



HM TREASURY

Long-term public finance report: an analysis of fiscal sustainability

December 2009



HM TREASURY

Long-term public finance report: an analysis of fiscal sustainability

December 2009



Official versions of this document are printed on 100% recycled paper. When you have finished with it please recycle it again.

If using an electronic version of the document, please consider the environment and only print the pages which you need and recycle them when you have finished.

© Crown copyright 2009

The text in this document (excluding the Royal Coat of Arms and departmental logos) may be reproduced free of charge in any format or medium providing that it is reproduced accurately and not used in a misleading context. The material must be acknowledged as Crown copyright and the title of the document specified.

Where we have identified any third party copyright material you will need to obtain permission from the copyright holders concerned.

For any other use of this material please write to Office of Public Sector Information, Information Policy Team, Kew, Richmond, Surrey TW9 4DU or e-mail: licensing@opsi.gov.uk

ISBN 978-1-84532-635-7
PU863

Contents

		Page
Chapter 1	Introduction	3
Chapter 2	Long-term demographic trends	7
Chapter 3	Environmental change	19
Chapter 4	Global uncertainties, globalisation and technological change	25
Chapter 5	Long-term economic growth	31
Chapter 6	Long-term fiscal projections	41
Annex A	Bibliography	55

1

Introduction

1.1 The Government's goal is to secure macroeconomic stability to promote high, stable and sustainable long-term economic growth that ensures prosperity for all. This is underpinned by the Government's fiscal objectives:

- 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 help smooth the path of the economy.

1.2 The Government launched the Long-term public finance report (LTPFR) in 2002 to provide analysis of long-term developments and their potential impact on the public finances. This information assists the Government in managing the public finances to meet its fiscal objectives.

The current fiscal context

1.3 The world economy was hit by a succession of shocks during 2007 and 2008 and as a result entered the most severe and synchronised global recession since the Great Depression. Timely and effective policy action has provided significant support to the economy. There are signs of stabilisation in the world and UK economy.

1.4 The financial crisis has had a profound and persistent impact on the public finances, and has resulted in a significant increase in borrowing in the short term. Reflecting its commitment to fiscal sustainability over the medium and long term, and to provide clarity and certainty over its plans, the Government has set out in the 2009 Pre-Budget Report fiscal consolidation plans to ensure that the deficit is reduced and debt is set on a declining path.

Implications for the Long-term public finances report

1.5 Reflecting recent developments, the 2009 Long-term public finance report differs from previous reports.

1.6 First, it does not attempt to project the government's primary balance over the next 50 years, based on projections of individual spending and revenue components. This type of mechanistic projection is informative under relatively normal economic circumstances as it helps illustrate the implications of continuing along a given fiscal trajectory. However, such projections are misleading during times when the economy is operating significantly below its full potential, because current policy is set to deal with exceptional short-term issues. It would therefore be misleading to project the fiscal stance resulting from these exceptional circumstances over the long term, and resulting long-run deficit projections would be implausible. Instead, this year's Long-term public finance report provides projections for those areas of spending that are particularly affected by long-term challenges, such as education, pensions and health. It also provides illustrative projections for debt based on the fiscal consolidation plans set out in the 2009 Pre-Budget Report.

1.7 Second, this year's Long-term public finance report includes an expanded discussion of the long-term trends and the associated challenges facing the UK, and sets out their potential implications for the economy and public finances, under a range of different scenarios. This serves to develop understanding of long-term challenges for the public finances and provides valuable insights into the variability of projections.

Long-term challenges

1.8 *The UK economy: analysis of long-term performance and strategic challenges*, published by HM Treasury in March 2008, identifies the challenges that are likely to be particularly important to the UK's long-term economic and fiscal performance as:

Demographic change

1.9 In the coming decades, the proportion of elderly people in the population is likely to increase substantially. This trend is common across most developed countries and is the result of a combination of factors, including increases in life expectancy, low fertility rates, and the ageing of two large cohorts born in the 1940s and 1960s. While UK demographic developments compare favourably with those of other countries¹, they could potentially put direct pressure on the public finances through impacts on age-related expenditure, such as state pensions or health care. Demographic developments could also potentially have implications for the relative size of the workforce and economic growth, thereby indirectly affecting the public finances.

