably certain future financial flows, for example contractually-agreed public service pension payments. The government's past activity also creates '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; and

- looking forward, the government's future activity will involve financial outflows, some to invest in assets but mostly to pay for spending on public services and transfer payments. But it will also receive future revenues, mostly from taxation. The government may also find itself in possession of valuable 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 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 should tell the same story. In practice they rarely appear to, because of the widely differing coverage of the various summary stock and flow measures used in policy presentation and discussion. We try in this report to tell a coherent story using both approaches 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 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 – most notably, that they exclude the present value of future revenue flows. The greatest financial asset of any government is 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 assess their implications for fiscal sustainability, taking into account the initial balance sheet position. We look at indicators that can be used to summarise fiscal sustainability on the basis of such projections.

1.6 Another advantage of looking at flows of spending and revenue is that they provide a more intuitive guide to the nature of the potential policy response: the bulk of any adjustment to shift 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 undertaking transactions in assets or liabilities.

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 permit a more complete picture, but they are by their nature extremely uncertain.

1.8 Recognising this trade-off, we examine both balance sheet information and future projections. The remainder of this introduction explains in more detail how the material in subsequent chapters of the report is structured around this analytical framework.

Past activity: the public sector balance sheet

1.9 Chapter 2 examines the impact of past government activity using measures of the public sector balance sheet. We consider three alternative presentations of the public sector balance sheet – two 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) has been used in particular as a key target indicator of fiscal health. This is defined as the public sector's consolidated gross debt less liquid financial assets – that is, those assets that could be readily sold. Governments have also reported estimates of public sector net worth (PSNW), which compares the public sector's liabilities with *all* of its assets, so including the illiquid assets that are excluded from PSND.

1.11 As seen in Figures 1.2 and 1.3, and explained further in Chapter 2, both measures encompass a relatively narrow and 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) 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 – 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.

1.12 Some of these gaps are addressed in the WGA. The WGA are consolidated financial statements for the public sector. They are completed in line with Generally Accepted Accounting Principles, specifically the International Financial Reporting Standards as adapted for the public sector. They include an accruals-based balance sheet.

Figure 1.2: Coverage of public sector net debt

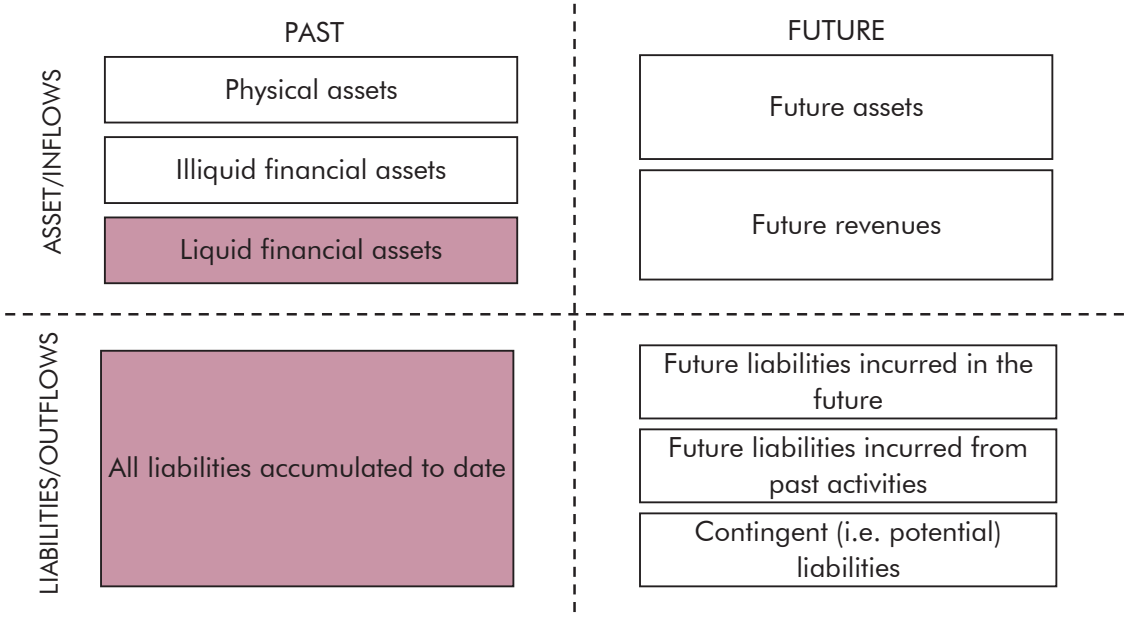
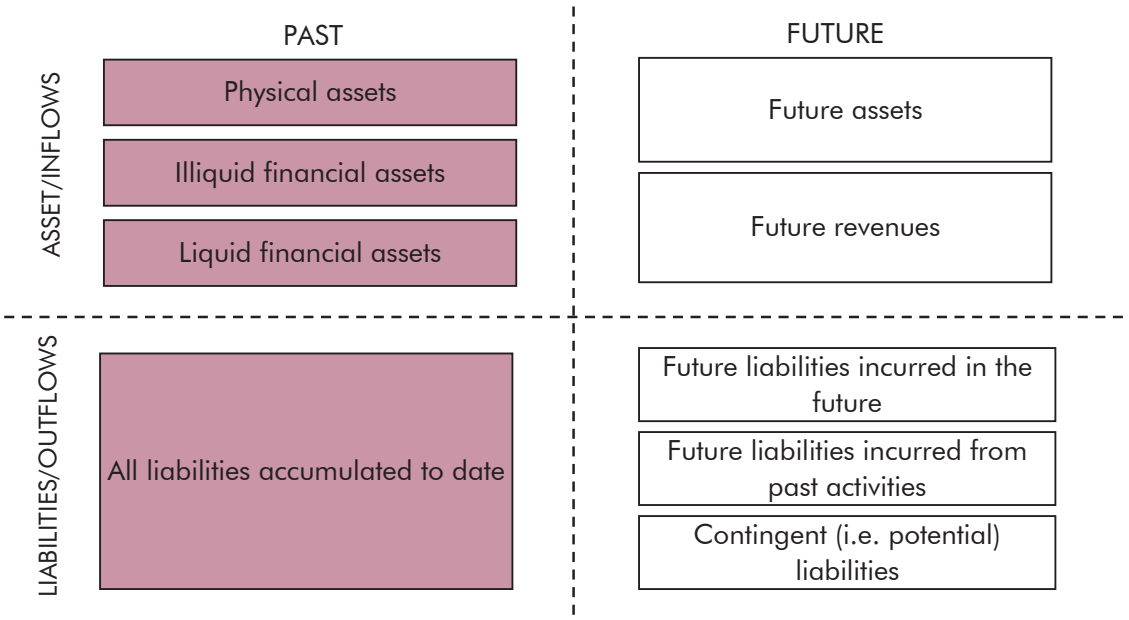


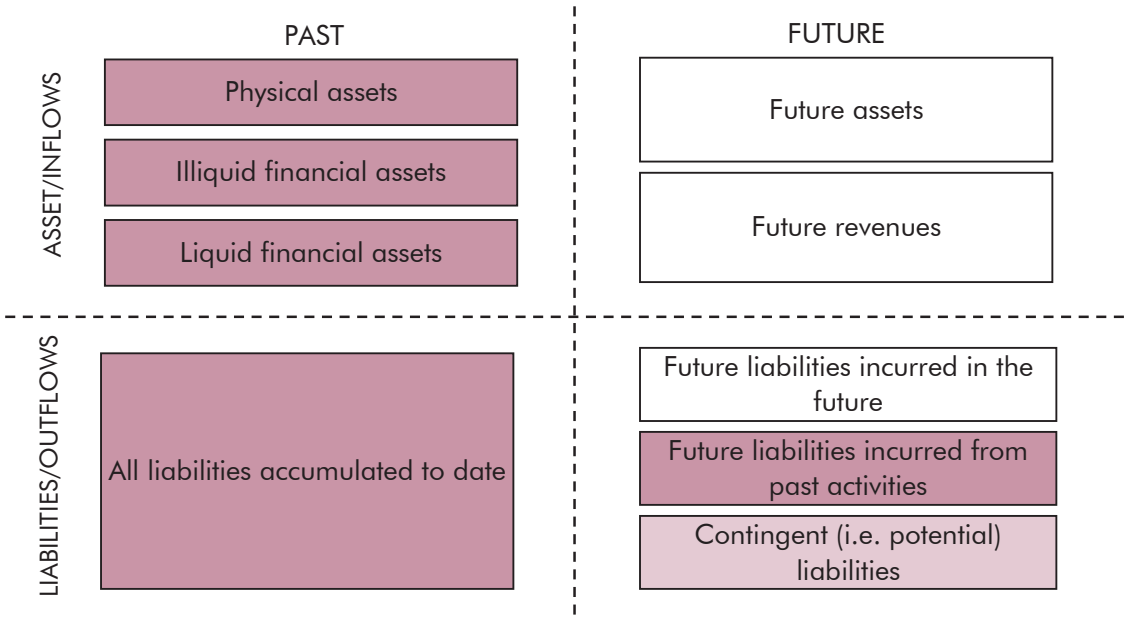
Figure 1.3: Coverage of public sector net worth



1.13 WGA capture a wider, but still incomplete, range of the activities identified in the previous section, as shown in Figure 1.4. They include financial and non-financial assets and liabilities, plus some costs incurred in the past for which the cash flows will occur in the future. In particular, they take account of net pension liabilities, provisions and commitments for finance leases such as PFI.

1.14 This is the third year in which the WGA have been published, so we can compare the latest figures for 2011-12 with those published at the time of last year's *FSR* for 2010-11, restated to reflect accounting changes, and the first year of WGA for 2009-10, which have not been restated, so are less directly comparable. In doing so, it is important to bear in mind that present value estimates of future financial flows, such as those included in the WGA, are very sensitive to the choice of discount rates used to convert the projected flows into one-off upfront sums. Changes to these rates between WGA publications can change estimates of assets and liabilities even in the absence of changes to underlying cash flows.

Figure 1.4: Coverage of the WGA measure of net liabilities



Future activity: Long-term spending and revenue projections

1.15 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 these balance sheets. In doing so, we focus on the effect of these flows on the future path of PSND.

1.16 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 the one taken by the Treasury prior to 2010 in its *Long-term public finance reports* and by a number of other fiscal bodies around the world.

1.17 The first five years of our projections are consistent with the March 2013 *Economic and fiscal outlook*, so as to focus on longer-term influences rather than revisions to our assessment of the short and medium-term outlook. However, changes between March forecasts can have a significant effect on the trajectory of the projections themselves, which we attempt to highlight in this report.

1.18 Using long-term projections of this type provides a relatively comprehensive way of assessing fiscal sustainability. It takes into account items such as the cost of public service pensions, but without the same sensitivity to the choice of discount rate as in the balance sheet approach. It also takes into account the fact that the

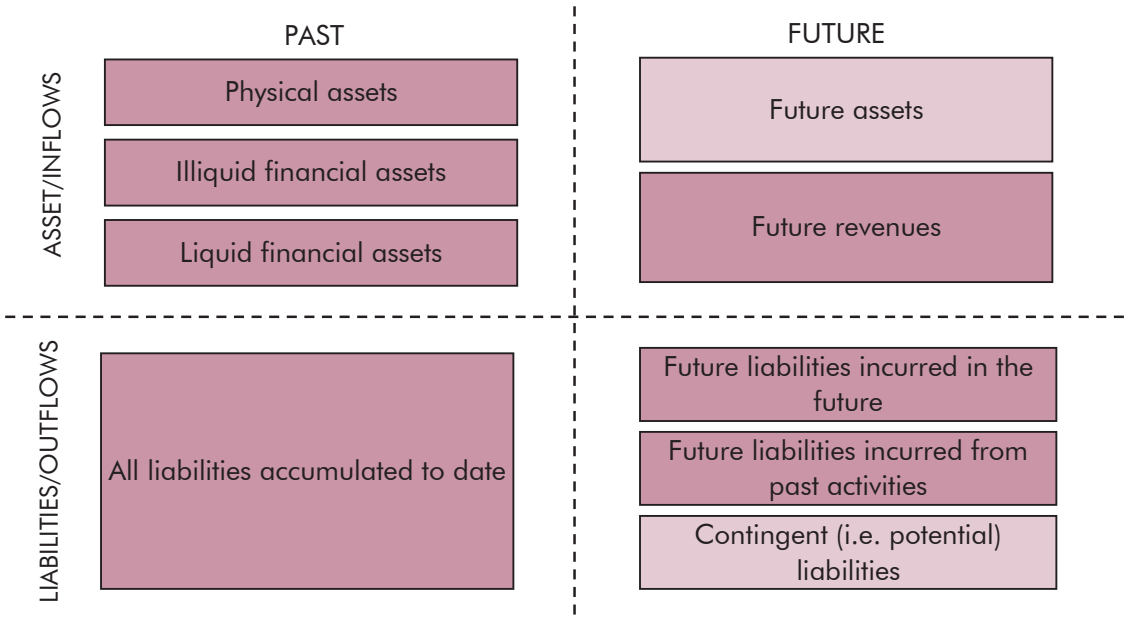
government has many non-contractual but nonetheless meaningful ongoing spending commitments. For example, it is likely to wish to continue to provide state education and health care. Crucially, it also recognises that the government has the ability to raise future tax revenues.

1.19 Figure 1.5 shows the content 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 schematic. A full assessment of fiscal sustainability must also attempt to encompass these. It is important to emphasise that, given the huge range of uncertainty around these issues and over these timescales, these should be treated as illustrative broad-brush projections rather than precise forecasts.

1.20 In its pre-2010 long-term projections, the Treasury focused on the implications of future changes in the age structure of the population for demand for particular broad categories of spending. We have followed a similar approach but have extended the analysis to take greater account of non-demographic drivers of spending and of long-term influences on different revenue streams. We also look at the impact of policy changes that can alter the size of these expected flows between *FSRs*.

1.21 On the expenditure side, long-term care spending is a particular focus in this report. Reforms to the long-term care system that will introduce a lifetime cap on individuals' payments require a more detailed modelling approach than we have used previously, given the importance of duration of care for total lifetime costs. We look in more depth at the evidence for these assumptions in the second annex to this report.

Figure 1.5: Content of our revenue and spending projections



1.22 On the revenue side, there are a number of non-demographic factors that might affect the size of particular revenue streams over the long term. These issues have not been analysed in depth in previous Treasury reports or in comparable reports in other countries. In Chapter 4 of this report, we revisit our analysis of long-term trends in UK oil and gas revenues and take a deeper look at the revenue consequences of greater labour market participation among older people.

Summary indicators of sustainability

1.23 Given a set of long-term projections for spending and revenues, there remains the need to summarise their implications for fiscal sustainability in a rigorous yet meaningful and comprehensible way. We discuss and illustrate various approaches to doing so in Chapter 5.

1.24 Most definitions of fiscal sustainability are built on the concept of solvency – the ability of the government to meet its future obligations. A formal solvency condition can be given by the government's inter-temporal budget constraint (IBC). The IBC will be satisfied if the projected outflows of the government (determined by the current level of public debt and the discounted value of all future expenditure) are covered by the discounted value of all future government revenue. Intuitively this means that over an infinite horizon the so-called primary balance (government receipts less spending on items other than debt interest) must be large enough to service and pay off the government's debt.

1.25 In some respects the IBC is an unrealistic constraint to apply in practice. For one thing, it assumes that governments will eventually wish to eliminate their debts entirely, which relatively few have expressed a desire to do. For another, the IBC permits a government to run large budget deficits for a significant period in the short and medium term as long as they hold out the promise of surpluses in the potentially far-distant future. For these reasons, we place greater emphasis on fiscal gap indicators that measure the immediate and permanent adjustment in the primary budget 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.

Assumptions regarding Government policy

1.26 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 or tax more in order to make them so. To make such a judgement, we first need to set out the assumptions we use regarding long-term policy.

1.27 Over the five-year forecasting horizon of our *Economic and fiscal outlooks,* a government's tax and spending policies are usually publicly announced and reasonably well defined. But assuming that governments would maintain them over decades is sometimes unrealistic and would 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. As required by the *Charter for Budget Responsibility, "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*".

1.28 Given the importance of these assumptions, we aim to be clear and transparent about them and our reasons for choosing them. The key policy assumptions are set out in Chapter 3.

1.29 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, and which is required of us in 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 "*reasonable accuracy*". Consistent with the *Charter*, this report notes significant policy commitments and aspirations not included in the central projections as fiscal risks, and where possible sets out the potential impacts of such policies. We have given greater coverage this year to announced policies that are likely to give rise to contingent liabilities or guarantees in WGA in the future.

Structure of the report

1.30 We use the analytical framework set out above to structure the material in the rest of this report:

- 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;
- Chapter 4: focuses on the sustainability of revenue flows; and
- Chapter 5: considers summary indicators of sustainability.

1.31 We also provide further information of the analysis that has informed our projection approach. In 2011, we included online material, available on our website at www.budgetresponsibility.independent.gov.uk, which provided detail on our approach to the valuation of asset sales, and the demographic and economic assumptions. Much of this information is still relevant to the approach used in this report. In 2012, we provided detailed annexes on public service pension projections and health care spending. This year we include the following additional analyses:

- Annex A: explores the evidence on the economic and fiscal implications of migration, assessing the assumptions that underpin our central projections; and
- Annex B: details the new approach we have taken to modelling long-term spending projections for long-term care and the implications of government reforms in this area.

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

2.1 This chapter looks at balance sheet measures that capture the fiscal impact of past government activity. We consider the public sector balance sheet measures in the National Accounts and in the Whole of Government Accounts (WGA), which have been published for a third year alongside this report.[1]

Balance sheet measures in the National Accounts

2.2 In this section we consider two balance sheet measures – public sector net debt (PSND) and public sector net worth (PSNW) – that are based on the National Accounts framework.

Public sector net debt and public sector net worth

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] The current and previous Governments have both set targets for PSND. The measure of PSND that is currently being targeted, and which is used throughout this document, is 'PSND ex'. This excludes the temporary effects of the current and previous governments' interventions to stabilise the financial sector.

2.4 The level of PSND changes each year by approximately the amount of public sector net borrowing (PSNB - the gap between spending and receipts) plus changes in public sector financial transactions (which includes student loans and other government lending), less changes in liquid assets. 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, for those assets that are classified as 'on

[1] We included detailed discussion of 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 (2009).

balance sheet' in the National Accounts. The measurement of PFI deals within the various balance sheet measures is discussed further below.

2.5 The ONS also publishes a wider National Accounts balance sheet measure: public sector net worth (PSNW), which measures the public sector's financial liabilities net of *all* of its assets, liquid and less liquid.[3] These include financial assets such as shares and other equities, long-term loans, medium and long-term bonds, and also the public sector's stock of non-financial assets. The coverage of PSND compared to PSNW is explained in the introduction to this document.

2.6 Chart 2.1 shows the recent levels of PSND and PSNW. The previous Labour Government's 'sustainable investment rule' required it to keep PSND below 40 per cent of GDP over the economic cycle. But the financial crisis and recession pushed PSND well above this level. At the end of 2012-13, PSND was £1,181 billion, or 75.1 per cent of GDP, or £44,810 per household.[4] The current Coalition Government set a supplementary target to have PSND falling as a share of GDP at a fixed date of 2015-16. The forecasts shown in Chart 2.1 are from our March 2013 *Economic and fiscal outlook (EFO)*. As we reported then, PSND is forecast to rise by 2.4 per cent of GDP in 2015-16, so that the Government is currently not on track to meet its supplementary target.

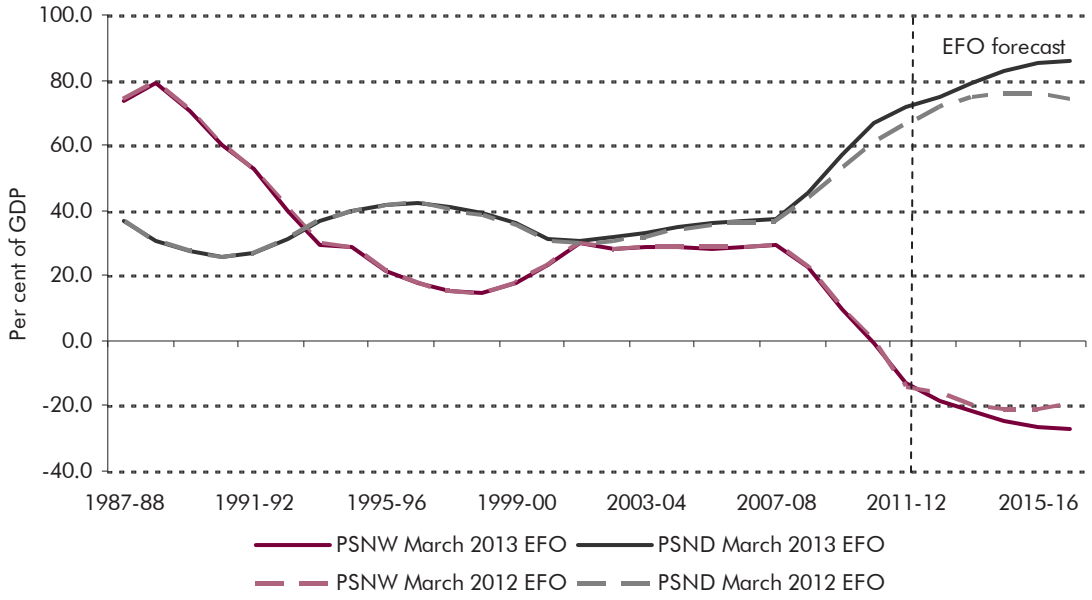
2.7 Chart 2.1 shows how movements in PSND and PSNW tend to mirror each other. This is because the value of public sector non-financial assets, the main difference between the two measures, tends to follow a relatively stable trend over time as it comprises large stocks of assets that depreciate slowly and are added to each year via public sector investment. PSNW fell sharply from 2008 onwards and the latest available outturn data at the end of 2011 gave a value for PSNW of minus £197 billion, which was minus 12.8 per cent of GDP.[5] Our forecast shows it falling further and becoming more negative from 2012 onwards, as much of the additional borrowing in recent years has been used to fund current rather than capital spending. This means the government has not accumulated assets to offset the additional liabilities.

[3] PSNW is derived from National Accounts estimates of general government and public corporations assets and liabilities, which are published in the Blue Book. The composition of PSNW is set out in Hobbs (2010).

[4] Based on there being 26.4 million UK households in 2012, from ONS (2012a). This source is used for all such calculations in this report.

[5] Where statistics for aggregates as a percentage of GDP are published, then figures used in this document are the latest published statistics. Elsewhere, where we have calculated outturn data as a percentage of GDP, then the GDP data used are the GDP outturn and forecast data from our March 2013 *EFO*.

Chart 2.1: Recent levels and forecasts of PSND and PSNW



Source: ONS, OBR

2.8 The changes in PSND since our March 2012 *EFO* are shown in Table 2.1 below. These include the classification change that ONS announced in September 2012, where Bradford and Bingley and Northern Rock (Asset Management) (NRAM) were reclassified to the central government sector from 2010-11.[6] This increased PSND by 6 per cent of GDP in 2010-11, which can be seen in Chart 2.1. In November 2012, the Government also announced that it would transfer the excess cash from the Bank of England's Asset Purchase Facility Fund (BEAPFF) to central government. The first APF transfers started in January 2013 and reduced PSND by 0.7 per cent of GDP.[7] Table 2.1 shows that, if we strip out the effects of these changes, our forecast for PSND deteriorated between March 2012 and March 2013 by 3.1 per cent of GDP in 2013-14, with the deterioration rising to 12.8 per cent of GDP in 2016-17. This reflects both higher borrowing and lower nominal GDP forecasts.

2.9 Although the ONS has reclassified Bradford and Bingley and NRAM to the central government sector, it has not yet included them in PSNW. This introduces a

[6] NRAM was reclassified from the first quarter of 2010, and Bradford and Bingley was reclassified from July 2010. Further details are available in ONS (2012b)

[7] In February 2013 the ONS announced that these APF transfers would be included in PSNB and PSND. See ONS (2013a). This decision has since been reviewed by the UK Statistics Authority. See UKSA (2013). In the Public Sector Finances Statistical Bulletin that covered April 2013, the ONS announced a further, wider review of the Public Sector Finance statistics that may result in further changes.

further difference between the measures of PSND and PSNW from 2010 onwards. Our forecasts assume that the APF transfers will reduce both balance sheet measures equally over the forecast period from 2012-13 to 2017-18.

Table 2.1: Changes in PSND from March 2012 *EFO* to March 2013 *EFO*

	Per cent of GDP [1]					
		Outturn	Forecast			
	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
PSND in March 2012 *EFO*	66.1	71.9	75.0	76.3	76.0	74.3
PSND in March 2013 *EFO* [2]	72.0	75.1	79.2	82.6	85.1	85.6
Change	**5.9**	**3.2**	**4.2**	**6.3**	**9.1**	**11.3**
Of which:						
Reclassification of B&B and NRAM	5.4	4.7	3.8	3.2	2.8	2.3
Inclusion of APF transfers	0.0	-0.7	-2.7	-3.2	-3.6	-3.8
Other changes	0.5	-0.8	3.1	6.3	9.9	12.8

[1] Non-seasonally adjusted GDP centred end-March.

[2] Figures for 2011-12 and 2012-13 are derived using the latest PSND outturns from the June 2013 PSF release, and GDP outturns consistent with our March 2013 *EFO* forecast.

2.10 As we described in last year's *FSR*, there is also a difference in how financial liabilities are measured in PSND and PSNW: in PSND these are measured at nominal (redemption) value, whereas in PSNW they are measured at market value. This means that movements in bond prices change PSNW. Given that the market and nominal values will converge at the point of redemption, and that the government will need to refinance the public sector financial liability on redemption, under normal circumstances the government should care more about the nominal values. In this respect, PSND is a more relevant measure of the public sector financial liability than PSNW.

Further developments in the National Accounts over the next year

2.11 The ONS work programme includes a major exercise to update the public finance statistics and the National Accounts so that these are compiled according to the concepts and definitions in the 'European System of Accounts 2010' (ESA10), which is the European Union equivalent of the latest United Nations System of National Accounts (SNA08). The ONS plans to introduce the changes required for ESA10 over a five-year period, with the first stage of full implementation in September 2014. Over the next six months, the key stages are for Eurostat to finalise its Manual on Government Deficit and Debt based on ESA10, and then for ONS to assess the impacts on the Public Sector Finance Statistics. ONS expects to be in a position to inform users later in 2013 of the

main changes and the impacts from moving from the current European System of Accounts 1995 to ESA10. Further details of key changes and the plan for implementing ESA10 are available in the ONS work programme.[8]

2.12 The ONS work programme also includes further work over the next year to publish more information required under new European Union legislation. [9] In particular the legislation requires Member States to publish more annual information on contingent liabilities. These new requirements are also due to come into force in 2014.

International comparisons of debt

2.13 Because National Accounts measures are compiled under internationally agreed rules, they have the advantage of allowing cross-country comparisons. Not all countries measure net debt in a way that can be compared directly with the UK's measure of PSND, but figures for many are available for the narrower measure of general government net debt, which excludes public corporations.

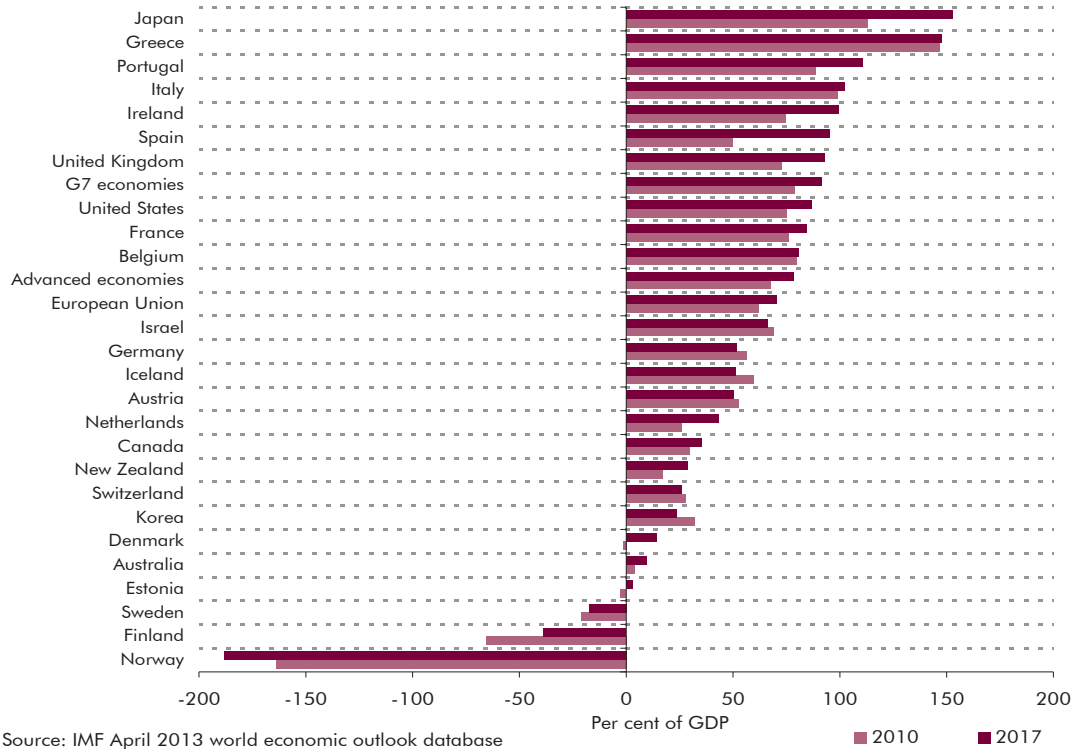
2.14 The IMF publishes estimates of general government net debt for different countries in its World Economic Outlook (WEO). Chart 2.2 shows the IMF's latest estimates for 2010 and forecasts for 2017 for those countries included in the IMF's grouping of advanced economies. These figures were taken from the April 2013 WEO. On this measure, UK general government net debt was 73 per cent of GDP in 2010 and was forecast by the IMF to rise to 93 per cent in 2017. This was lower than the G7 average of 79 per cent in 2010, but is higher than the G7 average of 91 per cent by 2017; the UK is forecast to have the third highest debt ratio in the G7 in that year. Chart 2.3 shows that the IMF has increased its forecast for UK general government net debt in 2017 by 11 per cent of GDP since the April 2012 WEO figures we reported in last year's *FSR*. This is the fifth largest upward revision of the 25 countries reported here.

2.15 We published our own forecasts of general government debt on the IMF definition in Table 4.41 of our March 2013 *EFO*, consistent with our own PSND forecast. Using the IMF definition, we forecast that general government debt would rise to 92 per cent of GDP in 2017, close to the IMF's April WEO forecast given above.

[8] The ONS work programme (ONS (2013b)) explains that under ESA10 there are some important changes in the way that non-financial assets are treated and classified, and that the most important changes for public sector accounts are the capitalisation of research and development, and of weapons systems.

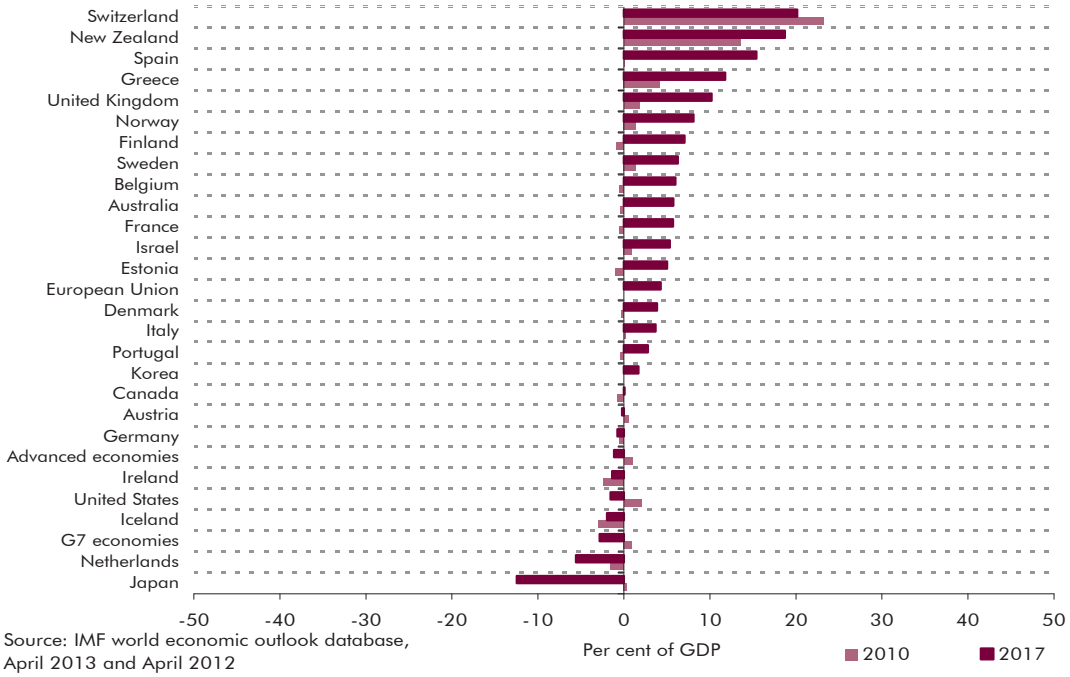
[9] In November 2011 the European Union introduced five new fiscal regulations and a directive, which are commonly known as the '6-pack' agreement. Further details are contained in the ONS work programme.

Chart 2.2: Latest IMF forecasts for general government net debt



Source: IMF April 2013 world economic outlook database

Chart 2.3: Movements in IMF forecasts for general government net debt between April 2012 and April 2013



Source: IMF world economic outlook database, April 2013 and April 2012

Balance sheet measures from WGA

2.16 The Whole of Government Accounts (WGA) are a set of financial statements for the whole of the public sector, produced by HM Treasury under international commercial accounting standards, as adapted and interpreted for the public sector context. The Treasury has now published WGA accounts for 2009-10, 2010-11 and 2011-12. The construction of the WGA was described in detail in our 2011 *FSR*, and is also described in the Treasury's WGA publications.[10]

2.17 In this chapter, we will discuss the key results from the latest WGA for 2011-12, look at what has changed since the previous year's WGA, and show how the WGA results have developed over the three years that have so far been published.

2.18 WGA paints a broader picture of the public sector balance sheet than the National Accounts, as shown in Figure 1.4 in the introduction to this document. Both PSND and PSNW are limited in that their coverage is backward-looking and they only reflect the public sector's net liabilities arising from past events that have built up to date. They do not include future liabilities incurred as a result of past government activity. In contrast, some information on future liabilities is available in the WGA, for example information on future public service pension payments, payments to PFI providers, and provisions and contingent liabilities related to risks of future costs that may materialise as a result of past activities. We look at this WGA information on future liabilities later on in this chapter, after we have looked at a summary of the latest overall WGA aggregates for 2011-12.

What's new in the 2011-12 WGA

2.19 Each year the basis of the WGA changes to take on improved or revised accounting methods. Where these changes are significant, the WGA results for the previous year are restated so that the two sets of results can be compared on a like-for-like accounting basis.

[10] HM Treasury (2013a)

Table 2.2: Changes to main aggregates in restated 10-11 accounts

	£ billion				
	2010-11 in 2010-11 WGA	Change in accounting for LA heritage assets	Change in valuation of shares in UKAR	Other changes to accounting policies	2010-11 restated in 2011-12 WGA
Balance sheet levels at end March 2010:					
Liabilities	-2,421	-	-	1	-2,420
Assets	1,228	4	3	0	1,234
Net liabilities	**-1,193**	**4**	**3**	**1**	**-1,186**
Flows during 2010-11:					
Operating revenues	-614	-	-	-	-614
Operating expenses	625	-	-	-	625
Net financing cost and gains and losses on assets	84	-	-	-	84
Net deficit [1]	**94**	**-**	**-**	**-**	**94**

[1] The net deficit in WGA is the net deficit of operating expenses less operating revenue, where 'operating' expenditure and revenue are analogous to 'current' expenditure and receipts in the National Accounts

2.20 In the 2011-12 WGA, the accounts for 2010-11 have been restated to reflect the main changes in accounting policies in the 2011-12 WGA. Table 2.2 above shows the impact of these changes. They are modest in aggregate. The main accounting changes are that:

- the value of the government's equity holdings in Bradford and Bingley plc and Northern Rock (Asset Management) are now re-estimated each year so that these assets are now valued at their latest market prices. This change has increased the total level of assets in 2010-11 by £3 billion;
- local authorities have changed the accounting treatment for their 'heritage' assets, so they are now accounted for in a similar way to their treatment in the central government sector.[11] This change has increased the total level of assets in 2010-11 by £4 billion; and
- the Armed Forces Pension Scheme has been reassessed using a better set of membership data, which has increased the net pension liability for 2010-11 by £1 billion.

2.21 In last year's WGA results for 2010-11, the public sector boundary for the accounts was widened to include the Bank of England and London & Continental

[11] Heritage assets are those with particular cultural, environmental or historical value.

Railways. In this year's WGA, there have not been any substantive changes to the public sector boundary. The accounts state that the boundary will be widened further next year to include Bradford and Bingley and NRAM.

The latest WGA aggregates

2.22 The WGA and the National Accounts can both be used to summarise income and expenditure flows, and to measure the public sector's fiscal deficit and net debt position. However the accounting frameworks are different, with similar concepts measured on different bases, which this means that reading from one set of accounts to the other is not straightforward.

2.23 The summary aggregates from the latest WGA financial statements for 2011-12 are shown in Table 2.3 below, compared with the restated 2010-11 results.

