

Office for
**Budget
Responsibility**

Fiscal sustainability report

July 2012



Office for Budget Responsibility

Fiscal sustainability report

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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 broad-brush illustrative 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 document 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.

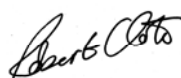
We have also drawn on the help and expertise of our advisory board and of officials across government, including the Department for Work and Pensions, HM Revenue and Customs, HM Treasury, the Department of Energy and Climate Change, the Department of Health, the Department for Business, Innovation and Skills, the Government Actuary's Department, and the Office for National

Foreword

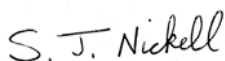
Statistics. We have had very useful discussions on our analysis of the health sector with John Appleby and colleagues from the King's Fund, and with Anita Charlesworth and colleagues from the Nuffield Trust.

We provided the Chancellor of the Exchequer with a draft set of our projections and conclusions on 28 June, 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* 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. It is likely that such a path would lead to lower long-term economic growth and higher interest rates, exacerbating the fiscal problem. The UK, it should be said, is far from unique in facing such pressures.
- 5 Separate from our central projections, we also update our work on non-demographic trends that are likely to reduce revenue from sources such as North Sea oil as a share of national income. Corporation tax and VAT receipts could also come under pressure from globalisation. So governments would be likely to need some replacement sources of revenue just to keep the tax burden constant, let alone to meet the costs of an ageing population.
- 6 Long-term projections such as these are highly uncertain and the results we present here should be seen as broad-brush illustrations 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 be made even bigger over that period.
- 8 But 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 in different presentations of the public sector balance sheet. We draw on National Accounts balance sheet measures and on the 2010-11 Whole of Government Accounts (WGA), which the Treasury is publishing alongside this report in unaudited summary form.
- 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 2012, PSND stood at £1023 billion, 66.1 per cent of GDP or £38,960 per household. Public sector net worth (PSNW) is a broader measure, which also includes physical and illiquid financial assets. At the end of 2010, PSNW stood at minus £155 million, 0.0 per cent of GDP or minus £6 per household. The Treasury has never used PSNW as a target as 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 peak in PSND has risen by 5.8 per cent of GDP to 76.3 per cent of GDP in 2014-15, while the expected trough in PSNW has fallen by 12.3 per cent of GDP to -21.1 per cent of GDP in 2014-15. The deterioration in PSNW is larger because of a difference in the way that liabilities are valued.
- 12 Commentators often criticise the use of PSND as an indicator of fiscal health (and the same criticisms would apply to PSNW) as it excludes future liabilities arising from past government action, for example payments to Private Finance Initiative (PFI) providers and the accrued rights to pension payments built up over the past by public sector workers.
- 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 unaudited WGA:

- the net present value of future **public service pension payments** arising from past employment was £960 billion or 63.8 per cent of GDP at the end of March 2011. This is £175 billion lower than was reported for the end of March 2010 in last year's *FSR*. The bulk of the difference – almost £126 billion – was due to the Government's decision in 2010 to uprate public sector pension payments by the CPI measure of inflation rather than the RPI. An increase in the real discount rate used to value the liability accounted for a further £69 billion of the decline. This illustrates the sensitivity of such net present value calculations to the choice of discount rate;
- the total capital liabilities in WGA arising from **Private Finance Initiative** contracts were around £32 billion, up from £28 billion at the end of March 2010. (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 £108 billion (7.2 per cent of GDP) in **provisions** at the end of March 2011 for future costs that are expected (but not certain) to arise, most significantly the hard to predict costs of nuclear decommissioning. Total provisions have risen by £6 billion since last year's WGA. This reflects the fact that roughly £24 billion of new provisions were added, £12 billion were used during the year (less than the £15 billion expected last year) and £6 billion were removed from future years as deemed unnecessary; and
- there were also £50 billion (3.3 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 as less than 50 percent. These previously included £165 billion for the Treasury's guarantee of the Bank of England's Special Liquidity Scheme. But the boundary of the WGA has been widened this year to include the Bank of England, so this liability has been consolidated out (and the scheme has also subsequently been closed). On a comparable basis, other contingent liabilities increased by £8 billion over the year to almost £50 billion at the end of March 2011, partly as a result of a £4 billion increase in tax payments being challenged in the courts. Contingent liabilities appear in the notes to the WGA, not its balance sheet.

15 Overall gross liabilities were £58 billion lower than in 2009-10 WGA at £2,422 billion on a comparable basis. This is largely the result of the £175 billion fall in

the estimated net public service pension liabilities, partly offset by a £126 billion increase in the liability for government borrowing and financing. This includes the borrowing needed to finance the 2010-11 net deficit of £106 billion.

- 16 Unlike PSND, the WGA balance sheet also includes the value of tangible and intangible fixed assets, estimated at £757 billion or 50.3 percent of GDP in March 2011. These have reduced by £8 billion since last year's WGA. The overall net liability in the WGA – total gross liabilities minus total gross assets – was £1,195 billion or 79.5 per cent of GDP at end-March 2011. This compares to PSND of £1,023 billion or 66.1 per cent of GDP at the same date and to a WGA net liability of £1,227 billion or 84.6 per cent of GDP at end March 2010.
- 17 There are significant limits to what public sector balance sheets alone can tell us about fiscal sustainability. For one thing, there is the sensitivity of balance sheet measures to the choice of – and movements in – the discount rate. We cannot easily quantify how much difference the choice of discount rates makes in aggregate, as the different accounts consolidated into the WGA use a variety of different discount rates according to their own accounting rules.
- 18 More fundamentally, balance sheet measures look only at 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, or that our latest EFO forecast shows PSNW turning negative from 2010 onwards.

Long-term projections

- 19 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 2012 EFO. This allows us to focus on long-term trends rather than making revisions to the medium-term forecast.

Demographic and economic assumptions

- 20 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. This reflects increasing life expectancy, declining fertility, and the 'demographic bulge' created by the post-war 'baby boom'.

- 21 We base our analysis on projections of the UK population produced by the Office for National Statistics (ONS) every two years. This year's *FSR* incorporates a new set of 2010-based population projections. Compared to the 2008-based projections we used last year, they project somewhat greater inward migration, slightly lower life expectancy for today's elderly and slightly higher life expectancy for future newborns – together leading over time to a larger population.
- 22 Notwithstanding these changes, the overall nature of the demographic challenge has not changed significantly since last year's *FSR*. Under the ONS scenario that we use for our central projection, the proportion of the population aged 65 and above rises from 17 per cent in 2012 to roughly 26 per cent in 2061, and net inward migration flows average roughly half the rate seen in recent years. But to test the sensitivity of our results to these assumptions, we also examine various alternative scenarios with different estimates of ageing and migration flows.
- 23 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 average rate over the past 50 years. But we also run alternative scenarios with productivity growth averaging 1.7 and 2.7 percent. We assume CPI inflation of 2 per cent (in line with the Bank of England's target) and a long-term GDP deflator inflation rate of 2.5 per cent. Our long-term projection for nominal GDP growth is consequently unchanged from last year.

Defining 'unchanged' policy

- 24 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.
- 25 Government policy is rarely clearly defined over the long term. And, in many cases, simply assuming that a stated medium-term policy continues for 50 years would lead to an unrealistic outcome. 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".
- 26 In our central projections, we assume that beyond 2016-17 underlying spending on public services, such as health, rises in line with per capita GDP. But health care is relatively labour intensive, so we might expect productivity growth in the sector to lag the rest of economy even though wages have to keep up. This implies that if we were to define unchanged policy as keeping health sector

output growing at the same rate as the economy, governments would need to spend an increasing share of GDP. We illustrate the impact of this assumption.

Results of our projections

- 27 Having defined unchanged policy we apply our demographic and economic assumptions to project spending and revenue streams over the next fifty years.

Expenditure

- 28 Population ageing will put upward pressure on public spending. In our central projection, spending other than on debt interest rises from 35.6 per cent of GDP at the end of our medium-term forecast in 2016-17 to 40.8 per cent of GDP by 2061-62, an increase of 5.2 per cent of GDP or £80 billion in today's terms.
- 29 The main drivers are upward pressures on key items of age-related spending:
- **health spending** rises from 6.8 per cent of GDP in 2016-17 to 9.1 per cent of GDP in 2061-62, rising smoothly as the population ages. If health care spending per capita was to rise by 3.6 per cent a year in real terms, to reflect possible lower productivity growth as explained above, this could increase spending by a further 7.5 per cent of GDP by 2061-62;
 - **state pension costs** increase from 5.6 per cent of GDP to 8.3 per cent of GDP as the population structure ages and State Second Pension entitlements mature. We assume that the 'triple guarantee' means that the value of the Basic State Pension rises by earnings growth plus 0.26 percentage points a year. This alone increases its cost by 0.6 per cent of GDP by 2061-62; and
 - **social care costs** rise from 1.1 per cent of GDP in 2016-17 to 2 per cent of GDP in 2061-62. The broad trend is in line with projections on unchanged policy published by the Commission on the Funding of Care and Support in 2011, although the results are not directly comparable. We have not prejudged the Government's policy response to the report.
- 30 These increases are partially offset by a fall in **gross public service pension payments** from 2.2 per cent of GDP in 2016-17 to 1.3 per cent in 2061-62. This compares to a fall from 2.0 to 1.5 per cent of GDP in last year's FSR. The higher starting point largely reflects a lower medium-term GDP forecast, while the lower end point reflects the cuts in the public sector workforce implied by the additional public spending cuts announced by the Government last November, plus the latest public service pension reforms announced in the same month.

- 31 In this *FSR* we also assess the impact of all the reforms announced by the current Government on the **net cost of public service pension provision** (i.e. including contributions as well as payments). We estimate that the net cost will fall from 1.7 per cent of GDP in 2016-17 to 0.9 per cent in 2061-62, but that the cost in 2061-62 would be 0.6 per cent of GDP bigger without the reforms. The decision to uprate public service pensions by CPI rather than RPI explains 0.4 percentage points of the difference, with the increases to member contributions announced in the 2010 Spending Review and the November 2011 recommendations in *Good Pensions that Last* each contributing a further 0.1 percentage points.

Revenue

- 32 Demographic factors will have less impact on revenues than on spending. Non-interest revenues are projected to rise from 37.3 per cent of GDP at the end of our medium term forecast in 2016-17 to 38.2 per cent of GDP in 2061-62, an increase of 0.9 per cent of GDP or £14 billion in today's terms. The increase is little changed since last year, although this masks some changes in composition.
- 33 Long-term fiscal sustainability analyses tend to assume that revenues are constant as a share of GDP or (as in our central projection) that they move only in line with demographic changes. But we also include in this report a discussion of non-demographic factors that might affect the size of particular revenue streams over the long term. The key conclusions are:
- various non-demographic factors are likely to put downward pressure on oil and gas revenues and receipts from transport and environmental taxes and tobacco duties. Our latest projections suggest oil and gas revenues falling to around half the level we projected last year by 2040-41, but the reduction is small as a share of GDP - from 0.1 to 0.05 per cent. So our broad conclusion remains as last year: that these factors could reduce the revenue from these taxes by up to 2 per cent of GDP over the next 30 years;
 - global corporation tax rates have been on a declining trend as governments around the world compete to attract mobile profits and capital. If a similar pattern were to persist whilst the UK headline rate remained unchanged, the incentive to draw profits away from the UK would reduce corporation tax receipts over time. If UK rates were to move in line with a declining global average there would be a direct fall in UK corporation tax receipts. But lower corporation tax rates could increase the level of GDP by reducing the cost of capital; we have not included this effect in our modelling; and
 - another possible effect of globalisation has been to reduce the price of tradeable goods relative to other goods and services. Most tradeable goods are subject to the standard rate of VAT, so if international trade were to exert downward pressure on such prices, and households spent relatively

less money on such goods as a consequence, VAT receipts would fall modestly as a share of GDP.

- 34 Our analysis of corporation tax and VAT is highly stylised and we do not produce a central estimate of the likely impact on UK tax receipts in the future. But coupled with the analysis of other revenue streams, it does suggest that future governments are likely to need to find replacement streams of revenue merely to hold the tax burden constant, let alone to meet upward pressures on spending.

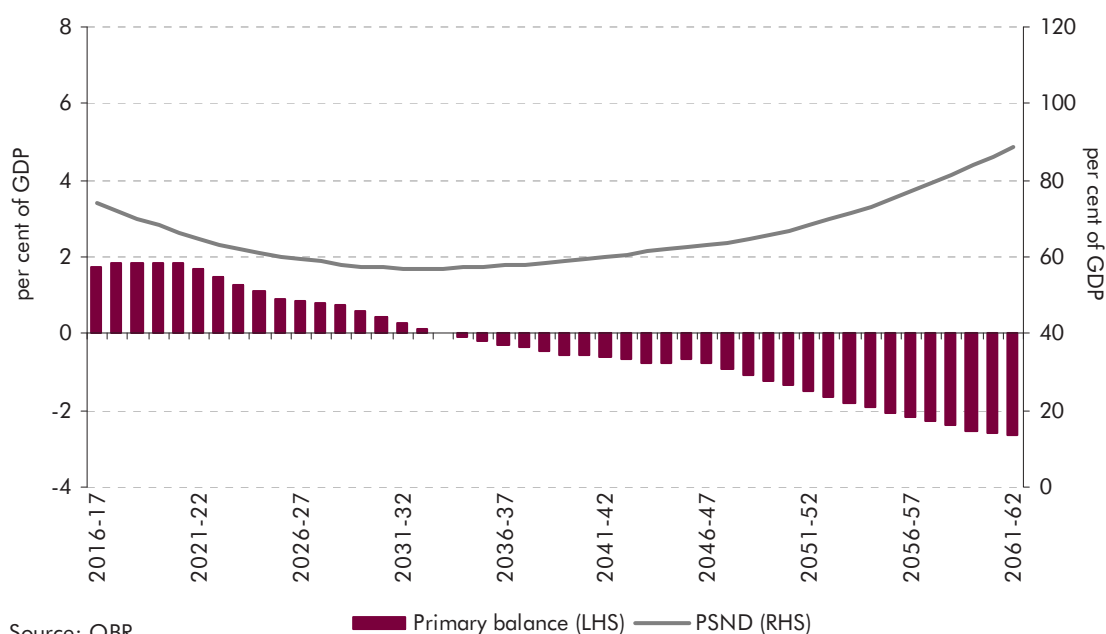
Financial transactions

- 35 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.
- 36 For the majority of financial transactions, we assume that the net effect is zero. One exception is the impact of the student financial support arrangements announced in December 2010. Student loans are projected to increase net debt by a maximum of 5.9 percent of GDP (£91 billion in today's terms) around the early 2030s, falling to 3.7 percent of GDP (£57 billion) by 2061-62 as the value of loan repayments rises relative to the value of new loans made. The profile for student loans is little changed since last year.

Projections of the primary balance and public sector net debt

- 37 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 revenues and spending) is projected to move from a surplus of 1.7 per cent of GDP in 2016-17 to a deficit of 2.6 per cent of GDP in 2061-62 – a deterioration of 4.3 percent of GDP or £65 billion in today's terms, slightly smaller than last year. This is shown in Chart 1.
- 38 Taking this and our projection of financial transactions into account, PSND is projected to fall from 74 per cent of GDP in 2016-17 to a trough of 57 per cent in the mid-2020s, before rising increasingly quickly to reach 89 per cent of GDP in 2061-62. The importance of demographic pressures in driving this increase is evident from that fact that if, instead, the primary balance remained constant beyond 2016-17 PSND would fall to zero by the late 2050s.

Chart 1: Central projection of the primary balance and PSND



- 39 Last year we showed a bigger prospective deterioration, with net debt moving from 69 per cent of GDP at the end of the *EFO* forecast to 107 per cent of GDP in 2060-61. The improvement in the outlook largely reflects the fact that we expect a bigger primary surplus at the end of the *EFO* forecast horizon this year than we did last year. The primary balance is forecast to be 1.7 per cent of GDP in 2016-17 compared with last year's forecast of 1.3 per cent of GDP in 2015-16. The deterioration in the primary balance projected over the subsequent 45 years is also 0.2 per cent of GDP smaller this year than last year.
- 40 The improvement is primarily because the Government has responded to a deterioration in the medium-term outlook for the underlying health of the public finances with additional projected cuts in spending that more than compensate and therefore deliver a stronger primary balance at the end of the *EFO* forecast horizon. You could see this as a contribution to the need for long-term fiscal adjustment we identified last year. But this also underlines how sensitive our projections are to the starting point at the end of the medium term forecast.
- 41 The effects of the ageing population are less likely to change from year to year, and policy adjustments to respond to it are likely to be long-term and incremental. Changes to the population projections since last year have a relatively small impact on our projections over time, eventually reducing pressure on the public finances somewhat.

- 42 Needless to say, there are huge uncertainties around any projections extending this far into the future. And it is therefore important to be aware how sensitive our central projections are to the assumptions that underlie them.
- 43 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 long-term economic growth, if long-term productivity growth was weaker (as this pulls down receipts, but not those areas of spending linked to prices), or if the age structure of the population was to turn out older than in our central projection.
- 44 Higher net inward migration than in our central projection – closer to the levels we have seen in recent years, for example – would put downward pressure on borrowing and PSND, as net immigrants are more likely to be of working age than the population in general. This effect would reverse over a longer time horizon, when those immigrants who remain in the UK reach old age.
- 45 Under the scenario in which governments respond to relatively weak productivity growth in the health service by increasing underlying health spending per capita by 3.6 per cent a year in real terms, the upward debt trajectory would be much more steep. PSND would be in excess of 200 per cent of GDP by the late 2050s.

Economic feedbacks

- 46 Left unaddressed, persistent fiscal deficits could have a number of negative consequences for the economy, and therefore for fiscal sustainability, that are not captured by our central projections. If fiscal deficits reduce national saving, raise interest rates and ‘crowd out’ investment, this would lead to lower levels of output and a reduction in living standards. Higher levels of debt can also restrict policymakers’ ability to respond to future economic difficulties.
- 47 Persistent deficits should be distinguished from temporary deficits, which can help sustain economic activity when private sector demand is depressed. The short-run effects of current fiscal policy on the economy are captured in our medium-term forecasts. In the longer-term projections in this report, output is assumed to remain at its sustainable trend level from 2017-18 onwards.

Summary indicators of fiscal sustainability

- 48 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 is clearly unsustainable.

- 49 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.
- 50 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 2.6 per cent of GDP (£39 billion in today’s terms) from 2017-18 onwards to satisfy the inter-temporal budget constraint. This is a slightly smaller figure than we estimated last year.
- 51 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 is 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’.
- 52 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 2017-18 to return PSND to its roughly pre-crisis level of 40 per cent of GDP in 2061-62, as well as that necessary to keep it at the level we expect at the end of our medium-term forecast, namely 75 per cent of GDP, again in 2061-62.
- 53 Under our central projections, the government would need to implement a permanent tax increase or spending cut of 1.1 per cent of GDP (£17 billion in today’s terms) in 2017-18 to get debt back to 40 per cent and 0.3 per cent of GDP (£5 billion in today’s terms) to have it at 75 per cent.
- 54 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 2016-17 than we forecast in the *EFO* (which would imply an underlying deficit that much greater throughout the projection horizon), then the necessary tightening would be bigger or smaller by the same amount.
- 55 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 annual 3.6 per cent per capita real growth in health spending; this would increase the necessary permanent policy adjustment in 2017-18 to 4.4 per cent of GDP for the 40 per cent target or 3.6 per cent of GDP for the 75 per cent target.

- 56 Governments need not respond to fiscal pressures with a one-off permanent tightening. As an alternative to the tightening of 1.1 per cent of GDP in 2017-18 necessary to meet the 40 per cent target, governments could opt for a series of tax increases or spending cuts worth an additional 0.4 per cent of GDP each decade. A more gradual (but ultimately larger) adjustment would mean a smaller fall in the debt to GDP ratio in the early years before PSND stabilises around the target level.

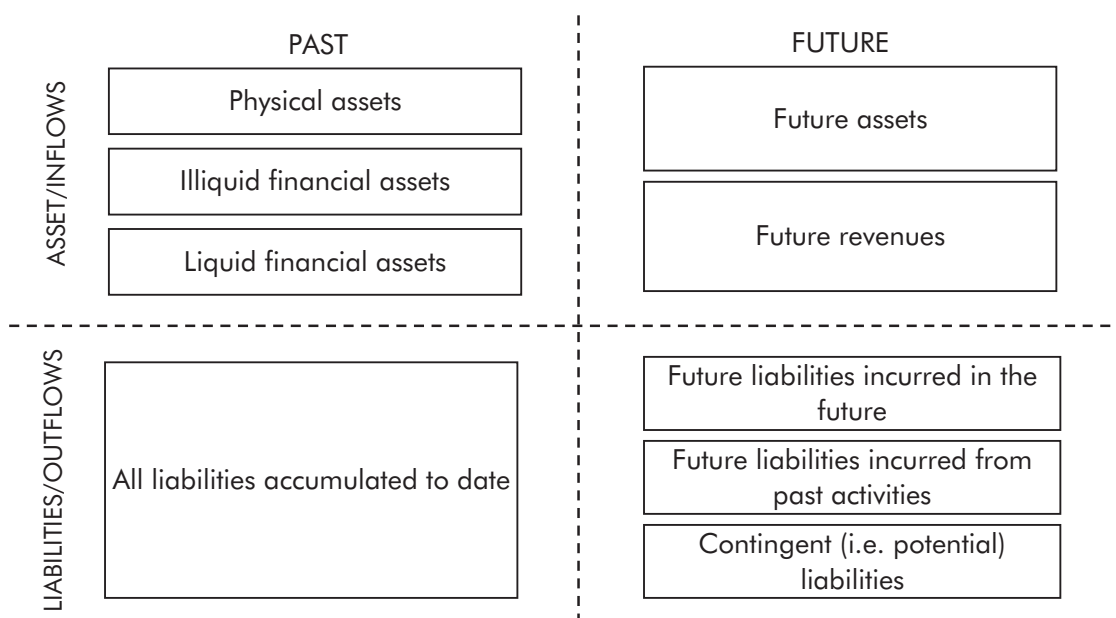
1 Introduction

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.
 - 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 the coverage of the different summary stock and flow measures used in policy presentation and discussion differs widely. 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 flows. We make projections of future government expenditure, revenue flows 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 have 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, this report examines 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* 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

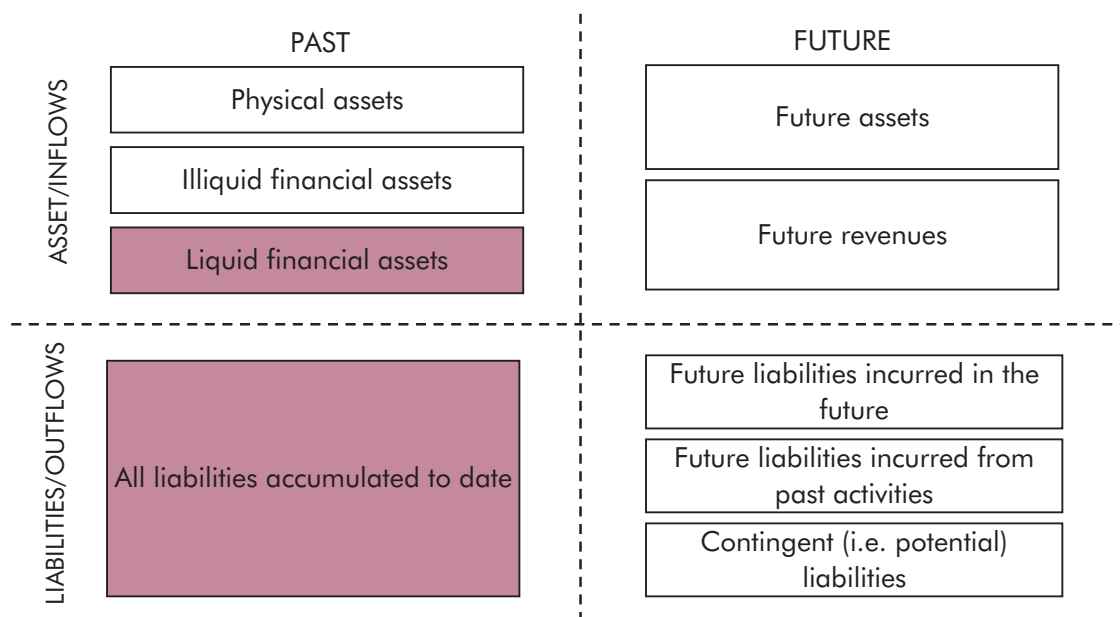
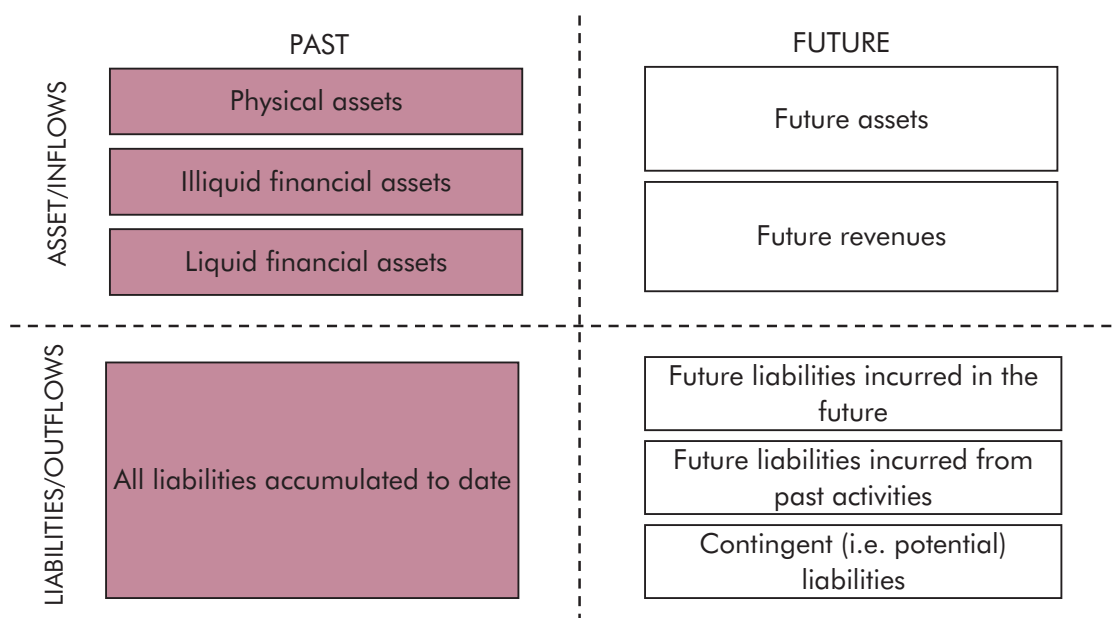
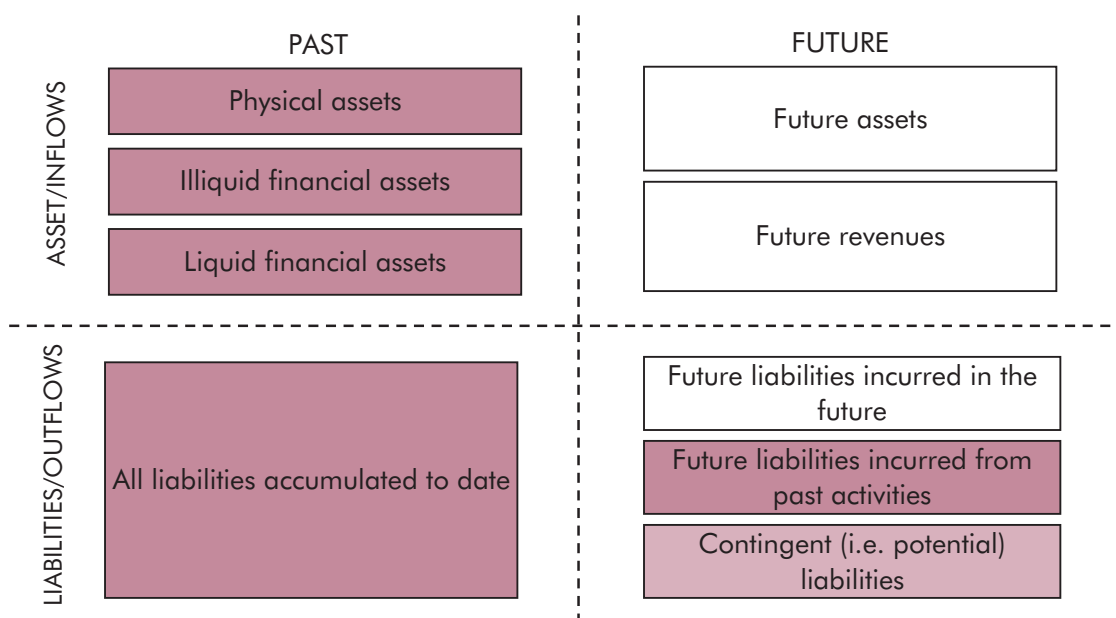


Figure 1.3: Coverage of public sector net worth



- 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 second year in which the WGA have been published, so we can compare the latest figures for 2010-11 with those published at the time of last year's FSR for 2009-10 (restated to reflect a broadening in coverage since last year). 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



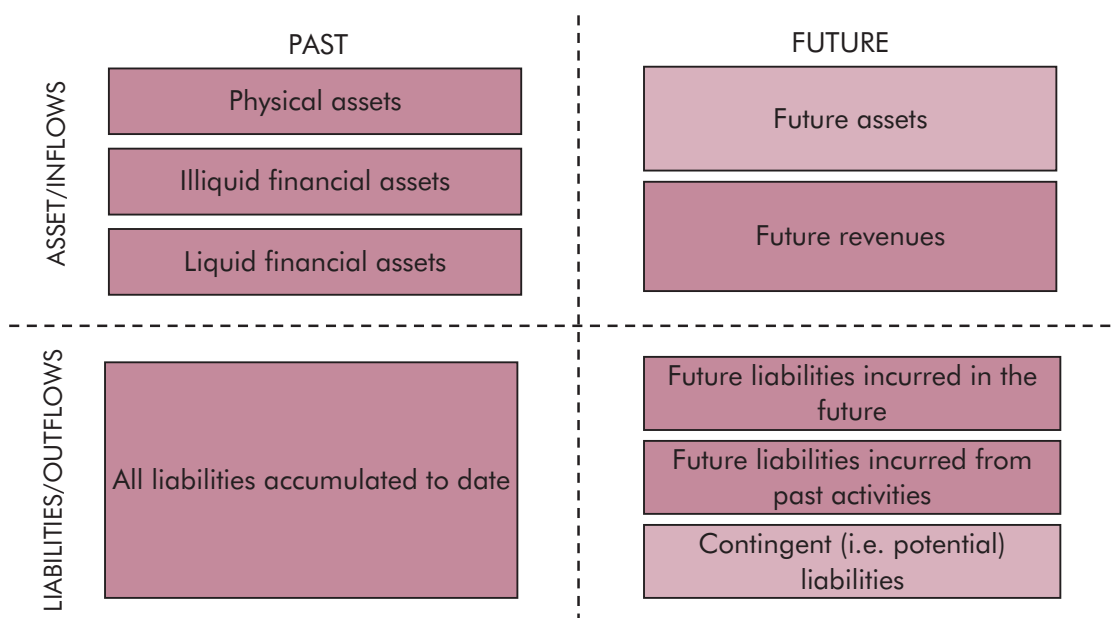
Future activity: Long-term spending and revenue projections

- 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, such as the US Congressional Budget Office (CBO).
- 1.17 The first five years of our projections are consistent with the March 2012 *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, that 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 the buoyancy of different revenue streams. We also look at the impact of policy changes that can alter the size of these expected flows between *FSRs*, in particular changes to the scheme designs for public service pensions.
- 1.21 On the expenditure side, health spending is a particular focus in this report. There is an extensive international literature showing how prospective changes in health spending can have a significant impact on the long-term health of the public finances – it is, for example, the main factor leading the CBO to conclude that current fiscal policy in the US is unsustainable. In addition to an increase in the number of older people, on whom health spending is concentrated, costs will be affected by changes in the proportion of people's lives spent in ill health. Productivity of workers in this sector will also have an important impact, not only on health spending at particular ages but also on the underlying direction of overall spending. We look in more depth at the evidence for these assumptions in the second annex of 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. This issue was not analysed in depth in previous Treasury reports. In Chapter 4 of this report, we renew our analysis, conducted last year, of the possible changes to these revenue streams due to technological or behavioural change. We also consider the potential impact effects of globalisation on two large tax bases in the UK, consumption tax and corporation tax.

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 (given by the current 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*, namely 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 that are not included in the central projections as fiscal risks, and where possible sets out the potential impacts of such policies.

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. Last year 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. This year we include the following additional analyses:

- Annex A: sets out the public service pension projections and the impact of recent reforms; and
- Annex B: discusses historic trends in health care productivity and morbidity, and the potential implications for future health spending.

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 second year alongside this report.¹ This year we also examine new experimental statistics from the Office for National Statistics (ONS) that measure the gross liabilities of the UK pensions system, including private and public sector workplace pensions.

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 recent interventions to stabilise the financial sector.
- 2.4 The level of PSND changes each year by 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

¹ We included detailed discussion of the new information available in the WGA in last year’s *FSR*. This year we confine ourselves to brief explanations of the main aggregates and concepts, but readers can refer back to last year’s publication for further details.

² More details of how PSND is measured are available in O’Donoghue (2009).

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

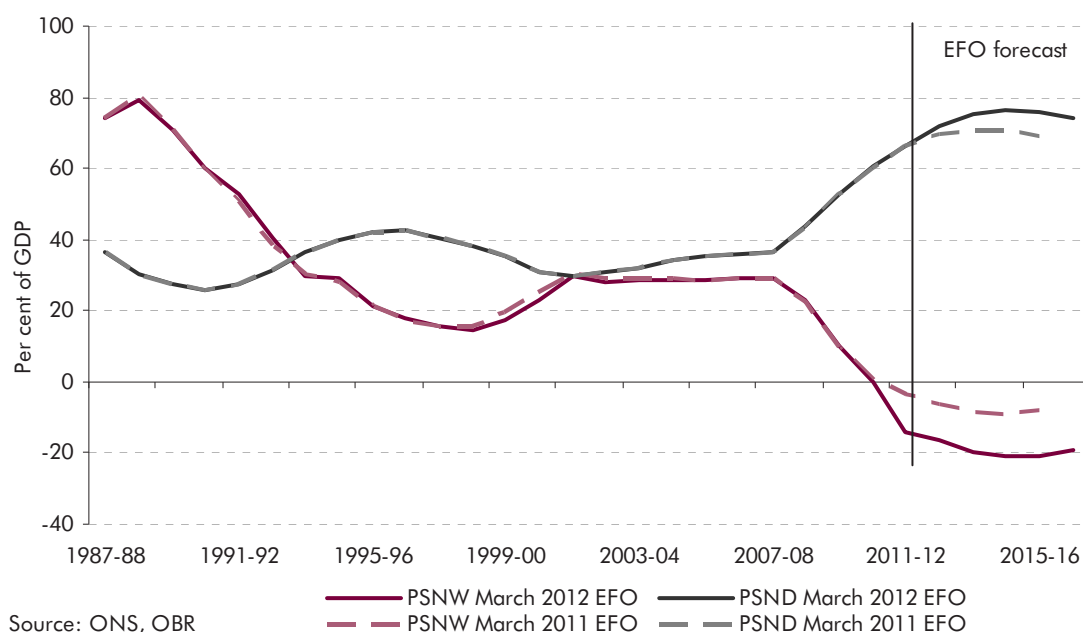
estimate of the additional debt that the government would have had to issue if it had purchased the buildings and other assets that the public sector uses through Private Finance Initiative (PFI) deals, where those assets are classified as 'on balance sheet' in the National Accounts. The measurement 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.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 further 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 2011-12, PSND was £1,023 billion, or 66.1 per cent of GDP, or £38,960 per household.⁴ The current Coalition Government has set a target to have PSND falling as a share of GDP at a fixed date of 2015-16.
- 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 only depreciate slowly. PSNW fell sharply in 2008 and 2009 and the latest available outturn data at the end of 2010 gave a value for PSNW of close to zero (-£155 million, or 0.0 per cent of GDP). OBR forecasts show it falling further and becoming more negative from 2011-12 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 accrued 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 number of UK households in 2011, from ONS (2011c) Statistical Bulletin: Families and households in the UK, 2001 to 2010. This source is used for all such calculations in this report.

Chart 2.1: Recent levels and forecasts of PSND and PSNW



2.8 Chart 2.1 compares our latest forecasts for both measures, from our March 2012 *EFO*, with the March 2011 *EFO* forecasts we reported in last year's *FSR*.

Compared with last year, PSND is higher because borrowing falls less quickly than assumed in the March 2011 *EFO*. The outlook for PSNW has deteriorated more than the outlook for PSND over the last year: in 2014-15, the expected peak in PSND has risen by 5.8 per cent of GDP to 76.3 per cent of GDP, whilst the expected trough in PSNW has fallen by 12.3 per cent of GDP to -21.1 per cent of GDP.

2.9 The larger fall in PSNW reflects a difference in the way that liabilities are valued between PSND and PSNW. The liabilities for PSND are at nominal (redemption) value, while the financial liabilities in PSNW are at market value. Over the past year, the sharp rise in bond prices has pushed up liabilities at market values, which reduces PSNW, but does not affect the nominal (redemption) value of the gilts used in PSND. The fact that debt that the government has sold has become more expensive in the secondary market does not mean that the public sector is worse off in any meaningful sense, suggesting that this method of valuation is a further limitation of PSNW as an indicator of the government's financial health.