Environmental change

1.10 The impact of climate change is already being felt in the UK and worldwide, and is expected to be particularly severe in the less developed countries, which are least able to adapt to sudden change. Without action, the UK can expect to face economic costs over the next few decades through damage to national infrastructure from severe weather events. The UK supports a goal of reducing developed countries' greenhouse gas emissions by 80 per cent by 2050 and is leading efforts to secure a global deal to tackle climate change at the UN Climate Change Summit in Copenhagen in December 2009. Policy action to reduce emissions is likely to have economic implications as the increasing cost of emissions will drive significant investments in energy saving and low-carbon technologies, while the need to adapt to some inevitable warming could require major changes to energy, transport and infrastructure. However, the indirect pressure this could potentially have on the public finances through affecting economic growth is likely to be modest.

Globalisation, technological change and global uncertainty

1.11 Technological change drives productivity improvements and is therefore integral to long-term economic growth. Globalisation and technological change are mutually reinforcing trends: new technology allows transactions to take place across longer distances and can lead to the integration of global markets; globalisation in turn encourages the diffusion of technological advances, which itself encourages innovation. By enhancing growth, these trends can underpin long-term fiscal sustainability, but they can also affect the public finances directly, for example through effects on tax bases, such as corporation tax. In the short term, these trends can contribute to global uncertainty. As the financial crisis has shown, they allow shocks to spread rapidly around the global economy. This presents significant challenges to all countries and underlines the importance of international cooperation. However, in the long term, these trends should support economic rebalancing in the UK and around the world.

¹ 2009 Ageing Report: Economic and budgetary projections for the EU-27 Member States (2008-2060), European Commission, 2008

Potential implications for long-term economic growth

1.12 Projections for economic growth in the long term are largely determined by productivity growth and changes in the size of the workforce. Future productivity growth is likely to be underpinned by technological change and globalisation, both of which will be increasingly influenced by environmental developments. It is, of course, difficult to accurately predict future developments in productivity. The central projection for long-term economic growth used in this report makes the reasonable assumption that productivity will continue to grow at its historic long-term trend. However, a range of productivity growth rates are modelled and they illustrate the impact productivity has on long-term growth, thereby highlighting the importance of prioritising policies that support future productivity growth.

1.13 The UK is one of the few European economies where the size of the workforce is projected to increase over the coming decades. This is attributed to a wide range of factors, including a projected increase in population, greater participation in the workforce from females as well as projected fertility rates and net migration. As a result, while exerting a drag on economic growth across many EU Member States, changes to the UK workforce are projected to support long-term economic growth in the UK.

1.14 Long-term economic growth projections, based around central projections for productivity and population growth, suggest that the economy is likely to grow at a rate between 2¼ and 2½ per cent over the long term. At this rate of growth, the economy would double in size within the next thirty years, while real per capita GDP would increase by over two thirds.

Potential implications for long-term fiscal projections

1.15 Long-term fiscal projections, unlike forecasts, are not based on a detailed analysis of all relevant factors. They are an illustration of how spending and revenue would evolve under a set of given assumptions and should therefore be caveated as involving a high degree of uncertainty. However, long-term fiscal projections do provide an illustration of the pressures on future public spending and revenues that governments will need to manage.

1.16 'Top-down' projections set out the future path of fiscal aggregates, in line with the Government's fiscal policy objectives. These projections take into account the plans for consolidation set out in the 2009 Pre-Budget Report and are therefore useful to illustrate the expected evolution of the fiscal aggregates. On this basis, for a range of potential interest and growth rates, debt would fall over the long term, reaching between 0 and 30 per cent of GDP by 2050.

1.17 'Bottom-up' projections illustrate the pressures that long-term trends and challenges could exert on different components of public expenditure and revenues, under a range of assumptions about those trends, including demographic developments, productivity growth and other potential changes, for example in consumption patterns. The main areas affected by these trends are health, long-term care, education and pensions, as well as taxes on income and wealth, and taxes on consumption and production. Demographic change is likely to put pressure on spending on age-related areas. The fiscal implications of policies to mitigate environmental change are likely to be modest, but are set to contribute to changes in the structure of the economy, which could influence the composition of receipts. The impact of globalisation and technological change is more uncertain, and so potential outcomes can best be covered in the fiscal projections by means of productivity scenarios. Different rates of productivity growth could have significant fiscal implications.

Conclusion

1.18 This report illustrates the potential pressure that long-term challenges and trends could put on the public finances. Given these and other pressures, the Government has set out fiscal consolidation plans in the Pre-Budget Report that are consistent with debt returning to lower levels. These plans will ensure the public finances are on a sustainable path, which in turn will promote long-term economic growth. It will also ensure the public finances are able to manage any unexpected economic shocks in future.