Table 2.3: Changes in the WGA public sector summary aggregates

	£ billion		
	2010-11 restated	2011-12	Difference
Balance sheet levels at end of year:			
Liabilities	-2,420	-2,615	-195
Assets	1,234	1,268	33
Net liabilities	**-1,186**	**-1,347**	**-161**
Flows during financial year:			
Revenue	-614	-617	-3
Direct expenditure	663	648	-16
Impairments and other costs from revaluations [1]	-38	67	106
Net financing cost and other gains and losses [2]	84	87	3
Net deficit	**94**	**185**	**91**

[1] In 2010-11 this included the £126 billion reduction in the net pension liability which reflected the change to uprate future public service pensions by CPI rather than RPI.

[2] Other gains and losses includes the revaluation of financial assets and liabilities and net loss on disposal of assets.

2.24 Total net liabilities in WGA are estimated at £1,347 billion at end March 2012, and to have increased by £161 billion since end March 2011. This is the result of an increase in gross liabilities of £195 billion, partly offset by a £33 billion increase in the assets netted off. These changes are discussed below.

2.25 Table 2.3 shows that the WGA net deficit increased from £94 billion in 2010-11 to £185 billion in 2011-12, which is in marked contrast to the fall in the current budget deficit from £101 billion to £90 billion shown in the National Accounts.[12]

[12] In the 2011-12 WGA publication, 'net deficit' has been renamed as 'net expenditure'.

This is because the WGA net deficit estimate was reduced by £126 billion in 2010-11 to reflect the present value of the savings that would result from the Government's decision to uprate public service pensions by CPI rather than RPI. In the WGA, some of the changes in balance sheet valuations are brought across into the revenue and expenditure account. The summary in Table 2.3 above shows the presentation in the WGA summary report, which separates out the main effects of the impairments and other costs from revaluations within the net deficit. The difficulties comparing results across years in the WGA accounts are discussed further in paragraph 2.38 below.

Changes in WGA gross liabilities

2.26 Table 2.4 below shows the changes in the latest figures for WGA gross liabilities in more detail.

Table 2.4: Changes in WGA gross liabilities

	£ billion		
	2010-11 restated	2011-12	Difference
Balance sheet levels at end March			
Net public service pension liability	961	1,008	47
Government borrowing and financing [1]	908	966	57
Provisions	107	113	6
PFI liabilities (capital commitments)	32	36	4
Working capital (creditors and debtors) [2]	116	119	2
Other financial liabilities [3]	295	373	78
Total liabilities	**2,420**	**2,615**	**195**

[1] These WGA 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 Protection Facility Fund (BEAPFF) as part of the Bank's quantitative easing programme (QE). The figures for these gilts held for QE are as follows:

2010-11	2011-12	Difference
198	309	111

[2] Derived from total trade and other payables in the WGA account, excluding PFI liabilities.

[3] Includes deposits by banks outside the public sector (as defined by WGA) in the Bank of England, the Debt Management Office and the Exchange Equalisation Account. The figures for the deposits by banks in the Bank of England will include additional reserves created by the Bank to finance the BEAPFF's purchase of gilts.

2.27 Table 2.4 shows that total WGA gross liabilities increased by £195 billion in 2011-12 mainly as a result of:

- an increase of £57 billion in the level of government borrowing and financing. This is the consolidated increase across all the entities included within the WGA. It is therefore net of the £111 billion increase in gilts held by the Bank of England Asset Protection Facility Fund (BEAPFF) as part of the Bank's quantitative easing programme (QE). This means that, before netting off this increase in the BEAPFF's gilt holdings, government liabilities for

issuance of gilts and other financing increased by £168 billion in 2011-12, which includes the borrowing to finance the WGA net deficit of £185 billion;

- an increase of £47 billion in the estimated net public service pension liability. This is discussed later in this chapter; and

- an increase of £78 billion in other financial liabilities. This will have been affected by the liabilities associated with the Bank of England's QE programme. The effects of QE on the WGA and National Accounts balance sheet measures are explained further in Box 2.1 below. The increase also included a £10 billion increase in deposits under sales and repurchase agreements entered into by the Debt Management Office (DMO) as part of their daily cash management operations. The DMO also increased their financial assets as well as their liabilities. These movements in DMO financial holdings are not unusual in size, given the size of their borrowing and money market operations.

2.28 The changes in liabilities also include smaller changes in respect of provisions and PFI liabilities. The latest WGA information for provisions and PFI are discussed in their relevant sections further below.

Box 2.1: QE and APF in WGA and the National Accounts

This Box explains how the QE and APF transactions are treated in WGA and in the National Accounts, and the differences between them. In last year's *FSR* we reported that the WGA boundary had been widened for the 2010-11 WGA, so that it included the Bank of England and the Bank of England's quantitative easing programme (QE). This year the WGA boundary has not changed, but, as explained in paragraph 2.8, the National Accounts measures of PSNB and PSND have widened to include Bradford and Bingley and Northern Rock (Asset Management) (NRAM), and also now include the APF transfers from the BEAPFF to central government.

Chart A below shows the different boundaries that the WGA and National Accounts use to define the public sector. Both sets of accounts consolidate all the transactions within the public sector boundary, so that the only transactions that affect the final results are those which cross the boundary between the public sector and the wider economy. This means, for instance, that the government's liabilities for net gilts issued are measured net of gilts held as assets by other bodies within the public sector.

Chart A illustrates how the financing of the central government net cash requirement and QE each work. Central government issues gilts (and other short term debt) into the market, to fully finance the central government net cash requirement. The BEAPFF implements decisions by the Bank's Monetary Policy Committee and buys in gilts from the secondary market. These are separate processes.

Chart A also illustrates how the different boundaries for WGA and National Accounts produce different effects in relation to the QE and APF transactions:

- PSND includes the Bank of England, but does not include the BEAPFF. This means that PSND includes the loans that the Bank makes to the BEAPFF to finance QE, and the reserves which the Bank creates to finance those loans, which are treated as liquid deposits by commercial banks. These assets and liabilities are balanced and have little effect on PSND;

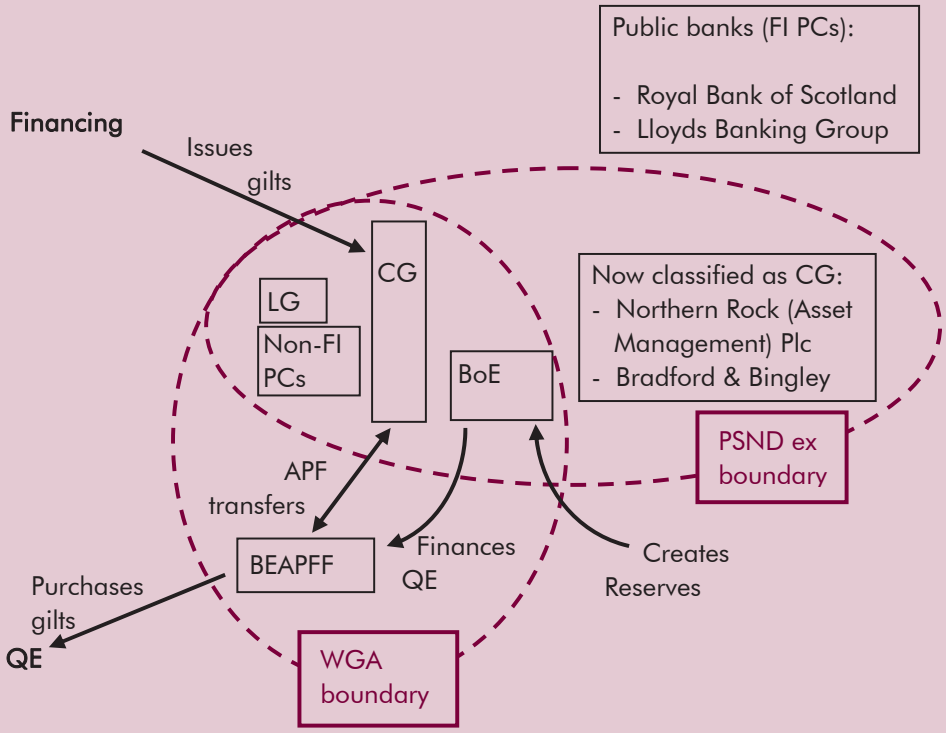
- this differs from net liabilities measured in WGA, which include the BEAPFF. The loans the Bank makes to the BEAPFF are consolidated out (since the lender and borrower are both within the WGA public sector boundary), but WGA include the gilts held by the BEAPFF as a result of QE, and the reserves which the Bank creates to finance the loans to the BEAPFF. This means that the WGA balance sheet shows lower net liabilities for gilts, since these are reduced by the BEAPFF's holdings. WGA therefore shows the effect of QE as short-term financial liabilities (the Bank's additional reserves) replacing the longer-term liabilities for gilts;

- WGA and the National Accounts also treat the APF transfers differently: in

the WGA these transfers are all within the public sector and therefore net out to zero. But in the Public Sector Finance statistics, the transfers flow across the public sector boundary and affect PSNB.[a] However this difference will not show up until 2012-13, when the APF transfers began.

In our recent March *EFO* we estimated that the cumulative effect of these QE transfers might reduce PSND by roughly 2 per cent of GDP by 2022-23, when QE unwinding is assumed to end. But these estimates are highly uncertain.

Chart A: QE and APF transactions which cross the public sector boundary, as defined in the National Accounts and in the WGA



Abbreviations:

CG	Central government
Non-FI PCs	Non-financial institution public corporations
FI PCs	Financial institution public corporations
LG	Local Government
BoE	Bank of England
BEAPFF	Bank of England Asset Protection Facility Fund

[a] The ONS classification treatment of the APF transfers in PSNB and PSND was reviewed recently by the UK Statistics Authority and will be covered by a further review which the ONS have announced recently. See footnote 7 earlier in this chapter for further details.

Changes in WGA gross assets

2.29 Table 2.5 gives a breakdown of the changes in WGA assets over 2011-12. The level of assets on the WGA balance sheet increased by £33 billion between the end of March 2011 and March 2012. This was largely the result of a £28 billion increase in tangible and intangible fixed assets, coupled with a £20 billion increase in other financial assets, and partly offset by a £19 billion reduction in the value of the equity investment in the public sector banks.

2.30 The £28 billion increase in the level of fixed assets mainly reflects a £27 billion increase in the net level of property, plant and equipment. There are two reasons for this increase. The main factor is the large number of schools that converted to become Academies in 2011-12. As in the National Accounts, this change in status and funding means that these schools switch in the WGA from the local authority to the central government sector. However this increase in the number of Academies has also increased the overall level of assets in 2011-12. This is because the latest WGA now includes some Academies that were not previously included as local authority schools. The other, smaller reason for the increase in fixed assets was the construction of new buildings for the Olympics.

Table 2.5: Changes in WGA gross assets

	£ billion		
	2010-11 restated	2011-12	Difference
Balance sheet levels at end March			
Tangible and intangible fixed assets [1]	726	754	28
Equity investment in the public sector banks [2]	60	41	-19
Student loans	30	33	4
PFI assets	35	39	4
Working capital (creditors and debtors) [3]	145	142	-3
Other assets [4]	239	259	20
Total assets	**1,234**	**1,268**	**33**

[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, Lloyds Banking Group, and UK Asset Resolution Ltd, which is the holding company for Northern Rock Asset Management plc and Bradford & Bingley plc.

[3] WGA trade and other payables

[4] Includes financial assets, holdings of gold, cash and cash equivalents, inventories and assets for sale.

2.31 The increase of £20 billion in the level of other assets mainly reflects movements in the levels of financial assets held by the Debt Management Office (DMO) and the Exchange Equalisation Account (EEA).[13] As noted above, the DMO and EEA financial liabilities also increased by £10 billion over 2011-12. These movements in DMO and EEA financial assets and liabilities are not unusual in size, given their daily money market and foreign exchange operations.

2.32 At the end of 2011-12, the government's total equity investments in all the public sector banks were valued at £40.8 billion. This includes the government's holdings in Royal Bank of Scotland (RBS), Lloyds Banking Group and UK Asset Resolution, which is the holding company for the government's shares in Bradford and Bingley and NRAM. This valuation reflected the latest market prices at March 2012.[14] The WGA shows the value of the government's equity holdings in public sector banks falling by £18.7 billion during 2011-12, a reduction of almost 33 per cent over the year. This decrease includes minus £1.2 billion relating to the sale of Northern Rock plc to Virgin Money in January 2012. The remaining fall in value is due to revaluations and impairments on the shares for RBS and Lloyds Banking Group, which includes an impairment of £11.4 billion on the RBS B-shares in respect of previous reductions in value which had not been reflected in the accounts before now.

2.33 Changes in the market price of the government's equity investments in the public sector banks will not be reflected in PSNB or PSND until the shares are eventually sold. We review the fiscal impact of all the government's financial interventions in each March Budget *EFO,* including the effect of the latest movements in market prices. We reported the Treasury's latest estimates of the potential fiscal impact of all the various financial interventions in Box 4.2 in our March 2013 *EFO*.

2.34 The changes in assets in 2011-12 also included increases of £3.5 billion in the value of assets from both student loans and PFI deals, which are discussed in later in the chapter.

2.35 This estimate for total public sector assets in WGA is significantly lower than the £1,540 billion National Accounts figure for the combined assets of the general government and public corporations sectors at end December 2011. The

[13] During 2011-12, the Debt Management Office held large asset and liability balances as part of its operations to manage the historically large government borrowing requirement. The Exchange Equalisation Account holds assets and liabilities as part of its operations to manage the government's foreign currency reserves.

[14] In the absence of directly observable market data, UKAR is valued on a net asset value of the consolidated balance sheet of Bradford and Bingley and NRAM.

difference between the two measures and the difficulties in comparing them were described in paragraphs 2.40 to 2.41 of the 2011 *FSR*.

2.36 In both the WGA and the National Accounts, the amounts of assets on the balance sheet are measured net of accumulated depreciation and impairment, and depreciation and impairment are treated as current expenditure, increasing the current deficit. However depreciation and impairment are measured differently in WGA and in the National Accounts – for example the National Accounts only includes impairments that are caused by normal wear and tear or accidental damage, whereas the WGA includes all impairments, however they are caused.[15] The differences between the two measures are shown in Table 2.8 below, which shows the full reconciliation between the current deficit in the National Accounts, and the net deficit in the WGA.

2.37 The ONS announced in 2011[16] that it proposed to use WGA data for central government depreciation in the National Accounts (except for the differences in impairments explained above, and also depreciation on roads). The Treasury estimate that this might increase the measure of depreciation in the National Accounts by as much as £1 to £2 billion – which would reduce the current budget surplus and net investment accordingly. We are keen to reflect this change in our *Economic and fiscal outlook* forecasts as soon as the size of the movement can be more accurately estimated. However the ONS timescale for implementing this change is currently unclear.

Comparisons of WGA aggregates for three years

2.38 Figures for the main WGA summary aggregates for the three years for which we now have WGA results are shown in Table 2.6 below. It is important to note the difficulties in comparing WGA results across all three years:

- changes in the classification of bodies and changes in accounting treatment are only taken back one year in each year's WGA results, so that only the results for the latest two years are directly comparable. (This contrasts with the National Accounts, where changes to classifications and methods are typically taken back as far as necessary to ensure that the whole historical data series are comparable.) At the moment there is not a large discontinuity in the back data for 2009-10 shown below, because the scale of change in the 2011-12 accounts is not large. However, the scale of these

[15] Further details on how depreciation and impairment are measured in WGA and the National Accounts were given in paragraphs 2.42 and 2.43 in our 2011 *FSR*.

[16] McLaren, Saunders and Zammit (2011)

restatements will vary in each year's WGA results, and the discontinuities will build up with each year's changes in accounting treatments;

- all the assets and liabilities on the WGA balance sheet, including the net present value of future liabilities, are revalued in each year's accounts, using the latest discount rates and latest determinants affecting valuations, including the latest market prices. This means that each year's balance sheet is based on different parameters, such as discount rates. If discount rates or other parameters change markedly, then these changes can obscure the other changes in results from year to year. Examples of this are the reduction in the discount rate in 2009-10, which increased WGA net liabilities by 17 per cent of GDP, and the change to uprate future public service pension payments by CPI rather than RPI, which reduced WGA net liabilities by 8 per cent of GDP in 2010-11;

- some of the changes to each year's balance sheet from revaluations, including some of the discount rate changes, are also treated as expenditure (positive or negative) in each year's revenue and expenditure account, so that these movements in the balance sheet will also affect the net deficit for that year. Table 2.6 separates out the main costs from revaluations included in the net deficit, leaving a measure of expenditure that is described in the WGA literature as 'direct expenditure'. By excluding the main effects from revaluations, this measure of expenditure is intended to be more comparable between years. However some minor effects from revaluations and discount rate changes will remain. By contrast, spending in different years is directly comparable in the National Accounts, because it does not include any costs from revaluations of assets or liabilities. Instead the National Accounts include the changes in valuation as current or capital costs or benefits if and when the assets or liabilities are sold (or liabilities are written off), and the difference in valuation is realised.

Table 2.6: Comparisons of WGA aggregates over three years

	Per cent of GDP [1]		
	2009-10 restated in 2010-11 WGA	2010-11 restated in 2011-12 WGA	2011-12
Balance sheet levels at end of year: [1]			
Liabilities [2]	-171	-161	-170
Assets	86	82	82
Net liabilities [1]	-85	-78.8	-87.7
Flows during financial year:			
Revenue	-41	-41	-40
Direct expenditure	44	45	42
Impairments and other costs from revaluations [2]	3	-3	4
Net financing cost and other gains and losses [3]	6	6	6
Net deficit	11	6	12

[1] The balance sheet figures as a percentage of GDP use GDP centred at end-March

[2] The WGA future net pension liability was reduced by 8.4 per cent of GDP in 2010-11 to reflect the change to uprate future public service pension payments by CPI rather than RPI. This reduction was also included in the WGA net deficit as a cost from a revaluation of a liability.

[3] Other gains and losses includes the revaluation of financial assets and liabilities and net loss on disposal of assets.

Differences between WGA and National Accounts aggregates

2.39 Tables 2.7 and 2.8 show the reconciliation between the WGA and the National Accounts aggregates, as set out in the 2011-12 WGA results.[17] These tables start with the fiscal aggregates from the National Accounts, and then show the additional items included in the WGA aggregates. These tables also show how the reconciliation has changed between 2010-11 and 2011-12.

2.40 These reconciliations in the 2011-12 WGA include a new difference with the National Accounts aggregates, in that the National Accounts include Bradford and Bingley and NRAM, which are not included in the WGA yet.[18]

2.41 Table 2.7 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 payouts. The WGA debt measure

[17] The relationships between the two sets of aggregates are also described in Daffin and Hobbs (2011).

[18] The 2011-12 WGA state that Bradford and Bingley and NRAM will be included in WGA from 2013-14, as they are expected to be a permanent part of government until their mortgage books have expired.

additionally includes an estimate of the net present value of future cash payouts arising from past employment. The 2011-12 WGA estimate of these additional liabilities is £1,008 billion (up from £961 billion in 2010-11), described below; and

- the inclusion of the public sector **tangible and intangible fixed assets** that are not included in PSND partially offsets £793 billion of these additional liabilities.

2.42 The WGA measure of net liabilities also includes additional future liabilities incurred to date for provisions and for PFI contracts. Finally, the WGA also additionally includes amounts owed to creditors, and amounts owing by debtors.

Table 2.7: Reconciliation of public sector net debt

	£ billion		
	Balance sheet levels at end March		
	2010-11 restated	2011-12	Difference
Public sector net debt (National Accounts)	**1,005**	**1,106**	**101**
Remove items included in PSND but not in WGA net liabiltiies:			
Bradford and Bingley and NRAM [1]	-94	-83	11
Add items included in WGA net liabilities but not in PSND:			
Net public service pensions liability	961	1,008	47
Provisions	108	113	5
Capital liabilities for PFI contracts	27	30	3
Tangible and intangible fixed assets	-761	-793	-32
Working capital (creditors and debtors)	-46	-40	6
Other	-14	6	20
WGA net liabilities	**1,186**	**1,347**	**161**

[1] This difference is effectively the net liabilities from the balance sheet of UK Asset Resolution (UKAR), which is the holding company for Bradford and Bingley and NRAM. The figures are taken from the ONS article (2013) 'Improving Government statistics – Aligning the Public Sector Finances and National Accounts and other developments to public sector statistics'.

2.43 Table 2.8 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 interest on the pension liability** in the balance sheet. This is an imputed flow, representing the interest costs of a future liability where the spending has not happened yet;

- the WGA net deficit includes other changes in the **future liability for past service costs of public service pensions**. Last year these further changes included the reduction in the liability by £126 billion to reflect the change in indexation from RPI to CPI. In the reconciliation for the 2011-12 WGA these further changes are relatively small;

- the WGA net deficit includes additional impairments (**write-downs of assets**), and higher estimates of depreciation;

- the classification of **capital grants** and **net gains or losses on sales of assets**, which count as capital expenditure in the National Accounts but as current expenditure in WGA and spending on **single-use military equipment** which is current spending in the National Accounts but capital investment in WGA; and

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

Table 2.8: Reconciliation of public sector current deficit

	£ billion		
	2010-11 restated	2011-12	Difference
Current deficit (National Accounts)	**101**	**90**	**-11**
Remove items included in National Accounts current deficit but not in WGA net deficit:			
Bradford and Bingley and NRAM	1	1	0
Plus additional items included in WGA net deficit:			
Net interest on public service pension scheme liabilities	61	65	4
Change in past service costs of public service pensions, including change in indexation from RPI to CPI	-126	1	127
Other differences between public service pension charges and pensions paid	-14	-14	0
Depreciation and impairment of assets	60	46	-14
Capital grants	18	13	-5
Net changes in provisions	6	5	-1
Net gains/losses on sale of assets	4	1	-3
Military expenditure not capitalised	-5	-6	-1
Other [1]	-12	-17	-5
Net deficit for the year (WGA)	**94**	**185**	**91**

Additional information on future liabilities

2.44 The following sections look at the latest information available from the 2011-12 WGA on levels of future liabilities incurred from past activities. We start by looking at student loans. Although these are assets rather than liabilities, there is an expectation that a proportion of loans will be written off over time. WGA contains useful information on expected levels of future write-offs. Then we go through each area of WGA information on future liabilities, including public service pensions, PFI and provisions and contingent liabilities.

2.45 After looking at the information available in the WGA, we include a new section that brings together the Government's main recent policy announcements affecting future contingent liabilities and guarantees. These are not currently included in our forecasts for PSNB and PSND, because they are future risks that could materialise but which are not currently expected to. It is useful to keep track of all these announcements to ensure that we cover any risks from these potential liabilities crystallising, affecting our assessment of fiscal sustainability.

Student loans

2.46 Government loans to students appear as assets in the WGA, while the borrowing to finance them appears as a liability. 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 cannot be repaid and are written off.

2.47 Student loan subsidies and write-offs are included in the WGA as balance sheet impairments when each loan is issued, where the impairment covers the total estimated costs for the interest subsidies and write-offs over the life of each loan. In the National Accounts, the interest subsidy and the write-offs are not charged to the deficit and net debt until they arise. As with pensions and provisions, the differences between the two accounting frameworks reflect timing: WGA includes the expected future spending when the liability for that spending is first incurred; the National Accounts include the costs when the spending happens.

Table 2.9: Changes to student loan assets

	£ billion
Student loan assets at end March 2011	29.6
Student loan assets at end March 2012	33.1
Total change in value of student loan assets in 2011-12	**3.6**
Of which:	
New loans issued and interest on total stock of assets	8.8
Repayments on existing loans	-1.5
Impairments on new and existing loans	-3.8

2.48 The WGA value of the assets increased by £3.6 billion in the year to the end of 2011-12, from £29.6 billion to £33.1 billion. New loans issued through the course of the year, and expected future interest income, increased the gross value of assets by £8.8 billion. Actual repayments on previous loans reduced the value of the total asset book by £1.5 billion.

2.49 Changes to impairments on new and existing issues of loans were £3.8 billion. This includes:

- impairments for future costs on new loans issued, in respect of lower subsidised interest payments and write-offs – where some of the loans issued are expected not to be recovered because of death, disability, income or age of the student. For England, this amounted to £1.9 billion, a resource accounting budget (RAB) charge of around 35 per cent of loans issued. Our latest set of projections would imply a similar RAB charge in 2012-13, under the newly reformed scheme; and

- changes in the estimate of total impairments for future costs of previous loans issued. These impairment costs are re-estimated in each year's accounts to reflect the latest OBR long-term economic forecasts. Impairments on past loans issued in England were revised by £1.5 billion, partly due to lower Bank Rate projections, which implied that loans subject to the 'base rate cap' would pay a lower rate of interest.

2.50 The WGA figures, which reflect the underlying numbers in the BIS and devolved administrations 2011-12 accounts, reflect the long-term forecasts which we published in our 2011 *FSR*, and so do not reflect our latest economic projections. Neither do they include the impact of loans that the government would expect to make to future students. In Chapter 3 we take these factors into account when considering the impact of student loans on our long-term fiscal projections.

Net liabilities of public service pensions

2.51 The 2011-12 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 include the expected value of future pension payments to current and future public service employees for employment after March 2012.

2.52 The latest WGA results show that net public service pension liabilities increased by £47 billion in 2011-12, from £961 billion at the beginning of the year to £1,008 billion at the end of the year. This covers the liabilities of both unfunded and funded schemes.

2.53 Table 2.10 below shows that the movement in the net pension liability in 2011-12 is small compared with the large movements seen in earlier years. The large movements in 2009-10 and 2010-11 happened because the current liability for the payment of future pensions for all past employment is re-estimated each year, based on the latest discount rate and the latest expected values for uprating future pension payments. In both 2009-10 and 2010-11 there were large movements in the discount rate, whereas the change in 2011-12 was relatively small.

2.54 In 2009-10 the real discount rate used for public service pensions fell by 1.4 percentage points, and this increased the WGA net pension liability by £258 billion. In 2010-11 the real discount rate used for public service pensions increased by 1.1 percentage points, reducing the WGA net pension liability by £69 billion. In 2011-12 the real discount rate fell by only 0.1 percentage points, increasing the pension liability by £10 billion.

2.55 In 2010-11 the net pension liability also fell by £126 billion because of the June 2010 policy decision to change the price indexation for public service pension uprating from the RPI to the CPI, with effect from April 2011. (CPI typically rises more slowly than RPI.) Because the change was announced in 2010-11, this affected the estimated liability for paying future payments of public service pensions in the 2010-11 WGA.

Table 2.10: Changes to net liabilities of public service pensions

	£ billion		
	2009-10 restated	2010-11 restated	2011-12
Net pension liability at 1 April	802	1,135	961
Net pension liability at 31 March	1,135	961	1,008
Change	**333**	**-174**	**47**
Of which:			
Change in past service costs	1	-126	1
Changes in assumptions underlying the value of liabilities, including the change in the real discount rate	258	-69	10
Pensions costs for staff employment in current year	28	40	35
Other changes	46	-19	1

2.56 As recent years show, the size of the net public service pension liability depends critically on the discount rate used to convert the future flow of expected cash payments into a one-off upfront sum. The higher the discount rate, the lower the present value of future cash payments and the lower the total liability. Table 2.11 below shows the discount rates used by the central government pension schemes in their accounts from 2008-09 through to 2012-13.[19] The discount rates are set on a real terms basis, based on the price indexation used to uprate public service pensions.

2.57 Table 2.11 also shows the discount rate that will be used by the central government unfunded pension schemes in 2012-13. This falls by 0.4 percentage points in real terms, and we might expect this to increase next year's WGA net pensions liability by around £40 billion.

Table 2.11: Discount rates for central government pension schemes

	2008-09	2009-10	2010-11	2011-12	2012-13
Discount rate, nominal	6.0%	4.6%	5.6%	4.9%	4.1%
Discount rate, real, using RPI	3.2%	1.8%	2.2%	1.8%	1.4%
Discount rate, real, using CPI			2.9%	2.8%	2.4%
Discount rate, real, as used to uprate public service pensions	**3.2%**	**1.8%**	**2.9%**	**2.8%**	**2.4%**

2.58 Table 2.10 showed that the cost of the future pensions in respect of staff employment during the current year fell by £5 billion in 2011-12, from

[19] These discount rates are set in the Government Financial Reporting Manual (FReM), based on real yields of high quality corporate bonds. This follows the requirements of international accounting standards.

£40 billion in 2010-11 to £35 billion in 2011-12. Some of this fall will reflect reduced staffing levels. However these estimates of future pension costs for the current year's employment are based on the discount rate used at the beginning of the year, and the figures for the current year also include an adjustment to correct the previous year's estimate in respect of the movement in the discount rate during the year. This means that the fall of £5 billion in the future pension costs for employment in 2011-12 largely reflects the increase in the discount rate of 1.1 percentage points in 2010-11.

2.59 The 2010 Spending Review announced increases in employee contributions to the public service pension schemes which are being phased in from 2012-13 to 2014-15. These increases will therefore be reflected from next year's 2012-13 WGA. For those funded pension schemes that are increasing employee contributions, the increases will reduce the public service net pension liability.[20] However, for the unfunded schemes, employees' pension contributions are not treated as income that reduces the public service pension liability. So instead, the increases in employee pension contributions for the unfunded schemes will reduce the WGA liability for government funding and borrowing.

2.60 In last year's *FSR* we included details of the new ONS experimental statistics which cover the whole of the UK's pension liabilities, including private sector workplace pensions, state pensions, and public service pensions.[21] ONS expect to issue their next update to those statistics in spring 2014 and we will review their further release of this information in our 2014 *FSR*.

2.61 WGA includes net public service pension liabilities, but excludes the present value of future state pension payments to the population in general. The rationale for this is that the public service pensions are a contractual obligation, while state pensions are a liability that arises according to the circumstances and legislation prevailing at the time of the claim, which makes any estimate of future payments too uncertain. However this distinction is less clear in practice, as the government can alter – and has altered – the generosity of public service pension payments, for instance with the change in the indexation from RPI to CPI. The new ONS experimental statistics on pension liabilities referred to above cover both public service pensions and state pensions.

[20] The funded schemes increasing contributions do not include the largest funded scheme - the Local Government Pension Schemes – which is not implementing contribution increases.

[21] Levy (2012)

The Private Finance Initiative

2.62 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.

2.63 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 as a way to hold down official estimates of public sector indebtedness for a given amount of overall capital spending, rather than to achieve value for money.

2.64 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 risks. In contrast, WGA puts the asset and associated liability for capital costs on the balance sheet of whichever entity the accountants judge to have effective control of it.

2.65 As at March 2012, PSND included £5 billion (0.3 per cent of GDP) in respect of the capital costs of PFI deals that were recorded as on balance sheet in the National Accounts. This estimate is based on previous year liabilities but may be revised once ONS has sourced the latest departmental data on PFI deals.

2.66 Based on the classification approach used for WGA, the comparable figures are shown in Table 2.12. This shows that the present value of future capital amounts payable for PFI liabilities as at March 2012 on the WGA public sector balance sheet was £36.1 billion, up from £32.0 billion at the end of March 2011.

2.67 Separately from the future liability recorded as part of the overall WGA net liability, the WGA publications also contain details of the present value of future PFI obligations, which cover service and interest cost payments as well as capital costs. These are shown in Table 2.12. (The obligations for future capital payments are higher than the future liabilities recorded on the balance sheet because the obligations cover some additional costs.)

2.68 Service and interest costs associated with PFI only affect the National Accounts and WGA as and when they arise, but as these are relatively firm long-term obligations, they have the potential to reduce the flexibility for other spending in the future. The Treasury collate data on PFI projects annually, including projections of annual PFI payments, covering capital, interest and service costs. These unaudited numbers will not necessarily be consistent with the figures in the latest WGA. In aggregate annual payments are a relatively small proportion of total spending. The Treasury data published in March 2012 show that, if no

further deals were signed, annual payments would peak at 0.6 per cent of GDP in 2013-14.[22] But such payments are not distributed evenly across the public sector and so the potential constraint may be more binding in some areas. These deals are spread across the public sector and will be included in departments' DELs, and the budgets of individual NHS trusts, local authorities and public corporations.

2.69 The separate data published by HM Treasury suggests that the information for the future liabilities that are recorded as on balance sheet in the WGA may relate to around 95 per cent of all operational PFI assets, by value. This suggests the total potential capital liability of on and off balance sheet PFI contracts was closer to £38 billion, or 2.5 per cent of GDP. This implies that, if all capital spending under PFI was to have been carried out through conventional debt financing, then PSND would have been 2.1 per cent of GDP higher at the end of March 2012. This difference is little changed since last year.

Table 2.12: WGA data for total future costs of PFI deals

	£ billion		
	2009-10	2010-11	2011-12
WGA data for PFI deals on balance sheet: [1]			
Figures from the Statement of Financial Position (balance sheet)			
Net book value of PFI assets	30.9	34.9	38.7
Liability for future capital payments	28.1	32.0	36.1
Present value of obligations for future periods:			
Capital payments [2]	34.1	35.1	38.0
Interest payments	33.4	39.0	42.3
Service charges	97.4	109.5	111.4
HM Treasury data for percentage of PFI deals on balance sheet (IFRS basis) (per cent) [3]	-	89%	95%
OBR calculations of WGA liability for future capital amounts payable, grossed up to total PFI deals, on and off balance sheet (per cent of GDP)	-	2.4%	2.5%

[1] On balance sheet on IFRS basis. 2009-10 as restated in 2010-11 WGA; 2010-11 as restated in 2011-12 WGA.

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

[3] Calculations based only on data that specify whether PFI deal is on or off balance sheet

2.70 The WGA publications 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. We show that information in Table 2.13.

[22] HM Treasury (2012a,b). HM Treasury are due to update this information later this year, but updated information was not available in time for this *FSR*.

Table 2.13: Future PFI payments, split by time period and split by sector

	£ billion		
	2009-10 restated	2010-11 restated	2011-12
WGA data for present value of capital and interest obligations for future periods, for PFI deals on WGA balance sheet [1]	67.5	74.1	80.3
Of which, obligations arising:			
Within one year	3.1	3.7	4.0
Later than one year, but within next five years	12.7	14.6	15.8
Later than five years	51.7	55.8	60.5
And of which, obligations by sector:			
Central government	20.4	22.1	44.2
NHS	14.4	17.9	
Local authorities	31.8	32.8	34.7
Public corporations	0.9	1.3	1.4

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

New Treasury control total for PFI spending

2.71 The Government announced at Autumn Statement 2012 that it would introduce a control total for the commitments arising from off balance sheet Private Finance Two (PF2) contracts. Following on from that commitment, and as part of the announcements in Spending Round 2013, the Government has now given some further details of how the new control total will work. This will cover all existing PFI and PF2 contracts funded by central government, whether on or off the WGA balance sheet. It will apply from 2015-16 onwards. The control will be a limit of £70 billion in nominal terms, which will apply over the five-year period from 2015-16 to 2019-20. This will cover all payments in respect of these PFI contracts, including payments to cover capital, interest and service costs. The Government have said their performance against this control total will be assessed on an annual basis at each Budget.

2.72 The Treasury data published in March 2012 showed total cumulative spending over the five-year period from 2015-16 to 2019-20 for payments on all PFI contracts of £50 billion. This covered all spending on all PFI deals signed before that date, which were funded by central government, and included all deals whether on or off the WGA balance sheet. This Treasury data forms the basis of the recently announced control total of £70 billion of total commitments but excludes projects signed last year and in procurement. When the Treasury release updated data later this year it will be possible to judge better how much headroom remains.

Other financial commitments

2.73 The WGA net liabilities include other non-PFI-related finance leases that are similarly off balance sheet in the National Accounts. These carried a further capital commitment of £5.3 billion in 2011-12, a reduction of £1.3 billion compared to the WGA liability at the end of 2010-11.

2.74 The WGA also includes various other financial commitments, which - like the obligations recorded for the payments of interest and service costs for PFI deals shown above - are ***not*** on the WGA balance sheet. These financial commitments are definitely expected to be incurred. However, they are not recognised as future liabilities or regarded as provisions in the WGA because the obligation to record the liability is not incurred until the associated capital asset or service is realised. The present values of future payments for these financial commitments are shown in Table 2.14 below. These include interest payments on finance leases, overall payments on operating leases, and payments on capital and other contracts.

Table 2.14: Future payments for other financial commitments

	£ billion	
	2010-11	2011-12
On balance sheet in WGA - included in net liabilities		
Finance leases: capital payments	**6.6**	**5.3**
Off balance sheet in WGA - *not* included in net liabilities		
Finance leases: interest payments	**21.2**	**19.8**
Operating leases	**21.9**	**20.9**
Contracted capital commitments:	**44.0**	**37.7**
of which:		
MOD commitments for property, plant and equipment, and for intangible fixed assets	18.1	16.6
TfL contracts for London Underground projects	4.8	4.2
NHS capital contracts for the National IT Programme	3.3	2.2
Other capital contracts [1]	17.8	14.7
Other non-cancellable contracts:	**65.8**	**59.4**
of which:		
Payments to Network Rail and train operating companies	11.8	8.0
Higher education grants	10.3	7.5
Working capital facility for Bradford & Bingley and NRAM	5.5	6.0
NHS IT service contracts for the next 5 years	4.7	5.1
Grants to schools, Academies and further education colleges	4.0	5.0
HM Treasury bilateral loan to Ireland	3.2	2.0
BBC outsourcing, programme acquisitions and rights	4.4	3.6
Hertfordshore county council commitments for services	1.1	2.7
Other [1]	20.8	19.5

[1] Other contracts, none of which are above £2 billion in size.

Provisions

2.75 Provisions are recorded in WGA when public sector bodies undertake activities that are expected to result in future costs. The provisions record the net present value of the future liabilities arising from past activities, and are estimated using the relevant discount rate.

2.76 New provisions increase the total of net liabilities recorded on the WGA balance sheet. These provisions for future liabilities 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.