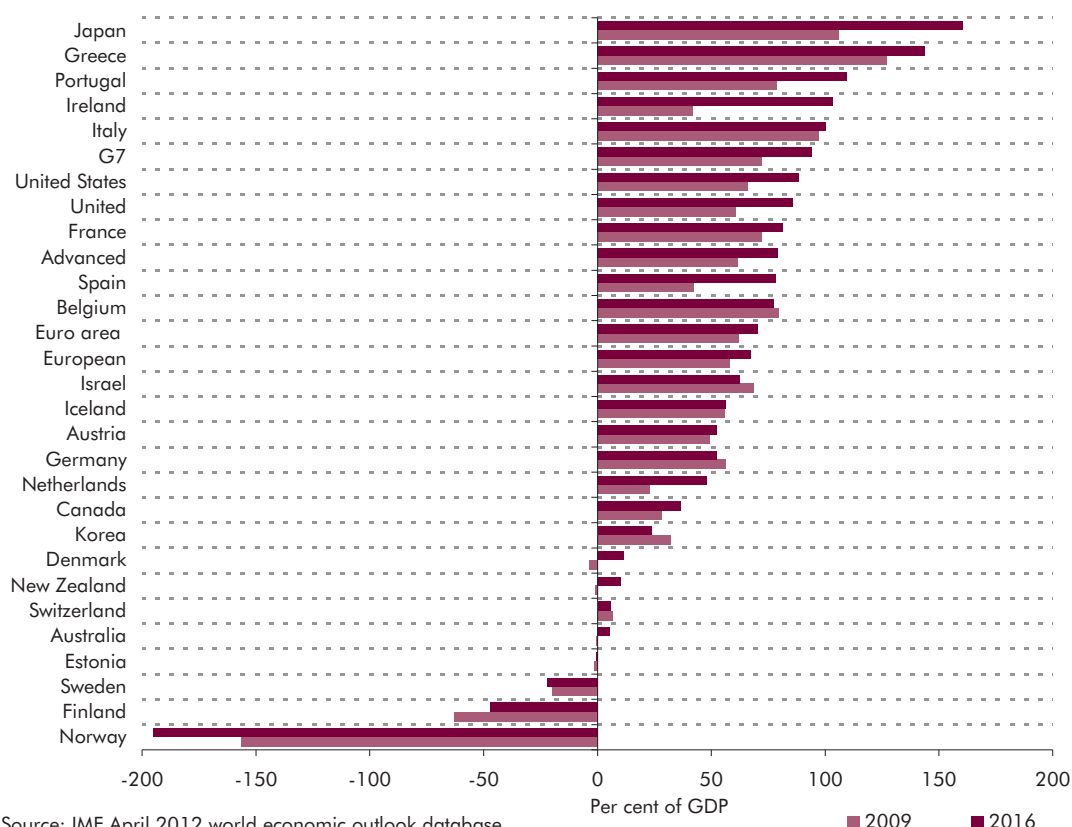
International comparisons of debt

2.10 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

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

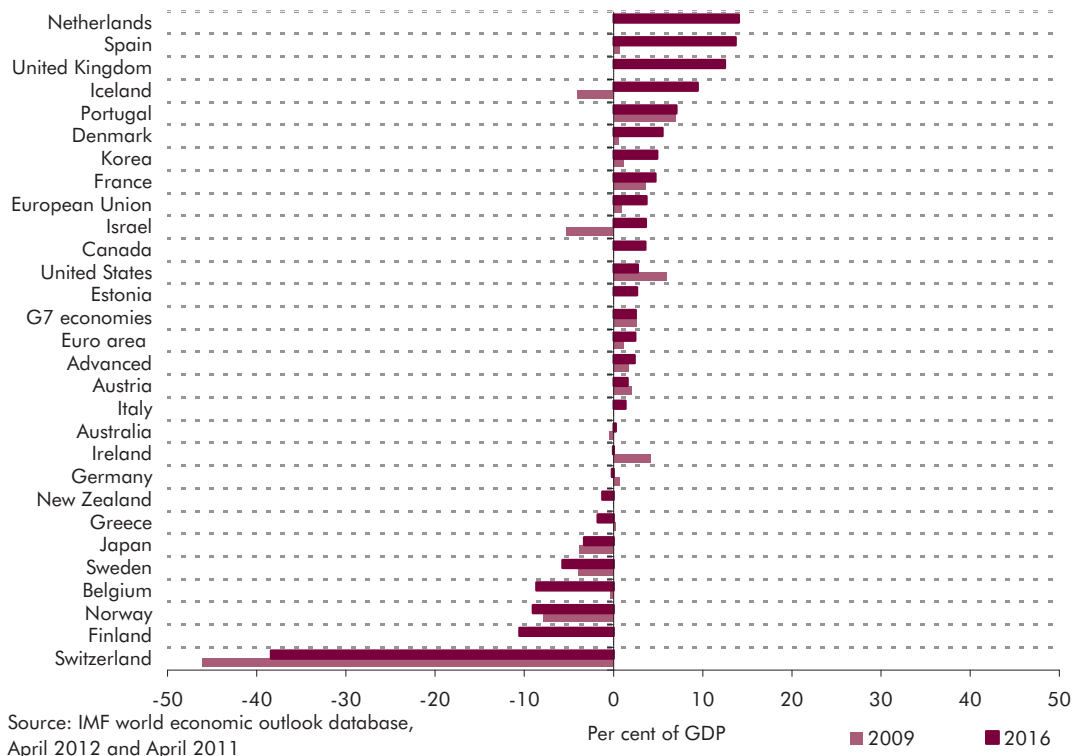
measure of PSND, but internationally comparable figures are available for general government net debt, which excludes the net debt of public corporations from the public sector total.

Chart 2.2: Latest IMF forecasts for general government net debt



2.11 The IMF publishes estimates of general government net debt for different countries in its World Economic Outlook (WEO). Chart 2.2, above, shows the IMF's latest estimates for 2009 and forecasts for 2016 for those countries included in the IMF's grouping of countries with advanced economies. These figures were taken from the April 2012 WEO. On this measure, UK general government net debt was 61 per cent of GDP in 2009 and is forecast by the IMF to grow to 86 per cent in 2016. This is lower than the G7 average of 72 per cent in 2009 and 94 per cent in 2016, although the G7 average is somewhat skewed by the very high levels of debt in Japan. Chart 2.3 shows that the IMF has increased its forecast for UK general government debt in 2016 by 13 per cent of GDP since the April 2011 WEO figures we reported in last year's FSR. This is the third largest upward revision of the 25 countries reported here.

Chart 2.3: Movements in IMF forecasts for general government net debt between April 2011 and April 2012



2.12 In the March 2012 *EFO* we produced calendar year forecasts for general government net debt on the definition used by the IMF and general government gross debt on the definition used by the European Commission (EC). These are shown in Table 2.1 below and compared to our financial year forecasts of PSND from which they are derived.

2.13 The main differences are that:

- the IMF and EC gross debt measures do not net off the value of the UK's liquid financial assets. Compared to PSND, this adds around 7 percentage points to the debt ratio on their definitions; and
- as general government measures, the IMF and EU figures all include costs of the financial sector interventions, e.g. the purchase of bank shares, loans to Northern Rock (Asset Management) Plc and Bradford and Bingley and depositor compensation in failed banks etc. PSND excludes the temporary effects of the financial interventions, although it will include their permanent costs as they occur. This also adds around 7 percentage points to the debt ratio on their definitions.

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- 2.14 The March 2012 *EFO* forecasts for debt levels in Table 2.1 are a little lower than those of the IMF and EC on comparable definitions. This reflects differing projections for GDP growth and government deficits.

Table 2.1: March 2012 *EFO* debt forecasts on international definitions

	per cent of GDP					
	2011	2012	2013	2014	2015	2016
March EFO 2012 forecasts						
Public sector net debt ¹	67.3	71.9	75.0	76.3	76.0	74.3
General government net debt (IMF definition)	74.1	80.2	83.5	84.9	84.4	82.3
General government gross debt (EC definition)	82.1	87.9	91.3	92.5	91.7	89.3
International Organisations forecasts						
General government gross debt (EC April 2012)	85.7	91.2	94.6			
General government gross debt (IMF April 2012)	82.5	88.4	91.4	92.8	92.2	90.1
General government net debt (IMF April 2012)	78.3	84.2	87.2	88.6	88.1	86.0

¹ Financial year

Balance sheet measures from WGA

- 2.15 The Whole of Government Accounts (WGA) is a set of financial statements for the whole of the public sector, produced under international commercial accounting standards, as adapted and interpreted for the public sector context. The construction of the WGA was described in detail in last year's *FSR*, and also in the Treasury's WGA publication.⁵
- 2.16 We draw here on the unaudited summary of the WGA for 2010-11 that the Treasury is publishing at the same time as this *FSR*.⁶ In the rest of this chapter, whenever we refer to WGA data, we are using the unaudited 2010-11 WGA data from this latest summary publication.
- 2.17 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

⁵ HM Treasury 'Whole of Government Accounts. Year ended 31 March 2010'

⁶ HM Treasury 'The Government of the United Kingdom of Great Britain and Northern Ireland. Unaudited Summary of the Whole of Government Accounts. Year ended 31 March 2011'

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.

2.18 This year further information on future pension liabilities is also provided in new ONS experimental statistics⁷ which cover the whole of the UK's pension liabilities, including private sector workplace pensions, state pensions, and public service pensions. These new ONS statistics cover similar ground to the information on public service pension liabilities available in the WGA, and to the projections of state pensions in Chapter 3. However the ONS statistics are based on standard assumptions designed to make them comparable from year to year, and from country to country. These new ONS statistics are discussed further in Box 2.1.

What's new in the 2010-11 WGA

2.19 The 2010-11 WGA are calculated on a slightly different basis to the 2009-10 WGA published last year. The three main changes are that:

- the boundary for the public sector has been widened to include the Bank of England and London & Continental Railways. This means that WGA now includes the Bank of England Asset Purchase Facility Fund (BEAPFF), which holds the assets and liabilities that relate to quantitative easing. This means that the WGA now includes some balance sheet transactions that are not included in PSND. This wider coverage and the effects of quantitative easing on the balance sheet are explained in the next section below;
- the accounts for local authorities are now all compiled using IFRS⁸ accounting standards. Previously these accounts were compiled using UK GAAP.⁹ This led to the restatement of various balances, which increased net liabilities by £2 billion; and
- there have also been some further changes to detailed accounting policies affecting specific areas of government departments' accounts. These include changes to the recording of some leases by the Ministry of Defence, so that these are now classified as finance leases rather than operating leases.

2.20 The 2009-10 WGA results have been restated so that the revised results have the same coverage and accounting policies as the latest 2010-11 results. This means

⁷ Levy (2012)

⁸ International Financial Reporting Standards (IFRS), the system of accounts used internationally by the private sector.

⁹ UK Generally Accepted Accounting Principles, set by the Financial Accounting Standards Board.

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that the two sets of results can be compared on a like for like basis, in terms of the basis of the accounts. Hence, in the rest of this chapter, whenever we refer to the results for 2009-10 we are referring to the restated results for 2009-10 from the 2010-11 accounts.

- 2.21 Table 2.2 below shows the impact of the restatement of the 2009-10 accounts. It is modest in aggregate. The main effect is that the change in the WGA boundary increases the WGA measure of public sector net liabilities in 2009-10 by £14 billion, as we explain in more detail in the next section. Changes in accounting policies reduce the WGA net deficit by £2 billion.

Table 2.2: Changes to main aggregates in restated 09-10 accounts

	£ billion				2009-10 restated in 2010-11 WGA
	2009-10 in 2009-10 WGA	WGA boundary change	First time adoption of IFRS	Other changes to accounting policies	
Balance sheet levels at end March 2010:					
Liabilities	-2,419	-57	-1	-2	-2,480
Assets	1,208	43	-1	3	1,253
Net liabilities	-1,212	-14	-2	1	-1,227
Flows during 2009-10:					
Operating revenues	-582	-1	-1	0	-583
Operating expenses	666	0	1	0	667
Net financing cost and gains and losses on assets	81	0	-	-2	79
Net deficit¹	165	0	0	-2	163

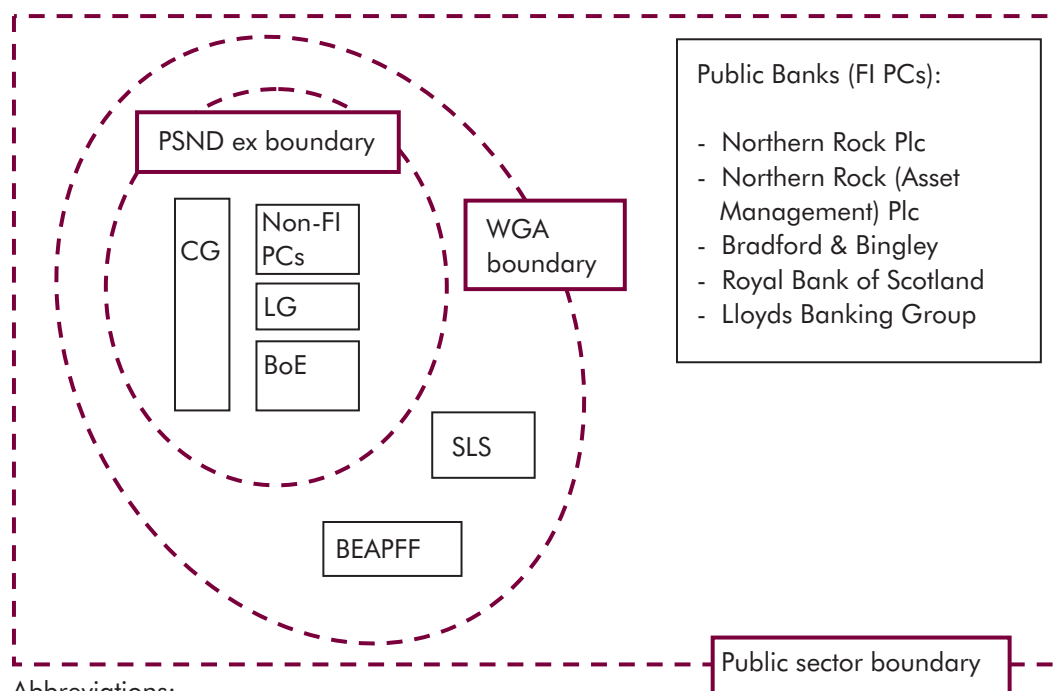
¹ The net deficit in WGA is the net deficit of operating expenses less operating revenue, where 'operating' expenditure and revenue are analogous to 'current' expenditure and receipts in the National Accounts

- 2.22 When comparing WGA results from year to year, it is important to remember that changes in balance sheet liabilities in each year are calculated using the discount rates that apply for that year and that such revaluations are also included as expenditure. For example, the WGA operating expenses and net deficit for 2010-11 have been reduced by £126 billion to reflect the reduction in the pension liability arising from the indexation of pensions by CPI rather than RPI. These conventions make it more difficult to compare WGA results from year to year.

Changes to the WGA boundary and effects of quantitative easing on the balance sheet

2.23 Figure 2.1 shows how the WGA boundary has been widened to include the Bank of England, including the Bank of England Asset Purchase Facility Fund (BEAPFF) and the Bank’s stock lending transactions under the Special Liquidity Scheme (SLS). This means that the WGA now includes the balance sheet transactions for the BEAPFF that are not included in PSND ex. Although the SLS transactions are also within the WGA boundary, the fact that the transactions involving lending of stocks means that they are not included in the Bank of England or WGA balance sheet. The commercial banks which the ONS has classified as within the public sector remain outside the scope of both WGA and PSND ex.

Figure 2.1: WGA boundary compared to PSND ex



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
SLS	Special Liquidity Scheme
BEAPFF	Bank of England Asset Protection Facility Fund

2.24 The BEAPFF is accounted for as a separate subsidiary company within the Bank of England, and contains assets bought by the Bank under the Asset Purchase

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Facility (APF), mostly the gilts purchased by the Bank for its quantitative easing programme.¹⁰ The BEAPFF borrows from the Bank to pay for the purchases it makes. So the balance sheet for the BEAPFF contains liabilities that are the loans from the Bank, and assets that are purchased under the APF. At the end of 2010-11, the BEAPFF had purchased just under £200 billion of assets, mainly gilts.

- 2.25** On the Bank of England's balance sheet the lending to the BEAPFF appears as an asset. The liability corresponding to this asset depends on how it has been funded. Loans to the BEAPFF for quantitative easing purposes are financed by the creation of central bank reserves, which appear as a liability on the Bank's balance sheet (as an increase in the level of reserves balances). The much smaller loans to the BEAPFF for other asset purchases under the APF are financed via a deposit from the government's Debt Management Office, which appear under 'other liabilities' on the Bank's balance sheet.
- 2.26** When the balance sheets for public sector bodies are consolidated within WGA, any liabilities of one body within WGA that are held as assets by another body within WGA are netted out as part of the process of consolidation. This produces a consolidated public sector balance sheet showing the total liability for debt held outside the public sector.
- 2.27** In the 2010-11 WGA, where the public sector boundary has been expanded to include the Bank of England and the BEAPFF, the process of consolidation means that the government's liabilities for gilts are reduced by the amount of gilts held within the BEAPFF. But the overall liabilities are also expanded to include the Bank of England's liabilities, including those which financed the BEAPFF's purchases, as described above.
- 2.28** The effects of widening the WGA boundary on the WGA balance sheet aggregates for 2009-10 are shown in Table 2.2 above. The changes increase total public sector assets by £43 billion, principally because WGA assets now include additional Bank of England assets. The overall level of WGA gross liabilities increased by £57 billion. A reduction in liabilities of £184 billion, mainly due to the holdings of gilts by the BEAPFF, was more than offset by an increase of £241 billion in financial liabilities, mainly from the deposits from banks and financial institutions held by the Bank of England.

¹⁰ The Asset Purchase Facility was established in January 2009, under a remit from the Chancellor of the Exchequer, with the initial objective of improving the liquidity of the corporate credit market by making purchases of high-quality private sector assets. In March 2009 the remit was extended to allow the Monetary Policy Committee (MPC) to use the Asset Purchase Facility to make purchases of assets (now including gilt-edged securities) in pursuit of its monetary policy aims.

The latest WGA aggregates

2.29 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 asset/debt position. However the accounting frameworks are quite different, with similar concepts measured on quite different bases, and this means that reading from one set of accounts to the other is not straightforward.

2.30 The public sector summary aggregates from the latest WGA financial statements for 2010-11 are shown in Table 2.3 below, compared with the restated 2009-10 results. Total net liabilities in WGA are estimated to be £1,195 billion at end March 2011, and to have decreased by £32 billion since end March 2010. This decrease is the result of a fall in gross liabilities of £58 billion partly offset by a £26 billion reduction in the assets which are netted off, as discussed below.

Table 2.3: WGA public sector summary aggregates

	£ billion		
	2009-10 restated	2010-11	Difference
Balance sheet levels at end of year:			
Liabilities	-2,480	-2,422	58
Assets	1,253	1,226	-26
Net liabilities	-1,227	-1,195	32
Flows during financial year:			
Operating revenues	-583	-611	-28
Operating expenses	667	623	-44
Net financing cost and gains and losses on assets	79	94	15
Net deficit ¹	163	106	-57

	Per cent of GDP ²		
	2009-10 restated	2010-11	Difference
Balance sheet levels at end of year:			
Liabilities	-170.9	-161.0	9.9
Assets	86.4	81.5	-4.8
Net liabilities	-84.6	-79.5	5.1
Flows during financial year:			
Operating revenues	-41.2	-0.4	40.8
Operating expenses	47.1	0.4	-46.7
Net financing cost and gains and losses on assets	5.6	0.1	-5.5
Net deficit ¹	11.5	0.1	-11.4

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

Changes in WGA gross liabilities

2.31 Table 2.4 below shows the changes in WGA gross liabilities in more detail. It shows that total WGA gross liabilities fell mainly as a result of a £175 billion fall in the estimated net public service pension liability (discussed in the section on pension balance sheet measures below). This is partly offset by a £126 billion increase in the liability for government borrowing and financing, which includes borrowing to finance the 2010-11 net deficit of £106 billion. The latest WGA information for provisions and PFI are discussed in their relevant sections further below.

Table 2.4: WGA public sector gross liabilities

	£ billion		
	2009-10 restated	2010-11	Difference
Balance sheet levels at end March			
Net public service pension liability	1,135	960	-175
Government borrowing and financing	782	908	126
Provisions	102	108	6
PFI liabilities (capital commitments)	28	32	4
Working capital (creditors and debtors)	179	182	3
Other liabilities ¹	254	231	-22
Total liabilities	2,480	2,422	-58

¹ Includes deposits by banks outside the public sector (as defined by WGA) in the Bank of England and the Debt Management Office.

Changes in WGA gross assets

2.32 Table 2.5 gives a breakdown of the changes in WGA assets over 2010-11. The level of assets on the WGA balance sheet fell by £26 billion between the end of March 2010 and March 2011, largely because of a £28 billion fall in the level of other assets, which are mainly financial assets. This includes changes in the levels of assets and liabilities held by the Debt Management Office and the Exchange Equalisation Account.¹¹

2.33 The level of fixed assets also fell by £8 billion, mainly because of a fall of £27 billion in the value of land and dwellings, partly offset by increases in the value of the motorway and trunk road network.¹² The fall in land and dwellings reflects

¹¹ During 2010-11, 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.

¹² Further details of change in assets are given in note 6 of the WGA unaudited summary.

additional impairments included in the 2010-11 WGA account for local authorities' social housing, which are explained further in the section below on depreciation and impairments.

Table 2.5: WGA public sector gross assets

	£ billion		
	2009-10 restated	2010-11	Difference
Balance sheet levels at end March			
Tangible and intangible fixed assets ¹	764	757	-8
Equity investment in the public sector banks ²	61	57	-5
Student loans	28	30	2
PFI assets	31	35	4
Working capital (creditors and debtors)	139	145	5
Other assets ³	230	202	-28
Total assets	1,253	1,226	-26

¹ Net of depreciation and impairment of assets

² Includes the value of the government's investments in the Royal Bank of Scotland, Lloyds Banking Group, Northern Rock Plc, Northern Rock (Asset Management) Plc, and Bradford & Bingley, which are managed by UK Financial Investments Ltd.

³ Includes loans and deposits with banks outside the public sector (as defined by WGA), including short term operations by the Debt Management Office

2.34 Table 2.5 also shows changes in the value of the Government's equity investments in public sector banks. We discussed the Treasury's latest estimates of the potential fiscal impact of all the various financial interventions in Box 4.3 in our March 2012 *EFO*. The changes in the level of assets associated with student loans and PFI contracts are explained in the later sections of this chapter.

2.35 This estimate for total public sector assets in WGA is significantly lower than the £1,462 billion National Accounts figure for the combined assets of the general government and public corporations sectors at the end of the calendar year 2010.¹³ The difference between the two measures and the difficulties in comparing them were described in paragraphs 2.40 to 2.41 of the 2011 *FSR*.

Differences between WGA and National Accounts aggregates

2.36 Tables 2.6 and 2.7 show the reconciliation between the WGA and the National Accounts aggregates, as set out in the summary of the unaudited WGA results.¹⁴ These charts start with the fiscal aggregates from the National Accounts, and then

¹³ ONS (2011a)

¹⁴ The relationships between the two sets of aggregates are also described in Daffin and Hobbs (2011).

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show the additional items included in the WGA aggregates. These tables also show how the reconciliation has changed between 2009-10 and 2010-11.

2.37 Table 2.6 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 additionally includes an estimate of the net present value of future cash payouts arising from past employment. The 2010-11 WGA estimate of these additional liabilities is £960 billion (down from £1,135 billion in 2009-10 – see the next section on the WGA pension liability) and these additional WGA liabilities more than accounts for the difference between the WGA net liabilities and PSND; and
- the inclusion of the public sector **tangible and intangible fixed assets** that are not included in PSND offsets £757 billion of these additional liabilities.

Table 2.6: Reconciliation of public sector net debt

	£ billion		
	Balance sheet levels at end March		
	2009-10 restated	2010-11	Difference
Public sector net debt (National Accounts)	760	905	145
Plus additional items included in WGA net liabilities:			
Net public service pensions liability	1,135	960	-176
Provisions	102	108	6
PFI contracts	25	27	2
Tangible and intangible fixed assets	-765	-757	8
Working capital (creditors and debtors)	-37	-44	-7
Other	7	-4	-11
WGA net liabilities	1,227	1,195	-32

2.38 Table 2.7 shows that the differences between the 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 also additionally includes the change in the future liability for past service costs of public service pensions, which reflects the change in indexation of these pensions from RPI to CPI;

- the WGA net deficit also includes additional impairments (**write-downs of assets**), and higher estimates of depreciation;
- the classification of **capital grants** which count as capital expenditure in the National Accounts but as current transfers 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 2.7: Reconciliation of public sector current deficit

	£ billion		
	2009-10 restated	2010-11	Difference
Current deficit (National Accounts)	110	103	-7
Plus additional items included in WGA net deficit:			
Net interest on public service pension scheme liabilities	59	61	2
Change in past service costs of public service pensions, including change in indexation from RPI to CPI	1	-126	-127
Other differences between public service pension charges and pensions paid	-9	-14	-5
Impairment of assets	24	52	28
Capital grants	16	18	2
Depreciation of assets	6	10	4
Net changes in provisions	-27	6	33
Net gains/losses on sale of assets	-	4	4
Military expenditure not capitalised	-5	-5	0
Other	-12	-3	9
Net deficit for the year (WGA)	163	106	-57

2.39 The following sections look at the remaining areas where the reconciliation above shows that there is additional information in the WGA balance sheet, where this is relevant to our assessment of fiscal sustainability.

Net liabilities of public service pensions

2.40 The WGA balance sheet includes an estimate of the current net liability for the future payment of pensions for all public service pension schemes, where the liability to pay the pension was incurred as a result of past employment. It does not include the expected value of future pension payments to current and future public service employees for employment after March 2011.

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2.41 The 2010-11 WGA estimates that net public service pension liabilities fell from £1,135 billion at the end of March 2010 to £960 billion at the end of March 2011. This covers the liabilities of both unfunded and funded schemes. Table 2.8 below shows the main changes underlying the £175 billion fall in the net public service pension liability in the 2010-11 WGA.

Table 2.8: Changes to net liabilities of public service pensions

Changes to WGA balance sheet 2010-11	£ billion	Per cent of GDP ¹
Net pension liability at 31 March 2010 (restated)	1,135	78.2
Net pension liability at 31 March 2011	960	63.8
Change	-175	-14.4
<i>Of which:</i>		
Change in past service costs, including change from RPI to CPI	-126	
Changes in assumptions underlying the value of liabilities, including the change in the discount rate (real, based on RPI)	-69	
Other changes	20	

¹ GDP centred at end-March

2.42 The main reason for the fall in the pension liability is 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. Because the change was announced in 2010-11, this affects the estimation of the liability for paying future payments of public service pensions in the 2010-11 WGA. Table 2.8 shows that this reduced the net public service pension liability by almost £126 billion.¹⁵

2.43 As we discussed in the 2011 *FSR*, the size of the net public service pensions 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.

2.44 Table 2.9 below shows the discount rates used by the central government pension schemes in their accounts from 2008-09 through to 2011-12.¹⁶ The discount rates are set on a real terms basis, based on the price indexation used

¹⁵ £126 billion is the total change in past service costs, which will also include other minor changes to past service costs, but these are very small – for instance these other changes were less than £1 billion in the 2009-10 WGA.

¹⁶ These discount rates are set in the Government Financial Reporting Manual (FRM), based on real yields of high quality corporate bonds. This follows the requirements of international accounting standards.

to uprate public service pensions. The real discount rate used in last year's accounts was 1.8 per cent, based on the RPI. In this year's accounts this has increased to 2.9 per cent, but this is now based on the CPI.

- 2.45 Table 2.8 above shows that the increase of 0.4 percentage points in the real discount rate based on the RPI reduced the net pension liability by about £69 billion in 2010-11. The further increase in the real discount rate that resulted from basing it on CPI is captured in the £126 billion reduction in past service costs shown as arising from the move to CPI for uprating pension payments.

Table 2.9: Discount rates for central government pension schemes

	2008-09	2009-10	2010-11	2011-12
Discount rate, nominal	6.0%	4.6%	5.6%	4.9%
Discount rate, real, using RPI	3.2%	1.8%	2.2%	1.8%
Discount rate, real, using CPI			2.9%	2.8%
Discount rate, real, using price indexation used to uprate public service pensions	3.2%	1.8%	2.9%	2.8%

- 2.46 Table 2.9 shows the discount rate that will be used by the central government unfunded pension schemes in 2011-12. This falls by just 0.1 percentage points in real terms, based on the CPI. We would therefore expect only a small change in the net pension liability in next year's WGA results on account of this change in the discount rate.
- 2.47 The other changes to the public service pensions liability shown in Table 2.8 will include the additions to the liability as a result of public service employment during 2010-11. These additions to liabilities are difficult to compare from year to year because they are calculated using the discount rate which changes each year.
- 2.48 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 discussed above. The new ONS estimates of pension liabilities cover both public service pensions and state pensions (see Box 2.1).

Box 2.1: ONS's new statistics on UK pension liabilities

In April 2012, the ONS published the first set of their new statistics on the total gross liabilities of UK pension providers, including the UK government. These cover pensions provided by private sector workplace schemes, public service pensions, and state pensions. The statistics show the pension liabilities at the start and end of 2010. Because these new ONS statistics are still being developed, they are currently described as 'experimental' statistics, rather than National Statistics.

Like WGA, these ONS pension liability statistics only cover future pension liabilities that have accrued from past employment. They also assume that future pension payments are based on existing pension policies. The ONS have developed these new statistics as part of the requirements of the new European System of Accounts (ESA2010). All EU member states will be required to produce this new information, probably from 2014 onwards, as supplementary information alongside the main National Accounts.

These liability statistics are calculated using a standard set of assumptions, designed to make the statistics comparable across EU countries, including that the discount rate for public service pensions should be 3 per cent real, or 5 per cent nominal. The discount rate will remain fixed, which means that, in due course, these statistics can be compared across a longer time series: the liabilities will increase by the additional liabilities accrued from the current year's employment, and will reduce by pensions paid – and these changes will be comparable from year to year.

Table A compares the ONS and WGA estimates of public service pension liabilities. Both estimates are derived from the same information source – the resource accounts for the pension schemes. However the ONS adjust the accounts data for the different discount rate required under ESA2010, using a methodology provided by GAD. Table A shows that, at the end of 2010, the ONS estimated the gross liability for public service pension liabilities to be £1,165 billion, which is very close to the WGA estimate of £1,168 billion at 31 March 2011. The ONS real discount rate (3 per cent) is close to the real rate applied in the WGA at the end of 2010-11 (2.9 per cent). The ONS estimate for the change in the liability due to the change in indexation from RPI to CPI is also very close to the WGA estimate. The estimates of the liabilities at end 2009 (or 31 March 2010) differ because the WGA liability at that time was based on a real discount rate of 1.8 per cent.

The ONS estimates for the government's liabilities for state pensions are shown in Table B. These are based on long-term projections provided by DWP and are produced on a similar basis to those which DWP provide for the analysis in Chapter 3 of this report. However, for ONS purposes DWP base the projections on the specific assumptions required under ESA2010 and only include payments that have accrued from past activities. In Chart 3.6 in Chapter 3, we show how the latest DWP long-term projections for pensions are divided between these payments for past accruals and the payments that are projected to accrue from future activities.

Table A: ONS and WGA estimates of public service pension liabilities

	£ billion		
	Funded public service pension schemes	Unfunded public service pension schemes	Total public service pension schemes
ONS estimates¹:			
Gross pension liability at end December 2009	332	915	1,247
Gross pension liability at end December 2010	313	852	1,165
Change	-19	-63	-82
<i>Of which:</i>			
Change in indexation of pensions from RPI to CPI	-32	-95	-127
WGA estimates:			
Gross pension liability at end March 2010 ²	309	1,019	1,328
Gross pension liability at end March 2011 ²	274	893	1,168
Change	-35	-126	-160
<i>Of which:</i>			
Change in indexation of pensions from RPI to CPI	-21	-105	-126
¹ Pensions in the National Accounts - A fuller picture of the UK's funded and unfunded pension obligations. Levy (ONS) 2012. The 'end December' figures are taken as the end March figures from pension schemes resource accounts.			
² Gross liabilities for the funded pension schemes have been calculated by subtracting estimates for the funded schemes' assets. These will be included in the full audited WGA accounts, when those are published later this year.			

Table B: ONS estimates of government liabilities for state pensions

	£ billion	Per cent of GDP ¹
Government liabilities for state pensions at end December 2009 ²	3,497	241
Government liabilities for state pensions at end December 2010 ²	3,843	256
Total change in liabilities for state pensions in 2010	346	14
<i>Of which:</i>		
Change from uprating basic state pensions using 'triple lock' guarantee	162	
Change from uprating additional pensions using CPI rather than RPI	-124	
Revaluation of the liability between the start and end of year ³	173	
Reduction in pension entitlements from payment of pension benefits	-69	
Other increases in pension entitlements over the year	204	
¹ GDP centred at end-March		
² See details of ONS source in Table A		
³ Revalued by applying the 5% nominal discount rate to the opening balance		

Depreciation and impairments

- 2.49 In both the WGA and the National Accounts, the current deficit includes an amount for depreciation and impairment of assets and the balance sheet includes assets which are measured net of accumulated depreciation and impairment. But depreciation and impairment are measured differently in WGA

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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.¹⁷

- 2.50 ONS announced in 2011¹⁸ that they proposed to use WGA data for central government depreciation in the National Accounts (except for the differences in impairments explained above, and also except for 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.
- 2.51 The WGA estimate of depreciation and impairments in 2010-11 includes an additional charge of £24.4 billion for the impairment of local authorities' social housing, which will include the housing stock of local authorities' Housing Revenue Accounts. Local authorities are required to reassess the value of their social housing on a rolling programme over 5 years, or to reassess the value of the whole stock every 5 years. Guidance issued in 2010 included revised adjustment factors which reduced the value of local authorities' social housing compared to private sector rented housing, and which also reflected the fall in yields in the private rental market since 2005.
- 2.52 Table 2.7 above, which shows the reconciliation between the WGA and National Accounts measures of the current deficit, includes an entry which records the difference between the two measures of impairments in the two accounting systems. This difference in the measurement of impairment has widened in 2010-11, partly reflecting the additional impairment for social housing described above.

The Private Finance Initiative

- 2.53 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 cover over time.

¹⁷ 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.

¹⁸ McLaren, Saunders and Zammit (2011)

- 2.54 The capital costs of some PFI deals are recognised as liabilities on the National Accounts public sector balance sheet, but many others are not. As well as lacking transparency, this has fuelled 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.
- 2.55 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 on the balance sheet of whichever entity the accountants judge to have effective control of it.
- 2.56 As at March 2011, PSND included £5.1 billion (0.3 per cent of GDP) in respect of PFI deals that were recorded as on balance sheet in the National Accounts. This figure has not been updated since the previous year. Based on the classification approach used for WGA, PFI liabilities amounting to £31.9 billion were on the WGA public sector balance sheet at the same date, up from £28.1 billion at the end of March 2010, as there were additional capital commitments on previous deals and further PFI contracts were recognised. Similarly, service costs rose by a proportionate amount, from £97.4 billion in 2009-10 to £109.5 billion in 2010-11.
- 2.57 Total future capital obligations, including potential lifecycle replacement costs, were £35.1 billion, up from £34.1 billion the previous year. These relate to around 95 per cent of all operational PFI assets, by value, which suggests the total potential capital liability of on and off balance sheet PFI contracts was closer to £37 billion (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 PSND would have been 2.1 per cent of GDP higher at the end of March 2011 than it actually was. This difference is little changed since last year.
- 2.58 Service and financing costs associated with PFI only affect the National Accounts and WGA as and when they arise, but as relatively fixed 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 costs. These unaudited numbers will not necessarily be consistent with the figures in the latest WGA.
- 2.59 Based on this series, if no further deals were signed, annual payments would peak at 0.6 per cent of GDP over the current Spending Review period, constituting only around 2½ per cent of Departmental Expenditure Limits (DELs). But such spending is not distributed evenly across the public sector and so the potential constraint may be more binding in some areas.

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2.60 The WGA balance sheet also includes other non-PFI-related finance leases that are similarly off balance sheet in the National Accounts. These carried a further capital commitment of £7.3 billion at the end of 2010-11, little changed from 2009-10.

Provisions

2.61 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.

2.62 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.

2.63 Table 2.10 gives a summary breakdown of the main provisions recorded in WGA. The largest provisions are for future nuclear decommissioning costs. Total liabilities for provisions increased by £6 billion between 2009-10 and 2010-11. Roughly £24 billion of new provisions were added, £12 billion were used during the year (less than the £15 billion anticipated in the 2009-10 accounts) and £6 billion were removed from future years. The main change in the stock was on provisions for nuclear de-commissioning, which increased by £4 billion reflecting changes to estimates of future decommissioning costs. Provisions for clinical negligence have also increased by £2 billion, following a 30 per cent increase in the volume of new claims reported in 2010-11. Table 2.11 shows when the provisions in March 2010 and March 2011 were expected to be used.

Table 2.10: Provisions in the WGA

Liabilities for provisions	£ billion	
	2009-10 restated	2010-11
Future liability covered by provision:		
Nuclear decommissioning	56.7	60.9
Clinical negligence	15.7	17.5
Other types of provision	29.8	29.7
Total provisions	102.2	108.1

Table 2.11: Timing of use of WGA provisions

	Provisions used in financial year £ billion	Provisions at end March, £ billion				Total level of provisions
		Future time period when provisions expected to be used				
		Within next year	Within 5 years	After 5 years		
2009-10 restated	11.9	15.4	23.0	63.8	102.2	
2010-11	12.2	12.0	27.2	68.9	108.1	

Contingent liabilities

- 2.64** The notes to the WGA accounts also 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 accounts or the summary aggregates. The latest figures from the 2010-11 WGA are shown in Table 2.12 below.
- 2.65** The results for 2009-10 in last year's WGA included £165 billion of contingent liabilities reflecting the Treasury's guarantee of the Bank of England's Special Liquidity Scheme (SLS). This contingent liability has now been removed in the restated results for 2009-10, because the Treasury and the Bank of England are now both included within the WGA, and the WGA consolidates out all contingent liabilities between bodies within its boundaries. However we also know that this guarantee was not called upon. The SLS scheme has now closed with fee income of £2.5 billion and no recorded losses.
- 2.66** Table 2.12 compares the restated contingent liabilities for 2009-10 and the latest WGA contingent liabilities for 2010-11. In total, contingent liabilities increased by £8 billion to £50 billion in 2010-11. Half of this increase came from a £4 billion increase in HMRC's contingent liabilities covering cases where tax collected was being challenged in the courts.
- 2.67** HMRC include both 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 which they expect to win. The provisions cover cases where they judge that there is more risk that they might lose. These amounted to £4.4 billion in 2010-11. In our March 2012 *EFO*, we included an assumption that expected tax losses from litigation would amount to £3.8 billion over the period 2012-13 to 2016-17, broadly similar to the HMRC provision.