2

Long-term demographic trends

In the coming decades, the proportion of elderly people in the population is likely to increase substantially. This trend is common across most developed countries and is the result of a combination of factors, including increases in life expectancy, low fertility rates, and the ageing of two large cohorts born in the late 1940s and 1960s.

While UK demographic developments compare favourably with those of other countries, they are likely to have a direct impact on the public finances through greater pressures on age-related expenditure such as state pensions or health care. Demographic developments are also likely to have implications for the relative size of the workforce and therefore on economic growth, thereby indirectly affecting the public finances.

2.1 In the coming decades the size and age structure of the population is set to change significantly. In particular, the proportion of the population of old age is likely to increase substantially. This trend is common across most developed countries and is the result of a combination of increases in life expectancy, low fertility rates and the ageing of the post World War II 'baby boomer' generations. The size and age structure of the population affects the public finances both directly by affecting public spending and receipts and indirectly, through their impact on economic growth.

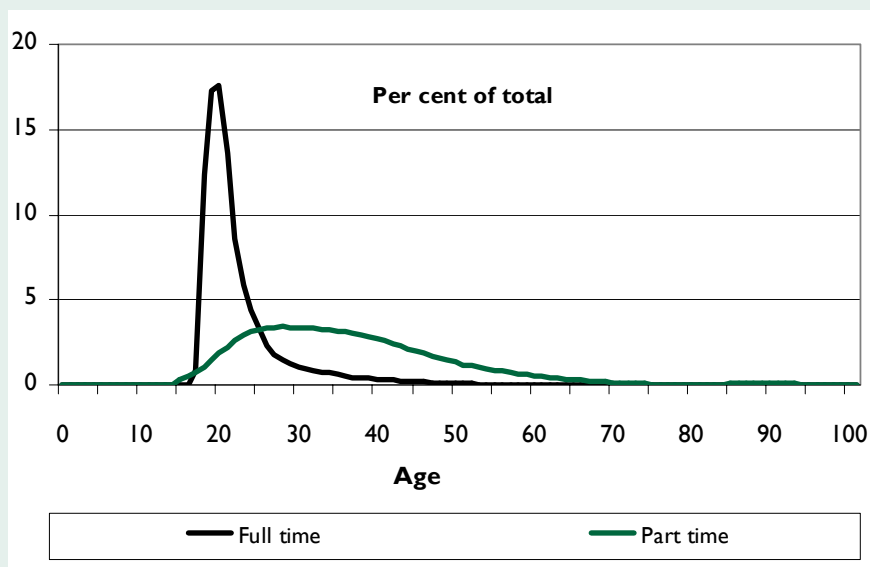
2.2 The age structure of the population directly affects the public finances, because age groups differ in the extent to which they contribute to public receipts and benefit from public expenditure. For example children are usually net benefactors as they benefit from expenditure on items such as education and health more than they contribute to government receipts. Once people reach working age they usually become net contributors until they retire, at which point they increasingly benefit from public expenditure on state pensions, health and long-term care, thus becoming net benefactors again.

2.3 Therefore, without any mitigating reforms (such as the increase in the State Pension age that the Government announced in 2006) or behavioural changes (such as people choosing to extend their working lives), an increasing number of people aged above State Pension age could put pressure on the public finances. While the UK population is projected to age by a lesser degree than many other advanced economies, it is important to monitor the long-term implications for the public finances.

Box 2.A: The interaction between age structure and the public finances

To analyse the effect that a changing age structure has on the population, one can use so-called 'age-profiles'. These show what the proportion of a stylised individual's lifetime consumption of, or contribution to, the public services are at each age. The chart below illustrates the age-profile for full-time and part-time higher education for a stylised male. It shows, for example, that on average around 17 per cent of the total amount spent on full time higher education on a male is spent when he is aged 20. As expected, most of the expenditure on full-time higher education is spent on those aged between 18 and 22. In contrast, expenditure on part-time higher education is much more evenly spread between ages of around 18 and 65.

Profiles of higher education (males)



Age-profiles, such as the one shown above, can be derived for all categories of expenditure and revenues where these vary with age. Not all categories of spending or taxation vary by age, for example public expenditure on overseas aid is not likely to differ across age groups.

