

Long-term public finance report: fiscal sustainability with an ageing population

December 2003



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**Long-term
public finance report:
fiscal sustainability with
an ageing population**

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OVERVIEW

INTRODUCTION

I.1 In 2002 the Government published its first *Long-term public finance report*¹ to provide a comprehensive analysis of long-term economic and demographic developments, and their likely impact on the public finances. The *Long-term public finance report* complements the illustrative long-term fiscal projections presented in the *Economic and Fiscal Strategy Report* (EFSR)², which are published at the time of the Budget. The Government is committed to continue to update and report on its assessments of long-term fiscal sustainability in the future.

This Report introduces a number of innovations and refinements

I.2 The 2003 *Long-term public finance report* follows the general structure of last year's report but also introduces a number of innovations and refinements. On the basis of an extended analysis, which includes, for example, different population scenarios, the 2003 Report confirms the findings of last year's report and other studies. It finds that, on the basis of current policies and a range of assumptions, the UK public finances are sustainable in the long term. In addition, the Report concludes that the UK is in a strong position relative to other major economies to face the challenges ahead. The Report also finds that there is a high degree of inter-generational fairness of current policies, compared to many other countries.

Motivation for the Report

I.3 The publication of the *Long-term public finance report* is motivated by the Government's belief that sustainable public finances are a prerequisite both to achieving high and stable rates of long-term economic growth, which is shared by all, and to ensuring that spending and taxation impact fairly between generations.

The Government needs to be aware of long-term trends

I.4 It is therefore important for the Government to have information on the long-term outlook, and the future implications of current policy. As well as assisting strategic decision-making, more information on long-term trends greatly improves fiscal transparency and credibility.

I.5 The key long-term trend that all developed economies are facing is the ageing of their populations. This trend will have profound effects on each society and economy over the coming decades. The demand for health care, for example, is likely to rise as a result of the increased number of older people. A good understanding of the challenges which might arise is essential for the Government to make the right strategic policy decisions and to ensure that government policy will be sustainable over the long term. Without this type of analysis there is a risk that unsustainable policies might be pursued, which require sharp corrective policy adjustments in the future. Such sudden and unexpected changes in policy could be very harmful and unfair for firms and individuals.

¹ 2002 *Long-term public finance report: an analysis of fiscal sustainability*, HM Treasury, November 2002.

² Annex A of the *Economic and Fiscal Strategy Report*, in *Budget 2003: Building a Britain of economic strength and social justice*, HM Treasury, April 2003.

THE UK FISCAL FRAMEWORK

1.6 The Government's objective of achieving high and stable long-term economic growth has to be put in the context of the UK's fiscal framework. The UK's fiscal framework facilitates transparent, long-term decision-making in both the public and private sectors. The framework is guided by the *Code for Fiscal Stability*³, which sets out a commitment to managing the public finances in the long-term interests of Britain. The five key principles of the *Code* – transparency, stability, responsibility, fairness and efficiency – support a long-term focus in the policy-making process.

Objectives for fiscal policy **1.7** Fiscal policy is set with consideration for the short, medium and long terms. The *Code* requires the Government to state its objectives and fiscal rules by which fiscal policy is operated. The Government's objectives for fiscal policy are:

- over the medium term, to ensure sound public finances and that spending and taxation impact fairly both within and between generations; and
- over the short term, to support monetary policy; and, in particular, to allow the automatic stabilisers to play their role in smoothing the path of the economy.

1.8 In the long run, fiscal policy supports the Government's long-term goals by ensuring that the public finances are sustainable, contributing to a stable environment that promotes economic growth. This environment is important for achieving the Government's objective of building a stronger, more enterprising economy and a fairer society, extending economic opportunity and supporting those most in need to ensure that rising national prosperity is shared by all.

Fiscal rules **1.9** The Government has formulated two fiscal rules through which the objectives for fiscal policy are implemented, which also reflect its commitment to fiscal sustainability and generational fairness. They are:

- the **golden rule**: over the economic cycle, the Government will borrow only to invest and not to fund current spending; and
- the **sustainable investment rule**: public sector net debt as a proportion of GDP will be held over the economic cycle at a stable and prudent level. Other things being equal, net debt will be maintained below 40 per cent of GDP over the economic cycle.

1.10 The golden rule specifies that current spending should be financed by current taxes (and not by future generations) over the economic cycle, thus ensuring generational fairness and fiscal sustainability. In addition, the sustainable investment rule ensures debt sustainability and also supports generational fairness by limiting the scope for the current generation to leave excessive debt burdens to future generations.

PURPOSE AND STRUCTURE OF THIS REPORT

Purpose

1.11 The *Code* also requires the Government to publish illustrative long-term fiscal projections, covering a horizon of at least ten years. In practice a 30-year horizon has been chosen. These projections, which are based on a top-down assessment of long-term fiscal

³ *Code for Fiscal Stability*, HM Treasury, March 1998.

sustainability and published in Annex A of the EFSR, do not identify specific long-term spending trends due to the modelling approach chosen. The Government presented its first assessment of long-term fiscal sustainability in last year's *Long-term public finance report*. This Report seeks to extend and build on the analysis in the last *Long-term public finance report* and in the EFSR, which is updated again in this Report. To this end the Report aims to provide:

- a comprehensive picture of the sustainability of the public finances over the long term based on a range of plausible assumptions;
- an indication of the degree of inter-generational fairness;
- better quality information to guide policy and enhance decision-making and planning by both the Government and individuals; and
- a framework for examining the effects of demography and other long-term trends on the public finances.

Structure

Long-term challenges **I.12** When assessing the long-term sustainability of the public finances and the degree of generational fairness of current policies, it is necessary to make an assessment of expected future trends. Chapter 2 looks at these long-term trends. One significant future development is the ageing of the population. While it is not clear how the population will evolve *exactly* over the coming decades, what can be predicted with confidence is that the number of older people will rise relative to those of working age. The changing population structure is likely to have implications for spending and revenues that are sensitive to demographic change, such as health expenditure. Last year's report only provided projections based on the Government Actuary's Department (GAD) principal population projections. This year's Report moves the analysis on by discussing these long-term challenges based on a range of population scenarios.

Stylised trend growth projections **I.13** The changing structure and level of the population is also likely to affect long-term trend growth and future GDP per capita. These trends are expected to vary across countries and could have profound effects on future living standards. Chapter 2 therefore presents for the first time stylised projections of trend growth in G7 countries up to 2051, based on demographic factors.

A more detailed analysis including accruals-based balance sheets **I.14** Last year's assessment of long-term fiscal sustainability was based on a number of approaches, including the top-down approach used for the illustrative long-term fiscal projections in Annex A of the EFSR, bottom-up projections and synthetic sustainability indicators, such as fiscal gaps. It is important that an assessment is as comprehensive as possible. Chapter 3 of this year's Report therefore extends the range of approaches to include the conventional national-accounts based measures of debt and an accruals-based balance sheet. The latter will provide the basis for the Whole of Government Accounts that will be published for 2006–07 onwards.

I.15 Chapter 4 presents the different measures and indicators of sustainability used in last year's report in more detail and discusses the strengths and limitations of each. The chapter builds on the last report with a new focus on the need for sensitivity analysis when conducting long-term projections and measures of generational fairness. It also introduces a new indicator, which is based on the fiscal gap concept.

- Principal and variant population projections are used this year** **I.16** Chapter 5 presents the key assumptions used in the fiscal projections. A range of reasonable assumptions is used, reflecting the fact that there is a very high degree of uncertainty regarding future developments. Given that the changing structure of the population is likely to be one of the main trends in the decades ahead, the underlying demographic assumptions are crucial to the projection results. This Report uses GAD's 2001-based interim principal population projections for the UK for the baseline projections but also uses – unlike last year's report – GAD's variant population projections to provide some sensitivity analysis^{4,5}. A range of assumptions is also used for productivity growth and the discount (real interest) rate. In addition, Chapter 5 shows how the spending and revenue projections, which are used to assess the long-term sustainability of the public finances, are generated.
- The Report confirms last year's results** **I.17** Using the latest medium-term projections⁶, Chapter 6 provides updated projections and compares them with those published in last year's *Long-term public finance report*. The results differ only slightly from those presented last year and show that, on the basis of current policies and a range of reasonable assumptions, the public finances are sustainable in the long term. The results also show, based on a refined approach to analysing the degree of inter-generational fairness, that current policies in the UK are relatively generationally fair compared to those in many other countries. Moreover, the projections show that, based on current policies, the general government's capital stock, as a share of GDP, is projected to rise substantially over the coming decades, and that spending is projected to be robust to changes in demographic assumptions, such as the fertility rate.
- More international comparisons** **I.18** Increasing attention is being paid to these longer-term fiscal issues internationally. Chapter 6 provides an overview of recent international studies. These studies confirm the findings of last year's report that the UK is in a strong position relative to other major economies to face the challenges ahead.

⁴ http://www.gad.gov.uk/Population_Projections/Population_projections_background.htm.

⁵ The Government Actuary's Department announced on 26 September that it will publish its 2002-based principal population projections on 18 December 2003.

⁶ 2003 *Pre-Budget Report*, HM Treasury, December 2003.

2

LONG-TERM CHALLENGES FOR THE PUBLIC FINANCES

INTRODUCTION

2.1 This chapter looks at the long-term challenges that could affect current and future fiscal policies. The main focus, as in last year's *Long-term public finance report*¹, is on demographic changes in general and population ageing in particular. While last year's report only considered a single set of population projections, the chapter illustrates the potential long-term challenges by also using the Government Actuary's Department (GAD) variant population projections. The chapter shows that the projected evolution of the UK's population is sensitive to a number of key demographic assumptions regarding fertility rates, net migration rates and increases in longevity. The chapter also provides updated population projections by the United Nations and a new discussion of how trend growth might be affected in the leading industrial economies by demographic changes over the coming decades.

THE CHANGING STRUCTURE OF THE UK POPULATION

2001-based interim population projections

2.2 One of the most important future developments is the changing structure of the UK's population. In the UK, GAD provides the official population projections based on different scenarios. Generally GAD publishes updated population projections on a two-year cycle. The latest set of projections was published in November 2002. These 2001-based interim projections are based on the 2001 Census, which found that around 1 million fewer people lived in the UK in 2000 than previously estimated². GAD will publish its next set of projections on 18 December 2003. Box 2.1 provides information on the underlying population data revisions and GAD's demographic assumptions for the 2002-based projections.

Box 2.1: Government Actuary's Department 2002-based population projections

At the end of September the Government Actuary's Department (GAD) announced that it would publish its latest 2002-based population projections on 18 December 2003. The projections will be based on the latest population estimates from the Office for National Statistics (ONS). The ONS published mid-year estimates for 2002 and revised mid-year estimates for 2001 in September 2003, and a further update in November. The revised estimates show that there were 213,000 more people in England and Wales than previously thought. Males, in particular in the 25 to 34 year age group, make up most of that increase¹.

The 2002-based principal population projections will be based on higher longevity assumptions for males and females than those used for the 2001-based interim projections (from 79.1 years at birth in 2027 to 80.6 years for males and from 83.3 years to 84.6 years for females). Furthermore, net migration and other changes will be raised marginally from 100,000 to 103,000. By contrast, the fertility rate assumption of 1.74 children per woman will remain unchanged².

¹ http://www.statistics.co.uk/census2001/cn_73.asp.

² http://www.gad.gov.uk/Population/2002/methodology/announcement_assumptions.htm.

Variant population projections

2.3 While there is general agreement that the population structure will change in the future, it is impossible to have precise estimates. The uncertainty surrounding population projections have to do with the future trends of longevity (life expectancy), fertility rates (the number of children per woman) and net migration rates (the difference between inflow and

¹ 2002 *Long-term public finance report: an analysis of fiscal sustainability*, HM Treasury, November 2002.

² <http://www.statistics.co.uk/census2001/>.

outflow of people). Even small changes in assumptions can make a significant difference to the outcome in the long term. The 2001-based population projections therefore comprise the principal projections, and high and low variants. Table 2.1 summarises GAD's main assumptions for the principal and high variant population projections. It is therefore important that assessments of long-term fiscal sustainability are tested against a range of plausible assumptions to ensure that they are robust.

Table 2.1: Assumptions for principal and variant population projections

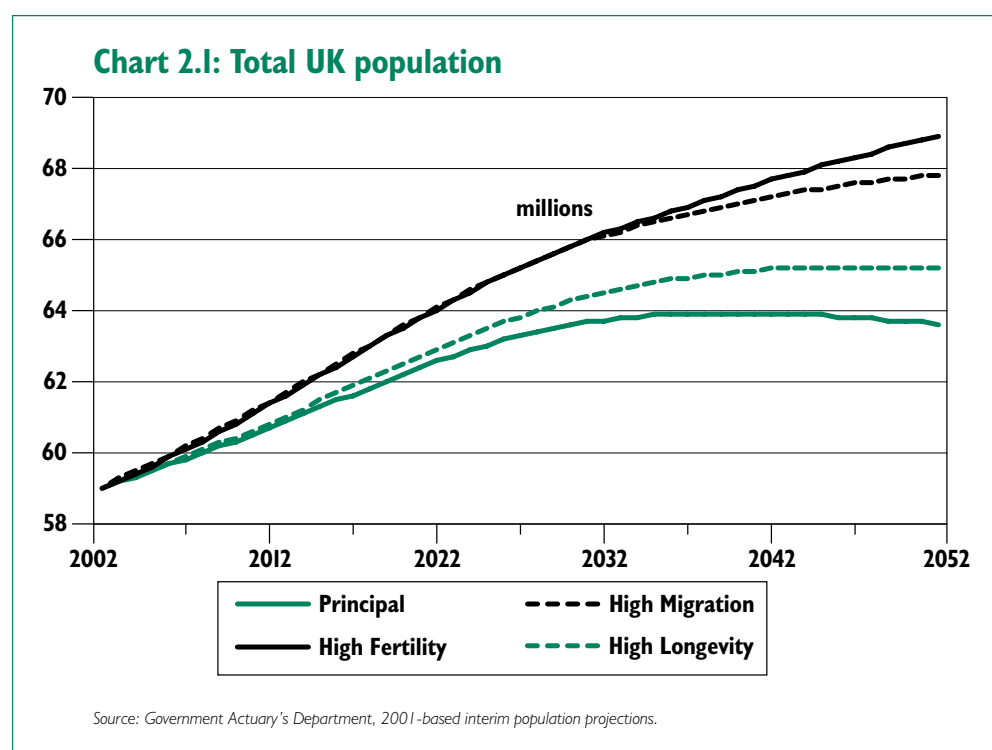
	Principal	High Fertility	High Longevity	High Migration
Fertility Rate ¹	1.74	1.94	1.74	1.74
Life expectancy (years) ²				
Males	79.7	79.7	81.9	79.7
Females	83.9	83.9	85.5	83.9
Long-term annual net migration	100,000	100,000	100,000	160,000

¹ Long-term average number of children per woman.

² At birth in 2040.

Source: www.gad.gov.uk/Population/2001/methodology/varassumptions.html.

2.4 According to the principal projections, the UK's population will increase from 59 million in 2002 to 64 million by the mid 2030s, and then stabilise. GAD's high variant scenarios are projected to lead to larger population sizes in the future, with the high longevity variant stabilising at around 65 million people, while the high fertility and high migration scenarios result in a population size of 69 million and 68 million respectively by 2050. Chart 2.1 shows the projected evolution of the UK's total population in the principal and high variant projections. In the low variants (low longevity, low fertility and low migration) the projected total population would be lower than in the principal projections. For example, in the low fertility variant the total population is projected to rise only slightly to 61½ million by 2030 before declining to close to the current level by 2050.



Box 2.2: Past and future trends in longevity

One of the most dramatic developments over the last century has been the increase in life expectancy¹. At the beginning of the 19th century, life expectancy at birth was less than 40 years. By the early 20th century this had increased to around 50 years. Nowadays it is approaching 80 years, and the relatively fastest growing age cohort is that of the “oldest old”, in other words those above 80 or 85 years of age.

There is a school of thought that believes that these increases cannot go on indefinitely as absolute life expectancy is limited. According to this view, higher life expectancy at birth mainly reflects the fact that relatively more people are likely to reach old age than in the past. The Government Actuary’s Department’s population projections are based on the assumption that longevity increases decrease asymptotically over time. In particular, GAD assumes that the increase in life expectancy halves every ten years after 2025^{2,3}.

The opposite view is also held that there is no theoretical upper limit to longevity. This “visionary” view is based on the notion that humans are programmed for survival rather than death and that humans do not necessarily have to die to make way for the next generation⁴.

¹ *The Hidden Age Revolution: Emergent Integration of All Ages*, Matilda White Riley, 1998.

² <http://www.gad.gov.uk/Population/2000/methodology/mortass.htm>.

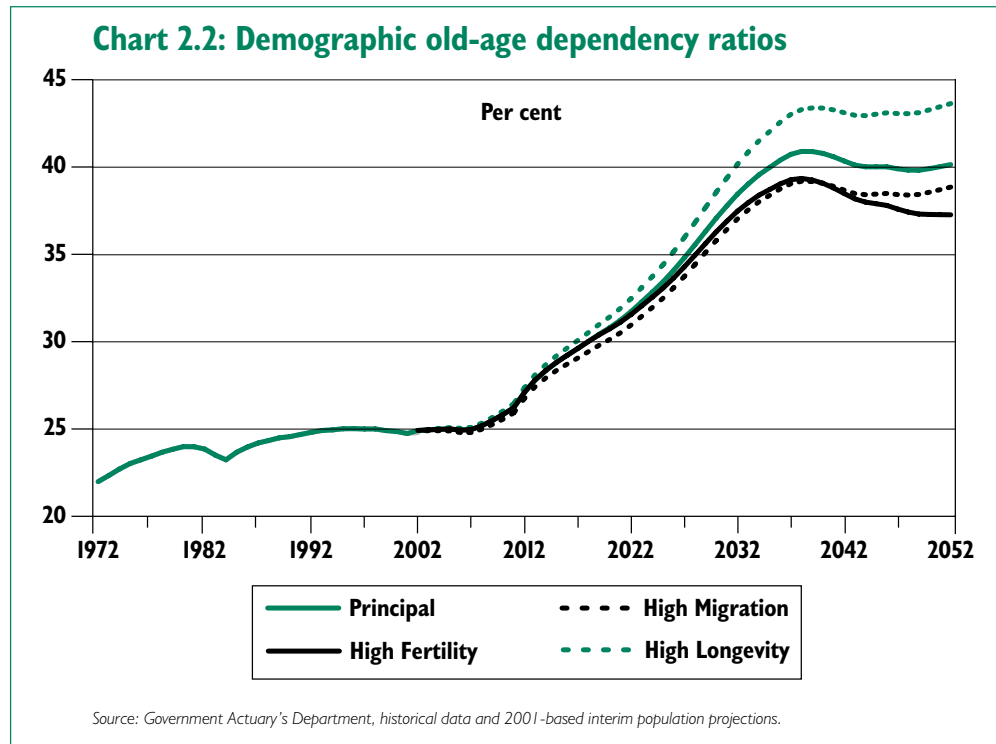
³ As stated in Box 2.1 GAD has announced that the 2002-based principal population projections will be based on higher longevity assumptions than the 2001-based interim principal population projections.

⁴ See *Brave Old World*, Tom Kirkwood, BBC Reith Lecture 1, 2001.

Changing population structure

2.5 In addition to the gradual rise in the number of people living in the UK, GAD’s projections show that the structure of the UK’s population will change significantly over the coming decades. According to GAD’s principal projections, the median age will gradually rise from 38 years in 2002 to around 44½ years by 2040 before stabilising, indicating an ageing society.

2.6 The ageing of the population can be illustrated by the evolution of the demographic old-age dependency ratio. This ratio shows the number of people aged 65 years and over relative to the number of people aged between 16 and 64 years. As can be seen from Chart 2.2 the demographic old-age dependency ratio has edged up slightly since the early 1970s, reaching around 25 per cent in 2002. The ageing process is expected to accelerate significantly after 2010, with the demographic old-age dependency ratio projected to rise to just above 40 per cent by 2040 in the principal scenario before falling back slightly. In the high longevity variant, the old-age dependency ratio is projected to rise to nearly 45 per cent by 2040 and then to remain at that rate. The long-term increase is projected to be most moderate in the high fertility rate variant, as the size of the working-age population will be boosted by an inflow of more young people in the coming decades.



Three distinct population trends

2.7 Underlying these general developments are three distinct population trends:

- the post-war baby-boom generation is gradually reaching retirement age. As a result the number of people above working age will rise. However, everything else equal, this increase would only have a temporary impact on the age structure as it would be a pure cohort effect;
- the general ageing of the population; life expectancy is expected to continue to rise over the coming decades. An increase in longevity will have a permanent demographic effect; and
- the fertility rate is expected to remain below the natural replacement rate³.

In the UK, these trends are moderated somewhat by projected continued net migration.

2.8 The sharp increase in all scenarios after 2010 can be explained by the rise in the number of people aged 65 years and over, which is projected to rise from 9.4 million in 2002 to around 15 million by 2052 in the principal projections and to 16.4 million in the high longevity variant. The more moderate increase in the high fertility scenario than in the principal scenario is not due to fewer older people (the number is nearly the same) but because of more people aged between 16 and 64 years.

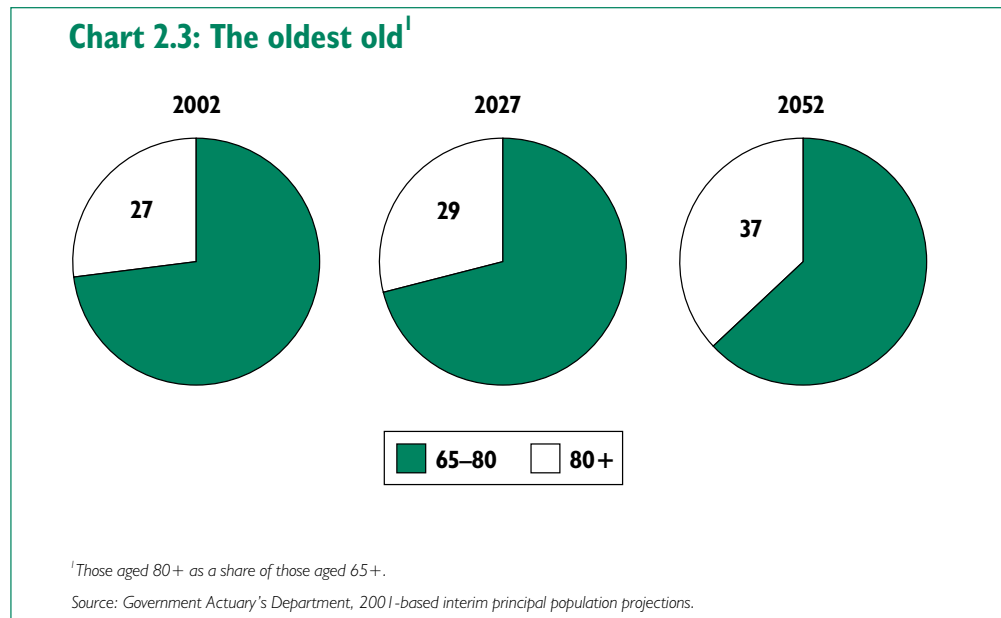
2.9 The ageing trend can also be assessed using the economic old-age dependency ratio⁴. The difference between the demographic and economic old-age dependency ratio is that the former is based on the number of people aged 65 years and above, while the latter is based on the number of people above working age. These are not necessarily the same. In the UK, for example, only females aged 16 to 59 are currently classified as being of working age. However,

³ The natural replacement rate (the rate necessary to stabilise the population) is slightly above 2 children per woman due to infant and child death.