Table 2.12: WGA quantifiable contingent liabilities

	£ billion		
	2009-10 in 2009-10 WGA	2009-10 restated in 2010 11 WGA	2010-11
Financial Stability interventions	174.7	9.7	9.8
Export guarantees and insurance policies	9.0	9.0	9.7
Clinical negligence	7.5	7.5	7.9
Taxes subject to challenge	5.5	5.5	9.7
Supporting international organisations	1.9	1.9	0.7
Other	7.8	7.8	11.9
Total quantifiable contingent liabilities	206.4	41.4	49.7

- 2.68 If any quantifiable contingent liabilities were to become likely to occur or to actually happen, then this would reduce the level of contingent liabilities and be recorded as an increase in provisions or spending. However it is not possible to tell from the WGA accounts whether any contingent liabilities changed their status in 2010-11 in this way.
- 2.69 Table 2.12 shows that the WGA accounts continue to include £10 billion in contingent liabilities for financial stability interventions. This covers the government's liability for the capital it has made available for RBS, Northern Rock Plc and Northern Rock (Asset Management) Plc.
- 2.70 In 2010-11, the 'other' contingent liabilities shown in Table 1.12 above included a £5 billion contingent liability for HMRC, to cover the potential for losses resulting from expenditure on decommissioning to be set off against profits chargeable to petroleum revenue tax (PRT). This could reduce PRT receipts already received. HMRC have amended this contingent liability for 2011-12 to cover the effect of decommissioning expenditure being offset for both PRT and ring-fence corporate taxes. The liability rises from £5 billion (PRT) in the 2010-11 accounts to £20 billion (PRT and ring-fence corporate taxes) in their 2011-12 accounts. This should appear in next year's WGA. The March 2012 Budget included a measure to enable the Government to sign contracts with companies operating in the UK and UK Continental Shelf, to provide greater certainty on the relief they receive when decommissioning assets.
- 2.71 The WGA also includes details of remote contingent liabilities, which are those where the chances of the liability actually arising are close to zero. In 2010-11 these remote contingent liabilities were reduced from £434 billion at 31 March 2010 to £378 billion at 31 March 2011. These included the Credit Guarantee Scheme, which closed for new issuance at the end of February 2012 and for which all debt will mature by the end of 2012.

- 2.72 The Treasury additionally announced two credit easing measures in November 2011: the Business Finance Partnership, and the National Loan Guarantee Scheme (NLGS). We included details of the expected impact on PSND in paragraph 4.34 of our November 2011 *EFO*. The NLGS does not affect PSND but will create a contingent liability for the Government of up to £20 billion.
- 2.73 The Bank of England announced its new Funding for Lending scheme in June 2012. Given that the scheme is expected to involve exchanges of assets between the Bank of England and other banks, this is unlikely to create contingent liabilities in future WGA accounts.

Student loans

- 2.74 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.
- 2.75 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 charged to the deficit and net debt only when they arise. As with pensions and provisions, the differences between the two accounting frameworks are all about timing: WGA includes the expected future spending when the liability for that spending is first incurred, whereas the National Accounts include the costs when the spending happens.

Table 2.13: Changes to student loan assets

	£ billion
Student loan assets at end March 2010	27.6
Student loan assets at end March 2011	29.6
Total change in value of student loan assets in 2010-11	2.0
<i>Of which:</i>	
New loans issued and interest on total stock of assets	8.1
Repayments on existing loans	-1.5
Impairments on new and existing loans	-4.6

- 2.76 The book value of the assets increased by £2 billion in the year to the end of 2010-11, from £27.6 billion to £29.6 billion. New loans issued through the course of the year, and expected future interest income, increase the gross value

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of assets by just over £8 billion. Actual repayments on previous loans reduced the value of the total asset book by £1.5 billion.

- 2.77 The expected impairments on newly issued loans were below £2 billion, with the outstanding difference in the headline balance reflecting a lower expectation of the value of previous loans. This mainly reflected the use of more recent economic forecasts for bank rate, earnings growth and RPI, rather than previously-used long-term assumptions. In particular, the bank rate projections implied that loans subject to the 'base rate cap' would pay a lower rate of interest of bank rate plus 1 per cent, rather than RPI for a longer period.
- 2.78 The WGA figures, which reflect the underlying numbers in the BIS and devolved administrations 2010-11 accounts, 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.

Conclusion

- 2.79 In this chapter we have reviewed the latest information available from balance sheet measures that is relevant for fiscal sustainability. We have seen that PSND deteriorated by a further 5.6 per cent of GDP during 2011-12, reaching 66.1 per cent of GDP by the end of March 2012. In the March 2012 *EFO*, this is forecast to deteriorate further to 76.3 per cent of GDP in 2014-15, before falling thereafter, which meets the government's supplementary fiscal target. Chart 2.1 showed that this forecast peak in 2014-15 has deteriorated by 5.8 per cent of GDP, compared to the March 2011 *EFO* forecast. The forecast for PNSW shows a bigger deterioration in the latest March 2012 *EFO* forecast, because PNSW values liabilities at market prices, which have increased, and because the additional borrowing has been used to finance current spending rather than maintain capital assets.
- 2.80 The PSND and PSNW National Accounts measures are limited in that they only record past liabilities accrued from past activities, and don't record future liabilities accrued to date. However the new ONS statistics on pension liabilities will form a useful supplement to the National Accounts, since they will cover future liabilities accrued to date for both public service pensions and state pensions. Although these statistics are critically dependent on the discount rate used, it is helpful that they will at least use a constant discount rate, so that the statistics will generate a time series which can be compared across years.
- 2.81 The latest WGA accounts contain similar information to these ONS estimates on future public service pension liabilities accrued to date, and also contain a further wealth of useful information on other future liabilities accrued to date, such as

provisions and capital commitments under PFI. The WGA accounts also offer a more complete view of the total public sector balance sheet, where both liabilities and assets are revalued on a comprehensive basis.

- 2.82** We have seen that both the WGA and ONS estimates of public service pension liabilities have been reduced by some £126 billion, as a result of the change in indexation of pensions from RPI to CPI. This is a reduction of about 10 per cent in the level of these pension liabilities, at end March 2010. In the WGA, this revaluation also reduces the 2010-11 net deficit. The WGA net liability has fallen by a further £69 billion in 2010-11 because the discount rate used to calculate central government pension liabilities has increased again in the 2010-11 accounts.
- 2.83** The detailed and comprehensive WGA data on future liabilities from past activities provides a treasure trove 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.
- 2.84** 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 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 analyse these future flows by undertaking a 'bottom-up' analysis, aggregating long-term projections of different spending and revenue streams as shares of GDP, plus financial transactions, assuming unchanged government policy.
- 3.2 Long-term projections of this type facilitate a relatively comprehensive assessment of fiscal sustainability. It takes 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. It also takes into account the fact 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, these 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 2016-17 that we published in the March 2012 *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 This chapter first outlines the policy, demographic and economic assumptions required to generate our projections, outlining where these have changed since the last *Fiscal sustainability report (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 influences and health spending

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scenarios. We then briefly analyse the potential impact of these projections on economic performance.

Key assumptions

Policy assumptions in the long-term projections

3.5 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 3.1 sets out the major policy assumptions we make, the most significant of which are discussed in more detail below.

Table 3.1: 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 2017-18. All tax escalators to end by 2016-17.
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. Basic State Pension uprated using the 'triple guarantee' mechanism. State Second Pension uprated in line with CPI in payment. No modelling of single tier pension.
Other benefits (e.g. working age benefits and housing benefits)	All working age benefits uprated with earnings from 2017-18. Universal Credit introduced from 2013.
Student loans	Policy parameters (e.g. cap on tuition fees and repayment threshold) uprated in line with earnings from 2017-18. 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	Recommendations of <i>Good Pensions that Last</i> incorporated for all schemes, including a working assumption regarding armed forces. Incorporates previous policy reform to increase employee contributions by blanket 3.2 per cent and uprate payments with CPI.

3.6 Consistent with the *Charter for Budget Responsibility*, 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 the 2011 FSR 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 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.

- 3.7 In some cases sufficient extra detail of the policy has been announced to allow us to incorporate the effects into our projections. The most significant is the transfer of the Royal Mail's historic pension deficit and liabilities. This had a positive impact on the public finances in the period covered in the March *EFO* as the transfer of assets from the scheme significantly reduce public sector net borrowing and debt in 2012-13. However, the long-run impact is likely to be negative for the public finances as the liabilities exceed the assets.

Tax and benefits uprating

- 3.8 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 earnings typically rise more quickly than prices (although not recently), this definition of unchanged policy would result in the average tax rate rising steadily over time as people find more of their income falling into higher tax bands. This effect is known as 'fiscal drag'. It would not be realistic to assume that this would be allowed to continue indefinitely, so in this report, like last year, we 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.
- 3.9 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 last year's report we therefore assume that working-age benefits rise in line with earnings in the long term. Box 3.1 shows the impact of these uprating assumptions on our projections.

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Box 3.1: Fiscal drag and price uprating

HMRC have updated last year's analysis of fiscal drag on income tax and NICs liabilities between 2016-17 and 2031-32. This is based on the latest Survey of Personal Incomes, updated long-term assumptions and the post-Budget 2012 tax regime i.e. incorporating the Budget decisions to increase the personal allowance and reduce the additional rate from 50p to 45p from April 2013. They find that by 2031-32, fiscal drag would increase tax revenues by 2.6 per cent of GDP (around 0.17 per cent a year). This is unchanged from last year's FSR.

These estimates are generated by comparing two different scenarios on HMRC's Personal Tax Model in which income tax and NIC thresholds and allowances are uprated either with CPI or nominal incomes. Of the fiscal drag effect on income tax:

- around half arises from individuals moving into paying tax and taxpayers paying a higher proportion of their income at the basic rate;
- around 30 per cent is from taxpayers moving into the higher rate band and existing higher rate taxpayers paying a larger proportion of their income at the higher rate; and
- the remainder 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, let alone with incomes.

The fiscal drag effect on NIC liabilities is much lower. The effect is mildly negative for employee NICs since the marginal rate falls to 2 per cent above the upper earnings limit (currently £42,475). 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 (2017-18 to 2031-32)

	Overall	Allowances	Basic rate limit	Higher rate limit/ £100k price effect	Higher rate limit/ £100k real effect
Income Tax (£ billion)	92.1	44.6	28.5	10.2	8.7
Income Tax (per cent of GDP)	2.3	1.1	0.7	0.3	0.2
	Overall	Individual		Employer	
NICs (£ billion)	11.1	-2.4		13.5	
NICs (per cent of GDP)	0.3	-0.1		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 guarantee (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. 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 0.4 per cent of GDP higher in 2031-32 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 much larger relative effect on prospective spending, equivalent to 1.6 per cent of GDP by 2031-32. Both this and the corresponding figure for pensioner benefits are unchanged from last year's estimates.

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. If fees continued to rise in line with inflation, the impact on net debt from student loans would peak at only 5.5 per cent of GDP and tail off more quickly than in our central projections. In 2061-62 they would add 1.5 per cent of GDP to net debt rather than the central projection of 3.7 per cent of GDP.

Public service pensions

- 3.10 In November 2011 the Government published *Good pensions that last*, in response to the recommendations of the Independent Public Service Pension Commission (IPSPC) published in March 2011. This contained the Government's preferred design for new public service pension schemes. The adoption of this design is reflected in our analysis, as well as previous reforms such as the move to uprate pension payments by CPI rather than RPI, and the increase in member contributions announced in March 2011. Annex A of this document looks in more detail at the impact of these policy changes on public service pension expenditure.

Expenditure on public services

- 3.11 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 2016-17 levels. This represents an increase of 0.2 per cent on the central assumption contained

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in the 2011 *FSR*, due to revisions to historical real GDP growth incorporated in the *ONS Blue Book 2011*. We discuss this change further from paragraph 3.20.

- 3.12 This assumption 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 otherwise have been expected to result in spending rising or falling as a share of output.
- 3.13 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. Later in this chapter and in Annex B we analyse the impact on our projections of alternative scenarios for productivity growth in the health sector.
- 3.14 After the current Spending Review period, our spending projections for 2015-16 and 2016-17 are driven by the Government's latest stated policy assumption for total expenditure and total gross investment. The Government has not made any decisions on the growth of individual items of departmental expenditure within these totals, so we assume that all the relevant individual spending categories within our model move in line with either aggregate government consumption or investment.

Demographic assumptions in the long-term projections

- 3.15 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 can result in very different compositions and levels of future populations. We include variants of these assumptions through alternative population projections that we use to test the sensitivity of our projections of the public finances.
- 3.16 Since our last report the ONS have produced new population projections based on 2010 population data. The largest change has been in the assumption for net migration. As with last year, we use the ONS's 'low migration' variant as our central assumption on the basis that the removal of migration restrictions for A8 migrants across the EU, and stated government policy over the shorter term, mean we are unlikely to see a continuation of recent migration trends that are projected in the ONS 'principal' variant. The 2008-based low migration population projections had a long-term average annual net migration

assumption of 120,000. In the 2010-based population projections this has increased to 140,000.

- 3.17 Table 3.2 shows the latest ONS long-term assumptions, and how these have changed, for the population variants of interest to us. The higher population in 2060 in our central variant (the ONS's 'low migration') compared to last year is largely due to the higher migration assumption. While life expectancy at birth in 2033 is broadly unchanged for both males and females, this masks two effects. The first is that life expectancy for current elderly cohorts has been reduced slightly. This will reduce the number of people reaching very old ages across our horizon. The second is that the rate of increase in life expectancy at birth is higher in the 2010-based projections than the ones we used last year after the mid-2030s. This means that by the end of our projections in 2061 life expectancy at birth is 0.6 and 0.4 years higher for men and women respectively, which would have implications over a longer horizon.

Table 3.2: ONS population variant assumptions for 2010

	Fertility rate	Life expectancy at birth in 2033 (years)		Long-term average annual net migration (thousands)	Size of population in 2060 (millions)	
		Males	Females		16-65	Total
Low migration	1.84	83.1	86.7	140	44.5	77.2
High migration	1.84	83.1	86.7	260	50.3	85.8
Zero net migration	1.84	83.1	86.7	0	35.0	64.1
Young age structure	2.04	81.0	85.4	260	52.8	88.2
Old age structure	1.64	85.2	88.1	140	41.4	74.3

Table 3.3: ONS population variant assumptions changes since 2008

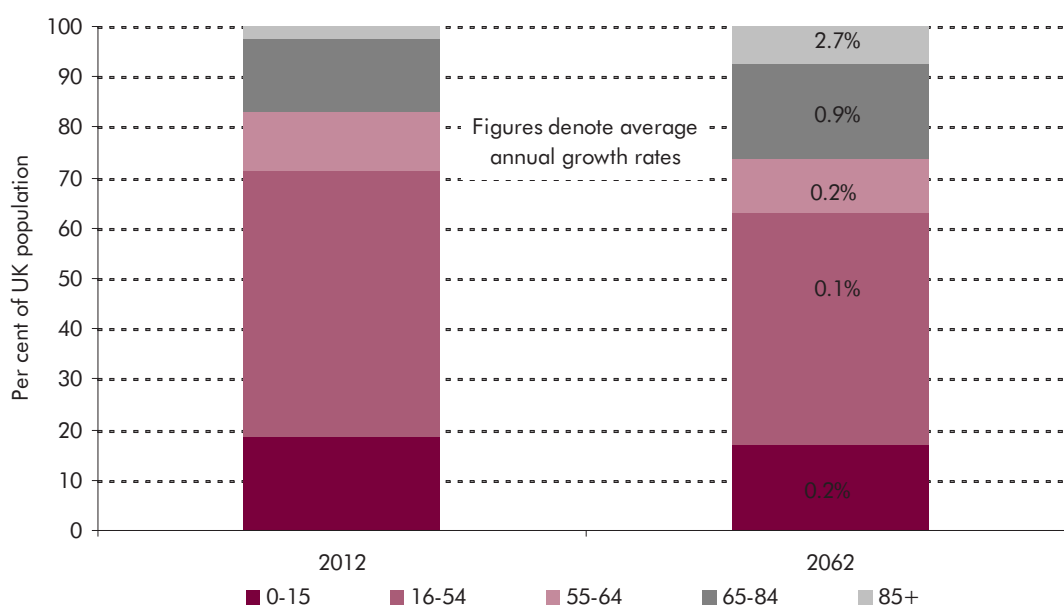
	Fertility rate	Life expectancy at birth in 2033 (years)		Long-term average annual net migration (thousands)	Size of population in 2060 (millions)	
		Males	Females		16-65	Total
Low migration	0	-0.1	-0.2	20	1.1	2.0
High migration	0	-0.1	-0.2	20	1.1	1.9
Zero net migration	0	-0.1	-0.2	0	1.2	2.1
Young age structure	0	-0.2	-0.2	20	0.5	0.8
Old age structure	0	0.0	-0.1	20	1.0	2.2

- 3.18 Some developments in population structure are relatively certain. In particular, the demographic bulge created by the post WWII baby boom will continue to pass through the projections as these cohorts age. Additionally, past trends in 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

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bands. These results are all within 0.1 percentage points of the composition shown in 2061 using the 2008-based projections, which we used last year. 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.

Chart 3.1: Projected changes in the size of population age groups



Source: ONS

3.19 The UK is not alone in having an ageing population structure. Many advanced economies will face similar pressures in the future. Chart 3.2 shows the projected changes in the dependency ratio, defined as the number of the people aged over 65 per hundred aged between 15 and 64, for various countries, derived from UN population projections.

Chart 3.2: UN projections of the dependency ratio



Source: UN Population Division

Economic assumptions in the long-term projections

3.20 Economic growth is the product of labour productivity growth and employment growth. Whole economy productivity growth in our central case is assumed to be 2.2 per cent per year measured in output per worker. This compares to an assumption of 2.0 per cent in the 2011 *FSR*. This change reflects revisions contained in *Blue Book 2011* which altered the way in which nominal GDP is deflated to calculate real GDP.¹ As we set out in our November 2011 *EFO* we expect this to have a permanent impact on measured GDP growth in future – real output growth will be 0.2 percentage points higher, and GDP deflator inflation 0.2 percentage points lower, for any given rate of nominal output growth. It is important to emphasise that these changes do not mean we are fundamentally more optimistic about long-term growth. It is purely a methodological change that does not affect the projection of nominal GDP growth and does not have any material impact on our results.

3.21 We project long-run changes in the proportion of the working 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

¹ For more detailed analysis of the changes to the deflator construction and the impact on GDP, see Chapter 2 of the November 2011 *EFO*.

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employment rate consistent with an assumed non-increasing inflation rate of unemployment (NAIRU) of 5.4 per cent. More information is contained in Annex B of last year’s report.

3.22 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. This leads to the long-term real growth rates set out in Table 3.4, with annual data available on our website. We allow for an additional year of above trend growth in 2017-18 where the UK is still considered to have spare capacity at the end of our five-year forecast. In the long term the growth rate of the GDP deflator is assumed to remain constant at 2.5 per cent, implying long-term nominal GDP growth rates from 4.8 to 5 per cent in our central projection.

Chart 3.3: Employment projections

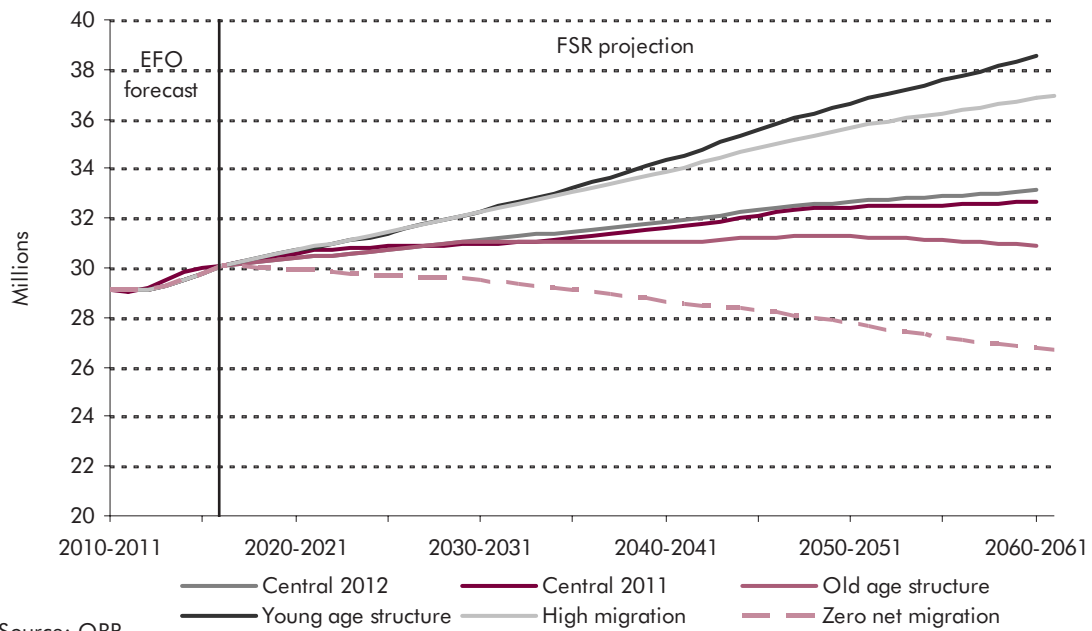


Table 3.4: Real GDP growth under variant population projections

	Annual GDP growth, per cent				
	2011-12 to 2020-21	2021-22 to 2020-21	2031-32 to 2040-41	2041-42 to 2050-51	2051-52 to 2061-62
Central	2.3	2.4	2.4	2.5	2.3
Old age structure	2.3	2.4	2.2	2.3	2.1
Young age structure	2.3	2.7	2.8	2.9	2.7
High migration	2.3	2.7	2.7	2.7	2.5
Zero net migration	2.1	2.1	1.9	1.9	1.9

- 3.23** We also require long-term inflation and earnings growth assumptions for uprating purposes. Earnings growth is assumed to be the product of labour productivity growth and wage inflation. For the sake of simplicity we use the GDP deflator as a proxy for wage inflation. In order that the revisions to this deflator do not cause a material change from last year's report, this means long-run earnings growth of 4.75 per cent, based on a multiplicative approach. For the inflation measures, we assume that in the long run the Bank of England will achieve its inflation target for CPI of 2 per cent. Given the construction of other indices, we can then calculate the relative 'wedge' between them and this measure.²
- 3.24** Interest rate projections are principally used to calculate the interest that is paid on government debt. In the 2011 *FSR* interest payments in the long term were constructed using projections of the yield curve to 2020 provided by the Debt Management Office. The rate was then held constant at the level of 5.1 per cent after 2020. The current yield curve projections indicate a far lower interest rate over the current projection horizon. This breaks the dynamic consistency rule that suggests interest rates should be closer to the growth rate in our projections. We have therefore decided to set the interest rate to 5 per cent from 2021-22. Other interest rates follow the same profile.
- 3.25** Table 3.5 lists the long-term assumptions used in our projections. Where these differ from the forecast in 2016-17 we usually assume for simplicity that there is a 5 year convergence to the long-term average. The full set of these assumptions, including the relevant March *EFO* determinants and transition figures, is included in the supplementary tables on our website.

² For more information on the calculation of 'wedge' measures, see OBR Working paper No.2: *The long-run difference between RPI and CPI inflation*.

Table 3.5: Long-term economic determinants

	Long-term assumption from 2021-22	
	Value	Notes
Prices and earnings		
Average earnings growth (Q2)	4.75	Product of labour productivity and GDP deflator
Public sector earnings growth	4.75	Assumed to grow in line with private sector earnings
GDP deflator	2.50	Constant from end of forecast
RPI (September)	3.40	Calculated as 'wedge' against CPI
RPIX	3.25	Calculated as 'wedge' against CPI
CPI (September)	2.00	Constant from end of forecast
ROSSI	2.80	Calculated as 'wedge' against CPI
Interest rates		
Gilt rate	5.00	OBR assumption
Bank rate	5.00	OBR assumption
LIBOR	5.00	OBR assumption
Employment		
Public sector workforce growth	0.25	Broadly in line with total employment growth

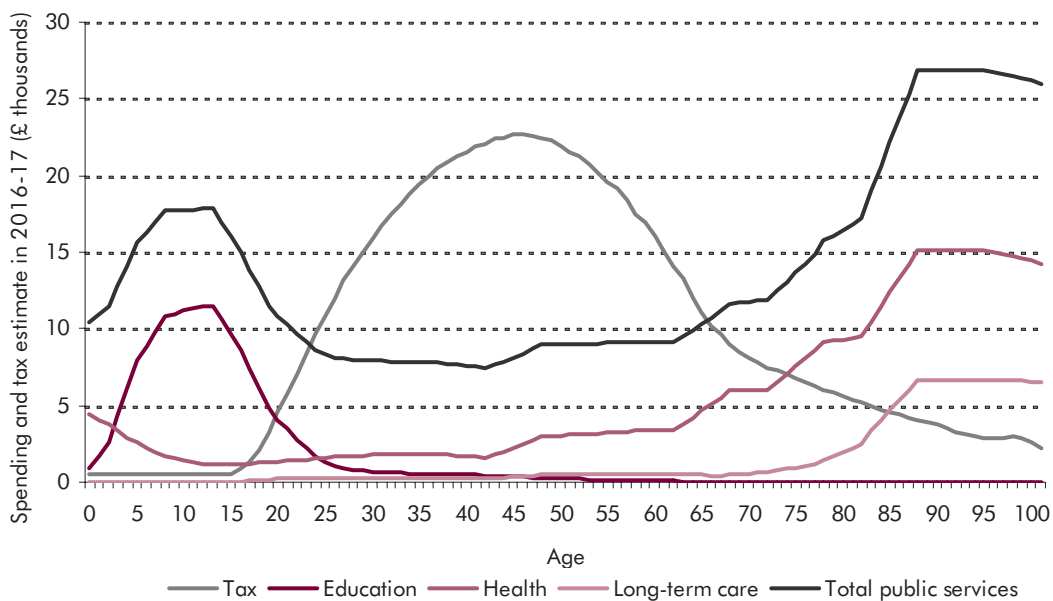
How we project the public finances

- 3.26** We construct long-term projections of spending and revenue streams through an unconstrained 'bottom-up' analysis. By generally holding spending and tax revenues per capita fixed as a share of GDP, borrowing remains unchanged as a constant share of actual GDP, absent demographic changes. This approach may not fully capture cyclical swings in the economy, 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.
- 3.27** 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.³ By applying profiles and population projections to spending and revenue at the end of the medium-term forecast in 2016-17 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 future 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 Chapter 3 of the 2011 FSR gives detailed examples of profiles for higher education and income tax.

3.28 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 2016-17. 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, but will pay less tax as their incomes and spending decline.

Chart 3.4: Representative profiles for tax and public services spending



Source: OBR

3.29 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 the chart above. 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. Additional details of the GAD approach are discussed in Annex A of this report.

3.30 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 2061-62

3.31 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 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

3.32 Table 3.6 shows our central spending projections as a percentage of GDP, excluding interest payments on the national debt. The big picture is that we project total non-interest public spending to rise from 35.6 per cent of GDP at the end of our medium-term forecast in 2016-17 to 40.8 percent of GDP by 2061-62, an increase of 5.2 per cent of GDP – equivalent to £80 billion in today's terms. We show the figure for 2060-61 in the table to aid comparison with last year's published figures. The full annual series is available on the OBR website.

3.33 We can see that from 2016-17 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.

3.34 The starting point for our long-term projections is the final year of our latest *EFO* expenditure forecast, which is now 2016-17. Compared to this starting point in the 2011 *FSR*, public service pensions and state pensioner benefits are higher as a share of GDP, largely due to a lower medium-term GDP forecast, rather than higher cash spending. By contrast the starting point for items of departmental expenditure such as health and education are lower than last year. This is largely due to the decision in the 2011 Autumn Statement to reduce total spending after the end of the current Spending Review period.

Table 3.6: Non-interest spending projections

	Per cent of GDP							
	Estimate ¹		FSR Projection					
	2011-12	2016-17	2021-22	2031-32	2041-42	2051-52	2060-61	2061-62
Health	8.1	6.8	7.1	7.7	8.3	8.7	9.0	9.1
Long-term care	1.3	1.1	1.2	1.5	1.7	1.9	2.0	2.0
Education	5.7	4.5	4.6	4.6	4.4	4.4	4.5	4.5
State pensions	5.7	5.6	5.3	6.1	7.0	7.3	8.2	8.3
Pensioner benefits	1.2	1.1	1.1	1.2	1.3	1.2	1.2	1.2
Public service pensions	2.1	2.2	2.0	1.7	1.5	1.3	1.3	1.3
Total age-related spending	24.1	21.3	21.3	22.8	24.2	24.9	26.2	26.3
Other social benefits	6.3	5.1	5.3	5.2	5.1	5.2	5.2	5.2
Other spending	12.2	9.2	9.2	9.2	9.2	9.3	9.3	9.3
Primary spending²	42.6	35.6	35.8	37.2	38.5	39.4	40.7	40.8

¹ Total spending consistent with the March 2012 EFO.
² Excludes interest and dividends.

Table 3.7: Changes in non-interest spending projections since FSR 2011

	Per cent of GDP							
	Estimate ¹		FSR Projection					
	2011-12	2016-17	2021-22	2031-32	2041-42	2051-52	2060-61	2061-62
Health	0.0	-0.6	-0.7	-0.9	-0.8	-0.8	-0.7	-
Long-term care	0.0	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-
Education	-0.3	-0.5	-0.5	-0.6	-0.6	-0.6	-0.6	-
State pensions	0.1	0.2	0.1	-0.2	0.2	0.3	0.4	-
Pensioner benefits	0.0	0.1	0.1	0.0	0.0	0.0	0.0	-
Public service pensions	0.1	0.3	0.1	0.0	-0.1	-0.1	-0.1	-
Total age-related spending	-0.1	-0.7	-0.9	-1.8	-1.4	-1.2	-1.1	-
Other social benefits	0.3	0.2	0.1	0.1	0.1	0.1	0.1	-
Other spending	-0.4	-0.2	-0.2	-0.2	-0.2	-0.1	-0.1	-
Primary spending²	-0.2	-0.7	-1.0	-1.9	-1.5	-1.1	-1.0	-

¹ Total spending consistent with the March 2012 EFO.
² Excludes interest and dividends.

Health

3.35 Table 3.6 shows spending on health rising from 6.8 per cent of GDP in 2016-17 to 9.1 per cent of GDP in 2061-62. This transition is relatively smooth, and occurs as the population ages. We can see that this is the largest component of age-related spending within our projections. Defining 'unchanged policy' for

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health spending is particularly problematic and for this reason we include more detailed discussion of trends in health spending later in this chapter and in Annex B. In particular we illustrate the impact on future spending of alternative assumptions on productivity growth in the health sector. We also consider alternative assumptions regarding the amount of time spent in ill health – known as morbidity.

- 3.36 Our projections for health spending are around 0.6 percentage points of GDP lower in 2016-17 than in the 2011 FSR, reflecting the Government's decision in November 2011 to cut its plans for overall public spending after the end of the current Spending Review (and our estimate of the impact this would have on public services spending). The gap increases marginally to 0.7 percentage points by 2060-61, but overall the profile is very similar.

Long-term care

- 3.37 Spending on long-term care is projected to increase from 1.1 per cent of GDP at the end of our medium-term forecast to 2 per cent of GDP by 2061-62. This again relates to the demographic shift in the population projections. As our model is purely demographically driven, it makes no allowance for additional changes in conditions that can affect spending on care, such as home ownership and marital status. Equally, our current profile is unlikely to capture the trend in care requirements for adults with learning disabilities or mental health issues that require social care, as highlighted in the *Fairer Care Funding* report by the Commission on Funding of Care and Support. This may mean the balance between age groups within our profile could shift in future, and this is something we may return to in future reports.

Education

- 3.38 While education spending is clearly a substantial component of age-related spending, it is projected to remain broadly flat beyond the end of the *EFO* forecast. There is a small increase in the first half of the projection period, reflecting increases in school spending driven by rising fertility rates in the years preceding the latest population projections. As with health, education spending is projected to be lower by the end of the medium-term forecast period compared to last year. This partly reflects the spending cuts announced in November 2011 and partly a change in our modelling approach so that this estimate now more closely aligns with the Classification of Function of Government (COFOG) data published by the Treasury in the *Public Expenditure Statistical Analysis*.

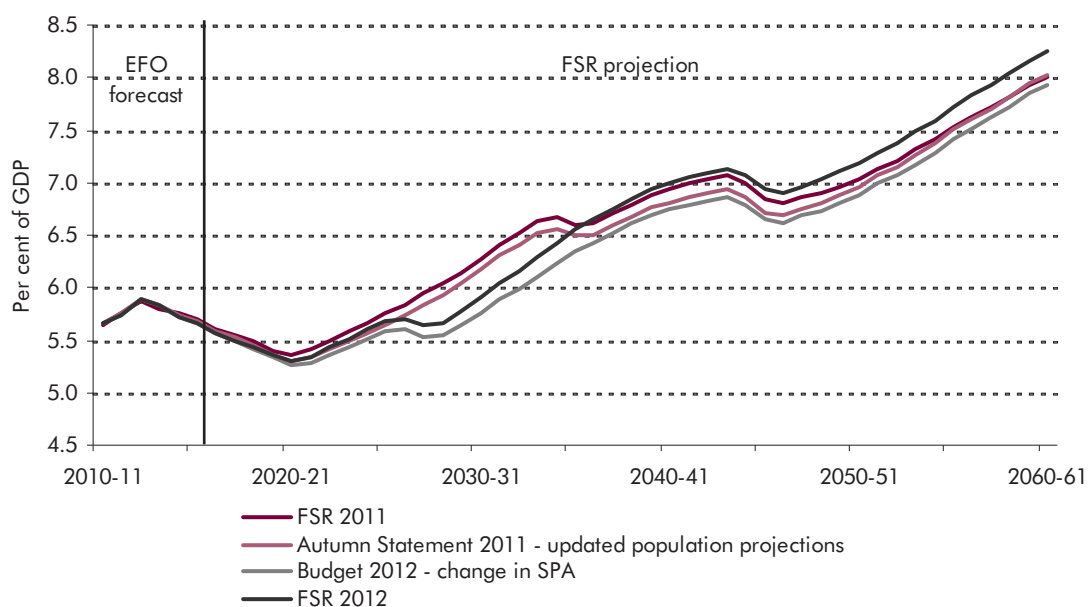
State pensions

- 3.39 The state pension projections increase from 5.6 per cent of GDP in 2016-17 to 8.3 per cent of GDP in 2061-62, driven largely by demographic trends and the maturing of State Second Pension entitlements. This compares to an increase

from 5.5 to 7.9 per cent of GDP from the end of the forecast to the end of the projections in last year's *FSR*.

- 3.40 This pensions line includes many items in addition to the Basic State Pension, such as the State Second Pension, Pension Credit and Winter Fuel Allowance. We also show other pensioner benefits, such as housing benefits, which are received by pensioners but are unrelated to pensions. We do not include any adjustment to account for the Government's proposals for potential reform of the state pension system, either in movement towards a single tier system, or of further changes to the state pension age (SPA) linked to expectations of longevity, given final details have not been announced.
- 3.41 One major alteration to the pensions forecast since last year arises from the Government's announcement in the 2011 Autumn Statement that it was bringing forward the increase in the SPA to 67, from 2034-36 to 2026-28. Chart 3.5 isolates the impact of this change by showing the projections of pensions payments on the following bases: (i) our 2011 projection; (ii) the 2011 projection adjusted for the latest population projections; (iii) the 2011 projection adjusted for population and the SPA changes; and (iv) our final 2012 projection. These projections are shown as a proportion of our current GDP forecast. We can see that the medium-term forecast does not vary much between different projections.
- 3.42 The impact of the new population projections is to reduce expenditure across all years of the projection compared to the 2011 *FSR*. The change to the SPA then reduces expenditure further between 2026-28 and 2034-36. But other modelling changes, particularly making the 'triple guarantee' more expensive, push up expenditure with the gap widening over the projection period.

Chart 3.5: Pension benefits as a proportion of FSR 2012 GDP projection



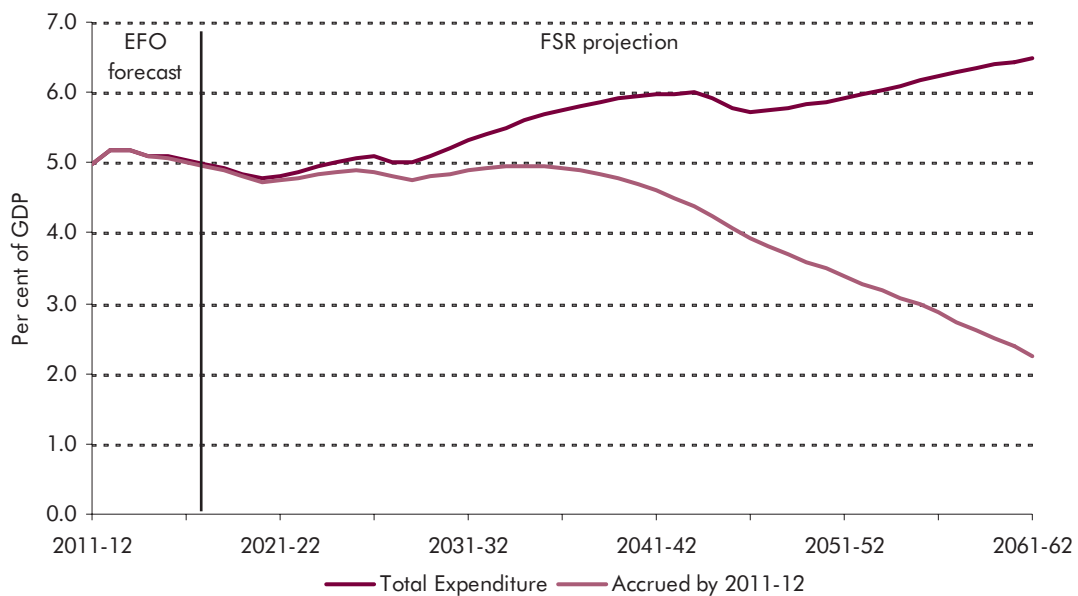
Source: DWP, OBR

3.43 The ‘triple guarantee’ 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. In our modelling, we assume this results in the Basic State Pension rising by earnings growth plus 0.26 per cent a year, based on the historic average of these variables (although in practice you would expect the increase to be in line with earnings in most years and higher in some). Last year we modelled an increase of earnings plus 0.2 per cent, which would have left spending 0.1 per cent of GDP lower in 2060-61 if we had done the same this year. This year’s figure is higher because we have updated the historic average of the variables with the latest data, including the recent years of relatively high inflation. Compared to increasing the Basic State Pension only in line with earnings, our approach increases cash spending by 12 per cent by the end of the projection period, equivalent to about 0.6 per cent of GDP.