2.77 Table 2.15 gives a summary breakdown of the main provisions recorded in WGA. The largest are for future nuclear decommissioning costs. Total liabilities for provisions increased by £6.3 billion in 2011-12. Roughly £21 billion of new provisions were added, £12 billion were used during the year (matching the amount expected to be used in the 2010-11 accounts) and £5 billion were removed because they were no longer expected to happen. The main change in the stock related to provisions for nuclear decommissioning, which increased by £3.4 billion reflecting changes to estimates of future decommissioning costs. Provisions for clinical negligence also increased by £1.9 billion, following a 6 per cent increase in the volume of new claims reported in 2011-12.

Table 2.15: Provisions in the WGA

	£ billion		
	2010-11 restated	2011-12	Difference
Future liability covered by provision:			
Nuclear decommissioning	60.9	64.3	3.4
Clinical negligence	17.5	19.4	1.9
Taxes subject to legal challenge	4.4	2.1	-2.3
Financial Assistance Scheme	2.7	3.9	1.2
Equitable Life payments scheme	1.5	1.3	-0.2
Other types of provision	20.0	22.3	2.3
Total provisions	**107.0**	**113.3**	**6.3**

2.78 Other provisions in Table 2.15 above include HMRC provisions for legal disputes over taxes, discussed in paragraph 2.86 below. The provisions also include £3.9 billion relating to DWP's Financial Assistance Scheme, which preceded the introduction of the Pension Protection Fund, and £1.3 billion for HM Treasury provisions for the Equitable Life Payments Scheme. Other provisions included

those covering injury benefits, criminal injuries compensation, legal aid and various compensation claims in relation to transport schemes or termination of employment.

2.79 Table 2.16 below shows when the provisions in March 2011 and March 2012 were expected to be used.

Table 2.16: Timing of use of WGA provisions

	Provisions used in financial year £ billion	Provisions at end March, £ billion			
		Future time period when provisions expected to be used			
		Within next year	Within 5 years	After 5 years	Total level of provisions
2010-11 restated	12.2	12.0	27.2	67.8	107.0
2011-12	11.7	13.4	27.4	72.5	113.3

2.80 In our March 2013 *EFO*, we looked at the latest 2011-12 information on provisions that is now reflected in these WGA results, and we checked that those provisions that are expected to be used in the next five years were included in our forecast. This review of provisions from the 2011-12 accounts was contained in Box 4.3 of the March 2013 *EFO*.

Contingent liabilities

2.81 The notes to the WGA accounts record various contingent liabilities, where the chances of the costs arising are judged to be less than 50 per cent. These are not included in the WGA main financial statements or the summary aggregates. The contingent liabilities are sub-divided into quantifiable or non-quantifiable contingent liabilities. There is also a separate category of 'remote' contingent liabilities, where the chances of the costs arising are judged to be near zero.

2.82 If any quantifiable contingent liabilities crystallised or looked more likely than not to do so, this would reduce the level of contingent liabilities and be recorded as an increase in spending or provisions. It is not possible to tell from the WGA accounts whether any contingent liabilities changed their status in 2011-12 in this way. However we show one example below – for tax losses allowed for oil field decommissioning costs – where we look at how the risks are reassessed and reclassified in each year's accounts.

2.83 Table 2.17 shows the latest figures for quantifiable contingent liabilities from the 2011-12 WGA. This table shows that in 2011-12, these contingent liabilities roughly doubled in size, from £50 billion at the end of 2010-11 to £101 billion at the end of 2011-12. Three items accounted for most of this increase. The

largest component was a new contingent liability of £29.7 billion for the UK's liability to make a callable capital subscription to the European Investment Bank (EIB), which makes long-term infrastructure loans to EU countries. In the 2010-11 WGA, this contingent liability was included as a remote contingent liability. In the 2011-12 accounts, it has been reclassified to a contingent liability.

2.84 All EU member states have contingent liabilities to make callable capital subscriptions to the EIB: these are part of the EIB's contingent assets, which back its lending operations. For the 2011-12 accounts, the risk of this liability being called was assessed to have increased because the EIB had been placed on 'Negative Watch' status by two rating agencies at varying points in the year. In 2012-13 the EU member states decided to further capitalise the EIB by making one-off payments into the EIB of €10 billion, for which the UK paid £1.3 billion. This payment was announced in Autumn Statement 2012 and classified in the National Accounts as a loan, increasing PSND. This paid-in capital reduced the likelihood of the EIB needing to call on members' callable contingent liabilities.

2.85 Table 2.17 shows that the WGA continue to include around £10 billion in quantifiable contingent liabilities for financial stability interventions. This mainly covers the government's liability for the contingent capital it has made available for RBS.

Table 2.17: WGA quantifiable contingent liabilities

	£ billion		
	2010-11	2011-12	Difference
Financial Stability interventions	9.8	9.9	0.1
Export guarantees and insurance policies	9.7	9.9	0.2
Clinical negligence	7.9	8.4	0.5
Taxes subject to challenge	9.7	14.5	4.8
Supporting international organisations	0.7	32.6	31.9
Oil and gas field decommissioning revenues	5.0	20.0	15.0
Other	6.7	5.5	-1.2
Total quantifiable contingent liabilities	**49.5**	**100.8**	**51.3**

2.86 HMRC include contingent liabilities and provisions in their accounts to cover the risks from litigation on taxes they have collected. The contingent liabilities cover the amount of tax at risk in cases that they expect to win, while the provisions cover cases which they see a serious risk of losing. At the end of 2011-12, the provision amounted to £2.1 billion (down from £4.4 billion at the end of 2010-11), and the contingent liability was £14.5 billion. In their 2012-13 Trust Statement, HMRC have increased the provision to £4.2 billion, with the contingent liability remaining at £14.5 billion. In our March 2013 *EFO*, we included an assumption that expected tax losses from litigation would amount to

£3.6 billion over the period 2013-14 to 2017-18, quite close to the 2012-13 HMRC provision.

2.87 Table 2.18 shows how HMRC have accounted for the risk of tax losses allowable from oil field decommissioning in their accounts from 2010-11 to 2012-13.

Table 2.18: Potential future liabilities for oil field decommissioning

	£ billion		
	2010-11	2011-12	2012-13
Total potential future liabilities in HMRC accounts:			
Provisions	-	-	3.8
Contingent liability	5.0	20.0	-
Unquantifiable contingent liability	-	-	Remaining risk[1]

[1] In HMRC's 2012-13 accounts, the remaining contingent liability is classified as unquantifiable.

2.88 HMRC increased their contingent liability for loss of taxes because of oil field decommissioning in 2011-12 from £5 billion to £20 billion. Legislation allows losses arising from oil field decommissioning to be set off against profits chargeable to petroleum revenue tax (PRT) and ring-fence corporation tax (CT). This could reduce PRT and CT receipts already received. The 2011-12 liability is for both PRT and CT, whereas the 2010-11 liability was for PRT alone. HMRC have further reviewed their assessment of the risks and possible estimates for loss of taxes for oil field decommissioning for their 2012-13 Trust Statement. This now includes a new provision of £3.8 billion for these losses. Our medium and long run projections for oil and gas revenues allow for decommissioning costs. This provision is consistent with the costs and consequent tax impact included in our March 2013 EFO forecast for oil and gas revenues. HMRC also no longer include a quantifiable contingent liability for the remainder of these possible losses. Given the uncertainty over the timing and amount of costs beyond 2017, HMRC have treated these longer-term costs as non-quantifiable contingent liabilities. This revised treatment will be shown in next year's WGA.

2.89 The changes in treatment between successive years' accounts illustrate how the risks of contingent liabilities are reassessed each year, and items are moved between provisions and contingent liabilities, or between quantifiable contingent liabilities and unquantifiable contingent liabilities.

2.90 Table 2.19 lists the main significant unquantifiable contingent liabilities. These cannot be quantified either because the estimates of possible costs are too uncertain, or because quantification would jeopardise the outcome of a case.

Table 2.19: Unquantifiable contingent liabilities in the 2011-12 WGA

Details of the most significant unquantifiable contingent liabilities in the 2011-12 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 guarantees for indemnity and other specified commitments associated with financial stability interventions.
• Compensation schemes set up by HM Treasury in relation to former shareholders of various banks taken into public sector ownership as part of the financial stability interventions.
• HM Treasury's contingent liability for risks associated with reinsurance arising from acts of terrorism
• Various civil nuclear contingent liabilities in BIS resource accounts
• Future increases in liabilities of the Financial Assistance Scheme beyond those recognised in the provision
• Contingent liabilities arising from rail franchise agreements
• Contingent liability in relation to the Channel Tunnel (to return the land to a suitable condition if the tunnel ceases to operate)

2.91 The Treasury's accounts for 2012-13 give further details on the latest position on the contingent liabilities relating to the Treasury's financial stability interventions. This includes changes to two of the unquantifiable contingent liabilities included above:

- following the sale of Northern Rock in January 2012 to Virgin Money, the Treasury has quantified the potential liabilities under the warranties associated with this sale, which are estimated to be £310 million, and these potential liabilities have been reclassified as a remote contingent liability;

- the Treasury has quantified the limit of its contingent liability to fund any deficit of the Bradford and Bingley Pension Scheme. This is estimated as £60.9 million and we would expect this to be included as a quantifiable contingent liability in the 2012-13 WGA.

Remote contingent liabilities

2.92 The WGA also includes details of remote contingent liabilities, which are those where the chances of the liability actually arising are close to zero. These remote contingent liabilities are similarly divided between quantifiable and unquantifiable remote contingent liabilities.

2.93 Two main changes to the quantifiable remote contingent liabilities in 2011-12 are worth noting:

- the remote contingent liability for the Credit Guarantee Scheme (CGS) was reduced from £115 billion at end March 2011 to £24 billion at end March 2012. The Treasury's accounts for 2012-13 state that the CGS closed at the end of October 2012, and the remote contingent liability has now been extinguished with no payouts; and

- as noted above, the EIB callable capital subscription was reclassified to a contingent liability rather than a remote contingent liability.

New contingent liabilities and guarantees from recent policy announcements

2.94 This section brings together the Government's main recent policy announcements that are expected to give rise to additional contingent liabilities and guarantees. These have not been included in our forecasts for PSNB and PSND, because the probability of them materialising is thought to be less than 50 per cent. However we would expect them to be included in the WGA when they begin to generate a potential future liability, with the liability expected to appear as some sort of contingent liability, off the balance sheet. It is useful to keep track of these announcements to ensure that we cover any risks from these potential liabilities materialising, and adding to PSNB and PSND in the future.

2.95 Table 2.20 below shows the Government schemes that have been announced since Autumn Statement 2011 and are expected to give rise to additional future liabilities of this sort. This list excludes the Funding for Lending (FLS) scheme, which the Bank of England and HM Treasury launched in July 2012. That scheme involves exchanges of assets between the Bank of England and other banks, so is not expected to create contingent liabilities in future WGA accounts.

2.96 While the precise accounting treatment of these various measures will not be known until future years' WGA are published, it is possible to think through some of the broad implications for fiscal sustainability now. Most importantly, while each measure in isolation could well be considered a remote contingent liability, the probability of the various liabilities crystallising are likely to be correlated. In particular, the probability that the various parties to which the Government is exposed will default would increase in the event of a further economic downturn. The more serious the downturn, the greater the likelihood of a larger proportion of contingent liabilities crystallising to the detriment of fiscal sustainability.

Table 2.20: Schemes with future liabilities announced after March 2011

Scheme	Limit (cap)	Date scheme announced	Period scheme operates	Extent scheme operating	In 11-12 or 12-13 accounts?	Resource accounts
New Buy Guarantee	£1 billion	Autumn Statement 2011	March 2012 to March 2015	Operating: Latest statistics show that the Government's contingent liability had increased to £23.1 million by 31 March 2013.	In DCLG 11-12 and 12-13 accounts	DCLG
National Loan Guarantee Scheme	£20 billion	Autumn Statement 2011	March 2012 to March 2014	Closed June 2013, superceded by FLS scheme. NLGS has £2.9 billion of guarantees outstanding.	In HMT 12-13 accounts	HMT
Export refinancing facility	£5 billion	July 2012	No time limit announced	Not operating yet. Still in design phase.	Not yet	ECGD
UK Infrastructure Guarantee Scheme	£40 billion	July 2012	End Oct 2012 until 2016	Operating: • Drax Power (£75 million) • Northern Line extension to Battersea (£1 billion)	In HMT 12-13 accounts	HMT
				SR 2013 announced: • Hinkley Point C eligible • 25 projects worth £13.5 billion have prequalified • Mersey Gateway Bridge (£500 million) • Housing regeneration scheme in Tottenham	Not yet	
Lending to PPPs	£6 billion	July 2012	July 2012 to 18 July 2013	Operational, but not expected to be used.	No	HMT
Rented sector guarantees	£10 billion	September 2012	June 2013 to March 2015	Just become operational. Not used yet.	Not yet	DCLG
Business Bank	£1 billion	Autumn Statement 2012	Expected to start in 2014	Not operating yet. Still in design phase. Options include offering guarantees	Not yet	BIS
Help to Buy: Mortgage Guarantee	£12 billion	March Budget 2013	January 2014 to December 2017	Not operating yet. Still in design phase.	Not yet	HMT

Conclusion

2.97 In this chapter we have reviewed the latest information available from balance sheet measures that is relevant for fiscal sustainability.

2.98 We have seen that PSND increased by a further 3.1 per cent of GDP during 2012-13, reaching 75.1 per cent of GDP by the end of March 2013. In the March 2013 *EFO* we forecast that it would rise to 85.6 per cent of GDP in 2016-17, before falling thereafter. Chart 2.1 showed that the forecast peak in PSND has increased by 9.3 per cent of GDP, compared to the March 2012 *EFO* forecast. PSNW became negative in 2010 and is forecast to worsen to minus 27 per cent of GDP by 2016-17.

2.99 The PSND and PSNW National Accounts measures are limited in that they only record past liabilities accrued from past activities, and do not record future liabilities accrued to date.

2.100 The WGA balance sheet measures offer a more complete view of the total public sector balance sheet, where both liabilities and assets are reviewed on a comprehensive basis, and some future liabilities arising from past activities are also included. The WGA also covers future risks, either as provisions, where the risks are expected to materialise, or as contingent liabilities, where the risks are possible but not probable, so not expected to materialise.

2.101 In the 2011-12 WGA we have seen increases, compared to the 2010-11 WGA, in the future liabilities for public service pensions (up by £47 billion, a 5 per cent increase), PFI capital costs (up by £4 billion, a 13 per cent increase), provisions (up by £6 billion, a 6 per cent increase) and contingent liabilities (up by £52 billion, a 104 per cent increase). We have looked at the specific factors underlying these increases, and ensured that we have reflected those risks in our forecasts. We have also seen how the WGA will reclassify particular items between provisions and contingent liabilities (such as HMRC's potential liability for tax losses from oil field decommissioning) or between contingent liabilities and remote contingent liabilities (such as the callable capital subscription to the EIB).

2.102 In this year's look at the balance sheet measures, we have also provided some additional transparency by looking at three new areas:

- in the light of the Treasury's new PFI control total, we have gathered together more of the information available in the WGA and in the Treasury's statistics on signed PFI deals, and presented these in Tables 2.12 and 2.13.

- we have also provided details of further definite commitments that are not included in the WGA balance sheet measure of net liabilities (Table 2.14).

- and we have gathered together a list of policy announcements that have created future potential liabilities that will appear in the WGA in due course, probably as further contingent liabilities (Table 2.20). These include a number of policies that are already in-train, including NewBuy, UK Infrastructure Guarantees and the National Loan Guarantee Scheme, and those still being worked up, including Help-to-Buy: Mortgage Guarantee and aspects of the Business Bank. It is important to monitor new major announcements of additional Government contingent liabilities, because of the risk that several contingent liabilities could become more exposed at the same time, in the event of a further major economic downturn.

2.103 The detailed and comprehensive WGA data on future liabilities from past activities provide a store of useful information on future potential fiscal risks. But it remains the case that all these balance sheet measures of the public finances are backward looking, in that they only cover, to varying degrees, existing net liabilities and some future liabilities arising from past government activity. None of these measures cover future liabilities arising from future activity, such as pension payments arising from future employment, or the future cost of sustaining public health and education systems, or the prospects for future tax revenues. So in this sense, and as illustrated by our basic schematic in Figure 1.4 of Chapter 1, none of the balance sheet measures are complete.

2.104 What matters for assessing future fiscal sustainability is whether future revenues can be expected to cover future spending, covering both past government activities and future government activities. We turn to this in the next chapter.

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

Introduction

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. But 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 sensitivity to the choice of discount rate as the balance sheet approach. They also recognise that the government has many non-contractual – but nonetheless meaningful – ongoing spending commitments, for example, that it is likely to wish to continue to provide state education and health care. Crucially, it recognises that the government has the ability to levy taxes in the future.

3.3 Given the significant uncertainty inherent over the lengthy time-scales that we consider here, our results should be treated as broad-brush projections rather than detailed forecasts. The first five years of the projections are consistent with the medium-term forecasts to 2017-18 that we published in the March 2013 *Economic and fiscal outlook* (*EFO*), so as to focus on longer-term influences rather than revisions to our assessment of the short and medium-term outlook.

3.4 The March *EFO* assumed that activity in the economy would still lie below its sustainable level at the end of the medium-term forecast horizon in 2017-18 and that this negative 'output gap' would only close after a period of above-trend growth in the following three years. We would expect to see a continued cyclical improvement in the fiscal position in that period, as above-trend growth boosts receipts and reduces spending as a share of GDP. To capture this, we have introduced a period during which individual receipts and spending lines are

rolled forward using the cyclical-adjustment coefficients set out in *OBR working paper No3: Cyclically adjusting the public finances*,[1] augmented by other sources where more suitable.

3.5 This chapter first outlines the demographic, economic and policy assumptions required to generate our projections, pointing out where these have changed since last year's *FSR*. We then explain how we make our central projections of spending and revenue, and then present our results, noting significant changes since last year. This is followed by sensitivity analysis, focusing on the medium-term starting point, demographic and economic influences, and health spending.

Key assumptions

Demographic assumptions in the long-term projections

3.6 One of the most important inputs into our long-term public finance model is a projection of the size and structure of the future population. This has significant implications both for the future size of the economy and for the future of the public finances. The projected size and structure of the population are determined by assumptions regarding longevity, fertility and net migration. Changes in these assumptions cumulated over a period of decades can make a big difference to the future size and composition of the population, with implications for the public finances. We therefore test the sensitivity of our projections to alternative population projections.

3.7 As in last year's report, our projections are based on ONS population projections using mid-2010 population data. We expect the ONS to publish new population projections later in the year, reflecting the results of Census 2011 and mid-2012 population estimates. We discuss this in Box 3.1.

3.8 We continue to use the ONS's 'low migration' variant for our central projection for the public finances. Net migration can be volatile from year to year, and ONS population projections assume constant net migration, informed by recent trends, rather than taking into account policy changes or the evolution of specific flows of migrants. We use the 'low migration' variant because its assumption of net inward migration of 140,000 a year seems more consistent with the likely impact of the removal of migration restrictions for A8 migrants across the EU, and the latest government policy on visa restrictions to control net inward migration; the ONS's 'principal' variant assumes annual net inward migration of 200,000 a year.

[1] Helgadottir et al (2012).

3.9 Table 3.1 summarises the 2010 ONS long-term assumptions for the population variants of interest to us. These are unchanged from last year's projections. This year we look at an additional variant labelled 'natural change only', which assumes zero gross inward and outward migration in the long term. 'Zero net migration' removes the direct effects of migration on the size of the population; the 'natural change' variant that holds gross migration flows at zero also removes the effects of migration on the age structure of the population. These issues are explored further in Annex A.

Table 3.1: ONS population variant assumptions

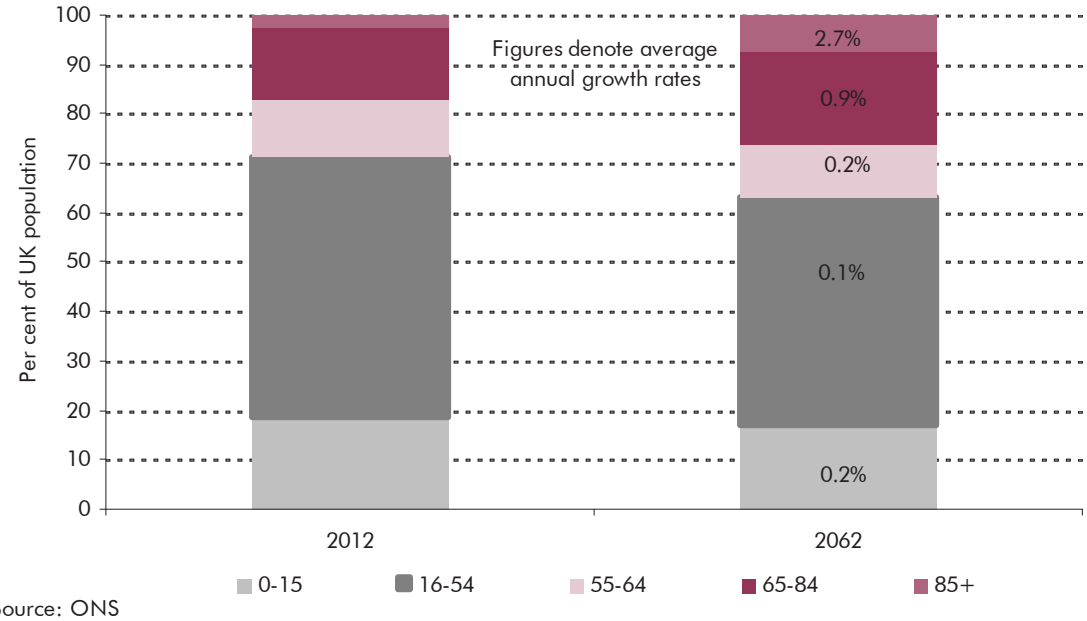
	Fertility rate	Life expectancy at birth in 2033 (years)		Long-term average annual net migration	Size of population in 2062 (millions)	
		Males	Females		16-65	Total
OBR Central[1]	1.84	83.1	86.7	140	44.8	77.5
High migration	1.84	83.1	86.7	260	50.7	86.6
Zero net migration	1.84	83.1	86.7	0	39.7	71.4
Natural change[2]	1.84	83.1	86.7	0	34.9	63.8
Young age structure	2.04	81.0	85.4	260	26.4	44.6
Old age structure	1.64	85.2	88.1	140	20.1	37.1

[1] Equivalent to the ONS's 'low migration' population variant.
[2] The 'natural change' variant assumes zero gross and net migration.

3.10 Some developments in population structure are relatively certain. In particular, we can be confident that the demographic bulge created by the post-WWII baby boom will continue to pass through the projections as these cohorts age. In addition, past trends of declining fertility and increasing longevity have created what is usually termed an 'ageing population'. Chart 3.1 demonstrates this phenomenon by showing the growth in the number of people aged over 85 compared to growth in other age bands. It is this ageing of the population that has the greatest impact on the future outlook for the public finances, if we assume (as we do in our central projection) that spending on different public services is held constant as a share of GDP for people of particular ages.

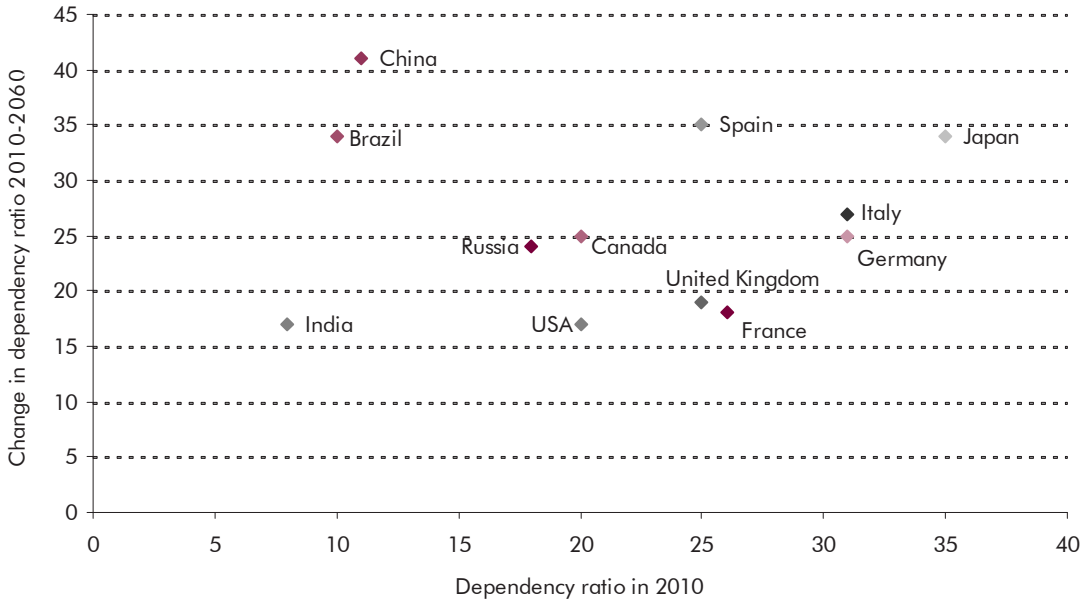
3.11 The UK is not alone in having an ageing population. Many advanced economies will face similar pressures. Chart 3.2 shows the projected changes in the dependency ratio, defined as the number of people aged over 65 per hundred aged between 15 and 64, for various countries, derived from UN population projections. The chart shows that a number of countries currently have higher dependency ratios than the UK and/or are projected to see those ratios rise more quickly over the coming 50 years.

Chart 3.1: Population structure in 2012 and 2062



Source: ONS

Chart 3.2: UN projections of the dependency ratio



Source: UN Population Division

Box 3.1: The preliminary results of Census 2011

The ONS updates its population projections every two years, based on mid-year population estimates. Every 10 years it can draw on the latest census results. Census 2011 suggested that there were around half a million more people in the UK in 2011 than assumed in the latest population projections, which are based on 2010 data.[a] Census findings will be incorporated in new population projections later this year.

The Census results will affect population estimates back to 2001. These underpin various Labour Force Survey (LFS) measures (such as activity and employment rates) and may alter our view on the outlook for productivity, the labour market and eventually GDP growth. But an initial assessment of the impact on LFS aggregates for England and Wales in 2011 suggests that the effects are likely to be relatively small.[b]

Revised population estimates also affect the composition of the population that is projected into the future. The Census found more people of working age, especially women of childbearing age, and fewer people aged 75 and over. Updated population projections for England out to 2021, which mechanically fed through the implications without reviewing assumptions on specific fertility and mortality rates, projected a slightly larger population due to more births and fewer deaths.[c]

We will consider the impact of revised ONS population projections in future *EFOs* and *FSRs*, once those projections are available.

[a] ONS (2012c)

[b] ONS (2012d)

[c] ONS (2012e)

Economic assumptions in the long-term projections

3.12 Our medium-term economic forecast shows actual output below potential in 2017-18, with the negative output gap projected to close after three years of above-trend growth from 2018-19 to 2020-21. We assume the output gap remains closed thereafter, recognising that in reality actual output will fluctuate around its potential as the economy is hit by unexpected shocks. Our projections for potential output are informed by our view on the average productivity trend, based on its historical path, and labour supply growth, based on labour market participation trends and the ONS's 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.

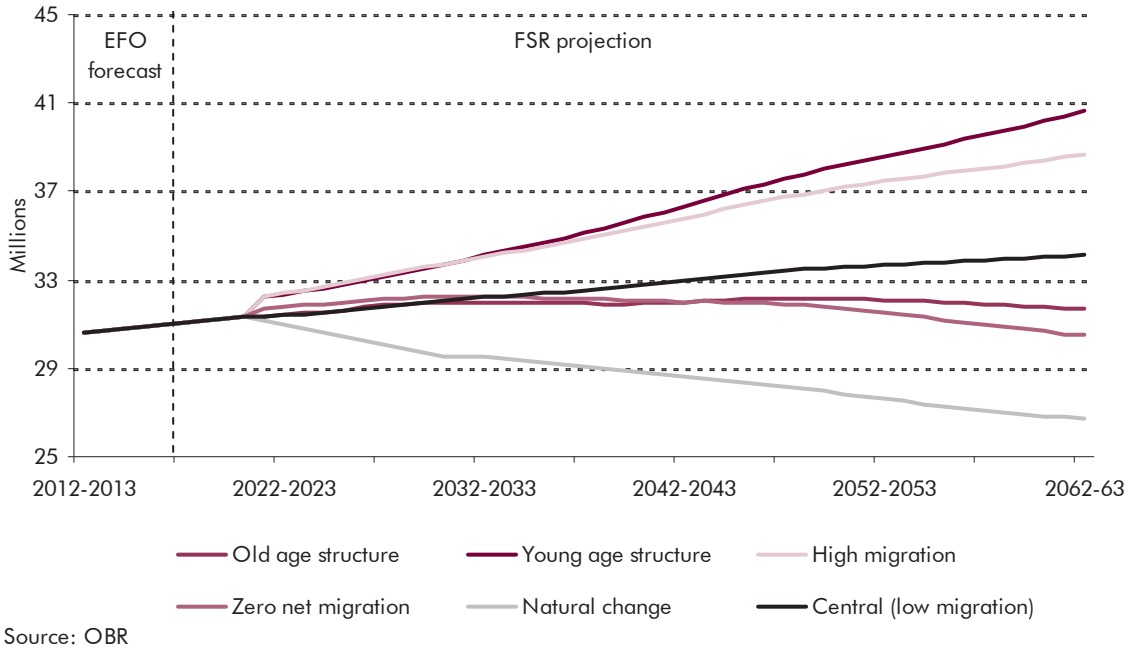
3.13 Table 3.3 lists the long-term assumptions used in our projections applied from 2021-22 onwards. The full set of these assumptions, including figures for the

preceding years, is included in the supplementary tables on our website. Our long-term assumption for average productivity growth remains at 2.2 per cent a year, unchanged from last year's *FSR* and consistent with its historical trend between 1971 and 2008.

3.14 We project long-run changes in the proportion of the population in employment using historic labour market participation profiles for different cohorts (by gender and year of birth). This allows us to model the participation rate of current cohorts through the projection period. From this we calculate an employment rate consistent with an assumed non-accelerating inflation rate of unemployment (NAIRU) of 5.4 per cent of the labour force, consistent with our *EFO* forecast. More information on our methodology is contained in Annex B of *FSR 2011*.

3.15 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, as shown in Chart 3.3. The biggest factor driving these projections is the size of the population rather than the smaller differences in employment rates between the variants. Depending on the particular demographic profile, this leads to the long-term real growth rates set out in Table 3.2, with annual data available on our website. Annual real growth rates in the long-term are little changed from last year's report.

Chart 3.3: Employment projections



Source: OBR

Table 3.2: Real GDP growth under variant population projections

	Annual GDP growth, per cent				
	2012-13 to 2022-23	2022-23 to 2032-33	2032-33 to 2042-43	2042-43 to 2052-53	2052-53 to 2062-63
OBR central[1]	2.2	2.5	2.4	2.4	2.3
Old age structure	2.2	2.4	2.2	2.3	2.1
Young age structure	2.2	2.7	2.8	2.8	2.7
Zero net migration	2.2	2.4	2.1	2.1	1.9
High migration	2.2	2.7	2.7	2.7	2.5
Natural change[2]	2.1	2.0	1.9	1.9	1.9

[1] Equivalent to the ONS's 'low migration' population variant.
[2] The 'natural change' variant assumes zero gross and net migration.

Table 3.3: Long-term economic determinants

	Long-term assumption from 2021-22	
	Annual growth rate, unless otherwise stated	
Labour productivity	2.2	Based on historical trend between 1971 and 2008
Prices and earnings		
Average earnings (Q2)	4.4	Product of labour productivity and GDP deflator
Public sector earnings	4.4	Assumed to grow in line with private sector
GDP deflator	2.2	Constant from end of forecast
RPI (September)	3.3	Calculated as CPI plus 1.3 percentage points
RPIX	3.2	Calculated as CPI plus 1.2 percentage points
CPI (September)	2.0	Constant from end of forecast at inflation target
'Triple lock'	4.7	Calculated as average earnings plus 0.3ppts
Interest rates (per cent)		
Gilt rate	5.0	OBR assumption
Bank rate	5.0	OBR assumption
Employment growth		
Public sector workforce growth	0.25	Broadly in line with total employment growth

3.16 We reassessed the long-term prospects for GDP deflator growth in our December 2012 *EFO* (see Box 3.8 of that report), lowering our long-term assumption from 2.5 per cent to 2.2 per cent a year. This is based on consumption deflator growth remaining in line with CPI inflation and the assumption that the other components of the GDP deflator would grow at close to historic rates. It is important to emphasise that these changes do not mean we have fundamentally changed our view about long-term inflation. Neither do they affect our view of real output and productivity.

3.17 Market expectations for interest rates continue to lie below our projections for nominal GDP growth. As in last year's report, we have decided to set the long-term nominal interest rate to 5.0 per cent, which is close to but above our nominal growth rate projections. Our change to the long-term GDP deflator implies that the differential between interest rates and growth in our central projection is now around 0.3 percentage points in the long term, up from 0.1

percentage points in last year's report. The revision to this differential is small in the context of the wider uncertainty around both GDP growth and interest rates.

3.18 We assume the labour share is constant in the long run. As a consequence, average earnings growth is equal to the product of labour productivity growth and whole economy inflation. Our revision to the GDP deflator therefore reduces nominal earnings growth to 4.4 per cent, even with our view on productivity unchanged; workers are no less productive, but their outputs carry a lower nominal value and so cash wages are relatively lower, with no change in purchasing power.

3.19 Our approach to projecting other inflation measures is unchanged. We continue to assume CPI inflation remains at 2.0 per cent in the long term, consistent with the Bank of England's inflation target. The long-run difference between RPI and CPI is around 1.3 percentage points, slightly lower than in last year's report, but based on the same detailed decomposition of the differences between the two measures.[2]

Policy assumptions in the long-term projections

3.20 Consistent with the *Charter for Budget Responsibility*, our projections reflect the potential impact of government announcements, where the policy is firm and detailed enough to estimate its long-term impact on the public finances.

3.21 Since last year's report the Government has made a number of policy announcements, including:

- pencilling in further spending cuts in 2017-18 in Autumn Statement 2012 and setting out other medium-term tax and spending measures in that Autumn Statement and in Budget 2013;
- providing more detail on spending allocations in 2015-16 in Spending Round 2013, along with some welfare measures. We have updated our projections for the spending allocations, but will consider the broader effects of welfare measures, including their direct effects on receipts and any indirect economic effects, in our autumn 2013 *EFO*. The 2017-18 spending envelope is unaffected, so the announcements affect the composition, rather than the level, of spending in that year;
- setting out more detail on the implementation of the Single Tier state pension from 2016-17;

[2] See Miller (2011).

- reform to the system of long-term care, including a lifetime cap on certain expenses; and

- that excess cash held in the Bank of England's Asset Purchase Facility (APF) would be transferred to the Exchequer on an ongoing basis.

The projected longer-term impacts of these policies are discussed in more detail below.

3.22 The projections in this report assume unchanged government policy. But Chapter 1 explained that it is often far from straightforward to define unchanged policy over a 50-year horizon. Table 3.4 sets out the major policy assumptions we make.

Table 3.4: Policy assumptions in the long-term projections

Policy	Long-term assumptions in the central projections
Taxes	Direct and indirect taxes uprated in line with earnings from 2018-19. All tax escalators to end by 2017-18.
Departmental spending	Grown in line with nominal GDP, apart from items subject to demographic pressures.
Pensioner benefits	State Pension Age equalised at 65 by November 2018, with the Pension Credit and Winter Fuel Payment qualifying ages rising in line. State Pension Age reaches 66 by October 2020, and rises further to 67 between 2026 and 2028, and 68 between 2044 and 2046; qualifying ages for Pension Credit, winter fuel payments, Disability Living Allowance and Attendance Allowance rise in line. Single Tier pension introduced for new pensioners from April 2016 Basic State Pension and Single Tier Pension uprated using the 'triple lock' mechanism. Additional Pension uprated in line with CPI in payment.
Other benefits (e.g. working age benefits and housing benefits)	All working age benefits uprated with earnings from 2018-19. Universal Credit introduced from 2013.
Student loans	Policy parameters (e.g. cap on tuition fees and repayment threshold) uprated in line with earnings from 2018-19. 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 by blanket 3.2 per cent; uprate payments with CPI; and to amend scheme benefits in line with the Public Service Pensions Act 2013.

3.23 This report notes significant policy commitments and aspirations that are not included in the central projections as fiscal risks, and sets out their potential impact where it is possible to do so. In previous *FSRs* we explained the potential

fiscal implications of the Government's desired asset sales programme, but noted that in most cases the Government had not yet stated clearly which assets it will sell, when and in what precise form – all of which makes it impossible to quantify their impact with "*reasonable accuracy*" as required by the Charter for Budget Responsibility. As a result, we do not include the potential proceeds and loss of income flows in our central projections until final and quantifiable detail is available. This includes the Government's intention to attract private capital into Royal Mail, where the precise timings and share of the business to be sold are not yet known.

3.24 The Chancellor set out plans relating to RBS and Lloyds Banking Group in his June Mansion House speech that may affect the public finances at some point in the future. The implications for eventual policy choices, and the timing of these, remain too uncertain to quantify at this stage. In particular, he set out:

- that the Treasury is considering options for share sales in Lloyds. Share prices at the time of our March *EFO* implied a loss of £5.7 billion on the total shareholding. As the shares were overall bought at above market prices, net debt is already £3.4 billion higher as a result of these transactions;

- a review into potentially splitting RBS into a good and a bad bank. Even if such a split was decided upon as a result of this review, its size, nature and accounting treatment are unclear; and

- likely future discussions on cancelling its Dividend Access Share with RBS. There is no market value for this right, although the Treasury, based on a number of modelling assumptions, shows a range around a value of £1.5 billion in its 2012-13 annual accounts.