⁴ The 2002 *Long-term public finance report* used the economic old-age dependency ratio to illustrate the ageing trend.

this will change as the female state retirement age will be raised gradually to 65 years by 2020. As a result the demographic and economic old-age dependency ratios will be identical from 2020 onwards.

2.10 The composition of those aged 65 years and over is projected to change as well. Chart 2.3 illustrates this trend using the principal population projections. It shows that around a quarter of all people aged 65 years and over were aged 80 years and over in 2002. By 2052 this fraction is projected to rise to more than a third.



Updated United Nations projections

2.11 An ageing population is a common trend across most developed and many other countries, and the populations of most other developed countries are projected to age more rapidly than the UK's. According to the United Nations' latest population projections (the 2002 Revision)⁵, the average demographic old-age dependency ratio in the European Union will rise from 24 per cent in 2000 to 36 per cent by 2025 and then 50 per cent by 2050. Among EU member states, Spain and Italy are predicted to experience the most dramatic population ageing, with the UK among the least.

2.12 The latest United Nations' projections for the EU countries differ substantially from those published previously⁶, with the average demographic old-age dependency ratio in 2050 now projected to be 5 percentage points lower than previously. This change is mainly due to a revised fertility rate assumption, with the United Nations now assuming that it converges to 1.85 children per woman by 2050 in most EU member states (including the UK) compared with 1.6 previously. The United Nations' revised fertility rate assumption is only slightly higher than GAD's corresponding assumption for the principal scenario⁷ and the current actual fertility rate of 1.64 in the UK. However, it is substantially higher than actual rates in many other EU countries, with Italy, Spain and Germany recording fertility rates of less than 1.3 in 2001. This suggests that the risks around these projections are not equal and that countries such as Italy, Spain and Germany could age more rapidly than indicated by the United Nations' projections if fertility rates do not pick up over the coming decades.

⁵ *World Population Prospects: The 2002 Revision*, United Nations, 2003.

⁶ *2002 Long-term public finance report: an analysis of fiscal sustainability*, HM Treasury, November 2002, page 15.

⁷ See Table 2.1.

2.13 With the exception of Japan (which had an old-age dependency ratio similar to the average of the European Union in 2000 and is predicted to experience even more rapid ageing), non-European developed countries are generally faced with less rapidly ageing populations. In the United States in particular, due to relatively high fertility and net migration rates, the population is projected to continue to age only moderately and continue to grow. By contrast, the accession countries that will join the European Union in May 2004 face similar changes in the population structure as the current EU member states. Table 2.2 shows, *inter alia*, the demographic old-age dependency ratio for the three most populous accession countries, i.e. Poland, Hungary and the Czech Republic, and for the two most populous countries in the world, China and India.

Table 2.2: Demographic old-age dependency ratios¹

	1950	1975	2000	2025	2050	Change 2000-2050
Selected EU member states						
Austria	16	24	23	36	55	32
Denmark	14	21	22	35	42	20
France	17	22	24	36	46	22
Germany	14	23	24	38	49	25
Greece	11	19	26	38	62	36
Italy	13	19	27	40	65	38
Netherlands	12	17	20	33	42	22
Spain	11	16	24	35	68	44
Sweden	16	24	27	40	47	20
UK	16	22	24	31	38	14
Weighted average of EU member states						
	14	21	24	36	50	26
Selected accession countries²						
Czech Republic	12	20	20	35	59	39
Hungary	11	19	21	32	50	29
Poland	8	14	18	31	50	32
Other selected developed countries						
Australia	12	14	18	30	40	22
Canada	12	13	18	33	44	26
Japan	8	12	25	50	72	47
New Zealand	14	14	18	29	38	20
US	13	16	19	28	32	13
Other selected countries						
China	7	8	10	20	37	27
India	6	7	8	12	22	14

¹ Those aged 65 years and over as a ratio of those aged 15 to 64 years.

² Three largest accession countries in terms of population size.

Source: United Nations, *World Population Prospects: The 2002 Revision*.

IMPLICATIONS OF A CHANGING AGE STRUCTURE FOR THE ECONOMY

Living standards are likely to continue to rise **2.14** There is a growing body of literature analysing the potential implications of an ageing population for the economy⁸. In this literature there is a consensus that living standards are likely to continue to rise in the coming decades and – even on reasonably cautious assumptions – double over the next 50 years⁹. However, the extent of this increase in living standards in individual countries will depend critically on their long-run potential growth rate.

Population ageing and trend growth **2.15** Demographic changes, and in particular changes in the working-age population, are likely to affect the long-term growth potential of an economy. While it is not clear whether an ageing workforce will have an effect on productivity growth (output per worker), the changing size of the working population, everything else equal, will have an impact on trend growth.

2.16 The potential impact of changes in the size of the working-age population in the G7 countries on trend growth can be illustrated on the basis of stylised assumptions for productivity growth. To isolate the pure demographic effect, productivity growth is assumed to be 2 per cent per year in every country. As such these stylised projections ignore the fact that productivity growth rates have varied across countries in the past and are likely to continue to do so in the coming years. For example, since the mid 1990s, labour productivity growth has been faster in the UK than in most other EU countries and the European Commission forecasts that this will continue at least over the next few years¹⁰. Over the longer term, however, it is reasonable to assume that productivity growth rates will converge, given factors such as the expected continuing integration of the world economy. The stylised projections used here also ignore the potential for ‘catch up’ in productivity *levels*. Productivity levels vary across G7 countries, and it is possible that countries with currently lower productivity levels will experience faster productivity growth as they converge towards the leaders. Finally, the illustrations make no allowance for possible future changes in the employment rate or legislative changes to the state retirement age. For example, as part of the Lisbon agenda, EU countries aim to raise the average total employment rate in the European Union from 63.4 per cent in 2000 to 70 per cent by 2010.

2.17 Table 2.3 shows the stylised projections of trend GDP growth in the G7 countries. The differences are entirely due to the varying projected evolution of the working-age population in the countries. The table shows that the UK is relatively well placed, based on the stated assumptions only the United States is projected to have consistently higher trend growth. Italy and Japan face potentially the most serious impact on trend growth from demographics, with both projected to grow by 1 per cent per year or less after 2031. If the UK were to maintain a higher productivity growth rate than most other EU countries (as it is forecast to do by the European Commission over the next few years), then its relative position would be more favourable.

⁸ For the UK see *The implications of an ageing population for the UK economy*, Garry Young, Bank of England Working Papers, 2002.

⁹ See *Maintaining Prosperity in an Ageing Society*, OECD, 1998, <http://www.oecd.org/dataoecd/21/42/2429182.pdf>.

¹⁰ *Autumn 2003 Forecast*, European Commission, 2003.

Table 2.3: Stylised projections of trend growth, based on changing working-age population¹

	2001 to 2010	2011 to 2020	2021 to 2030	2031 to 2040	2041 to 2050
Canada	3	2	1¾	2	2
France	2½	1¾	1¾	1¾	1¾
Germany	1¾	1¾	1	1½	1¾
Italy	1¾	1¼	¾	¼	1
Japan	1½	1	1¼	¾	1
UK ²	2½	2	1¾	2	2
US	3	2½	2¼	2½	2½

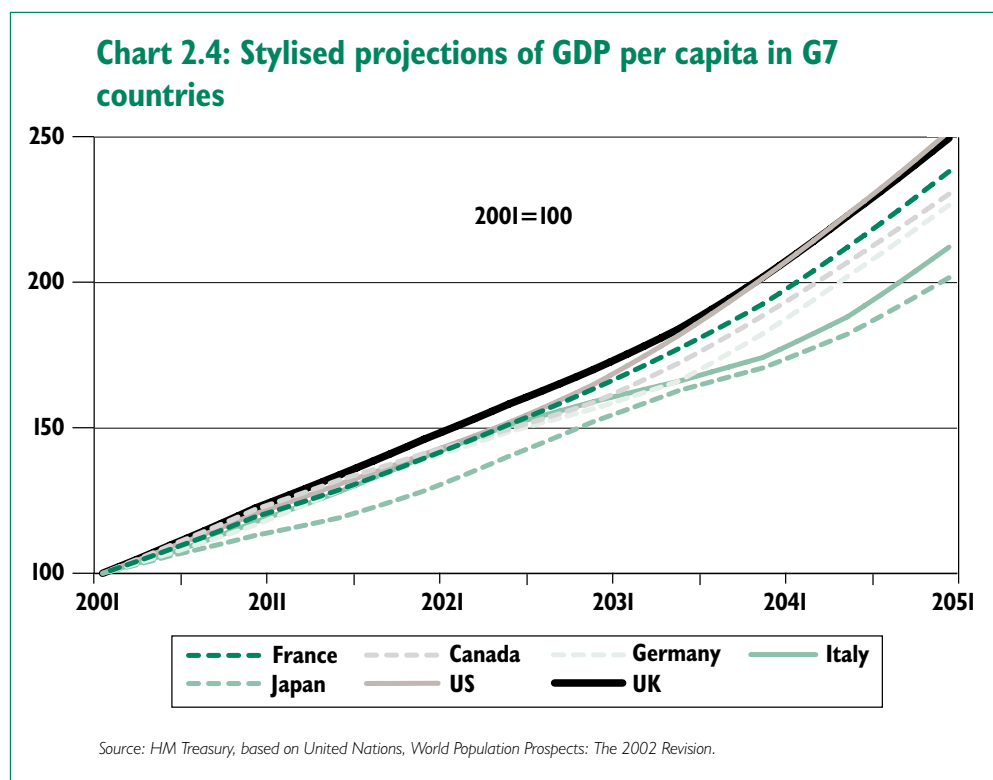
¹ Sum of changes in employment and productivity growth (assumed to be 2 per cent per year for every country). Ignores possible changes to the employment rate and definition of working-age population.

² HM Treasury's neutral view of trend growth is 2¼ per cent per year up to 2006–07 and then 2½ per cent per year. This differs slightly from the numbers presented here. This is due to a number of factors, for example HM Treasury's neutral view builds in expected increases of the employment rate of 0.2 percentage points per year up to 2006–07. The numbers also differ slightly from those used in this Report, as the latter take account of the increase of the female state retirement age between 2010 and 2020. See Chapter 5, Table 5.1.

Source: HM Treasury, based on United Nations, *World Population Prospects: The 2002 Revision*.

GDP per capita projected to rise rapidly

2.18 The stylised projections also show that the UK's position is favourable in terms of projected GDP per capita, which is perhaps a better indicator of future living standards than trend growth. Chart 2.4 below shows the illustrative projections of GDP per capita in the G7 countries, using the same productivity growth assumption as above and with the countries' respective levels in 2001 normalised to 100. Chart 2.4 shows that GDP per capita is projected to increase by two and a half times over the next 50 years in the UK¹¹, an increase only matched by the United States. By contrast, GDP per capita is projected to rise less rapidly in the other G7 countries.



¹¹ The results differ only marginally if based on the Government Actuary's Department's 2001-based principal population projections rather than the United Nations' 2002-revised data.

OTHER LONG-TERM TRENDS

2.19 Another strand of literature has analysed the potential impact of an ageing population on asset prices. There are two contrasting views. The first argues that the sharp rise in asset prices in the 1990s was due to the current baby-boom generation accumulating assets, which it will sell again once it reaches retirement age. Coupled with smaller future cohorts (and hence less demand), asset prices can therefore be expected to fall in the future¹². The second view is that peoples' savings behaviour does not change dramatically when they enter retirement age and hence asset demand and prices should remain relatively stable¹³.

Technological advances and changing preferences

2.20 The changing structure of the population is not the only likely long-term trend. Other trends, such as the likely continued advancement of technological knowledge, will also shape the UK's and other developed countries' economies in the future. The expected continued technological progress will impact on all aspects of life, including on the supply of health care in the UK. In addition to demographic developments and technological advances, changing expectations and preferences are also likely to affect demand for certain types of goods and services, such as health and education, where the public sector plays a major role. As societies become richer, economic theory suggests that people will spend disproportionately more on some goods and services, including education and health¹⁴. It is therefore possible that demand for health and education (per head but also as a share of GDP) will rise in the future. The public sector's role in providing and financing these goods and services will then determine the impact on the public finances¹⁵.

2.21 These potential trends raise important issues and ought to be studied in more detail in the future. However, in the absence of a clear modelling methodology, these potential trends are not incorporated in the long-term projections presented in this Report.

¹² *Will bequests attenuate the predicted meltdown in stock prices when baby boomers retire?*, Andrew B. Abel, NBER, 2001.

¹³ *Demographic structure and asset returns*, James M. Poterba, *The Review of Economics and Statistics*, 2001.

¹⁴ For this reason these sort of goods and services are often termed "luxury goods".

¹⁵ Climate change is another possible long-term trend, which might have an impact on the public finances in the future, as governments might have to deal with the consequences of changing weather patterns. See *Who Will Pay? Coping with Aging Societies, Climate Change, and Other Long-Term Fiscal Challenges*, Peter S. Heller, International Monetary Fund, 2003.

3

APPROACHES TO ASSESSING LONG-TERM FISCAL SUSTAINABILITY

INTRODUCTION

3.1 The Government's fiscal policy framework is based on the five key principles set out in the *Code for Fiscal Stability* – transparency, stability, responsibility, fairness and efficiency. The *Code* requires the Government to state both its objectives and the rules through which fiscal policy will be operated¹.

Key fiscal aggregates

3.2 Timely reporting of the key fiscal aggregates in accordance with the *Code* enhances the transparency of the fiscal framework. No single indicator can capture all relevant information about the current or prospective fiscal position and so there are a number of different fiscal aggregates. For example, in the context of ensuring that fiscal policy remains prudent and is sustainable in the long term, one might want to consider not only the level of public sector net debt but also the primary balance and public sector net borrowing². This reinforces the need for full and complete information on the public finances to be made freely available.

Accruals-based balance sheets

3.3 The main fiscal aggregates reported in the Budget and Pre-Budget Report are measured on the national accounts basis³. However, there are alternative approaches for examining progress against the Government's fiscal policy objectives, each with its own advantages and disadvantages. By examining these different approaches it is possible to build up a broader understanding of the position of the public finances. The 2002 *Long-term public finance report*⁴ discussed some of these alternative approaches, in particular those based on comprehensive projections. This year's Report builds on this discussion and adds net debt and accruals-based balance sheets to the analysis.

ASSESSING SUSTAINABILITY

Defining long-term fiscal sustainability

3.4 Any assessment of long-term fiscal sustainability will have to be made against a benchmark. There are many possible definitions of sustainability. One useful definition is that a government should be able to meet its obligations if and when they arise in the future. Sustainability will therefore also depend on a government's future revenue (with which it might be able to meet its obligations). The ability to meet obligations when they arise implies that a government should consider debt financing only as long as the debt burden remains at a prudent level. The definition is therefore in the spirit of the Government's sustainable investment rule.

3.5 This chapter sets out some of the different approaches to assessing the sustainability of the public finances. In particular, it focuses on three different approaches:

- national accounts measures of debt;
- the accruals-based balance sheet, which will be prepared as part of Whole of Government Accounts; and
- indicators based on comprehensive projections of future spending and revenue which underpinned much of the analysis contained in last year's *Long-term public finance report*, and which are used extensively again this year.

¹The Government's fiscal objectives and fiscal rules are presented in Chapter 1, paragraphs 1.6 to 1.10.

²*Analysing Fiscal Policy*, HM Treasury, November 1999 provides a useful summary of how the main fiscal aggregates can be used to assess the performance of fiscal policy.

³See page 282 onwards of *Budget 2003: Building a Britain of economic strength and social justice*, HM Treasury, April 2003 for a brief description of the national accounts basis.

⁴2002 *Long-term public finance report: an analysis of fiscal sustainability*, HM Treasury, November 2002.

National accounts measure of debt

3.6 Measures of public debt have often been the prime focus when analysing the sustainability of the public finances. Debt is the cumulative effect of past borrowing, and as such provides a measure of obligations created in the past that have been accumulated to date.

3.7 The ability of governments to borrow has economic benefits as it helps avoid sudden changes in tax or spending, and can help to stabilise the economy. Through borrowing, governments are able to help smooth household incomes over the business cycle, and therefore help to stabilise output in the face of economic shocks. Borrowing also enables governments to spread the cost of investment across current and future generations, and hence promote fairness between generations.

3.8 There are limits to how much a government can borrow however. Too high a level of debt may have a number of adverse effects:

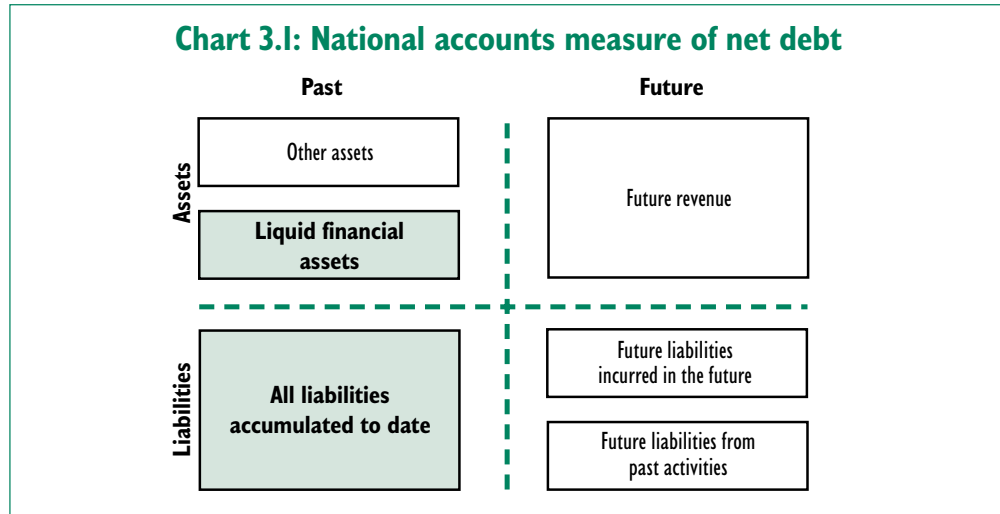
- higher real interest rates and ‘crowding out’. High debt could lead to higher real interest rates, for example if investors in government bonds believe there is an increased risk of default for which they require compensation through higher real interest rates. This in turn could ‘crowd out’ private sector investment, with a potentially adverse effect on the long-run growth potential of the economy;
- debt servicing requirements may become unsustainable without a tightening in the fiscal position. In addition, a high debt level means that small changes in the real interest rate could have a large effect on debt servicing costs, increasing the vulnerability of the fiscal policy; and
- the long-term credibility of a government (and successive governments) may be damaged. So even if a prudent fiscal policy were announced later, markets may not regard such an announcement as credible. This might hamper growth and stability even after the level of public debt has been brought under control.

Gross debt and net debt **3.9** There are, however, different measures of debt. One important distinction is between net debt and gross debt. Gross figures capture the total value of a government’s financial liabilities, but do not take account of any financial assets the government may own. These figures are widely available making them useful for international comparisons. The reference value for public debt in the Maastricht Treaty is based on a measure of gross debt to GDP.

3.10 Net debt subtracts the value of liquid financial assets from gross debt. As it provides a fairer reflection of a government’s immediate solvency than gross debt, the Government’s sustainable investment rule is based on net figures. However, data for net debt are not as readily available internationally as for gross debt, explaining partly why the latter is used more frequently in an international context.

3.11 Chart 3.1 shows a schematic representation of net debt, the Government’s preferred measure of debt. The green shaded boxes show the assets and liabilities taken into account when measuring net debt. This shows that net debt is purely a historical concept, looking at past activities that have created liabilities and liquid financial assets⁵.

⁵ By contrast, gross debt covers the shaded box labelled “All liabilities accumulated to date” only.



3.12 The net debt measure plays a key role in the Government’s fiscal framework. As stated in Chapter 1, the Government has formulated two fiscal rules, the golden rule and the sustainable investment rule, through which the objectives for fiscal policy are implemented. The sustainable investment rule, which states that public sector net debt as a proportion of GDP will be held over the economic cycle at a stable and prudent level, ensures that, when the Government borrows to invest, it does so in a way that does not threaten the long-term sustainability of the public finances.

Net debt as an indicator of long-term fiscal sustainability

Advantages 3.13 The level of debt is probably the most straightforward of the indicators of sustainability. One particular advantage is that the national accounts approach, which underpins measures of debt, is based on internationally agreed rules, allowing the public finances in one country to be compared with other countries.

3.14 Net debt has a number of other advantages as an indicator of sustainability. For example, as a concept it can be easily understood and interpreted. This helps to improve the transparency of the fiscal framework. In addition, being entirely backward looking, net debt is based on actual data, and the figures can be produced quickly and reliably.

3.15 Measures of debt are also relatively responsive to short- to medium-term policy changes or economic events. For example, net debt fell quickly during the late 1990s as the Government took tough decisions on tax and spending to restore the public finances to a sustainable position. The responsiveness of debt to current circumstances means it can usefully inform policy development over the medium term. This makes net debt a suitable indicator for measuring progress in the medium-term fiscal framework.

Limitations 3.16 Perhaps the principal limitation of net (and gross) debt as a sustainability indicator is its backward-looking nature. It cannot answer the question of whether a government will be able to meet its obligations if and when they arise in the future. However, to compensate for this, medium-term projections of net debt are made in each Budget and Pre-Budget Report.

3.17 In addition, as a cash measure, it can also be affected by the time at which payments are made or when receipts arrive. Differences between the time when a transaction actually occurs and the associated cash payment or receipt, which do not affect the underlying position of the public sector, could actually increase or decrease net debt artificially. Again, making projections over the medium term helps to remove the incentives for governments to engage in artificial distortions.

3.18 Net debt also gives an incomplete view of current assets and liabilities, in particular, it does not take account of the other (non-financial) assets that the government may hold.

Accruals-based balance sheets

Accruals accounting **3.19** Accruals accounts aim to record what has happened to an entity during a specified period, and how management has performed. They therefore look at past transactions and the extent to which these have already committed future funding flows. Accruals accounts therefore provide a fuller picture of an entity's position than a simple cash statement by including all of that entity's assets and liabilities.

3.20 Accruals accounting has, historically, been applied to the private sector and is only now becoming more widespread in the public sector. Accruals accounting differs from cash accounting in that it requires the effects of transactions and other events to be reflected, as far as is possible, in the financial statements for the accounting period in which they occur, and not necessarily in the period in which any cash involved is received or paid. For example, provisions, which are estimates for costs such as nuclear decommissioning and clinical negligence, are recorded as expenses at the time the liability is incurred, even though no immediate expenditure may be involved.