3.44 In Box 2.1 we discussed the new ONS estimates for the government’s liabilities for state pensions. These are based on projections of spending similar to those that DWP produce for our long-term analysis. The current ONS liability estimate relates to the projections in the 2011 FSR – although various changes to assumptions have been made to meet the requirements of the European System of Accounts 2010, and the figure relates to calendar years.

3.45 In Chart 3.6 we show a preliminary estimate of the payments for contributory items of state pensions that have been accrued to date for the projections contained in this report.⁴ This serves to highlight the distinction between future payments for past service, and projected future payments for future service (we show a comparative chart for public service pensions in Chart A.2).

Chart 3.6: Projections of contributory state pension payments



Source: DWP, OBR

Public service pensions

3.46 Gross public service pension payments are projected to fall from 2.2 per cent of GDP in 2016-17 to 1.3 per cent of GDP in 2061-62. This compares to a fall from 2 per cent of GDP to 1.5 per cent of GDP in last year's report. The starting point is higher than last year largely thanks to lower medium-term GDP forecasts. In contrast, spending is lower than last year at the end of the projection, partly because of the further expected reductions in the public sector workforce in our medium-term forecast resulting from the additional spending cuts announced by the Government in 2011. In addition, the pension reforms announced by the Government since the last report reduce expected spending by around 0.1 per cent of GDP. The OBR has also made an adjustment to the figures provided by GAD to align to the March EFO. This adjustment is larger than that required in

⁴ The 'accrued by 2011-12' is an estimate based on initial provisional results. Further analysis will be undertaken for the update of the *Pensions in the National Accounts* which may result in revision of this estimate.

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last year's report and accounts for some of the extra difference between projections.

- 3.47 Annex A analyses the impact of all of the public sector pension reforms introduced by the Government since 2010 on net public service pension costs. This combines the impact on gross spending with the impact on member contributions. We estimate that the net cost will fall from 1.7 per cent of GDP in 2016-17 to 0.9 per cent in 2061-62, but that the cost in 2061-62 would be 0.6 per cent of GDP bigger without the reforms. The decision to uprate public service pensions by CPI rather than RPI in payment explains 0.4 percentage points of the difference. The increases to member contributions announced in the 2010 Spending Review and the post-Hutton recommendations in *Good Pensions that Last* each contribute a further 0.1 percentage points.

Other items

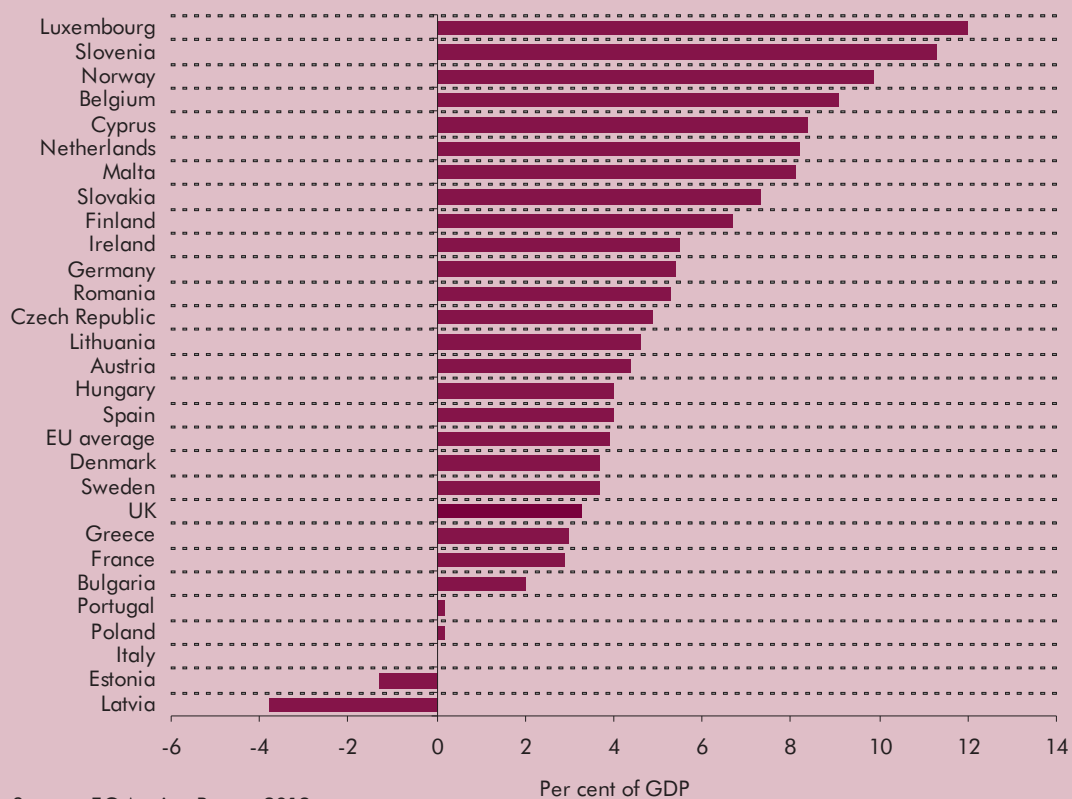
- 3.48 'Other social benefits' and 'other spending' relate to items that are not very responsive to ageing. Other social benefits are broadly flat as a share of GDP over the projection period, within which working age benefits stand at 3.1 per cent of GDP at the start and end of our projections.
- 3.49 We also include an adjustment for Universal Credit, which the Government intends to introduce in 2013 and which will replace several current benefits and tax credits. The approach taken in our projections is to model current benefits and tax credits, and add the Government's proposed maximum marginal cost of Universal Credit of £2.5 billion in 2016-17. This addition is then projected in line with spending on the current benefits it will replace.
- 3.50 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 after 2016-17. These other items are now around 0.2 per cent of GDP lower than our projections last year, partly due to the additional spending cuts announced in November 2011, and partly due to some modelling adjustments of the spending lines discussed above.
- 3.51 Under the new student loan fee system, debts unpaid over a 30-year period, post graduation, will be written-off. Under the Whole of Government Accounts (WGA), discussed in Chapter 2, estimated write-offs affect the net position when the loans are originally issued. But for the National Accounts, write-offs only affect spending once they materialise. Future write-offs relating to loans under the new system are therefore expected to increase spending by around 0.1 per cent of GDP from the mid-2040s. There is also expected to be a smaller pick-up in write-offs relating to loans issued to students starting courses between 2006 and 2011, which will be written-off 25 years post graduation in the mid-2030s.

Box 3.2: European Commission estimates of ageing pressures

The European Commission (EC) produces its own analysis of ageing pressures for member states every three years.¹ The most recent set of projections was published in May 2012, and estimates that the UK would experience an additional spending pressure equivalent to 3.3 per cent of GDP between 2010 and 2060. This was slightly below the EU average of 3.9 per cent of GDP. The chart below shows the change in spending figures between 2010 and 2060 for all 27 EU countries.

There are many important differences between the EC approach and that used by the OBR. For example, the Commission only considers the demographic impact on spending, and not on tax receipts. Also, by using 2010 as the base year, they take no account of spending plans already announced for the next 5 years.

Chart A: EC projections of the change in age-related costs, 2010-2060



Source: EC Ageing Report 2012

Decomposing the Commission projections, we are able to compare theirs and ours for some broad categories of spending as shown in Table B.

The projections for combined state and public service pension spending are similar, increasing by 1.5 per cent of GDP in the EC report and 1.7 per cent of GDP in our projections. This is because the Commission makes use of the results of domestic forecasting models that the OBR also uses. The main reasons for the small difference

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are that the Eurostat projections assume less population ageing and that the ‘triple guarantee’ will be less expensive than we assume.

The differences in the projections of health care and long-term care spending partly reflect different coverage in the data. In the case of long-term care our definition excludes spending in hospitals. However, the increases in spending on long-term care are similar in both projections. For health spending, the EC projections suggest an increase in spending of 1.1 per cent of GDP, compared to our increase of 0.8 per cent. The EC’s methodology includes a lower overall spend on the elderly, and also incorporates a large allowance for improvements in morbidity.

Table B: Comparison of age-related expenditure items

	Per cent of GDP									
	Pensions		Health		Long-term care		Education		Unemployment	
	2010	2060	2010	2060	2010	2060	2010	2060	2010	2060
EC projection for the UK	7.7	9.2	7.2	8.3	2.0	2.7	5.0	5.1	0.3	0.2
OBR projection	7.7	9.5	8.2	9.0	1.3	2.0	6.1	4.5	0.3	0.6

Definitional differences mean that the OBR’s projections of unemployment benefit are not directly comparable with the EC’s. The earnings uprating assumption used by the OBR also keeps this spending constant from the end of the forecast period.

¹ European Commission (2011) and European Commission (2012).

Revenue

- 3.52** As with spending, the revenue projections 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 37.3 per cent of GDP at the end of our medium term forecast in 2016-17 to 38.2 per cent of GDP in 2061-62, an increase of 0.9 per cent of GDP – equivalent to £14 billion in today’s terms. The increase is unchanged since the 2011 FSR, although there have been changes in the composition of this growth, as shown in Tables 3.8 and 3.9.
- 3.53** 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 3.1 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 2.6 per cent of GDP by 2031-32.

Table 3.8: Non-interest revenue projections

	Per cent of GDP							
	Estimate ¹		FSR projection					
	2011-12	2016-17	2021-22	2031-32	2041-42	2051-52	2060-61	2061-62
Income tax	10.0	10.6	10.6	10.6	10.7	10.7	10.8	10.9
NICs	6.7	6.9	6.8	6.7	6.8	6.7	6.7	6.7
Corporation tax	2.9	2.5	2.5	2.5	2.5	2.5	2.5	2.5
VAT	6.4	6.3	6.3	6.4	6.4	6.4	6.5	6.5
Capital taxes	1.1	1.3	1.4	1.4	1.5	1.5	1.5	1.5
Other taxes	10.2	9.8	9.8	9.9	10.0	10.0	10.1	10.1
Primary revenue²	37.3	37.3	37.5	37.5	37.9	37.9	38.1	38.2

¹ Total revenue consistent with the March 2012 EFO

² Excludes interest and dividends

Table 3.9: Changes in non-interest revenue projections since FSR 2011

	Per cent of GDP							
	Estimate ¹		FSR projection					
	2010-11	2015-16	2020-21	2030-31	2040-41	2050-51	2060-61	2061-62
Income tax	-0.2	-0.1	-0.1	-0.2	-0.1	0.0	0.0	-
NICs	0.2	0.3	0.3	0.2	0.3	0.3	0.3	-
Corporation tax	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-
VAT	-0.1	0.1	0.1	0.0	0.1	0.1	0.1	-
Capital taxes	0.1	0.1	0.1	0.0	0.0	-0.1	-0.2	-
Other taxes	-0.2	-0.4	-0.4	-0.5	-0.4	-0.3	-0.3	-
Primary revenue²	-0.5	-0.3	-0.4	-0.8	-0.5	-0.3	-0.4	-

¹ Total revenue consistent with the March 2012 EFO.

² Excludes interest and dividends.

- 3.54 The modest overall projected increase in revenue beyond our medium-term forecast horizon is the result of a rise in income tax, VAT and capital taxes as a share of GDP. This reflects the ageing population structure. Older age groups usually continue to pay income tax (on pensions), VAT and capital taxes, but do not contribute to output once they have left the labour market. Therefore, the revenue from these streams increases as a share of output.
- 3.55 Largely for this reason, income tax receipts rise as a share of GDP from 10.6 per cent in 2016-17 to 10.9 per cent in 2061-62. In contrast, NICs are projected to fall from 6.9 per cent to 6.7 per cent over the period, mainly because pension income is not liable to NICs. Likewise, VAT receipts rise as a share of GDP, since people in retirement will consume out of pension income. The starting point for

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income tax receipts is lower than in last year's projections, but receipts increase at a higher rate to offset this by the end of the projections. This is largely due to the effect of the higher migration assumption, as the profile of net migration suggests most inward migrants are of working age.

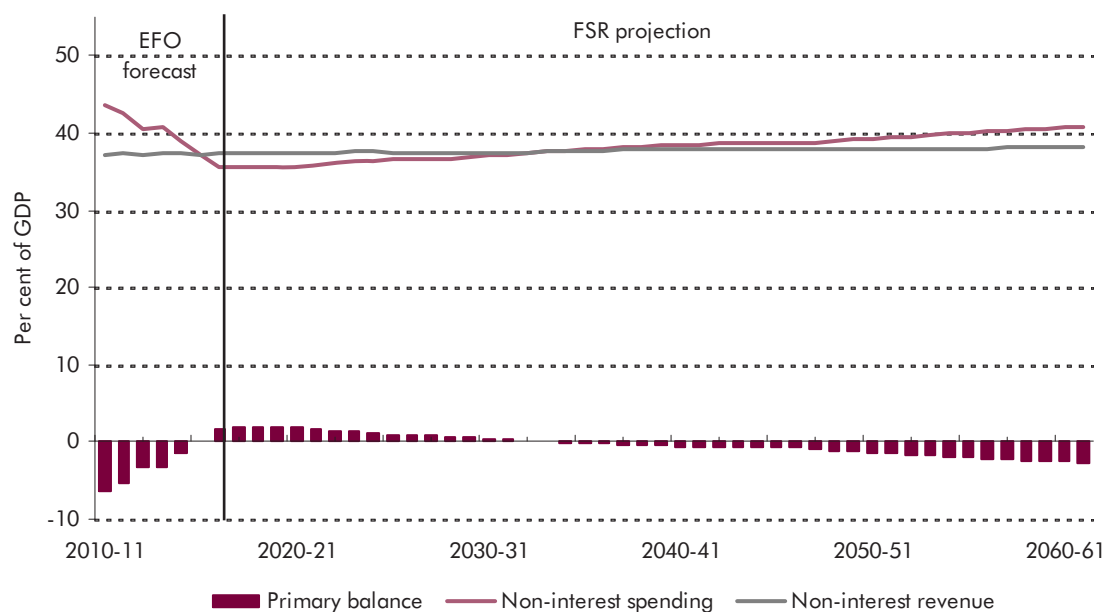
- 3.56** Capital tax revenues, which consist of those generated by inheritance tax, capital gains tax and stamp duties, are expected to rise from 1.3 per cent of GDP in 2016-17 to 1.5 per cent of GDP in 2061-62. Over half of this rise reflects an increase in inheritance tax, reflecting the fact that pensioners are a growing proportion of the overall population. We have adjusted this effect so that the level of tax paid is not constantly increasing with age, as we would not expect all ageing cohorts to continue accruing wealth. Receipts from capital gains tax also rise with an ageing population, as those nearing retirement or in retirement sell off businesses and other financial assets.
- 3.57** 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. This updates the analysis from the 2011 *FSR* of North sea oil revenues, and provides additional analysis of the potential impact of globalisation on revenues from corporation tax and VAT.

The implications for the public finances

The central projection

- 3.58** 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 1.7 per cent of GDP in 2016-17 to a deficit of -2.6 per cent of GDP in 2061-62 – a deterioration of 4.3 percent of GDP, equivalent to £65 billion in today's terms (Chart 3.7). In effect, we project that over five decades these primarily demographic pressures would reverse more than half of the structural improvement in the public finances that we are expecting to see over the next five years as a result of the fiscal consolidation.

Chart 3.7: Revenue, spending and the primary balance



3.59 In order to see how this projected deterioration in the primary balance would feed through into public sector net debt and other balance sheet measures, we also need to take into account future financial and other transactions.⁵ These 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 in any single year.

3.60 For the majority of financial transactions we assume that there is a net effect of zero over the projection period. One exception is the increase in public sector net debt that will arise from the arrangements for student financial support announced in December 2010. We have commissioned the Department for Business, Innovation and Skills (BIS) to model projections of loans and repayments over the next 50 years. Our key assumptions here are that student numbers are assumed to be flat at their current numbers and the initial average fee loan per student is £7,000. We also assume that the tuition fee cap and maintenance grants and loans are uprated in line with earnings after the forecast period.

⁵ In Chapter 2, we outlined the provisions detailed in the WGA, within Tables 2.10 and 2.11. From the underlying information it would be possible to construct a flow of cash payments related to these provisions across our projection horizon. However, the cash flow for provisions will be included within departmental spending when realised, so are implicitly captured in our projections.

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- 3.61 Total student loan payments increased net debt by 2.7 per cent of GDP at the end of 2011-12. The impact is projected to peak at 5.9 per cent of GDP (£91 billion in today's terms) around the early 2030s, falling to 3.7 per cent of GDP (£57 billion) by 2061-62. The broad profile remains unchanged since last year, but these figures are marginally higher, as we now capture loans issued by the devolved administrations over and above loans issued by BIS. The additional loans have not been produced bottom-up, but are instead assumed to follow a similar path to English loans.
- 3.62 With a projection of financial transactions we can then produce projections of public sector net debt and public sector interest payments. These are shown Table 3.10. This shows our projection of public sector net debt falling from just below 75 per cent of GDP in 2016-17 to less than 60 per cent in the 2030s, before rising to 89 per cent of GDP after 50 years. Over the comparable 50-year period, the 2011 FSR projections showed debt increasing from just over 69 per cent of GDP to 107 per cent of GDP. 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					
	2011-12	2016-17	2021-22	2031-32	2041-42	2051-52	2060-61	2061-62
Primary spending	42.6	35.6	35.8	37.2	38.5	39.4	40.7	40.8
Primary revenue	37.3	37.3	37.5	37.5	37.9	37.9	38.1	38.2
Primary balance	-5.3	1.7	1.7	0.3	-0.6	-1.5	-2.6	-2.6
Net interest	3.0	2.8	2.5	2.1	2.2	2.5	3.3	3.4
Total Managed Expenditure	45.8	39.0	39.1	40.2	41.7	42.9	45.0	45.3
Public Sector Current Receipts	37.5	37.9	38.3	38.4	38.9	38.9	39.1	39.2
Public sector net borrowing	8.3	1.1	0.8	1.8	2.8	4.0	5.9	6.1
Public sector net debt	67.3	74.3	65	57	60	68	86	89

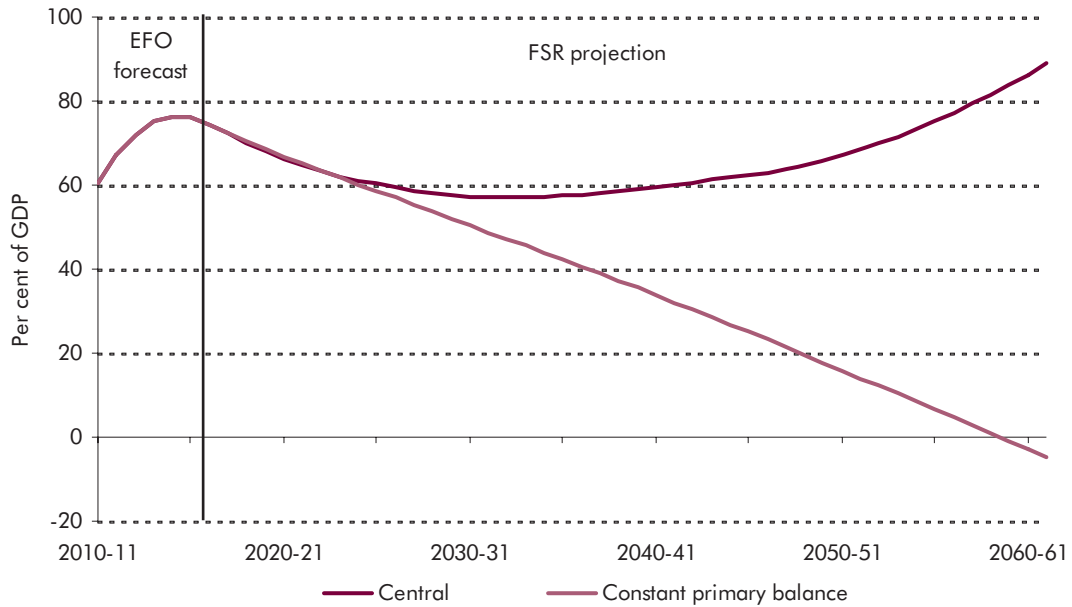
Table 3.11: Changes in the central projections of fiscal aggregates since FSR 2011

	Per cent of GDP							
	EFO Forecast		FSR projection					
	2011-12	2016-17	2021-22	2031-32	2041-42	2051-52	2060-61	2061-62
Primary spending	-0.2	-0.7	-1.0	-1.9	-1.5	-1.1	-1.0	-
Primary revenue	-0.5	-0.3	-0.4	-0.8	-0.5	-0.3	-0.4	-
Primary balance	-0.3	0.4	0.6	1.1	1.0	0.8	0.6	-
Net interest	0.1	-0.4	-0.4	-0.5	-0.7	-1.0	-1.2	-
Total Managed Expenditure	-0.2	-1.4	-1.5	-2.2	-2.1	-1.9	-2.0	-
Public Sector Current Receipts	-0.6	-0.5	-0.5	-0.7	-0.3	-0.1	-0.2	-
Public sector net borrowing	0.4	-0.8	-1.0	-1.5	-1.7	-1.8	-1.8	-
Public sector net debt	1.2	7	2	-5	-11	-16	-20	-

- 3.63** Charts 3.8 and 3.9 show the paths of public sector net debt and public sector net interest respectively as a share of GDP in our central projection, comparing them to the paths if the primary balance was to remain constant beyond 2016-17.
- 3.64** It is clear that the longer-term spending pressures, if unaddressed, would put the public finances on an unsustainable path in our central projection. Public sector net debt would reach nearly 90 per cent of GDP and be rising at the end of the projections. We shall quantify this ‘sustainability’ more formally in Chapter 5. However, as we have observed on numerous occasions, 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.

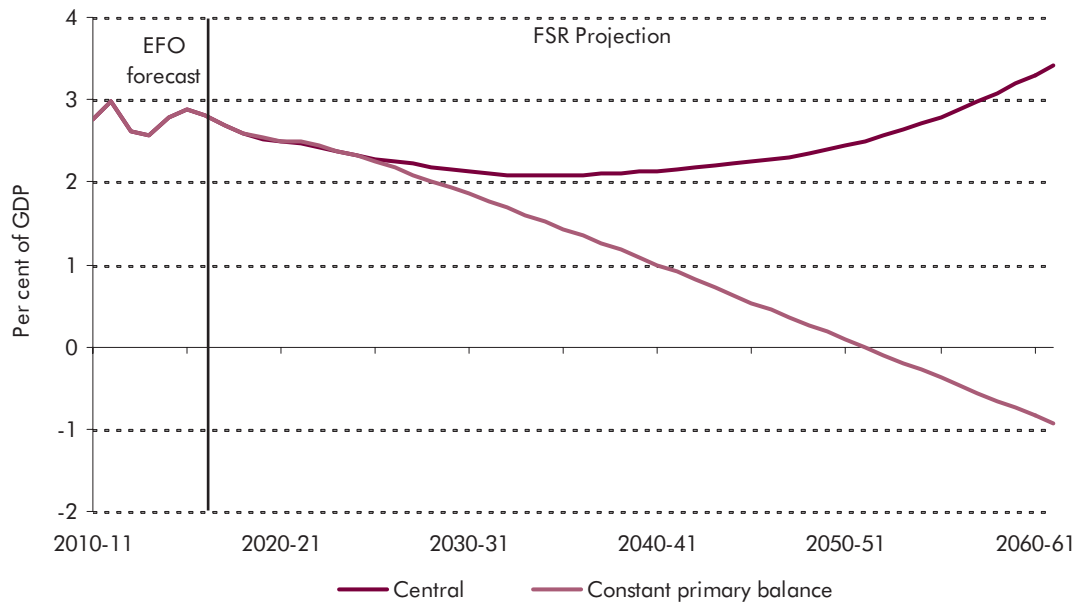
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Chart 3.8: Central projection of public sector net debt



Source: OBR

Chart 3.9: Central projection of net interest payments



Source: OBR

Changes since last year's projections

3.65 Chart 3.10 provides a stylised decomposition of the changes in the headline primary balance since last year's *FSR*. It shows that:

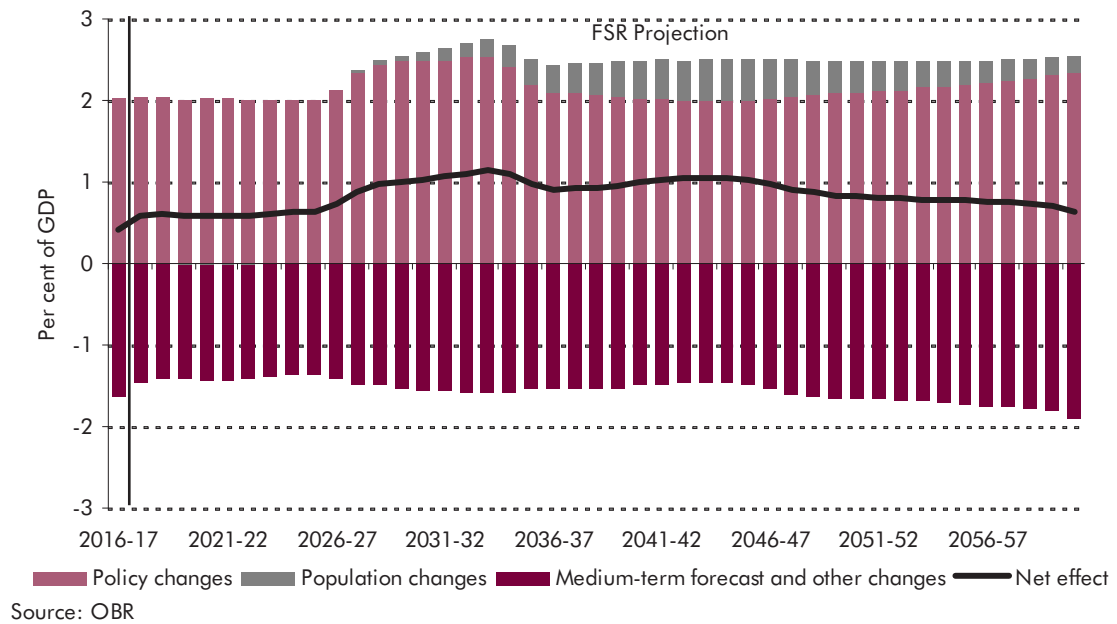
- the underlying position of the public finances expected at the end of the medium term forecast horizon has deteriorated since last year's *FSR*, principally reflecting downward revisions to the level of potential output set out in our November 2011 and March 2012 *EFOs*. These revisions were partially offset by other forecasting changes to receipts and spending, including the effects of rolling the medium-term forecasts forward to 2016-17. A net deterioration in the expected primary balance of around 1½ per cent of GDP persists in later years. Modelling changes within the long-term projections also marginally reduce the primary balance. In particular, we have reviewed our age profile for capital taxes and our assumption of the effect of the 'triple guarantee' on the Basic State Pension. We have also improved the way that interest rates feed into the model, and removed some double counting on student loan interest payments, which do not affect the primary balance, but do show up in the debt projections;
- the Government has more than compensated for this underlying deterioration by announcing a deeper and longer fiscal consolidation through additional spending cuts. Lower structural spending in 2016-17 and an additional year of fiscal drag improve the fiscal position by around 2 per cent of GDP.⁶ Further ahead, bringing forward the state pension age rise to 67, from 2034-36 to 2026-28, implies lower spending on pensions and fractionally higher receipts in the intervening years. Savings from public sector pension reforms also take time to feed through, whilst the effects of lower departmental spending in 2016-17, in particular on health, build over time; and
- the latest population projections have a relatively small impact over time, eventually reducing pressure on the public finances somewhat. Higher fertility rates in the near-term imply slightly higher spending on education in the 2020s. This initially masks more persistent positive effects from a slightly

⁶ A different counterfactual would of course imply a different degree of policy tightening. The 'unchanged policy' baseline against which policies in the *EFOs* were measured against assumed a real freeze in total spending and uprating of tax thresholds with inflation. On this basis, the direct effect of consolidation on public sector net borrowing was closer to 0.8 per cent of GDP.

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larger workforce, given higher migration, and small declines in the life expectancy of some cohorts.

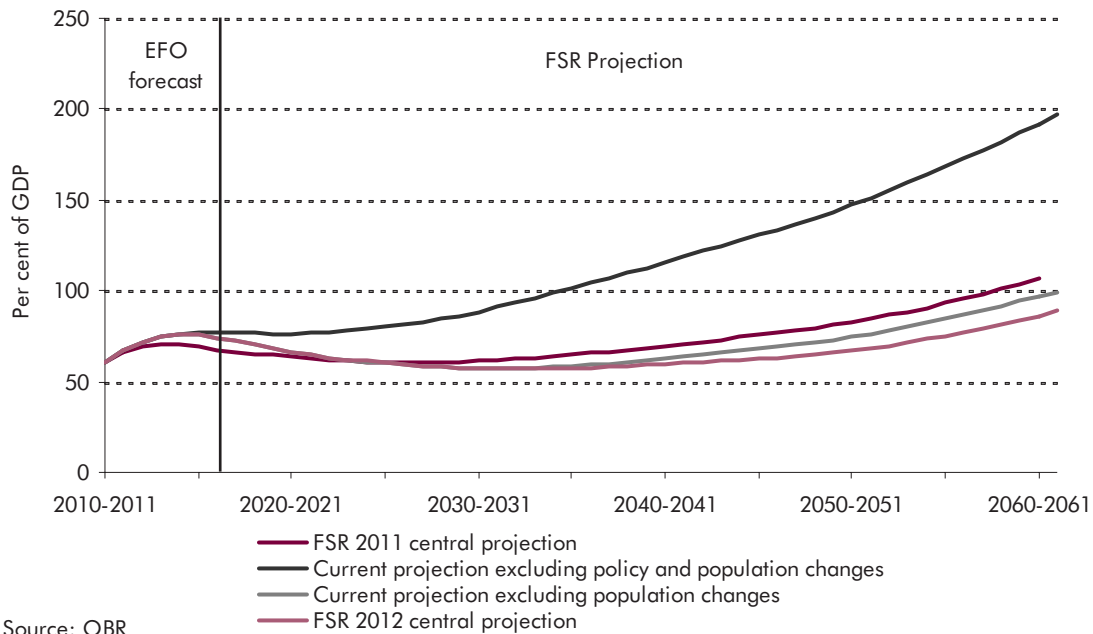
Chart 3.10: Stylised decomposition of changes in the primary balance since FSR 2011



3.66 Chart 3.11 illustrates the cumulative effects of these changes on our debt projections. Excluding the impact of policy changes and the most recent set of population projections, the medium-term deterioration in the public finances, coupled with modelling changes in the longer-term projections, would have implied that debt continued to rise towards 200 per cent of GDP over 50 years.

3.67 Policy changes return the debt projections to a similar but marginally lower path than set out in last year's FSR. Finally, although the demographic changes are relatively small, particularly in the context of previous revisions to population projections, the cumulative effect is to reduce net debt as a share of GDP by around 10 per cent over the 50 year projection period.

Chart 3.11: Stylised decomposition of changes in the net debt projections since the FSR 2011



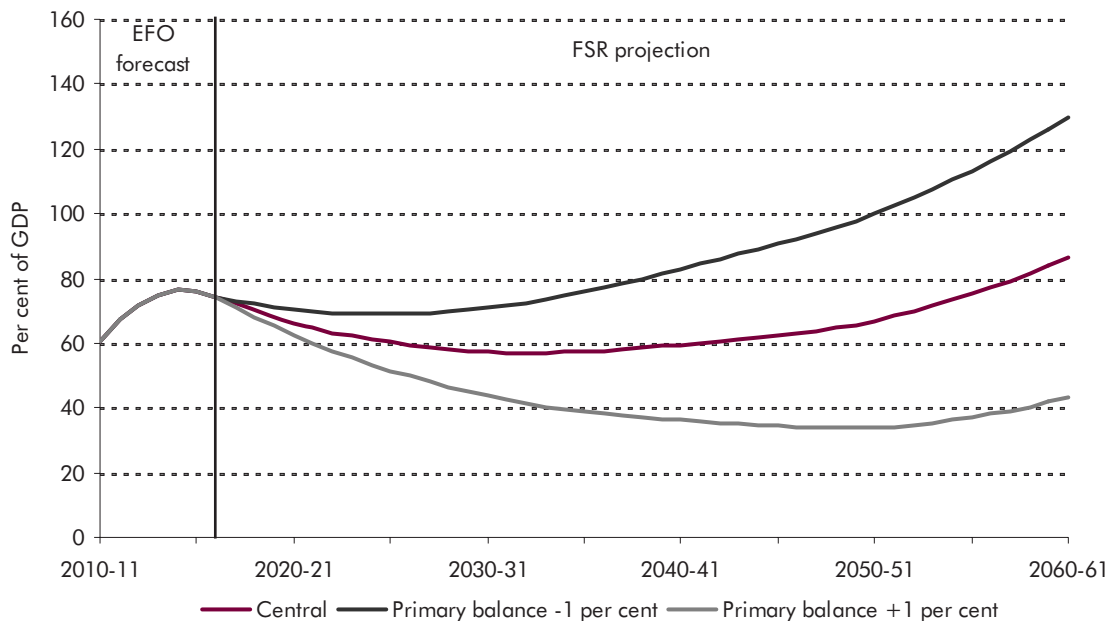
Sensitivity analysis

3.68 This section analyses the sensitivity of our analysis to the medium-term fiscal position and to our key demographic and economic assumptions. Box 3.3 shows the sensitivity to changes in underlying spending and tax profiles, whilst the final section shows the impact of alternative scenarios for health spending.

Sensitivity to the medium-term fiscal position

3.69 We have shown the significant impact that changes to our medium-term forecast have had in the previous section. This illustrates the importance of the gap between spending and revenue at the starting point of our projections, with any gap locked into the long-term. Chart 3.12 shows that if the primary balance in 2016-17 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 130 per cent of GDP rather than around 90 per cent in our central projections. A gap in 2016-17 that is 1 per cent of GDP better than in our March forecast would see debt fall to less than 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 2016-17



Source: OBR

Sensitivity to demographic and economic assumptions

3.70 Table 3.2 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 3.12, which shows the differences in spending and revenue compared to our central projection. Charts 3.13 and 3.14 show the impact of these changes on public sector net debt.

3.71 The demographic variants we use are the ONS's 'zero migration', 'high migration', 'young age structure' and 'old age structure' scenarios. 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 the population does not grow as quickly overall, and the concentration of those older than working age increases. In this scenario lower fertility reduces education costs in the middle of the projections, lowering public sector net debt relative to the central case, before the costs associated with ageing become larger and debt consequently increases faster.

3.72 The migration scenarios illustrate that higher net migration reduces upward pressure on debt over our projection horizon. Inward migrants are assumed in the ONS projections to be more concentrated in working age than the population in general. So higher inward migration would tend to increase tax receipts and not add much to age-related spending pressures, even whilst allowing for an

increase in GDP from extra employment. However, it should be borne in mind that when the inward migrants retire from the workforce, those that remain in the UK will push up spending more than they increase revenues, and even if they leave the UK most will still be entitled to UK state pension payments. So higher migration could be seen as delaying some of the fiscal challenges of an ageing population rather than a way of avoiding them.

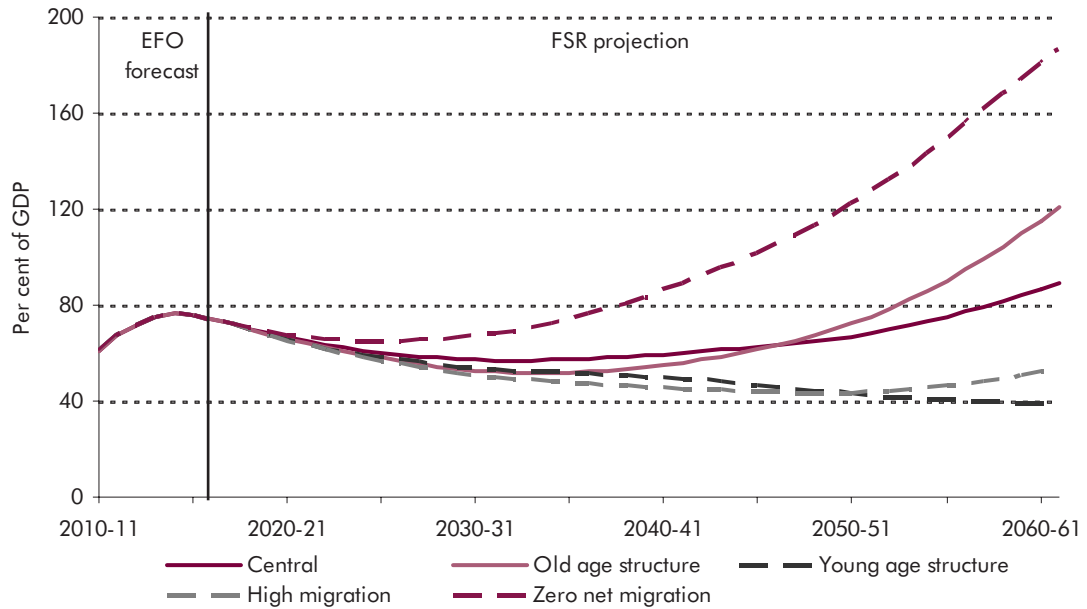
- 3.73** The ‘young age structure’ scenario combines a high migration assumption with lower life expectancy and higher fertility to yield a larger working-age population. However, the increase in the number of children adds to education costs, resulting in slightly higher spending up to 2040-41 and thus higher public sector net debt compared to the high migration scenario alone.
- 3.74** 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 to productivity so revenue is unchanged as a share of GDP in both scenarios. However, as some spending items, such as the State Second Pension, are uprated with prices, these fall as a proportion of spending in the higher productivity scenario. So the higher productivity scenario reduces long-term fiscal pressures while the lower productivity scenario increases them. Thanks to the increase in the assumed cost of the ‘triple guarantee’ for the basic state pension, and the overall tightening in spending, these elements now constitute a larger proportion of spending than in our 2011 projections, meaning a greater proportion that is not sensitive to changes in our productivity assumption.
- 3.75** Box 3.3 discusses the sensitivity of our projections to the way in which some of the underlying profiles in our long-term model are constructed.