3.25 We have based our central projections on the currently announced dates for future rises in the State Pension Age (SPA), but note that the Government has proposed linking the SPA more directly to life expectancy[3] and that managing pensions spending might be best achieved through changes in the SPA.[4] All else equal, earlier and/or further rises in the SPA would alleviate some of the long-term pressure on fiscal sustainability from spending on the State Pension. In last year's report we discussed the impact on our long-term projections of the Government's Autumn Statement 2011 announcement to bring forward the rise in the SPA to 67 from 2034-36 to 2026-28.

[3] Pension Bill 2013-14.

[4] Paragraph 1.47 of Spending Round 2013.

Tax and benefits uprating

3.26 In our medium-term forecasts, unless the Government states otherwise, we assume that it will uprate income tax allowances and thresholds in line with inflation. But because in the long term earnings are expected to rise more quickly than prices (due to productivity growth), this definition of unchanged policy would result in the average tax rate rising steadily over time as more income moves into higher tax bands. This effect is known as 'fiscal drag', and is discussed in more detail in Box 3.2. It would not be realistic to assume that this would be allowed to continue indefinitely. As in previous reports, we therefore assume that allowances and thresholds rise in line with earnings rather than prices beyond the medium-term horizon, turning off fiscal drag after five years.

3.27 A similar issue arises on the spending side, where uprating working-age benefits in line with prices rather than average incomes over the long term would see the value of those benefits shrinking 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.

Expenditure on public services

3.28 For public services such as health and education we assume an underlying real increase in expenditure per capita of 2.2 per cent per year from 2021-22 onwards. This implies that such spending remains flat as a share of actual GDP, absent changes in the demographic profile. By locking in that position, we take no account of any potential cyclical swings in output in later years, which may be expected to result in spending rising or falling as a share of output.

3.29 We then apply our 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.

Box 3.2: Fiscal drag and price uprating

HMRC have updated last year's analysis of fiscal drag on income tax and NICs liabilities between 2018-19 and 2032-33. The analysis is based on the latest Survey of Personal Incomes, updated long-term economic assumptions and the effect of measures announced since last year such as the increases in the personal allowance and the abolition of the NIC contracting-out rebate as a result of the introduction of the Single Tier pension. The results show that by 2032-33 fiscal drag would increase tax revenues by 2.4 per cent of GDP.

These estimates are generated by comparing two different scenarios on HMRC's Personal Tax Model in which income tax and NICs thresholds and allowances are uprated either with CPI or nominal incomes. As was the case in this analysis last year:

- around half arises from people moving into paying tax and some taxpayers paying a higher proportion of their income at the basic rate;
- around a third is from taxpayers moving into the higher rate band, and people paying the higher rate on a larger proportion of their income; and
- the remaining portion is from the additional rate threshold and the personal allowance taper. The medium-term assumption is that these are fixed in cash terms, so fiscal drag arises from not uprating in line with CPI, and further, not uprating with incomes.

The effect on NICs is much lower. The effect is marginally negative for employee NICs as the marginal rate falls to 2 per cent on earnings above the upper earnings limit (£41,450 in 2013-14). This is offset by the effect on employer NICs where there is no upper limit.

Table A: Income tax and NICs: effect of fiscal drag (2018-19 to 2032-33)

			Basic rate	Higher rate limit	
	Overall	Allowances	limit	price effect	real effect
Income tax (£ billion)	78.4	39.9	23.4	8.6	6.6
Income tax (per cent of GDP)	2.1	1.1	0.6	0.2	0.2
	Overall		Individual		Employer
NICs (£ billion)	11.4		-1.37		12.8
NICs (per cent of GDP)	0.3		0.0		0.3

Our long-term assumptions for uprating pensioner benefits are similar to the current medium-term policy settings. In both cases the Basic State Pension is subject to the 'triple lock' (rising by the maximum of earnings, prices or 2.5 per cent a year), and the Pension Credit uprated with earnings. For the medium-term forecast, the Second

State Pension is uprated by CPI in payment, but average earnings in accruals. The Single Tier pension is legislated to rise at least in line with earnings. For the purposes of these projections, we assume it is also subject to the 'triple lock'.

Uprating other smaller pension benefits and non-pension benefits to pensioners, including housing and disability benefits, by earnings in the long term means that, in total, pensioner benefits would be 0.3 per cent of GDP higher in 2032-33 than under existing medium-term policy.

Nearly all working-age benefits are due to be uprated by CPI in our medium-term forecast. Our long-term assumption of uprating by earnings, which ensures that living standards for recipients are maintained relative to the rest of the population, therefore has a larger relative effect on prospective spending, equivalent to 1.4 per cent of GDP by 2032-33.

We also assume that student loan fees are uprated with earnings. The medium-term forecast assumes these are uprated with RPIX inflation from 2014-15, but rolling that assumption forward into the long term would imply that university income steadily diminishes relative to the size of the economy.

We also assume student loan fees grow in line with earnings rather than being uprated with RPIX inflation, as in our medium-term forecast. Rolling that assumption forward into the long term would imply that university income would steadily diminish relative to the size of the economy. If fees continued to rise in line with inflation, the impact on net debt from student loans would peak at only 6.1 per cent of GDP and tail off more quickly than in our central projections. In 2062-63 they would add 2.0 per cent of GDP to net debt rather than the central projection of 5.0 per cent of GDP.

How we project the public finances

3.30 Our projections up to 2017-18 are consistent with the March 2013 *EFO* forecast. From 2018-19 to 2020-21, we project the economy to grow at above-trend rates as the output gap closes. We would expect the public finances to continue to improve over this period, with receipts rising slightly as a share of GDP, and spending – which absent policy changes would largely be expected to grow with potential output – falling as a share of GDP.

3.31 A relatively large negative output gap over such an extended period is unusual. In previous *FSRs*, the output gap at the end of the medium term had been relatively small and we modelled the fiscal implications in a simple top-down way. Given the size of the output gap in the final year of our medium-term forecast (-2.1 per cent of output in 2017-18), this simple approach is no longer sufficient to capture the scale of the improvement we might reasonably expect to see over this period as spare capacity is brought back into productive use.

3.32 For this *FSR*, our projections for the three years 2018-19 to 2020-21 are largely calculated using the bottom-up cyclical-adjustment coefficients published in *OBR working paper No3: Cyclically adjusting the public finances*.[5] We replace these estimates where better sources are available, in particular for spending projections that we commission through external sources[6] and the profile of cash transfers between the Exchequer and the Bank of England Asset Purchase Facility (APF) we set out in Table 4.4 of our March *EFO*.

3.33 Table 3.5 shows the projected public sector primary balance as a share of GDP between 2012-13 and 2020-21. The improvement up to 2017-18 reflects both fiscal consolidation measures and, from 2014-15 onwards, cyclical improvements in the economy.

3.34 Our March *EFO* forecast a cyclically-adjusted primary surplus of 2.5 per cent of GDP in 2017-18. All else equal, we would expect the headline primary surplus to converge to that level over time. Yet that is not the case in these *FSR* projections, principally due to the spending streams projected using different methodologies. In particular, transfers from the Exchequer to the APF in 2020-21 reduce the primary balance by 0.3 per cent of GDP more in 2020-21 than it does in 2017-18 (which would otherwise have been rolled forward). Excluding the APF transfers, the primary surplus is 2.4 per cent of GDP in 2020-21. We do not explicitly capture the effects of ageing over this three-year window.

Table 3.5: Primary balance

	Per cent of GDP								
	March EFO Forecast						FSR Projections		
	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Primary balance	-3.5	-4.8	-3.8	-2.6	-0.6	0.9	1.3	1.7	2.1
Primary balance ex. APF	-3.5	-4.8	-3.8	-2.6	-0.6	1.0	1.4	2.0	2.4

3.35 The path of public sector primary balances presented in Table 3.5 is subject to significant uncertainties and should be treated as a simplified illustration of the expected improvement in the fiscal position as a consequence of the output gap narrowing in those years. Later in this chapter, we describe the implication for our projections if the primary balance as a share of GDP in 2017-18 was one percentage point higher or lower.

[5] Helgadottir et al (2012).

[6] These include all DWP-related benefits, public sector pensions, student loans, long-term care and flows relating to Bradford & Bingley and Northern Rock (Asset Management).

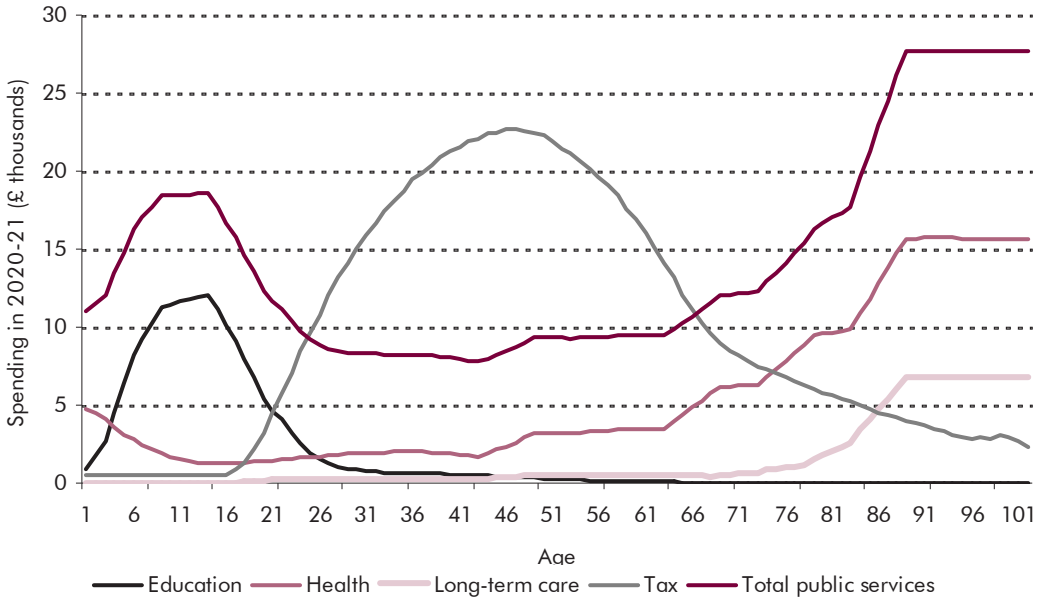
3.36 From 2021-22, we construct long-term projections of spending and revenue streams through an unconstrained 'bottom-up' analysis. By holding spending and tax revenues per capita fixed as a share of GDP, borrowing remains unchanged as a share of actual GDP, absent demographic changes. This approach will not capture cyclical swings in the economy that may arise after the current economic cycle unwinds, but it does allow us to attempt to isolate the changes in both spending and revenue that would be caused by the changing demographic composition of the UK. Key spending and revenue items are sensitive to both the size and age structure of the population.

3.37 Our modelling approach makes use of individual spending and revenue profiles for males and females. The profiles capture the age distribution of spending or revenue over a representative individual's lifetime. By applying profiles and population projections to spending and revenue it is possible to calculate the total spending per person of a given gender and year of age, and it is this calculation that forms the basis of our projections of the public finances. These per capita allocations are raised in line with real earnings over the projection horizon. By combining these with population projections, spending and revenue streams can then be generated.

3.38 Chart 3.4 shows representative profiles for public service spending items and for tax. This has been achieved by applying the relevant profiles to the disaggregated spending forecast in 2020-21. This shows that in early life people consume a relatively large amount of health care and state-funded education. At the same time they will be making little contribution to tax revenues through their income and spending. During working age they consume fewer public services, but will be paying more tax. In later life, they consume more health care and long-term care,[7] but will pay less tax as their incomes and spending decline.

[7] For this year's report, we do not use the spending profile for long-term care illustrated in the chart having introduced more detailed projections of demand for long-term care.

Chart 3.4: Representative profiles for tax and public services spending



Source: OBR

3.39 Social security spending and public service pension spending are modelled outside our long-term projection model, but will also add to spending by age in Chart 3.4. The Department for Work and Pensions projects social security payments using OBR assumptions. This allows us to incorporate the additional complexities of these benefit items explicitly. Similarly, the Government Actuary's Department (GAD) has projected unfunded public service pension payments. Finally, projections for long-term care spending are provided by the Department of Health (DH) on the basis of Personal Social Services Research Unit (PSSRU) projections of demand for long-term care. The methodologies are discussed in more detail in Annex B.

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

Public spending and revenue projections to 2062-63

3.41 In this section we present the results of our bottom-up spending and revenue projections, using the methodology and modelling assumptions outlined in the previous section. These projections do not represent a precise prediction of the likely evolution of spending or revenue. Rather they show what might happen if policy was to remain unchanged on the basis of the assumptions we have chosen and if our other illustrative assumptions were to hold true. If the projections show

the public finances on an unsustainable path, and were to prove accurate, we would expect policymakers to take corrective action.

Public spending

3.42 Table 3.6 shows our central spending projections as a percentage of GDP, excluding interest payments on government debt. The big picture is that we project total non-interest public spending to fall from 36.7 per cent of GDP at the end of our medium-term forecast in 2017-18, to 36.1 per cent of GDP in 2020-21 as the output gap closes and then to rise to 40.6 percent of GDP by 2062-63, an overall increase of 4.0 per cent of GDP – equivalent to £61 billion in today's terms. The full annual series are available on our website. Table 3.7 shows changes since last year's report. We have extended the projections from that report out to 2062-63, to ease comparison between the two sets of figures.

3.43 Table 3.6 shows how from 2021-22 onwards the main drivers of the increase in non-interest spending are health, state pensions and long-term care costs, due mainly to the ageing population.

3.44 The effects of the Government's pencilled-in cuts to departmental budgets in 2017-18 become more apparent as the output gap continues to close. By 2020-21, spending on health, education and 'other spending' are lower as a share of GDP as the cuts more than offset the impact of the reductions to potential output in our medium-term forecast. By contrast, the starting point for state pensions, public sector pensions and long-term care are higher than last year, largely due to lower GDP projections, rather than higher cash spending – although the 'triple lock' also raises state pension spending as a share of GDP. On our March *EFO* forecast, state pensions will have been uprated by more than earnings growth in 4 out of the 7 years between its introduction and the end of our medium-term forecast in 2017-18.

3.45 The expected increase in non-interest spending between the end of the medium-term forecast and the end of the long-term projection is 4.0 per cent of GDP, around 1.3 per cent of GDP less than projected last year. The main changes are:

- lower spending on state pensions, following the introduction of the Single Tier;
- a larger output gap at the end of our medium-term horizon, which temporarily raises spending as a share of GDP;
- the government has pencilled in spending cuts for 2017-18, which in our projections reduces health, education and other spending as a share of

GDP in the long term, the effects of which are more apparent once the output gap closes;

- other non age-related spending ('other spending') are reduced between 2017-18 and 2020-21 as a result of the output gap closing and the additional spending cuts in 2017-18. There is then a further reduction from 2022-23 as transfers from the Exchequer to the APF are projected to end; and

- these changes are partially offset by long-term care, reflecting the policy to cap certain lifetime payments.

Table 3.6: Non-interest spending projections

	Per cent of GDP							
	Estimate[1]		FSR Projection					
	2012-13	2017-18	2020-21	2022-23	2032-33	2042-43	2052-53	2062-63
Health	8.1	7.0	6.9	7.0	7.6	8.2	8.5	8.8
Long-term care	1.2	1.3	1.4	1.5	1.8	2.1	2.3	2.4
Education	5.6	4.6	4.5	4.5	4.5	4.3	4.4	4.4
State pensions	6.0	5.8	5.7	5.8	6.6	7.5	7.6	8.4
Pensioner benefits	1.2	1.0	1.0	1.0	1.0	1.1	1.1	1.1
Public service pensions	2.2	2.3	2.2	2.2	1.9	1.6	1.4	1.3
Total age-related spending	**24.4**	**22.0**	**21.6**	**21.9**	**23.4**	**24.8**	**25.3**	**26.4**
Other social benefits	6.5	5.8	5.7	5.7	5.8	5.8	5.9	5.9
Other spending	9.6	8.8	8.7	8.4	8.4	8.4	8.4	8.4
Spending[2]	**40.5**	**36.7**	**36.1**	**36.1**	**37.6**	**39.0**	**39.6**	**40.6**

[1] Spending consistent with the March 2013 EFO.
[3] Excludes interest and dividends.

Table 3.7: Changes in non-interest spending projections since *FSR* 2012

	Per cent of GDP							
	Estimate[1]		FSR Projection					
	2012-13	2017-18	2020-21	2022-23	2032-33	2042-43	2052-53	2062-63
Health	0.2	0.2	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2
Long-term care	-0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.4
Education	0.1	0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
State pensions	0.1	0.3	0.4	0.4	0.5	0.5	0.3	0.0
Pensioner benefits	0.0	-0.1	-0.1	-0.1	-0.2	-0.1	-0.2	-0.1
Public service pensions	-0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.0
Total age-related spending	**0.2**	**0.8**	**0.4**	**0.4**	**0.5**	**0.5**	**0.3**	**0.0**
Other social benefits	0.3	0.7	0.5	0.5	0.6	0.7	0.7	0.7
Other spending	-0.5	-0.4	-0.5	-0.8	-0.8	-0.8	-0.9	-0.9
Spending[2]	**0.0**	**1.1**	**0.4**	**0.0**	**0.3**	**0.4**	**0.0**	**-0.2**

[1] Spending consistent with the March 2013 EFO.

[3] Excludes interest and dividends.

Health

3.46 Table 3.6 shows spending on health rising from 6.9 per cent of GDP in 2020-21 to 8.8 per cent of GDP in 2062-63. This increase is relatively smooth, and occurs as the population ages. As in previous *FSRs*, this is the largest component of age-related spending in our projections. But the increase in spending over the long-term horizon is 0.4 per cent of GDP smaller than in last year's *FSR* because of departmental spending cuts pencilled in for 2017-18, which reduce the share of spending as a share of GDP as the output gap closes and GDP grows at above-trend rates. As detailed spending plans beyond 2015-16 are yet to be made, we assume spending cuts are spread evenly across all departments.

3.47 Assuming that health care spending per capita for a person of a given age and gender remains constant as a share of GDP might be thought unrealistic given the likelihood that productivity growth in this relatively labour intensive sector is likely to be lower than that in the rest of the economy. Later in this chapter we show the sensitivity of our central net debt projections to an alternative profile for health spending. Last year's report explored these issues in greater detail – see Annex B of the *FSR 2012*.

Long-term care

3.48 Spending on long-term care is expected to increase from 1.4 per cent of GDP in 2020-21 to 2.4 per cent of GDP by 2062-63, 0.4 per cent of GDP higher than projected in our 2012 *FSR*. The increase in long-term care spending over the projection horizon is 0.3 per cent of GDP larger than last year. This mainly reflects reforms announced by the Government and in particular a lifetime cap

on certain expenses that individuals will pay towards their long-term care, with the state meeting excess costs. This increases government spending by 0.3 per cent of GDP by 2062-63. Details of the reforms and the effects of these on our projections are covered in Annex B. We assume that spending on long-term care is driven by demand in the medium and long term, so do not explicitly capture any implications for long-term care spending as a consequence of broader spending cuts, as we do for departmental budgets.

Education spending

3.49 While education spending is clearly a substantial component of age-related spending, it is projected to be broadly flat over much of the projection period and the profile is essentially unchanged from last year's projections, with 2017-18 spending cuts pushing through to subsequent years. We do not yet have a detailed set of plans for spending by function consistent with 2015-16 budgets set in Spending Round 2013. Instead we assume that the intention to protect the schools budget in real terms in 2015-16 applies to total spending on education.

State pensions

3.50 Spending on state pension is projected to fall as a share of GDP as the output gap closes and then rise thereafter, from 5.7 per cent of GDP in 2020-21 to 8.4 per cent of GDP in 2062-63, driven largely by demographic trends and the maturing of pension entitlements. This line includes many items in addition to Basic State Pensions and Second State pensions (to be replaced by Single Tier pensions, discussed below), such as Pension Credit, Winter Fuel Payments, TV licenses and the contributory Christmas Bonus.

3.51 As in previous *FSRs* we assume that the Basic State Pension is uprated using the 'triple lock', in line with the current government policy. The 'triple lock' policy states that the Basic State Pension will rise by the highest of earnings growth, CPI inflation or 2.5 per cent – and we assume that it applies throughout the projection period. The 'triple lock' would see pension spending rise as a share of GDP if earnings growth was higher than nominal GDP growth or if both earnings and GDP growth were low relative to CPI inflation, as over the recent past. In our central projection, we assume that the 'triple lock' also applies to the Single Tier pension, which will be legislated to rise by at least average earnings. We assume that the 'triple lock' is equivalent to earnings growth plus 0.30 per cent a year. This is higher than last year's assumption of 0.26 per cent, as we have now taken on board another year of relatively low earnings growth and have included our medium-term forecast to 2017-18 in the period over which we estimate the effect.

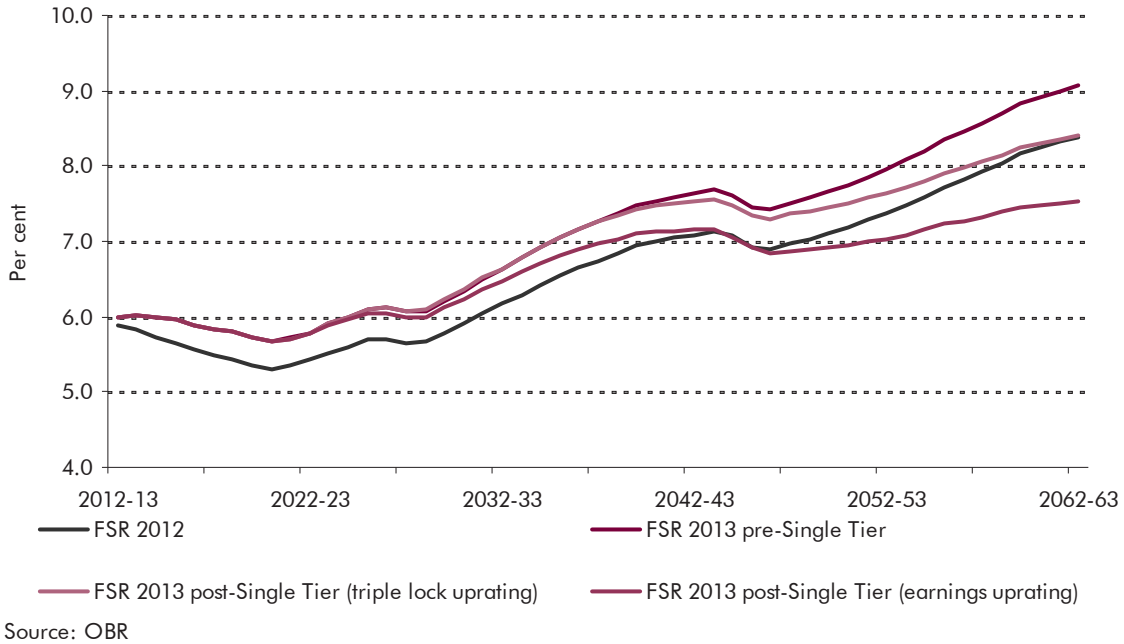
3.52 The central pensions projections presented in Table 3.6 reflect the introduction of the Single Tier pension. Alongside Budget 2013, the Government announced that

for people reaching State Pension age from April 2016, the current two tier state pension system will be replaced by the Single tier Pension. This will be a flat rate pension, above the level of the basic means test and requiring 35 qualifying years to receive the full rate. Under the Single Tier pension, the State Second Pension – the earnings-related element of state provision – will close. This means that the system whereby Defined Benefit (DB) pension schemes can contract out of the State Second Pension will also come to an end. Also, as the full pension will be above the basic means test level, the Savings Credit element of Pension Credit will no longer be available to new pensioners.

3.53 Chart 3.5 isolates the impact of this policy announcement and uprating assumptions on state pension spending, by showing the projections of pensions payments as a percentage on GDP on the following bases:

- last year's projections;
- our 2013 projections pre-Single Tier;
- our 2013 projections, post-Single Tier assuming a pension uprating in line with the 'triple lock'; and
- our 2013 projections, post reform and assuming uprating in line with average earnings for both the Single Tier and Basic State Pension.

Chart 3.5: State pensions spending projections



Source: OBR

3.54 Chart 3.5 shows that:

- in the absence of any reforms, spending on state pensions would be higher as a share of GDP than projected last year, due to changes in the medium-term forecast for GDP and the upward revision to the pension increases implied by the 'triple lock' over both the medium and longer term;

- spending under the reformed Single Tier would be broadly unchanged as a proportion of GDP until the late 2030s. Thereafter, the rise in spending expenditure would be reduced by 0.7 per cent of GDP in 2062-63, primarily because it will no longer be possible to build up large amounts of State Second Pension. In addition, the greater generosity of Single Tier will reduce entitlements to means-tested benefits, leading to lower expenditure on Pension Credit, Housing Benefit and Council Tax Benefit; and

- if both the Basic State Pension and Single Tier pension payments were uprated in line with earnings rather than by the 'triple lock', pensions spending would be projected to be a further 0.9 per cent of GDP lower by 2062-63, at 7.5 per cent of GDP.

Public service pensions

3.55 Gross public service pension expenditure (before offsetting member contributions) is projected to fall from 2.2 per cent of GDP in 2020-21 to 1.3 per cent of GDP in 2062-63. The share at the end of the projection period is unchanged from last year's report, but this masks two offsetting factors. In the near term, lower projected GDP in this report means that the pension payments represent a higher percentage of GDP. However, this is offset by further expected reductions in the public sector workforce in our medium-term forecast, which reduce pension payments in later years relative to those in last year's report.

Other social benefits

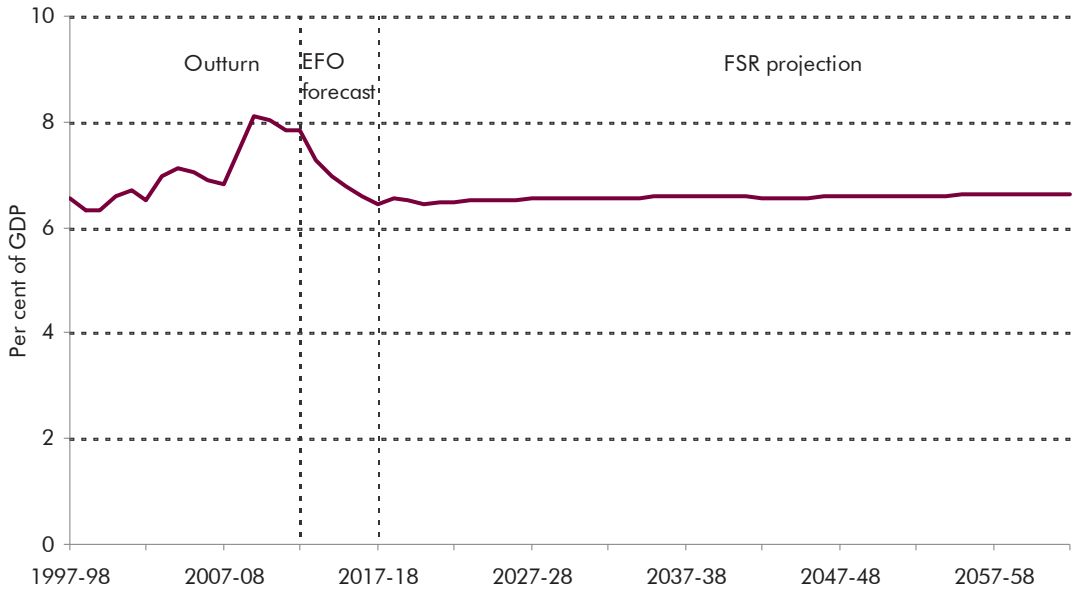
3.56 Other social benefits are broadly flat as a share of GDP over the projection period, within which working age benefits stand at 2.9 per cent of GDP at the start and end of our projections.

3.57 The Government announced in Spending Round 2013 that it intends to introduce a cap on elements of welfare spending from 2015-16 onwards, to include all social security and tax credit spending, apart from state pensions and the most counter-cyclical elements, such as Jobseeker's Allowance (JSA) and housing benefit passported from JSA.

3.58 The Government has yet to announce the final elements of welfare which are considered as the most counter-cyclical – and are hence excluded from the cap –

nor details on how the cap will operate under Universal Credit. Chart 3.6 illustrates that spending on welfare and tax credits potentially within the scope of the welfare cap increased from 6.6 per cent of GDP in 1997-98, to 6.8 per cent before the recession in 2007-08, and to a peak of 8.1 per cent in 2009-10. Spending on these benefits is forecast to fall as a share of GDP in the medium term as policy, including uprating by less than inflation over a number of years, reduces spending, and GDP grows at above-trend rates. Its share is projected to fall to, and remain around 6.6 per cent of GDP in the long term.[8] A cap in itself would not affect our projections, although we would capture any changes in policy were the cap breached and the Government chose to respond.

Chart 3.6: Welfare and tax credits, excluding state pension, Jobseeker's Allowance and housing benefit passported from Jobseeker's Allowance



Source: DWP, OBR

Other spending

3.59 Other non-age related spending includes spending on 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 2021-22 onwards. Cuts to departmental budgets in the medium-term forecast, including those for 2015-16 set out in Spending Round 2013 and pencilled in for 2016-17 and

[8] Over the forecast and projection periods, we assume that JSA, housing benefit passported to JSA recipients and equivalent spending under Universal Credit are excluded from the cap.

2017-18, reduce spending as a share of GDP. As the economy grows at above-trend rates, such spending falls further as a percentage of GDP.

3.60 This category also includes spending to cover losses on gilts sold by the APF. As we set out in our March *EFO*, based on market expectations for interest rates and our assumptions for what this implies for the unwinding of QE, the APF is projected to wind down in 2022-23. This increases spending by up to 0.3 per cent of GDP in 2021-22.

Revenue

3.61 As described above, we project revenue to increase as a percentage of GDP between 2017-18 and 2020-21, due to above-trend growth as the output gap closes. The bulk of the improvement, based on past relationships between taxes and the economic cycle, comes through increases in corporation tax and capital taxes as company profits and asset prices recover with the wider economy.

3.62 Compared to last year's projections, income tax and corporation tax are lower as shares of GDP once the output gap closes, due to downward revisions in the medium-term forecast set out in our March 2013 *EFO*. Other broad categories are generally higher, reflecting developments in the medium-term forecast, or, especially in the case of capital taxes, our approach to correcting for the stage of the cycle.

3.63 As with spending, the revenue projections from 2020-21 presented in Table 3.8 reflect changes in the absolute size and age composition of the population. The big picture is that non-interest revenues are projected to rise from 37.6 per cent of GDP in 2017-18, the end of our medium-term forecast horizon, to 38.8 per cent of GDP in 2062-63, an increase of 1.2 per cent of GDP – equivalent to £19 billion in today's terms and similar to the overall increase in last year's report. But in contrast to last year, the pick-up is more pronounced in the early years of the projections, as we model the implications of above-trend growth.

3.64 As we noted earlier in this chapter, this relatively flat picture depends crucially on our assumption that tax allowances and thresholds are uprated in line with earnings rather than prices over the longer term. Box 3.2 shows that if we had increased income tax and national insurance contributions allowances by prices instead of earnings, this would have increased revenues by around 2.4 per cent of GDP by 2032-33.

Table 3.8: Non-interest revenue projections

	Per cent of GDP							
	Estimate[1]		FSR projection					
	2012-13	2017-18	2020-21	2022-23	2032-33	2042-43	2052-53	2062-63
Income tax	9.7	10.5	10.5	10.5	10.5	10.6	10.6	10.7
NICs	6.7	7.0	7.0	7.0	6.8	6.9	6.9	6.9
Corporation tax	2.6	2.1	2.2	2.2	2.1	2.2	2.2	2.2
VAT	6.5	6.3	6.3	6.3	6.4	6.5	6.5	6.5
Capital taxes	1.1	1.5	1.9	1.9	1.9	2.0	2.0	2.0
Other taxes	10.4	10.2	10.2	10.2	10.3	10.4	10.4	10.5
Revenue[2]	**37.0**	**37.6**	**38.1**	**38.0**	**38.1**	**38.6**	**38.5**	**38.8**

[1] Receipts consistent with the March 2013 EFO.
[3] Excludes interest and dividends.

Table 3.9: Changes in non-interest revenue projections since *FSR 2012*

	Per cent of GDP							
	Estimate[1]		FSR projection					
	2012-13	2017-18	2020-21	2022-23	2032-33	2042-43	2052-53	2062-63
Income tax	-0.1	-0.1	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1
NICs	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2
Corporation tax	-0.2	-0.4	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
VAT	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Capital taxes	0.0	0.1	0.5	0.5	0.5	0.5	0.5	0.5
Other taxes	0.0	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Revenue[2]	**-0.2**	**0.2**	**0.6**	**0.5**	**0.6**	**0.6**	**0.6**	**0.6**

[1] Receipts consistent with the March 2013 EFO.
[3] Excludes interest and dividends.

3.65 Income tax revenue is projected at 10.5 per cent of GDP in 2020-21, marginally lower than last year reflecting changes in the medium-term forecast. Income tax revenues as a share of GDP increase as a result of the ageing population, as older age groups usually continue to pay income tax on pensions, even though their income does not directly contribute to GDP. Corporation tax projections are also lower than last year due to downward revisions to the medium-term forecast, reflecting in part lower headline corporation tax rates.

3.66 Capital tax revenues, those generated by inheritance tax, capital gains tax and stamp duties, are expected to rise from 1.5 per cent of GDP in 2017-18 to 1.9 per cent of GDP in 2020-21 and then 2.0 per cent of GDP in 2062-63. Capital taxes are relatively highly geared towards changes in asset prices. As the economy recovers and asset prices pick up, capital taxes would therefore be expected to rise as a share of GDP. Over the longer term, such taxes also rise as

the population ages, as those nearing retirement or in retirement are assumed to sell businesses and other financial assets.

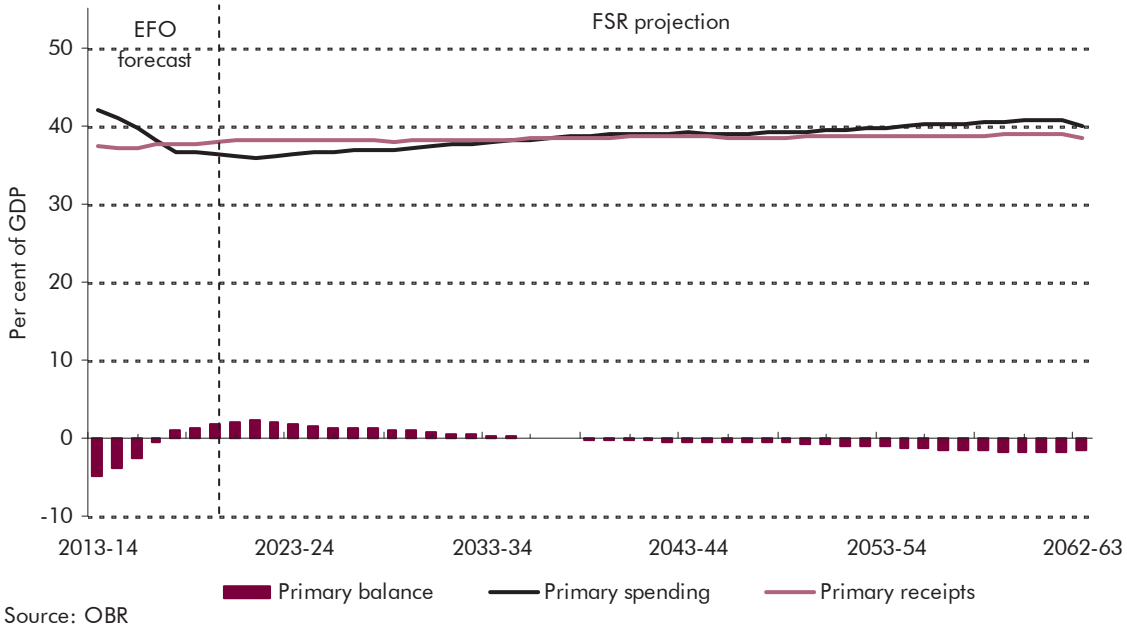
3.67 In our more detailed analysis of tax revenue sustainability in Chapter 4 we consider non-demographic factors that might affect the size of particular revenue streams over the long term. Chapter 4 updates the analysis within previous *FSRs* of North Sea oil revenues, and provides additional analysis of the impact on income tax and national insurance contributions of changes in labour market participation rates for the over-65 age group.

The implications for the public finances

The central projection

3.68 Our central projections show public sector revenues increasing as a share of GDP beyond our medium-term forecast horizon, but not as quickly as public spending. As a result, the primary budget balance (the difference between non-interest or 'primary' revenues and spending) is projected to move from a surplus of 0.9 per cent of GDP in 2017-18 to 2.1 per cent of GDP in 2020-21 and then to a deficit of 1.8 per cent of GDP in 2062-63 – an overall deterioration of 2.7 per cent of GDP, and a structural deterioration of 4.2 per cent of GDP, equivalent to £65 billion in today's terms (Chart 3.7). In effect, we project that over the best part of five decades these primarily demographic pressures would reverse around 40 per cent of the improvement to the primary balance of 9.8 per cent of GDP that we expect to see between 2009-10 and 2017-18, which includes the reversal of the previous government's fiscal stimulus package and the subsequent consolidation.

Chart 3.7: Revenue, spending and the primary balance



Source: OBR

3.69 In order to see how this projected deterioration in the primary balance would feed through into public sector net debt we need to take into account future financial and other transactions. These transactions affect public sector net debt by increasing the government's cash requirement, even though they do not affect the current balance or public sector net borrowing.