Resource accounting and budgeting **3.21** The Government recognised that the introduction of accruals accounting could significantly enhance the framework for planning, controlling and accounting for departmental expenditure, and improve the quality of information on the public sector. Therefore in April 2001, it introduced resource accounting and budgeting (RAB). This replaced the previous cash-based control system with a new accruals system based on UK Generally Accepted Accounting Practice (UK GAAP). The use of accruals data to plan and control finances at an entity level brings significant benefits as summarised in Box 3.1.

Box 3.1: The introduction of resource accounting and budgeting¹

Resource accounting and budgeting (RAB) has introduced a new system of financial management that translates the Government's policy priorities into departmental strategies and budgets, and then reports to Parliament on the efficiency and effectiveness of the services provided. The results of this process assist the government in setting priorities for its biennial Spending Reviews.

RAB includes a wider range of financial information than previously available, creating incentives to manage more financial performance indicators, which include the level of:

- fixed assets (for example land, buildings, information technology and specialist equipment) and the costs of holding them;
- working capital (cash, stocks, creditors and debtors); and
- long-term liabilities.

The benefits of RAB include for:

Parliament

- better information on how resources are used and whether taxpayers are receiving value for money; and
- more focused information to allow for better scrutiny of public spending.

Central government

- a more strategic approach to public expenditure planning and better data to inform decisions; and
- supporting the fiscal framework by a clearer distinction between consumption and investment.

Individual departments

- better information on costs, assets and liabilities;
- resource allocation and capital spending linked to the delivery of services;
- full costs of activities measured and costs recorded when they are incurred rather than when they are paid; and
- cost of assets spread over the period in which they are used to provide services rather than just in the year of purchase.

¹ For more information on RAB and the benefits of accruals accounting see http://www.hm-treasury.gov.uk/documents/public_spending_and_services and *The Whole Truth: Or Why Accruals Accounting Means Better Management*, Public Audit Forum, November 2002.

3.22 Although the Government has introduced RAB for controlling and reporting individual departments' finances, fiscal reporting still remains on the national accounts basis.

**Whole of
Government
Accounts**

3.23 The potential wider benefits of resource accounting were recognised by the Government when it committed, in the *Code for Fiscal Stability*, to produce full accruals-based accounts for the whole of the public sector. Building on the departmental information produced as a result of RAB, the Government has announced it will publish Whole of Government Accounts (WGA), that will be based on UK GAAP and will include an accruals-based balance sheet. WGA will also present a consolidated⁶ view of the public sector finances⁷. The introduction of WGA will bring benefits in terms of information quality as discussed in Box 3.2.

⁶ The whole of the public sector will be treated as a single entity. All material transactions and balances between constituent entities will be eliminated.

⁷ More information on the approach to and benefits from the Whole of Government Accounts programme can be found in *Implementing resource based financial management*, HM Treasury, 2002 and at <http://www.wga.gov.uk>.

Box 3.2: Benefits of Whole of Government Accounts

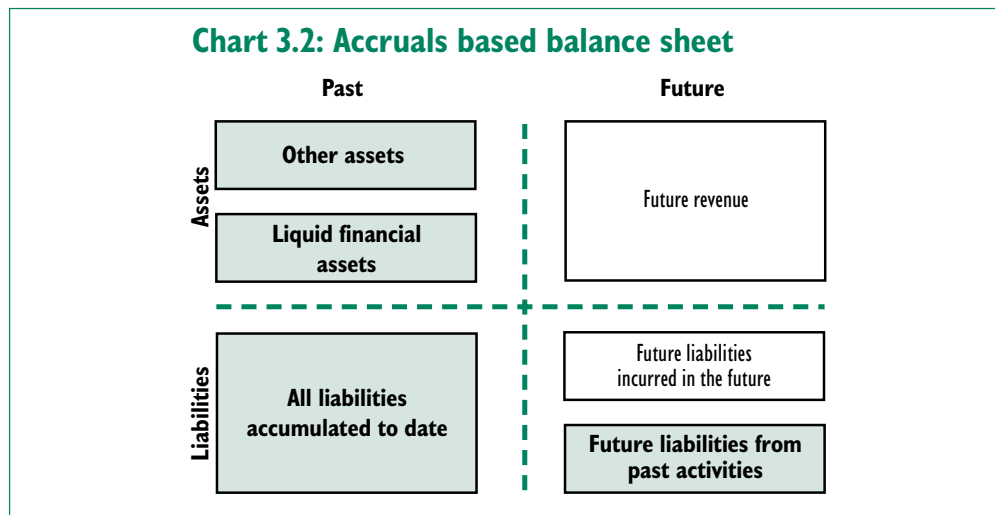
Whole of Government Accounts (WGA) will present a comprehensive picture of the public finances at a particular moment in time, prepared on a basis comparable with the private sector, as well as accounting for public spending and cash flows in the previous 12 months. This will improve the **transparency** of government finances. The programme will also deliver other key benefits in terms of information quality:

- the programme will require bodies within the public sector boundary to prepare data on a consistent basis. The programme is therefore acting as a catalyst for the convergence of accounting policies across the public sector and is improving the **comparability** of financial data;
- data on items not currently in existing measures of public finance (such as provisions, contingent gains and liabilities and future contract expenditure) will be available¹. This will increase the **completeness** of public sector financial data; and
- the accounts will be independently audited and certified by the Comptroller and Auditor General. This will demonstrate the **integrity** of public sector financial data.

In addition, through the WGA programme the Government aims to make it possible to progressively increase the amount of audited data included directly in the UK National Accounts, for example by replacing modelled depreciation data with actual data.

¹Accounting standards require accounts to disclose probable future income and possible future expenditure (contingent gains and liabilities) arising from past events, and other future expenditure arising from existing commitments. Disclosed amounts do not count towards the overall balance.

Balance sheet 3.24 One of the outputs of WGA will be a balance sheet for the public sector showing assets and liabilities (both financial and non-financial). As WGA is based on UK GAAP, the balance sheet will include provisions for future liabilities arising from past events. The green shaded area in Chart 3.2 shows a schematic representation of a balance sheet as prepared on a UK GAAP basis.



3.25 The balance sheet can be related back to the net debt measure in national accounts. There are two important conceptual differences though, as accruals-based balance sheets include:

- both financial and non-financial assets and liabilities, while net debt just takes account of financial liabilities and liquid financial assets; and

- some costs incurred in the past for which the cash flows will occur in the future. For example, under Financial Reporting Standard (FRS) 17⁸, future unfunded pension payments related to the build-up of past pension entitlements of current and former public-sector employees count as a liability.

Experience with balance sheets **3.26** National accounts and GAAP-based balance sheets are similar – the main theoretical difference is that some future liabilities are excluded from national accounts net worth measures, which are therefore entirely backward looking. Net worth is published alongside other fiscal aggregates in the Budget and Pre-Budget Report. However, at present net worth is not used as a key indicator in the UK fiscal policy framework, mainly because of the difficulties found in measuring government assets and liabilities which are being addressed through the Whole of Government Accounts programme. Internationally, and for similar reasons, there are only a few countries that have used balance sheet data for fiscal policy so far, with New Zealand and Australia at the forefront. Box 3.3 provides an overview on New Zealand's and Australia's experiences with using balance sheets for fiscal policy.

Box 3.3: Whole of government accounts and fiscal policy – international experiences

To date few countries use accruals-based balance sheet data in setting fiscal policy, with the forerunners in this area being Australia and New Zealand. Their experiences give some idea as to the practical challenges involved in using balance sheet data for fiscal policy.

New Zealand: New Zealand introduced accruals budgeting in the mid 1990s, with a fiscal framework based purely on GAAP data. This accruals information underlies their fiscal indicators, objectives and budgetary framework. Initially, New Zealand's key fiscal indicator was the operating balance. However, this included revaluations and was found to be subject to a high degree of volatility, making it hard to judge the underlying state of the public finances. To overcome this problem a new indicator was introduced, excluding the impact of revaluations.

Australia: Australia introduced accruals budgeting at the Commonwealth (federal) level in the late 1990s. Its primary fiscal objective is to maintain budget balance over the economic cycle, with a supplementary objective to increase the net worth¹ position over the medium to long term. The budget balance is assessed using the fiscal balance, which is the net operating balance less net capital investment. Australia operates a dual system where budgeting is conducted on a GAAP basis and fiscal objectives are based on the Government Finance Statistics (GFS) framework. Although GFS is an accruals-based framework, it has a number of accounting treatments that are different to GAAP. This has caused confusion and Australia, alongside the UK, is playing a leading role in international work to minimise the differences between GAAP and national accounts frameworks.

¹As the flow indicators underpinning the fiscal strategy are based on the Government Finance Statistics framework, it was decided to frame this supplementary objective in terms of 'net worth'. Note that this is not equivalent to the 'net worth' term used in the UK National Accounts.

⁸The Accounting Standards Board issued FRS17 in December 2000. It requires employers to account for their share of their occupational pension scheme's surplus or deficit as an asset or liability. The standard is due to be implemented in full in the private sector from 2005–06, with disclosures in notes to the accounts in the interim. The Government will adhere to the original implementation timetable and include the liabilities of its unfunded pension schemes on the balance sheet from 2003–04.

The balance sheet as an indicator of long-term fiscal sustainability

Advantages 3.27 As an indicator of long-term sustainability, the balance sheet (including changes between years) has a number of advantages:

- it provides a more comprehensive and accurate picture of the government's assets, including data on current assets and liabilities, and some data on future cash flows (provisions), which are not taken into account in net debt;
- it is not influenced by year-end cash flow management in the way that net debt can be;
- it is published alongside other useful information, such as data on contingent gains and liabilities, that helps to build up a better understanding of the government's position; and
- it presents an informative and reliable snap-shot position of the government finances.

Limitations 3.28 The accruals-based balance sheet also has limitations as a measure of the long-term sustainability of the public finances. Perhaps the most fundamental issue is that UK GAAP was primarily developed for companies, and as a consequence it is backward looking. Its aim is to record what happened in the past (including the extent to which past transactions have already committed future funding flows) and how well management dealt with it. However, projections of accruals-based data could be made, although at present there may be timing issues with data availability.

3.29 GAAP-based balance sheet measures exclude future revenues and liabilities except those liabilities that result from past events. This reflects the future uncertainty of the private sector where a company may decide, or be forced, to cease trading. In the public sector, though, much greater certainty is attached to future revenues and liabilities as a result of government's sovereign 'right to tax' future taxpayers and its ongoing commitment to provide services such as healthcare and education. These are much more certain than in the private sector but still do not meet the criteria for inclusion in a GAAP-based measure. The omission of these future cash flows and the fact that it is a snapshot at a particular moment in a year, limits the use of a balance sheet in assessing long-term fiscal sustainability. This limitation is widely recognised⁹.

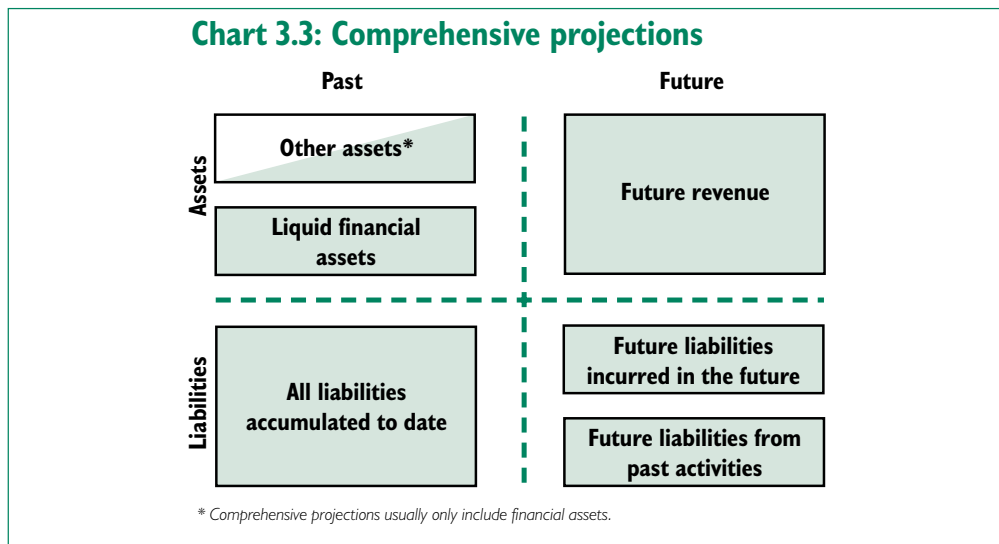
⁹For example see: <http://news.ft.com/servlet/ContentServer?pagename=FT.com/StoryFT/FullStory&c=StoryFT&cid=1051390385886&p=1012571727172>, and *Fiscal and Generational Imbalances: New Budget Measures for New Budget Priorities*, Jagadeesh Gokhale and Kent Smetters, American Enterprise Institute, July 2003, page 20.

Indicators based on comprehensive projections

3.30 As discussed, net debt and the accruals-based balance sheet provide certainty by focussing on historical data. However, this certainty is delivered at the cost of usefulness when assessing long-term fiscal sustainability. To answer the question whether a government will be able to pay its obligations if and when they arise in the future, it is necessary to have information on the likely future evolution of spending and revenue. An indicator based on detailed past and future information would be more comprehensive than the accruals-based balance sheet in two ways:

- it would include information about future revenue streams; and
- the indicator would have a more comprehensive approach to liabilities by including future liabilities arising from future events as well as provisions for future liabilities arising from past activities.

3.31 Chart 3.3 shows that an indicator based on comprehensive projections and past information would utilise virtually all available information. As such it would be more useful to answer the question as to whether current policies can continue into the future than the other approaches discussed above. The term “comprehensive” is being used here to describe the inclusion of all future spending and revenue and not as necessarily covering a longer time horizon.



Possible indicators 3.32 There are a number of indicators that have the characteristics discussed here, including the intertemporal budget gap, fiscal gaps and – to a lesser extent – the inter-generational balance gap as derived by generational accounting. In addition, the projected evolution of spending and revenue (either for individual items such as education or income tax or in aggregate) as a share of GDP also provides very useful information. These indicators and projections are discussed in the following chapter.

Comprehensive projections as an indicator of long-term fiscal sustainability

Advantages 3.33 The main advantage of comprehensive projections is that they potentially take into account all future spending and revenue streams. Combined with past information (generally debt), these indicators, at least in theory, should give a more reliable view of the long-term sustainability of the public finances than backward-looking indicators.

Limitations 3.34 The downside of basing an indicator primarily on projected future spending and revenue is that the projections will be subject to a high degree of uncertainty, making long-term projections imprecise. The degree of uncertainty means that it is important to perform sensitivity analysis based on a range of assumptions.

CONCLUSIONS

3.35 There are many indicators that can be used to assess the long-term sustainability of the public finances, including debt (gross and net), accruals-based balance sheets and those based on comprehensive projections. The indicators are primarily distinguished by:

- the assets and liabilities included or excluded; and
- the time horizon chosen, principally the degree to which the measures look solely at past events or include future projections.

3.36 As discussed in this chapter, each approach has different advantages and disadvantages. As such there is no single indicator that is superior to any other in all circumstances and the understanding of sustainability is strengthened by consideration of all the indicators:

- debt is easily understood and interpreted, can be produced quickly and easily, and is a responsive indicator suitable for use in medium-term fiscal frameworks, and it is therefore the fiscal aggregate used in the Government's sustainable investment rule;
- accruals-based balance sheets increase the scope of the assets and liabilities taken into account, and are published with useful additional information such as contingent gains and liabilities; and
- comprehensive projections attempt to incorporate all future spending and revenue, and therefore try to deal directly with the issue of long-term sustainability, namely the Government's ability to meet its obligations if and when they arise in the future.

3.37 The next chapter describes the different approaches to compiling comprehensive projections that include future spending and revenue streams. It also discusses the synthetic indicators arising from the different approaches and considers how they should be interpreted.

4

FORWARD-LOOKING FISCAL SUSTAINABILITY MEASURES

INTRODUCTION

4.1 This chapter sets out the different methodologies that can be used to assess the long-term sustainability of the public finances, building on the theoretical discussion in the previous chapter. As in Chapter 4 of last year's *Long-term public finance report*¹, it shows the methodology used in the illustrative long-term fiscal projections in Annex A of the *Economic and Fiscal Strategy Report (EFSR)*², as well as further approaches. In particular it presents: bottom-up projections, the intertemporal budget gap, the fiscal gap and generational accounting, with each technique's strengths and weaknesses highlighted. In addition, it presents a new indicator which is based on the fiscal gap concept. Where helpful, the chapter refers to Chapter 4 and Annex A of last year's report for a more technical discussion of the issues.

4.2 This year's Report builds on and extends the presentation provided last year, arguing the case for sensitivity analysis and providing an overview of what might be understood by generational fairness. In addition, it highlights the data requirements needed for the different approaches and the trade-offs that have to be considered when using them.

LONG-TERM FISCAL SUSTAINABILITY MEASURES

Top-down approach: updated illustrative long-term fiscal projections

4.3 Within the EFSR, the *Code for Fiscal Stability*³ requires that illustrative long-term projections of the outlook for the key fiscal aggregates are presented for a period of no less than 10 years into the future, based on a range of plausible assumptions, so as to shed some light on the inter-generational impact and sustainability of fiscal policy.

4.4 These projections are presented in Annex A of the EFSR and have in practice covered a 30-year horizon. The projections are derived using a top-down approach. One of the main strengths of this approach is that it can be based on the assumption that the fiscal rules are met. As such, the top-down approach answers the question, what resources are available for future spending, assuming that the fiscal rules are met. In particular, the illustrative long-term fiscal projections presented in Annex A of the EFSR calculate at what rate current consumption (for example current spending on health and education) and net investment can grow while allowing the Government to meet its fiscal rules. An added advantage of the illustrative long-term fiscal projections is that they explicitly show the evolution of the net debt to GDP ratio over time. Chapter 6 provides updated illustrative long-term fiscal projections, based on the medium-term fiscal projections presented in the 2003 Pre-Budget Report⁴.

¹ 2002 *Long-term public finance report: an analysis of fiscal sustainability*, HM Treasury, November 2002.

² *Economic and Fiscal Strategy Report in Budget 2003: Building a Britain of economic strength and social justice*, HM Treasury, April 2003.

³ *Code for Fiscal Stability*, HM Treasury, March 1998.

⁴ 2003 *Pre-Budget Report*, HM Treasury, December 2003.

Bottom-up approach

4.5 A very different approach to the top-down projections is that taken by bottom-up projections. The bottom-up approach is a popular technique that can be used to project the path of individual spending and revenue items either in absolute terms or as a share of GDP into the future. Bottom-up projections can be constructed using a wide range of factors, including demographic developments, cost and demand drivers, and investment requirements. These projections can then be used to identify future fiscal pressures, and various “what if” scenarios can be simulated⁵.

4.6 Bottom-up projections generally do not comprise all spending and revenue items; instead they typically focus on a subset of age-related spending items (for example pensions or health spending). These specific projections are useful on their own as they highlight how much (if any) a spending or revenue item might change over time and when this change might take place⁶.

Comprehensive bottom-up projections

4.7 However, there is no inherent reason why bottom-up projections cannot be comprehensive in the sense that they cover all spending and revenue items, for example as classified in the national accounts. In fact, in order to assess the long-term sustainability of the public finances, bottom-up projections need to be comprehensive on the spending and revenue side. This can either be achieved by generating a full set of projections or by assumption. The latter approach is frequently taken, for example to keep the projection exercise simple or because there is a good reason to believe that a particular item will remain constant as a share of GDP over time. In assessing the long-term sustainability of the public finances of EU countries, the European Commission, for example, projects age-related spending⁷ using a bottom-up approach but assumes that non-age related spending and revenue remain constant as a share of GDP over time^{8,9}.

4.8 Chapter 6 provides the results of this year’s comprehensive bottom-up projections. Bottom-up projections are presented for total spending and revenue, as a share of GDP, over the next five decades and their respective composition. While last year’s report only provided the results based on the Government Actuary’s Department principal population projections, Chapter 6 in this year’s Report also shows spending projections based on a range of variant population scenarios.

Primary balance

4.9 A comprehensive set of bottom-up spending and revenue projections can be used to derive future primary balances. With these it is possible to identify fiscal pressures over the long term and assess the long-term sustainability of the public finances. Countries such as Australia have used this technique¹⁰ in evaluating the long-term outlook. The change in projected expenditure on the programmes studied can provide an indication of what might need to happen to spending or taxation¹¹ to reduce or even eliminate any existing fiscal imbalance. As such the bottom-up approach is well suited to alert policy makers to potential future spending pressures (or revenue shortfalls) and as such provides useful insights into the long-term sustainability of the public finances.

⁵ A combination of the top-down and bottom-up approaches is possible. The illustrative long-term fiscal projections published in Annex A of the EFSR, for example, incorporate bottom-up projections of transfer spending (e.g. debt interest and social security transfers) in the overall top-down framework.

⁶ See for example *The future Growth of Social Security: It’s Not Just Society’s Aging*, Congressional Budget Office, 2003.

⁷ Age-related spending comprises expenditure that is sensitive to changes in the age structure of the population, for example health, education, child/family benefits and pensions.

⁸ Unless national governments provide revenue projections based on alternative assumptions.

⁹ See *Public Finances in EMU*, European Commission, 2003, page 22.

¹⁰ *Intergenerational Report 2002-03*, Department of the Treasury of Australia, May 2002.

¹¹ A government might also address any future potential fiscal imbalance by implementing structural reforms over the longer term.

4.10 A number of fiscal sustainability indicators are based on the relationship of projected primary balances in the long term and the initial debt stock. These indicators are discussed below and include the intertemporal budget constraint and fiscal gaps. These indicators form an integral part of the assessment of long-term fiscal sustainability presented in this Report.

Intertemporal budget constraint/gap

4.11 To formalise the assessment of sustainability, the government's obligations over time can be represented in the intertemporal budget constraint (IBC)¹². The IBC states that all current and future revenue streams should be sufficient to cover all current and future spending streams and today's debt. As pointed out by Cardarelli, Sefton and Kotlikoff though: "The constraint does not assume that the government debt is ever fully paid off, merely that the debt grows less quickly than the rate of discount – that is it does not explode. Thus, it is consistent with the long-run existence of government deficits, as long as these deficits are smaller than the amount needed simply to service the level of outstanding debt"¹³. However, this statement is only correct for an infinite horizon. Over a finite horizon, the intertemporal budget constraint implies that debt is repaid at the end of the period¹⁴.

Intertemporal budget gap

4.12 If current and future revenues are not sufficient to cover current and future spending, and current debt (and hence not meet the intertemporal budget constraint), then the extent of the imbalance is called the intertemporal budget gap (IBG). The IBG can be used to calculate the immediate and permanent change in the fiscal stance that is needed to meet the intertemporal budget constraint, in other words ensure the long-term sustainability of the public finances¹⁵.

4.13 To get a feel for the relative magnitude of the imbalance (if any), the IBG is often expressed either as a percentage of GDP or in terms of a specific revenue item. The latter interpretation is that to restore balance the revenue item would have to be raised (or lowered if there is a negative gap) by a certain percentage today, and this increase (decrease) to be carried forward into the future. This does not mean though, that the required adjustment will have to come from the revenue side. A change in spending of the same size would also work, as would a combination of the two.