Source: HM Treasury

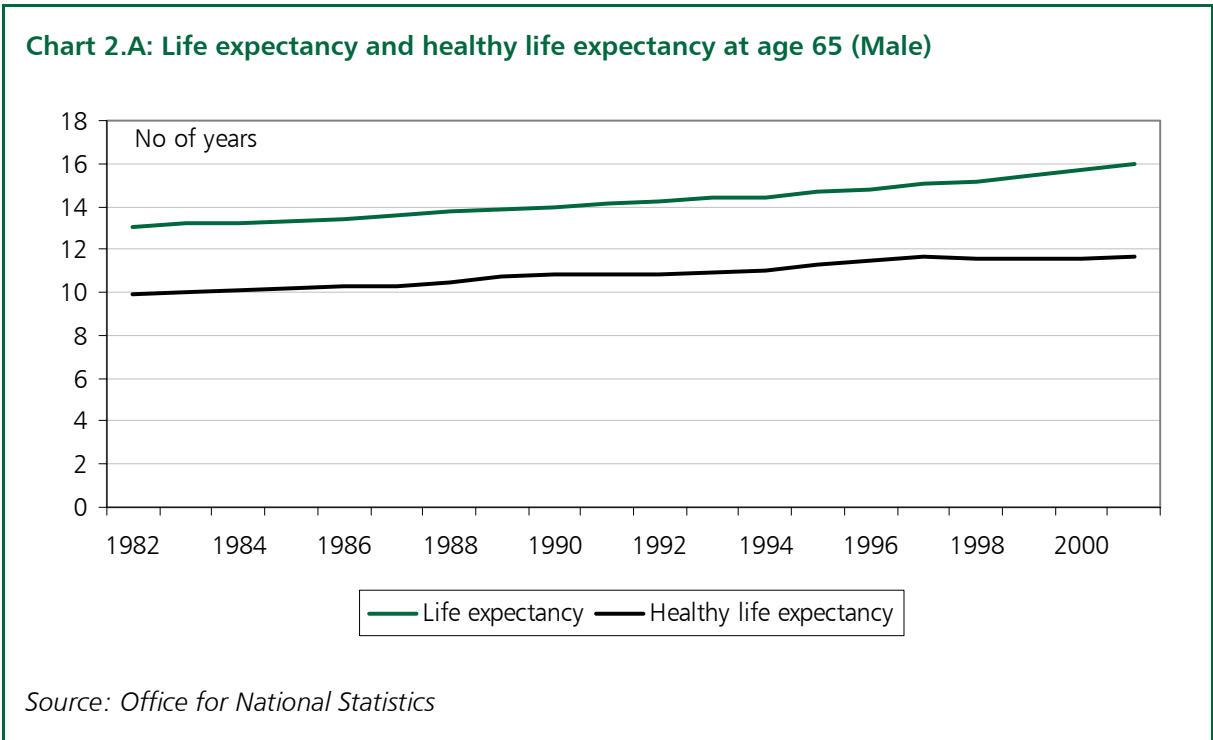
2.4 Demographic change can also affect the public finances indirectly if it implies a change in the number of people of working age, which in turn would affect the size of the workforce. The age structure of the population therefore affects economic growth, which in turn has important implications for the ability of governments to meet financial obligations and thus on fiscal sustainability.

Historic trends

2.5 The key drivers of demographic change are life expectancy, net migration and fertility. While life expectancy has slowly but steadily increased in the past, fertility and net migration have both fluctuated substantially. For example the late 1940s and the 1960s saw relatively high rates of fertility, which led to two significantly larger-than-normal cohorts being born in those years. These cohorts have shaped the age structure of the population since then and are commonly referred to as the 'baby-boomer' generations.

Life expectancy

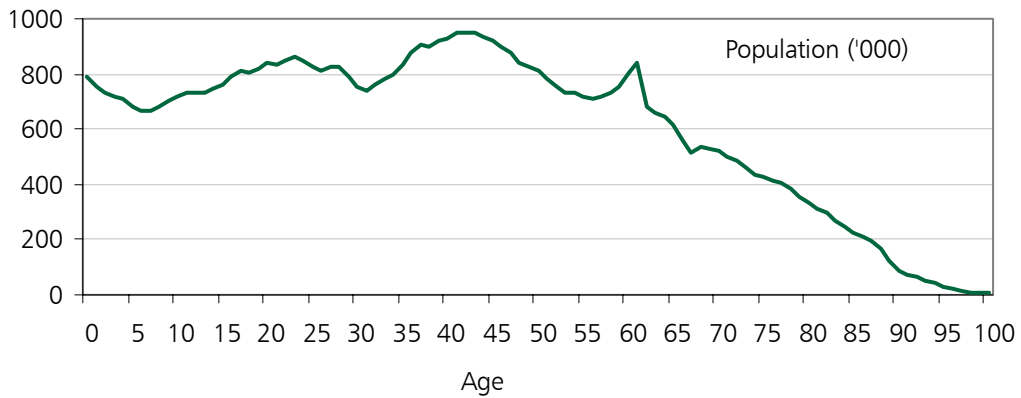
2.6 Improvements in health mean that people are living longer. Chart 2.A shows that life expectancy for males aged 65 has increased by around three years over the last thirty years. The chart also shows that many of the 'extra' years are healthy ones, as healthy life expectancy has increased by nearly two years over the same horizon, although the rate of increase in healthy life expectancy appears to have slowed over the past ten years. The change in healthy life expectancy has important implications, for example, for peoples' ability to extend their working lives or to take on caring responsibilities (including care for grandchildren and spouses).