3.70 For the majority of financial transactions we assume that there is a net effect of zero over the projection period, with the exception of student loans and the winding down of Bradford & Bingley and Northern Rock (Asset Management), consistent with UKAR's latest business plans.

3.71 We have commissioned the Department for Business, Innovation and Skills (BIS) to model projections of student loans and repayments over the next 50 years. The key assumptions underlying our projections are that student numbers remain constant at their current numbers and that the 2012-13 average fee loan per student is £7,000. We also assume that tuition fee cap and maintenance grants are uprated in line with earnings after the medium-term forecast period.

3.72 Total student loan payments increased net debt by 3.0 per cent of GDP at the end of 2012-13. The impact is projected to peak at 6.7 percent of GDP (equivalent to £103 billion in today's terms) around the early 2030s, and then to fall to 5.0 per cent of GDP by 2062-63. The broad profile remains unchanged from last year, with the level higher throughout mainly due to downward revisions to the level of GDP, rather than higher net outlays. Since last year's report, we

have revised down our assumption for long-term average earnings growth. This has only a small effect on net lending to students, as the income level beyond which students begin to repay their loans also moves with our earnings growth assumption beyond 2017-18.

3.73 As the assets of B&B and NRAM are wound down over time, their impact on net debt falls from a peak of over 6 per cent of GDP in 2010-11 to close to zero by the mid-2020s.

3.74 With a projection of financial transactions, we can now produce projections of public sector net debt and public sector interest payments. Table 3.10 shows our projections of public sector net debt falling from around 85 per cent of GDP in 2017-18 to just above 66 per cent of GDP in the early-2030s, before rising to 99 per cent of GDP after 50 years. Over the comparable 50-year period, the 2012 *FSR* showed debt peaking in the near term at 76 per cent of GDP in 2014-15, before falling to 57 per cent in the early-2030s and then increasing to over 90 percent of GDP by 2062-63 – below that in our current projections. We discuss the change in the scale of this movement in the next section.

Table 3.10: Central projections of fiscal aggregates

	Per cent of GDP							
	EFO Forecast		FSR projection					
	2012-13	2017-18	2020-21	2022-23	2032-33	2042-43	2052-53	2062-63
Primary spending	40.5	36.7	36.1	36.1	37.6	39.0	39.6	40.6
Primary revenue	37.0	37.6	38.1	38.0	38.1	38.6	38.5	38.8
Primary balance	-3.5	0.9	2.1	2.0	0.4	-0.4	-1.0	-1.8
Net interest	2.1	3.1	3.0	2.9	2.6	2.7	3.1	4.0
Total Managed Expenditure	43.6	40.5	39.8	39.7	41.1	42.6	43.6	45.5
Public Sector Current Receipts	38.0	38.3	38.8	38.7	38.9	39.5	39.5	39.7
Public sector net borrowing	5.6	2.2	0.9	0.8	2.2	3.2	4.2	5.8
Public sector net debt	76	85	78	74	66	71	80	99

Table 3.11: Changes in the central projections of fiscal aggregates since *FSR 2012*

	Per cent of GDP							
	EFO Forecast		FSR projection					
	2012-13	2017-18	2020-21	2022-23	2032-33	2042-43	2052-53	2062-63
Primary spending	0.0	1.1	0.0	0.0	0.3	0.4	0.0	-0.2
Primary revenue	-0.2	0.2	0.6	0.5	0.6	0.6	0.6	0.6
Primary balance	-0.3	-0.9	0.6	0.5	0.3	0.2	0.6	0.9
Net interest	-0.5	0.5	0.5	0.4	0.5	0.6	0.6	0.5
Total Managed Expenditure	0.2	1.7	0.5	0.4	0.7	0.8	0.5	0.1
Public Sector Current Receipts	0.4	0.3	0.5	0.5	0.5	0.5	0.5	0.5
Public sector net borrowing	-0.2	1.4	-0.1	-0.1	0.2	0.3	0.0	-0.4
Public sector net debt	4	13	15	10	9	10	10	8

3.75 Charts 3.8 and 3.9 show the paths of public sector net debt and public sector net interest as a share of GDP in our central projection, comparing them to the paths if the cyclically-adjusted primary balance was to remain constant at its 2017-18 level.

3.76 It is clear that longer-term spending pressures, if unaddressed, would put the public finances on an unsustainable path in our central projection. Public sector net debt would approach 100 per cent of GDP and still be rising at the end of the projections. We quantify this 'unsustainability' more formally in Chapter 5. 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 the key assumptions we have made. Before that we explain the factors driving the change in our projections compared to last year's report.

Chart 3.8: Central projection of public sector net debt

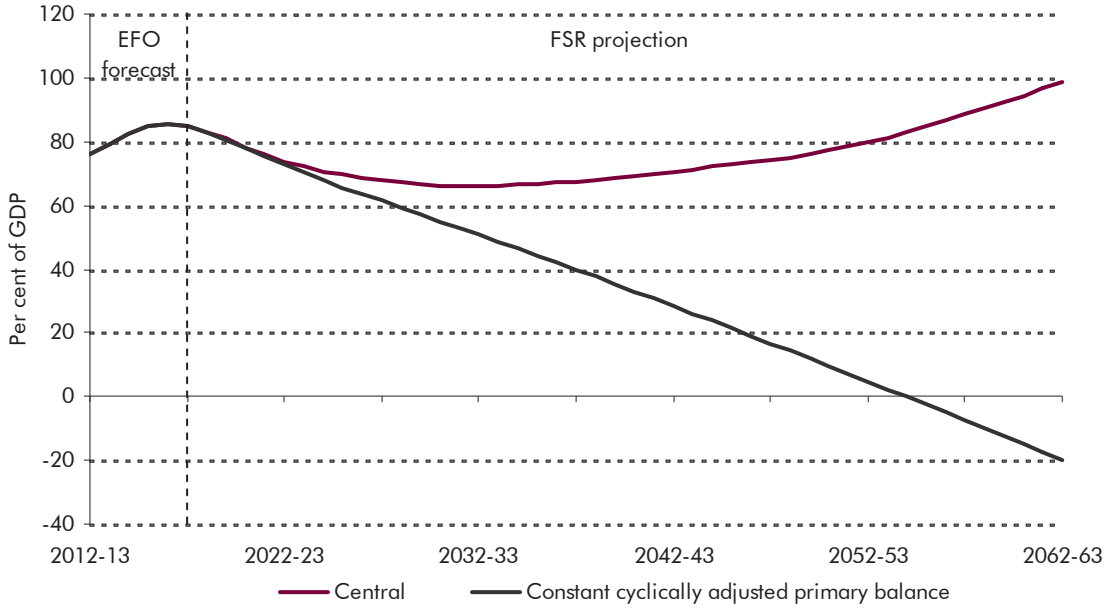
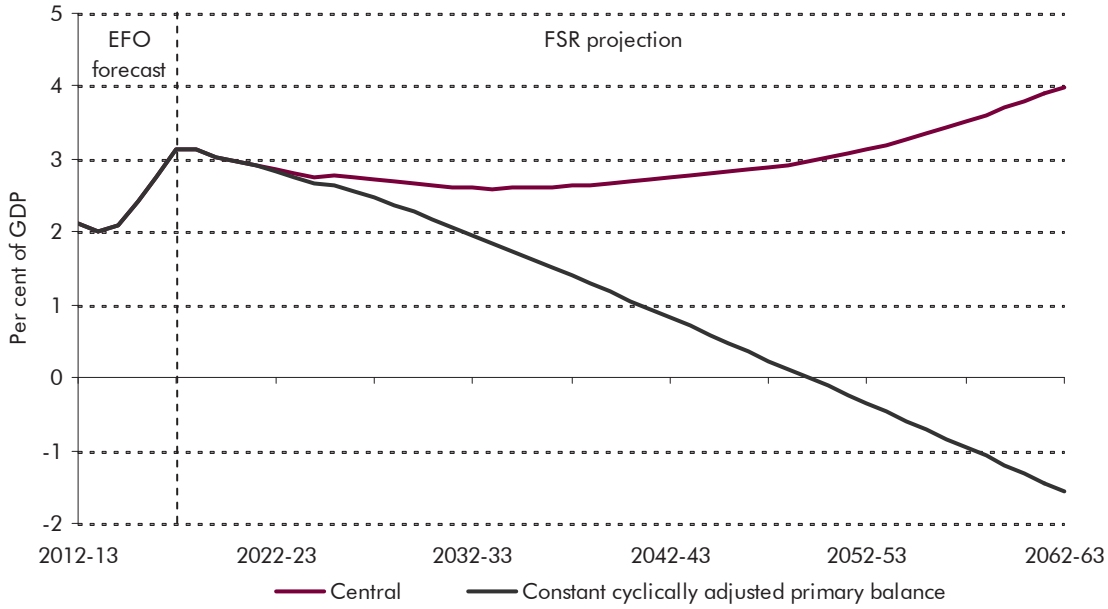


Chart 3.9: Central projection of net interest payments



Source: OBR

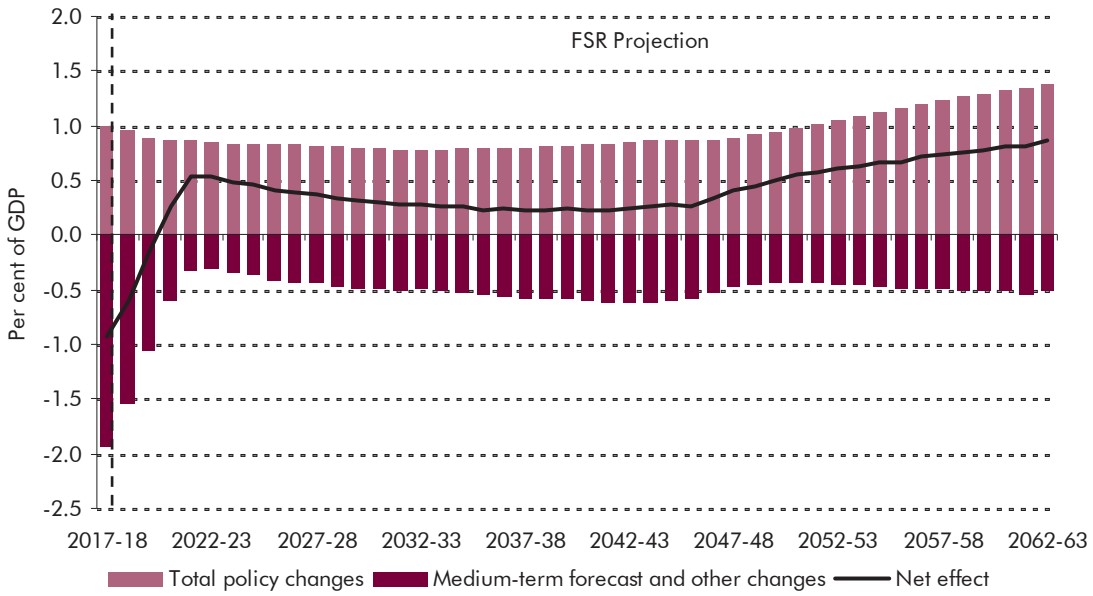
Changes since last year's projection

3.77 Chart 3.10 provides a stylised decomposition of the changes in the headline primary balance since last year's *FSR* over the projection period and Table 3.12 shows a more detailed split for the final year. They show that:

- absent policy measures, the headline primary balance would have deteriorated by close to 2 per cent of GDP by the end of our medium-term forecast horizon in 2017-18. This reflects a structural hit to the public finances due mainly to our lower view for potential output over the period, and a cyclical deterioration. This cyclical effect is unwound by 2020-21, but the structural hit remains – giving a deterioration relative to last year of 0.6 per cent of GDP. Other changes are broadly offsetting, and include our improved modelling of the primary balance as the negative output gap closes. If we had introduced that methodology last year, the pre-measures deterioration between reports would have been around 0.3 per cent of GDP larger; and

- Government policy measures over the past year improve the primary balance by roughly 1 per cent of GDP from 2017-18, primarily reflecting an additional year of spending cuts for 2017-18 pencilled in at Autumn Statement 2012. The Government has also announced policies which affect the long-term path of the primary balance. The lifetime cap on certain payments to cover for long-term care increases spending and worsens the primary balance by up to 0.3 per cent of GDP by 2062-63. This is more than offset by savings from the Single Tier pension reform, which reduces spending from the late 2030s onwards. By 2062-63, policy changes improve the primary balance by a net 1.4 per cent of GDP, more than offsetting the pre-policy deterioration of 0.5 per cent of GDP and delivering an overall net improvement of 0.9 per cent of GDP.

Chart 3.10: Stylised decomposition of changes in the primary balance since *FSR* 2012



Source: OBR

Table 3.12: Changes in the primary balance and net debt in 2062-63

	Per cent of GDP	
	Primary balance	Net debt
FSR 2012 projection	-2.7	91
FSR 2013 projection	-1.8	99
Change	**0.9**	**8**
of which:		
Pre-measures	**-0.5**	**59**
2017-18 net debt to GDP ratio	0.0	13
2017-18 structural primary balance	-0.6	27
Other	0.1	19
Measures	**1.4**	**-51**
Medium-term consolidation	1.0	-48
Long-term care reforms	-0.3	4
Introduction of Single Tier	0.7	-7

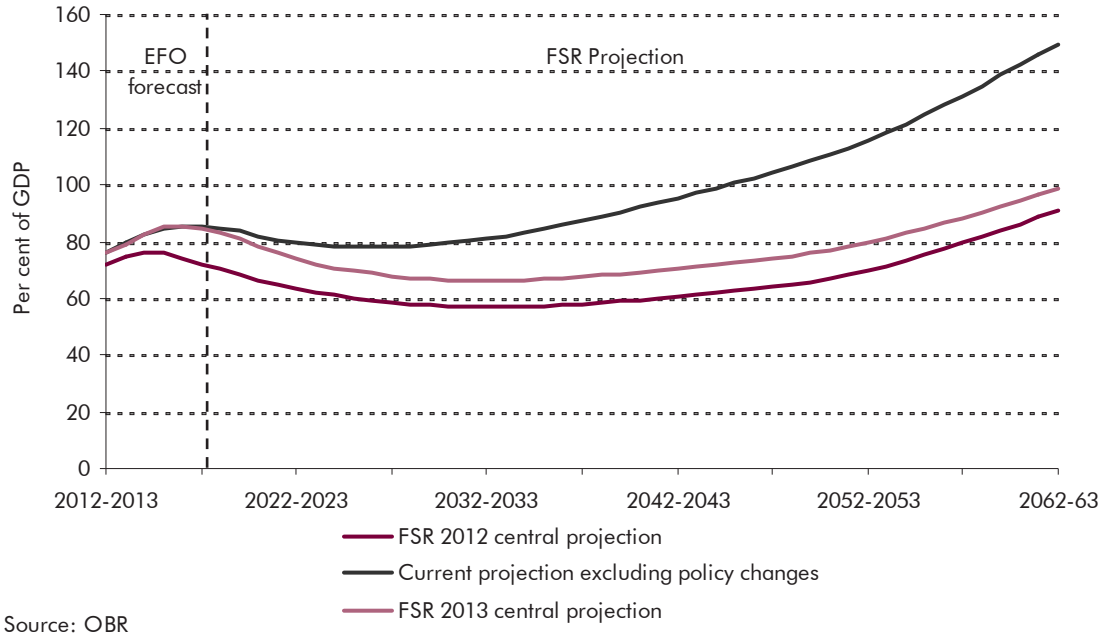
3.78 Chart 3.11 and Table 3.12 illustrate the cumulative effects of these changes on our net debt projections. They show that:

- excluding the impact of policy changes, net debt would have risen to around 150 per cent of GDP by 2062-63, compared to 90 per cent of GDP last year. This largely reflects higher debt and a lower pre-measures primary

balance in 2017-18 relative to last year's projection. Net interest payments, which affect net debt, but not the primary balance, are around 0.5 per cent of GDP higher across the projection period, due to revisions to our medium-term forecast and a small change to our assumption of the long-term difference between interest rates and nominal GDP growth. This explains why the overall net debt position is worse than last year even though the primary balance is better; and

- policy changes largely offset this rise, and in particular the spending cuts pencilled in for 2017-18. The introduction of Single Tier improves the primary balance towards the latter end of our projection, having a relatively modest impact on net debt over a 50-year horizon although accumulated savings would reduce net debt further in future years relative to the *FSR 2012* projections.

Chart 3.11: Stylised decomposition of changes in the net debt projections since the *FSR* 2012



Source: OBR

3.79 Neither set of projections includes the crystallisation of any of the contingent liabilities that the Government has accumulated over the recent past and which are discussed in Chapter 2. In isolation, each contingent liability is judged to have a less than 50 per cent probability of being called, but it is certainly possible that some will crystallise over the longer term.

Sensitivity analysis

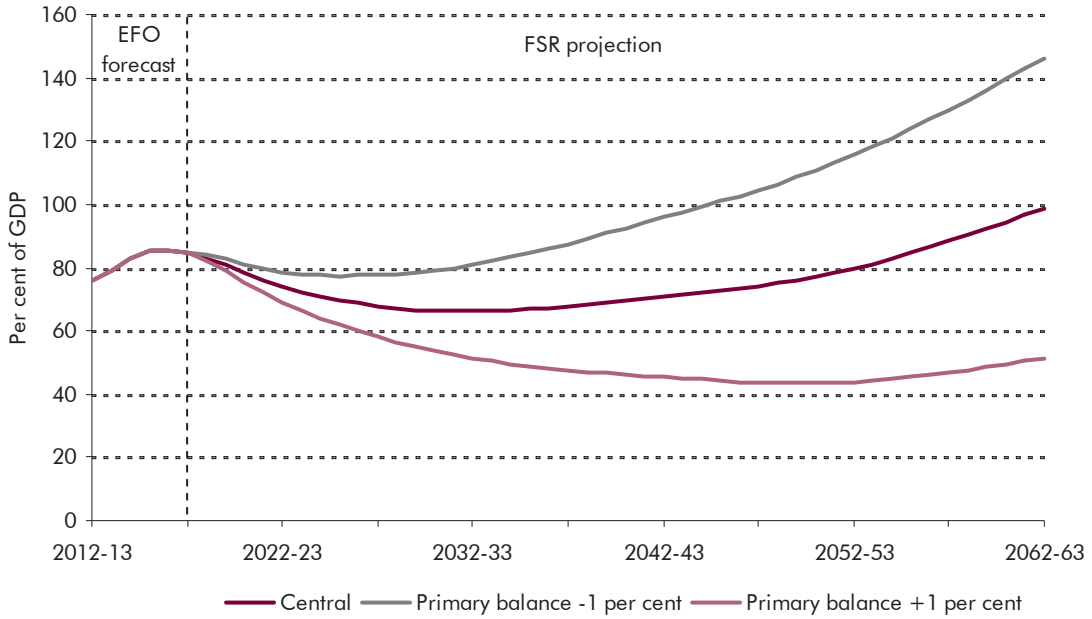
3.80 This section analyses the sensitivity of our central projections to the medium-term fiscal position and to our key demographic and economic assumptions.

Sensitivity to the medium-term fiscal position

3.81 We have shown how changes to our medium-term forecast and our methodology to project spending and revenue as the output gap closes has a significant impact on our projections. This particular sensitivity illustrates the importance of the gap between spending and revenue at the starting point of our projections, with any gap locked in over the long-term.

3.82 Chart 3.12 shows that if the primary balance from 2017-18 onwards was worse by 1 per cent of GDP than in our March forecast, then by the end of the period net debt would increase to around 150 per cent of GDP rather than around 100 per cent in our central projections. Conversely, a structural primary balance that was 1 per cent of GDP higher in 2017-18 would see debt fall to just over 40 per cent of GDP before beginning to rise again.

Chart 3.12: Sensitivity of public sector net debt projections to the primary balance in 2017-18



Source: OBR

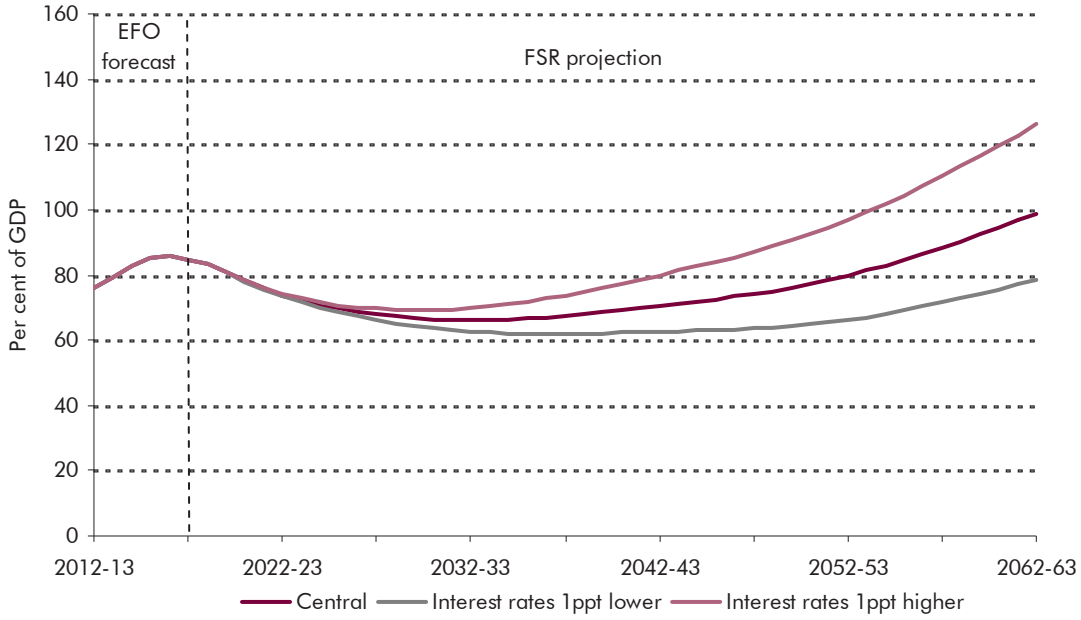
Sensitivity to interest rates

3.83 Another key assumption is that the interest rate the Government pays on its newly issued debt gradually rises towards 5 per cent in the long term, slightly above the

rate of nominal GDP growth. This is higher than market expectations would currently imply for the long term. But conversely, gilt rates may be higher than assumed, if for example demand for safe assets fell as economic uncertainty receded, or the markets had not fully priced in the withdrawal of QE. The Bank of International Settlements (BIS) simulated debt projections for the UK, US and Japan assuming interest rates were 1 or 2 percentage points higher relative to GDP growth. The shock for the UK was relatively smaller, given a longer average maturity of government debt.[9]

3.84 Chart 3.13 illustrates the path of net debt if gilt rates were 1 percentage point higher or lower from 2018-19 onwards. Over a short horizon, the impact is relatively small, as changes would only apply to new debt issuance, 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 gather pace. Under an alternative with interest rates 1 percentage point higher in the long term, net debt would exceed 120 per cent of GDP over 50 years, climbing more rapidly than in our central projection. Gilt rates 1 percentage point lower would reduce net debt to a trough of 60 per cent of GDP, before rising to around 80 per cent of GDP in 2062-63.

Chart 3.13: Sensitivity of public sector net debt projections to interest rates



Source: OBR

[9] BIS (2013).

Sensitivity to demographic and economic assumptions

3.85 Table 3.1 outlined the alternative population assumptions produced by the ONS. The sensitivity of our results to these assumptions, and to productivity growth of 1.7 per cent or 2.7 per cent, can be seen in Table 3.13, which shows the differences in spending and revenue compared to our central projection. Charts 3.14 and 3.15 show the impact of these changes on public sector net debt.

3.86 The demographic variants we use are the ONS's 'young age structure' and 'old age structure' scenarios. Table 3.14 and Chart 3.15 also show the ONS's migration scenarios – 'high migration', 'zero net migration' and a 'natural change' scenario which we have used for the first time this year, assuming zero gross as well as net migration. The migration scenarios are discussed further in Annex A.

3.87 The 'old age structure' scenario uses the same long-term net migration assumption as our central projection, but combined with higher life expectancy and lower fertility. This means that the population grows more slowly. Lower fertility in this scenario reduces education costs in the middle of the projections, lowering public sector net debt relative to our central projections, before pension, health and long-term care costs associated with ageing become larger and debt consequently increases faster.

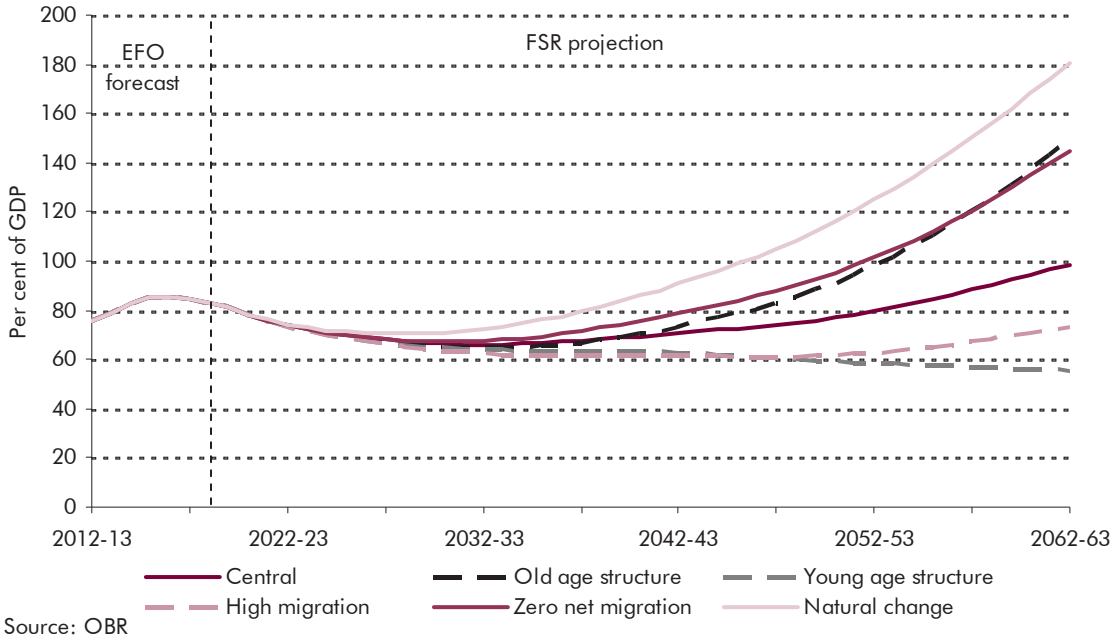
3.88 The 'young age structure' scenario combines a high migration assumption with lower life expectancy and higher fertility to yield a larger working-age population. However, the increase in the number of children adds to education costs, resulting in slightly higher spending up to the early 2040s and thus higher public sector net debt compared to the high migration scenario alone.

3.89 The productivity scenarios highlight the impact of our assumptions about the uprating of taxes and benefits. We assume all items of revenue are uprated in line with earnings in the long-term. Earnings are linked with productivity so revenue is unchanged as a share of GDP in both scenarios. However, as some spending items, such as second state pensions, are uprated with prices, these fall as a proportion of spending in the higher productivity scenario. These scenarios also assume interest rates are unchanged, which affect the debt dynamics as discussed above. Although the effects on net debt are relatively small in comparison to the other scenarios, the impact on living standards would be far greater.

Table 3.13: Spending and revenue for demographic and economic variants

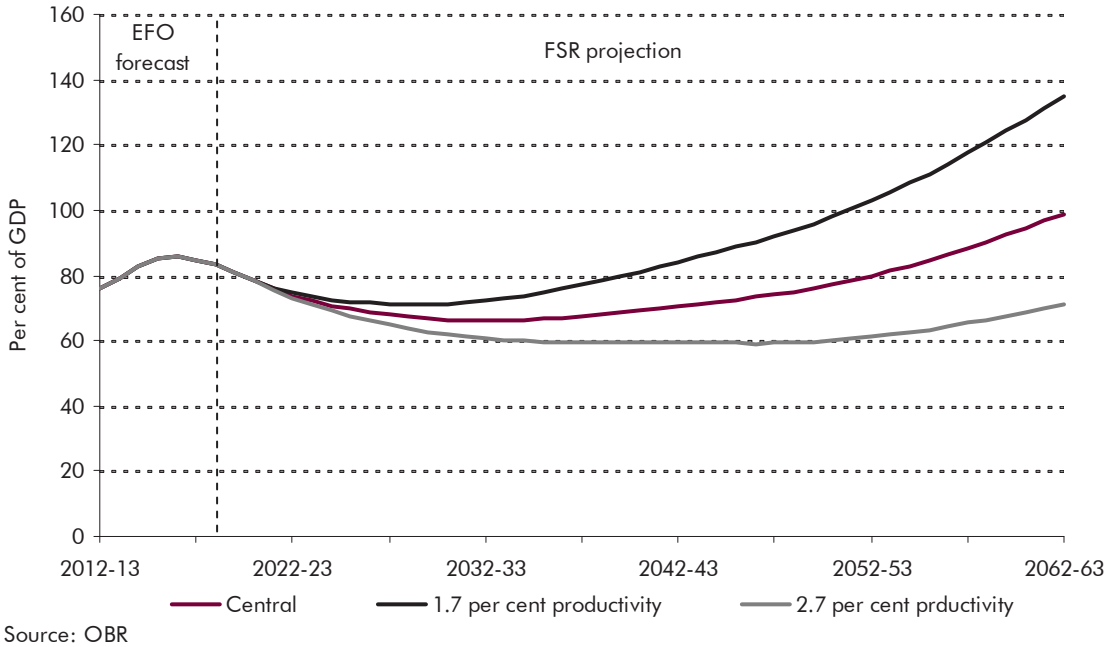
	Difference from central projection, per cent of GDP							
	EFO forecast		FSR projection					
	2012-13	2017-18	2020-21	2022-23	2032-33	2042-43	2052-53	2062-63
Old age structure								
Total managed expenditure	0.0	0.0	0.0	0.0	0.0	1.4	3.4	6.7
Public sector current receipts	0.0	0.0	0.0	0.0	0.3	0.6	0.7	0.9
Young age structure								
Total managed expenditure	0.0	0.0	0.0	-0.1	-0.3	-1.6	-3.2	-5.2
Public sector current receipts	0.0	0.0	0.0	-0.1	-0.2	-0.7	-0.9	-1.0
High migration								
Total managed expenditure	0.0	0.0	0.0	-0.1	-0.5	-1.1	-1.7	-2.0
Public sector current receipts	0.0	0.0	0.0	-0.1	-0.1	-0.2	-0.3	-0.2
Zero net migration								
Total managed expenditure	0.0	0.0	0.0	0.0	0.3	1.2	2.4	4.7
Public sector current receipts	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.5
Natural change								
Total managed expenditure	0.0	0.0	0.0	0.2	0.9	2.5	4.9	7.6
Public sector current receipts	0.0	0.0	0.0	0.1	0.1	0.4	0.7	0.7
1.7 per cent productivity								
Total managed expenditure	0.0	0.0	0.0	0.1	0.5	1.1	1.7	2.5
Public sector current receipts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.7 per cent productivity								
Total managed expenditure	0.0	0.0	0.0	-0.1	-0.5	-0.9	-1.3	-1.8
Public sector current receipts	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.1

Chart 3.14: Public sector net debt for demographic variants



Source: OBR

Chart 3.15: Public sector net debt for productivity variants



Source: OBR

Sensitivity to alternative health spending scenarios

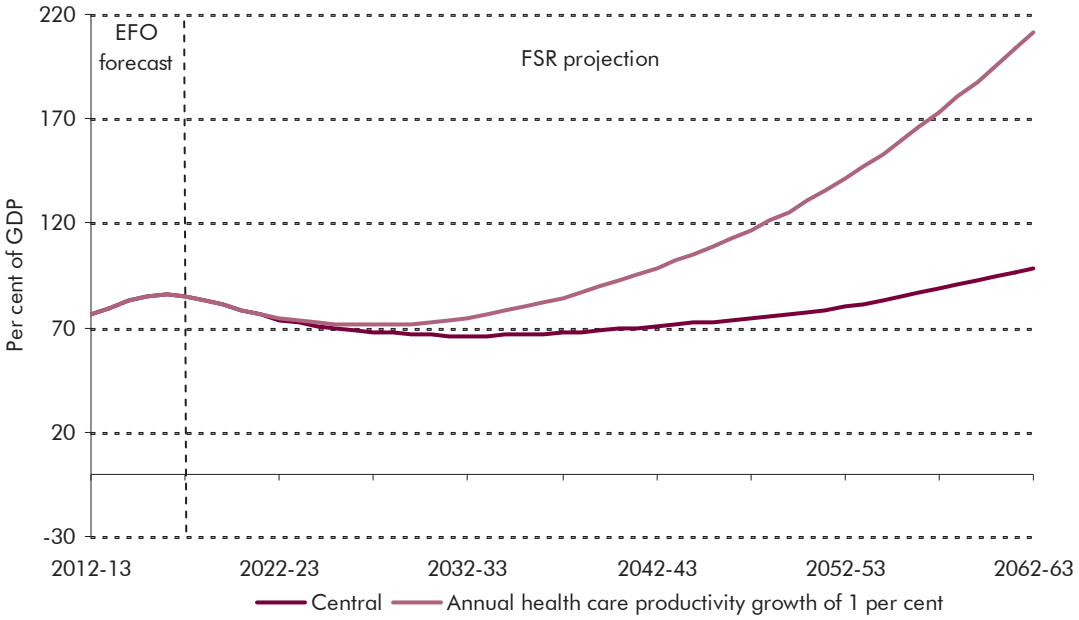
3.90 Spending on health makes the largest single contribution to the increase in age-related spending in our central projection. Given its importance, in past reports we have shown a number of alternative scenarios using different assumptions about productivity growth in the health sector and morbidity. We discussed these in detail in Annex B to last year's *FSR*. The effect of alternative morbidity scenarios on health spending is significantly smaller than the impact of alternative productivity assumptions.

3.91 If health sector productivity was assumed to rise at 2.2 per cent a year – in line with our long-term assumption for whole economy productivity – then in our central projections the level of service provided per person would implicitly rise by the same amount as output in the rest of the economy. But health care provision is relatively labour intensive and we might therefore expect productivity growth to be slower in this sector than in the economy as a whole. Yet over the long term, wages in the sector would still need to rise in line with those in the whole economy. This would lead to what is known as 'Baumol cost disease' where costs in the public sector rise relative to other sectors.[10] To maintain an increase in the level of service provided in line with increases in real output across the rest of the economy, governments would have to increase expenditure more quickly.

3.92 In last year's report we included a scenario in which health sector productivity grew by 0.8 per cent a year, in line with one estimate of average productivity growth in the healthcare sector between 1979 and 2009. The latest data show a fall in health sector productivity of 0.9 per cent in 2010, but once revisions to previous data are taken on board, the estimate for average productivity growth over the whole period increased to 1.0 per cent per year. Rolling this forward would imply that real health spending per person would need to rise to 3.4 per cent a year to increase health output by 2.2 per cent a year, in line with real earnings growth. Interpreting unchanged policy towards health spending in this way would see health spending in 2062-63 rise by around1.9 per cent of GDP relative to our central projection and would imply a significantly higher path for net debt over the projection period, as shown in Chart 3.16.

[10] Baumol (1966).

Chart 3.16: Public sector net debt assuming lower productivity in the health care sector



Source: OBR

Conclusion

3.93 The long-term projections in this chapter are highly uncertain and the results we present here should be seen as illustrative broad-brush projections rather than precise forecasts. We have illustrated some of the uncertainties through sensitivity analyses that vary key assumptions regarding demographic trends, whole economy and health sector productivity growth, interest rates and the position of the public finances at the end of our medium-term forecast.

3.94 As with our projections in previous *FSRs*, these uncertainties should not be used to disguise the fact that in most of these scenarios the public finances are projected to come under pressure over the longer term, primarily as a result of an ageing population. 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 long-term care. But the same demographic trends would leave government revenue roughly stable as a share of national income.

3.95 In the absence of offsetting tax increases or spending cuts, the pressure we have identified would eventually increase the budget deficit sufficiently to put public sector net debt on an unsustainable upward path. As discussed in previous *FSRs*, it is likely that such a path would lead to lower long-term economic growth and higher interest rates, worsening the fiscal position further. The UK is far from unique in facing such pressures.

3.96 Whilst these overall conclusions remain similar to last year, the outlook has significantly deteriorated over the medium term with public sector net debt now projected to reach 86 per cent of GDP in 2016-17, 10 per cent of GDP higher than in last year's *FSR*. By the end of the long-term horizon, net debt is 8 per cent of GDP higher in 2062-63 than projected last year at 99 per cent of GDP, reflecting the offsetting effects of an underlying deterioration and policy changes that improve the fiscal outlook.

3.97 The Government has responded to the medium-term deterioration with additional spending cuts, which become more apparent as we assume the output gap closes. The Government has also announced the introduction of Single Tier, which reduces state pension expenditure in the long term. These measures more than offset other changes, so that the primary balance is in a better position than in last year's projections.

3.98 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 5.

3.99 Before that, in Chapter 4, we look more closely at the sustainability of tax revenues. The analysis in the central projections in this chapter only considered the impact of demographic pressures on government revenues. In the next chapter we update our work on non-demographic trends that are likely to affect revenue from sources such as oil and gas revenue, and consider the effect of increasing participation rates in the over-65 age groups on income tax and NICs receipts.

4 The sustainability of tax revenues

Introduction

4.1 Our long-term projections for revenues in Chapter 3 assume a constant ratio of tax revenue to GDP, except for changes driven by demography. This approach is consistent with most international examples of sustainability analysis. In practice, as we saw in Chapter 3, the impact of demographic trends on revenues is projected to be relatively small.