4.14 More generally, even if the IBG points to an imbalance, it does not necessarily imply that fiscal action has to be taken. Over these very long time horizons, many policy levers are available and in general structural policies, for example those that help to raise trend growth, will be important.

Strengths and limitations

4.15 The key strength of the intertemporal budget constraint approach is that it is comprehensive in the spending and revenue items covered and in the time horizon over which it is calculated. The intertemporal budget constraint approach also has a number of weaknesses. First, the results are sensitive to the starting position of the projection, and the difference between the assumed real interest/discount rate and productivity growth rate. Second, as long as the IBC is satisfied, there are no further constraints on the evolution of the

¹² For a more technical discussion of the intertemporal budget constraint and the other approaches introduced in this chapter see 2002 *Long-term public finance report: an analysis of fiscal sustainability*, HM Treasury, November 2002, Chapter 4 and Annex A.

¹³ *Generational accounting in the UK*, Roberto Cardarelli, James Sefton, and Laurence J. Kotlikoff, *Economic Journal*, 2000, page F550.

¹⁴ A simple illustrative example, using a finite horizon, can be found in the 2002 *Long-term public finance report: an analysis of fiscal sustainability*, HM Treasury, November 2002, pages 22-23.

¹⁵ Sustainability, as understood in the context of the intertemporal budget constraint, requires that the debt to GDP ratio remains stable in the steady state. Also note that changing the primary balance immediately and permanently is not the only possible policy response to meet the intertemporal budget constraint. However, the tax smoothing literature suggests that policies should be changed as rarely as possible to minimise efficiency losses in the economy.

debt to GDP ratio over time, in other words the ratio can take any value. The European Central Bank therefore argues that: "...[the IBC] is consistent with large debt stocks as long as the potential of sufficiently large primary surpluses in the (possibly distant) future allows their repayment. Thus, it does not provide a clear indication of the extent to which fiscal policies could be deemed sustainable"¹⁶. This potentially raises compatibility issues with existing debt targets such as the UK's sustainable investment rule or the 60 per cent gross debt to GDP "criteria" in the European Union's Stability and Growth Pact. It also implies that the IBC does not necessarily ensure that the government can meet its future obligations *if and when they arise* in the future.

4.16 Meeting its obligations *if and when they arise* might require substantial inter-generational transfers as future generations might have to pay off debt built up by earlier generations. The IBC therefore provides limited information on generational fairness aspects of fiscal policies. Third, being a stock indicator, the IBC does not reveal when the pressure on the public finances might be greatest in the future. Fourth, when covering an infinite time horizon, the IBC and IBG face a high degree of uncertainty, which makes them inevitably imprecise. The IBC and IBG share this characteristic with other indicators that are based on very long horizons.

4.17 This year's Report, as last year's, uses the concept of the intertemporal budget constraint/gap to assess the long-term sustainability of the public finances. Chapter 6 provides results, based on a range of reasonable assumptions.

Fiscal gaps

4.18 The fiscal gap approach uses the IBC to calculate the immediate and permanent change in the primary balance needed to achieve a certain, pre-determined debt target in the future^{17,18}. The required change in the primary balance to GDP ratio depends on the initial and desired target ratios, the time horizon (the end point of which is often called the "target year"), and the projected primary balance. Various countries, including the US, Canada and New Zealand¹⁹ have estimated the magnitude of their fiscal gaps.

Choosing time horizon involves trade-offs

4.19 One of the main differences between the fiscal gap and intertemporal budget constraint approaches is that the former is based on a finite (pre-determined) horizon whereas the latter generally covers an infinite horizon. This means that any information on the future evolution of the primary balance beyond the target year is ignored in the calculations. Choosing the horizon for the fiscal gap calculations therefore involves a trade-off in that it should be long enough to capture all the major future developments which might impact on the primary balance but also short enough to minimise the degree of uncertainty. In practice, it is best to present fiscal gaps over a range of horizons.

¹⁶ See *The need for comprehensive reforms to cope with population ageing in Monthly Bulletin*, European Central Bank, 2003, page 42.

¹⁷ This definition follows *The US fiscal problem: where we are, how we got there, and where we're going*. Alan Auerbach, in *NBER Macroeconomics Annual*, edited by S. Fischer and J. Rotemberg, 1994.

¹⁸ The European Commission has used a related measure (the "tax gap") to assess the long-term sustainability of the EU Member States' public finances. See *Public finances in EMU 2003*, European Commission, 2003.

¹⁹ See *The Long-Term Budget Outlook*, Congressional Budget Office, 1998 and *The Long-Term Budget Outlook: an Update*, Congressional Budget Office, 1999, and *Long-term fiscal projections and their relationship with the intertemporal budget constraint: an application to New Zealand*, John Janssen, New Zealand Treasury, 2002.

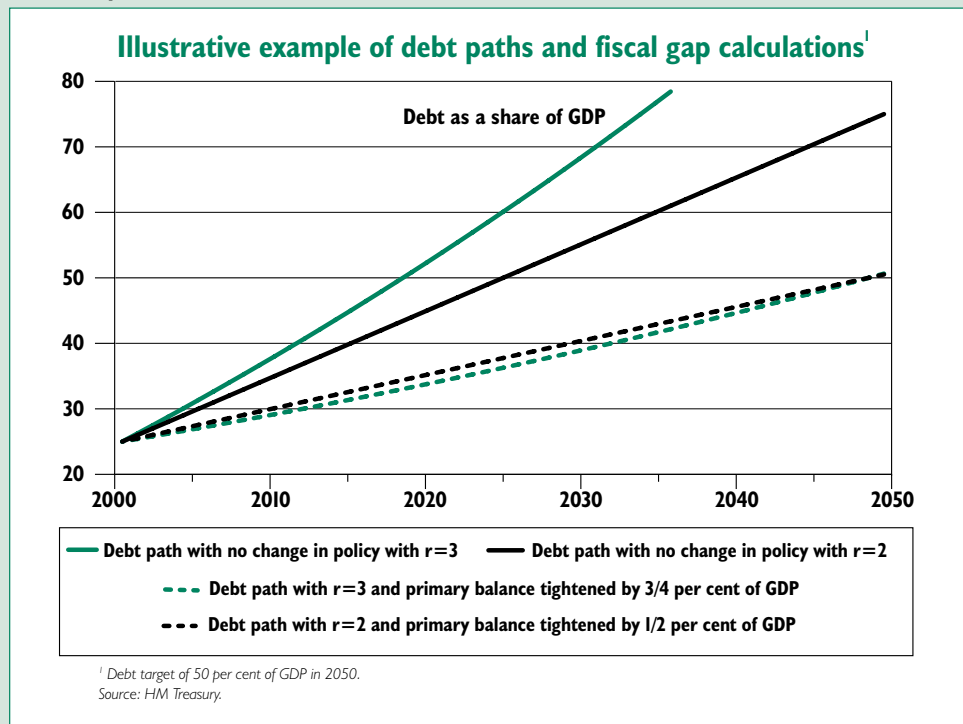
Box 4.1: The need for sensitivity analysis

The projected evolution of the debt to GDP ratio (and hence also the fiscal gap concept) depends on the projected primary balance and the underlying assumptions. Whereas future primary balances depend on future policy settings, most projection models do not allow for a feedback effect from policy to key economic variables. The evolution of the debt to GDP ratio, in particular, also depends on the differential between the assumed real interest rate r and real GDP growth g . In any given year t the debt level D_t will depend on the debt level in year $t-1$, D_{t-1} , the interest paid and the primary balance in year t , PB_t . At the same time the size of the economy in year t , GDP_t , depends on the size in year $t-1$ and the growth rate g . The evolution of the debt to GDP ratio can therefore be stated as:

$$\frac{D_t}{GDP_t} = \frac{(1 + r)D_{t-1} + PB_t}{(1 + g)GDP_{t-1}}$$

Everything else equal, the debt to GDP ratio in year t will therefore be the higher, the bigger the ratio $(1+r)/(1+g)$.

The chart below provides a simple illustration. Consider a country where GDP in year 2000 is 100 and economic growth is 2 per cent per year. In addition assume that the government has debt equivalent to 25 per cent of GDP in year 2000, and that, based on current policies, the government’s primary balance is projected to be in deficit by 1 per cent of GDP every year in the future. Debt as a share of GDP will then gradually rise. The rate of increase will depend on the real interest rate relative to the real growth rate. In this particular example it can be easily demonstrated that the debt to GDP ratio rises by the primary balance (1 per cent of GDP) every year if the real interest rate r is equal to the growth rate g ¹. In this scenario, depicted by the bold black line, the debt to GDP ratio reaches 50 per cent after exactly 25 years. The debt to GDP ratio would rise more quickly if a higher interest rate were assumed. For example, with an interest rate of 3 per cent, the debt to GDP ratio would reach 50 per cent after around 18 years and then continue to rise and after 25 years reach 60 per cent.



These assumptions also affect the fiscal gap calculations. For any desired debt target and target year, the fiscal stance needs to be tighter (or less loose), the larger the differential between r and g . For example, if the government aimed for a debt to GDP ratio of 50 per cent by 2050, then it would have to tighten its primary balance by $\frac{1}{2}$ per cent of GDP in the case with a real interest rate of 2 per cent but by $\frac{3}{4}$ per cent of GDP for a real interest rate of 3 per cent.

Given the uncertainty surrounding long-term projections, it is therefore essential to provide sensitivity analysis around the main assumptions, and in particular the interest rate and the economic growth rate.

¹ Note that this means that $r = g = 0.02$.

Strengths and limitations **4.20** One of the main strengths of fiscal gaps is that they are intuitive and can be easily explained and interpreted in the context of existing policy rules, e.g. the sustainable investment rule in the UK. As such fiscal gap calculations can send clear policy signals. An additional strength is that fiscal gaps can be calculated using a range of target years and target debt to GDP ratios. However, this approach also has a number of limitations. Kennedy and Matier argue that: “It is important to be clear about what we can and cannot conclude from fiscal gap estimates. A fiscal gap of zero indicates that current fiscal policy is sustainable... However, this does not necessarily mean that current fiscal policy is on an optimal path”²⁰. Another limitation, especially for fiscal gaps with distant target years, is that the debt to GDP ratio might exceed the desired target value at some point during the projection period before the target year. This is likely to happen if revenue and/or spending develop in a non-linear way, which is possible over longer time periods, for example due to a cohort effect affecting an ageing population.

4.21 Chapter 6 of this Report presents fiscal gap calculations consistent with the Government’s sustainable investment rule in the sense that the pre-determined net debt target is set to 40 per cent of GDP.

An alternative fiscal gap indicator **4.22** It is possible to imagine other indicators of long-term fiscal sustainability. Related to the fiscal gap approach, for example, is an indicator, which calculates the immediate and permanent change in the primary balance necessary so that the debt to GDP ratio never exceeds a certain limit. This indicator therefore addresses one of the limitations of the intertemporal budget constraint (IBC) and fiscal gaps, which put no explicit restrictions on the evolution of the debt to GDP path over the projection period. This indicator might be useful for a situation where the current debt to GDP ratio is below some pre-determined upper limit, for example presently in the UK where the net debt to GDP ratio is below the Government’s sustainable investment rule’s 40 per cent limit. Chapter 6 shows the projected evolution of net debt over a 100-year period, as a share of GDP, using this alternative indicator.

²⁰ *Comparing the Long-term Fiscal Outlook for Canada and the United States Using Fiscal Gaps*, Suzanne Kennedy and Chris Matier, Canadian Department of Finance, 2002, page 4.

Generational accounting

Inter-generational fairness **4.23** Generational accounting was developed in the early 1990s²¹ and is based on the notion that fiscal policies should be generationally fair. To assess whether policies are generationally fair, generational accounting compares the projected net lifetime tax transfers faced by newborns born in different years. The projected net lifetime net transfers are also called the generational account of an individual. If the projected net transfers of these different groups are similar²², then current policies are considered to be generationally fair.

4.24 The generational accounts' inter-generational balance gap (IGG) indicates by how much current taxes have to rise (or fall), or spending has to fall (or rise), so that a current newborn and a future newborn are equally well off. The comparison is made with current newborns, rather than all past newborns (existing generations), since although the current Government can affect the lifetime tax burden for current and future newborns, it can only partially affect the lifetime tax burden for existing generations. This is because existing generations have already faced past tax regimes, set by previous governments^{23,24}. To calculate the IGG the generational accounts require a comprehensive set of spending and revenue projections broken down by age groups²⁵.

Strengths and limitations **4.25** One strength of generational accounts is that they, unlike other approaches, provide one possible indication of the inter-generational fairness aspects of current policies. The main drawback is arguably that the inter-generational balance indicator is difficult to interpret, which makes it difficult to communicate. Moreover, its approach is very different to those taken by other indicators, making it difficult to compare them. In addition, generational accounting has substantial data requirements. Auerbach *et al.* argue that: "...with the advantage of more information, ..., comes the need for more assumptions and data"²⁶. Despite this limitation, Auerbach *et al.* conclude that generational accounting usefully complements other measures such as cash-flow budget figures. Another potential limitation is that generational accounts generally do not distinguish between current consumption and investment. This distinction matters when calculating the degree of inter-generational fairness as current consumption only benefits the current generation whereas investment benefits current and future generations. This could lead to a biased IGG. However, Chapter 6 and the Annex show that it is possible to address this shortcoming²⁷.

²¹ See *Generational accounts: a meaningful alternative to deficit accounting*, Alan Auerbach, Jagadeesh Gokhale, and Laurence J. Kotlikoff, in *Tax Policy and the Economy*, edited by David Bradford, 1991.

²² Net tax payments are the difference between taxes paid to the government and transfers received from the government. To be comparable, the generational accounts for different age cohorts need to be growth adjusted. It is also possible to express net tax payments in terms of income to make the comparison.

²³ The technical details for the calculation of the inter-generational balance gap can be found in Annex A of the 2002 *Long-term public finance report: an analysis of fiscal sustainability*, HM Treasury, November 2002.

²⁴ For the UK, the IGG therefore provides one indication on how far the Government is achieving its fiscal policy objective of ensuring that spending and taxation impact fairly between generations.

²⁵ Gokhale and Smetters propose two new measures, the fiscal imbalance (FI) and the generational imbalance (GI), which are related to the generational accounts indicators. For a discussion see *Fiscal and Generational Imbalances: New Budget Measures For New Budget Priorities*, Jagadeesh Gokhale and Kent Smetters, American Enterprise Institute, July 2003.

²⁶ *Budget Blues: The Fiscal Outlook and Options for Reform*, Alan J. Auerbach, William G. Gale, Peter R. Orszag and Samara R. Potter, in *Agenda for the nation* edited by Henry J. Aaron, James Lindsey and Pietro Nivola, 2003, page 33.

²⁷ For additional criticisms see 2002 *Long-term public finance report: an analysis of fiscal sustainability*, HM Treasury, November 2002, pages 25–26.

Box 4.2: What is generational fairness?

Generational accounting offers one way of thinking about generational fairness. However, it is a relatively narrow concept as it is only concerned with net lifetime tax transfers. The Government's golden rule¹ provides an alternative approach to thinking about generational fairness. According to the golden rule, the Government can only borrow to invest (over the economic cycle), implying that individual generations have to pay for their own consumption.

Another approach comes from the sustainable development literature². Policies are considered to be generationally fair if they satisfy the needs of the present without compromising the needs of the future. Generational accounts do not attempt to capture this as, for example, they do not account for all of the benefits generated by some types of government spending. For instance, the benefits of education expenditure go beyond the mere monetary transfer as a well-educated future workforce makes future generations better off, through higher growth and technological advancements. In addition, generational accounting fails to capture the environmental effects of current policies, which could lead to future generations being worse off, such as climate change and the depletion of fossil fuels.

These factors can be brought together under the idea that the government and society more generally will pass on a 'portfolio' of assets, which includes, *inter alia*, public and private physical capital, human capital, stock of technology and knowledge and natural resources, to the next generation. Some of these factors are included in alternative indicators such as the index of sustainable economic welfare (ISEW) and living standards measures³. Generational fairness could be assessed on the basis of these sort of broader indicators.

A further driver of generational fairness is the amount of wealth current generations leave to future generations. One highly theoretical view is that if current generations realise they are leaving a large tax burden to future generations they will respond by increasing their savings and bequests. Therefore any measure of generational fairness should include private bequests, which are generally ignored in generational accounting⁴.

It is clear therefore that there is no standard definition of what 'generational fairness' actually comprises. However, generational accounting provides one useful interpretation and gives an indication of the sustainability and fairness of fiscal policy.

¹ See Chapter 1 for more information on the Government's fiscal rules.

² *The United Nations' Commission on Environment and Development: Our Common Future*, Gro Harlem Brundtland, 1987.

³ *Is Economic Growth Good For Us?*, Nicholas Crafts, *World Economics*, 2003.

⁴ See *Intergenerational Fairness in Old-Age Provision: Who cares? Who cares?*, Chris de Neubourg and Alexander Sebald, International Social Security Association, 2003, which describes generational accounts with bequests.

4.26 This Report uses the generational accounts approach in Chapter 6 to assess the degree of inter-generational fairness of current policies. It does this using the standard indicator and an indicator that distinguishes between current consumption and investment. As stated, generational accounting provides only one way of thinking about inter-generational fairness aspects of policies.

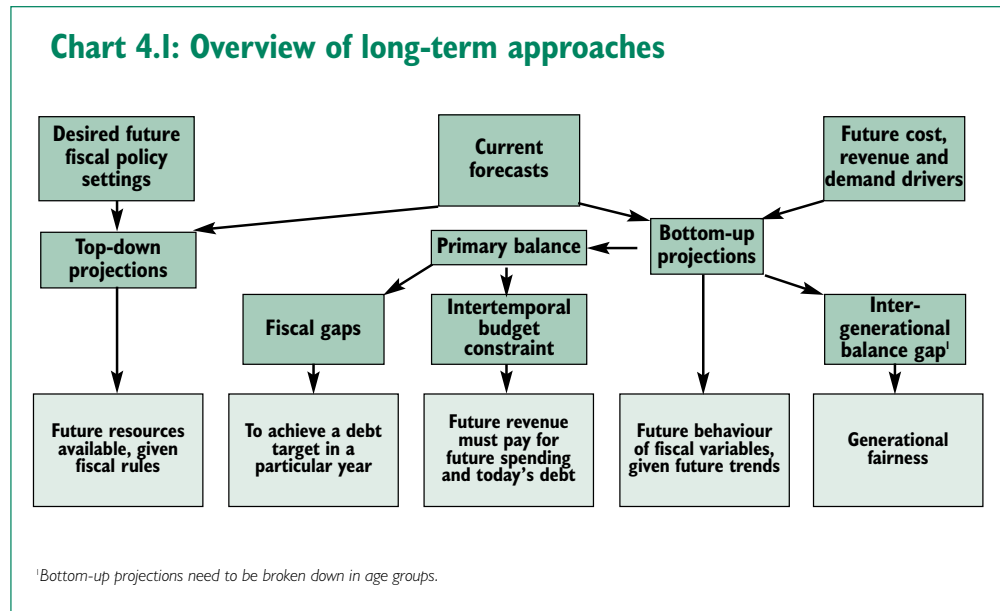
Generational accounts can be used to derive other indicators

4.27 The generational accounts approach has an additional positive feature in that the dataset required to calculate the IGG can also be used to generate bottom-up projections, and calculate the IBG and fiscal gaps. This is due to the fact that the IGG requires a more detailed dataset than the other approaches. For example, Cardarelli *et al.* use the generational

accounts approach: “...to assess both generational equity and the sustainability of current government policy”²⁸. It is also possible to project future annual budgets with the available data, in other words create a list of spending and revenue items (and their aggregates) for particular years in the future²⁹.

OVERVIEW OF APPROACHES

4.28 Chart 4.1 provides a schematic overview of the long-term approaches used in this Report. The chart shows that the top-down approach is distinct from the other approaches in that it is based on desired future fiscal policy settings rather than underlying future cost, revenue and demand drivers. The fiscal gap and generational accounts can be derived from



A common dataset

the same comprehensive bottom-up projections.

4.29 The generational accounts have the highest demands on the underlying dataset in that the bottom-up projections need to be broken down in age groups as well. As stated above, with the generational accounts dataset it is possible to derive the other bottom-up indicators, and this is done in this Report.

4.30 As stated, this Report uses the approaches discussed in this chapter to assess the sustainability of the public finances in the long term and the degree of inter-generational fairness of current policies. The results are presented in Chapter 6.

Table 4.1: Data requirements

	Comprehensive projections	...broken down by age	Time horizon
Intertemporal budget gap	✓		Infinity
Fiscal gaps	✓		Target year
Inter-generational balance gap	✓	✓	Infinity

²⁸ *Generational accounting in the UK*, Roberto Cardarelli, James Sefton, and Laurence J. Kotlikoff, *Economic Journal*, 2000, page F565.

²⁹ See *Generational accounts for the Dutch public sector*, Harry ter Rele, *De Economist*, 1998.