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Table 3.12: Spending and revenue for demographic and economic variants

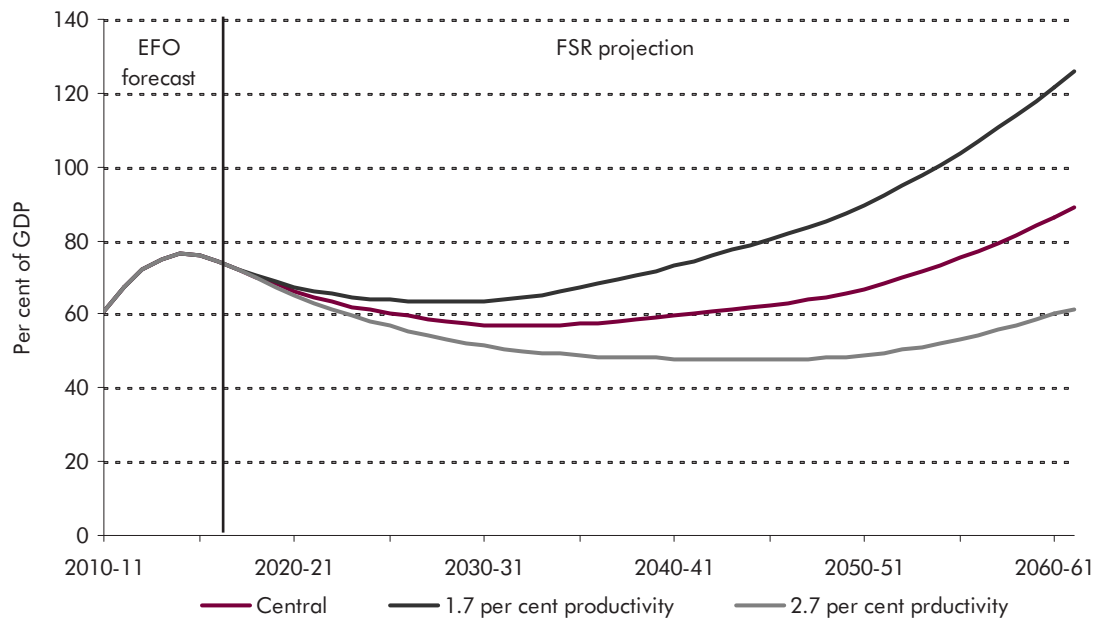
	Difference from central projection, per cent of GDP						
	EFO forecast		FSR projection				
	2011-12	2016-17	2021-22	2031-32	2041-42	2051-52	2061-62
Old age structure							
Total managed expenditure	0.0	0.0	-0.2	-0.5	0.6	2.2	4.9
Public sector current receipts	0.0	0.0	0.0	0.2	0.6	0.6	0.8
Young age structure							
Total managed expenditure	0.0	0.0	0.0	-0.3	-1.6	-3.4	-5.5
Public sector current receipts	0.0	0.0	0.1	0.0	-0.4	-0.6	-0.8
High migration							
Total managed expenditure	0.0	0.0	-0.1	-0.6	-1.4	-2.1	-2.6
Public sector current receipts	0.0	0.0	0.1	0.1	0.0	-0.1	-0.1
Zero net migration							
Total managed expenditure	0.0	0.0	0.2	1.2	3.0	5.6	8.2
Public sector current receipts	0.0	0.0	-0.1	-0.1	0.1	0.4	0.5
1.7 per cent productivity							
Total managed expenditure	0.0	0.0	0.2	0.6	1.1	1.8	2.6
Public sector current receipts	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	-0.2	-0.5	-0.9	-1.4	-2.0
Public sector current receipts	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Chart 3.13: Public sector net debt for demographic variants



Source: OBR

Chart 3.14: Public sector net debt for productivity variants



Source: OBR

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

Box 3.3: Sensitivity to age and gender profiles

As discussed at the beginning of this chapter, we make our long-term projections by using profiles that break down spending by year of age. Our model contains profiles previously developed by the Treasury for its *Long-term Public Finance Reports*. Typically these can be constructed by using administrative or survey data to work out the age and gender of those using a service or paying a tax. We then assume that this current distribution will be maintained in future.

In our 2011 *FSR* we outlined work conducted by the National Institute of Economic and Social Research (NIESR) updating generational accounts estimates for the UK. This work similarly requires the construction of spending and revenue profiles. Table C compares the effects of these profiles with our own. As projections of pensions spending and other benefits are conducted outside our model, we focus on the main elements of health, education and long-term care, and taxes.

Table C: Difference to FSR 2012 projections with NIESR profiles

	Per cent of GDP						
	Estimate		FSR projection				
	2011-12	2016-17	2020-21	2030-31	2040-41	2050-51	2061-62
Health	0.0	0.0	0.1	0.2	0.2	0.2	0.3
Long-term care	0.0	0.0	-0.1	-0.2	-0.3	-0.5	-0.5
Education	0.0	0.0	-0.1	0.0	0.0	0.0	0.0
Spending¹	0.0	0.0	0.0	0.1	-0.1	-0.2	-0.3
Income tax	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Capital taxes	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Other taxes	0.0	0.0	0.0	0.1	0.1	0.1	0.2
Revenue¹	0.0	0.0	0.1	0.2	0.2	0.3	0.4
Public sector net debt	0.0	0.0	0	-2	-4	-8	-15

¹ Excludes interest and dividends

The NIESR profiles suggest higher health spending than our own. This is due to our model incorporating off-setting estimates of the death-related costs, despite having a slightly higher profile for the elderly. However, this is more than offset by a lower projection for long-term care. This is because a more significant proportion of spending in the NIESR model is on adult rather elderly care. There is no difference in the projections for education as the profiles used are very similar.

The NIESR profiles imply additional revenue over the projection period mainly due to differences in capital taxes and other taxes. NIESR profiles for smaller taxes such as alcohol, tobacco and petrol assume higher consumption by those in retirement.

The overall impact is that the NIESR profiles would imply a lower level of net debt by 2061-62. This highlights the sensitivity of our projections to these underlying profiles. We will continue to consider developing these, based on new data, which may cause additional changes to our long-term projections in the future.

Sensitivity to alternative health spending scenarios

- 3.76** Spending on health makes the largest single contribution to the increase in age-related spending in our central projection. Given its importance, we show a number of alternative scenarios using different assumptions about health spending. Annex B provides a more detailed discussion of the evidence on productivity growth and trends in morbidity that we have used as the basis for these scenarios.
- 3.77** The first set of scenarios considers the impact of slower productivity growth in health care. 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 in our central projections. 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.⁷ To maintain an increase in the level of service provided in line with increases in national income, governments would have to increase expenditure more quickly.
- 3.78** If productivity growth in the health sector was 0.8 per cent per year, in line with one estimate of the average productivity growth in the health care sector since 1979, then real health spending per person would need to increase by 3.6 per cent each year to increase health output by 2.2 per cent per year, in line with real earnings growth. Interpreting unchanged policy towards health spending in this way would see health spending in 2061-62 rise by around 7.5 per cent of GDP relative to our central projection and would imply a significantly higher path for public sector net debt over the projection period (Chart 3.15). Scenarios where productivity growth was flat or falling – consistent with estimates of healthcare productivity over the more recent past – would imply even higher levels of spending and debt.⁸
- 3.79** We also look at the impact of different assumptions regarding morbidity – the length of time spent in ill health. To the extent that costs relating to the final year of life are projected forward on the basis of falling mortality rates, our projections of health spending partly capture improvements in health over time. On the other hand, all other age-related health costs are based on a constant health profile

⁷ Baumol (1966).

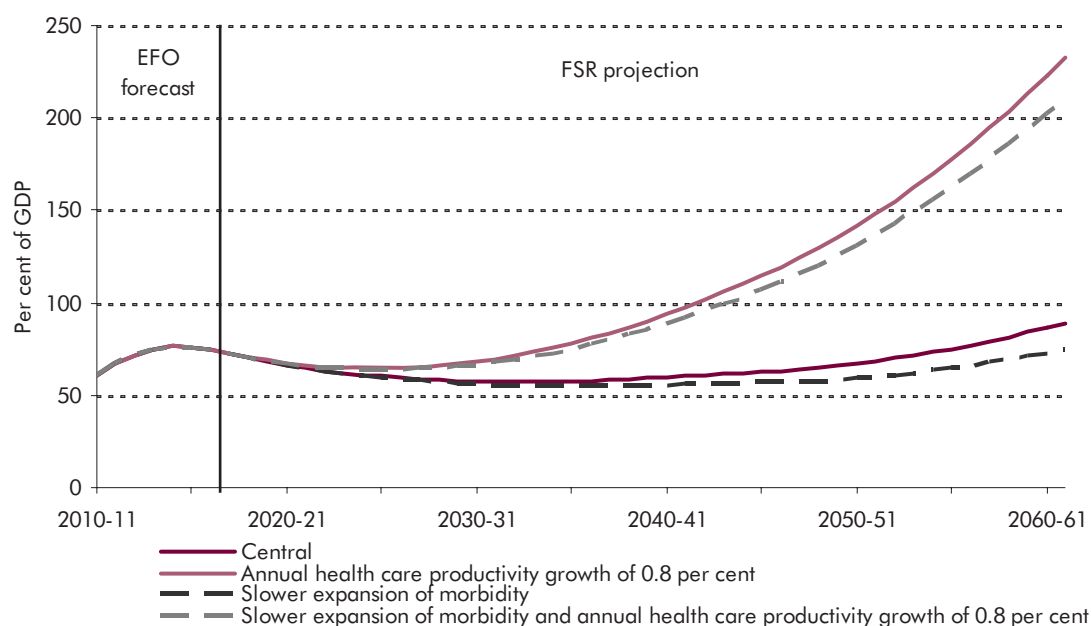
⁸ See Annex B for further details of these scenarios.

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for a person of a specific age and gender. An alternative assumption for these costs would be to assume that health status improves over time as life expectancy increases, implying more of the additional years of life are spent in better health. If the total number of years spent in relatively good health increases by one year for every 12 years then this would reduce health spending by around 0.5 per cent of GDP by 2061-62 relative to our central projection. This would reduce projected public sector net debt as shown in the chart below.

- 3.80** The effect of the alternative morbidity scenario on projected health spending is significantly smaller than the effect of the alternative productivity scenario. A scenario that combines the two scenarios described above therefore leads to higher projected health spending relative to our central projection. In particular, health spending increases to around 15½ per cent by 2061-61 in a scenario in which healthcare productivity grows by 0.8 per cent per year and the number of years spent in relatively good health increases by one year in every twelve.

Chart 3.15: Public sector net debt in health spending scenarios



Feedback from the public finances to the economy

- 3.81** In the analysis presented above, we implicitly assume that the long-term performance of the economy is the same under a wide variety of scenarios. Running significant fiscal deficits may be a very sensible strategy when private

demand is unusually depressed, but running significant exogenously⁹ generated, fiscal deficits for long periods could however have a number of negative consequences for the economy. It could reduce national saving, raise interest rates and 'crowd out' investment leading to lower levels of output.

- 3.82** In this section we use simple correlations to illustrate the possible long-term feedback between the fiscal position and the economy. The focus here is on the potential economic effect of persistently high government borrowing, due to the increased spending pressures we have already identified. The short to medium run effects of current fiscal policy are captured in the five year forecasts presented in our March 2012 *EFO*.

Crowding out illustration

- 3.83** In an open economy like the UK, the crowding out effect of a higher fiscal deficit on investment is likely to be partly offset by higher private saving and/or by attracting foreign capital. Historical correlations suggest that a £1 increase in the fiscal deficit has been associated with an increase in private saving of around 90p and a widening of the current account of 1p.¹⁰ Assuming, for the purposes of illustration, that these correlations held true in the future then in the event that the deficit evolved as in our central projection, the capital stock would be around 1 per cent smaller and the level of real GDP around 0.5 per cent lower by 2061-62 than our central projections assume. This compares to a figure of around 1 per cent reduction in real GDP, calculated from last year's projections. This illustrates a further potential consequence of the lower deficit in our central projection.

Interest rate response

- 3.84** If funds from the private and external sectors do not rise sufficiently to offset a fall in public savings, this would lead to an increase in interest rates (which is part of the reason for the crowding out of investment). Persistent fiscal deficits and higher levels of public debt could also increase the risk premium demanded by investors, further pushing up interest rates and the cost of debt interest.

⁹ An exogenous increase can be thought as a discretionary change in fiscal policy i.e. it is the result of a movements in taxes or spending that is not related to the level of economic activity. It is distinct from endogenous movements in fiscal deficits which are the result of movements in the economy e.g. the automatic stabilisers.

¹⁰ These are correlations and not causal relationships covering a wide range of economic conditions and many changes in fiscal policy. Nevertheless the numbers have some support in more rigorous studies, see for example: Rohn (2010), Brittle (2010), Bussiere et.al (2004), Feyrer and Shambaugh (2009), Ferrucci and Miralles (2007), De Mello et.al (2004), De Serres and Pelgrin (2003), Loayza et.al (2000) and Haque et.al(1999).

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

- 3.85 We use the same illustrative rule of thumb from last year's report that a 1 per cent increase in the fiscal deficit raises interest rates by 20 to 30 basis points. We find this would increase the debt to GDP ratio by 1-2 per cent of GDP in 2061-62, which includes the impact of crowding out. This compares to an estimate of between 2 to 3 percent that we estimated last year.

Conclusion

- 3.86 The long-term projections in this chapter are highly uncertain and the results we present here should be seen as broad-brush illustrations rather than precise forecasts. We have illustrated some of the uncertainties through sensitivity analyses – by varying key assumptions regarding demographic trends, whole economy and health sector productivity growth, and the health of the public finances at the end of our medium-term forecast horizon.
- 3.87 As with our projections in the 2011 *FSR*, 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 health care. But the same demographic trends would leave government revenues roughly stable as a share of national income. We note that productivity growth in the health sector – and the way in which governments choose to respond to it – will also be a key factor in the future sustainability of the public finances.
- 3.88 In the absence of offsetting tax increases or spending cuts, the pressures we have identified would eventually increase the budget deficit sufficiently to put public sector net debt on an unsustainable upward trajectory. It is likely that such a path would lead to lower long-term economic growth and higher interest rates, exacerbating the fiscal problem. However, the UK is again far from unique in facing such pressures.
- 3.89 Whilst these overall conclusions remain similar to last year, the outlook has improved on our central projection. This is primarily because the Government has responded to a deterioration in the medium-term outlook for the underlying health of the public finances with additional projected cuts in spending that more than compensate and therefore deliver a stronger primary balance at the end of the *EFO* forecast horizon. You could see this as a contribution to the need for long-term fiscal adjustment we identified last year. But this also underlines how sensitive our projections are to the starting point at the end of the medium term forecast. The effects of the ageing population is less likely to change from year to year, and policy adjustments to respond to it are likely to be long-term and incremental.

- 3.90 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.
- 3.91 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 reduce revenue from sources such as oil and gas revenues, and consider the effects on VAT and corporation tax of some of the forces of globalisation over the next 50 years.

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, leading to an increase in the tax to GDP ratio of around one percentage point over the next 50 years.
- 4.2 This chapter looks in more detail at non-demographic trends that could affect the sustainability of the tax base over time. In essence, we consider whether there is a good argument for assuming that, other than demographics, a specific revenue stream will rise by a rate other than the growth rate of nominal GDP over the long run. Last year the trends discussed in this chapter were technological change, resource depletion, behavioural change and globalisation.
- 4.3 In this chapter we update some of the analysis included last year's report. We then present a range of highly stylised scenarios demonstrating how corporation tax and Value Added Tax (VAT) could also be affected by trends associated with globalisation.

Update of tax analysis in 2011 *Fiscal sustainability report*

- 4.4 Last year's report assessed how non-demographic trends could affect oil and gas revenues, transport taxes, environmental taxes, and tobacco duties. There have been no significant changes to the long-term outlook for transport taxes, environmental taxes, and tobacco duties since then, suggesting the results from last year would still stand.
- 4.5 In the case of oil and gas revenues we have updated our projections, as set out below, to reflect some significant changes to our medium-term forecast. Our latest projections show oil and gas revenues falling to around half the level we projected last year by 2040-41. But the reduction is small as a share of GDP – from 0.1 to 0.05 per cent – so our broad conclusion remains as last year: that

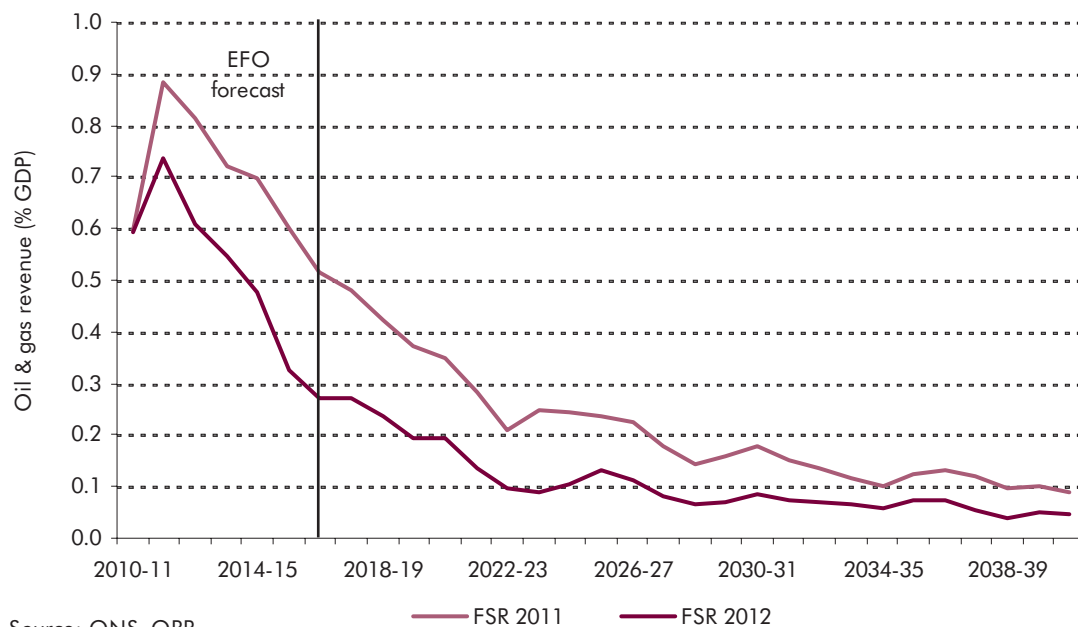
non-demographic factors could lower the tax to GDP ratio for these revenue streams by up to 2 percentage points over the next 20 years.

Oil and gas revenues

- 4.6 UK oil and gas production peaked in 1999 and has since fallen by over 60 per cent. Last year's analysis showed that with a stylised assumption of a 5 per cent per annum fall in production, oil and gas revenues would fall from an expected 0.9 per cent of GDP in 2011-12 to between 0.1 and 0.2 per cent of GDP from 2028 onwards (see Chart 4.1).
- 4.7 Since we produced this analysis last year we have significantly reduced our medium-term forecast for these revenues. Oil and gas revenues were only 0.7 per cent of GDP in 2011-12, mainly due to lower production levels. Our projections for oil and gas prices are also lower than last year, while our forecast for capital expenditure has increased. There have also been policy changes: Budget 2012 introduced measures on decommissioning certainty and field allowances with the aim of supporting oil and gas production.
- 4.8 We have used the same methodology as last year to produce a stylised projection out to 2040, but with updated assumptions on oil and gas prices, capital expenditure and operating expenditure to bring the projections in line with our March 2012 forecast. In particular:
- oil and gas prices are assumed to rise by 2.5 per cent a year from 2017 onwards, in line with price rises in the UK economy as a whole. Oil prices rise from \$95 a barrel in 2016 to \$173 a barrel in 2040. This compares with a projection in last year's report of a rise from \$107 a barrel in 2015 to \$206 a barrel in 2040. The differing profile for oil prices reflects a weaker starting point for the long-term analysis, related to a lower oil futures curve, and the fact that we assume that the rise in prices beyond the medium-term is 2.5 per cent rather than 2.7 per cent; and
 - we maintain the long-term assumption of a 5 per cent per annum fall in production, which is slightly slower than the trend decline since 1999. We have made no allowance for possible shale gas production, given the uncertainties about the scale and feasibility of such activity. But this clearly represents an important upside risk to the projections.
- 4.9 The updated assumptions have a significant impact on the projections. By the end of the 30 year period, receipts are projected to be around 0.05 per cent of GDP – around half the level projected in last year's report. The main driver is lower assumed prices over the projection period, although the updated expenditure and production projections also reduce projected revenues.

4.10 Many fields could cease production in the 2020s. At this point companies will receive tax relief for decommissioning expenditure, pushing down UK oil and gas revenues. At Budget 2012 the Government announced that it will provide greater certainty on tax relief for decommissioning expenditure. As set out in Chapter 2, there is a £5 billion contingent liability related to the effect of decommissioning relief on PRT in the Whole of Government Accounts for 2010-11. HMRC have increased the contingent liability to £20 billion in their 2011-12 accounts to cover both PRT and ring-fence corporate taxes.

Chart 4.1: UK oil and gas sector revenue projections



Source: ONS, OBR

4.11 The key sensitivity for this projection is the path for oil and gas prices. The large swings in prices over the past decade have made UK oil and gas revenues the most volatile of the main tax streams. UK oil and gas revenues have varied between 0.4 per cent of GDP and 0.9 per cent of GDP between 2000 and 2010. Higher oil and gas prices than expected would boost profits although, if they were associated with strong cost pressures (as in the mid-2000s), the gain in receipts would be dampened. In contrast, persistently low oil or gas prices would not only reduce profits but also discourage investment and accelerate the decommissioning of fields. In such a scenario, the drop off in production and hence receipts is likely to be steeper than envisaged here.

Globalisation and tax sustainability

4.12 The term globalisation captures the idea of an increasingly connected world, in terms of economic transactions as well as social and cultural ties. Economic

globalisation has been defined by the IMF as follows: “the increasing integration of economies around the world, particularly through the movement of goods, services, and capital across borders.”¹ Globalisation has the potential to affect a wide variety of taxes through a number of different channels.

- 4.13 In the tax chapter of the 2011 *Fiscal sustainability report* there was a discussion of the impact of globalisation on labour taxes. Through a combination of increased specialisation within the world economy and advances in technology, the premium on skills has increased. The share of the pre-tax income of the top 5 per cent of UK income taxpayers rose by 3.1 percentage points between 1999-2000 and 2009-10. Given the progressivity of the income tax system, this has boosted receipts. Further globalisation could also increase the mobility of highly skilled labour. Depending on whether this leads to an inflow or outflow of labour, the impact on revenues could be either positive or negative.
- 4.14 In this report we focus on two further specific trends associated with globalisation that could affect UK tax revenues. First we examine the potential impact of cross border movements of profits on corporation tax revenues. We then consider how international trade and changes in international relative prices could affect VAT revenues.
- 4.15 Given the huge uncertainties around the path and impact of globalisation, these projections are not presented as our central estimates of future revenues from these sources. Rather they are highly stylised projections. Moreover, the scenarios are partial analyses capturing only the direct impact on revenues and do not take into account the potential wider economic effects of globalisation.

Corporation tax and globalisation

- 4.16 International reductions in capital controls and developments in technology and communications have increased the ability of companies to choose where to locate investment and where to book profits. In this analysis we consider how international corporation tax rates can affect incentives to shift profits between countries. Globalisation may have wider impacts on corporation tax; anything that affects the profitability of a firm can affect corporation tax revenues. However, for the purposes of this work we investigate only the impact of profit shifting on revenues.

¹ IMF (2008).

How corporation tax rates affect profit shifting

- 4.17 Profit shifting refers to actions by a firm to distribute its operations and income among a number of countries so that its tax burden is minimised. Various methods can be used to achieve profit shifting but the basic idea is to arrange a group's internal transactions so that the maximum possible profit is declared in low tax jurisdictions. For a discussion of the different types of profit shifting see Varney (2007).
- 4.18 Some forms of profit shifting are entirely legitimate; firms may seek to move headquarters to benefit from a more advantageous tax rate. But other forms are considered harmful and there has been international cooperation to discourage these practices. The OECD has introduced guidelines for transfer pricing which set out principles to allocate profits fairly between jurisdictions where firm functions are split across borders. These guidelines have also been used as a constraint on profit shifting to distinguish allowable and non-allowable practices, determined by an arm's length principle.²
- 4.19 Varney (2007) finds a basic correlation between the statutory corporation tax rate and the share of taxable corporate profits in the economy for EU countries. This suggests that a higher statutory rate is associated with a low share of taxable profits, which is suggestive of profit shifting. To model the potential long-term effects of profit shifting on UK corporation tax, we investigate how incentives to shift profits could be affected by differences between the statutory corporation tax rates of the UK and its main trading partners.
- 4.20 In this analysis we focus on the impact of corporation tax rates on profit shifting, not including international investment flows. A lower corporate tax burden would generally also increase the attractiveness of a given jurisdiction for investment, other things being equal. Indeed, corporate taxation is one of the top ten investment decision criteria according to Ernst & Young's annual *European Attractiveness Survey*.³ Therefore if the corporation tax rate were to fall further in comparison to international rates (and assuming that the effective and marginal rates track the statutory rate), we might expect the UK to attract more FDI.⁴ However, such effects are not considered in this analysis.

² OECD (2010).

³ Ernst & Young (2011).

⁴ Effective corporation tax rates and marginal corporation tax rates in a tax jurisdiction affect incentives to invest and how much to invest respectively.

Changes to corporation tax rates in the UK and abroad

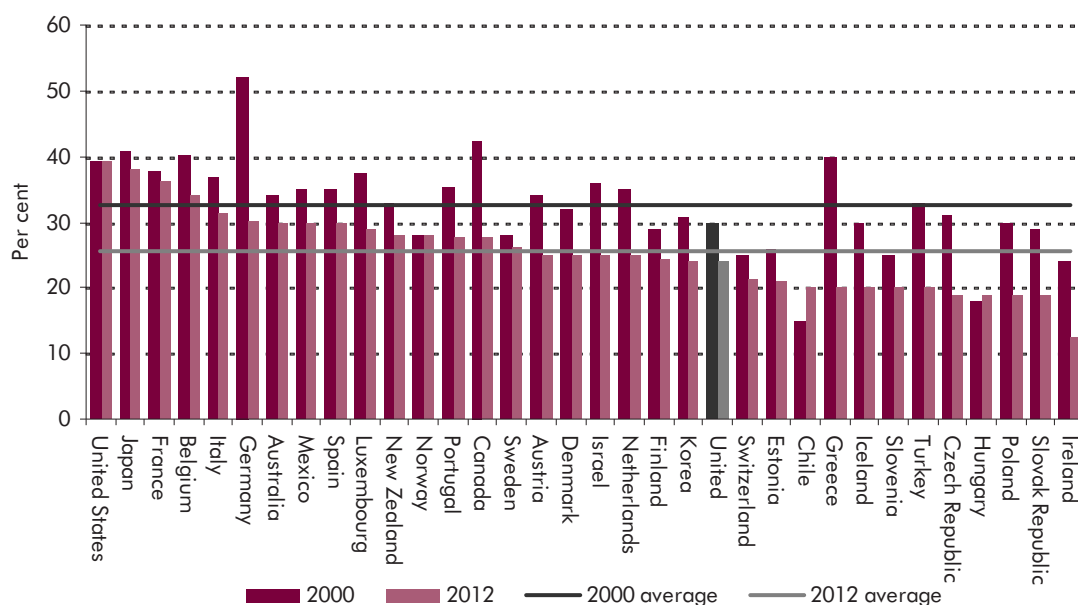
- 4.21 Statutory corporation tax rates are the rates at which firms are required to pay tax on their taxable income, such as trading or investment profits and capital gains, less deductions, such as trading losses and capital allowances. Chart 4.2 shows that in line with most OECD countries, the statutory corporation tax rate in the UK in 2012 is lower than it was in 2000. Other countries' rates have also tended to fall over the same period. The UK's current rate of 24 per cent is relatively low compared to most OECD countries and is set to fall further, reaching 22 per cent in 2014.
- 4.22 Although corporation tax rates have been falling on average, tax revenues paid by corporates have generally increased over time as a share of GDP (see Chart 4.3).⁵ This increase in the corporate tax to GDP ratio can partly be explained by base broadening. Base broadening implies widening the definition of taxable income so a higher proportion of a company's income becomes liable for tax. One example of base broadening is the removal or reduction in the generosity of capital allowances. Another possible explanation for the observed strength of revenues is the transfer of income from the non-corporate to corporate sector in response to lower tax rates.⁶ We do not consider these effects in our modelling. We assume no further base broadening and only consider shifting profits between the UK and international competitors.
- 4.23 Some commentators have suggested that we will see a race to the bottom for corporation tax rates as countries compete to attract mobile capital and profits.⁷ However, Devereux & Bilicka (2012) note that although in the past there have been large falls in countries' corporation tax rates, this trend is slowing for those countries whose rates are already relatively low; they find no evidence of a new wave of tax competition across all OECD and G20 countries. Instead they suggest that in the next few years it will be countries with relatively high corporation tax rates whose rates are likely to fall.

⁵ Devereux and Sorenson (2006) show that when weighted by each country's GDP then revenues paid by corporations have been broadly flat between 1965 and 2004.

⁶ Transferring income from the non-corporate to the corporate sector refers to tax motivated incorporations. It occurs when the self-employed register themselves as companies and declare their income as corporate profits rather than employment income. The incentive for doing so is that paying corporation tax on their income would be lower than their personal income tax burden.

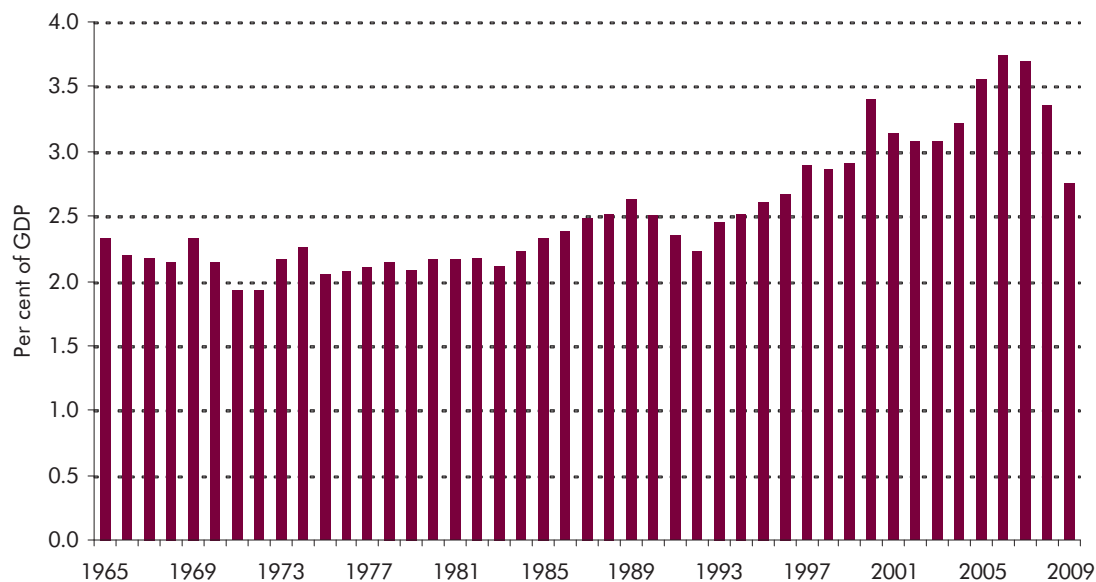
⁷ See for example Sorenson (2007) and Devereux and Loretz (2006).

Chart 4.2: OECD corporation tax rates in 2000 and 2012



Source: OECD

Chart 4.3: Taxes on corporate profits as a share of GDP (unweighted average) of OECD countries

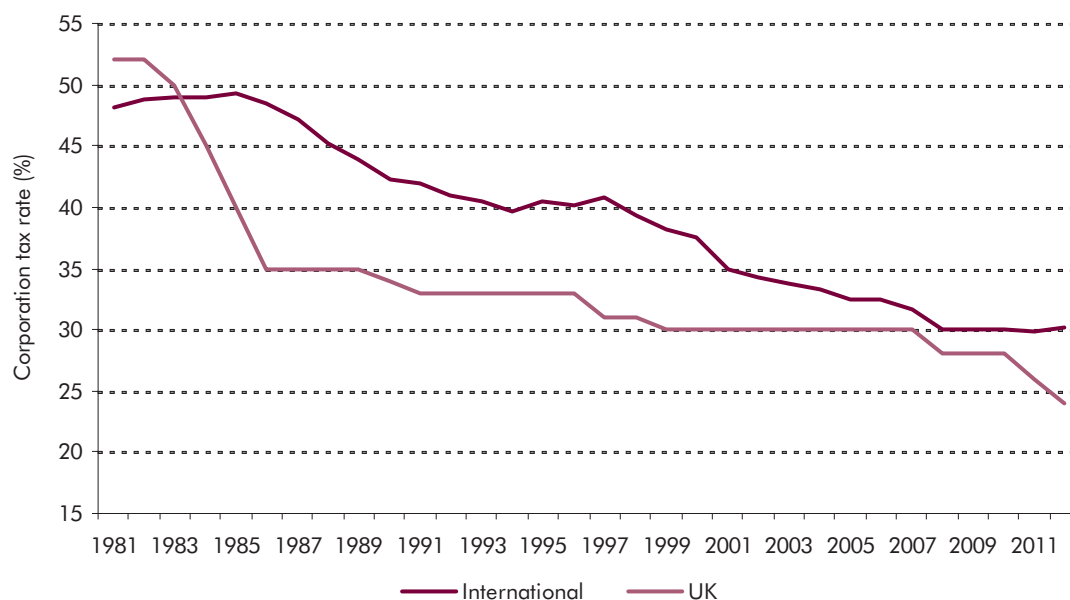


Source: OECD

Corporation tax scenarios

- 4.24 In the following section we model how corporation tax revenues might be affected as firms seek to shift profits to a jurisdiction with a lower tax burden. In these scenarios we project a continuation of the current downward trend in corporation tax rates (both UK and international), using different trend declines.
- 4.25 There is no stated long-term Government policy for corporation tax. So in these scenarios we use two assumptions to represent unchanged Government policy over the long-term:
- the UK statutory rate remaining at 22 per cent (the current stated policy at the end of our medium-term forecast) for the projected period as international corporation tax rates fall. This implies that the tax rate differential increases over time; and
 - the tax rate differential between the UK and its international competitors remains constant. As foreign competitors reduce their statutory corporation tax rates the UK also reduces its rate.
- 4.26 We model the evolution of the UK statutory corporation tax rate against a single representative average corporation tax rate for the UK's main trading partners. This captures the idea that it is the UK's relative competitiveness against other countries in terms of tax burden that determines how much profits are shifted into, or out of, the UK.
- 4.27 We define this representative international corporation tax rate as the trade-weighted average of statutory corporation rates across a number of OECD countries. The subset of countries broadly matches OECD member countries before 1981, with the exception of Mexico (which was not a member country in 1981 but whose rate has been included) and Turkey (for which the OECD did not have data in 1981).

Chart 4.4: UK and representative international statutory corporation tax rates



Source: OECD, OBR, ONS

- 4.28** The weightings are determined by each country's share of exports from the UK. Chart 4.4 above shows that both the representative international corporation tax rate and the UK corporation tax rate have been falling, though since 1984 the UK's rate has been consistently lower than our constructed international rate.
- 4.29** We produce two sets of scenarios according to the two different definitions of unchanged policy, summarised in Table 4.1. In the first set the UK rate is held at 22 per cent from 2014-15 onwards as the international rate declines (following the already announced rate cuts in 2013-14 and 2014-15). The second set features the UK corporation tax rate falling in line with the international tax rate.
- 4.30** To ensure consistency with our 2012 *Economic and fiscal outlook (EFO)* forecast we keep the 2012 differential between the UK and international tax rates constant until 2016-17. The international rate is assumed to track the UK rate, falling by 1 percentage point in both 2013-14 and 2014-15 to maintain the current differential. This explains why the graphs representing UK and international rates are parallel between 2012 and 2016 in Chart 4.5.
- 4.31** In each set of scenarios we then consider two different trend declines in corporation tax rates: 1.7 per cent per year and 1 per cent per year. The 1.7 per cent figure is the 20-year average fall in the international corporation tax rate as described in the section above. The 1 per cent point fall examines the implications of corporation tax rates falling at a slower rate in future, as

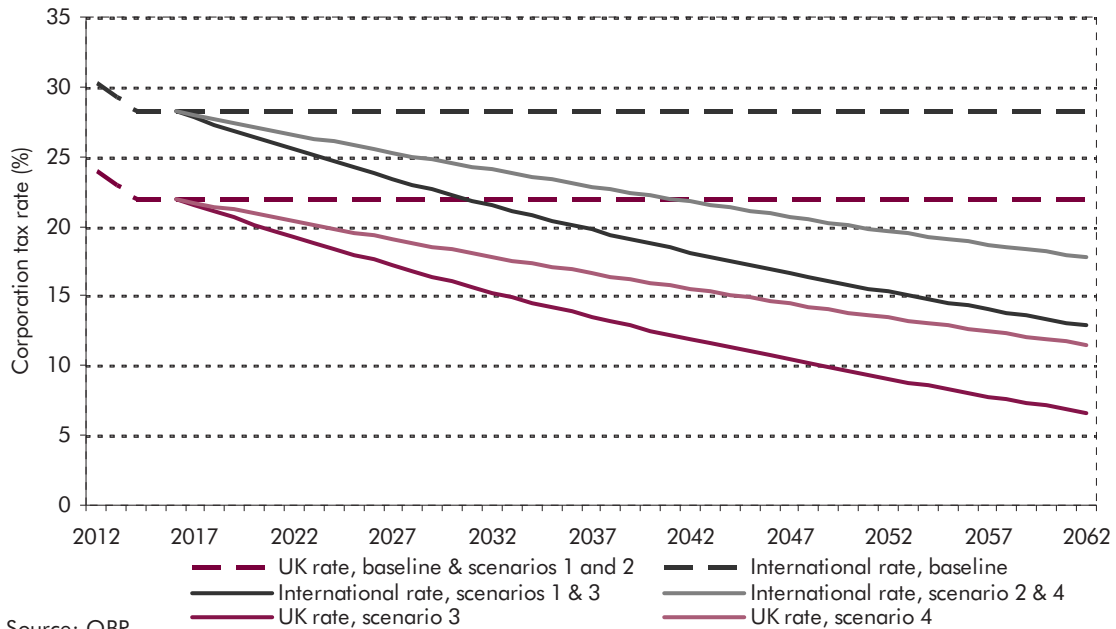
suggested by Devereux and Bilicka (2012). Chart 4.5 shows the path of these hypothetical tax rates over our 50 year projection period.