Fertility

2.7 Fertility rates (the long-term average number of children per woman) have fluctuated significantly over time. They peaked in the late 1940s and again in the 1960s, and this temporary increase has shaped the age structure of the population ever since. Chart 2.B below shows the age structure of the population in 2008. The number of 60 year olds (born in 1949) and 35 to 45 year olds (born in the 1960s) stand out. As these cohorts age, there will be relatively large increases in the number of retired people over a relatively short period, with potential impacts for the economy and public finances.

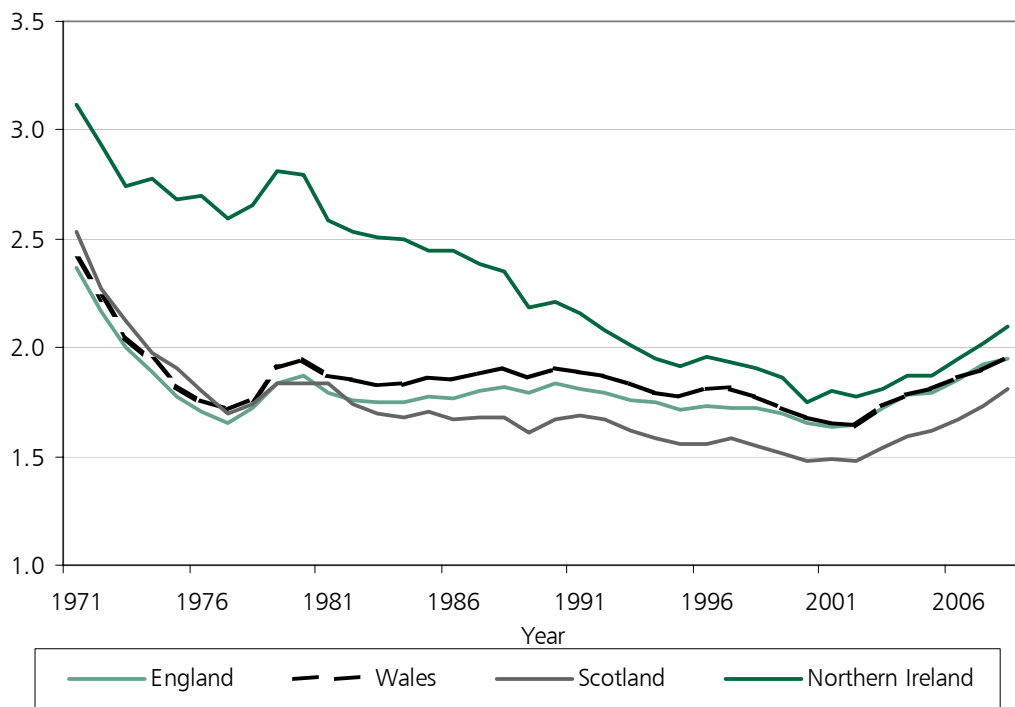
Chart 2.B: Number of people ('000) by age in 2008



Source: Office for National Statistics, 2008-based population projections

2.8 Between 1970 and 2001, fertility rates fell, but they have recently picked up again, as shown in Chart 2.C. The rate of fertility that would hold the population constant in the absence of net migration is around 2.1 for most industrialised countries. While fertility rates across the UK as a whole remain below this rate, some parts of the UK are moving closer to it.