4.2 In each *Fiscal sustainability report (FSR)* we also look in more detail at a variety of trends that could affect the sustainability of the tax base over time. In previous *FSR*s we have looked at technological change, resource depletion, behavioural change and the effect of globalisation on corporation tax and VAT revenues. In most cases these trends are likely to reduce the ratio of revenues to GDP over the next 20 to 30 years on current policies. Consequently we believe that governments are likely to need to find some replacement sources of revenue to keep receipts on the path shown in our central projection, let alone to meet the upward pressures on spending from an ageing population.

4.3 In this year's *FSR* we look at two revenue streams:

- we update our central long-term projection for oil and gas revenues, based on the medium-term price and production assumptions from the March 2013 *Economic and fiscal outlook (EFO)*. We illustrate the uncertainty that lies around the central projection by examining the impact of different assumptions for the path of oil prices and production levels beyond our medium-term forecast horizon; and

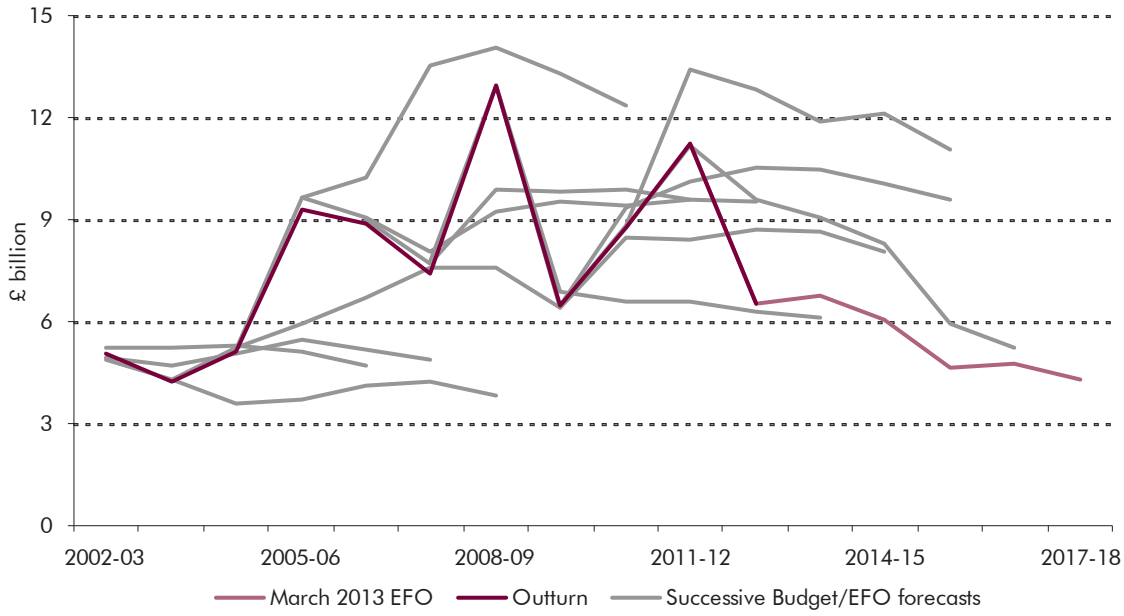
- we look at the impact of various potential structural changes in the labour market on income tax and NICs receipts. In particular we look into the effect of increased participation of the over-65s in the labour market.

Oil and gas revenues

4.4 We have published long-term projections for oil and gas revenues in both of our previous *FSR*s. In this *FSR,* we update the central projection and show the sensitivity of these revenues to different oil price and production paths. North Sea oil and gas receipts are on a long-term downward trend as the basin matures. At the same time, oil and gas revenues remain the most volatile of the main UK tax receipts. They depend on rates of production and extraction, the global dollar price of oil, the sterling/dollar exchange rate, and the level of capital and operating expenditure. And each of these determinants is relatively volatile in its own right.

4.5 Forecasting revenues in the medium term requires us to make judgements about movements these underlying determinants. Chart 4.1 shows the path of receipts against successive Budget forecasts since 2002, underlining how difficult they are to predict even over relatively short time horizons. Our medium-term forecast is used as the starting point for our long-term projections and, as a result, variations in the underlying determinants affect that starting point.

Chart 4.1: Oil and gas revenue forecasts



Source: HM Treasury, OBR, HMRC

Central projections

4.6 Total UK oil and gas production has fallen every year since 1999, with particularly steep falls of 19 per cent and 14 per cent in 2011 and 2012 respectively. Our medium-term forecast out to 2017-18 assumes that this decline

will pause over the next five years, reflecting the pay-off from recent high levels of investment. But the forecast for revenues is lower than last year's, reflecting the sharper-than-expected fall in production in 2012 and large increases in expenditure, which can be offset against tax.

4.7 Our methodology for the long-term projections remains as in previous years. We commission HMRC to run their oil and gas revenue model to extend the medium-term forecast for a further 23 years, to 2040-41. The model estimates revenues at individual field-level, based on data provided by operators. For the long-term projections, the model is augmented to allow for extra production from new incremental projects in existing fields, development of technical reserves and new exploration, in order to meet the stylised production profile.

4.8 From the end of the *EFO* horizon, we apply the following assumptions:

- oil and gas prices rise by 2.2 per cent a year from 2018 onwards, in line with the whole economy price increases assumed throughout the *FSR* projections. The starting point for oil prices in the long-term projections is around $5 a barrel lower than last year at $93 a barrel. By 2040-41, oil prices increase to around $150 a barrel (in nominal terms), somewhat lower than the $173 a barrel assumed in last year's analysis. This reflects a reduction in the assumed rate of whole economy inflation since last year, as set out in the December 2012 *EFO*. The starting point for gas prices is slightly higher than assumed in last year's *FSR*, which reflects higher wholesale prices at the time of this year's *EFO* than last year's;

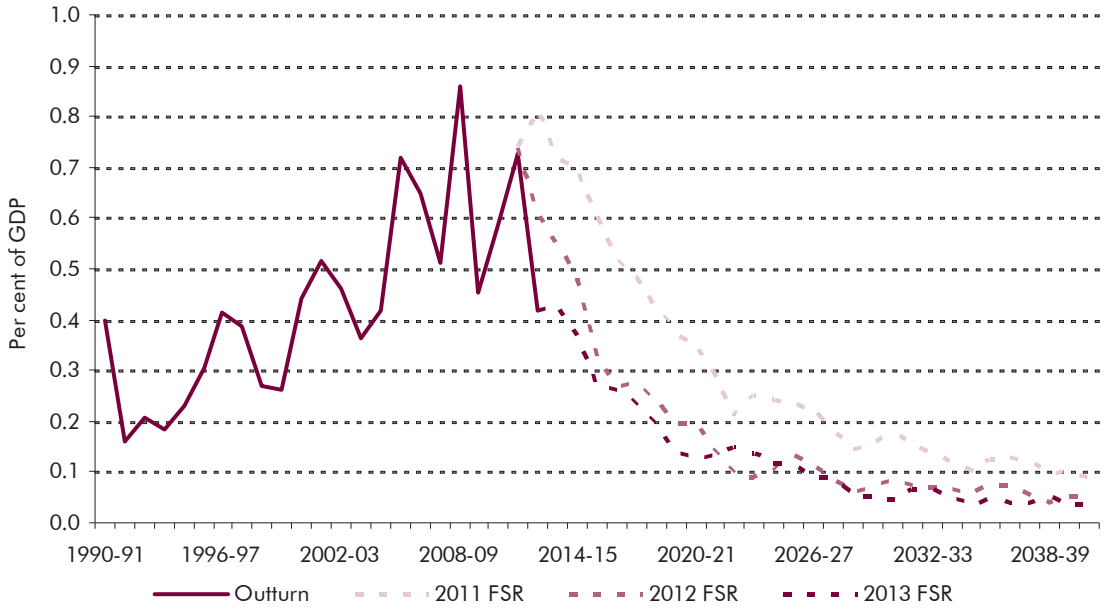
- production is assumed to fall by 5 per cent a year, as we assumed last year. This is slower than the 7.8 per cent a year average decline since 1999;

- real operating and capital expenditure are both assumed to fall in line with production; and

- decommissioning expenditure is as reported by operators.

4.9 Our long-term projections do not take account of any potential future receipts from shale gas reserves. The size of these reserves, the speed with which they might be extracted and the tax treatment of any future activity are all too uncertain for us to make meaningful projections at this stage. But shale clearly represents a significant upside risk to the long-term projections and we will incorporate its impact in our projections as soon as there is an adequate evidence base.

Chart 4.2: Oil and gas revenues



Source: HMRC, ONS, OBR

4.10 Our projections beyond the medium-term horizon are similar to last year's. Recent weak production data have prompted us to lower our medium-term forecasts, but the long-term prospects for oil and gas revenues have not changed significantly. Revenues are expected to fall to around 0.03 per cent of GDP in 2040-41, compared to 0.05 per cent last year. Between 2018-19 and the end of the projection period, total receipts are now projected at around £56 billion, compared to £67 billion last year.

4.11 Lower oil prices are one of the key drivers of the downward revisions to the projections, although this is slightly offset by an upward revision to gas prices at the last *EFO*, based on the latest data for wholesale gas prices. The lower starting point for the level of production results in lower levels across the projection, again with a negative effect on receipts. Higher levels of operating, capital and decommissioning expenditure also reduce projected revenues.

Scenarios

Price scenarios

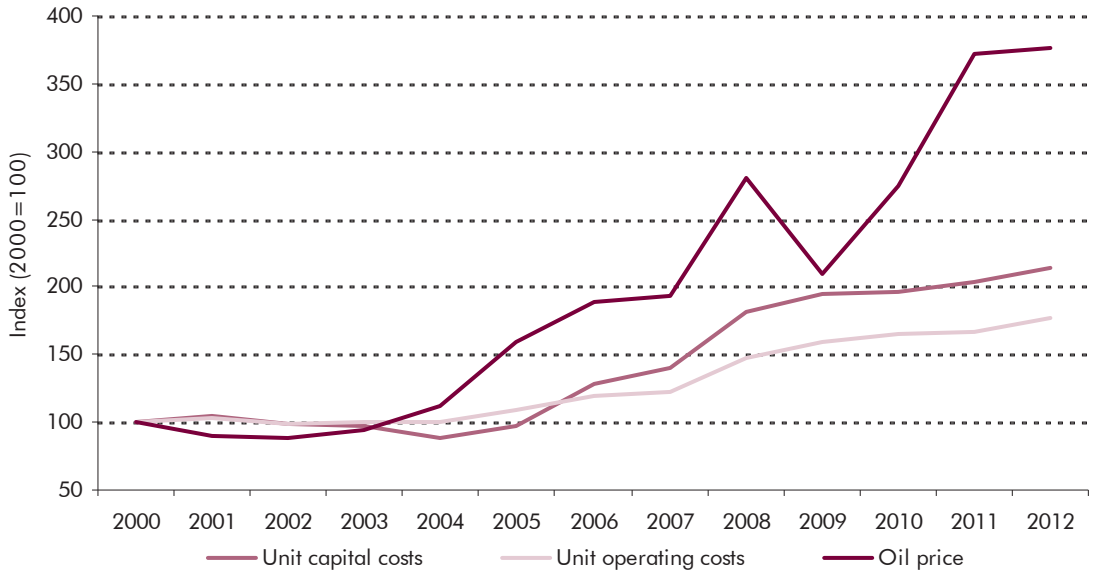
4.12 In this section we set out the sensitivity of the long-term projections to alternative paths for oil and gas prices.

4.13 Our medium-term forecast uses the oil price futures curve to project the oil price over the next five years. For our long-term projections we assume that the oil price remains flat in real terms thereafter. Oil prices are determined by a broad range of global factors, such as the growth rate of the global economy, global production levels and spare capacity, geopolitical events and speculative demand. These wide ranging factors make oil prices extremely difficult to forecast.

4.14 Our alternative price scenarios are based on the trajectories of the Department of Energy and Climate Change's (DECC) 'high' and 'low' scenarios for oil prices. In order to splice the DECC scenarios onto the medium-term price assumptions in the March *EFO,* we apply the price growth rate in each scenario to the price of $93 a barrel in 2017-18 assumed at the end of the medium-term forecast, so the levels do not necessarily coincide. As the DECC projections end in 2030, we have also extended the series using the average growth rate over the projection horizon for the final decade. Gas prices are assumed to follow a similar path to oil prices. Production is assumed to fall by 5 per cent a year, as in the central projections.

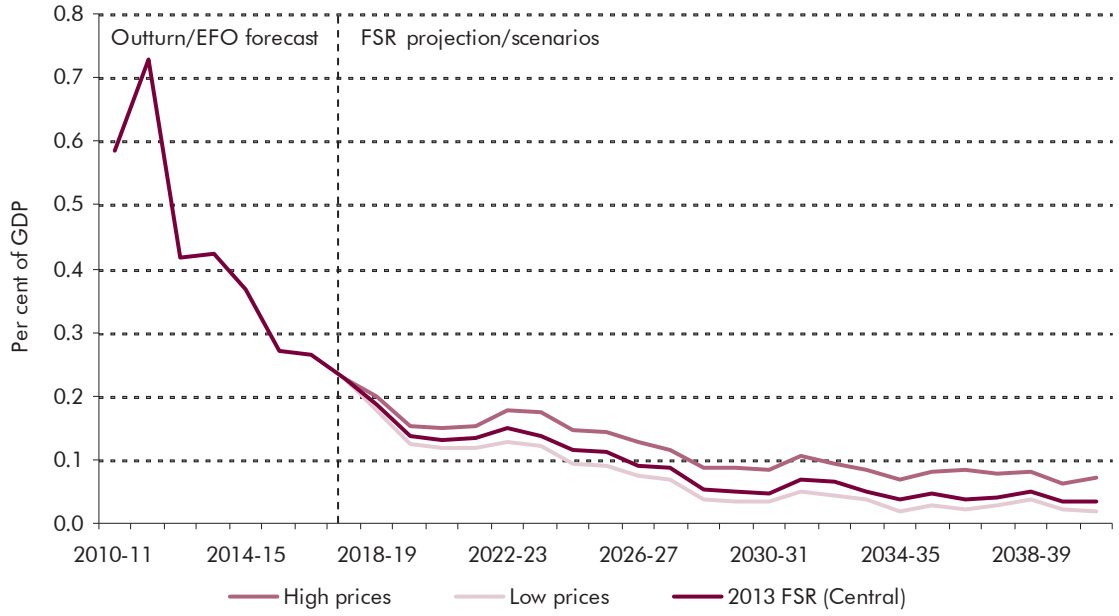
4.15 We also assume that changes in the oil price feed through to operating and capital expenditure costs. On average, unit operating and capital costs in the industry have increased at around half the rate of oil prices over the last 12 years, with the sharp run up in oil prices in 2007 and 2008 associated with a steep rise in costs. To take account of this effect, we have assumed that only around half of the increase in oil and gas prices feeds through to taxable profits and receipts in the alternative scenarios.

Chart 4.3: Oil prices and unit capital and operating costs (£ sterling terms)



Source: Thomson Reuters, IHS CERA, OBR calculations

Chart 4.4: Receipts from alternative price scenarios



Source: HMRC, OBR, ONS

4.16 By 2040-41, oil prices reach $260 a barrel in the 'high' scenario and $107 a barrel in the 'low' scenario. The 'high' scenario increases revenues by an average of 0.03 per cent of GDP over the long-term projection period and by a maximum of 0.05 per cent of GDP in any one year. Cumulatively from 2018-19 to 2040-41, this delivers £26 billion of extra revenues in the 'high' scenario and £12 billion less revenue in the 'low' scenario than the £56 billion in the central projection.

Production scenarios

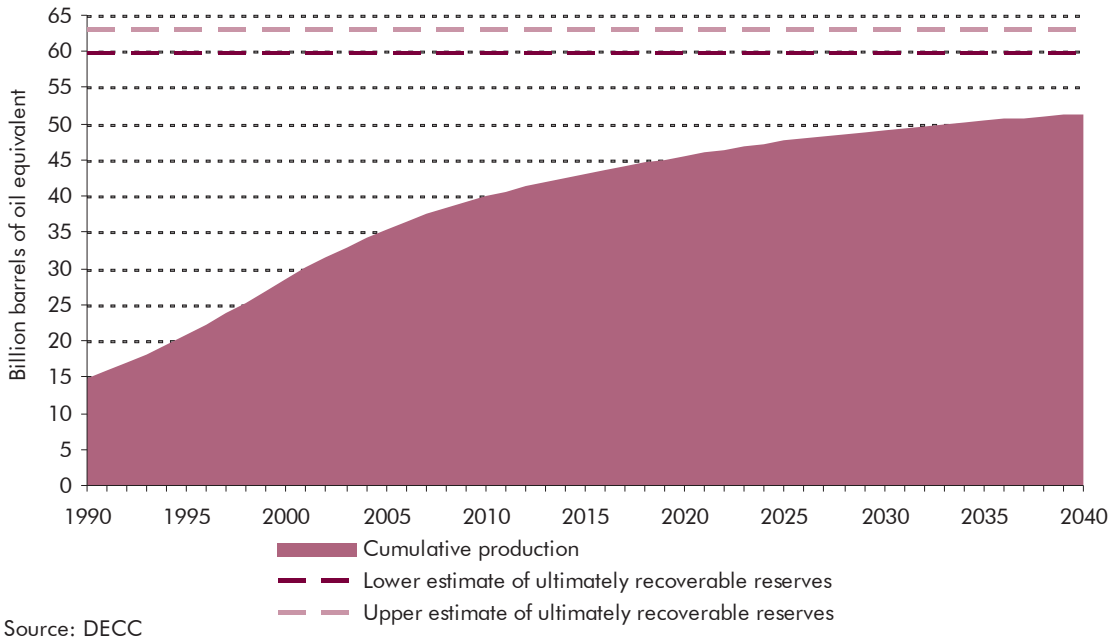
4.17 UK oil and gas production has fallen by an average of 7.8 per cent a year since 1999. Our central projection assumes a slightly slower 5 per cent a year decline from 2018-19, but we have also modelled the effects of slower and faster declines. Production could be boosted as a result of increased investment or higher oil prices increasing the viability of incremental or new field exploration. Alternatively, production could be depressed, as in recent years, by high levels of maintenance and unplanned outages. These factors have also increased volatility.

4.18 Our 'low' production scenario sees output decline at 7.5 per cent a year from the end of the medium-term forecast horizon. The 'high' production scenario sees it remaining flat for a further five years beyond the medium-term horizon, at which point – from 2023-24 – it declines at the same 5 per cent rate as in the central projection. Total production over the period to 2040-41 in the 'high' scenario

would be broadly equivalent to a rise in production to 2 million barrels of oil equivalent (boe) a day over the medium-term horizon – as forecast by the industry[1] – followed by a slightly quicker average decline than in our central projection thereafter.

4.19 The pace of production over the next two decades will depend on the total amount of ultimately recoverable reserves. Chart 4.5 illustrates the cumulative production implied by our central path of a decline of 5 per cent a year from 2018-19. As cumulative production moves closer to the current estimate of ultimately recoverable reserves we would expect production to slow, as extraction becomes increasingly difficult in maturing fields and the discovery of new fields slows. Our 'high' production scenario remains within the current lower estimate of ultimately recoverable reserves shown in the chart, suggesting very low levels of production could be maintained over a number of years after the end of our projection horizon. Such an assessment is, of course, very uncertain.

Chart 4.5: UK oil and gas reserves and production



Source: DECC

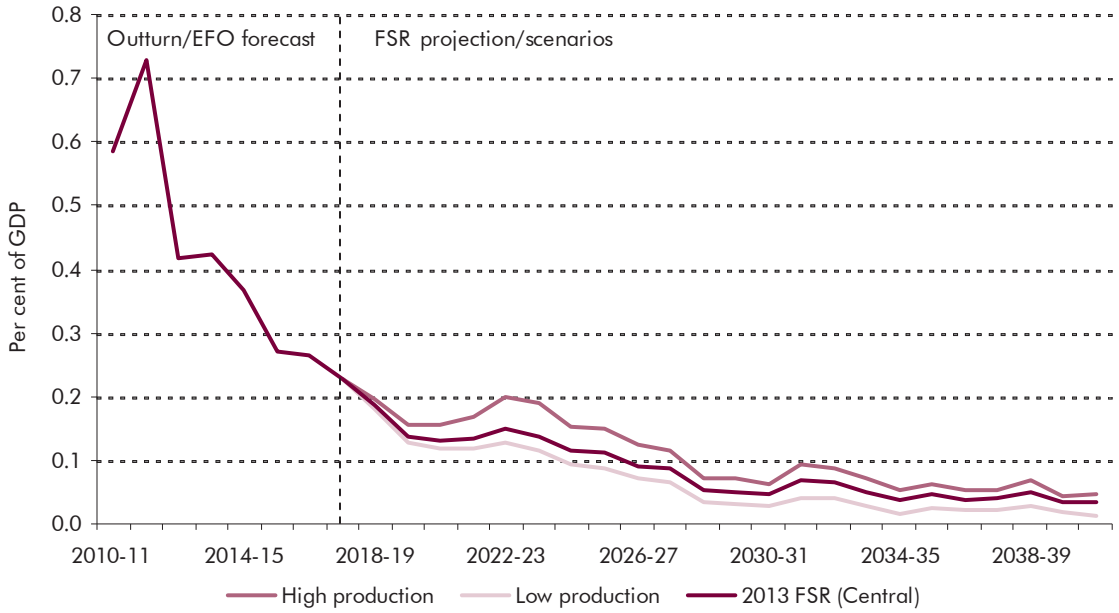
4.20 Alternative production paths are likely to have an effect on the capital and operating expenditure of producers. In the two alternative production scenarios, operating and capital expenditure are adjusted to increase or decrease at a rate consistent with the rate of production.

[1] Oil & Gas UK (2013).

4.21 Production falling by 7.5 per cent a year results in a fall of more than 80 per cent by 2040-41, to around 260,000 boe a day. Revenues in 2040-41 would be around 0.01 per cent of GDP, compared to 0.03 in the central projection. Total receipts between 2018-19 and 2040-41 would be £40 billion.

4.22 The 'high' production alternative scenario generates revenues of around 0.1 per cent of GDP on average over the whole period and a total of around £73 billion between 2018-19 and 2040-41. This scenario relies on the discovery and introduction of a greater quantity of new and incremental projects than our central scenario.

Chart 4.6: Receipts from alternative production scenarios



Source: HMRC, OBR, ONS

Table 4.1: Scenario results

	Central	Low prices	High prices	Low production	High production
Total receipts (2018-19 to 2040-41)					
£ billion	55.6	43.3	81.5	40.0	73.0
Difference from central projection	-	*-12.3*	*25.9*	*-15.6*	*17.4*
Total receipts (average 2018-19 to 2040-41)					
Per cent of GDP	0.08	0.07	0.11	0.06	0.11
Difference from central projection	-	*-0.02*	*0.03*	*-0.02*	*0.02*

Conclusion

4.23 Oil and gas receipts are the most volatile revenue stream in the UK public finances and forecasting them over even very short horizons is fraught with difficulty. Our short-term forecasts over the last three years have tended to be too high, mostly as production has fallen short of expectations.

4.24 Over the longer term, we can be more confident that oil and gas receipts are on a declining trend as total production from the UK continental shelf moves towards its ultimately recoverable capacity, although the potential exploitation of shale gas offers a significant but as yet unquantifiable upside risk to this path. But the same factors that make North Sea receipts volatile on a year-to-year basis make it very hard to predict the pace of the trend decline with any confidence. The production and price variants in this chapter give some idea of the main uncertainties.

The labour market and personal taxes

4.25 In 2012-13, income tax and NICs accounted for around 45 per cent of total public sector current receipts. A variety of demographic and non-demographic factors could affect income tax and NICs receipts as a proportion of GDP. Changes in the distribution of income, changing patterns in modes of employment, the structure of the labour force and the structure of the tax system itself could have wide-ranging positive or negative effects on receipts.

4.26 Changes in the structure of employment are important for income tax and NICs receipts because some modes of employment, such as part-time and self-employed jobs raise less tax overall for the Exchequer than full-time, employee jobs. So there may be downward pressure on personal tax receipts if the long-term trend increases in these modes of employment are the result of switches from full-time employment.

4.27 The distribution of income is important because the progressivity of the tax system means that higher incomes are taxed at a higher rate. In previous *FSR*s, we have discussed the effect of globalisation on the distribution of income and tax revenues. A combination of increased specialisation within the world economy and advances in technology has increased the premium on skills, helping drive shifts in the income distribution. As the proportion of people earning higher incomes increases, the average tax rate on total labour income increases, all else equal.

4.28 In addition, 'fiscal drag' will also increase revenues. When earnings increase faster than tax thresholds, more income falls within higher tax brackets and the

average tax rate increases. In Chapter 3, we illustrate the effect of fiscal drag on income tax and NICs revenues.

4.29 In the remainder of this section, we focus on recent increases in the rate at which the over-65s participate in the labour market. Chapter 3 shows that income tax revenue is projected at 10.5 per cent of GDP in 2020-21. Income tax revenues would be expected to increase as a share of GDP as the ageing population increases the number of people in retirement, because older age groups usually continue to pay income tax on pensions (as well as paying taxes on their spending), even though most of their income does not directly contribute to GDP. Meanwhile, increases in the State Pension Age (SPA) are expected to lead people to remain in the labour market for longer on average. This increases income tax receipts in cash terms, but is likely to reduce them as a share of GDP – older workers tend to have lower average tax rates than the rest of the population, reflecting the types of work they do, their employment status and the hours they work.

Older-age participation

4.30 Since the late 1990s, there has been a steady increase in labour market participation and employment amongst people aged 65 or over. Whilst increases in the SPA would increase the number of over-65s in the labour market, they might also be influenced by the need to continue working if they cannot afford to retire or want to boost retirement income to maintain living standards, facilitated by increased healthy life expectancy.

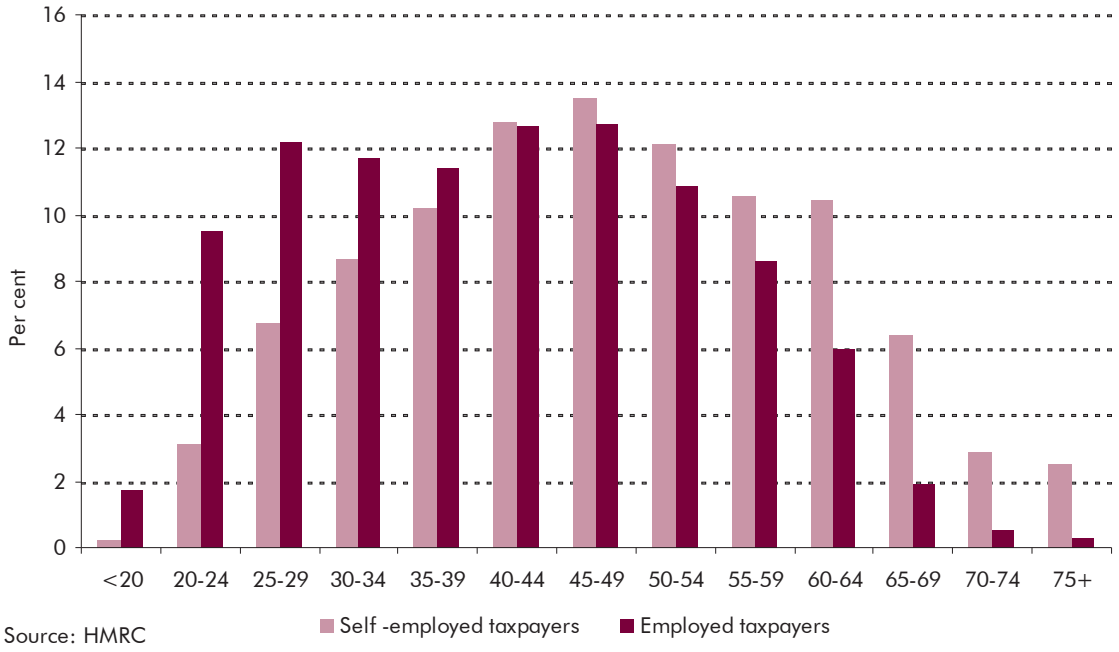
Chart 4.7: 65+ employment rate

Source: ONS

4.31 An increase in the economic activity rate given by an increase in participation of a higher proportion of over 65s would have a positive effect on economic growth – as more people contribute to output – and tax receipts. However, older workers are also more likely to work in part-time jobs or in self-employment. The latest ONS *Pension Trends* reported that 67.2 per cent of people in employment over the SPA worked part-time (compared to 25.5 per cent of the 16-65 population) and 31.3 per cent were self-employed (compared to 13.5 per cent of the 16-65 population) in mid-2012.[2] Chart 4.8 shows the distribution of taxpayers who are employed and self-employed by age group. The proportion of self-employed taxpayers at older ages, and particularly over 60, is much higher than those in employment. Older people may prefer to be self-employed for a number of reasons, such as the relative flexibility in the amount of hours worked.

[2] ONS (2013c).

Chart 4.8: Distribution of taxpayer by type of employment and age group



Source: HMRC

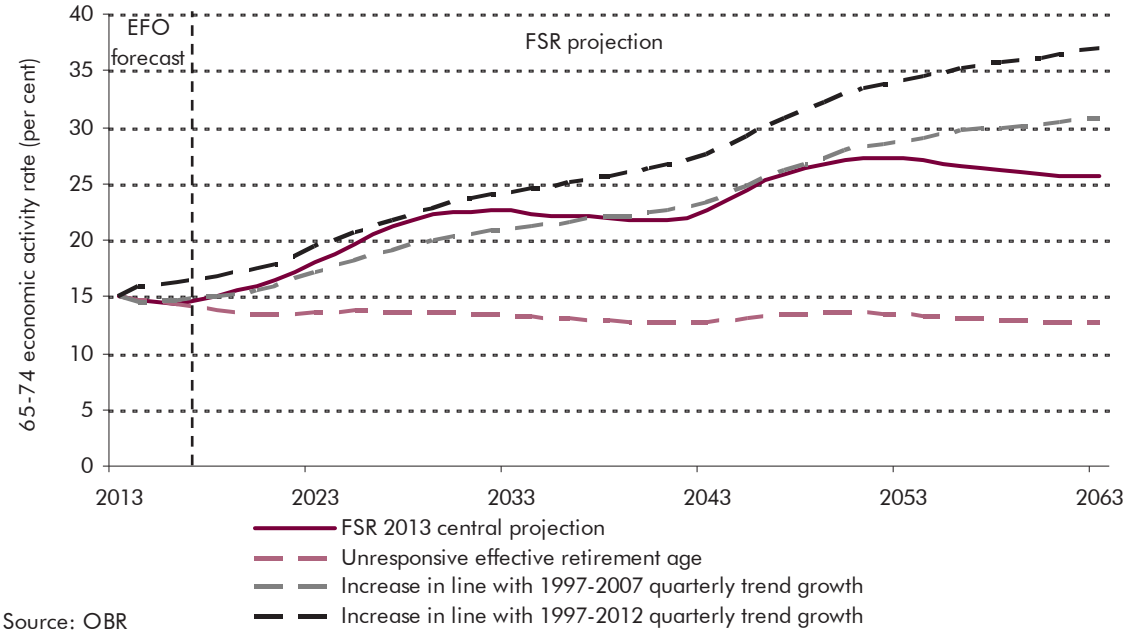
4.32 As the average tax rate from part-time jobs and self-employment is likely to be lower than the rate that would be expected from full-time employment, an increase in the number of older people working in these modes of employment is likely to lower the average tax rate overall. Average tax rates in self-employment and part-time jobs are lower because average incomes are lower, which may reflect a number of factors from productivity and hours differentials to the proportion of income declared as taxable. In addition, the average tax rate is lower because people over the age of 65 are not required to pay NICs.

Scenarios

4.33 The following scenarios analyse the sensitivity of the revenue forecasts in the central projections to alternative assumptions on participation rates for those aged 65-74. Chart 4.9 outlines the alternative activity rate scenarios.

4.34 In our central scenario, the increase in economic activity amongst 65-74 year olds in the long term is driven predominantly by the announced increases in the SPA to 68 between 2044 and 2046, based on the assumption that for those affected, the change will start to influence their participation rates 10 years prior to the change. Activity rates are expected to increase from 15.0 per cent in 2013-14 to 25.7 per cent in 2062-63.

Chart 4.9: 65-74 economic activity rate scenarios



Source: OBR

4.35 We can see the impact of the higher SPA by comparing the activity rates in the central scenario to those we would expect if the effective retirement age – the age at which people actually retire, as opposed to the age at which they become entitled to their pension – was not affected by the increase in the SPA from 65. The economic activity rate for 65-74 year olds would remain broadly flat at between 12 and 13 per cent – 13 percentage points below our central projection by 2062-63.

4.36 Our other scenarios assume that older worker participation rates increase in line with recent trends, increasing in line with quarterly growth rates between 1997 and 2007 in one scenario and between 1997 and 2012 in the other. We have used the trend growth in participation up to 2007 as one of the scenarios to exclude any potential cyclical impact of the recession on older worker participation. Both scenarios result in higher activity rates in 2062-63 than our central scenario – 5.1 percentage points higher in 2062-63 using the 1997 to 2007 trends; and 11.2 percentage points higher using the 1997 to 2012 trends.

4.37 The sensitivity of our economic growth forecasts to our assumptions on the 65-74 participation rate is shown in Table 4.2. In the 'unresponsive effective retirement age' scenario, the older worker participation and employment rates fall to 13.0 and 12.7 percentage points respectively below our central projection in 2062-63. This has a negligible impact on the average annual GDP growth rate, but the cumulative impact over 50 years is to reduce the level of GDP by 2.9 per cent relative to our central projection.

Table 4.2: Economic activity rate, employment and economic growth for old age participation variants

	Difference from central projection, percentage points unless stated otherwise					
	EFO forecast	FSR projection				
	2017-18	2020-21	2030-31	2040-41	2050-51	2062-63
Unresponsive effective retirement age						
65-74 activity rate	-0.6	-2.4	-8.8	-9.0	-13.6	-13.0
65-74 employment rate	-0.6	-2.4	-8.6	-8.8	-13.2	-12.7
Real GDP growth	-0.1	-0.1	-0.1	0.0	-0.1	0.0
Real GDP (central projection = 100)	99.9	99.5	98.1	98.0	97.2	97.1
Increase in line with 1997-2007 quarterly trend growth						
65-74 activity rate	0.1	-0.3	-2.1	0.7	0.7	5.1
65-74 employment rate	0.1	-0.3	-2.1	0.7	0.7	5.0
Real GDP growth	-0.1	0.0	0.0	0.1	0.0	0.1
Real GDP (central projection = 100)	100.0	99.9	99.5	100.2	100.1	101.2
Increase in line with 1997-2012 quarterly trend growth						
65-74 activity rate	1.8	1.6	0.9	4.5	5.7	11.2
65-74 employment rate	1.7	1.5	0.9	4.4	5.6	10.9
Real GDP growth	0.0	0.0	0.1	0.1	0.1	0.1
Real GDP (central projection = 100)	100.4	100.3	100.2	101.0	101.2	102.5

4.38 Our sensitivity analysis looks at the effect on income tax and NICs revenues by projecting forward the over-65 participation rate based on the scenarios set out above. We assume that the proportion of self-employed and employed taxpayers over 65, as identified by HMRC's Survey of Personal Incomes, remains constant over the projection period. We then apply this to the average tax rate and median income to estimate the income tax paid by taxpayers in this age group. These projections will, of course, be sensitive to the choice of average tax rate. As mentioned above, the average tax rate is likely to be lower for older age workers because of their likely modes of employment. However, if older age workers remain in the labour market for longer in full-time jobs then their average tax rate will be higher, further boosting tax revenues.

4.39 The sensitivity of our revenue forecast to the 65-74 participation rate assumption is shown in Table 4.3. It shows that our NICs receipts forecast is less sensitive to the changes in older worker participation than our income tax forecast, as older workers are not required to pay employee NICs on their income. An increase in over-65 employment would only generate increases in NICs revenue through employers' contributions. In the 'unresponsive effective retirement age' scenario, lower older worker participation reduces income tax and NICs receipts by £22.1 billion compared to our central projection by 2062-63.

4.40 In the scenarios driven by recent trends, higher older worker participation in the long term increases income tax and NICs receipts by £8.8 billion and £19.1

billion respectively by 2062-63, compared to our central projection. The additional receipts in these scenarios are much less than the change in GDP brought about by the increase in participation, resulting in a lower income tax and NICs to GDP ratio. In neither case would the effects be large enough to materially affect the long-term path of the public finances set out in our central projections in Chapter 3.

Table 4.3: Revenue projections for old age participation variants

	Difference from central projection, £ billion in nominal terms unless stated otherwise					
	EFO forecast	FSR projection				
	2017-18	2020-21	2030-31	2040-41	2050-51	2062-63
Unresponsive effective retirement age						
Income tax receipts	-0.1	-0.3	-2.1	-3.5	-7.7	-13.9
NICs receipts	0.0	-0.2	-1.3	-2.1	-4.5	-8.2
Total receipts	-0.1	-0.5	-3.4	-5.5	-12.2	-22.1
Additional receipts as % of GDP	0.0	0.0	-0.1	-0.1	-0.1	-0.1
Increase in line with 1997-2007 quarterly trend growth						
Income tax receipts	0.0	0.0	-0.5	0.3	0.4	5.5
NICs receipts	0.0	0.0	-0.3	0.2	0.2	3.3
Total receipts	0.0	-0.1	-0.8	0.4	0.7	8.8
Additional receipts as % of GDP	0.0	0.0	0.0	0.0	0.0	0.1
Increase in line with 1997-2012 quarterly trend growth						
Income tax receipts	0.2	0.2	0.2	1.8	3.2	12.0
NICs receipts	0.1	0.1	0.1	1.0	1.9	7.1
Total receipts	0.3	0.3	0.3	2.8	5.2	19.1
Additional receipts as % of GDP	0.0	0.0	0.0	0.0	0.1	0.1

Conclusion

4.41 There has been a steady increase in labour market participation and employment amongst people aged 65 or over in recent years, and we expect the trend to continue in the long term as State Pension Age and older people's ability and need to continue work increase. It is difficult to predict the responsiveness of the effective retirement age to increases in State Pension Age, and as the variants in this chapter showed, our tax revenue projections are somewhat sensitive to the assumption on older worker participation. The 'unresponsive effective retirement age' scenario in this chapter shows the maximum downside risk of this variable on our revenue projection, while the other scenarios give some idea of the sensitivity of our revenue projections to this assumption. The potential effects are modest relative to the other uncertainties surrounding our central projections.