Table 4.1: Scenarios and combination of rate change

Scenario	Definition of unchanged policy	UK rate	International rate
Baseline		Fixed at 22 per cent beyond 2014-15	Fixed at 28.2 per cent beyond 2014-15
1	UK rate remains constant	Fixed at 22 per cent	Falls by 1.7 per cent per year (e.g. 2016 rate is 28.2 per cent, falling to 27.8 per cent in 2017)
2			Falls by 1 per cent per year (e.g. 2016 rate is 28.2 per cent, falling to 28 per cent in 2017)
3	Differential remains constant	Both rates fall by 1.7 per cent per year (e.g. 2016 UK rate is 22 per cent, falling to 21.5 per cent in 2017)	
4		Both rates fall by 1 per cent per year (e.g. 2016 UK rate is 22 per cent, falling to 21.7 per cent in 2017)	

4.32 In scenario 3 in which corporation tax rates fall by 1.7 per cent per year the projected UK corporation tax rate falls to 7.5 per cent by 2062. Assuming a lower rate of fall of 1 per cent per annum instead (scenario 4) results in a UK corporation tax rate of around 11.5 per cent by 2062.

Chart 4.5: Projected tax rates in our modelling



Projecting corporation tax revenues forwards for 50 years

4.33 For this work HMRC has developed a simple model to provide corporation tax forecasts over a 50-year horizon. The key assumptions underpinning this model are as follows:

- the baseline for modelling is that corporation tax revenue stays flat as a proportion of GDP and that the UK rate remains at its currently announced level throughout the forecast period. The differential between the UK and international rate remains constant during the projection period. Since there is no change in the differential between the UK and international corporation tax rates in the baseline projection there is no incentive for additional profit shifting over the period;
- we use a semi-elasticity⁸ of -2 to estimate how much tax is foregone due to profit shifting because of changes in the differential between UK and international corporation tax rates. This assumption was used in costings for recent Budget policy measures and is a central estimate informed by evidence from multiple studies (we examine the sensitivity of our projections to varying this assumption);

⁸ The semi-elasticity here captures how the dependent variable, in this case profits declared in the UK, responds to a one percentage point change in the tax rate differential.

- adjustments to the projections have been made for financial sector losses beyond the medium-term period to 2020 using HMRC information; and
- we assume that 50 per cent of the aggregate profits currently accrued by quarterly instalment payers in the Home, Industrial and Commercial (HIC) sector and the financial sector are 'mobile', i.e. they could potentially be declared outside the UK.⁹ Instalment payers in the HIC sector will include large international firms with intellectual property whose profits can also be shifted easily; we assume that all large financial sector firms operate internationally. We also examine the sensitivity of our projections to varying this 50 per cent assumption.

Results

- 4.34 Chart 4.6 shows how corporation tax revenues change as a proportion of GDP over 50 years under each scenario.
- 4.35 In the baseline, corporation tax would remain a constant proportion of GDP if the UK and international rates remained the same from 2016-17 onwards. Chart 4.6 shows that when the UK tax rate is held constant at 22 per cent and the international rate falls, revenues fall compared to the baseline as profits are assumed to shift out of the UK. The effect is bigger in the first scenario as the difference between the international corporation tax rate and the UK rate is bigger, providing larger incentives to move profits out of the UK.
- 4.36 A much larger effect is seen in scenarios 3 and 4 in which UK rates are assumed to fall in line with international rates, with revenues falling to around 1 per cent of GDP by 2062. Profit shifting incentives are created, at the margin, by changes in the *differential* between the UK and international rate, and not directly by changes in the level of the taxes themselves. So in this scenario reducing the UK rate prevents further profit shifting. However, by doing so it significantly reduces the direct revenues received from the UK corporate sector.
- 4.37 Overall this analysis suggests that the costs of greater profit shifting from allowing the corporation tax rate differential to increase are much less than the direct cost of reducing the rate in order to maintain the differential. However, this analysis does not include the potential effects on net capital investment flows into the UK of allowing the UK-international corporation tax differential to widen. And

⁹ The estimate that 50 per cent of profits are mobile has been derived on the basis of judgements about the amount of profits which arise within multinationals which can potentially move profits easily. We do not have a strong evidence base for this assumption. Hence we consider sensitivity analysis around this 50 assumption to see how it affects the results from our model.

governments can also attempt to maintain overall revenues while reducing the main statutory rate. As discussed previously in many countries headline corporation tax rates have been falling but overall corporation tax revenues have increased as a share of GDP.

Chart 4.6: Projected UK corporation tax revenues



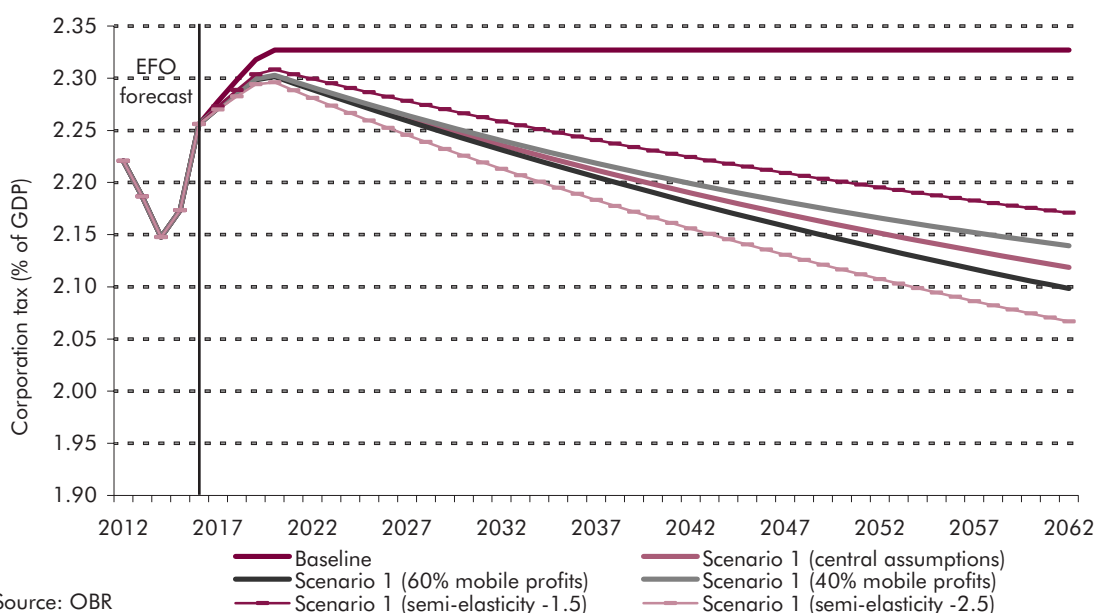
4.38 For simplicity we do not include wider economic effects in our modelling. However, we would expect that lower corporation tax rates would reduce the cost of capital, which would increase the capital stock and should produce a temporary rise in the GDP growth rate or a permanent increase in the level of GDP.

Sensitivity analysis

- 4.39 We examine the sensitivity of these results to our assumptions on the level of mobile profits in the UK and on the semi-elasticity of profit sharing to the tax differential.
- 4.40 We consider two scenarios for the mobility of profits: the first in which the assumed share of mobile profits in the UK increases gradually from 50 per cent to 60 per cent over the projection period; and the second in which it falls from 50 per cent to 40 per cent. Chart 4.7 shows that the effects of changing these assumptions are not significant as a share of GDP. By 2061-62 their maximum effect is to increase or decrease corporation taxes as a share of GDP by 0.2 per cent compared to scenario 1.

4.41 We then consider alternative semi-elasticity assumptions of -2.5 and -1.5, and how they compare to the semi-elasticity of -2 in our central case. The chart below shows that our results are not vastly sensitive to this assumption (though they have a larger effect than changing the assumed share of mobile profits). This is important because it suggests that differences in behaviour do not significantly affect the likely impact of profit shifting on corporation tax revenues in our modelling.

Chart 4.7: Projected UK corporation tax revenues under alternative assumptions



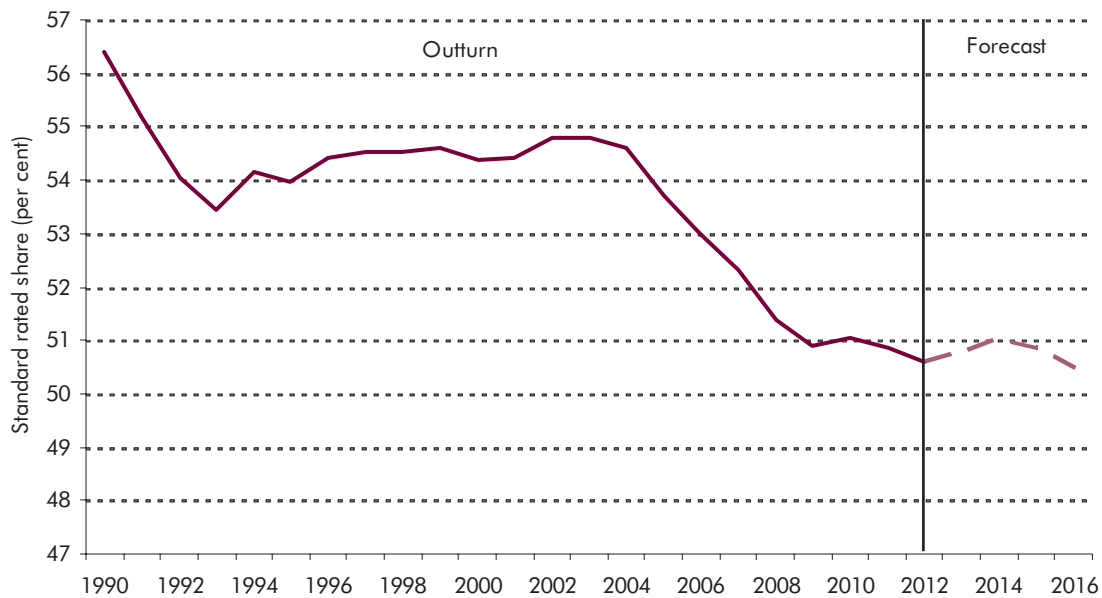
Value added tax and globalisation

- 4.42 Changing patterns of international trade could affect future value added tax (VAT) revenues by altering the composition of household consumption and the relative prices of goods and services. Two-thirds of VAT revenues are currently attributable to household spending on goods and services.
- 4.43 Globalisation can affect relative prices through a number of channels. In a more integrated world, prices increasingly reflect the global, rather than the domestic, balance of demand and supply. Globalisation promotes greater specialisation as goods are increasingly produced in the countries that can produce them most cheaply. There may also be a productivity gain from market competition in a particular industry or sector if it encourages companies to reduce production costs.

4.44 The standard rated share (SRS) refers to the proportion of household spending that is subject to the standard rate of VAT. Over the last two decades the SRS has broadly been declining (see Chart 4.8). The most important factor which caused the SRS to fall in the 2000s was increasing housing costs. As people spent more on housing (which is not subject to the standard rate of VAT) they had less to spend on discretionary purchases, which are more likely to be subject to the standard rate of VAT. Other factors are also likely to have played a part. For instance, some of the fall could be attributed to lower priced imports from countries like China and other emerging market economies.

4.45 In our modelling we explore the potential impact on VAT revenues of such changes in the relative price of manufactured imports (a high proportion of which will be subject to the standard rate of VAT). The decline in the price of durables to non-durables over the past few decades is a trend recognised by the Bank of England.¹⁰ Though not explored in this chapter, one argument against assuming such price falls will persist would be that increasing incomes in emerging economies will increase the global demand for goods and could lead to higher prices. This has been one of the drivers of higher commodity prices seen in recent years.

Chart 4.8: Standard rated share of household spending



Source: HMRC

¹⁰ Power (2004).

VAT scenarios

4.46 In this section we explore the possible effects of further declines in the price of manufactured goods on VAT revenues. We describe two highly stylised scenarios in which the prices for particular subsets of imported goods fall by 1 percentage point per year for the next 50 years relative to other prices:

- 1 in the first scenario the price of imported goods with technological content falls, in particular household appliances, tools and equipment, purchases of vehicles, audio-visual and information processing and other major durables. This is consistent with findings presented in a recent IMF paper on changing patterns of global trade.¹¹ It highlights the trend towards emerging market economies, particularly China, increasing the technological content of their exports; and
- 2 in our second scenario we explore the effect of price falls of all imported manufactured goods. In addition to the price falls included in scenario 1, we include price falls for clothing and footwear, furniture and communication equipment among other goods.

4.47 In our modelling we assume that in 2016-17 around 8 per cent of consumption constitutes tradeable manufactured goods with a technological element. This is in line with the current proportion of consumption on these types of goods as shown by 2011Q4 ONS Consumer Trends data. In the same year the data show that total tradeable manufactured goods constitute around 20 per cent of consumption.

Methodology

4.48 HMRC produced long-term VAT projections using the following OBR assumptions:

- consumption is assumed to remain fixed at the same percentage of GDP over the next 50 years as at the end of our latest medium-term forecast;
- VAT revenues grow in line with consumption in our baseline projection;
- over the next 50 years the same types of goods are available, tastes remain the same and all relative prices are the same – except for the prices that we are changing in our scenario;

¹¹ IMF (2012a).

- to determine the effect that each scenario has on the VAT forecast we establish how much a reduction in the prices of the chosen goods affects the consumption share of these goods;
- we estimate the proportion of consumption of each type of good which is standard rated (consistent with the March 2012 *EFO* VAT forecast assumptions). Using this information and the new pattern of consumption we establish the resulting change in the standard rated share for each year of the *FSR* period; and
- we apply the calculated standard rated share to the VAT receipts forecast to estimate the effect of the fall in the price of manufactured goods on VAT revenues.

4.49 Key assumptions in this analysis are the income and substitution elasticities that measure how consumers change their consumption in response to price changes. We have chosen quite defined categories of goods to change in price in our modelling. We were not able to find suitable elasticities in the literature which are directly applicable to the categories we have chosen. For simplicity we therefore present results for two illustrative elasticities of zero and -1.

4.50 An elasticity of zero would imply that consumers would not change the volume of purchases in response to a change in prices. In this case the share of total consumption spent on manufactured goods falls proportionally to the reduction in price. An elasticity of -1 implies that consumers adjust to the lower prices by keeping their share of nominal consumption of manufactured goods the same as before the price change. They would do this by purchasing more goods in response to lower prices.

4.51 It is likely that the actual effect might be somewhere within this range. A reduction in prices is likely to have some effect on behaviour, with consumers purchasing these now cheaper goods instead of other relatively more expensive goods. However, it is also likely that the share of consumption that goes on these types of goods following a price fall would be lower as a result. Using elasticities of zero and -1 gives us a range of effects on consumption, and hence a possible range of impacts on VAT receipts.

Results

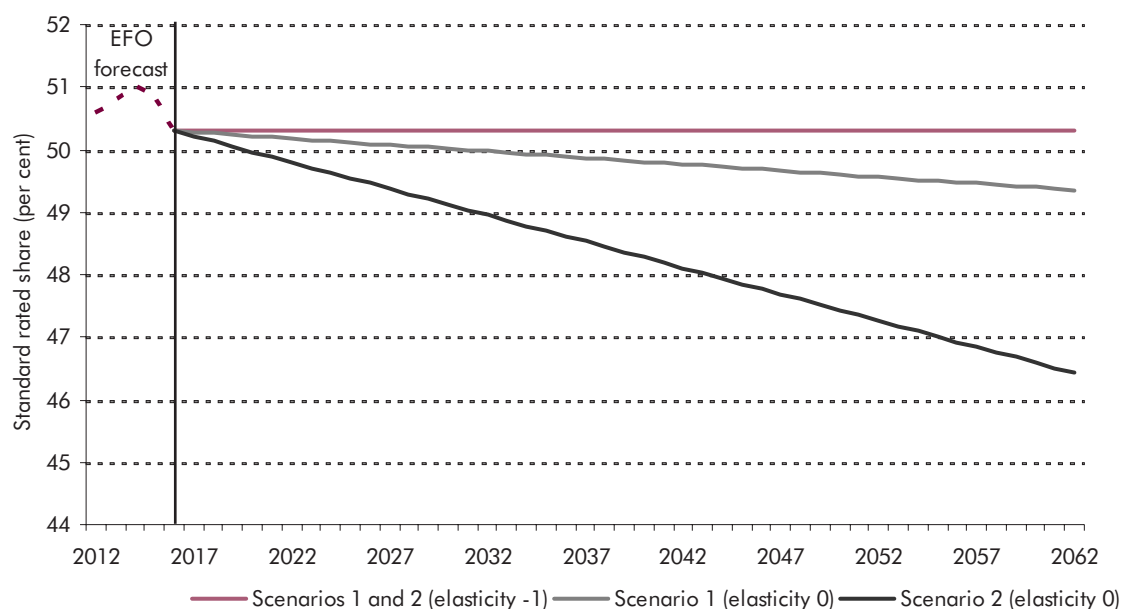
4.52 Chart 4.9 shows that in our March 2012 *EFO* forecast for VAT the SRS is increasing until 2014-15 and then declines. The rise in the SRS up to 2014-15 is mainly due to assumed lower housing costs in the form of lower mortgage interest payments in our medium term forecast. These changes should be considered in the context of the historical SRS (see Chart 4.8) which shows that

the rise and subsequent fall in 2014-15 and beyond represent relatively small changes by historical standards. Beyond the medium term, our projections assume the prices of manufactured goods fall as in the two scenarios described in paragraph 4.46.

4.53 Chart 4.9 illustrates the path of the SRS in both these scenarios. If consumers do not change the volume of manufactured goods they buy in response to lower prices (i.e. an elasticity of zero) then the falls in the SRS are shown by the grey and black lines below for scenarios 1 and 2 respectively. As we would expect, reducing the prices for a wider variety of imported goods (scenario 2) has a larger effect on the SRS than the narrower scenario 1.

4.54 However, if consumers were to purchase more manufactured goods in response to lower prices, so that they maintain the same proportion of their consumption on manufactured items, there would be no change in the SRS. This is shown by the flat purple line in Chart 4.9. The differences between the flat line and the downward sloping lines for each scenario represent the range of the possible impacts on the SRS of declining prices.

Chart 4.9: Standard rated share of household spending



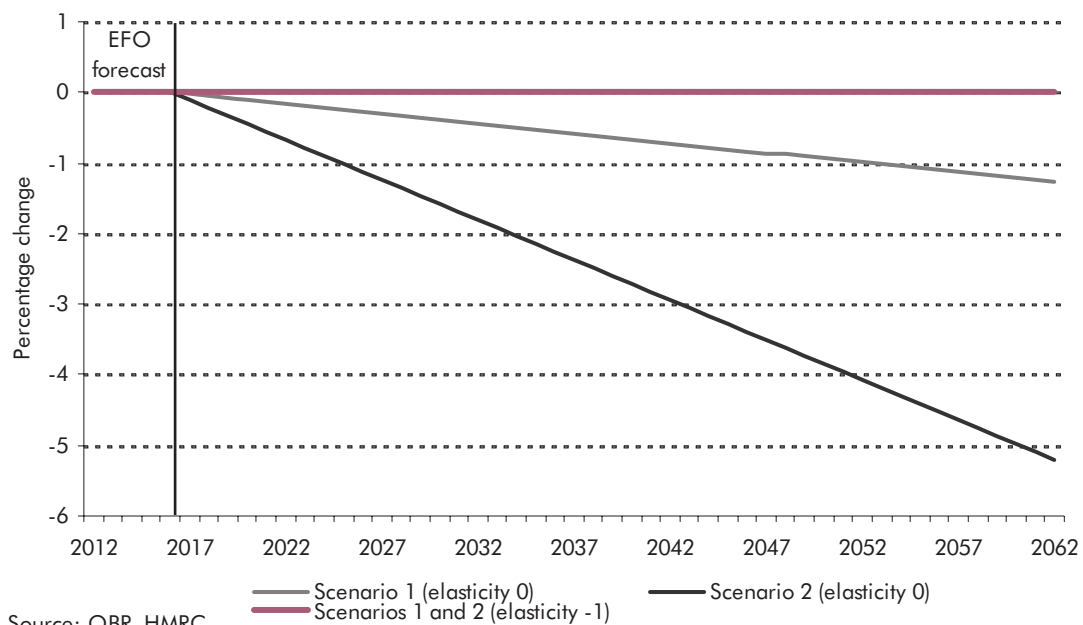
Source: OBR, HMRC

4.55 Our modelling shows that the effect on the standard rated share of ever cheaper manufactured goods would be relatively small. In scenario 2 the SRS falls to 46.1 per cent in 2062 from 50.3 per cent in 2016. The effect on the SRS is even smaller when the same price fall is applied to goods with a technological content

(scenario 1). Compared to the changes in SRS over the last few decades the modelled falls in the SRS do not represent large changes (see Chart 4.8).

4.56 The falls in the standard rated share described above result in modest changes to VAT revenue projections. Chart 4.10 shows that assuming an elasticity of -1 in scenarios 1 and 2 has no effect on the SRS and hence no effect on VAT revenue projections compared to our baseline. It also shows that by 2062 assuming an elasticity of zero (i.e. no behavioural response to lower prices) reduces VAT revenues by a maximum of 5.1 per cent in scenario 2. This would reduce VAT receipts as a share of GDP in 2062 from 6.3 per cent in our baseline projections to 5.9 per cent. In scenario 1 by the end of the FSR period VAT revenues are only 1.2 per cent lower than our projected baseline; this corresponds to a 0.1 percentage point fall in VAT as a proportion of GDP.

Chart 4.10: Reduction in VAT revenues



4.57 The results produced by our model represent modest changes in VAT over a 50-year period. However if the trends discussed above materialised and were to compound other trends with further negative effects on the standard rated share (e.g. increasing commodity prices) then globalisation could have more negative effects on VAT revenues than those presented above.

Conclusion

4.58 The analysis in this chapter suggests that the non-demographic factors considered here are likely to put downward pressure on tax revenues over the next 50 years:

- updating our 2011 oil and gas tax projections suggests that oil and gas revenues could fall from their current level of 0.7 per cent as share of GDP to around 0.05 per cent in 2040-41;
- in last year's report we identified a range of non-demographic factors which could lower the tax to GDP ratio for oil and gas revenues, transport and environmental taxes and tobacco duties by up to 2 percentage points over the next 20 years. The modest revision to our oil and gas projected revenues does not change this broad estimate;
- global corporation tax rates have been on a declining trend as governments around the world compete to attract mobile profits and capital. If a similar pattern were to persist whilst the UK headline rate remained unchanged, the incentive to draw profits away from the UK would reduce corporation tax receipts over time. If UK rates were to move in line with a declining global average there would be a direct fall in UK corporation tax receipts. But lower corporation tax rates could increase the level of GDP by reducing the cost of capital; we have not included this effect in our modelling; and
- another possible effect of globalisation has been to reduce the price of tradeable goods relative to other goods and services. Most tradeable goods are subject to the standard rate of VAT, so if international trade were to exert downward pressure on such prices, and households spent relatively less money on such goods as a consequence, VAT receipts would fall modestly as a share of GDP.

4.59 Our analysis of corporation tax and VAT here is highly stylised and we do not produce a central estimate of the likely impact on UK tax receipts in the future. But coupled with the analysis repeated from last year, it does suggest that future governments are likely to need to find replacement streams of revenue merely to hold the tax burden constant, let alone to meet upward pressures on spending.

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. In our central projection, under our assumptions for unchanged policies, public sector net debt and debt interest would eventually rise continuously as a share of GDP, thanks 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 industrial countries. 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 can be given by the government’s inter-temporal budget constraint.¹ Satisfying this condition requires the government to raise enough revenue to cover all its non-interest spending and also to service and eventually pay off its outstanding debt over an infinite time horizon. This requirement is normally expressed in stock rather than flow terms, namely that the present value of 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

¹ For derivation of the inter-temporal budget constraint see European Commission (2009).

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 debts will accumulate; the higher the growth rate, the easier it is to service and pay them off. 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 starts off with. The greater the amount by which the interest rate exceeds the growth rate, the bigger the primary surplus required.
- 5.6 In our central projections we assume that the long-run real interest rate is only marginally above the long-term growth rate of the economy, which implies that only small permanent primary surpluses are required to stabilise debt. 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 2061-62.
- 5.7 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 2017-18. On this basis, the UK's inter-temporal budget gap is currently equal to 2.6 per cent of GDP. In other words, under our central projections the government would need to increase taxes and/or cut spending permanently by 2.6 per cent of GDP (around £39 billion in today's terms) from 2017-18 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 2016-17. The equivalent figure in last year's *FSR* was 3.1 per cent.
- 5.8 The European Commission regularly calculates the inter-temporal budget gap for EU member countries, referring to it as its 'S2 indicator'. The Commission's most recent estimate for the UK was 12.4 percent of GDP in 2009, well above the EU average of 6.5 per cent of GDP.² This figure is much larger than the one we have calculated above, mainly because our calculation includes the impact of the medium-term consolidation measures already in the pipeline for the next five

² European Commission (2009).

years, whereas the Commission took no account of any measures taking effect beyond 2009 (including the withdrawal of temporary stimulus measures). The EC figure is also calculated with reference to the general government gross debt ratio used in the Maastricht criteria rather than the public sector net debt ratio that we focus on. The Commission's next estimates are due later this year.

- 5.9 The inter-temporal budget constraint has the advantage of theoretical rigour, but it also has limitations. For example, it assumes that governments will eventually wish to eliminate their debts 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, as rather than being met through an immediate and permanent adjustment, it could allow governments to run large fiscal deficits for extended periods provided there are sufficiently large fiscal surpluses at some point in the potentially far distant future. It does not seem realistic to assume that any government could credibly commit itself and its successors to such a path of long-deferred virtue. Tolerating persistent deficits for an extended period also risks incurring a loss of market confidence and the negative economic consequences discussed in Chapter 3. As a result, alternative criteria are usually used to judge sustainability, the most common being the 'fiscal gap'.

Fiscal gaps

- 5.10 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 target year.
- 5.11 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. But there is no consensus regarding the level of the optimal debt ratio and how quickly one should aim to return to it if the public finances are pushed 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 current fiscal policy is optimal.
- 5.12 In the absence of a policy rule that dictates the choice of target year, the aim is normally to pick a date just far enough into the future to capture the most significant (typically demographic) future influences on the public finances, but not so far into the future that the projections are subject to any greater uncertainty than necessary.

5.13 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 only marginally exceeds the economic growth rate, 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

Target year	Adjustment in primary balance, per cent of GDP		
	2051-52	2061-62	
Target debt to GDP ratio (per cent)	40	40	75
Central projection	0.8	1.1	0.3
Interest rate 1 per cent higher	1.1	1.3	0.7
Interest rate 1 per cent lower	0.6	0.9	-0.1
Gradual progress ¹	0.4	0.4	0.1
Low productivity	1.4	1.7	1.0
High productivity	0.3	0.5	-0.3
High migration	0.1	0.3	-0.5
Zero net migration	2.3	3.0	2.3
Old age structure	1.0	1.7	1.0
Young age structure	0.1	0.0	-0.9
Increased health spending ²	3.2	4.4	3.6
Slower expansion of morbidity	0.6	0.8	0.0
Increased health spending ² and slower expansion of morbidity	2.8	3.9	3.1

¹Adjustment required each decade.

²Real health spending per person growth of 3.6 per cent per annum, equivalent to annual productivity in the health care sector of 0.8 per cent.

5.14 The table shows that for the government to target debt at its pre-crisis level of around 40 per cent of GDP in 2061-62 would require a permanent increase in taxes or cut in spending of 1.1 per cent of GDP (£17 billion in today's terms) in 2017-18 or a series of tax increases or spending cuts worth an additional 0.4 per cent of GDP (£6 billion) each decade. To keep debt at the same level in 2061-62 that we forecast in 2016-17 – around 75 per cent of GDP – would require a less demanding permanent tax increase or spending cut of 0.3 per cent of GDP in 2017-18 (£5 billion) or tax increases/spending cut worth 0.1 per cent of GDP (£2 billion) each decade.

5.15 The necessary adjustments would be larger if the long-term interest rate was to exceed the economic growth rate by more than we assume in our central scenario, or if productivity growth were slower, or the age structure older than in our central projection. By far the biggest adjustment would be required in the

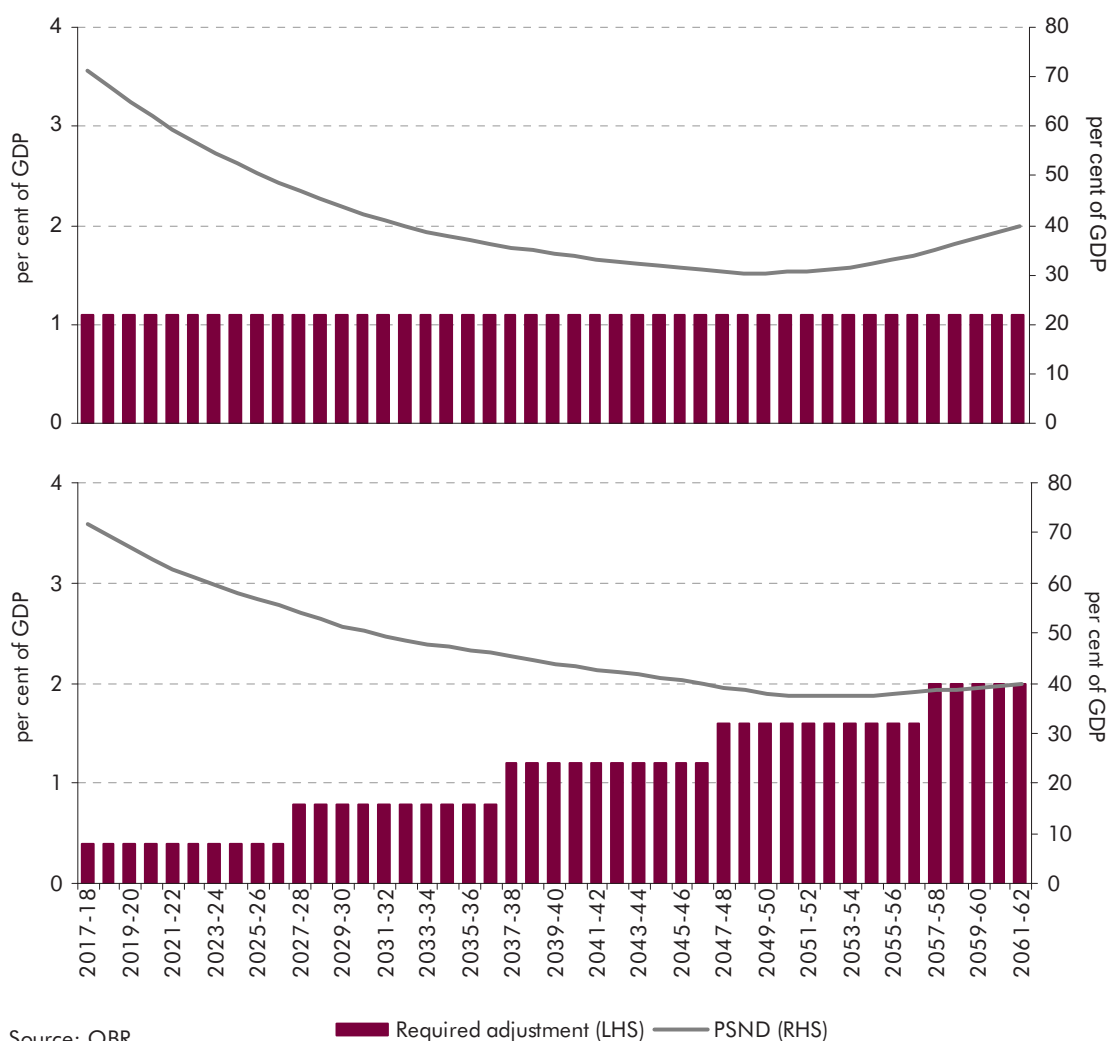
scenario where we assume that 'unchanged policy' is consistent with real health spending per capita growing at 3.6 per cent per year rather than the 2.2 per cent assumed in our central projection. In this case the required adjustment to get debt back to 40 per cent of GDP would be four times bigger – a one-off 4.4 per cent of GDP from 2017-18, or 1.6 per cent of GDP each decade.

- 5.16 The focus on a particular target year means that the path of the primary balance and net debt beyond this point is ignored. Table 5.1 also shows what would be required to bring the debt to GDP ratio down to 40 per cent ten years earlier, in 2051-52. This would generally require a smaller adjustment, but debt would continue to rise as a share of the economy in subsequent years, due to continued spending pressures on health and state pensions.
- 5.17 The European Commission also calculates fiscal gap measures for EU members. Its 'S1 indicator' is the change in the primary balance required to stabilise the gross general government debt at the Maastricht ceiling of 60 per cent of GDP in 2060. The Commission's 2009 estimate put the S1 indicator at 8.8 per cent of GDP for the UK, well above the EU average of 3.3 per cent of GDP. Our own projections would give a comparable estimate of 0.8 per cent of GDP, implemented in 2017-18. As with the inter-temporal budget gap, our gap estimate is much smaller than the Commission's because we are looking at the adjustment required above and beyond the current consolidation plans.
- 5.18 The decision on how quickly to close the fiscal gap will affect how the debt ratio moves in the period preceding the target date. Charts 5.1 and 5.2 illustrate the path of the debt-to-GDP ratio for targets of 40 per cent and 75 per cent of GDP respectively in 2061-62, with variants for the timing of the response in each case: the one-off and decade-by-decade responses that we quantified above, plus for the 75 per cent of GDP target, a scenario in which the adjustment is calibrated to ensure that the debt-to-GDP stays constant at that level.
- 5.19 The variants show that an earlier response would keep the debt to GDP ratio lower than a gradual (but ultimately bigger) response en route to the target. Keeping the debt-to-GDP ratio stable at 75 per cent would allow some policy loosening at the outset, followed by a sharper tightening subsequently.
- 5.20 Chart 5.1 shows that a one-and-for-all policy tightening of 1.1 per cent of GDP in 2017-18 would bring debt down to around 30 per cent of GDP in the 2040s before rising back to 40 per cent of GDP in 2061-62. Tightening policy by 0.4 per cent of GDP a decade would see it fall only marginally below 40 per cent of GDP and stabilise around that point.
- 5.21 The differences highlight the fact that even if policymakers know where they want the debt ratio to end up, there are choices to be made about the desirable path

Summary indicators of fiscal sustainability

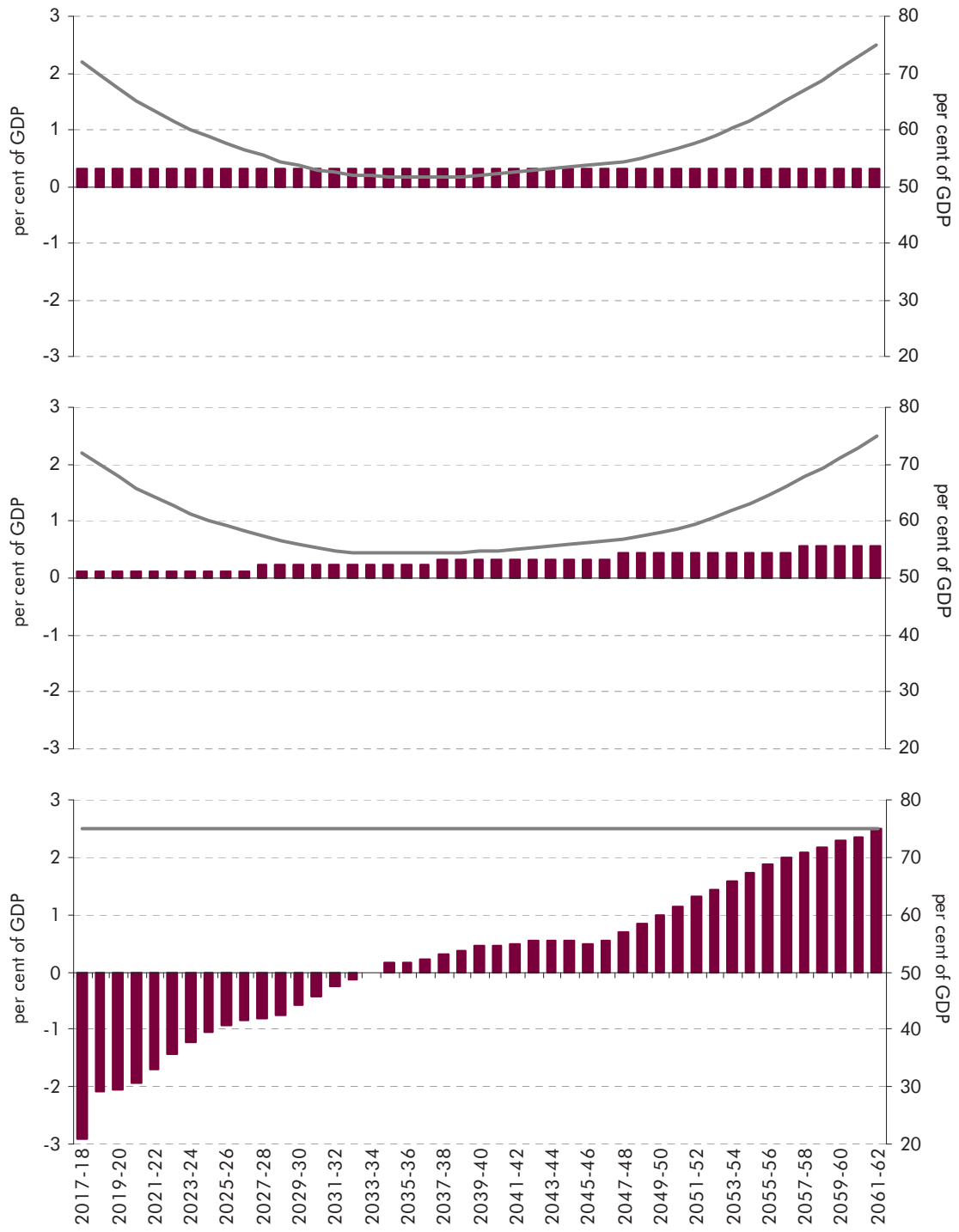
to get there. In the run-up to the recent financial crisis several countries were endeavouring to 'pre-fund' the costs of an ageing population by tightening fiscal policy sufficiently to bring their debt to GDP ratios considerably lower. The intention was that when the costs of ageing materialised they 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

Chart 5.2: Alternative adjustments to the primary balance and the implied path of net debt if targeting a debt to GDP ratio of 75 per cent in 50 years



Source: OBR

■ Required adjustment (LHS) — PSND (RHS)

- 5.22 The choice of time profile has implications for how the burden of the adjustment is spread across the generations. But this will also be shaped by private transfers, such as inheritances, which are not mediated through the public sector (see Box 5.1).