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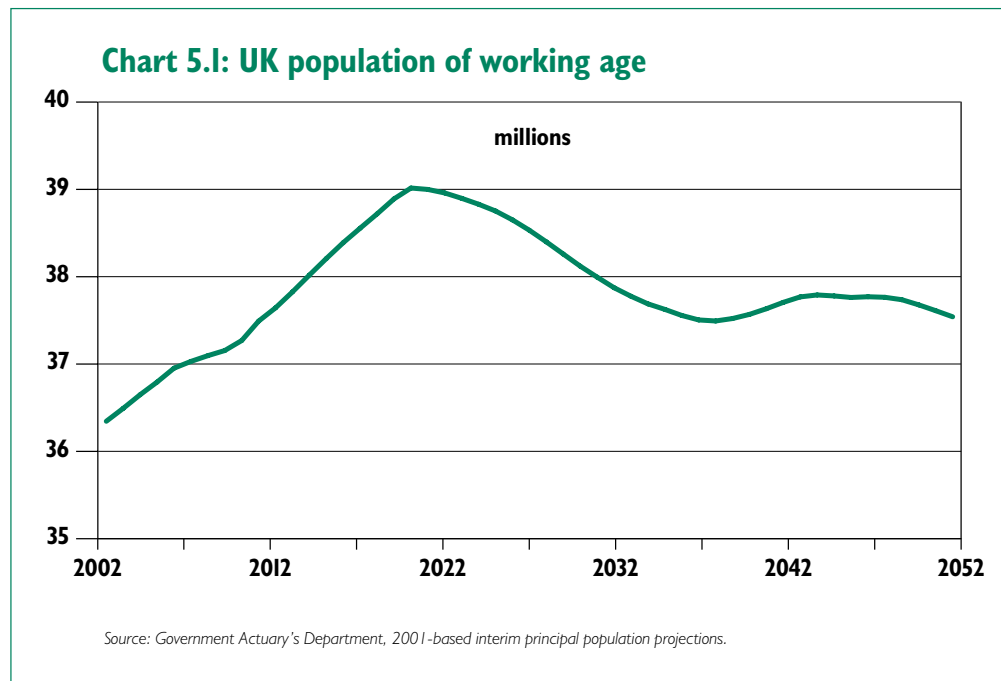
ASSUMPTIONS

DEMOGRAPHY

2001-based interim population projections are used

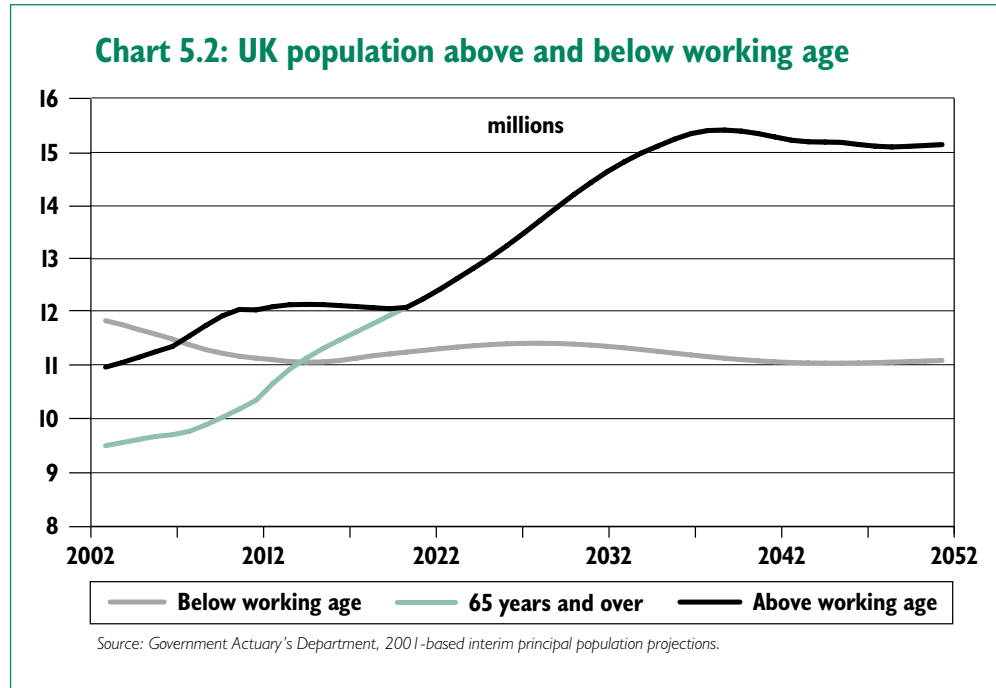
5.1 The projections in this Report are based on the Government Actuary's Department's (GAD) 2001-based interim principal and variant UK population projections. This year's Report therefore allows for a more comprehensive assessment of the long-term fiscal position than last year's report, when the variant population projections were not available.

5.2 Chart 5.1 shows the likely evolution of the number of people of working age over the coming decades, based on GAD's principal projections. A statistical concept of working age is used in that it includes all males aged 16 to 64 years and all females aged 16 to 59 years (rising to 64 years by 2020). The continued rise between 2010 and 2020 is entirely due to the increase of the female state pension age from 60 years in 2010 to 65 years by 2020¹. The number of people of working age will reach its peak in 2021 at around 39 million, before falling to around 37½ million by the mid 2030s.



5.3 Chart 5.2 shows the evolution of the number of people aged 65 years and over, and below and above working age over the same horizon. The number of people aged 65 years and over is projected to rise from less than 9½ million in 2002 to over 15 million by 2040 before stabilising. Because of the sharp increase in the number of people of working age due to the increase in the female state retirement age between 2010 and 2020, the number of people above working age is projected to rise less rapidly than that of people aged 65 years and over between 2010 and 2020. The number of people aged between 0 and 15 years is projected to decline by nearly 1 million from 11.9 million in 2002 to 11 million by 2015 and then fluctuate around that level.

¹ See Chapter 2, paragraphs 2.6 to 2.9 for more details.



LABOUR MARKET

5.4 The Report requires assumptions on the labour market participation rates and the unemployment rate. These are needed for a number of reasons:

- transfers such as unemployment benefits depend on unemployment rates;
- future public pension expenditure depends on entitlements². For example, the gradual rise in the female participation rate will, everything else equal, lead to higher pension spending in the future as these women build up higher pension entitlements; and
- assumptions on working-age population, and labour market and unemployment rates (and hence the employment rate) are needed to derive employment levels. These in turn are necessary, alongside productivity assumptions, to derive economic growth and hence future GDP levels.

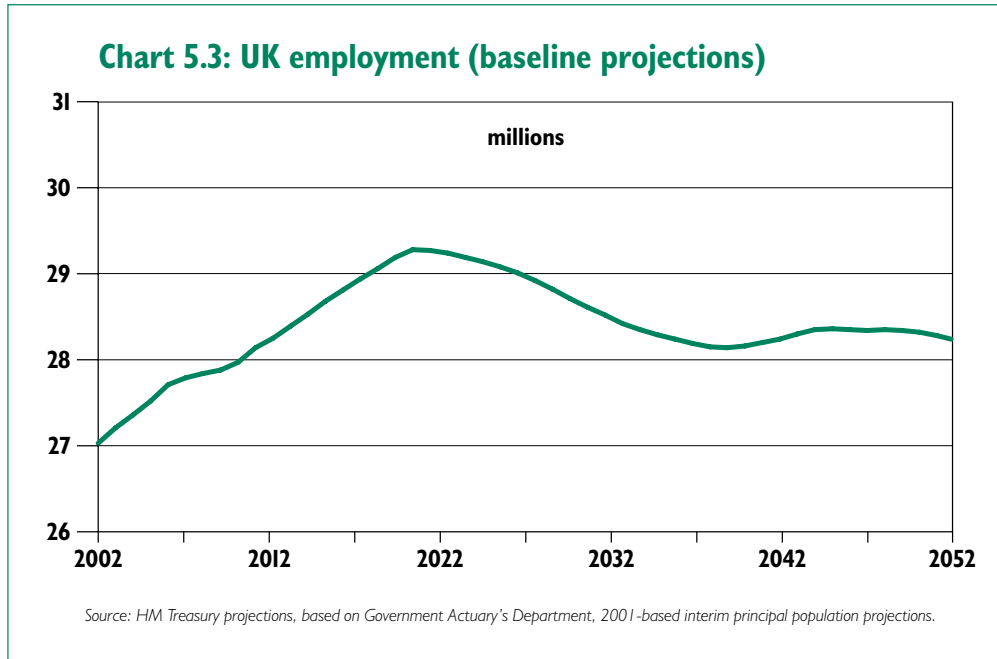
Constant overall employment rate

5.5 As in the 2002 *Long-term public finance report* it is assumed that the overall employment rate remains unchanged beyond the medium term³. This means that changes in employment levels are entirely due to changes in the size of the working-age population. Up to 2008–09, the projections are consistent with the medium-term projections in the 2003 Pre-Budget Report⁴. Chart 5.3 shows the projected evolution of total employment up to 2052 used in this Report's baseline projections, based on the principal population projections.

² To be entitled to the full basic state pension, individuals must have reached state retirement age, 65 years for males and 60 years for females (the latter will be raised to 65 years between 2010 and 2020). In addition, individuals are generally required to have paid, and/or have been credited as having paid, National Insurance Contributions for about 90 per cent of their working life in order to receive the full basic state pension.

³ See 2002 *Long-term public finance report: an analysis of fiscal sustainability*, HM Treasury, November 2002, page 31.

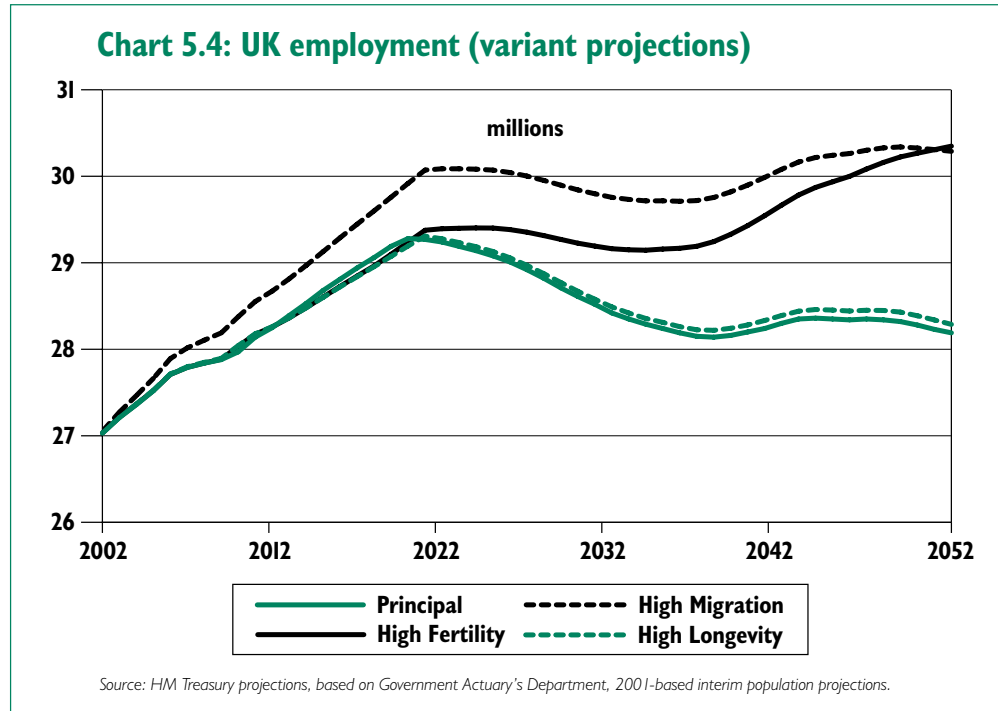
⁴ 2003 *Pre-Budget Report*, HM Treasury, December 2003.



5.6 Focussing only on the working-age population, the above approach – as in last year’s report – ignores any potential future trends in the number of people employed above state pension age. In mid 2003 nearly 1 million people above retirement age were in employment; an implied employment rate of around 9 per cent. Of these around two thirds were females, most of them in the age group 60 to 65 years. However, with life expectancy continuing to rise and the number of years that can be enjoyed in good health likely to increase as well, it is possible that the number of older people that work beyond state pension age will rise.

Employment in variant population projections

5.7 This Report also presents results based on the variant population projections introduced in Chapter 2. Using the same assumption of a constant overall employment rate as for the principal projections, Chart 5.4 shows that even small changes in the demographic assumptions have a major effect on the population structure, including the size of the working-age population. A higher fertility rate, everything else equal, will initially lead to an increase in the number of people below working age. The impact on the working-age population is not realised until around 2020, given the time it takes for additional newborns to reach working age. Assumed higher net migration makes an immediate, positive impact on the working-age population, and this effect continues, and becomes more pronounced, over time. However, eventually these migrants will reach retirement age as well. Higher longevity mainly affects older age cohorts but can also be expected to make a small difference to the size of the working-age population as fewer people of working age die prematurely.



PRODUCTIVITY

5.8 The productivity growth assumption used in the baseline scenario is 2 per cent per year. This is the average long-term productivity growth rate for the UK since the mid 1950s. It is also the neutral productivity assumption used in the Government's medium-term forecasts on trend growth⁵.

5.9 However, lower and higher productivity growth assumptions of 1¼ per cent and 2¼ per cent per year respectively are also used to provide some sensitivity analysis. Annex A of the *Economic and Fiscal Strategy Report*⁶ (EFSR) stresses that the lower productivity growth assumption is cautious. The higher productivity growth assumption is included to reflect the upside risks to productivity growth⁷.

GROSS DOMESTIC PRODUCT (GDP)

5.10 Given assumptions regarding employment and productivity growth, it is possible to derive projected GDP growth beyond the end of the medium-term forecast period. Table 5.1 shows average real GDP growth in the coming decades for the baseline scenario with the principal population projections.

⁵ See *Trend Growth: Recent Developments and Prospects*, HM Treasury, April 2002.

⁶ *Economic and Fiscal Strategy Report in Budget 2003: Building a Britain of economic strength and social justice*, HM Treasury, April 2003.

⁷ See *Trend Growth: Recent Developments and Prospects*, HM Treasury, April 2002.

Table 5.1: Real GDP growth and its components in the baseline scenario (per cent)¹

Year	2012–13 to 2021–22	2022–23 to 2031–32	2032–33 to 2041–42	2042–43 to 2051–52
Productivity	2	2	2	2
Employment	½	–¼	0	0
Real GDP²	2½	1¾	2	2

¹ Productivity growth per year is 1¾ per cent and 2¼ per cent in the low and high productivity scenarios respectively.

² Note that these growth rates do not match those presented in Chapter 2, Table 2.3. This is due to a number of reasons, including that the rates presented here take account of the increase of the female state retirement age between 2010 and 2020.

5.11 As the above table shows, growth in real GDP is dependent on the change in employment, which in turn is dependent on the demographic assumptions made. Table 5.2 shows what effect the variant population projections have on projected real GDP growth.

Table 5.2: Real GDP growth in the variant population projections (per cent)¹

Year	2012–13 to 2021–22	2022–23 to 2031–32	2032–33 to 2041–42	2042–43 to 2051–52
High Migration	2½	2	2	2
High Longevity	2½	1¾	2	2
High Fertility	2½	2	2	2¼

¹ Productivity growth per year is 2 per cent for all variants.

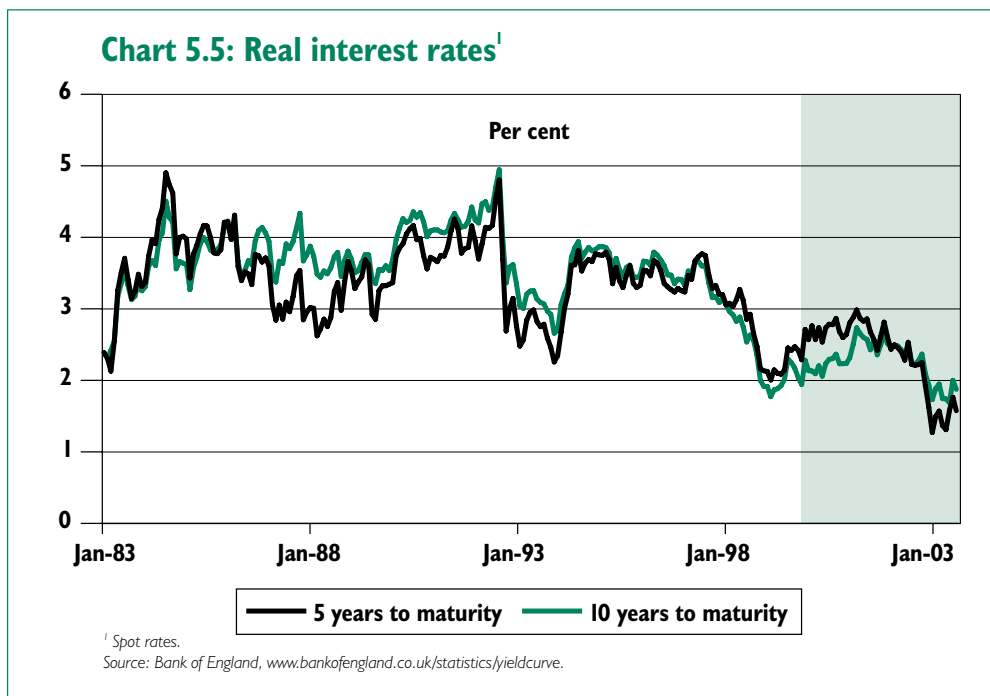
DISCOUNT/DEBT INTEREST RATE

5.12 The forward-looking approaches to long-term fiscal sustainability (see Chapter 4) require a real discount/debt interest rate assumption. This is necessary either to calculate the present discounted value of future spending and revenue flows or to project the debt to GDP ratio into the future.

5.13 A discount rate can be derived from data on long-term real interest rates based on index-linked gilts. As Chart 5.5 shows real interest rates have varied between 2 per cent and 5 per cent since 1982, and have remained between 1½ per cent and 3 per cent since early 1998, averaging less than 2½ per cent since 2000. The Report presents results based on real interest/discount rate assumptions of 2½ per cent, 3 per cent and 3½ per cent⁸.

⁸ An alternative approach would be to assume that the debt interest rate is not a constant but instead positively related to the debt stock or debt to GDP ratio. A rising debt to GDP ratio would then lead to a higher debt interest rate, reflecting the fact that the risk of default increases. With this assumption the debt to GDP ratio would rise even faster if it were on an unsustainable path.

5.14 The discount/interest rate assumptions are in line with the recommendations of the 2003 *Green Book*⁹. The *Green Book* is a best practice guide for all Central Government departments and executive agencies on the process of project appraisal and evaluation. The 2003 *Green Book* recommends a discount rate of 3½ per cent but also states that there are a number of circumstances (for example when the impacts occur over the long term as in these calculations of long-term fiscal sustainability), in which a lower discount rate may be appropriate. The discount rate assumptions are also similar to those used in recent academic studies, which analysed the long-term sustainability of the public finances in the United States¹⁰.



SPENDING AND REVENUE

Current policies are assumed

5.15 The long-term projections are based on the assumption of current policy, in other words it is assumed that the Government will leave current policy unchanged in the future. This should not be interpreted as meaning that policy will *not* change over time but it is used so that the long-term projections do not prejudice future Government policy. This assumption is frequently used in long-term projections, for example in the illustrative long-term fiscal projections in Annex A of the EFSR and by the European Union's Economic Policy Committee¹¹.

⁹ *The Green Book: appraisal and evaluation in central government*, HM Treasury, 2003.

¹⁰ Gokhale and Smetters use a real discount rate assumption of 3.6 per cent, which they derive from the average yield on 30-year US Treasury bonds. See *Fiscal and Generational Imbalances: New Budget Measures for New Budget Priorities*, Jagadeesh Gokhale and Kent Smetters, American Enterprise Institute, July 2003. Auerbach *et al.* use a slightly lower real discount rate assumption of 3.3 per cent. See *Reassessing the Fiscal Gap: Why Tax-Deferred Saving Will Not Solve the Problem*, Alan J. Auerbach, William G. Gale and Peter R. Orszag, The Brookings Institute, July 2003.

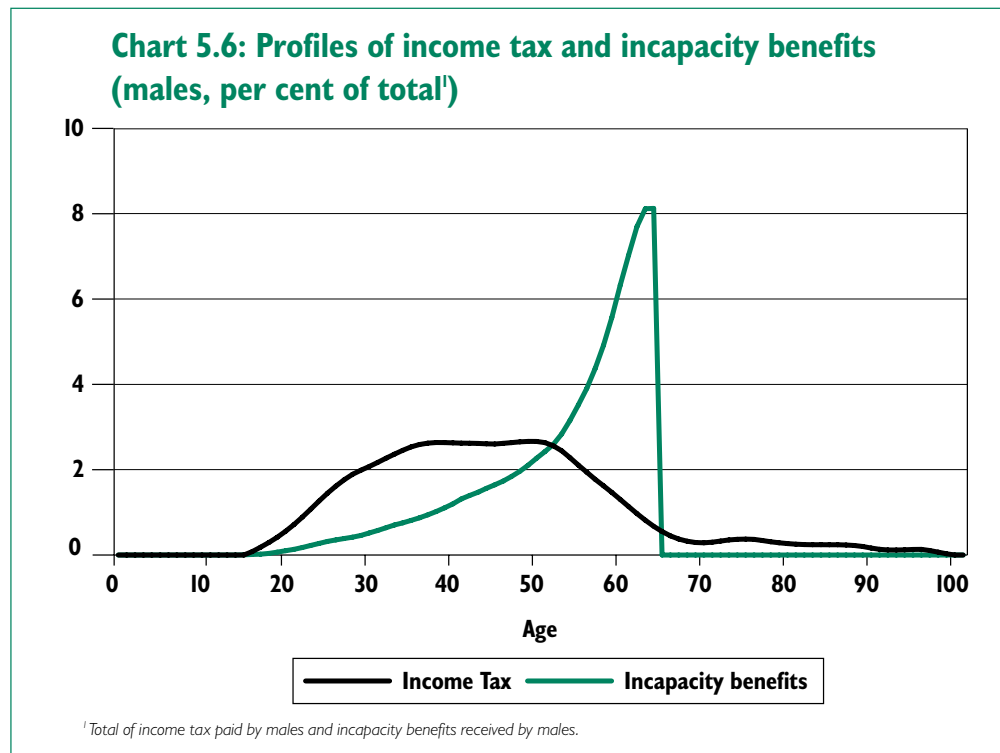
¹¹ *The impact of ageing populations on public finances: overview of analysis carried out at EU level and proposals for a future work programme*, Economic Policy Committee, October 2003.

5.16 Current policy has been interpreted as all policy already in place or announced in this year's Pre-Budget Report. Current policy refers to the level of per-capita spending and revenue rather than the real growth rate in 2008–09, in other words what is used for the projections is the level of spending and revenue per head at the end of the medium term, and not the growth rate of spending and revenue items in that particular year.

Spending and revenue items have specific age profiles

5.17 The spending and revenue projections are based on the same separate spending and revenue profiles for males and females as used in last year's report. These profiles have been calculated by the National Institute of Economic and Social Research (NIESR), and used before in the context of generational accounts for the UK, derived from household or individual micro-data¹².

5.18 The profiles show the distribution of total spending and total revenue across age cohorts, and vary according to sex. The age aspect of the profiles allows the inter-generational aspects of the public finances to be examined. The profiles are best explained with the help of an illustrative example. Chart 5.6 shows income tax and incapacity benefits for males. As can be seen from Chart 5.6, males aged 15 years or less do not contribute to the Government's overall income tax revenue, whereas males 65 years and older only contribute a small proportion. The former observation is explained by the fact that younger males are generally in education and do not earn income on which they have to pay income tax. The second observation is explained by the fact that males reach retirement age at 65 years, with labour market participation rates falling rapidly from then on. Males between 30 years and 50 years contribute the most to overall income tax revenue. The gradual decline between 50 and 65 years is due to the fact that labour-market participation rates for males of these age groups fall.



¹² For more details on how the specific profiles have been derived see *Generational accounting in the UK*, Roberto Cardarelli, James Sefton, and Laurence J. Kotlikoff, *Economic Journal*, 2000.

5.19 The distribution of incapacity benefits across the age cohorts largely reflects the extent incapacity increases with age. Older males leave the labour force, many of whom claim an incapacity benefit. For example, males aged 64 years receive 8 per cent of the total incapacity benefits paid out to males. The drop at 65 years to zero is due to the fact that males reach the state pension age at 65 years and move from receiving an incapacity benefit to receiving the basic state pension.

Deriving per capita contributions and allocations

5.20 With these profiles, and information on the number of males and females in every cohort, and the total money amount for the spending and revenue items, it is possible to derive the per capita allocation or contribution as a share of total spending or total revenue on the different spending and revenue items¹³.

5.21 The projection model calculates per capita allocations and contributions for all of the different spending and revenue items, using the spending and revenue profiles and information on total spending and revenue from HM Treasury's medium-term projections. Where appropriate, the projection model raises the per capita allocations and contributions in line with productivity gains over the projection horizon. These per capita terms are then combined with detailed population projections to generate spending and revenue projections. These projections can then be used to calculate the indicators discussed in Chapter 4¹⁴.