5 Summary indicators of fiscal sustainability

Introduction

5.1 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 central projection shows that public sector net debt and debt interest would eventually rise continuously as a share of GDP, due largely to the prospective ageing of the population.

5.2 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

The inter-temporal budget gap

5.3 Most definitions of fiscal sustainability are built on the concept of solvency – the ability of the government to meet its 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 and eventually pay off its outstanding debt. 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 existing debt plus the present value of all its future spending.

5.4 In the event that a government is not on course to satisfy the inter-temporal budget constraint, the 'inter-temporal budget gap' is a measure of the immediate and permanent increase in taxes and/or cut in public spending as a share of GDP that would put the government back on course.

5.5 The primary balance required to satisfy the inter-temporal budget constraint depends crucially on the size of the gap between the real interest rate that the government has to pay on its debt and the long-run growth rate of the economy.

The higher the interest rate, the quicker debt will accumulate; the higher the growth rate, the easier it is to service and pay it off. If the interest rate paid on government debt remains below the rate of growth, as in most of the years following World War II (see Box 5.1), then net debt would still fall as a share of GDP even if the government were to run a primary budget deficit.

5.6 Conversely, if the interest rate exceeds the economic growth rate (as it is normally assumed to do) 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 service and pay off the debt it has already accumulated. The greater the amount by which the interest rate exceeds the growth rate, the bigger the primary surplus required.

5.7 In our central projections, we assume that the long-run real interest rate is marginally above the long-term growth rate of the economy (5.0 per cent versus 4.7 per cent). This implies that only small permanent primary surpluses are required to stabilise the debt to GDP ratio.

5.8 As the inter-temporal budget gap is calculated from revenue and spending flows over an infinite time horizon, we have to make some assumption about their behaviour beyond our 50-year projection horizon – for simplicity, we hold them constant as proportions of GDP after 2062-63.

5.9 In the projections we report here, we assume that tax and spending policy evolves as currently announced over the five years of the *EFO* medium-term forecast horizon. So we calculate the inter-temporal budget gap for a policy change implemented immediately thereafter, in 2018-19. On this basis, the UK's inter-temporal budget gap is currently equal to 1.9 per cent of GDP. In other words, under our central projections the government would need to increase taxes and/or cut spending permanently by 1.9 per cent of GDP (around £29 billion in today's terms) from 2018-19 onwards to satisfy the inter-temporal budget constraint with an immediate and permanent adjustment. It should be emphasised that this would be an additional tightening after and on top of the fiscal consolidation programme that is already in train up to 2017-18, which improves the primary balance by 9.8 per cent of GDP between the peak deficit in 2009-10 and 2017-18. The equivalent figure for the UK's inter-temporal budget gap in last year's *FSR* was 2.6 per cent of GDP. The reduction of 0.7 per cent of GDP since last year reflects a number of offsetting factors, the largest of which is the reduction that stems from the additional spending cuts the Government has pencilled in for 2017-18, the final year of our medium-term forecast.

5.10 The European Commission (EC) regularly calculates the inter-temporal budget gap for EU member countries, referring to it as its 'S2 indicator'. The Commission's latest estimate for the UK, published last year, was 5.2 per cent of

GDP, well above the EU average of 2.6 per cent of GDP.[1] This figure is much larger than our estimate, mainly because our calculation includes the impact of the medium-term consolidation measures in the pipeline for the next five years; the Commission took no account of measures taking effect beyond 2014. The IFS estimates that fiscal consolidation measures will improve the primary balance by 3.3 per cent of GDP between 2014-15 and 2017-18, which suggests that our estimate is broadly in line with the EC's on a comparable basis. The EC figure is also calculated for the general government gross debt ratio, which is used in the Maastricht criteria, rather than the public sector net debt ratio that we focus on.

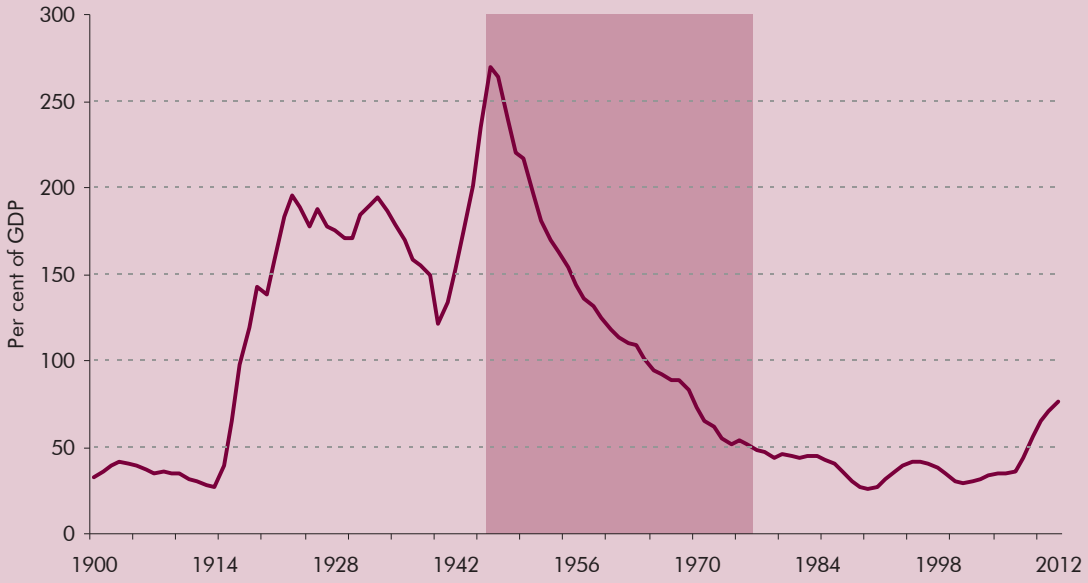
5.11 The inter-temporal budget constraint has the advantage of theoretical rigour, but it also has significant limitations as a practical guide to policy. For example, it assumes that governments will eventually wish to eliminate their debt entirely, which relatively few have expressed a desire to do. Revenue and spending projections over 50 years are uncertain enough; projections over an infinite horizon are clearly far more so. The inter-temporal budget constraint might also be thought insufficiently constraining, because rather than being met through an immediate and permanent adjustment, it 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. 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'.

[1] European Commission (2012).

Box 5.1: Post-World War II debt reduction

Shortly after the end of the Second World War, UK government debt peaked at around 270 per cent of GDP. Over the subsequent three decades, the debt ratio fell steadily to around 50 per cent of GDP (Chart A). Given the current high ratio of public debt to GDP in the UK and many advanced economies, it is interesting to note the factors that accounted for the reduction in the public debt burden over this period.

Chart A: UK national debt 1900-2012



Source: IMF, ONS

Over the 30 years from 1946, national debt increased from £27 billion to £64 billion in nominal terms. That £37 billion increase was almost entirely due to the issuance of fresh debt to cover interest payments over the period, as successive governments ran a cumulative primary (i.e. non-interest) surplus of £7.6 billion over this period, averaging 1.6 per cent of GDP a year. Both non-interest spending and receipts were broadly flat as a share of GDP over most of the 30 years.

In nominal terms, GDP grew by 8.8 per cent a year on average over this period, comprising 2.3 per cent average annual real GDP growth and a 6.5 per cent average annual rate of whole economy inflation. The growth rate of nominal GDP was higher than the 3.6 per cent average effective interest rate paid by the government on public debt. This large average difference meant that the debt ratio would have fallen as long as the primary balance was in deficit by no more than 6.4 per cent of GDP on average, though that average disguises a very wide range from year to year.

The interest rate on government debt was also lower than the inflation rate in 24 of the 30 years, notably when inflation was particularly high. The persistence of these negative real interest rates in part reflected 'financial repression' – in other words, that the interest rates at which the government could borrow were held below inflation by a

number of institutional and policy factors.[a] Among them was the Bretton Woods system, which featured restrictive exchange rate controls and a fixed exchange rate. Quantity and price controls on domestic bank lending also encouraged domestic financial institutions to invest in government debt.

When the percentage increase in nominal debt caused by interest payments is lower than the percentage increase in nominal GDP from economic growth, the 'snowball' effect on the public debt to GDP ratio is to reduce that ratio. In nominal terms, debt increased by 137 per cent over the 30 years, but nominal GDP increased by more than 1,200 per cent in the same period. This reduced the debt ratio by four-fifths of its original level to less than 50 per cent of GDP (Table A).

Table A: The UK debt and GDP profile in 1946 and 1976

	£ billion, unless otherwise stated	
	1946	1976
Debt	27	64
GDP	10	131
Debt (per cent of GDP)	270	49

[a] See Reinhart and Sbrancia (2011).

Fiscal gaps

5.12 Rather than looking over an infinite horizon, as the inter-temporal budget gap does, 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 certain, pre-determined debt to GDP ratio in a specified year.

5.13 One of the main strengths of fiscal gaps is that they are intuitive and can be interpreted easily in the context of some policy rules, such as the Maastricht debt criterion of 60 per cent of 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. 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.

5.14 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.

5.15 Table 5.1 shows fiscal gap calculations for the productivity, population and health care variants discussed in Chapter 3. As with the inter-temporal budget gap calculation, the primary balance necessary to stabilise debt as a share of GDP depends crucially on the difference between the real interest rate and the

long-term economic growth rate. We therefore show the gaps not only for our central assumption that the long-run real interest rate exceeds the economic growth rate by 0.3 percentage points, but also under alternative assumptions where the interest rate is 1 percentage point higher or lower relative to the long-term economic growth rate.

Table 5.1: Fiscal gap estimates

	Adjustment in primary balance, per cent of GDP			
Target year	2062-63	2062-63	2062-63	2052-53
Target debt to GDP ratio (per cent)	20	40	60	40
Central projection	1.7	1.2	0.8	1.1
Interest rate 1 ppt higher	1.8	1.5	1.1	1.3
Interest rate 1 ppt lower	1.5	1.0	0.5	0.9
Gradual progress[1]	0.6	0.5	0.3	0.5
Low productivity	2.2	1.8	1.4	1.6
High productivity	1.2	0.7	0.3	0.6
High migration	1.2	0.7	0.3	0.7
Zero net migration	2.4	2.0	1.6	1.6
Natural change only	3.0	2.6	2.3	2.2
Old age structure	2.6	2.2	1.8	1.6
Young age structure	0.8	0.4	-0.1	0.5
Increased health spending[2]	4.0	3.6	3.2	2.8

[1] Adjustment required each decade.

[2] Real health spending per capita growth of 3.4 per cent a year, equivalent to annual productivity in the health care sector of 1 per cent.

5.16 The table shows that to return the debt to GDP ratio to its pre-crisis level of around 40 per cent of GDP in 2062-63 would require a permanent increase in taxes and/or cut in spending of 1.2 per cent of GDP (£19 billion in today's terms) in 2018-19 or a series of tax increases or spending cuts worth an additional 0.5 per cent of GDP (£7 billion) each decade. Targeting debt ratios of 20 and 60 per cent of GDP would require larger and smaller adjustments respectively. With the profile of debt across the projection horizon reasonably flat this year, the fiscal gaps applied a decade earlier show only small differences relative to 2062-63.

5.17 The adjustment to hit any given debt target would be larger if the long-term interest rate were to exceed the economic growth rate by more than we assume in our central scenario, or if productivity growth were slower, or if the age structure were older than in our central projection. Of the scenarios we show in Table 5.1, by far the biggest adjustment would be required where we assume that 'unchanged policy' is consistent with real health spending per capita growing at 3.4 per cent a year rather than the 2.2 per cent assumed in our central projection due to lower health sector productivity growth. In this case, the required adjustment to get debt back to 40 per cent of GDP would be a one-off 3.6 per cent of GDP from 2018-19, or 1.3 per cent of GDP each decade.

5.18 The European Commission also calculates fiscal gap measures for EU members. Its 'S1 indicator' is the change in the primary balance required by 2020 to stabilise general government gross debt at the Maastricht ceiling of 60 per cent of GDP in 2030. The Commission's estimate puts the S1 indicator at 5.0 per cent of GDP for the UK, well above the EU average of 1.8 per cent of GDP. Our own projections would give an estimate of 1.6 per cent of GDP, implemented in 2020-21. As with the inter-temporal budget gap, our estimate is much smaller than the Commission's because we are looking at the adjustment required above and beyond the current consolidation plans out to 2017-18.

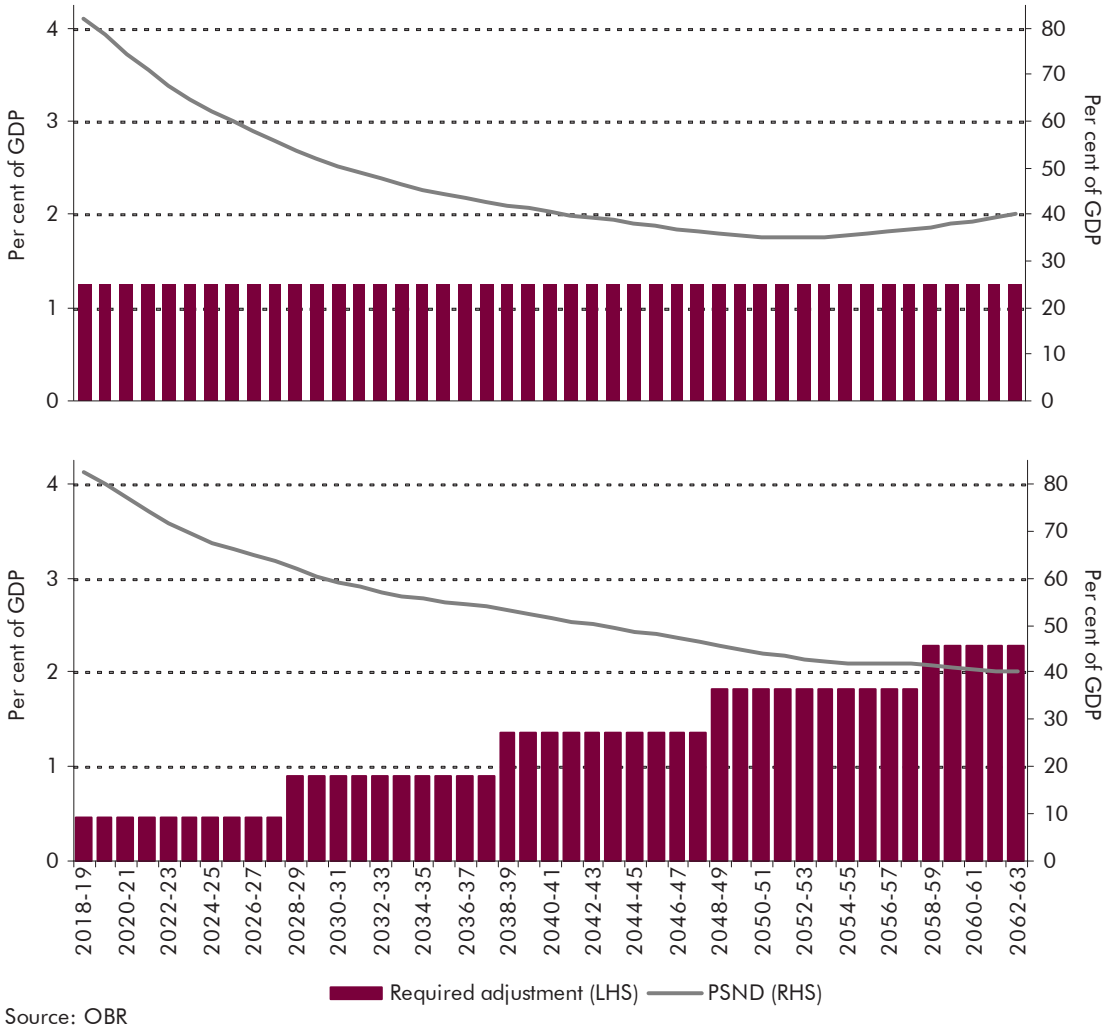
5.19 Chart 5.1 illustrates the difference that the choice between a one-off permanent adjustment and (an initially smaller, but ultimately larger) cumulative decade-by-decade adjustment makes to the path of net debt en route to the target:

- a once-and-for-all policy tightening of 1.2 per cent of GDP in 2018-19 would see the debt ratio fall through 40 per cent of GDP in the mid-2040s, reach a trough of 35 per cent of GDP in the early 2050s and then rise back to 40 per cent of GDP in 2062-63. But the tightening would be smaller than the 1.9 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; and

- tightening policy by 0.5 per cent of GDP a decade would see the debt ratio fall more slowly to begin with, reaching 40 per cent in 2062-63 without having fallen below that level beforehand. By the target date, the cumulative tightening since 2018-19 would have reached over 2 per cent of GDP, which is larger than the tightening required to stabilise the debt ratio and so debt would fall gradually beyond the target date.

5.20 The 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 recent 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 bigger spending cuts and tax increases.

Chart 5.1: Alternative adjustments to the primary balance and the implied path of net debt if targeting a debt to GDP ratio of 40 per cent in 50 years



Source: OBR

Conclusion

5.21 In our central projection, as well as under several of the variants we calculated 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 same would also be true of most advanced economies, as the fiscal challenges of an ageing population and non-demographic pressures on health spending are common to many.

5.22 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 a sustainable position might be. The Government has no long-term target for the debt to GDP ratio and indeed there

is no consensus regarding an optimal ratio or how quickly one 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, rather than 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.

5.23 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 fiscal tightening beyond the current consolidation plan for the next five years in order to address the fiscal costs of an ageing population and perhaps upward pressures on health spending.

5.24 That said, our findings should not be taken to imply that the Government necessarily needs to achieve a bigger tightening over the next five years than it already plans to. However, policymakers and would-be policymakers should certainly think carefully about the long-term consequences of any policies they introduce in the short term. And they should give thought too to the difficult choices that will confront them once the current consolidation is complete.

A The impact of inward migration in the long-term projections

A.1 The long-term projections in our *Fiscal sustainability report* (*FSR*) reflect projected changes in the population structure, by applying lifetime profiles of receipts and expenditure. As a consequence, assumptions on migration levels and the demographic and economic characteristics of migrants are crucial in assessing the long-term evolution of the economy and the public finances.

A.2 In all our projections, natives and migrants[1] are assumed to have the same fertility, labour participation and productivity rates, although the age structure of the net migrant inflow is different from the UK population. These are simplifying assumptions, implicit in the ONS population projections that we use, or in our mechanistic approach to modelling long-term trends.

A.3 This annex assesses our long-term assumptions on the characteristics of non-UK born individuals against recent outturn data. More specifically, we compare our simple assumptions on migrants' characteristics with recent outturn evidence on annual net migration levels, age distribution and fertility rates. We also present some literature on migrants' performance in the labour market and their contribution to productivity. We focus more on migrant inflows than outflows, reflecting the richer literature and data available for the former.[2] The last section shows the sensitivity of our central projections to different assumptions on migration levels.

[1] In this document we use the UN recommended definition of a long-term international migrant, also adopted by the ONS. That is someone who changes his or her country of usual residence for a period of at least a year, so that the country of destination effectively becomes the country of usual residence.

[2] For an analysis on UK emigration flows see Sriskandarajah and Drew (2006) or Hatton and Tani (2005).

Migration flows and population projections

Migration levels

A.4 Since the oil crisis of the 1970s, the UK has changed from being a country characterised by net emigration to one characterised by net immigration. This trend of increased inward migration is true of OECD countries as a whole, which have seen both rising immigration and net inward migration since the early 1980s. In the decade since the mid-1990s, most of the rise in immigration to the UK has come from the Asian Commonwealth, 'other Asia' and the EU8 countries[3] (Mitchell et al., 2011). The recent recession has led to some decrease in EU8 immigration to the UK, although the overall stock of migrants from most EU8 countries continued to grow even during the recession (McCollum and Findlay, 2011).

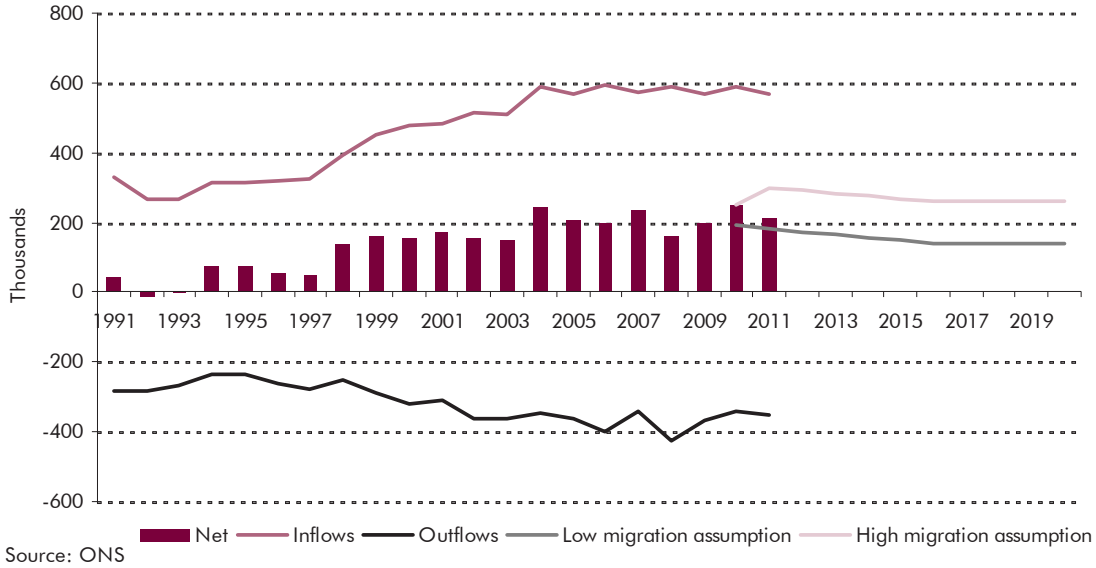
A.5 Chart A.1 shows the latest data on migration inflows and outflows and the ONS assumptions on long-term net migration underlying our projections. Long-Term International Migration (LTIM) data[4] show that between 2002 and 2011 average net migration has been just above 200,000 a year. This represents a considerable increase in migration flows – both inward and outward – relative to the previous decade, when average net inward migration was 87,400 a year.

A.6 As with last year's *FSR*, we use the ONS 'low migration' variant for our central projections. This assumes that net inward migration will stabilise at 140,000 a year from 2016 onward. This is lower than the ONS principal assumption of 200,000 based on recent demographic trends. We use the 'low migration' variant because it seems more consistent with the likely impact of the removal of migration restrictions for EU8 migrants across the EU, and the latest government policy on visa restrictions to control net inward migration. This level is kept constant throughout the 50-year horizon and does not reflect potential annual variations in the net migration figures due to economic or policy factors.

[3] Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Slovenia and Slovakia.

[4] See ONS (2013d). The Long-Term International Migration data are based on the International Passenger Survey (IPS) with adjustments to account for asylum seekers, migration to and from Northern Ireland and people whose length of stay changes from their original intentions.

Chart A.1: LTIM data and ONS assumptions on UK migration

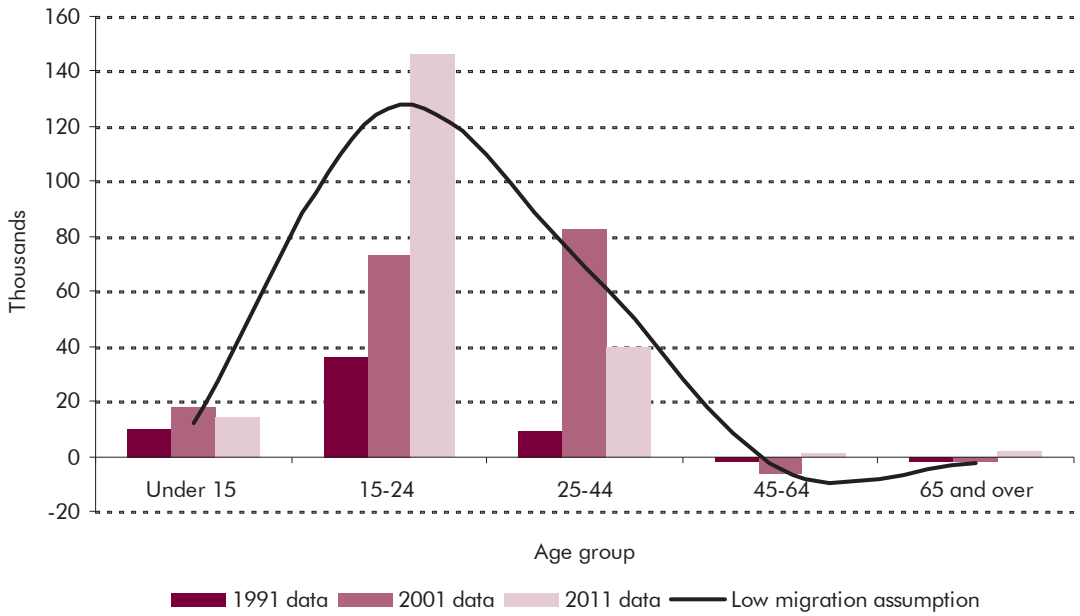


Source: ONS

The age distribution of migrants

A.7 In our projections we assume annual long-term net migration by age to be in line with the ONS assumptions, shown in Chart A.2. The main features are a peak at the younger working ages (20s and 30s) which then flattens off before turning negative at older ages around 60s and 70s. This is broadly in line with the latest LTIM data. Comparing migrants' age distribution with the projected population distribution in the same year it is evident that migrants are more concentrated in the working-age group than the overall population.

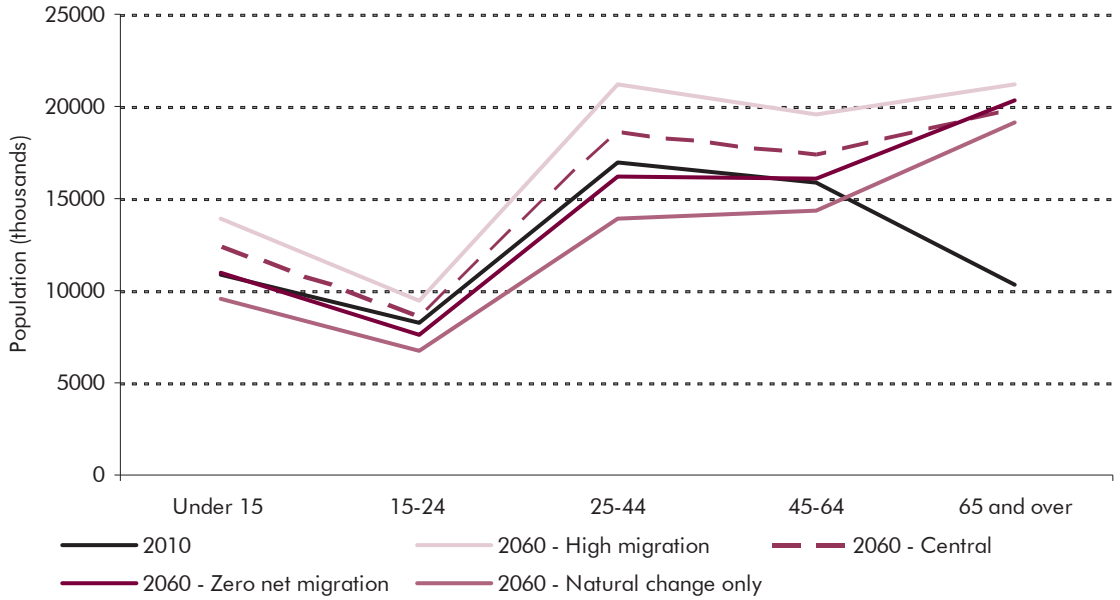
Chart A.2: LTIM data and the ONS population assumption on net migration by age



Source: ONS

A.8 Net inflows in younger age groups influence how the structure of the population evolves over time, which is a key driver of our projections. Chart A.3 and Table A.1 show the population structure and the dependency ratios up to 2060 in our population variants. The higher the assumed migration level, the lower the dependency ratio and the smoother the impact of the baby-boomers on the population structure by 2060. Because of the mechanical nature of our model, the larger the number of people of working age relative to the total population, the larger the workforce and hence GDP.

Chart A.3: Population structure in 2010 and in 2060 under different migration scenarios



Source: ONS

Table A.1: Dependency ratios

	2010	2020	2030	2040	2050	2060
High migration	0.52	0.59	0.63	0.65	0.67	0.71
Low migration	0.52	0.59	0.64	0.68	0.70	0.73
Zero net migration	0.52	0.59	0.65	0.69	0.72	0.79
Natural change	0.52	0.61	0.67	0.74	0.80	0.83

Fertility rates

A.9 In our migration scenarios we use the ONS assumption that UK-born and non-UK born women have the same total fertility rate (TFR) of 1.84. This assumption is marginally below the average TFR in 2007 and 2011 as shown in Table A.2.

A.10 But the recent data also show that non-UK born women of childbearing age had higher fertility rates than UK-born women. The 2011 data show migrants to have higher age-specific fertility rates in all age groups except among the under-20s, where UK-born women have a slightly higher fertility rate. Between 2007 and 2011, the TFR for UK-born women edged up slightly. By contrast, the non-UK born fertility rate fell. It is unclear whether the difference between 2007 and 2011 is the result of some convergence or due to other factors, such as a shift in composition of immigration flows from regions with fertility rates higher than the UK (such as Asia and Africa) to regions with fertility rates similar to those in the UK (such as the rest of the EU).

Table A.2: Age specific fertility rates and total fertility rates for UK born and non UK-born women, UK, 2007 and 2011[5]

	Births per thousand women, unless otherwise stated					
	2007			2011		
Age group	UK born	non-UK born	Tot Pop	UK born	non-UK born	Tot Pop
15-19	26	34	26	22	20	22
20-24	68	105	73	69	82	71
25-29	98	127	104	100	119	105
30-34	104	134	110	114	127	118
35-39	53	79	57	58	83	63
40-44	11	22	12	12	24	14
TFR 15-44	**1.80**	**2.51**	**1.91**	**1.89**	**2.28**	**1.96**

[1]TFR is expressed in births per woman

Table A.3: Estimated population of UK born and non-UK born women of childbearing age (15-44 years) living in the UK, 2007 to 2011

	Millions				
	2007	2008	2009	2010	2011
UK born	10.68	10.53	10.41	10.33	10.17
Non-UK born	1.81	1.94	2.01	2.09	2.23
All women	12.48	12.46	12.42	12.41	12.40

[1.] Non-UK born women include those whose country of birth is not stated.
[2.] Numbers may not sum exactly to totals due to rounding.

A.11 In addition to age-specific fertility rates, one major factor affecting the number of babies born annually is the size and age structure of the female population of childbearing age in that year. As discussed in previous sections, migrants are concentrated in the 20-30 age group, contributing disproportionately to the overall number of women in childbearing age. LTIM data show that between 2007 and 2011 the number of UK-born women aged 15 to 44 living in the UK dropped by 5 per cent from 10.7 million to 10.2 million. Over the same period, the number of foreign-born women in this age group increased by 24 per cent from 1.8 million to 2.2 million.

[5] The total fertility rate (TFR) is the average number of children that a group of women would each have if they experienced the age-specific fertility rates for a particular year throughout their childbearing lives. This measure reflects the current intensity of childbearing and the rate at which the population is replacing itself.

Age-specific fertility rates (ASFRs) are a measure of fertility specific to the age of the mother and are useful for comparing the reproductive behaviour of women at different ages. They are calculated by dividing the number of live births in a year to mothers in each age group by the number of females in the mid-year population of that age. Rates are expressed per 1,000 women in the age group.

A.12 Given their relatively low weight in the overall population, higher fertility rates for non-UK born women have only a relatively small positive impact on the UK-wide fertility rate. Nevertheless, to the extent that higher rates would lead to a higher aggregate fertility rate than assumed in our central projections, the population structure would move closer to the young age structure variant presented in Chapter 3.

The impact of migration on productivity

A.13 Generally speaking, studies find that migration will raise productivity if migrants are more skilled on average than natives. Within the international literature Glover et al. (2000), Kangasniemi et al. (2008), Mattoo et al. (2005) and Moen (2005) show how migrants can affect labour productivity through a number of channels, for example:

- migrants may have skills that are scarce in the native population and these skills complement native skills in production; and
- migrants can influence productivity through their contribution to innovation and increased knowledge spillovers.

A.14 The US Congressional Budget Office recently published an analysis of the potential impact on the US economy of higher immigration, which, while differing in detail, is likely to provide some useful insights for the UK.[6] The analysis uses a conventional production function approach, where output is accounted for by the availability of labour and capital and the efficiency with which they are deployed. The main effects of an increase in net migration on aggregate GDP comes through an increase in labour supply and the consequent positive response of investment to the higher return on capital that results. The initial impact on per capita GDP is relatively minor, turning more positive over time as the economy adjusts, while the impact on the distribution of income depends on the skill-mix of the new immigrants and the degree of substitutability with skills in the existing labour force.

A.15 More specifically on the UK, Kangasniemi et al. (2008), using a growth accounting methodology, find that the contribution of migrant labour to economic growth is quite modest for the 1987-2005 period, with the total effect of migrants on GVA growth in the UK over the period being positive but small (0.17 per cent). Also, during the same period, the impact of migrant workers on labour productivity growth is estimated to be negligible (-0.07 per cent), with the negative sign due to a reduction in the share of migrant labour in total hours

[6] CBO (2013).

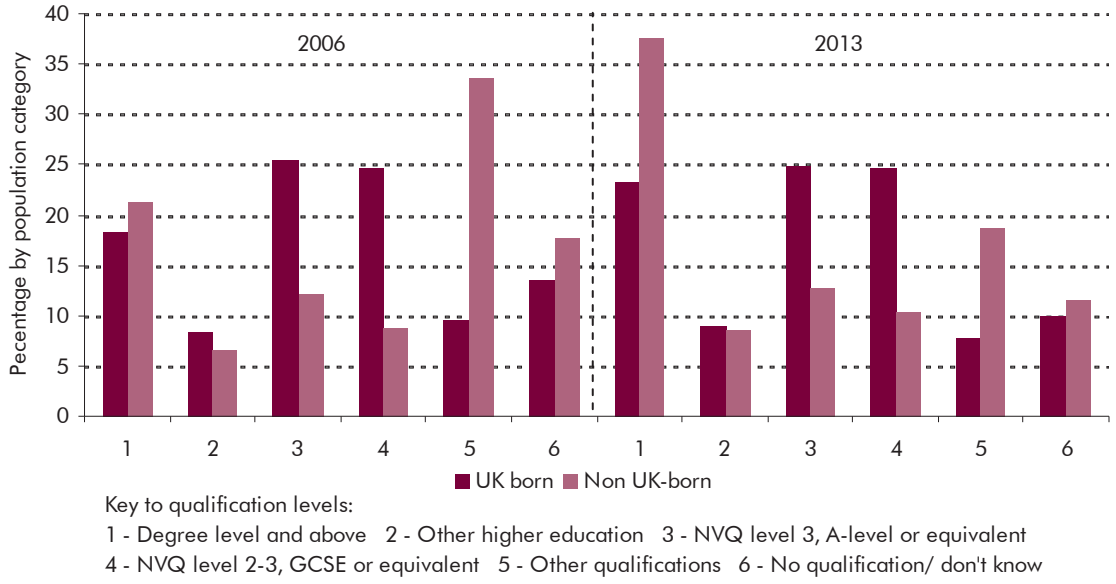
worked compared to previous years – a quantity effect rather than a quality effect.

A.16 In our projections we implicitly assume that migrants have the same characteristics as natives in terms of participation in the labour market, skills, employability and productivity. In the following sections we explore how those assumptions compare with the relevant literature and latest micro data on the characteristics of migrants. In particular, we will look at the qualifications of immigrants and whether their skills are complementary to or substitute for those of the native population; and the ability of the UK labour market to deploy those skills.

Qualifications and skills of migrants

A.17 Looking at recent Labour Force Survey (LFS) data, qualifications are somewhat polarised within the migrant population. Chart A.4 shows the distribution across the main qualifications of UK and non UK-born in the first three months of 2006 and 2013. LFS data show that a higher proportion of migrants have degree-level qualifications than natives, and that this has been rising over time. However, given the high incidence of 'other qualifications' it is difficult to conclude that migrants are on average more qualified than natives.

Chart A.4: Qualification for migrants and natives (2006 and 2013)



Source: ONS

A.18 To some extent, the concentration of migrants in the highest qualification category may reflect the functioning of the visa tier system, with non-EU

immigrants allowed into the UK on work permits and students coming to the UK to study for post-graduate qualifications. As noted by Glover et al. (2000) migrants entering through other routes will tend to have a more diverse range of skills – both because of their various reasons for migration and because of the diverse education systems they experienced.