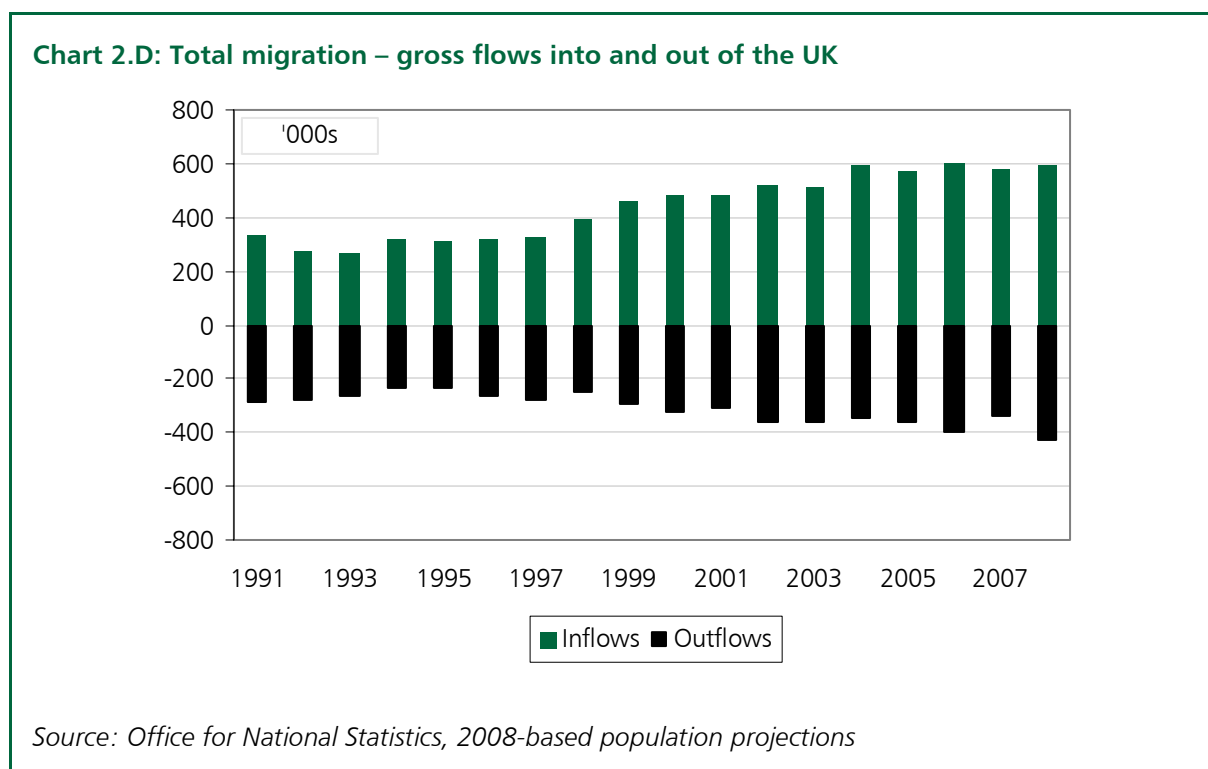
Chart 2.C: Total fertility rate, UK countries, 1971 - 2008



Source: Office for National Statistics

Net migration

2.9 International migration has grown in recent years, and like many other countries, the UK has seen an increase in both inward and outward migration. Chart 2.D shows migration to and from the UK over the past decade. The overall effect has led to positive net migration.



2.10 The recession may be associated with significantly weaker net migration over the next few years. Net migration into the UK has typically fallen following previous recessions, and latest official and administrative migration data support the possibility of a slowdown in net migration inflows. Recent ONS estimates, for example, indicate that net migration into the UK fell by 70,000 to 163,000 in 2008.¹

Population projections

2.11 Some aspects of demographic change are much harder to predict than others. Future developments in life expectancy, and even more so in fertility and net migration are all unknown today and therefore extremely difficult to project with any certainty. In contrast the ageing of past baby boom generations is more certain as the key events (past fluctuations in birth rates) have already taken place and the relevant people are already born. Given the uncertainties around future developments, it is important to interpret population projections with great caution, and where possible to consider a range of different outcomes that allows for variations in the underlying assumptions.

2.12 The Office for National Statistics published its latest set of population projections in October 2009. The projections are based on the current structure of the population (as shown in Chart 2.B above) and assumptions about future developments in life expectancy, fertility and net migration. Based on different combinations of these assumptions, the ONS produces a number of variant population projections. Table 2.A shows the specific assumptions underlying a selection of variant projections.

¹ 2008-based ONS Population Projections, ONS, 2009

2.13 The projection results differ markedly, with the high longevity variant projecting an increase to 82.2 million people, and the low population variant projection an increase to 66.6 million by 2060. The numbers of those aged 16 to 67 in 2060 (i.e. those below State Pension age in that year) are highest in the high longevity and ONS principal variant and lowest in the low population variant.