5.22 Chapter 2 argued that there are a range of potential long-term trends alongside the projected demographic changes. These trends include changing behaviours, and expectations and preferences. These potential trends are not taken into account in the projections.

Differences from last year's report

5.23 With one exception, the projection approach used in this Report is the same as in last year's report. The exception is the modelling approach chosen for projecting National Insurance Contributions (NICs). In this year's Report it is assumed that NIC rates will remain unchanged so that NICs will rise in line with productivity gains and population changes. NICs are therefore projected in the same way as the other revenue items. In last year's report it was assumed that NICs would change at the same rate as spending from the National Insurance Fund. The change constitutes a more appropriate reflection of the fact that NICs not only fund the National Insurance Fund but also contribute to the NHS.

Exceptions

5.24 However, there are a number of spending items for which it is beneficial to rely on external projections, or where an explicit assumption regarding the future evolution can be justified. These spending items are therefore treated differently from the others in this Report. The two exceptions are:

- social security spending, which is projected by the Department for Work and Pensions (DWP), and the Government Actuary's Department (GAD). This is because the projection approach used in this Report would not capture a number of important trends, for example that future basic state pension spending will be affected by rising female participation rates in the past and the build up of the Pension Credit¹⁵; and

¹³ For more details see the 2002 *Long-term public finance report: an analysis of fiscal sustainability*, HM Treasury, November 2002, pages 33–36. Last year's report also provides two more examples, education spending and consumption of hospital and community services.

¹⁴ As discussed in Chapter 4, the age- and gender-specific breakdown of future spending and revenue is necessary to assess the degree of inter-generational fairness of current policies, as calculated in the generational accounts.

¹⁵ For last year's report, the projections provided by the DWP and GAD covered a horizon of 50 years. For this year's Report the horizon has been extended, where possible, to cover 70 years. The main exception is the Pension Credit, where there is not yet sufficient data to support a revised projection.

- higher longevity generally goes hand in hand with a rise in the number of years enjoyed in good health. This effect, called compression of morbidity, is likely to have a dampening effect on future long-term care spending. This Report therefore assumes that long-term care spending remains constant as a share of GDP from 2008–09 onwards as in last year’s report.

INTRODUCTION

6.1 This chapter presents the results of this year's *Long-term public finance report*. Building on and extending the analysis of last year's report, the results are presented in terms of indicators based on historical data and forward-looking indicators. The forward-looking indicators are presented on a range of assumptions, including variant population projections as provided by the Government Actuary's Department (GAD), thereby taking account of the high degree of uncertainty regarding long-term projections¹. These variant projections were not available last year. For the first time this year, the chapter presents a brief discussion of potential non-demographic drivers of future health spending and shows the projected evolution of the general government capital stock as a share of GDP. The chapter also provides a discussion of the degree of inter-generational fairness of current policies, using a modelling approach, which has been refined since last year's report. The results are compared with those presented in last year's report, and with other international studies.

Long-term sustainability and the fiscal rules

6.2 The analysis in this Report assumes, for modelling purposes, that taxation and spending policies at the end of the medium-term forecast are continued into the future. Of course, this does not mean that there will be no changes to taxation and spending in the future, the latter will depend on the results of future Spending Reviews.

6.3 As discussed in Chapters 3 and 4, there are a variety of indicators that can be used to assess long-term fiscal sustainability. What matters from the Government's perspective is keeping within the fiscal rules as discussed in Chapter 1. Importantly, the Government aims to meet the fiscal rules over the cycle. It does not make sense to try to set fiscal policy now to exactly meet the fiscal rules over the next 50 or 100 years – the uncertainties are simply too great. Moreover, at these horizons the range of policy instruments available is much greater than simply changing spending plans and tax rates. A wide range of structural reforms could also make a vital contribution. The purpose of this Report is to look ahead beyond the normal medium-term horizon to ensure that current Government policies remain sustainable in the long run.

6.4 A common starting point for thinking about long-term fiscal sustainability is to consider a sustainable debt to GDP ratio. Indeed, the Government's sustainable investment rule is based on this idea. The sustainable investment rule states that public sector net debt will be held at a stable and prudent level over the cycle, and that, other things equal, net debt will be maintained below 40 per cent of GDP over the economic cycle².

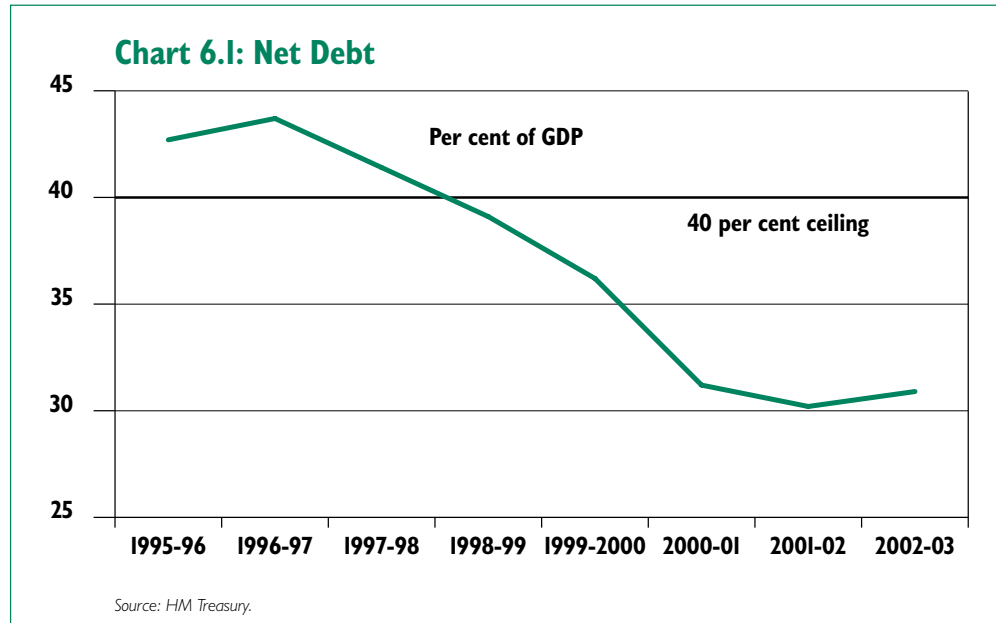
¹ The assumptions used in this Report are stated in Chapter 5.

² A summary of research into the 'optimal' level of public debt can be found in *Reforming Britain's Economic and Financial Policy*, HM Treasury, 2002. Most studies have estimated the optimal level of net debt to be between 20 to 50 per cent of GDP. The sustainable investment rule's 40 per cent net debt to GDP ratio is consistent with a balanced and responsible approach to fiscal management.

INDICATORS BASED ON HISTORICAL DATA

Net debt

6.5 The national accounts measure of net debt is one of the key fiscal aggregates and is the basis for the Government's sustainable investment rule³. Chart 6.1 shows that since 1997, the Government has managed to reduce net debt below 40 per cent of GDP, thereby meeting its sustainable investment rule. Chapter 2 of the 2003 Pre-Budget Report provides updated projections of net debt as a share of GDP up to 2008-09⁴.



Accruals-based balance sheet

6.6 The Government has announced that consolidated Whole of Government Accounts (WGA) will be published for 2006-07 onwards. The accounts will cover all public sector entities and be produced using best accounting practice. Potentially, Whole of Government Accounts have an important role in the guiding and reporting of fiscal policy in the future. This will be developed further in the run up to publication of the accounts.

ANALYSIS OF FUTURE SPENDING AND REVENUE

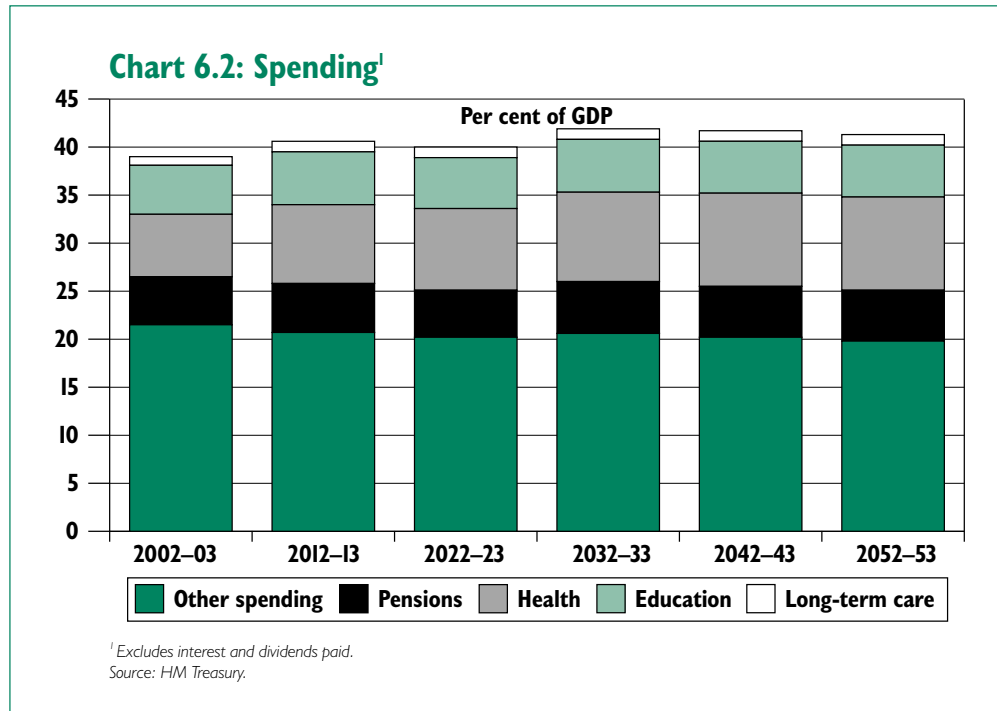
6.7 This section presents the results of the bottom-up spending and revenue projections on the baseline assumption of 2 per cent productivity growth per year and the principal population projections.

Spending projections

6.8 Total spending (including gross investment) is projected to rise slightly from 38.9 per cent of GDP in 2002-03 to 40½ per cent by 2012-13, then drop marginally before rising again, stabilising around 41½ per cent of GDP in later decades. Chart 6.2 shows the evolution of spending and of some of the key spending items as a share of GDP.

³ See Chapter 1 for details on the Government's two fiscal rules, the golden rule and the sustainable investment rule.

⁴ 2003 Pre-Budget Report, HM Treasury, December 2003.



Individual spending projections

Education 6.9 Education spending is projected to remain relatively stable over the coming decades, fluctuating around 5½ per cent of GDP. This reflects the fact that the number of people of education age (either in schools, higher education or further education) is projected to vary only slightly. The increase from 5.1 per cent in 2002-03 to 5.5 per cent in 2012-13 reflects the substantial increase in education spending announced in the 2002 Spending Review up to 2005-06.

Pensions 6.10 Public pension spending⁵ is projected to remain stable over the next 50 years, fluctuating between 4.9 and 5.4 per cent of GDP. As a share of GDP, public pension spending is projected to be highest around 2032-33, when the number of pensioners is projected to be increasing at its fastest rate as the 1960s baby-boom generation enters retirement. The projections, therefore, confirm earlier findings, for example by the Department for Work and Pensions (DWP) and GAD⁶.

6.11 Alternative projections can be generated on a wide range of assumptions and policy scenarios, including uprating pension increases in line with earnings growth rather than inflation. For example, based on GAD projections⁷, it can be calculated that spending on the basic state pension and SERPS/S2P would rise to around 7 per cent of GDP by 2050 with earnings uprating, around 3 percentage points higher than under current policy.

⁵ Public pension spending is defined as the sum of the basic state pension, State Second Pension, Minimum Income Guarantee and Pension Credit, Winter Fuel Payments, Over 75 TV licences, and Christmas Bonus. For the purposes of this exercise, the Pension Credit is assumed to be uprated in line with earnings over the projection horizon provided by the Department for Work and Pensions. See also Chapter 5, footnote 15.

⁶ *The Pension Credit: long-term projections*, Department for Work and Pensions, 2002, and *Quinquennial Review of the National Insurance Fund*, Government Actuary's Department, October 2003.

⁷ *Quinquennial Review of the National Insurance Fund*, Government Actuary's Department, 2003.

Health 6.12 Health spending as a proportion of GDP is projected to rise from 6½ per cent in 2002-03 to around 9¾ per cent by 2052-53. Of this an increase of roughly 1½ percentage points of GDP by 2007-08 reflects the substantial increase in NHS spending announced in Budget 2002⁸ in response to the Wanless Review⁹. The further increase from 2008-09 is driven by demographic changes.

6.13 However, the pure demographic effect on health spending beyond 2008-09 is likely to be less marked than shown in these projections. This is because higher longevity generally goes hand in hand with a rise in the number of years enjoyed in good health. This trend, which is called compression of morbidity, could potentially have a marked dampening effect on health spending growth¹⁰. The health projections do not assume a compression of morbidity effect. There are also non-demographic factors that might affect health spending in the future. Box 6.1 summarises the health projections published in the Wanless Review.

Box 6.1: Future health spending trends

The health spending projections in this Report build in the substantial increases in public spending on the NHS up to 2007-08 announced in the 2002 Spending Review¹, and then assume spending grows in line with the predicted demographic changes. Alternative projections of possible future health spending have been published in the Wanless Review², an independent review of the trends and resource needs that could affect the health service in the UK over the next 20 years. The review modelled future health spending based on three different scenarios, which differ in terms of the efficient use of resources and responsiveness of the health service, and the level of public engagement in health issues. These scenarios range from 'slow uptake', with minimal public engagement and inefficient use of resources through to the 'fully engaged' scenario, where there is a high level of public engagement in health-seeking behaviour and the health service sees large productivity gains. The Wanless Review projects health spending as a proportion of GDP to rise from around 9½ per cent in 2007-08 to 10.6 per cent by 2022-23 in the 'fully engaged' scenario, and to 12½ per cent in the 'slow uptake' scenario³.

The Wanless Review therefore projects health spending to rise further over the coming two decades than the principal projections in this Report. The difference is driven by the non-demographic factors that feature in the Wanless scenarios, which can broadly be separated into demand and supply drivers. On the demand side, these include the level of health promotion, disease prevention and health-seeking behaviour. Supply side factors include the pace of technological and medical advance, the use of information and communications technology in the health service and the productivity of the workforce in the health service.

In Budget 2003⁴ the Chancellor of the Exchequer asked Derek Wanless to continue his work, in particular to study how the 'fully-engaged' scenario could be realised. Derek Wanless is expected to report back in early 2004.

¹ 2002 Spending Review: *Opportunity and security for all: Investing in an enterprising, fairer Britain*, HM Treasury, July 2002.

² *Securing our Future Health: Taking a Long-Term View*, Derek Wanless, 2002.

³ This includes 1.2 per cent of GDP for private sector health spending. This needs to be excluded to compare the projections presented in the Wanless Review with those presented in this Report.

⁴ *Budget 2003: Building a Britain of economic strength and social justice*, HM Treasury, April 2003.

⁸ *Budget 2002: The strength to make long-term decisions: Investing in an enterprising, fairer Britain*, HM Treasury, April 2002.

⁹ *Securing our Future Health: Taking a Long-Term View*, Derek Wanless, 2002.

¹⁰ See also 2002 *Long-term public finance report: an analysis of fiscal sustainability*, HM Treasury, November 2002, page 16 and *Demand for long term care in the UK: projections of long-term care finance for older people to 2051*, Raphael Wittenberg, Ruth Hancock, Adelina Comas-Herrera and Linda Pickard, in *A New Contract for Retirement: Modelling Policy Options to 2050*, edited by Richard Brooks, Sue Regan and Peter Robinson, 2002.

Long-term care 6.14 The projections in this Report, as in last year's report, assume a compression of morbidity effect for long-term care. This assumption is based on past experience, which suggests that people can expect an increase in the number of years enjoyed in good health as life expectancy rises¹¹. This means that long-term care spending is held at around 1 per cent of GDP (the 2008-09 level) rather than rising to 1³/₄ per cent by 2052-53 as it would if compression of morbidity were not allowed for.

Other spending 6.15 Spending on education, pensions, and health and long-term care amounted to roughly 45 per cent of total government spending in 2002-03. This share is projected to rise to around 52 per cent by 2052-53. In terms of GDP, the total of education, pension, and health and long-term care spending is projected to be 21¹/₂ per cent by 2052-53. The gradual decline of other spending between 2002-03 and 2052-53 largely reflects the assumption that most non-pension social transfers (which represent nearly a third of other spending) will rise in line with prices after 2008-09, reducing their share in GDP.

Spending summary 6.16 The changing demographic structure of the UK's population – and especially the ageing aspect – is projected to have only a limited impact on public spending over the coming decades. This contrasts with the findings in many other developed countries, where the spending pressures are much greater. As shown in Table 6.1, spending on education and pensions is projected to remain more or less stable as a share of GDP after the end of the medium-term forecast. Health spending is projected to increase the most, rising to 9³/₄ per cent by 2052-53. As a result, total spending is projected to be slightly higher, as a share of GDP, in 2052-53 than at the end of the medium term. The substantial increase in spending between 2002-03 and 2012-13 largely reflects the Government's increased spending on public services in the medium-term fiscal projections, in particular, education and health as part of the 2002 Spending Review and the 5-year settlement on health¹².

Table 6.1: Spending projections (per cent of GDP)

	2002-03	2012-13	2022-23	2032-33	2042-43	2052-53
Education	5.1	5.5	5.3	5.5	5.4	5.4
Pensions ¹	5.0	5.1	4.9	5.4	5.3	5.3
Health ²	6.5	8.2	8.5	9.3	9.7	9.7
Long-term care ^{3,4}	0.9	1.1	1.1	1.1	1.1	1.1
Total age-related spending	17.5	19.8	19.7	21.2	21.4	21.5
Other spending	21.5	20.7	20.2	20.6	20.2	19.8
Total spending⁵	38.9	40.5	39.9	41.8	41.7	41.3

¹ Defined as the sum of the basic state pension, including the State Second Pension, Minimum Income Guarantee and Pension Credit, over 75 TV licences, and Christmas Bonus.

² Gross NHS spending.

³ Compression of morbidity assumed.

⁴ Excluding long-term care provided within the NHS which is accounted for under Health (for which no compression of morbidity is assumed).

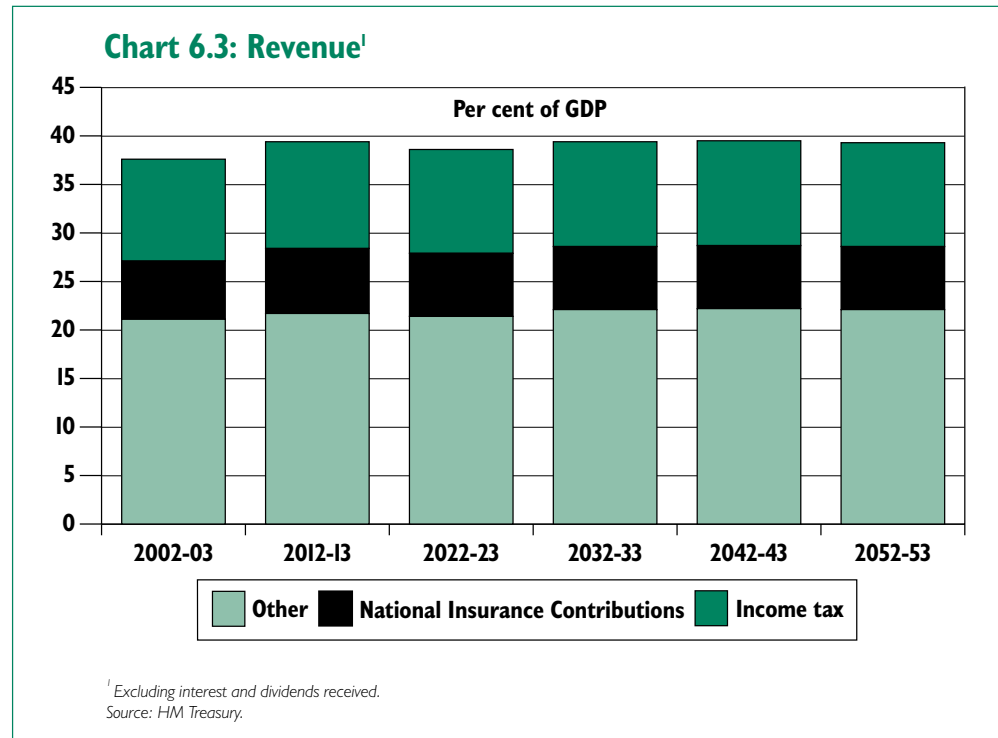
⁵ Total spending including gross investment but excluding interest and dividends payments.

¹¹ See Chapter 5 and 2002 *Long-term public finance report: an analysis of fiscal sustainability*, HM Treasury, 2002, pages 44-45.

¹² See *Budget 2002: The strength to make long-term decisions: Investing in an enterprising, fairer Britain*, HM Treasury, April 2002, Chapter 6.

Revenue projections

6.17 Chart 6.3 shows that revenue is projected to remain fairly stable as a share of GDP beyond 2012-13. Chart 6.3 also reveals that the composition of revenue is projected to remain stable over the coming decades, with income tax and NICs accounting for around a quarter and a sixth of total revenue respectively.



Revenue projections are probably on low side

6.18 These projections do not pick up all the potential developments on the revenue side that can be expected. In fact, there are numerous reasons why revenue may rise as a share of GDP without a change in policy, including:

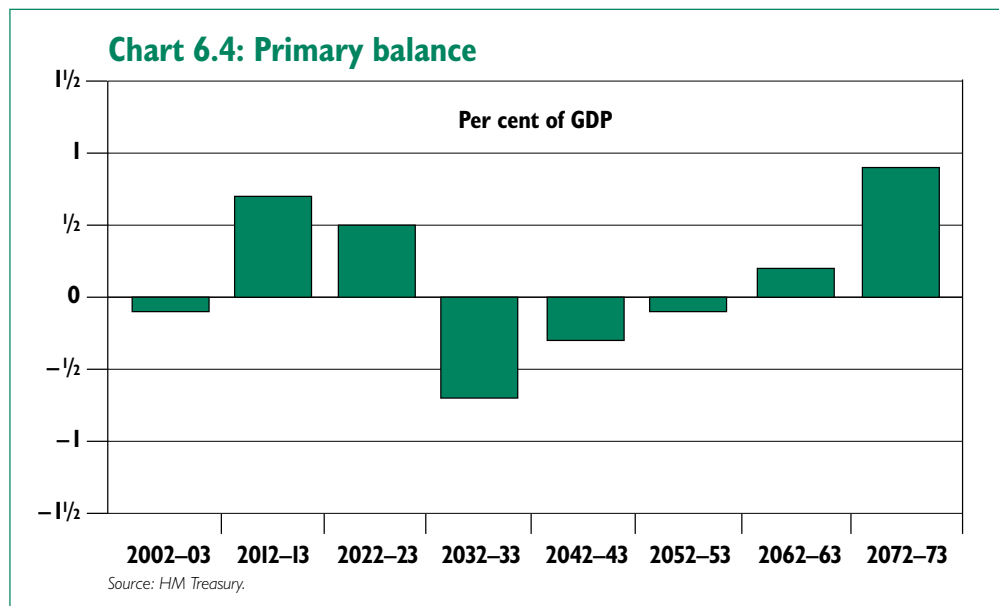
- the number of pensioners with significant pension entitlements is expected to increase over the coming decades. While contributions to pension schemes are exempt from taxation (up to generous limits), the future income stream that a funded pension generates is taxed. There is evidence that such a policy could have a significant upward effect on revenue in countries with well-established funded pension schemes¹⁴;

¹³ The exact figures are 37.6, 39.4, 38.6, 39.4, 39.5 and 39.3 per cent respectively.