Box 5.1: Generational and National Transfer Accounts

Solvency is not the only criterion that can be used in assessing fiscal sustainability. Some researchers view it through the lens of intergenerational equity, arguing that a fiscal position is unsustainable if future generations are being left to make a larger net contribution to the government's finances than today's generation. This may be the case even if the inter-temporal budget gap is equal to zero.

This concern can be addressed using 'generational accounts', such as those produced for the UK by the National Institute of Economic and Social Research (NIESR), supported by the ONS.^a These show the net discounted life-time contributions that people are expected to make to the public finances as a function of their age. If the net contribution for future generations is larger than that of current newborns, it is possible to calculate an 'intergenerational budget gap' – the tax or spending change necessary for this no longer to be the case.

There are additional flows between generations that do not pass through the public sector, but instead move within the family or through capital markets. National Transfer Accounts attempt to capture these wider flows and the relative importance of the intermediaries (public sector, family or markets), therefore providing a rounder view of the savings and consumption patterns of particular generations.

A snapshot National Transfer Account for the UK is now available for 2007, on an internationally comparable basis.^b Over an extended period, as the time series is built up, it will also be possible to track the extent to which consumption matches savings for particular cohorts over their lifetime.

^a McCarthy, Sefton and Weale (2011)

^b McCarthy and Sefton (2011)

Conclusion

- 5.23 Our central projections, and several of the variants we calculated in Chapter 3, show that on current policy we would eventually expect to see public sector net debt on a continuously rising trajectory as a share of GDP. This would clearly be unsustainable. The same would be true of most industrial countries, as the fiscal challenges of an ageing population and non-demographic pressures on health spending are common to many.

- 5.24 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 as regards an optimal ratio or how quickly one should try to return to it when the public finances are blown 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 behaviour of debt in the meantime.
- 5.25 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.
- 5.26 That said, our findings should not be taken to imply that the Government needs to achieve a bigger tightening over the next five years than it already plans to. But 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 Public service pensions

Introduction

- A.1 In Chapter 3 we set out long-term projections for spending on public service pension schemes from 2015-16. They incorporate the expected impact of all the main reforms to public service pension provision announced by the current Government. This annex details the modelling assumptions required to produce these projections, and gives a breakdown of the cumulative effect of reforms on public service pension gross expenditure and member contribution income.
- A.2 The first section gives an outline of the public service pension reforms announced since June 2010. We then detail the assumptions used to construct the projections used in Chapter 3, and how this relates to other estimates of pension liabilities contained in Chapter 2. Using our current financial assumptions, we then look at the impact of the main reforms, namely Consumer Prices Index (CPI) uprating, changes to member contributions and the final November 2011 recommendations for pension scheme design.

Public service pension reforms

- A.3 Reforms to public service pensions began under the previous government, with higher pension ages introduced for new entrants in most schemes. Cap and share pension valuations were introduced, on the grounds that risk needed to be shared more equitably between taxpayers, employers and employees.
- A.4 In June 2010, shortly after taking office, the current Government announced that future pension increases in public service pension schemes would be in line with CPI rather than the Retail Prices Index (RPI) – with the former tending to rise less quickly than the latter over the long term.
- A.5 The Chancellor also invited Lord Hutton to chair the Independent Public Service Pension Commission (IPSPC), to undertake a fundamental structural review of public service pension provision. The IPSPC produced an interim report in October 2010, detailing the pension landscape and identifying short-term reforms. It presented a rationale for an increase in member contributions and a recommendation that the discount rate used to calculate the contributions required for future payments be reviewed. The Government said in response at the 2010 Spending Review that it would increase contribution rates and in the November 2010 and March 2011 *Economic and fiscal outlooks (EFOs)* we

assumed an increase to be phased in from 2012-13 that would raise approximately £2.8 billion per annum by 2014-15.

- A.6 The IPSPC delivered its final report in March 2011, and the Government subsequently accepted the recommendations as a basis for consultation. In November 2011 the Treasury published *Good pensions that last*, which detailed the preferred scheme design for future public service pension schemes. The March 2012 *EFO* forecast did not include any consequences of these further potential reforms, because they would have minimal impact on expenditure in the forecast period, and much of the scheme-by-scheme detail had yet to be agreed. However, we did say that we would examine the impact of these reforms in this *Fiscal sustainability report (FSR)*.
- A.7 Subsequently, cost ceilings for new scheme designs have been set for the main central pension schemes for teachers, the NHS and the civil service. Ceilings have also been set for the locally administered government police and fire schemes that are included in our analysis. Whilst discussion on reform for the armed forces pension scheme is currently ongoing, we have confirmed with the Treasury that these will constitute part of the final reforms and that they should therefore be included as the best indication of current policy. We outline the working assumption to incorporate the armed forces below.

Approach in the 2012 FSR

Scheme assumptions

- A.8 The OBR commissioned the Government Actuary's Department (GAD) to calculate the new public service pension projections included in this report.
- A.9 The main change compared to the 2011 *FSR* is the inclusion of post-Hutton reform scheme design. For this purpose, benefits in the reformed schemes for teachers, civil servants and the NHS are taken to be the benefits detailed in the Government's Preferred Scheme Design, or 'Reference Scheme'. This is the preferred design for new schemes as set out in *Good pensions that last*. It is a Career Average Re-valued Earnings (CARE) scheme that contains the following features:
- an annual accrual rate of 1/60th;
 - a normal pension age (NPA) linked to State Pension Age (or 65, whichever is higher), in this case rising to 68 by 2046;
 - earnings revaluation of benefits while members are in service;

- pensions in payment and in deferment indexed by CPI;
 - average member contributions set at the level of the existing scheme after the increase of 3.2 percentage points currently planned;
 - no fixed lump sums, optional commutation, with a 12:1 factor for converting pension to lump sum; and
 - ill-health, death and survivor benefits that match the current provision available to new members.
- A.10** For the police and fire schemes, the benefits in the post-reform schemes are also taken to be the benefits detailed in the Government's Preferred Scheme Design, but adjusted in line with HM Treasury's announcements of 28 March and 9 February on each scheme respectively. The main adjustments are an annual accrual rate of 1/57th, and a NPA of 60. For the purposes of this report we have assumed that reforms to the armed forces scheme will have the same proportional impact as the police and fire reforms, whilst recognising that no announcements regarding the future design of the armed forces pension scheme have yet been made.
- A.11** Although the projections of pension scheme benefit payments are taken from the Government's Preferred Scheme Design, actual scheme designs have differed from this construction. However, as these are constrained by the cost envelope set by the Preferred Scheme Design there is no impact on the projections of payments, and we do not consider the distributional effects of these changes.
- A.12** The key long-term financial assumptions required for the construction of public service pension projections are included in Table 3.5 of Chapter 3. These are very similar to the 2011 FSR assumptions, with the largest change being the assumed additional reduction in public sector employment in 2015-16 and 2016-17.
- A.13** The approach used to construct the projections of pre-reform expenditure in this report is the same as that used in the 2011 FSR, the IPSPC's interim and final reports, and in the Treasury's 2009 *Long-term public finance report*. More detail can be found on the GAD website.¹

¹ http://www.gad.gov.uk/services/Occupational_Pensions/Public_sector_pensions.html

Adjusting for the long term

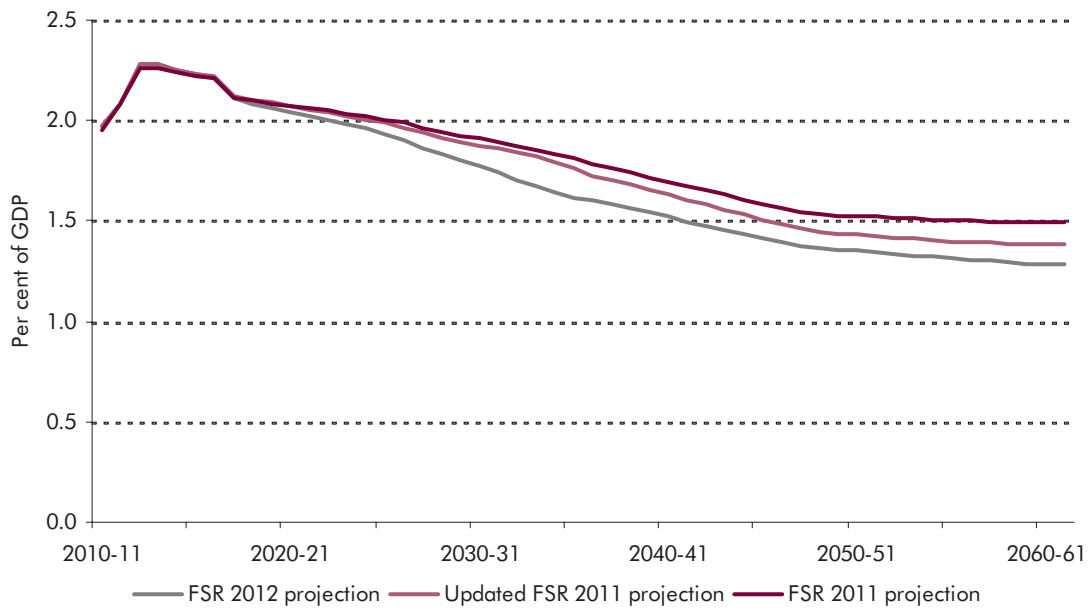
- A.14 The modelling approach used in our long-term projections requires some simplifying assumptions, and uses a combined model for schemes with similar designs. Details of the schemes' membership profiles and demographic assumptions are taken from the most recent scheme calculations, the reporting dates of which vary by scheme. The starting point for the projections is the schemes' 2007-08 resource accounts. Assumptions are based on the most recent valuation data, but these vary in age.
- A.15 This approach differs to that used in our medium-term *EFO* forecasts, where we ask all schemes individually to return a forecast based on the demographics of each individual pension scheme. Our forecasts since November 2011 have included upward revisions to pension payments and lump sum payments in the NHS and teachers pension schemes, reflecting the latest in-year data available to these schemes. To the extent that these revisions reflect changes in timing of payments, they bring forward expenditure that our long-term modelling would expect to be smoothed over later years.
- A.16 These differences bring about a disparity of £3.4 billion between our March 2012 *EFO* forecast for 2016-17 and the results of GAD's long-term modelling for the same year. We have made the judgement that around half of this difference is due to timing issues, the rest due to modelling differences. To align to expenditure in the March 2012 *EFO* forecast we have included this as a fixed cash figure, so its value diminishes over time. We have taken a similar approach for our projections of contributions and of Royal Mail pension expenditure, which are included in total pension expenditure from 2012-13.

FSR 2012 projections

- A.17 The projections contained in Chapter 3 show total gross spending on public service pensions peaking at around 2.3 per cent of GDP during the five-year forecast period, before falling to 1.3 per cent of GDP by 2061-62. This incorporates our modelling of the post-reform pension scheme designs. These figures imply a steeper fall than our 2011 projections, where expenditure peaked at around 2 per cent of GDP, before falling to around 1.5 per cent of GDP.
- A.18 However, if we were to apply the same medium-term level adjustment and subsequent GDP figures to our 2011 projections, these too would show a peak of around 2.3 per cent of GDP over our five-year forecast, before falling to 1.5 per cent of GDP. Updating with our latest long-term assumptions would have seen gross pension expenditure falling to 1.4 per cent of GDP by 2061-62. So the impact of modelling new scheme design is about 0.1 per cent of GDP, which is apparent from around 2025. This comparison is shown in Chart A.1 below,

against our current projection of GDP. Further detail on this change is provided in the next section.

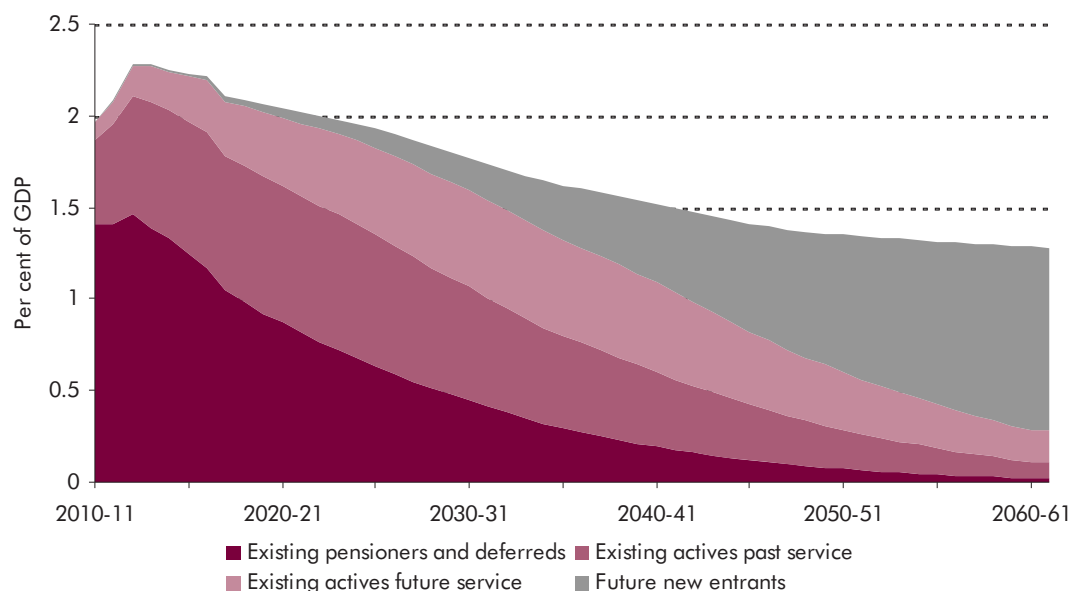
Chart A.1: Public service pension gross expenditure



Source: OBR, GAD

- A.19** Our 2011 FSR included an analysis of the composition of the projected public service pension payments between past and future service. We have not updated that analysis for the current projection figures. However, applying the same ratios of composition to the current projections of gross expenditure yields the results shown in Chart A.2. It shows that in the current year all payments are for existing pensioners and past services, but by the end of the projection nearly 80 per cent are for service that has not yet been undertaken.

Chart A.2: Composition of projected public service pension payments



Source: OBR, GAD

- A.20** We are far from certain that these ratios would be unchanged, given the scheme benefit and possible behavioural changes caused by the pension scheme reforms. However, conceptually it is useful to note the important distinction between the liability incurred for services already rendered, and projections of payments that we expect the government to make based on future service.
- A.21** The treatment of public service pension liabilities included in the Whole of Government Accounts (WGA) only comprise the lower two bands of Chart A.2, relating to payments for existing pensioners and the past service of existing workers. The same is true of the liability included in the new ONS pension liability estimate. Chapter 2 explained the differences in construction for these liability figures. We could theoretically apply a discount rate to these two categories to yield our own present value liability figure. However, this would not be directly comparable to the WGA figure due to the uncertainty in the ratios we have applied. There are also differences in the assumptions used compared to the WGA actuarial calculation, and the calculation would ignore payments after 2061-62 (although that far ahead the discounting effect is very strong and so this impact may be minimal).

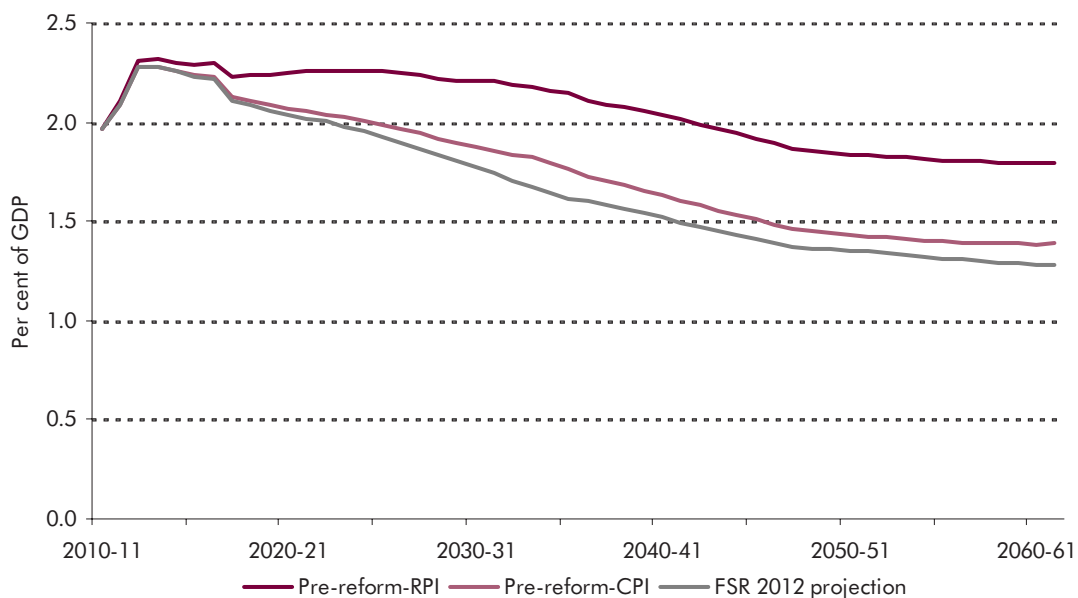
The impact of the Government's pension reforms

- A.22** To illustrate the impact of the current Government's reforms, described in the first section of this annex, we need to consider their impact on both expenditure and income.

Gross expenditure

- A.23** To analyse the impact of the reforms on pension expenditure GAD have projected public service pensions on the basis of the designs inherited by the current Government. Such projections contain none of the reforms to scheme design, and also have the uprating of pensions in payment linked to RPI inflation.
- A.24** Chart A.3 shows this as the upper line. As we can see, this scenario has a much flatter evolution of future pension payments, reaching around 1.8 per cent of GDP in 2061-62. The lower two lines are the same as the updated 2011 FSR projections and the 2012 FSR projection shown in Chart A.1. The policy change to CPI uprating of pensions causes payments in 2061-62 to fall to 1.4 per cent of GDP. The additional design changes we incorporate in this FSR causes them to fall slightly further to 1.3 per cent of GDP. So the total impact of reforms on expenditure under this Government amounts to 0.5 per cent of GDP in 2061-62, with four-fifths of the reduction arising from the move from RPI to CPI uprating.
- A.25** However, under our projection methodology the difference between the bottom two expenditure projections in Chart A.3 will continue to widen until a stable membership profile is reached. We would expect there to be stability in the profile of new entrants, active members and pensioners by perhaps around the year 2100.

Chart A.3: Effect of reforms on gross expenditure



Source: OBR, GAD

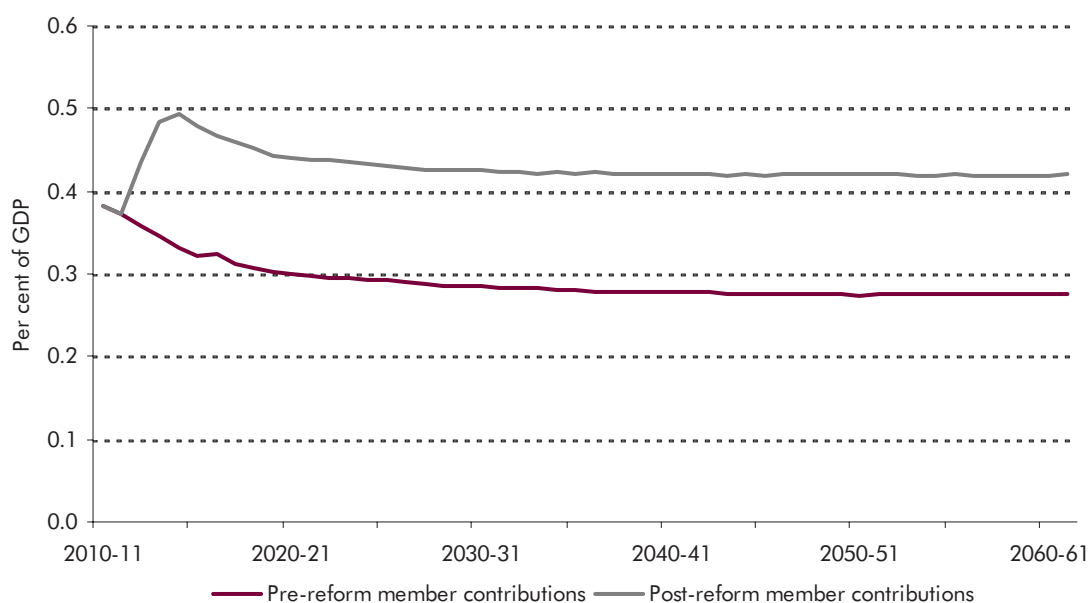
A.26 The impact of the switch from RPI to CPI uprating depends on the assumed gap between these two measures of inflation. We have assumed this to be stable at 1.4 per cent in the long term. However, it is possible that a different long-term gap may emerge over time. If long-term average RPI inflation was to be 0.25 percentage points higher or lower than this assumption then pre-reform CPI-based spending would be 0.1 per cent of GDP higher or lower respectively. This sensitivity has no impact on our central projections as these are based on CPI increases, but rather indicates that spending would have been different in our counterfactual RPI case.

Contributions

A.27 The 2010 Spending Review announced incremental increases in member contributions equivalent to an overall increase of 3.2 per cent by 2014-15, and we have added this additional contribution in aggregate rather than as scheme-specific additions. As a behavioural response we have also assumed that this increase in contribution rates causes a one per cent reduction in pensionable pay through opt outs, in line with previous *EFO* assumptions.

A.28 The overall effect is shown in Chart A.4, where we can see the increase in the contributions causes divergence in the lines from 2012-13, before stabilising at just under 0.15 per cent of GDP.

Chart A.4: Effect of reforms on member contributions

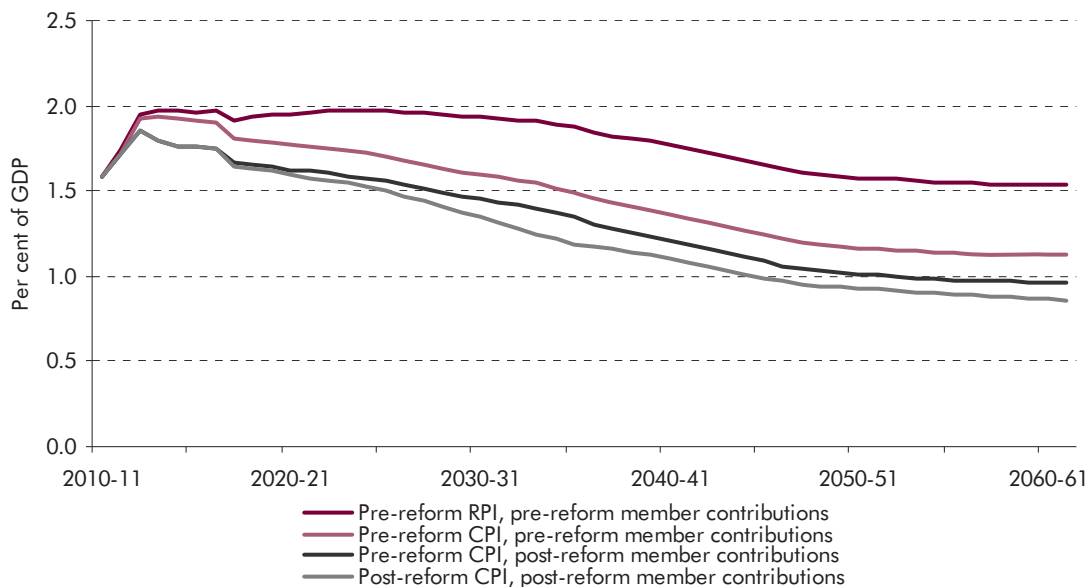


Source: OBR, GAD

Net impact of reforms

- A.29** The total impact of the reforms combines the effects of changes to the inflation link, the new scheme designs, and the reforms to contributions. Chart A.5 shows these impacts, moving first from a projection based on the old RPI link and pre-reform contributions. We estimate that pre-reform net spending would fall from 2 per cent of GDP currently to 1.5 per cent of GDP towards the end of the fifty year projection period. Moving from RPI to CPI indexation causes net spending to fall to 1.1 per cent of GDP towards the end of the projection period. Both of these projections ignore the effects of the opt outs caused by increasing contributions.
- A.30** The increase in contributions causes a further 0.1 per cent of GDP fall in net spending by 2061-62, with the effects of opt outs now included. Finally, the reform of schemes in line with the recommendations of *Good Pensions that Last* causes a further 0.1 per cent of GDP fall in net spending, to around 0.9 per cent of GDP, although we note that further savings may continue to emerge beyond the projection period. The total impact of Government reforms on net spending therefore amounts to around 0.6 per cent of GDP in 2061-62.

Chart A.5: Effect of reforms on net expenditure



Source: OBR, GAD

B Long-term pressures on health spending

B.1 In our central projections health spending is projected to increase from just under 7 per cent of GDP in 2016-17 to around 9 per cent by 2061-62 as a result of demographic change. However, there are likely to be a range of additional pressures on health spending above and beyond those created by changes in the age structure of the population. In our 2011 *Fiscal Sustainability Report* we presented sensitivity analysis based on varying our assumptions for productivity growth in the health sector and the proportion of life spent in good or poor health ('morbidity'). This annex looks at these two issues in more detail.

Productivity

B.2 For the purposes of our long-term projections of spending we do not make any explicit assumptions about productivity growth in the public sector. In our central projection real health spending per person is assumed to grow by 2.2 per cent a year, in line with the growth of whole economy real incomes. In the absence of demographic effects, this serves to keep health spending constant as a share of GDP, in real terms.

B.3 If the income elasticity of demand for health care is equal to unity, demand for health care will also grow by 2.2 per cent per annum. If it is assumed that real wages in the health sector also grow by 2.2 per cent per annum, in line with whole economy real incomes, an increase in health spending per person of 2.2 per cent per annum will be sufficient to cover the costs of increasing real wages, but health care inputs per person will remain unchanged. In order to generate an increase in health care per person of 2.2 per cent per annum, it is therefore necessary for productivity in health care to improve at the same rate.

B.4 In practice, productivity growth in the health sector may lag behind whole economy productivity growth, particularly given the labour intensity of health care provision. In this case health care spending may be subject to 'Baumol cost disease':¹ while real wages in the health care sector keep pace with whole economy incomes, slower productivity growth means that additional inputs would

¹ See Baumol (1966).

be necessary to achieve the required improvement in care per person of 2.2 per cent. Accordingly health spending per person would need to grow more quickly; how much more quickly would depend on how far productivity growth in health care lagged behind the whole economy rate. The next section discusses some of the available estimates of productivity growth in the health care sector.

Estimates of health care productivity

Office for National Statistics

B.5 Estimates of productivity growth in publicly-funded health care in the UK are regularly produced by the Office for National Statistics (ONS). The ONS estimates incorporate three elements:²

- **Inputs:** a cost-weighted index of labour inputs, goods and services inputs (for example, clinical supplies) and capital consumption;
- **Quantity of output:** the quantity of health care output is measured as a cost-weighted index of health care activities, such as the number of a particular type of operation or the number of GP consultations. These activities fall into three categories: Hospital and Community Health Services (HCHS), Family Health Services (FHS) and GP prescribing; and
- **Quality adjustment:** the quantity of output is then adjusted for changes in quality. The adjustment reflects two aspects of quality: the extent to which the service delivers its intended outcomes; and the extent to which the service is responsive to user needs. The former is measured using estimates of health gain, changes in waiting times and outcomes from primary care; the latter is based on responses to the National Patient Survey. More details of the methods used to quality-adjust health care output are set out in ONS (2012).

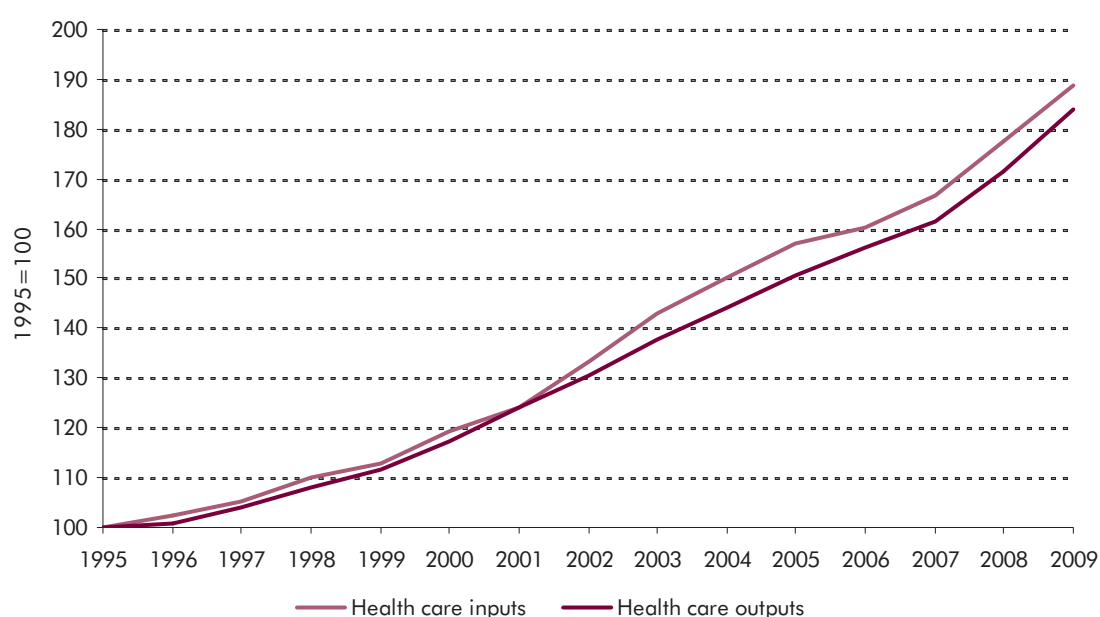
An index of productivity is then compiled by comparing changes in quality-adjusted health care output with changes in health care inputs.

B.6 Charts B.1 and B.2 set out the latest ONS estimates of health care inputs, outputs and productivity, as reported in Hardie et al (2011). Between 1995 and 2001, input growth kept pace with the growth of outputs, resulting in largely unchanged productivity. Following the NHS plan (2000), which committed to a significant increase in NHS resources between 2001 and 2004, the growth of inputs

² See Hardie et al (2011) for further details of the methodology.

accelerated markedly.³ Taken together with largely unchanged output growth, the increase in input growth resulted in a drop in measured productivity of 1.3 per cent per annum on average between 2001 and 2004. Since 2004 productivity has again remained largely flat, as input growth has been broadly matched by the growth of output. Over the full period since 1995 the ONS estimates suggest that productivity growth in health care has averaged -0.2 per cent per annum.

Chart B.1: Health care inputs and outputs: ONS estimates



Source: ONS

³ See HM Treasury (2000a, 2000b) and Department for Health (2000). Budget 2000 set out 6.1 per cent average annual real terms growth in NHS spending over the four years to 2003-04.

Chart B.2: Health care productivity: ONS estimates



Source: ONS

University of York Centre for Health Economics (CHE)

B.7 The Centre for Health Economics (CHE) at the University of York also produces regular estimates of productivity growth in the English National Health Service. The CHE estimates are based on a similar approach to the ONS estimates, although some important methodological differences mean that it is difficult to compare the two series directly:⁴

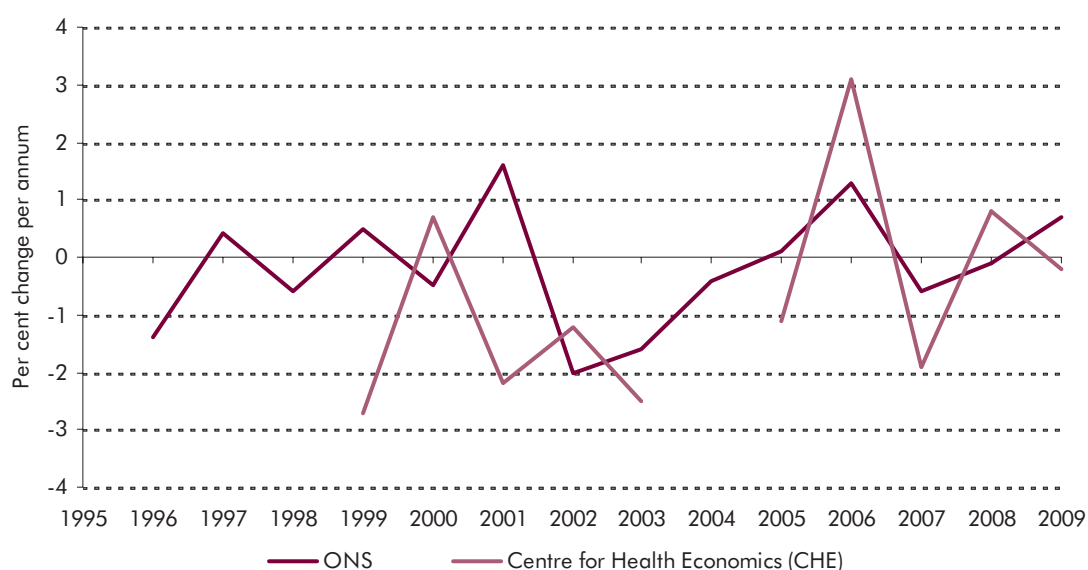
- the estimates produced by the ONS relate to the United Kingdom, while the CHE estimates cover England only;
- patient experience (as measured using the National Patient Survey) is separately accounted for in the ONS estimates, but not specifically included in the CHE approach; and
- changes in the categorisation of hospital activities are accounted for using different methods.⁵

⁴ Hardie et al (2011) sets out a description of the differences between the two measures.

⁵ The ONS estimates deal with changes in the categorisation of hospital activities by mapping new activities to previous categories, while CHE impute activity using the health service cost index. See ONS (2010a), Box 2.1, for further discussion of this issue.

B.8 Chart B.3 sets out the latest CHE estimates of annual health care productivity growth alongside those produced by the ONS.⁶ The CHE estimates provide a similar picture to the ONS results: in both cases productivity fell back in 2002 and 2003 as input growth accelerated, while annual productivity growth has averaged around zero per cent per annum since 2004.

Chart B.3: Estimates of health care productivity growth



Source: ONS, Bojke et al (2012), Dawson et al (2005). CHE estimates relate to financial years and are shown with reference to calendar years for purposes of comparison.

Other estimates

B.9 In attempting to gauge the long-term rate of productivity growth in health care it is useful to assess the trend in productivity over a reasonably long period of time. One limitation of the ONS and CHE estimates is that they cover only the period since the mid 1990s, a period at least partly characterised by exceptional input growth. As noted by the National Audit Office (2010), ‘productivity might initially be expected to fall in periods of rapid input growth as any resulting increase in output may be slower to achieve’. If this is the case, the ONS and CHE estimates may not be fully representative of the long-term rate of productivity growth in health care.

⁶ The CHE estimate of productivity growth in 2004 is excluded from the chart as this is unduly influenced by an improvement in the quality of available data around this time, and does not accurately represent a material change in productivity. In particular, an improvement in the collection of community care data by Primary Care Trusts led to a significant increase in measured output growth. See Bojke et al (2012).

- B.10** There is limited information on health care productivity prior to the mid-1990s. Oliver (2005) presents crude (not quality-adjusted) estimates of productivity growth extending back to 1979, using the Cost Weighted Activity Index (CWAI) for Hospital and Community Health Services in England. This series is subject to some significant drawbacks: it only covers a limited number of hospital activities; it takes no account of complex case mix; and it is not adjusted for changes in quality (Oliver, 2005). Nevertheless in the absence of other readily available series it may be instructive to consider this index alongside the more recent ONS and CHE estimates.
- B.11** Chart B.4 sets out the health care productivity index based on the CWAI for Hospital and Community Health Services, as reported in Oliver (2005). The index implies average crude productivity growth of 0.9 per cent per year between 1979-80 and 2000-01, although there are marked variations in productivity growth within this period: prior to 1995-96 – when the ONS estimates begin – productivity growth averaged 1.7 per cent per annum, before falling back steeply.
- B.12** It is not possible to make direct comparisons between the CWAI measure and the ONS/CHE estimates. Apart from the obvious methodological differences, the sharp fall in productivity between 1995-96 and 2000-01 is noticeably at odds with both the ONS and CHE estimates for this period, which suggest broadly unchanged productivity. The measure also excludes any adjustment for changes in quality, although it is not necessarily clear in which direction this would affect the estimates.⁷ Nevertheless it is notable that the long-term CWAI measure generally points to positive productivity growth in health care over the period prior to 1995-96.

⁷ For example, increases in patient waiting times over time could conceivably imply a negative quality adjustment.

Chart B.4: Health care productivity since 1979



Source: Oliver (2005). Estimates based on the Hospital and Community Health Services Cost Weighted Activity Index.

Productivity and long-term health spending

- B.13** Measuring productivity growth in health care is difficult. Quite apart from the difficulties in capturing the quantity of inputs and outputs, there is no single measure to capture changes in quality, and quality-adjusting output is necessarily subject to very significant uncertainties.⁸
- B.14** Set against this uncertainty, we have maintained the assumption that real health spending per person grows in line with real incomes for the purposes of our central projection. This is consistent with an implicit assumption that annual productivity growth in health care keeps pace with the whole economy rate of 2.2 per cent. However, to test the sensitivity of our projections we set out three alternative projections of health spending based on different assumptions about the rate of health care productivity growth:⁹

- assumed health care productivity growth of -0.2 per cent per annum, in line with ONS estimates of the average productivity growth rate since 1995;

⁸ Black (2012) provides a critique of the quality adjustment approach used in the ONS estimates. The ONS response can be found at: http://www.ons.gov.uk/ons/dcp14858_260157.xml.