2.14 It is important to note that there are no probabilities attached to any of the different variants and the variants shown below were selected to provide a symmetric sensitivity analysis to illustrate the possible effects of demographic change on the public finances. These different variants are applied in Chapter 6.

Table 2.A: Assumptions for selected variant population projections

	Fertility rate	Life expectancy at birth (years) in 2032-33		Long-term average annual net migration	Total population in 2060 ('000)	Population aged 16-67 in 2060 ('000)
		Males	Females			
High longevity	1.84	85.0	88.1	180,000	82,200	48,300
Low longevity	1.84	81.2	85.7	180,000	76,600	47,600
ONS Principal	1.84	83.1	86.9	180,000	79,400	48,000
Low migration	1.84	83.1	86.9	120,000	75,000	45,000
Low population	1.64	81.2	85.7	120,000	66,600	41,400
Low fertility	1.64	83.1	86.9	180,000	73,600	44,700

Source: Office for National Statistics, 2008-based Population Projections

2.15 The population projections are based on the assumption that life expectancy continues to increase at historic rates for the next decade, before starting to slow. Experts are divided about future trends in life expectancy. Some suggest that increasing obesity and other lifestyle choices will increase mortality rates and therefore dampen the increases in life expectancy.² Others argue that there is a natural limit to life expectancy.³ However, in the past, projections of life expectancy have systematically been underestimated, supporting the argument of those who suggest that longevity will continue to increase.

2.16 Fertility rates are assumed to remain in line with observed trends in the recent past. This takes into account the increase in fertility rates over the past ten years that was illustrated in Chart 2.C above. Future fertility rates are very uncertain and subject to many influences. However, even if fertility rates were to fall in coming years, the recently observed high rates mean that a relatively large number of children were born in the last few years, leading to a larger number of young people and, eventually, a larger workforce in the coming decades. This contributes to the UK’s relatively favourable demographic position when compared with other European countries where fertility rates have been significantly lower.

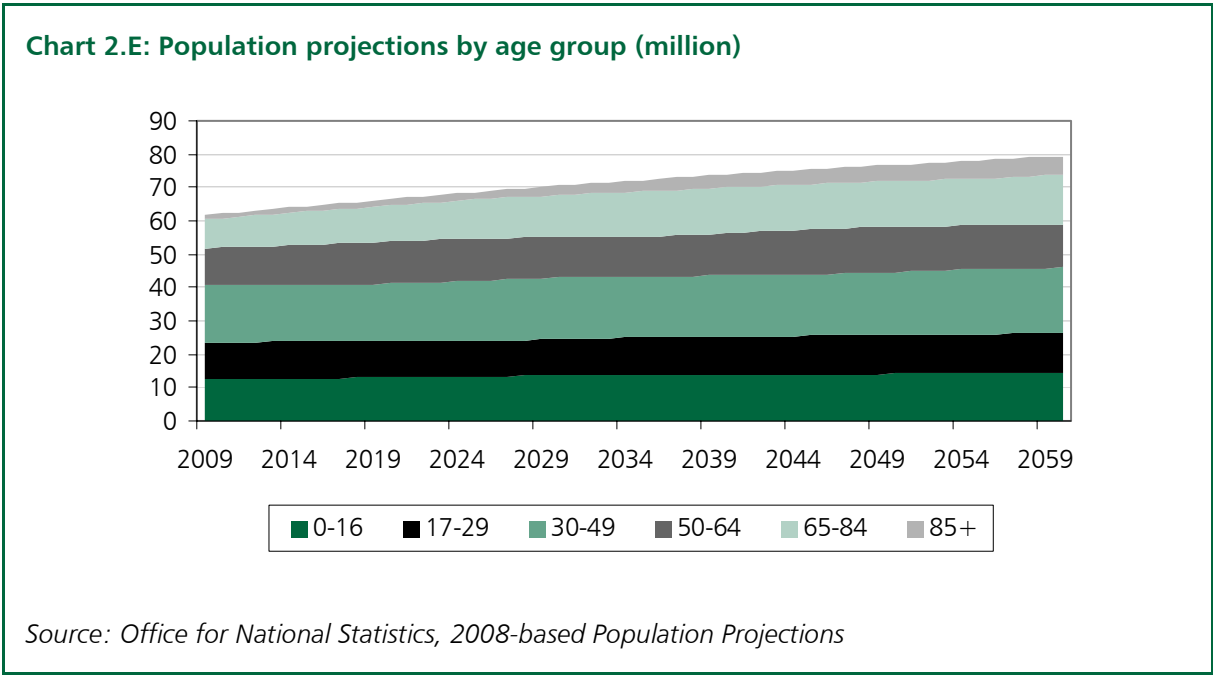
2.17 Net migration, too, is very prone to fluctuations, in particular as it is likely to respond to future developments in the global economy, which are very uncertain and have the potential to