¹⁴ For more details on a Dutch study which projects that total tax revenue from pension income will rise by around 5 percentage points between 2001 and 2040 in the Netherlands see 2002 *Long-term public finance report: an analysis of sustainability*, HM Treasury, November 2002, page 40. Also see *Deferred Taxes in the Public Finances*, Michael J. Boskin, NBER, January 2003 and a response to Boskin's paper *Reassessing the Fiscal Gap: Why Tax-Deferred Saving Will Not Solve the Problem*, Alan J. Auerbach, William G. Gale and Peter R. Orszag, July 2003.

- employment rates, in particularly of older age cohorts and those above the State Pension age, might increase markedly in the coming decades as a result of higher life expectancy and possibly longer healthy lives^{15,16}; and
- even with unchanged tax rates, and tax allowances/thresholds indexed for inflation, real fiscal drag will tend to push up revenue due to economic growth. For example, a reasonable long-term assumption is that real earnings will increase in line with productivity growth. The revenue projections should therefore be interpreted as assuming a comprehensive form of ‘real indexation’.

Primary balance is projected to move into deficit **6.19** As a result of the projected spending and revenue trends, the general government primary balance is projected to move from a surplus equivalent to 0.7 per cent of GDP in 2012-13 into deficit by the late 2020s¹⁷. Chart 6.4 shows that the projected deficit on the primary balance is most marked, as a share of GDP, in the 2030s, when spending pressures are projected to be greatest. However, the primary balance is projected to return to surplus after 70 years, reflecting the fact that the ageing process has run its course (the number of people aged 65 years and over is projected to decrease from 2060 onwards) and the continued relative decline of social security spending.



¹⁵ As discussed in Chapter 5, the age profiles of the individual spending and revenue items are held constant over the projection horizon. While this approach allows the projections to pick up any demographic changes, it does not take account of any potential future policy developments or behavioural changes, including higher employment rates for older workers or higher participation rates in higher and further education. These would have to be modelled separately.

¹⁶ The Government has recently announced its intention to increase the returns to those who defer taking their state pension. People who choose to defer from April 2005 will have the option of an enhanced pension or the option of an interest bearing taxable lump sum.

¹⁷ To derive the primary balance, it is necessary to include interest and dividends received to the revenue projections shown in Chart 6.3. Interest and dividends received are assumed to remain constant as a share of GDP, at 1/4 per cent, from the end of the medium-term forecast onwards.

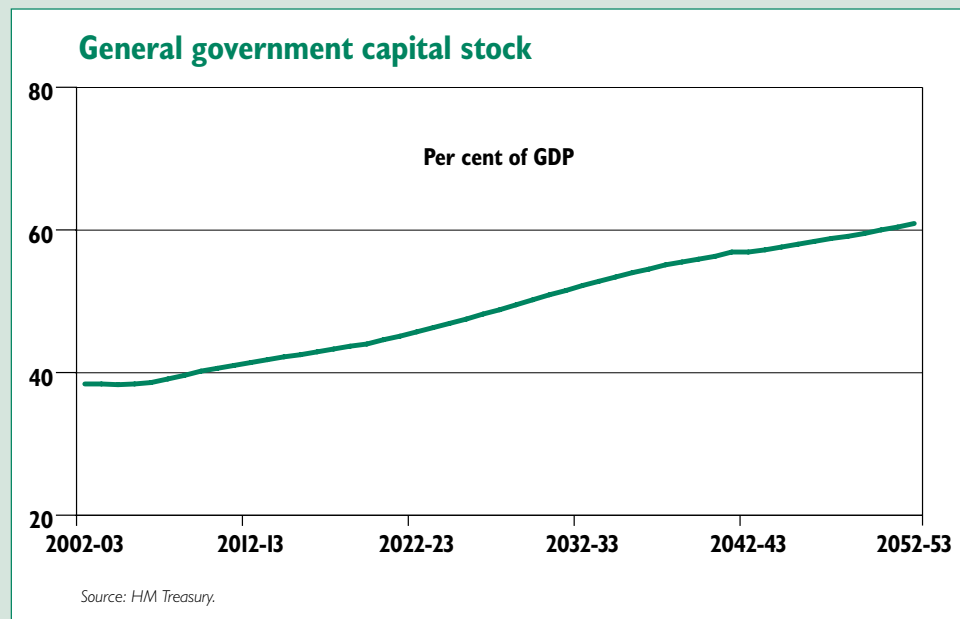
General government capital stock 6.20 From the spending projections, the elements relating to gross domestic fixed capital formation¹⁸ can be used to project the general government's capital stock over the coming decades. Box 6.2 discusses briefly the implied evolution of the capital stock to GDP ratio. It shows the projections lock in historically high levels of public net investment, which imply a significant increase in the general government capital stock to GDP ratio over the next 50 years, from around 40 per cent to just over 60 per cent.

Box 6.2: Projecting general government capital stock

At the end of 2001 the general government stock was estimated to amount to slightly more than £400 billion¹, equivalent to around 40 per cent of GDP. General government depreciation stood at £8½ billion in 2002-03, implying a depreciation rate of around 2 per cent on the capital stock. Assuming that the depreciation rate remains constant over time, the following chart shows that the investment projections imply that the general government capital stock would rise to around 60 per cent of GDP by 2052-53.

The projected increase of the general government capital stock to GDP ratio is due to the fact that the projections are based on the policy settings at the end of the medium term². As such they are based on (and lock in) historically high levels of investment in the NHS and education, compensating for decades of under-investment.

This suggests that the Government could reduce its gross investment rate over the coming decades if it decided to stabilise the general government capital stock at a lower level than presented here. Everything else equal, this would also reduce total spending as a share of GDP, leading to a smaller deficit on the primary balance over the coming decades, or would free up financial resources that could be used for other spending.



¹ Capital Stocks, Capital Consumption and Non-Financial Balance Sheets, Prabhat Vaze, Ian Hill, Andrew Evans, Nuru Giritli and Joseph Foroma, 2003, Table 5.7.

² See Chapter 5.

¹⁸ General government investment comprises gross domestic fixed capital formation, and capital grants within the public sector and to the private sector. Only gross domestic fixed capital formation adds to the general government's capital stock.

ANALYSIS OF THE LONG-TERM FISCAL POSITION USING FORWARD-LOOKING INDICATORS

Updated illustrative long-term fiscal projections

6.21 Annex A of the 2003 *Economic and Fiscal Strategy Report* (EFSR), published in Budget 2003¹⁹, showed that the UK's public finances are broadly sustainable in the long term. Moreover, it showed that:

- current public consumption can grow slightly faster than GDP growth in the long run, while meeting the Government's golden rule;
- public sector net investment can grow close to the economy's growth rate over the projection period without jeopardising the sustainable investment rule; and
- the net debt to GDP ratio is projected to remain below 40 per cent by the end of the projection period.

6.22 These conclusions are supported by updated illustrative long-term fiscal projections, which are based on the medium-term fiscal projections in the 2003 Pre-Budget Report. The main assumptions are:

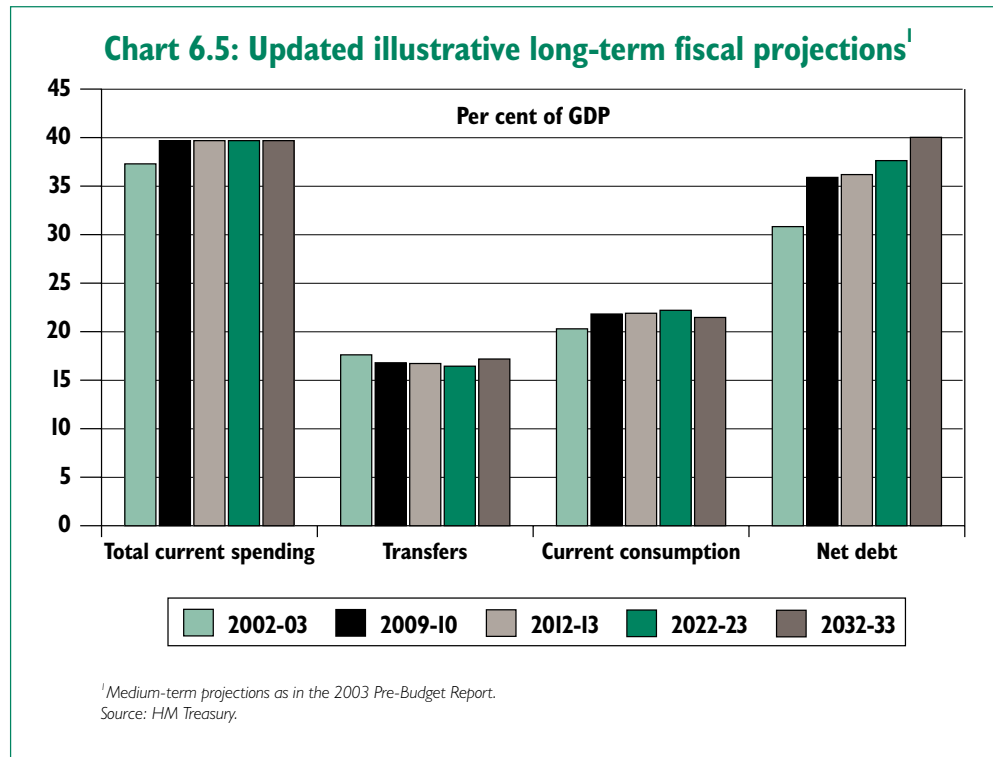
- productivity growth of 2 per cent per year between 2009-10 and 2012-13, and of 1³/₄ per cent per year from 2013-14 onwards²⁰;
- employment growth in line with changes in the working-age population beyond 2008-09;
- public sector net investment consistent with the medium-term projections up to 2008-09, and 1³/₄ per cent of GDP thereafter; and
- current spending and revenues grow in line with GDP from 2009-10 onwards and are the same, in other words the current budget is in balance (and hence the golden rule is met).

These assumptions differ from those used for the baseline projections in Annex A of Budget 2003 in that the medium-term horizon extends now to 2008-09 rather than 2007-08 and that net investment as a share of GDP is 1³/₄ per cent rather than 1.8 per cent from 2009-10 onwards.

6.23 The updated illustrative long-term fiscal projections are shown in Chart 6.5. They show a very similar picture of overall long-term fiscal sustainability to those presented in Annex A of the 2003 EFSR.

¹⁹ *Budget 2003: Building a Britain of economic strength and social justice*, HM Treasury, April 2003.

²⁰ Annex A of the EFSR states that a lower productivity growth rate assumption of 1³/₄ per cent per year is cautious. See also Chapter 5, paragraphs 5.8-5.9.



6.24 Transfers as a share of GDP are projected to remain relatively stable between 2009-10 and 2032-33 as the increase in debt interest payments is more or less offset by relatively lower other transfers such as non-pension social benefits.

Current consumption can grow slightly faster than GDP

6.25 Current consumption is projected to rise from 20.3 per cent of GDP in 2002-03 to 22.2 per cent of GDP in 2022-23 before falling marginally to 21.4 per cent by 2032-33. Despite this, current consumption as a share of GDP in 2032-33 will be higher than in 2002-03. This relative expansion reflects the fact that current consumption can grow at a slightly faster average annual rate than GDP while still meeting the golden rule.

6.26 Using the stated assumptions and modelling approach, the net debt to GDP ratio is projected to remain below 40 per cent until at least the end of the projection horizon, implying that the sustainable investment rule is met.

6.27 With the results of the updated illustrative long-term fiscal projections only marginally different from those presented in Annex A of the 2003 EFSR, the conclusions drawn earlier remain valid: the UK's public finances are broadly sustainable over the long term. Consistent with meeting the golden rule, current consumption can grow slightly faster than GDP in the projections, providing the resources to meet future spending needs. Furthermore, public sector net investment can grow more or less in line with the economy without jeopardising the sustainable investment rule. Net debt is projected to remain below 40 per cent of GDP in the long term.

Intertemporal budget gaps

6.28 Chapter 4 also introduced the concept of the intertemporal budget constraint/gaps. Table 6.2 presents estimates of the intertemporal budget gap under a range of discount rate and productivity rate assumptions, that is the increase/reduction in tax revenue as a share of GDP in 2002-03 (and a proportionate increase/reduction thereafter) to meet the intertemporal budget constraint²¹. It is likely that higher rates of productivity will be associated with higher real interest/discount rates. The results show that whether revenue (or spending) needs to change at all to maintain intertemporal balance depends to some extent on the discount rate assumption. If a low discount rate is used, as could be justified by the low real interest rate on long-term UK government bonds²², the condition for intertemporal balance is exceeded in each case regardless of the productivity assumption.

Table 6.2: Intertemporal budget gaps¹ (per cent of GDP)

Discount rate (per cent)	2 ¹ / ₂	3	3 ¹ / ₂
Lower productivity (1 ³ / ₄ per cent)	-1 ¹ / ₄	1	1 ³ / ₄
Baseline (2 per cent)	-1 ¹ / ₄	1 ¹ / ₄	1 ¹ / ₄
Higher productivity (2 ¹ / ₄ per cent)	-2 ¹ / ₂	-3 ¹ / ₄	1 ¹ / ₂

¹ Tax increase (or decrease) in 2001-02 and a permanent, proportionate tax increase (or decrease) thereafter needed to ensure intertemporal balance. Rounded to the nearest quarter percentage point.

Fiscal gaps

6.29 The fiscal gap concept introduced in Chapter 4 takes a sustainable debt to GDP ratio as a starting point for thinking about long-term fiscal sustainability. The fiscal gap measure represents the change in the primary balance needed to attain a particular debt target at a particular point in time. A negative fiscal gap, for example, implies that the Government could loosen fiscal policy while still attaining a particular debt level in the future. Taking the 40 per cent net debt to GDP level from the sustainable investment rule as the target, it is therefore possible to use the fiscal gap concept to estimate the primary balance that is consistent with the Government's sustainable investment rule over different time horizons²³.

6.30 Tables 6.3 to 6.5 show the fiscal gaps required under a variety of scenarios where the change in the primary balance is assumed to occur from 2009-10 onwards, that is beyond the medium-term horizon for fiscal policy²⁴. Table 6.3 shows the baseline projections under the different interest rate assumptions.

²¹ As stated in Chapter 4, the adjustment could also include changes on the spending side. In practice, structural reforms could also help to close the gap.

²² See Chapter 5, Chart 5.5.

²³ It should be noted that the Report focuses on the general government rather than on the public sector, while the Government's fiscal rules apply to the public sector. However, the difference is small and does not affect the analysis much.

²⁴ If the change in the primary balance were assumed to be in 2004-05 instead of 2009-10 then the implied increases or reductions in the primary balance would be correspondingly smaller.

Table 6.3: Fiscal gaps¹ in baseline scenario with 2 per cent productivity growth (per cent of GDP)

Interest rate (per cent)	2½	3	3½
Target year			
2022-23 ²	-1	-¾	-½
2032-33	-¼	-¼	0
2042-43	0	¼	¼
2052-53	0	¼	½

¹ Change to primary balance needed to attain a particular debt level at target year. Rounded to nearest quarter percentage point.

² Net debt target is reached at end of year specified.

6.31 The results show that the UK public finances are in a strong long-term position. Table 6.3 shows, for example, that the Government could loosen its fiscal stance if it aimed for a net debt to GDP ratio of 40 per cent by 2022-23 or 2032-33 in the baseline case. If the horizon were extended to 2042-43 and beyond, the Government would have to tighten fiscal policy only marginally to ensure that net debt reaches 40 per cent of GDP by the target year. Table 6.3 also shows that the Government could loosen fiscal policy slightly more (or tighten by slightly less) the lower the assumed interest rate. It should also be emphasised that all the numbers are small, varying between -1 and ½ per cent of GDP. This needs to be seen in the context of an average absolute difference between forecast and outturn for public sector net borrowing of little over 1 per cent of GDP over the period 1977-78 to 2002-03²⁵.

6.32 Tables 6.4 and 6.5 illustrate the effect of assuming lower and higher productivity growth respectively than in the baseline scenario²⁶. The main impact of making different productivity assumptions is to change the rate at which most social transfers (uprated in line with prices) move in relation to earnings. A faster rate of productivity growth implies that price-indexed benefits grow more slowly relative to GDP and hence suggest an even stronger fiscal position.

Table 6.4: Fiscal gaps¹ in lower productivity scenario (1¾ per cent productivity)¹ (per cent of GDP)

Interest rate (per cent)	2½	3	3½
Target year			
2022-23 ²	-¾	-½	-¼
2032-33	0	0	¼
2042-43	¼	½	½
2052-53	½	½	¾

¹ Change to primary balance needed to attain a particular debt level at target year.

² Net debt target is reached at end of year specified.

²⁵ 2003 *End of year fiscal report*, HM Treasury, December 2003.

²⁶ It should be noted that HM Treasury has found that there are some clear upside risks to productivity growth in the medium term. See *Trend Growth: Recent Developments and Prospects*, HM Treasury, April 2002. On current estimates growth in output per hour has averaged 2.4 per cent between the on-trend points in 1997 and 2001. See also Annex A of the 2003 Pre-Budget Report, HM Treasury, December 2003 for a discussion of trend growth in the economic forecast.

Table 6.5: Fiscal gaps¹ in higher productivity scenario (2¼ per cent productivity) (per cent of GDP)

Interest rate (per cent)	2½	3	3½
Target year			
2022-23 ²	-1¼	-1	-¾
2032-33	-½	-½	-¼
2042-43	-¼	-¼	0
2052-53	-¼	0	0

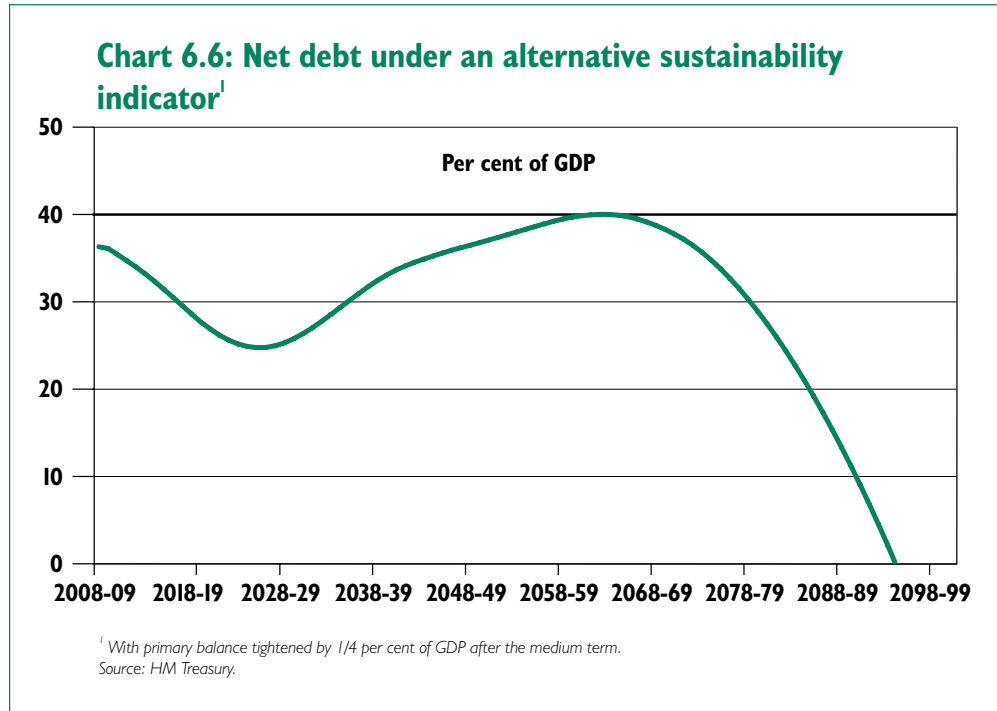
¹Change to primary balance needed to attain a particular debt level at target year.

²Net debt target is reached at end of year specified.

6.33 The figures presented in Tables 6.4 and 6.5 suggest that the fiscal gap calculations are robust to changes in the productivity rate assumption, with the suggested policy action only marginally different to those under the baseline projections.

Alternative fiscal gap indicator

6.34 Chapter 4 introduced an alternative fiscal gap indicator, which calculates the required change in the primary balance after the medium term so that the net debt to GDP ratio *never* exceeds a certain limit. Chart 6.6 shows the evolution of the net debt to GDP ratio for the baseline scenario (2 per cent productivity growth) and a real interest rate assumption of 3 per cent. As can be seen, if the Government tightened its fiscal stance by ¼ per cent of GDP after 2009-10, then the net debt to GDP ratio would never exceed the 40 per cent limit as specified by the Government's sustainable investment rule. If this policy were continued over the very long term, the projection implies that the Government would eventually build up net assets.



Comparing the alternative indicator with the fiscal gap

6.35 The tightening of the primary balance required so that the net debt to GDP ratio never exceeds 40 per cent can be compared with the fiscal gap calculations in the baseline scenario (see Table 6.2). The required change in the fiscal stance is of the same magnitude as that indicated by the fiscal gaps for the target years of 2042-43 and 2052-53 (Table 6.2). This suggests that the net debt to GDP profiles would look very similar for the fiscal gap calculations with these two target years, with the path only slightly higher than shown in Chart 6.6.

6.36 The calculations of the inter-generational gap, using an approach refined since last year, are presented and discussed in Box 6.3.

Box 6.3: Inter-generational balance

As discussed in Chapter 4, the generational accounting approach offers one way of thinking about the degree of inter-generational fairness of current policies¹. The following table shows the inter-generational balance gap (IGG), in other words the required immediate (and permanent) revenue increase (or spending reduction or a combination of the two) to establish inter-generational fairness, based on two different approaches. The IGG presented in Case A is based on the approach used in last year's *Long-term public finance report*. This approach makes no distinction between current consumption and investment in the generational accounts, which could lead to a biased IGG indicator². The IGG stated in Case B presents arguably a truer picture of the degree of inter-generational fairness of the Government's current policies as it takes into account that investment – unlike current consumption – benefits today's and future generations. The Annex explains the differences between the two approaches in more detail.

Inter-generational balance gaps in baseline scenario¹ (per cent of GDP)

Discount rate (per cent)	2½	3	3½
Case A ²	2½	2¾	2¾
Case B ³	2¼	2½	2¾

¹ Tax increase (or decrease) in 2002-03 and a permanent, proportionate tax increase (or decrease) thereafter to ensure the net lifetime tax burden on current newborns is equal to that of future newborns.

² No distinction made between current consumption and investment.

³ Distinction made between current consumption and investment.