A.19 Determining the degree of substitutability of skills between migrants and natives is not straightforward. The distribution of qualifications shown in Chart A.4 seems to suggest a degree of complementarity between non-UK and UK-born, on the assumption that migrants perform jobs that are commensurate with their qualifications. However, this does not always seem to be the case. Comparing data on education and occupational distribution CEP (2012) and Nickell et al. (2008) conclude that migrants, and in particular new immigrants, are more concentrated in elementary occupations than might be expected given their qualifications, indicating that in some occupations migrants are often overqualified for the jobs they perform.

A.20 Complementarity and substitutability of skills between migrants and natives in the labour market has been extensively studied, with mixed results. Jonathan Wadsworth, of Royal Holloway College and the government's independent Migration Advisory Committee, reported that *"It is hard to find evidence of much displacement of UK workers or lower wages, on average."*[7] Manacorda et al (2006) find little evidence of overall adverse effects of immigration on employment and wages for UK-born. Lucchino et al. (2012) finds no relationship between national insurance number registrations and changes in the number of people claiming unemployment benefit at local authority level. Their conclusion was that unemployment did not rise faster or fall more slowly in areas where migration was higher.

A.21 While there is little evidence of displacement overall, it is likely that some groups may be affected by migration. On the basis of LFS data, CEP (2012) concludes that there may be some downward pressures in the low wage market where, despite their higher reported education levels, many new immigrants tend to find work, which implies a degree of displacement.

A.22 To conclude, while migrants are more likely to have higher-level qualifications than natives, there is uncertainty around whether such skills are complementary to or substitute for those of the native population. This would be reflected in the degree of absorption of migrants' skills or job displacement in the labour market and, ultimately, productivity and GDP.

[7] Bryson et al. (2012)

Migrants' participation and performance in the labour market

A.23 If it is true that migrants are relatively more qualified than UK-born and that their skills are complementary to those of natives, in order to affect productivity and GDP it is necessary that migrants' skills are deployed effectively in the labour market. This section explores migrants' participation and performance in the labour market to assess these effects.

A.24 LFS data in Chart A.5 show that there has been a dramatic increase in the over-16 non-UK born participation rates from 2007 onwards, following the 2004 and 2006 enlargement of the EU to include 10 Eastern European countries, plus Cyprus and Malta. As observed by OECD (2013), it is also possible that the recent economic crisis has brought some non-UK born women into work. The overall increase has been driven both by the male non-UK born population, whose participation has been consistently higher than natives' since 2007, and the female non-UK born population, whose participation rates have been steadily converging toward those of native women, overtaking it recently.

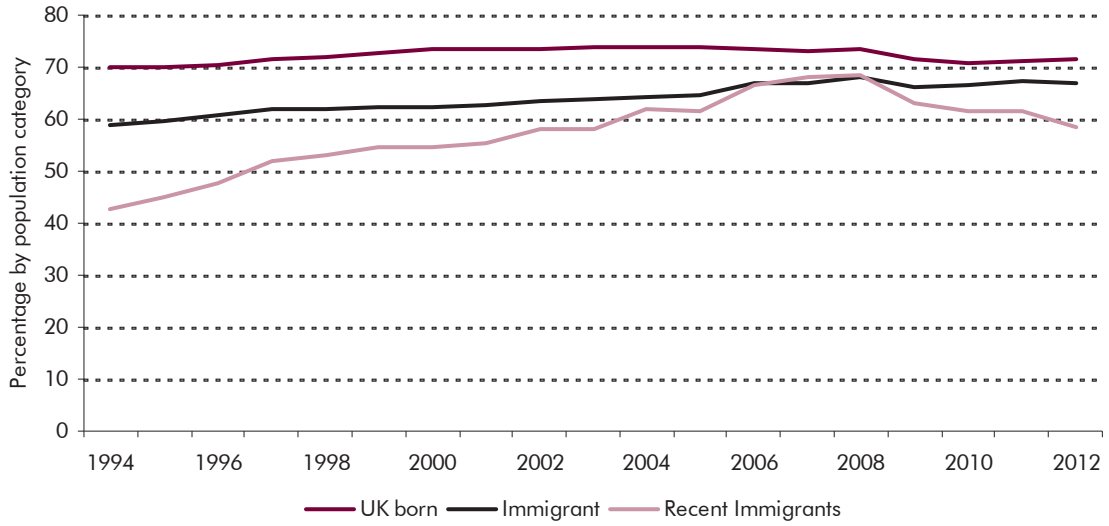
Chart A.5: UK- and non-UK born participation rates (age 16+)

Source: ONS

A.25 Chart A.6 shows how the employment rates of UK-born workers and immigrants in the 16-64 age group have evolved over time. As subsets of the 16+ population, these are not directly comparable with Chart A.5. The latest LFS data show that 74 per cent of UK-born individuals of working age were employed compared with 65 per cent of all immigrants in 2005. Since 1995, 'recent' immigrants have had lower employment rates than immigrants in general,

though the gap between the groups has narrowed substantially until 2008, when this convergence was interrupted by the financial crisis.

Chart A.6: Working age employment rates



Note: Immigrant is defined as someone born outside the United Kingdom, but who now resides in the United Kingdom. Recent Immigrants are defined as foreign born individuals who arrived in the survey year or at some time in the previous four (calendar) years.
Source: LFS

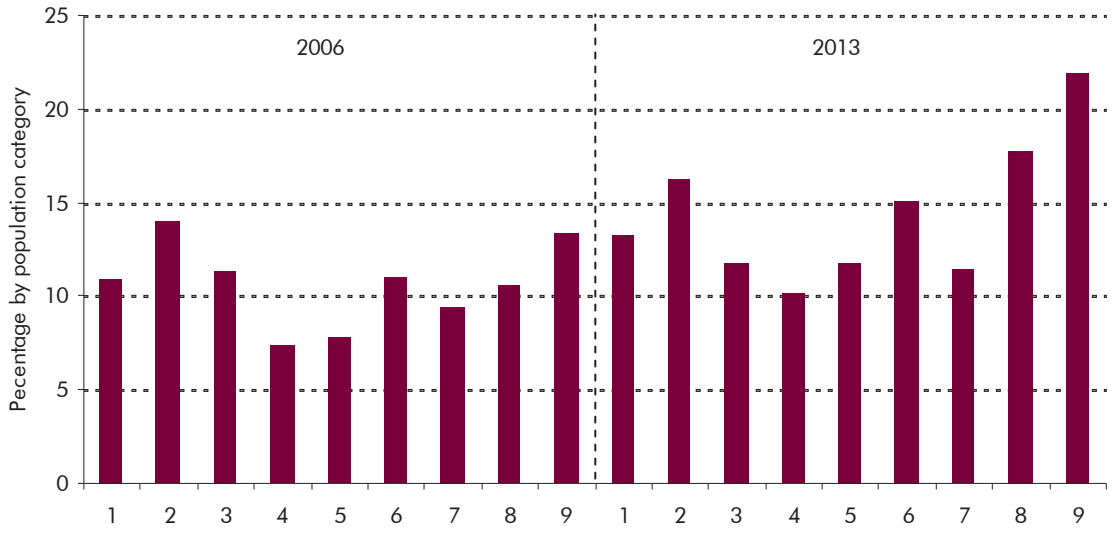
A.26 LFS data show that migrants have mixed success in the labour market, with education and English language fluency key determinants of labour market success (Shields et al., 1999). Looking at the subsets in working age, migrants are less likely to be employed and more likely to be unemployed than natives (on LFS data). Again, there is considerable heterogeneity in migrants' experiences and some groups of migrants have particularly high unemployment and inactivity rates, while others have high employment rates (Glover et al., 2000).

A.27 Chart A.6 also shows that the impact of the financial crisis on natives and long-term immigrants has been broadly similar, although recent immigrants have been more negatively affected than the other groups. This is in contrast with the experience across the OECD countries where, on average the labour market situation of migrants in general has worsened over the past four years, in absolute terms and relative to the native-born. OECD (2013) finds that, across the OECD countries, the unemployment rate of the foreign-born rose by 5 percentage points between 2008 and 2012, whereas for the natives the increase was more modest at 3 percentage points.

A.28 Detailed analysis on the performance of immigrants across occupation is provided by Nickell et al. (2008). In their analysis of 2004 and 2006 data, they show how there is a tendency for immigrants to be predominantly in high-skill

and low-skill jobs. They also show how this distribution changed from 2004 onwards, with a larger fraction of new immigrants entering low-skill occupations than previously. The latest LFS data showing the proportion of people in each occupation that are non-native (Chart A.7) indicates that such trends have continued after 2006.

Chart A.7: Share on non-UK born by occupation (three months to March, 2006 and 2013)



Key to qualification levels:
1 - Managers and Senior Officials 2 - Professional occupations 3 - Associate Professional and Technical 4 - Administrative and Secretarial 5 - Skilled Trades Occupation 6 - Personal Service Occupations 7 - Sales and Customer Service Occupations 8 - Process, Plant anf Machine Operatives 9 - Elementary Occupations

Source: ONS

A.29 An approximation of labour productivity is offered by hourly wages rates. Chart A.8 shows that, according to LFS data, immigrants have on average earned more than UK-born individuals since 1993, though this is likely to conceal considerable variation in incomes. This result is partly explained by the fact that immigrants have been more likely to live in London, where hourly wage rates are higher than the rest of the country (Saleheen, 2006). Also, many of the relatively well-paid migrants may result from the work permit system in matching migrants to vacancies in skilled occupations. The difference is less pronounced since 2008, probably driven by the fact that 'new' immigrants are increasingly taking up low-paid jobs, which could explain the increased polarisation of non-UK born in elementary occupation shown in Chart A.7.

Chart A.8: Average gross hourly pay for those aged 16-64

Notes: Immigrant is defined as someone born outside the United Kingdom, but who now resides in the United Kingdom. Recent Immigrants are defined as foreign born individuals who arrived in the survey year or at some time in the previous four (calendar) years.
Source: LFS

A.30 To conclude, the evidence is mixed on the contribution of migrants to productivity. On the one hand, a higher proportion of immigrants have degree-level qualifications, which may indicate higher skills relative to the UK-born labour force. The non-UK born also earn, on average, higher salaries. This evidence may suggest that immigrants have a positive impact on productivity. But, on the other hand, the latest LFS data suggest that there is a mismatch between qualifications and occupations, which may suggest that migrants' skills are not deployed efficiently in the economy and hence their potential contribution to productivity may not materialise fully. There is no consensus in the literature on the size of any contribution to productivity and GDP per capita.

A.31 In our projections, migrants are assumed to have the same economic characteristics as natives but are more concentrated in the working-age group than the overall population. Because of the mechanical nature of our model, this has a positive effect on participation rates, employment and ultimately GDP and GDP per capita growth, see Table A.4.

Table A.4: Average GDP per capital growth in the migration scenario

	Average GDP per capita growth, per cent			
	2022-23 to 2032-33	2032-33 to 2042-43	2042-43 to 2052-53	2052-53 to 2062-63
OBR central (low migration)	2.0	2.0	2.1	2.1
Zero net migration	1.9	2.0	2.0	1.9
High migration	2.0	2.1	2.1	2.0
Natural change	1.9	1.9	1.9	2.0

The impact of migration on the fiscal position

A.32 Although it is not possible to quantify the net fiscal impact of migration in our projections, the impact is likely to be positive, because a greater proportion of migrants are of working age.

A.33 When considering the fiscal impact of migration it is helpful to consider the life cycle of an individual, which can broadly be split into three distinct stages shown in Chart 3.4. From birth until leaving full-time education, an individual will be a net fiscal cost, due to the costs of providing education and other services. But once an individual enters the labour market they are likely to make a net fiscal contribution, as taxes paid will usually exceed the cost of services consumed. This will depend on the employment rate, level of earnings, and amount of services consumed. Finally, upon retirement an individual is likely to be a net burden again, as they are receiving pensions and often require greater use of medical services.

A.34 Given this pattern, it seems probable that immigrants will make a more positive contribution to the UK public finances over their lifetimes than natives. They are relatively more likely to arrive as adults, so the UK will receive the positive contribution from their work without having to pay for their education, although their children will require support. It is also the case that upon arrival, if unemployed, they are not immediately entitled to – or are not eligible for – unemployment benefits, and they will contribute to tax receipts as soon as they start working. Those who spend enough years working in the UK will be eligible for state pensions once they retire, but to the extent that they leave the UK in later years, they will not require access to health and long-term care support.

A.35 Over the last decade, studies on the fiscal impact on the UK public finances seem to agree around a positive, although often not significant, effect because of the working age nature of migrants. The key results from some of these studies are as follows:

- Dustmann et al. (2010) found that EU8 immigrants who arrived after EU enlargement in 2004 paid substantially more (by over 35 per cent) in taxes than they received in government assistance. This was at a time when the

government was running a budget deficit and natives were on average receiving more from the government than they were paying. Gott and Johnston (2002) studied 1999-2000, when the government was running a budget surplus, and estimated that migrants contributed 10 per cent more than they received, whereas the UK-born were estimated to have paid 5 per cent more than they received;

- in 2005, the Institute for Public Policy Research (IPPR) published 'Paying their way – the fiscal contribution of immigrants in the UK', which extended the Gott and Johnston study. This concluded that migration had a positive impact on the public finances and that this impact was growing. Data for all years showed that migrants contributed more to the net fiscal position than UK-born when presented as a ratio of contributions to consumption of services;

- Rowthorn (2008) highlighted various adjustments that could be made to the IPPR data, which could make the migrant contribution negative or positive. These included estimating the migrant contribution if the budget was balanced, omitting defence spending, and including as migrants UK-born children of mixed parentage. With all his adjustments included, he concluded that the net contribution of migrants is negligible; and

- a recent OECD report *International migration outlook 2013* concluded that '*the fiscal impact of immigration tends to be small in most countries. Nevertheless, immigrants tend to have a less favourable net fiscal position than the native-born, but this is almost exclusively driven by the fact that immigrant households contribute on average less in terms of taxes and social security contributions than the native-born and not by higher dependence on benefits.* But, for the UK, the study found immigrants' contribution was not significantly different than those of native-born households. This difference to the OECD average is because of the relatively young age profile of the migrant population.

A.36 All these papers warn of the sensitivity of their results to changes in the underlying assumptions. One significant assumption is around the definition of a migrant. In much of the analysis above, we have defined a migrant as an individual born outside the UK who has made the UK his or her country of residence. So children of migrants born in the UK are part of the native group. Some argue that these children should be partly or fully classified as migrants since they would not be in the country if their parents had not come. The ONS population variants that we use implicitly capture such effects.

A.37 Other caveats include the assumption that migrants use services in the same way as natives (while, for example, migrants presumably use translation services in

hospitals more than the UK-born) and uncertainties around the contribution of migrants to corporation tax receipts or VAT, or their use of defence spending, for example.

A.38 Further, all the studies above use a static approach, which focuses on a particular year and compares the contribution of migrants to public finances and the benefits received. They do not look forward and consider the future change in fiscal impacts between migrant and UK-born, which is only possible through a dynamic approach.

Sensitivity analysis

A.39 This section presents the sensitivity of our 50-year projections to different migration assumptions. Table A.5 lists the alternative assumptions based on the ONS variants to the 2010-based National Population Projections. The low, high and zero net migration variants are unchanged from last year. This year we look at an additional variant labelled 'natural change', which assumes zero gross inward and outward migration in the long term. The 'zero net migration' variant removes the direct effects of migration on the size of the population; holding gross migration flows at zero also removes the effects of migration on the age structure of the population.

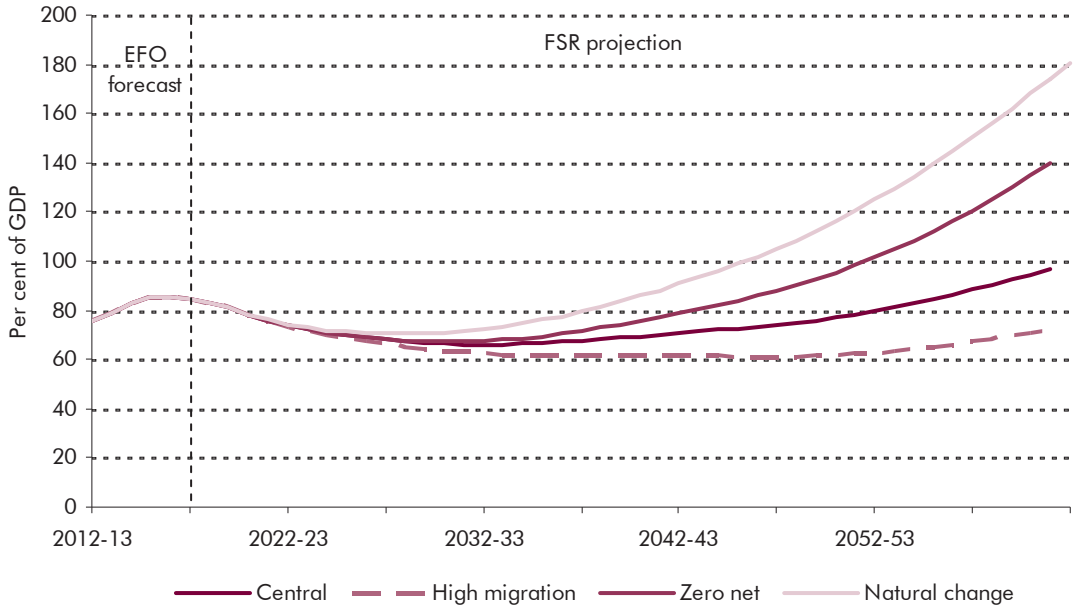
Table A.5: ONS migration variants

	Long-term average annual net migration (thousands)	Size of population in 2062 (millions)	
		16-65	Total
OBR Central (low migration)	140	44.8	77.5
High migration	260	50.7	86.6
Zero net migration	0	39.7	71.4
Natural change	0	34.9	63.8

A.40 Chart A.9 shows different net debt projections for each variant. These results are similar to those presented in previous *FSRs*.

A.41 Comparing the public sector net debt profile in the central ('low migration') projections with the 'natural change' variant, shows that net debt would be 78 per cent of GDP higher by 2062-63, assuming zero gross migration in the long-term. This is driven by the greater share of net migrants being of working age, which raises employment and GDP while reducing age-related spending pressures.

Chart A.9: Public sector net debt for migration variants



Source: OBR

Table A.6: Spending and revenue for migration variants

	Difference from central projection, per cent of GDP							
	EFO forecast		FSR projection					
	2012-13	2017-18	2020-21	2022-23	2032-33	2042-43	2052-53	2062-63
High migration								
Total managed expenditure	0.0	0.0	0.0	-0.1	-0.5	-1.1	-1.7	-2.0
Public sector current receipts	0.0	0.0	0.0	-0.1	-0.1	-0.2	-0.3	-0.2
Zero net migration								
Total managed expenditure	0.0	0.0	0.0	0.0	0.3	1.2	2.4	4.7
Public sector current receipts	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.5
Natural change								
Total managed expenditure	0.0	0.0	0.0	0.2	0.9	2.5	4.9	7.6
Public sector current receipts	0.0	0.0	0.0	0.1	0.1	0.4	0.7	0.7

A.42 As shown in Table A.6, in our model, higher inward migration would tend to increase tax receipts but add little to age-related spending pressures. However, it should be borne in mind that, over an even longer horizon, inward migrants will also retire from the workforce creating new age-related spending pressures. So higher migration could be seen as delaying some of the fiscal challenges of an ageing population rather than a way of resolving them permanently.

Conclusion

A.43 This annex provides more detail on the methodology we use to project the impact of migration on the public finances and compares the ONS assumptions underlying our projections with the latest data. As mentioned in other parts of this document, these results should be interpreted as broad-brush illustrations, not detailed forecasts.

A.44 Our sensitivity analysis shows that overall migration has a positive impact on the sustainability of the public finances over our 50 year horizon. Under our central assumption of 140,000 annual net inward migration from 2016 the public sector net debt to GDP ratio reaches 99 per cent by 2062-63, while assuming zero gross migration increases the net debt to GDP ratio to over 174 per cent. These results are driven by the assumed age structure of net migration, which tends to be more concentrated in the working age group and hence reduces the dependency ratio throughout the projection period.

A.45 In our attempt to summarise the vast literature on the impact of migration on the labour market and productivity we have not found definitive evidence on the impact of immigrants on productivity and GDP. Most of the literature seems to indicate that immigrants have a positive, although not significant, impact on productivity and GDP, indicating that our central assumption about migrants' contribution to the economy looks reasonable.

A.46 There is, however, clear evidence that, since migrants tend to be more concentrated in the working-age group relatively to the rest of the population, immigration has a positive effect on the public sector's debt dynamics. This is shown in our sensitivity analysis, where higher levels of net inward migration are projected to reduce public sector net debt as a share of GDP over the long term relative to the levels it would otherwise reach.

B Long-term care projections

B.1 Long-term care covers a wide range of services delivered to those requiring assistance in activities related to daily life. These services may be required by people of any age, and may be related to reduced capacity stemming from physical or mental disability or from old age. Care can be provided in many settings, from help at home to services provided in residential care homes.

B.2 In February 2013, the Government announced reforms to the system of long-term care in England, following recommendations made in the independent Commission on Funding of Care and Support – the 'Dilnot Commission' – which reported in July 2011.[1]

B.3 This annex considers the implications of the reforms in the context of the broader pressures on long-term care spending, common to the rest of the United Kingdom. Long-term care policy is set independently by the devolved administrations.[2]

Current and future policy

B.4 The new system will be introduced in England from 2016-17. The major feature is the creation of a lifetime cap on certain expenses that individuals will pay towards their long-term care, with the state meeting the excess costs. Means-tested support for residential care will also be extended. Under the current system individuals pay for the full costs of their care until their capital and assets fall below a means-tested threshold.

B.5 The key features of the current system are that:

- if the individual has capital above an 'upper capital threshold', currently £23,250, the individual pays the full cost of their care. For residential care, the value of the home is usually included in capital after the first 12 weeks;

[1] Commission on Funding of Care and Support (2011).

[2] Free personal care is available for individuals aged 65 and over in Scotland, with the system currently being reformed to more closely integrate health and social care services. Both Wales and Northern Ireland have concluded external consultations on care support, with a view to potential future reforms.

- when capital is below £23,250, the state meets some of the cost depending on the individual's assessable income; and

- assessable income includes a notional weekly income ('tariff income') of £1 for each £250 of capital above a 'lower capital threshold', currently £14,250, capped at the upper capital threshold. Capital up to the lower capital threshold, and any income from it, is ignored completely in the means test.

B.6 The Government's announced reforms introduce a new capped system with the following features:

- once an individual has received care to meet their eligible needs to the value of the lifetime cap, the state will pay any additional costs to meet their eligible care needs. These costs, calculated at the prices that local authorities pay, cover a package of care that the individual has been assessed as needing;

- the lifetime cap is expected to be £72,000 in 2016-17 for people above state pension age, while people who develop eligible needs before state pension age will have a lower cap. Individuals who turn 18 with eligible needs will receive free care and support to meet those needs;

- in residential care, eligible care costs exclude the daily living costs element of care home fees sometimes known as 'hotel costs', which include board, food and heating;

- the upper capital threshold in residential care will be increased and is expected to be £118,000 in 2016-17; and

- in residential care, daily living costs will remain means-tested and will be around £12,000 in 2016-17.

Modelling spending on long-term care

B.7 In past reports we modelled long-term care costs through a representative profile of spending by year of age and gender (see Chart 3.4 in this report), which was applied to the ONS population projections in each year of our projection period. However, this approach would not allow us to model the implications of the reforms without generating a representative profile of the additional costs above the new cap for each particular age and gender.

B.8 We have therefore taken a different approach in this report. The first step was to commission the Personal Social Services Research Unit (PSSRU) to project forward what spending on long-term care would have been if the existing system

remained in place. PSSRU models were also the platform for the analysis underlying the Dilnot Commission's report.

B.9 Headline differences between PSSRU's modelling and our previous approach are small, as the representative profiles we had used were initially based on PSSRU data. PSSRU's models, which capture young adults and older people separately, are based on a finer degree of granularity and require a number of additional assumptions.[3] The assumptions used for this report are set out in Table B.1.

Table B.1: OBR assumptions underlying the PSSRU modelling

	Assumption used
Population	Based on our central assumption, the ONS's low migration variant.
Unit costs	Unit costs rise by 2.2 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 is 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.
Pensions	No allowance has currently been made for the switch to Single Tier pensions.

B.10 The second stage was to calculate the incremental costs of the capped cost system. This is produced using the Department of Health's micro-simulation model of care journeys, which in turn uses inputs from PSSRU's aggregate model. Based on their specific characteristics, the model randomly assigns each individual an uncompleted care pathway, through nursing homes, residential homes, or differing levels of home care.[4]

Key drivers of spending on long-term care

B.11 While there are many factors that influence the level of care required and provided there are perhaps three main drivers. These are demographics, the duration of care and unit care costs.

[3] Further details on PSSRU's models can be found in Wittenberg et al (2008a) and Wittenberg et al (2008b).

[4] A brief summary of the care journeys micro-simulation model can be found in Department of Health (2013).

Demographics

B.12 Changes in demographics are a key determinant of the number of people seeking long-term care through the state. As spending on long-term care is heavily skewed towards the elderly, it rises as a share of GDP as the population ages.

B.13 It is not only the rate of ageing that is important, but also the prevalence of disability at different ages. In Annex B of *FSR 2012*, we discussed the relative rate of healthy ageing with increases in life expectancy – the 'morbidity effect'. This 'morbidity effect' has wider implications beyond health spending alone, and in particular may be expected to influence the level of long-term care required. These wider effects are likely to be a topic we return to in future *FSRs*. Beyond demographics, demand will also be affected by the proportion of individuals that choose 'informal' care, through for example family carers.

B.14 Modelling by PSSRU of the current system assumes that the age specific prevalence of needing care is constant. This assumption, coupled with increases in life expectancy which are projected by ONS, implies that life expectancy with a care need at age 65 more than doubles over the next 50 years, and at a much faster rate than overall life expectancy, as shown in Table B.2.

Table B.2: ONS population projections of life expectancy

	Years			Percentage change since 2010 (per cent)	
	2010	2035	2060	2035	2060
Life expectancy at age 65	18.5	22.3	24.8	20	34
Life expectancy with a care need at age 65	2.8	4.0	5.8	42	109
Memo: Proportion of years with care need (per cent)	*15*	*18*	*24*		

Duration of care

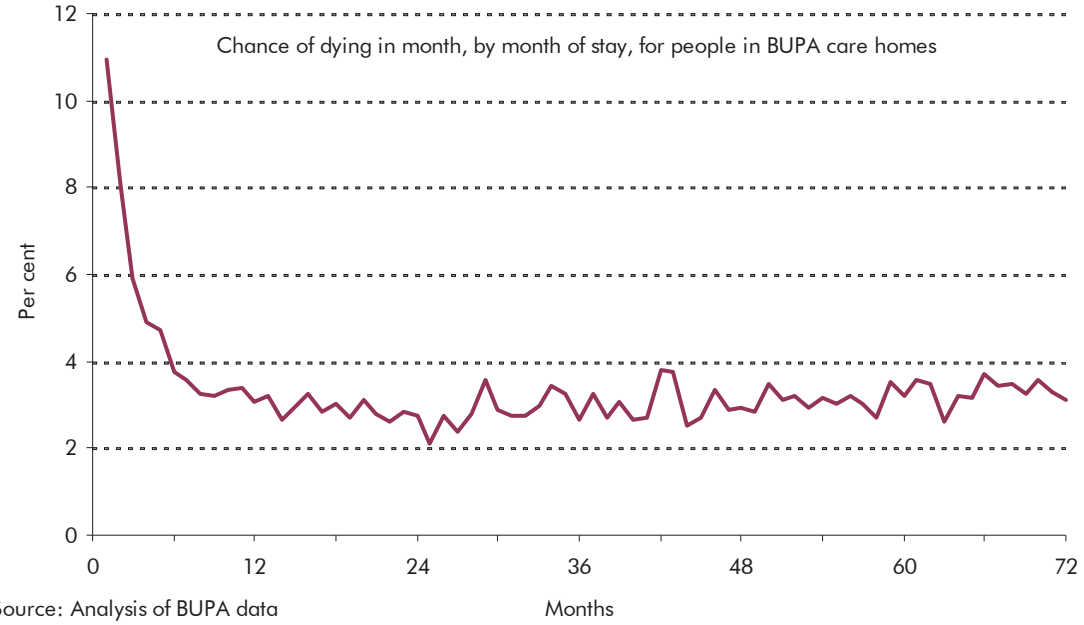
B.15 The increase in life expectancy with a care need of around 109 per cent over 50 years implied by the ONS assumptions could result from:

- the probability at age 65 of needing care in the future increasing by that amount, with the average duration of care need remaining the same; or
- the average duration of care need (for those developing a care need) increasing by that amount, but with the future lifetime probability of needing care remaining the same; or
- any combination of the two.

B.16 The balance between these two factors – likelihood and average duration – will affect the additional costs of the capped cost system. The first of these could hold if the probability of developing a care need at each age (i.e. the age-specific incidence) remains constant over time, whilst mortality for those in care remains constant. The second could hold if mortality rates fell sufficiently for those entering care. Duration of care becomes a key variable under a capped spending system because it largely dictates how many people are likely to exceed the cost ceiling, and therefore determines the excess cost that the government will have to absorb.

B.17 Chart B.1 suggests observed mortality rates for individuals in residential care have been broadly constant beyond the first year. Furthermore, a longitudinal study of people being admitted to care found almost exactly the same mortality rate, of around 3 per cent a month, for those surviving in care.[5] These show a different pattern from mortality rates in the general population of older people, but suggest that an assumption of a constant average duration of care is more plausible and this is therefore the basis of our central projections. However, we also consider the implications of relaxing this assumption, by showing a variant in which the duration of care needs increase by 20 per cent over the next 50 years.

Chart B.1: Risk of dying in the next month for those in residential care



Source: Analysis of BUPA data

[5] PSSRU (2000).

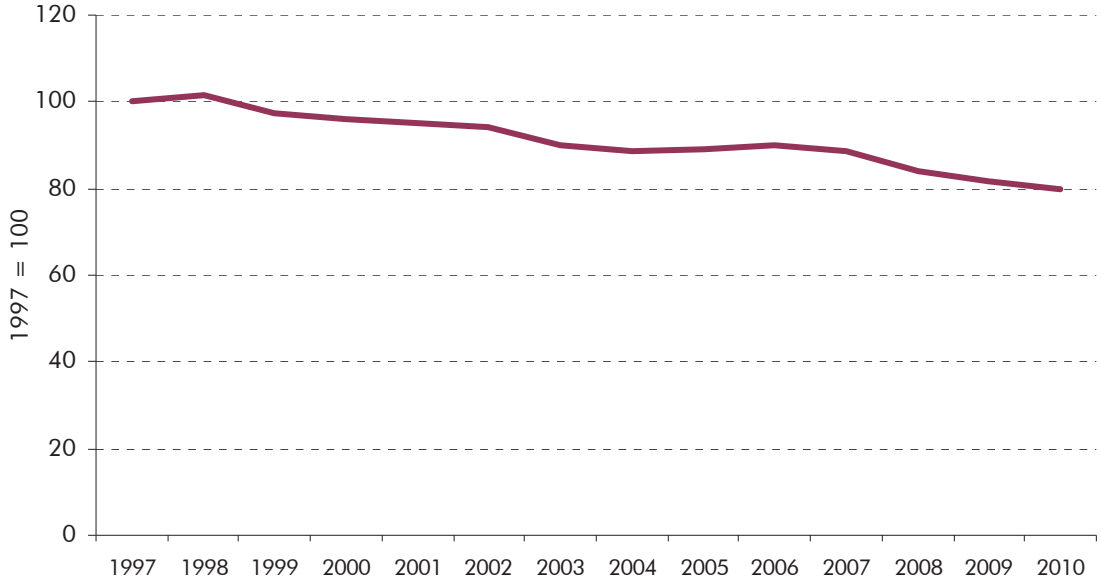
Unit costs of care and productivity

B.18 For the purposes of our long-term projections, we do not make any explicit assumptions about productivity growth in the public sector. In the PSSRU model, real unit costs are assumed to rise by 2.2 per cent a year, in line with the growth of whole economy real incomes.

B.19 This would be consistent with an income elasticity of demand for long-term care equal to unity, and annual labour productivity growth in the long-term care sector of 2.2 per cent a year, in line with whole economy productivity. It would also be consistent with no productivity growth, but also no change in coverage (in which case policy delivers the same quality and quantity of services in each year, rather than rising in line with the rest of the economy).

B.20 Long-term care support is relatively labour intensive and total factor productivity growth over the recent past has been negative, falling in 10 of the years between 1997 and 2010, and around 20 per cent over the period as a whole (see Chart B.2). If that trend continued, unit cost pressures would increase relative to our central assumption, in order to maintain the same level of care – another example of the 'Baumol cost disease' described in Chapter 3.

Chart B.2: Adult social care productivity index



Source: ONS

B.21 However, these productivity estimates do not take account of changes in quality, so if quality has improved over time, underlying productivity may have been underestimated. Nor do they take into account changes in the levels of need for

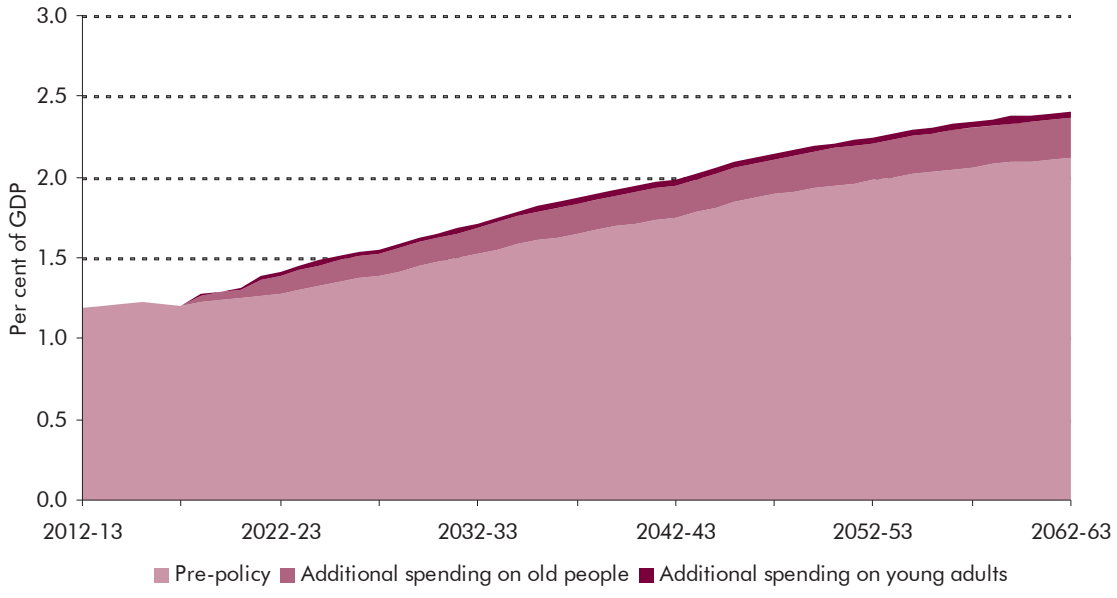
people in different care settings. Changes in the composition of spending on long-term care will also affect the headline productivity measure. If, for example, an increasing proportion of individuals moved from receiving home care to residential care, then productivity would again be underestimated, as the higher relative cost of residential care outweighs its difference in recorded output.

Impact of policy on the projections

B.22 Chart B.3 shows our central projection for spending on long-term care, both pre- and post-reform. Spending on long-term care is projected to rise from 1.3 per cent of GDP in 2017-18 to 2.4 per cent of GDP in 2062-63. Around 0.3 percentage points of the rise can be attributed to the effects of recent announcements, with the remainder predominantly reflecting an ageing population. The announcements begin to increase spending more noticeably from 2019-20, as more individuals reach the lifetime cap.

B.23 Under existing policy, just over half of spending on long-term care is spent on the elderly. Higher spending as a consequence of the lifetime cap almost entirely relates to this age group, who are more likely to have capital above the existing 'upper capital threshold' under current policy and are therefore contributing larger sums for their current long-term care support. Spending on the elderly increases by close to 20 per cent of its pre-policy level through the 2020s as the policy reaches steady state.

Chart B.3: Total long-term care spending



Source: OBR

Sensitivities

B.24 In Chapter 3, we showed that spending on long-term care would rise to 3.0 per cent of GDP in 2062-63, an additional increase of 0.5 per cent of GDP relative to our central projection, if the population were to evolve in line with the ONS's 'old age' population variant. Assuming the duration of care need was unaffected, the same increase would apply under this population variant and the total policy effect would rise slightly to 0.4 per cent of GDP.

B.25 A key assumption in our central projections is that the average duration in care remains constant over the projection period. Here we consider the effects of assuming an increase in the duration of care, by 20 per cent over the next 50 years. This corresponds to a monthly mortality rate for those in care falling from 3 per cent a month to 2.5 per cent a month. As Table B.3 shows, the additional cost relative to our central spending projection is relatively small, moving from a little below 20 per cent to a little above. The overall impact would remain at 0.3 per cent of GDP by 2062-63.

Table B.3: Additional spending on old people

	Per cent						
	2016-17	2019-20	2025-26	2035-36	2045-46	2055-56	2062-63
Central	6.8	14.8	18.7	19.7	19.7	19.7	19.7
Increased duration in care	6.9	15.1	19.2	20.6	21.0	21.4	21.8

B.26 A further uncertainty relates to productivity in the sector. For given levels of service and the lifetime cap, excess costs due to lower productivity would in principle be borne by the Government. To counter this risk, the Government has legislated for a five-yearly review of the level at which the lifetime cap is set, which will explicitly take regard of the financial burden on the state and local authorities. If productivity were to be lower than our central projection, pushing total care costs higher, the level of the lifetime cap could potentially be raised to leave the costs borne by the state broadly unaffected.

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