⁹ This is consistent with varying the implicit relative cost of health care in our projections.

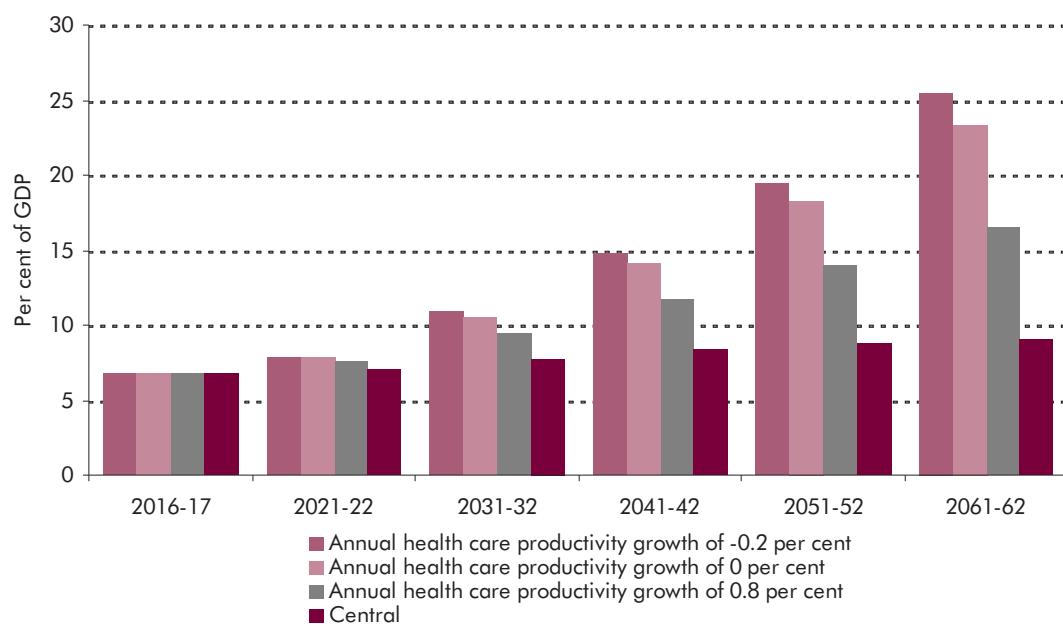
Long-term pressures on health spending

- assumed health care productivity growth of zero per cent per annum. This is consistent with the average rate implied by both the ONS and CHE estimates once the period between 2001 and 2004 – characterised by exceptional growth in inputs – is excluded from the calculation; and
- assumed health care productivity growth of 0.8 per cent per annum. This is in line with the average annual productivity rate obtained by combining the estimates for 1979-80 to 1995-96 presented in Oliver (2005) with the latest ONS estimates for the period since 1995.

B.15 These variations in productivity growth have a significant effect on projected health spending (Chart B.5).¹⁰ Health spending climbs to well over 20 per cent of GDP by 2061-62 in the first two scenarios based on the productivity growth rate since 1995; this compares to a share of around 9 per cent in our central projection. In the case where health care productivity grows at an annual rate of 0.8 per cent, health spending increases to around 16½ per cent of GDP by the end of the projection period. As a result public sector net debt rises much more steeply in these alternative projections (Chart B.6).

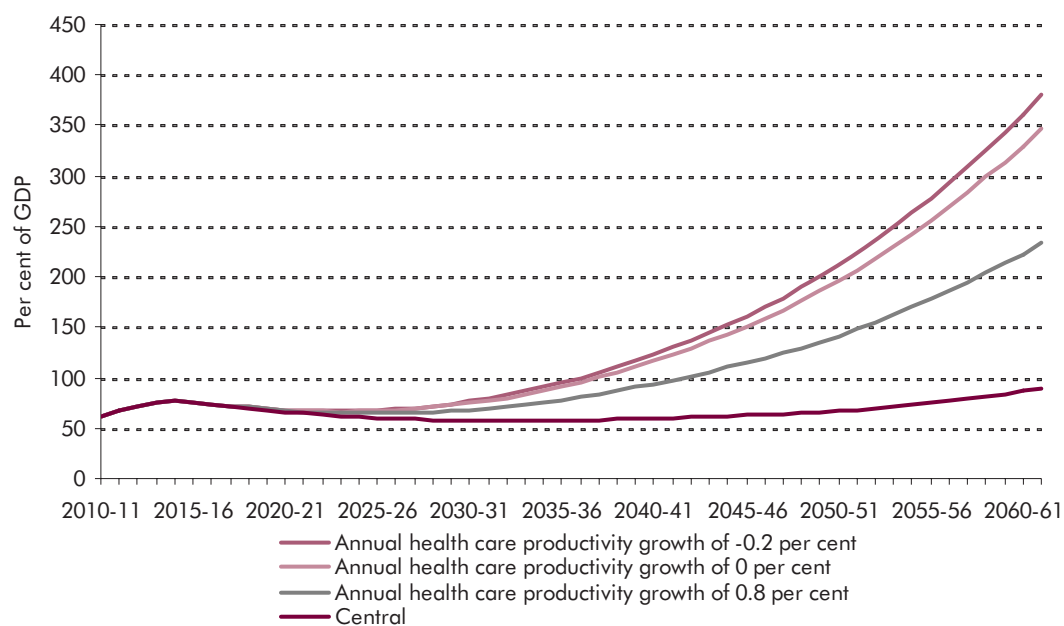
¹⁰ The scenarios assume that demand for health care per person increases by 2.2 per cent a year, in line with the growth of real incomes (i.e. there is a unit income elasticity of demand for health care); and that the government funds this improvement in health care per person.

Chart B.5: Projected health spending



Source: OBR

Chart B.6: Public sector net debt

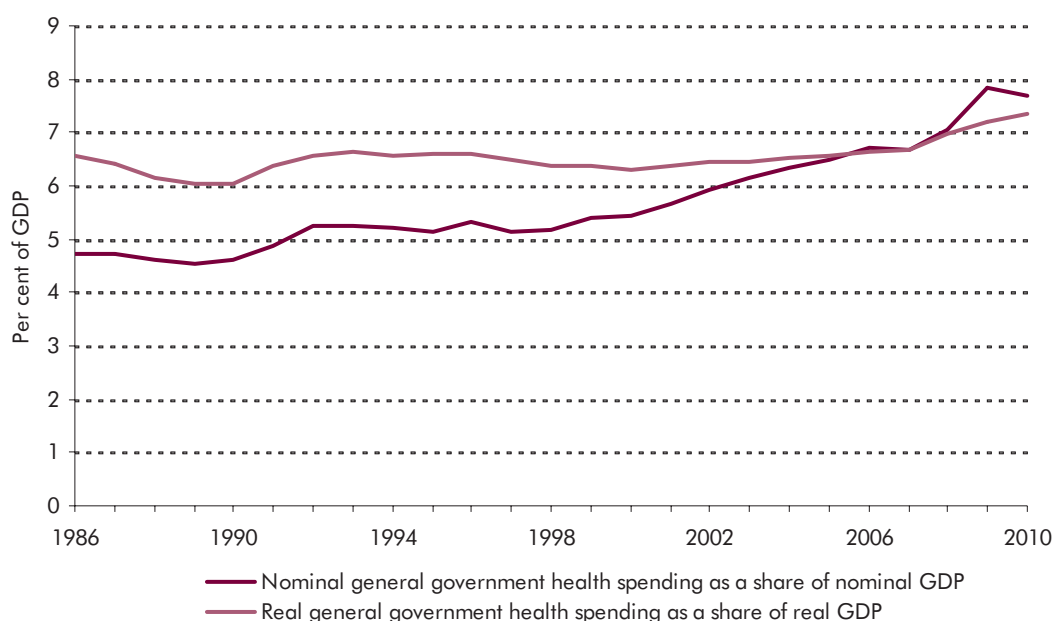


Source: OBR

Long-term pressures on health spending

B.16 As with all our long-term projections of spending and revenue, these alternative scenarios do not represent a prediction of the likely evolution of health expenditure. Rather, they should be interpreted as broad-brush illustrations of what might happen if policy was to remain unchanged and the underlying assumptions were to hold true. Nevertheless, previous experience would suggest that it is not unreasonable to expect a rise in health spending as a share of GDP even in the absence of demographic pressures: over the past forty years health spending has risen consistently in the UK and across other OECD countries in the face of relatively less pressure from demographic change.¹¹ Indeed, the rise in the nominal share of output accounted for by health spending relative to the real share in the UK over the past twenty-five years is consistent with an increase in the implicit relative price of health care over this period – and therefore the existence of Baumol-type effects (Chart B.7).

Chart B.7: Health spending as a share of GDP



Source: ONS

¹¹ The OECD (2006) decompose changes in health spending across OECD countries between 1970 and 2002 into the effect of demographic change (an 'age effect'); the effect of rising incomes; and a residual reflecting excess cost growth. On average, public health spending per capita increased by 4.3 per cent per year; of this, rising incomes accounted for 2.5 percentage points; the age effect 0.4 percentage points; and residual excess cost growth 1.5 percentage points.

Income elasticity of demand

- B.17** The central and alternative projections set out in Charts B.5 and B.6 rest on the assumption that the income elasticity of demand for health care is unity. In the absence of demographic pressures or additional costs from subdued productivity growth, this assumption serves to keep health spending stable as a share of national income over the long run. By contrast, an income elasticity of demand in excess of unity would mean that, eventually, virtually all income would be spent on health; equally an income elasticity of demand less than unity would mean that health spending would tend to zero as a share of GDP. An income elasticity of demand of unity would therefore appear to be a reasonable central assumption for the purposes of long-term spending projections.
- B.18** There is a vast literature on the income elasticity of demand for health care. A report by the OECD (2006) sets out evidence from both cross-sectional and time series studies. Estimates of the income elasticity of demand range from close to zero to well in excess of unity, with some evidence that the size of the coefficient is larger when estimated at a macro level rather than at the level of the individual. An econometric exercise set out by the OECD highlights the sensitivity of the estimated income elasticity to the estimation procedure: based on data on OECD countries for the period 1970-2002, the estimate of the income elasticity of demand varies from just under 0.9 up to 1.6 depending on the number of variables used and the method of estimation.
- B.19** Set against the uncertainty, the OECD suggest that the most reasonable approach for long-term projections of health spending is to assume an income elasticity of unity, consistent with the convention adopted for our central projections. Indeed, historical data for the UK suggest that real health spending has broadly kept pace with real incomes since the mid 1980s, although the real share of national income devoted to health care has risen slightly over the past few years (Chart B.7).
- B.20** The OECD subsequently conduct sensitivity analysis using an income elasticity of demand of 0.8 and an income elasticity of demand of 1.2. On the basis of our central projection for health care productivity growth – which assumes that health care productivity improves in line with the whole economy rate – an income elasticity of demand of 0.8 would mean that health spending would reach around 7½ per cent of GDP by 2061-62 – around 1½ percentage points below our central projection. Equally an income elasticity of demand of 1.2 would increase health spending in 2061-62 to 11 per cent of GDP.

Publicly-funded health care

- B.21** The projections set out in Charts B.5 and B.6 also assume that the government meets increases in demand by funding an improvement in care per person of just

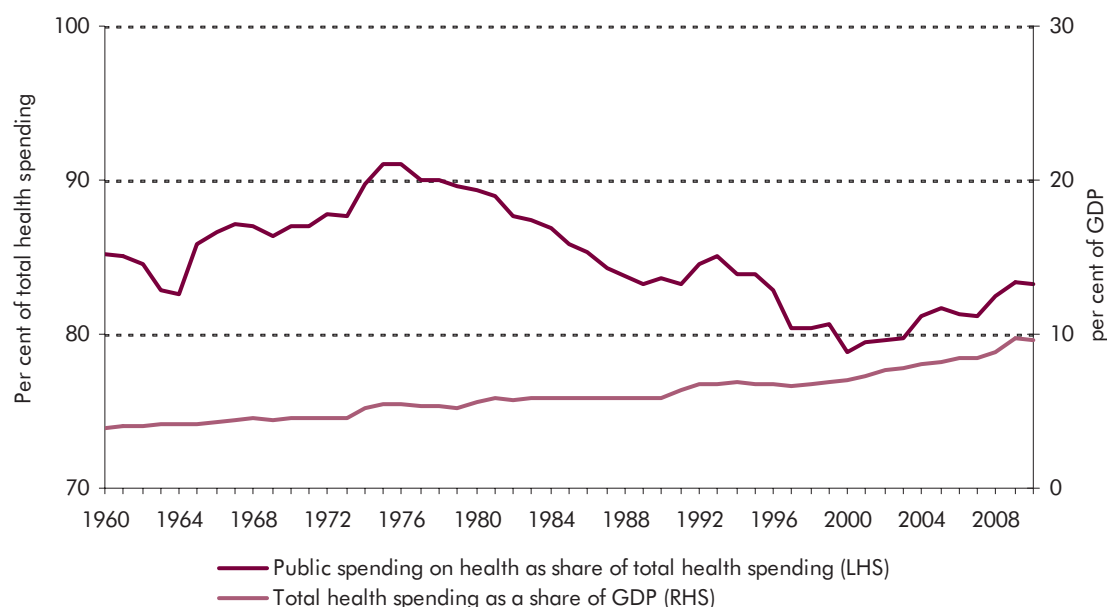
over 2 per cent per year, consistent with real income growth. Implicit in this assumption is that there is no relative shift towards privately funded health care over time as a result of increasing demand. An alternative scenario would be to assume that the relative share of total health spending accounted for by the private sector climbs over time as overall demand for health care increases.

- B.22** The mix between public and private spending on health care will be determined by a large number of factors that are difficult to predict with any degree of certainty – not least the relative cost of private health care. Nevertheless, historical data do not tend to suggest a systematic or consistent relationship between the level of spending and the split of spending between the public and private sector. Chart B.8 sets out total health spending in the UK as a share of GDP since 1960, alongside the share of total spending accounted for by public spending.¹² While total health spending as a proportion of GDP has climbed steadily over the past fifty years, the share of total spending accounted for by public spending has fluctuated, rising between the mid 1960s and mid 1970s, falling back gradually from the mid 1970s, before recovering from the early 2000s.
- B.23** A similar picture emerges from cross-country comparisons. Chart B.9 sets out the total change in total health spending as a share of GDP since 1970 for a range of OECD countries, alongside the change in the public spending share.¹³ In all cases health spending as a share of GDP has increased over the past forty years, and by a relatively similar amount. With the exception of the United States, the change in health spending as a proportion of GDP varies from just under 3 percentage points to just over 6 percentage points. However, as with the UK time series, there appears to be no obvious systematic relationship between the overall change in health spending and the proportion accounted for by the public sector. While health spending as a share of GDP has increased in all countries since 1970, there is no consistent pattern in the public spending share, with some countries displaying an increase in the share and others a fall.

¹² Total health spending and public health spending are as defined in OECD (2011). Public spending on health includes all health expenditure by public funds, where public funds are defined as state, regional and local Government bodies and social security schemes.

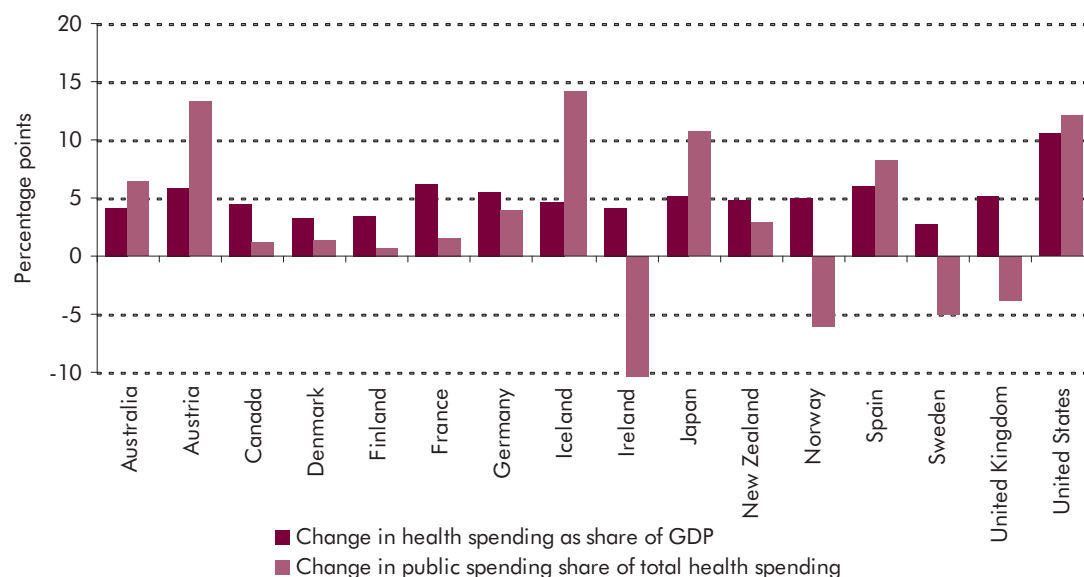
¹³ The chart covers all OECD countries where a sufficient time series of data was available.

Chart B.8: Public spending as a share of total health spending in the UK



Source: OECD health database

Chart B.9: Changes in health spending in OECD countries since 1970



Source: OECD health database. Chart shows percentage point change between 1970 and 2010 except Australia (1971 to 2009), Denmark (1971 to 2010), Japan (1970 to 2009) and Spain (1970 to 2009).

Morbidity

- B.24** In constructing our projections of health spending we distinguish between two types of expenditure:
- costs relating to the final year of life ('death-related' costs); and
 - other costs that vary with age and gender, but which are not explicitly linked to the last year of life – that is, they are 'age-related', but not necessarily 'death-related'.
- B.25** In our central projection, costs relating to the final year of life are projected forward using ONS projections of mortality. To the extent that mortality rates are projected to fall, our projections of health spending partly capture expected improvements in health. On the other hand, other 'age-related' costs are projected forward by assuming a constant health status for a person of a specific age and gender. In other words, health spending on a person of a specific age and gender is the same at the start and end of the projection period for these costs once general improvements in health care are accounted for.
- B.26** Given projected increases in life expectancy, this implicitly means that the length of time spent in ill health increases to some extent over time – an expansion of morbidity. An alternative convention would be to assume that more of the additional years of life are spent in better health – in other words, an increase in healthy life expectancy. All else equal, an improvement in healthy life expectancy over time would reduce projected health spending as a share of GDP.
- B.27** There are a number of ways to measure healthy life expectancy. One approach is to use responses given by survey respondents on their health. The ONS regularly produce two different measures of healthy life expectancy based on self-reported health:
- 'General' healthy life expectancy: the number of years an individual can expect to spend in 'good' health;¹⁴ and
 - Disability-free life expectancy: the number of years an individual can expect to spend free from a limiting long-standing illness or disability.

¹⁴ The specific definition of 'good health' has changed over time. Since 2007, the headline measure has been based on the number of individuals reporting their health as 'very good' or 'good' in response to the question 'How is your health in general? Is it...'. Previous estimates were based on the number of individuals reporting their health as 'good' or 'fairly good' in response to the question 'Over the last 12 months would you say your health has been...'. See Smith and White (2009) for further details.

- B.28** Assessing the long-term trends in these estimates is complicated by a series of significant changes to methodology and survey design. For example, changes to the measures in 2001 – including changes to the design of the General Household Survey, the inclusion of 2001 census data and the expansion of the measure to cover the whole of the United Kingdom, rather than Great Britain¹⁵ – mean that it is difficult to directly compare the pre-2001 series with the series that follows. A further revision to the survey question means there is an additional discontinuity in the headline series around 2007.¹⁶
- B.29** Charts B.10 and B.11 set out ONS estimates of life expectancy and ‘general’ healthy life expectancy at age 65 since 1981, for males and females respectively. To reflect the discontinuity in the measure in 2001, the pre-2001 and post-2001 series are shown separately.¹⁷ For both males and females, the absolute increase in healthy life expectancy has lagged behind the change in total life expectancy. While life expectancy at age 65 for males increased by 4.2 years between 1981 and 2006, healthy life expectancy increased by 2.7 years.¹⁸ Similarly, life expectancy at age 65 for females increased by 3 years over this period, compared to an increase in healthy life expectancy of 1.8 years.

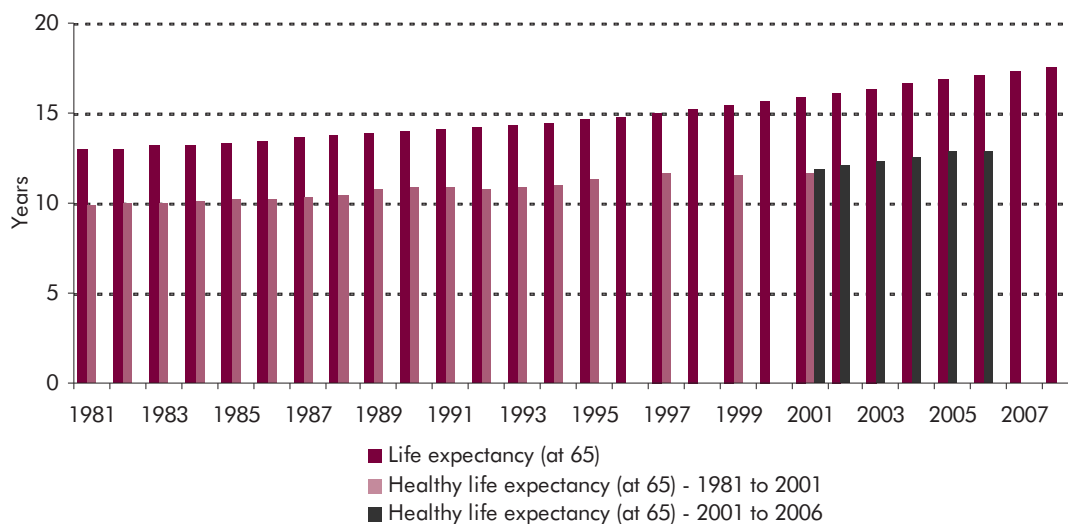
¹⁵See Breakwell and Bajekal (2005) for a full discussion.

¹⁶ See Smith and White (2009).

¹⁷ Estimates of healthy life expectancy for 2007 and 2008 have been based solely on a revised measure using a new question. These estimates have been excluded from the chart for the purposes of clarity, but are set out in ONS (2010b) and ONS (2011b). The exclusion of these estimates does not affect the conclusions set out here.

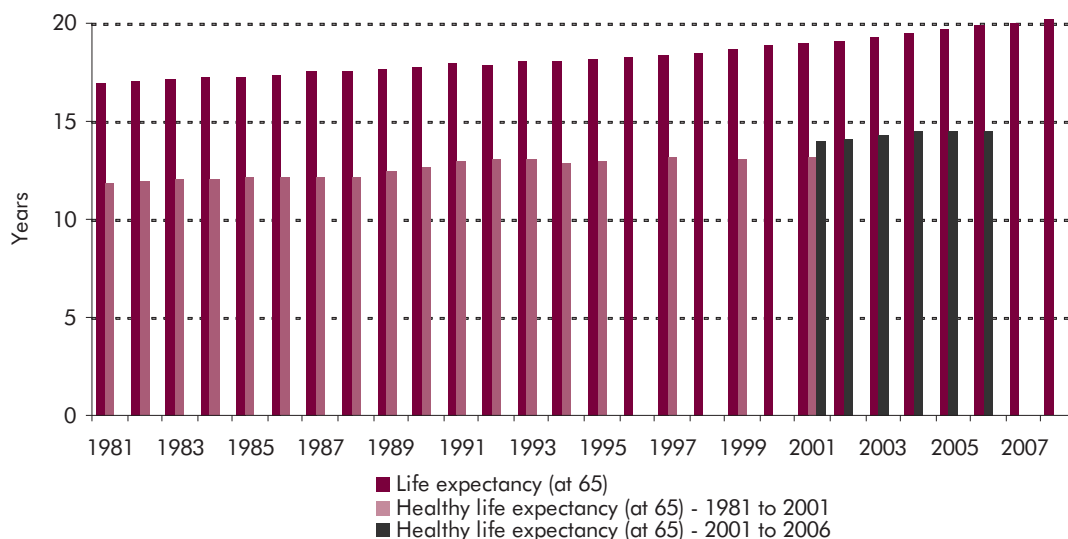
¹⁸ To account for the discontinuity in the level of measured health life expectancy in 2001, total changes in life expectancy over the period 1981 to 2006 are estimated by adding the total change between 1981 and 2001 using the old measure to the total change between 2001 and 2006 using the new measure.

Chart B.10: Healthy life expectancy at 65: males



Source: ONS. Healthy life expectancy measure between 1981 and 2001 is Great Britain only. Measure between 2001 and 2006 reported as rolling three year moving average: for the purposes of the chart observations are related to the middle year of the average.

Chart B.11: Healthy life expectancy at 65: females

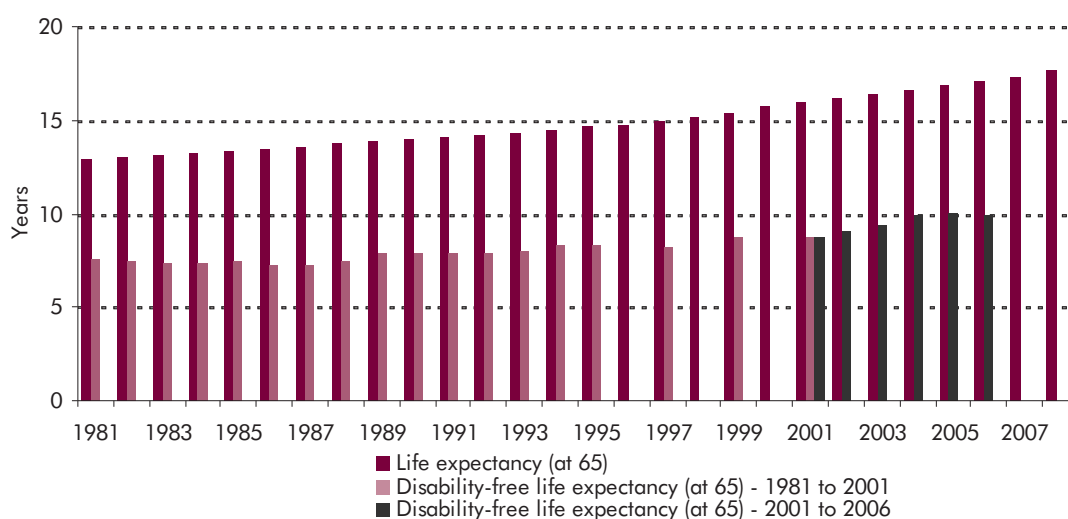


Source: ONS. Healthy life expectancy measure between 1981 and 2001 is Great Britain only. Measure between 2001 and 2006 reported as rolling three year moving average: for the purposes of the chart observations are related to the middle year of the average.

B.30 A similar picture emerges from estimates of disability-free life expectancy. Charts B.12 and B.13 set out ONS estimates of total life expectancy and disability-free life expectancy at 65 back to 1981, for males and females respectively. As with the general healthy life expectancy measure, there is a discontinuity in the

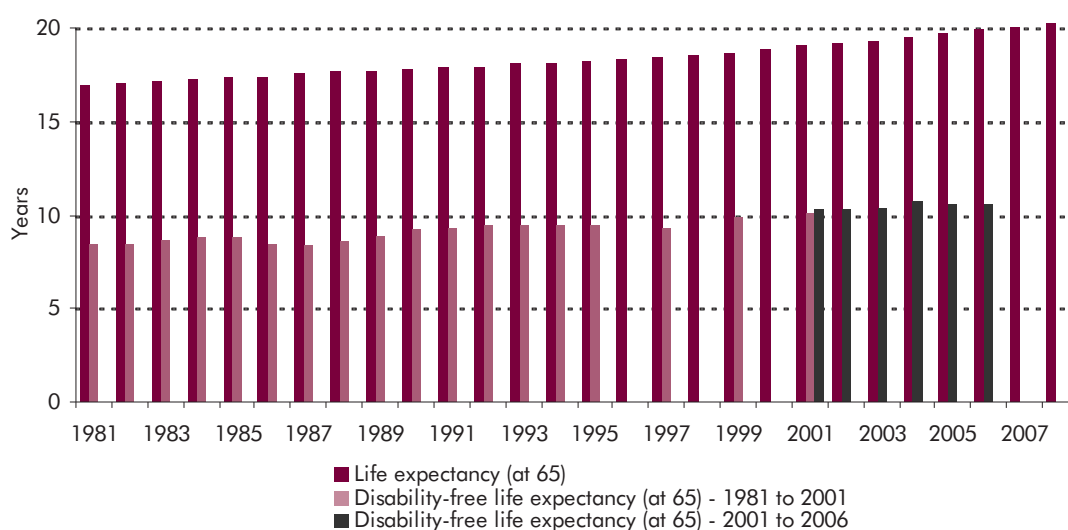
measure in 2001, so the pre-2001 and post-2001 series are shown separately. Between 1981 and 2006, disability-free life expectancy at age 65 increased by 2.4 years for males and 1.9 years for females, firmly below the increase in life expectancy at 65 for males and females of 4.2 years and 3 years respectively.

Chart B.12: Disability-free life expectancy at 65: males



Source: ONS. Disability-free life expectancy measure between 1981 and 2001 is Great Britain only, and reported by ONS as 'life expectancy free from limiting long-standing illness (LLI)'. Disability-free life expectancy measure between 2001 and 2006 reported as rolling three year moving average: for the purposes of the chart observations are related to the middle year of the average.

Chart B.13: Disability-free life expectancy at 65: females



Source: ONS. Disability-free life expectancy measure between 1981 and 2001 is Great Britain only, and reported by ONS as 'life expectancy free from limiting long-standing illness (LLI)'. Disability-free life expectancy measure between 2001 and 2006 reported as rolling three year moving average: for the purposes of the chart observations are related to the middle year of the average.

Morbidity and health spending

- B.31** The ONS population projections used to generate our central projections of health spending imply that life expectancy at 65 increases by one year every seven years. To the extent that costs relating to the final year of life are projected forward on the basis of falling mortality rates, our projections of health spending partly capture improvements in health over time. On the other hand, all other age-related health costs are based on the assumption of constant health status for a person of a specific age and gender. Given the increase in life expectancy, this implicitly assumes some increase in the number of years spent in ill health.
- B.32** An alternative convention for all other age-related health costs would be to assume that the health status for a person of a specific age and gender improves over time at some rate as life expectancy increases, implying that more of the additional years of life are spent in better health. The available ONS estimates suggest that healthy life expectancy has expanded as total life expectancy has increased, albeit at a slower rate. Taking the average over the period between 1981 and 2006, the estimates presented above suggest that healthy life expectancy has increased by around 0.6 years for every one year increase in life expectancy (at age 65).¹⁹ An alternative assumption for the projection of other age-related health spending would be that health status improves according to this ratio. Taken together with the projected increase in life expectancy assumed for the ONS population projections, this would imply an increase in healthy life expectancy of one year every twelve years. This scenario would still be consistent with an increase in the number of years spent in ill-health but would represent a slower expansion of morbidity than that implicitly assumed in our central projection.
- B.33** A more pronounced alternative would be to assume that health status improves in step with life expectancy – in other words, that healthy life expectancy increases by one year for every seven years of the projection period, in line with the rate of improvement in life expectancy. This would imply that years of ill health are shifted to later in life – a compression of morbidity. This is somewhat at odds with the available ONS evidence, although it provides a useful test of the sensitivity of our projections to changes in morbidity.
- B.34** Charts B.14. and B.15 set out our central projections of health spending and public sector net debt alongside two alternative scenarios: a slower expansion of

¹⁹ The specific ratios for each measure, by gender, can be derived by dividing the total increase in healthy life expectancy by the total increase in life expectancy at age 65 between 1981 and 2006. For every one-year increase in life expectancy, general healthy life expectancy has increased by 0.64 years for males and by 0.59 years for females; while disability-free life expectancy has increased by 0.58 years for males and by 0.64 years for females.

morbidity, with health status improving by one year for every twelve years of the projection period; and a compression of morbidity, where healthy life expectancy is assumed to improve in line with overall life expectancy at age 65.²⁰ Again, these alternative scenarios should be interpreted as broad-brush illustrations rather than a specific prediction about the evolution of health spending. As would be expected, both scenarios reduce projected expenditure relative to our central projection. By 2061-62, health spending is projected to reach 8 per cent of GDP in the compression of morbidity scenario and around 8½ per cent with a slower expansion of morbidity; this compares to around 9 per cent in our central projection. Accordingly, both scenarios imply a lower projected path for public sector net debt (Chart B.15).

- B.35** The effect of alternative morbidity scenarios on projected health spending and public sector net debt is significantly smaller than the impact of the alternative productivity scenarios set out in Charts B.5 and B.6. A 'combined' scenario, which incorporated alternative assumptions for both health care productivity growth and morbidity, would therefore be dominated by the impact of lower productivity growth. For example, under a scenario where health care productivity was assumed to grow by 0.8 per cent per annum and there was a slower expansion of morbidity, projected health spending would rise to around 15½ per cent of GDP by 2061-62 – significantly above the slower expansion of morbidity scenario set out in Chart B.14.

²⁰ This is achieved in the model by shifting upwards the cost profile for age-related health expenditure on those over the age of 65 by one year of age for every seven years (compression of morbidity scenario) or every twelve years (slower expansion of morbidity scenario). This implies, for example, that spending per person on an individual aged 70 in 2030-31 is equivalent to spending per person on an individual aged 69 in 2023-24 (compression of morbidity scenario) or in 2018-19 (slower expansion of morbidity scenario), once the general improvement in health care per person - which grows in line with real incomes in our central projection - is controlled for.

Chart B.14: Projected health spending

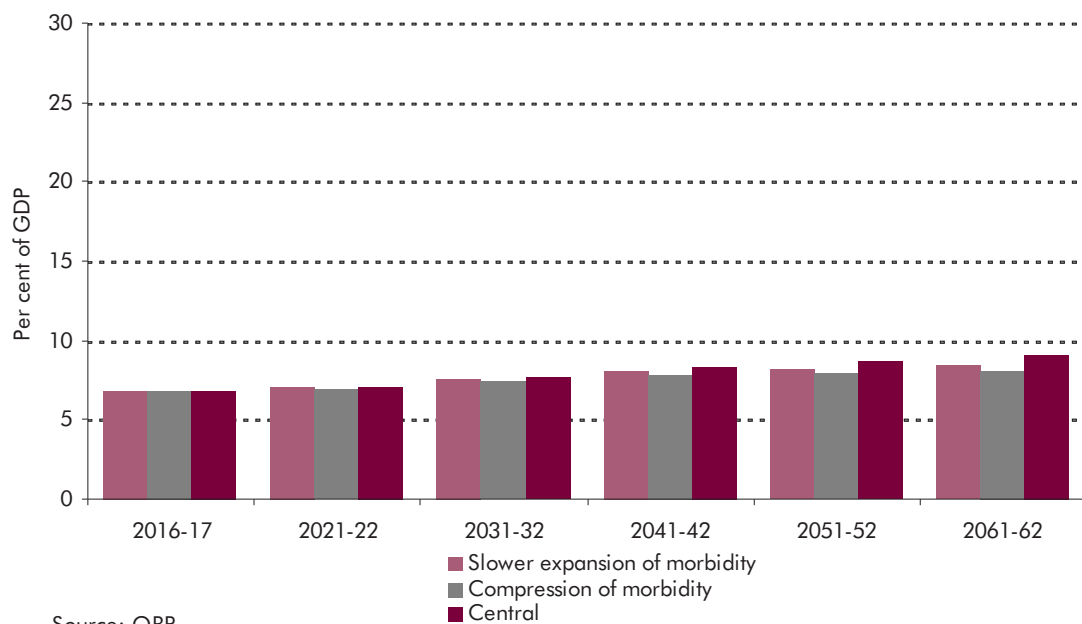
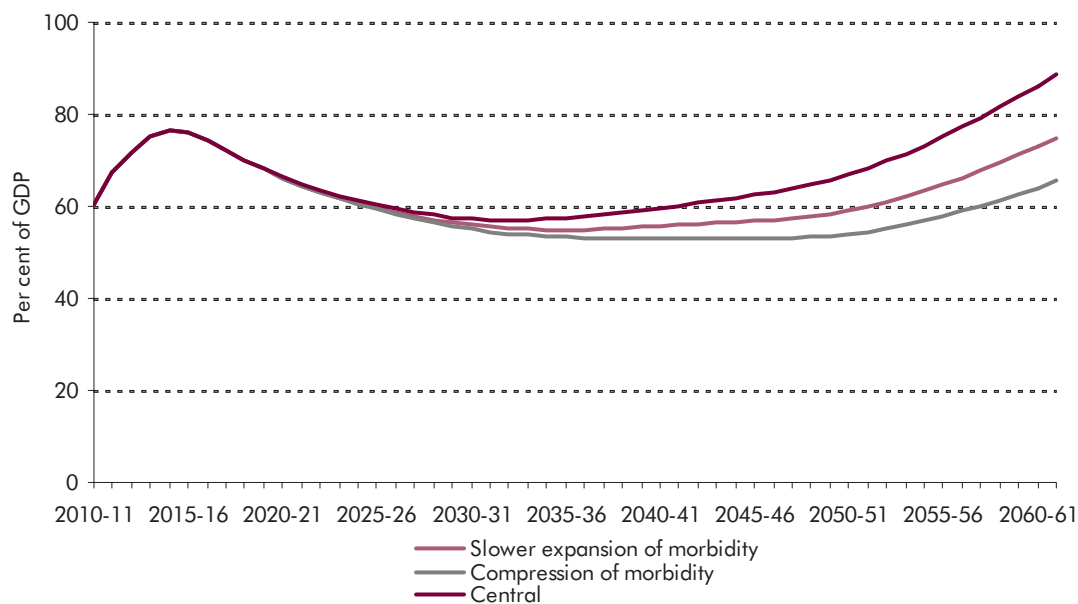


Chart B.15: Public sector net debt



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