Regardless of the approach chosen, the table shows that the fiscal adjustment needed to fully close the inter-generational gap is within 2 to 3 per cent of GDP. By comparison, the average absolute difference between forecast and outturn for public sector net borrowing was little over 1 per cent of GDP over the period 1977-78 to 2002-03³. As suggested in last year's report the degree of inter-generational fairness of current policies is higher if investment is treated differently to current consumption in the generational accounts. However, given that investment represents only around 5 per cent of total government spending, the IGG in Cases A and B are very similar.

These results need to be put in an international context. Using the concept of generational accounts, Cardarelli *et al.*, for example, found that current policies in the UK have a relatively high degree of inter-generational fairness compared to those in many other countries. For example Cardarelli *et al.* calculated that the fiscal adjustment required to achieve generational balance in Germany and the United States was equivalent to 10 per cent of GDP⁴.

¹ See Chapter 4.

² See 2002 *Long-term public finance report: an analysis of fiscal sustainability*, HM Treasury, November 2002, pages 25 and 53-54.

³ 2003 *End of year fiscal report*, HM Treasury, December 2003.

⁴ See 2002 *Long-term public finance report: an analysis of fiscal sustainability*, HM Treasury, November 2002, page 55 and *Generational accounting in the UK*, Roberto Cardarelli, James Sefton and Laurence J. Kotlikoff, *Economic Journal*, 2000.

COMPARISON WITH RESULTS OF LAST YEAR'S REPORT

The results are very similar to last year's 6.37 Even though the results in this year's Report are based on updated medium-term fiscal projections²⁷, they differ only slightly from those published last year. The main differences are:

Spending

- overall spending is projected to be marginally higher, as a share of GDP, than in last year's report. This is because of a slightly higher projection for pension spending as a share of GDP, which in turn is due to a revised projection methodology rather than policy changes. The pension projections, provided by the Department for Work and Pensions (DWP), and GAD, are based on the same methodology as used in GAD's Quinquennial Review²⁸; and
- education is projected to be marginally lower as a share of GDP than last year. This is entirely due to a reclassification within the projection model, with the difference now classified under other spending (which is correspondingly higher).

Revenue

- revenue is projected to remain more or less stable as a share of GDP, compared with a decline in last year's projections. This is because of a modified modelling assumption for revenue from National Insurance Contributions, as explained in Chapter 5, paragraph 5.23.

Indicators

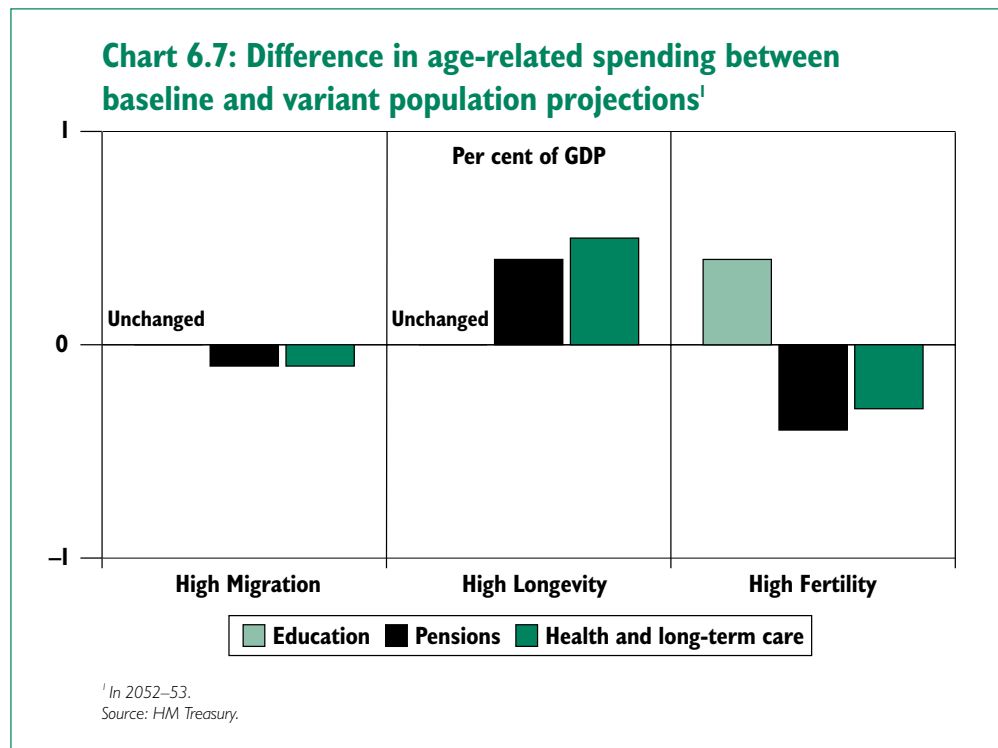
- the **intertemporal budget gap** is projected to be slightly smaller than in last year's report. This means that, given the respective assumptions regarding productivity growth and the discount rate, fiscal policy needs to be tightened less (or could be loosened more) to meet the IBG. This is mainly due to the modelling change on the revenue side, as discussed above, which more than offsets slightly higher projected pension spending; and
- the **fiscal gap** calculations are also positively affected by the modelling change on the revenue side, with the required tightening of the primary balance to meet a pre-determined target level of net debt to GDP in a target year now marginally smaller (or the possible loosening larger) than in last year's report.

²⁷ See 2003 Pre-Budget Report, HM Treasury, December 2003.

²⁸ Quinquennial Review of the National Insurance Fund, Government Actuary's Department, October 2003.

RESULTS BASED ON VARIANT POPULATION PROJECTIONS

High migration 6.38 An innovation in this year's Report, this section presents the spending projections based on the population variants and a productivity growth assumption of 2 per cent per year. Chart 6.7 shows that spending as a share of GDP in the high migration variant is more or less the same as in the baseline projections (see Table 6.1). In the projections higher absolute spending on pensions and health in later decades (reflecting more people above working age) is offset by higher GDP, the latter due to a larger working-age population (see Chapter 5).



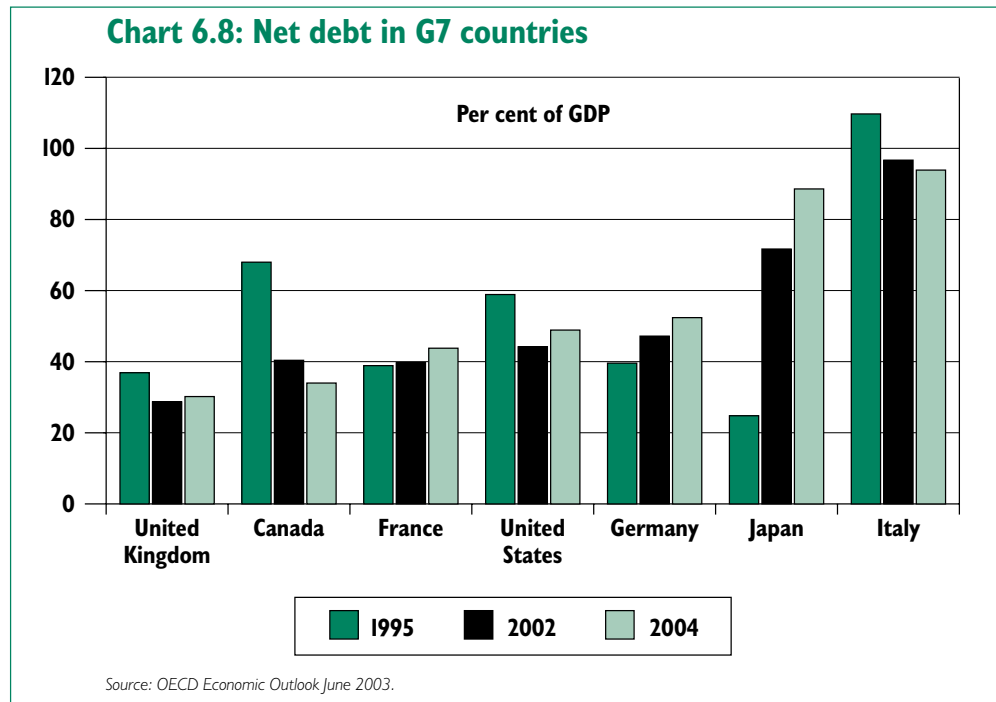
High longevity 6.39 As argued in Chapter 5, employment levels are projected to be similar in the high longevity and principal population variants. GDP is therefore also projected to be similar over the coming decades. However, the high longevity variant projects that there will be more people above working age. As a result, pension and health spending are projected to be around $\frac{1}{2}$ percentage point higher than in the baseline projections. By contrast, education spending as a share of GDP remains unaffected by the change in the population assumption.

High fertility 6.40 In the high fertility variant, employment (and hence GDP) is projected to be substantially higher than in the baseline projections from around 2020 onwards due to an inflow of more young people into the labour force (see Chapter 5). Chart 6.7 shows that this leads to a fall in pension and health spending in terms of GDP even though they remain relatively stable in absolute terms. By contrast, education spending is projected to rise as a share of GDP, reflecting the fact that there are more people below working age in the high fertility variant than in the baseline projections.

INTERNATIONAL COMPARISONS

UK fiscal position is relatively strong **6.41** International comparisons show that the UK's long-term fiscal position appears relatively strong compared with other developed countries facing challenges from ageing populations, including many EU countries and the United States²⁹.

Net debt **6.42** The recent global economic slowdown has had a significant impact on public finances throughout the world and some of the G7 economies have experienced rising debt to GDP ratios between 2000 and 2003. Chart 6.8 shows that the net debt to GDP ratio is forecast to be higher in five out of the seven G7 countries in 2004 than in 2002, including in the UK. Despite this, the UK's net debt to GDP ratio is predicted to remain among the lowest in the G7 in 2004.



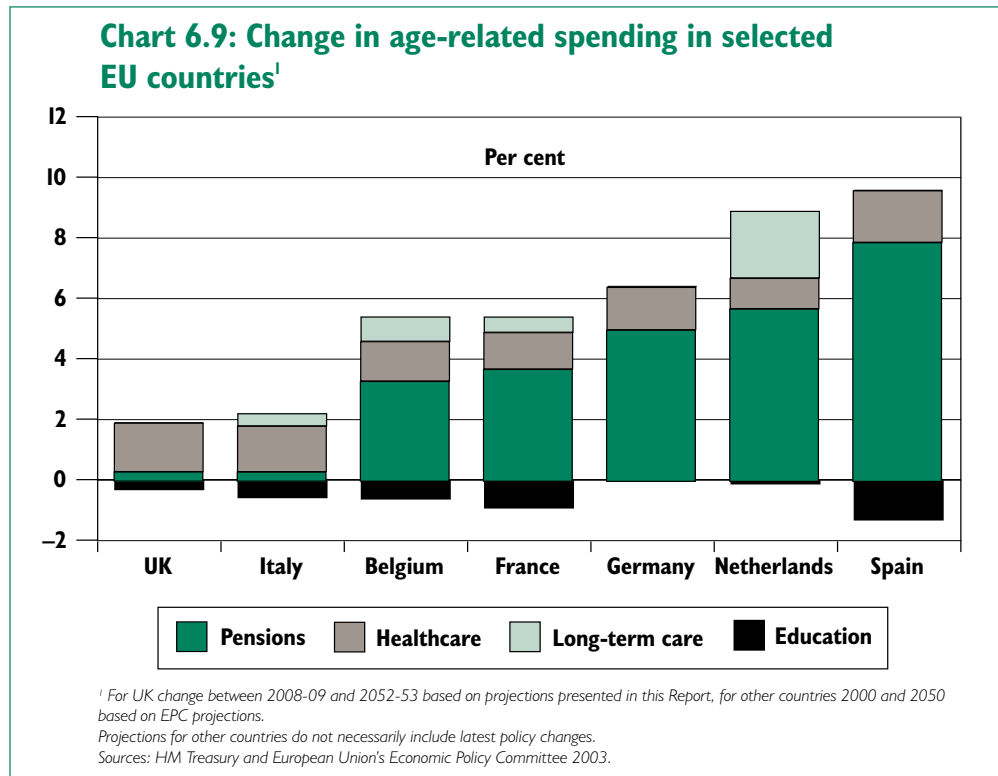
Independent study confirms UK's relatively favourable position **6.43** A study published by US-based think tank Center for Strategic and International Studies and Watson Wyatt, a global consulting firm, confirms the UK's relatively favourable position with respect to ageing populations and its impact on the public finances. According to the study³⁰, the UK's vulnerability to rising old-age dependency costs is low. It shares this assessment with Australia and the United States. All the other countries analysed fare substantially worse, with France, Italy and Spain considered to be highly vulnerable to these changes. The rest of this section looks at the long-term prospects of these and other countries in further detail.

²⁹ See Chapter 2.

³⁰ *The 2003 Aging Vulnerability Index: An Assessment of the Capacity of Twelve Developed Countries to Meet the Aging Challenge*, Richard Jackson and Neil Howe, Center for Strategic and International Studies and Watson Wyatt Worldwide, 2003.

Ageing represents a major challenge in many EU member states

6.44 The challenges posed by an ageing population on the public finances appear to be particularly large in European countries. The European Union’s Economic Policy Committee (EPC) recently published its findings on the impact of ageing populations on the public finances³¹. The EPC projects that age-related spending, in particular on pensions and health care, will rise substantially in many EU member states over the coming decades. The UK is one of the few countries where age-related spending is projected to rise only marginally. Chart 6.9 shows the projected difference in age-related spending over the coming decades in seven selected EU countries. The chart shows that age-related spending is projected to rise only modestly in the UK but substantially in most of the other EU countries shown. The picture would be similar if other EU countries had been chosen.



6.45 The European Commission published an assessment of the long-term sustainability of the public finances in EU member states earlier this year³². Based on information provided in the member states’ latest stability and convergence programmes, the Commission argues that: “...The policy conclusions, ..., are worrying. Even assuming all Member States achieve the budget targets for 2006 ..., there is a risk of unsustainable public finances emerging in about half of EU Member States... To close this financing gap, governments should try to avoid raising taxes ..., and concentrate efforts on reducing ... age-related expenditure by reforming pension and health care systems and/or reducing non-age related primary spending while increasing employment and fostering growth”³³.

6.46 According to the European Commission publication, the UK belongs to the group of European countries with sustainable public finances. Table 6.6 shows the European Commission’s policy conclusions on the sustainability of public finances in EU member states, using a range of quantitative and qualitative indicators.

³¹ *The impact of ageing populations on public finances: overview of analysis carried out at EU level and proposals for a future work programme*, Economic Policy Committee, October 2003.

³² See *Public Finances in EMU 2003*, European Commission, 2003, Chapter 3.

³³ *Public Finances in EMU 2003*, European Commission, 2003. See also *The impact of ageing populations on public finances: overview of analysis carried out at EU level and proposals for a future work programme*, Economic Policy Committee, October 2003.

Table 6.6: European Commission's policy conclusions on fiscal sustainability**Appears to be sustainable**

Belgium¹, Denmark, Finland, Ireland², Luxembourg, Netherlands, Sweden, UK

Clear risk of emerging budgetary imbalances

Austria, France, Germany, Greece, Italy, Portugal, Spain

¹ Conditional upon sustaining large primary surpluses in the coming decades or more.

² Some risk of emerging budgetary imbalances given projected increases in spending on pensions and health care, but there should be scope to meet financing challenge given low tax rates and low levels of government debt.

Source: Public Finances in EMU 2003, European Commission, 2003, pages 27-28.

6.47 The European Commission points out that even in countries with sustainable public finances the ageing of the population will lead to a number of challenges. For example, in Denmark the tax to GDP ratio will have to remain relatively high compared to other industrialised countries, while in Belgium (which currently has a very high debt to GDP ratio) sustaining high primary surpluses over the long term might be a challenge.

6.48 According to the European Commission, there are different reasons why the public finances might become unsustainable in some EU countries. In Spain, for example, the main risk comes from the sharp expected increase in pension spending in the coming decades, while in Germany it is a combination of projected higher pension and health spending, and relatively poor labour market performance.

6.49 In the United States, academic and public interest in the long-term sustainability of the public finances has increased substantially over the last year. Much of the recent academic work has been stimulated by the tax reductions announced by the US Government in 2001 as part of the Economic Growth and Tax Relief Reconciliation Act (EGTRRA).

Fiscal imbalances predicted in the United States

6.50 The United States Congressional Budget Office (CBO) regularly publishes long-term analysis³⁴ covering a wide range of topics, including future social security and defence spending. The CBO projects that social security spending will increase from 4.2 per cent of GDP in 2000 to 6.2 per cent by 2075³⁵, with slightly more than half of this increase due to a larger number of people above retirement age and rising life expectancy, with the remainder coming from real increases in benefits. However, these increases are dwarfed by the projected developments for the main health services, Medicare and Medicaid. According to the CBO, combined spending on Medicare and Medicaid will rise from 3.4 per cent of GDP in 2000 to nearly 15 per cent by 2075, due to a combination of demographic and non-demographic factors³⁶. Health spending is likely to increase even more as a result of the US Government's recent decision to extend the Medicare programme to provide a prescription drug benefit.

³⁴ <http://www.cbo.gov/byclasscat.cfm?class=0&cat=3>.

³⁵ *The Future Growth of Social Security: It's Not Just Society's Aging*, Congressional Budget Office, July 2003.

³⁶ *The Economic Costs of Long-Term Federal Obligations*, Congressional Budget Office Testimony, July 2003.

6.51 Auerbach *et al.* analyse the long-term sustainability of the US public finances using the fiscal gap approach³⁷. Among other things, they calculate fiscal gaps for a time horizon up to 2075. Based on what they consider to be the least pessimistic assumptions, Auerbach *et al.* find that the fiscal gap is 1.6 per cent of GDP. Auerbach *et al.* also present results based on what they consider to be more realistic assumptions, for example that the: "...phase-out and sunset provisions of EGTRRA are repealed, other temporary tax provisions are made permanent..."³⁸. Based on these assumptions, the US long-term fiscal position is substantially worse, with a fiscal gap equivalent of 4.9 per cent of GDP for a time horizon up to 2075. By comparison, in the UK the fiscal gap (over 50 years) is projected to be at most 1 per cent of GDP.

6.52 Gokhale and Smetters also analyse the US long-term fiscal position, using two new measures, the fiscal and generational imbalances³⁹. The fiscal imbalance, which is used to analyse sustainability, is the sum of current federal debt and all future discounted federal primary balances⁴⁰. Gokhale and Smetters calculate that the fiscal imbalance is \$44.2 trillion, roughly four times today's GDP and nearly ten times today's debt burden⁴¹, with the lion share of the fiscal imbalance arising mainly from public health care spending.

Australia faces challenges as well

6.53 The Australian Treasury published its first intergenerational report in May 2002⁴². The report presents bottom-up projections up to 2041-42 for central government revenue and spending. As in many developed countries, the main fiscal pressure is likely to come from increased health spending. The Australian Treasury projects that central government health spending will double from around 4 per cent of GDP today to 8 per cent by 2041-42, with non-demographic factors the main drivers⁴³. Over the same period pension spending is projected to rise moderately from 2.9 per cent of GDP to 4.6 per cent of GDP⁴⁴. According to the projections, revenue will exceed spending until around 2015 but thereafter, fiscal pressures are expected to build up gradually. By 2041-42 the deficit on the primary balance is projected to be equivalent to 5 per cent of GDP. The report states that: "...if policies are not adjusted, the current generation of taxpayers is likely to impose a higher tax burden on the next generation. The required adjustment in taxes and spending is about 5 per cent of GDP by 2041-42... Governments will need to exercise sound policy management to minimise the tax burden transferred to the next generation..."⁴⁵.

³⁷ *Budget Blues: The Fiscal Outlook and Options for Reform*, Alan J. Auerbach, William G. Gale, Peter R. Orszag and Samara R. Potter, Brookings Institution, May 2003.

³⁸ *Budget Blues: The Fiscal Outlook and Options for Reform*, Alan J. Auerbach, William G. Gale, Peter R. Orszag and Samara R. Potter, Brookings Institution, May 2003, footnote to Table 2.

³⁹ *Fiscal and Generational Imbalances: New Budget Measures for New Budget Priorities*, Jagadeesh Gokhale and Kent Smetters, The AEI Press, July 2003.

⁴⁰ The fiscal imbalance indicator shows the actual imbalance arising under the assumption of unchanged policy, whereas the intertemporal budget constraint presents the imbalance in terms of the required policy change to establish long-term fiscal sustainability. Gokhale and Smetters argue that the former indicator benefits from the fact that it does not require any assumed policy adjustment.

⁴¹ Based on the average yield on 30-year US bonds in recent years, Gokhale and Smetters use a real discount rate of 3.6 per cent to discount future primary balances. As such they do not use a "risk-adjusted" discount rate. This is in line with the real discount rate/interest rate assumptions used in this Report.

⁴² *Intergenerational Report 2002-03*, Department of the Treasury of Australia, May 2002.

⁴³ See also Box 6.2.

⁴⁴ Australia has well-developed second and third pillar pension provision, complementing state pension spending.

⁴⁵ *Intergenerational Report 2002-03*, Department of the Treasury of Australia, May 2002, page 1.

CONCLUSIONS

6.54 The Report updates the illustrative long-term fiscal projections presented in Annex A of the EFSR and confirms the findings in Budget 2003. Given the assumed profile for tax revenue and the projected profile for transfers, current consumption can grow slightly faster than GDP growth in the long run while meeting the Government's golden rule. In addition, public sector net investment can grow close to the economy's growth rate over the projection period without jeopardising the sustainable investment rule. Given the modelling assumptions, the net debt to GDP is projected to remain below 40 per cent in the long term.

6.55 The Report also provides updated bottom-up projections of spending and revenue (and their respective components). The bottom-up projections, which are based on updated medium-term fiscal projections, differ only slightly from those presented in last year's report. The main differences are that, first, pension spending is projected to be marginally higher as a share of GDP in the long term than projected last year (while remaining stable at around 5 per cent of GDP) and, second, revenue is projected to be stable as a share of GDP rather than fall, as projected last year. In both cases the difference is due to changes in modelling and underlying assumptions rather than policy changes.

6.56 As last year, this year's Report also assesses the long-term sustainability of the public finances using a series of fiscal sustainability indicators, including the intertemporal budget gap/constraint and fiscal gaps. The updated results confirm the findings of last year's report and of the Annex A-style projections that the UK fiscal position is sustainable in the long term on the basis of current policies and that the UK is in a strong position relative to many other developed countries to face future challenges. Furthermore, using a modelling approach refined since last year, the Report finds a relatively high degree of inter-generational fairness of current policies when compared with those in other developed countries.

6.57 This year's Report also provides projections based on variant population scenarios. The projections show that future spending trends are robust to changes in demographic assumptions. For example, age-related spending is projected to be less than one percentage point higher as a share of GDP using GAD's high longevity population projections than in the baseline projections, which use GAD's principal projections.

6.58 The *Long-Term Public Finance Report* along with the *End of year fiscal report* mark a major development of the UK's fiscal framework. In particular, they provide substantially more transparency and detailed analysis on both the distant future and the recent past.

6.59 The indicators used in this Report do not supplant the fiscal rules, which govern the Government's fiscal policy. What the Report does show, using a range of established indicators and reasonable assumptions, is that the UK public finances are sustainable in the longer term.