² A Potential Decline in Life Expectancy in the United States in the 21st Century, Olshansky et al, 2005

³ Limits to Human Life Expectancy: Evidence, Prospects, and Implications, Manton, Stallard and Tolley, 1991

impact very quickly. Recent ONS data shows, for example, that net migration into the UK has fallen by 70,000 between 2007 and 2008.⁴

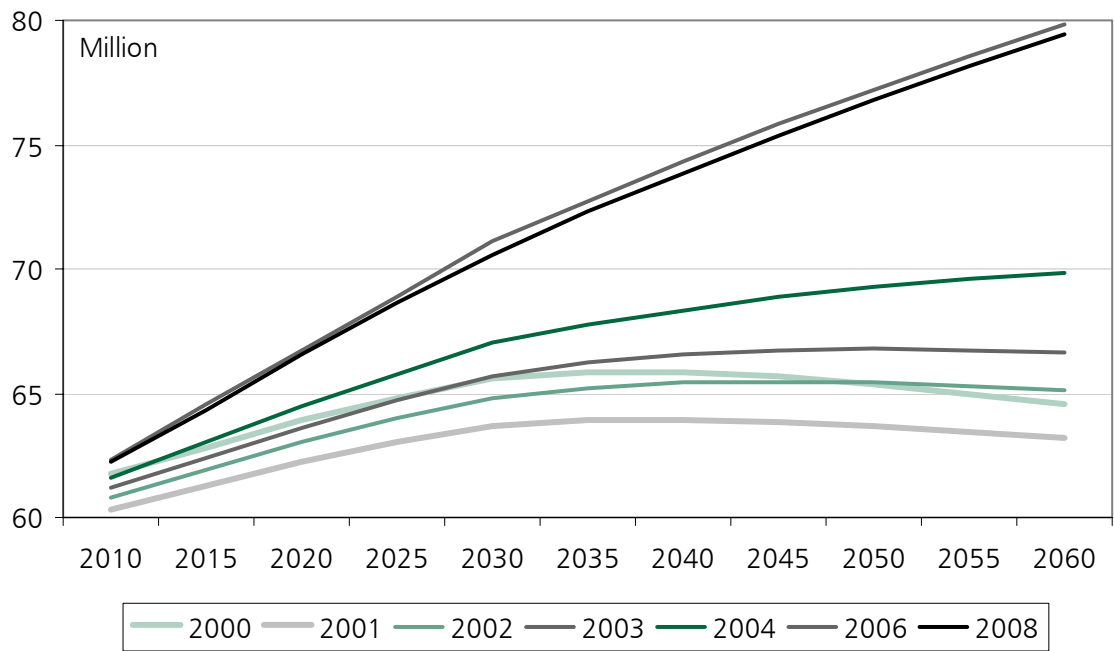
2.18 Under the ONS’ principal population variant the population is projected to increase from just over 61 million in 2009 to over 79 million by 2060. This is shown in Chart 2.E, which breaks down the increase by age group. The most marked increase in population over the next decades is for those aged 65 and above; however, the number of children is also set to increase by 2.1million. Together these two groups are projected to increase in number by 12.4 million, while the population of age 16 to 64 increases by only 5.3 million. This will have implications for the economy and public finances, as the increase in dependents (i.e. children and the retired, who tend to be net consumers of output and public goods and services) is greater than the increase of the working age population (who tend to be net contributors).



2.19 As explained above, future developments in fertility, migration and life expectancy are highly uncertain. The population projections are deterministic and the relatively recent developments in fertility and net migration are locked in for the duration of the projection horizon. However, given the extent to which these have fluctuated in the past and are prone to fluctuate in the future, the projections should be interpreted with care. Chart 2.F below shows that long-term population projections from the last ten years have projected very different potential outcomes, which illustrates the variability and uncertainty surrounding long-term projections.

⁴ 2008-based ONS Population Projections, Office for National Statistics, 2009

Chart 2.F: Population projections from different years since 2000



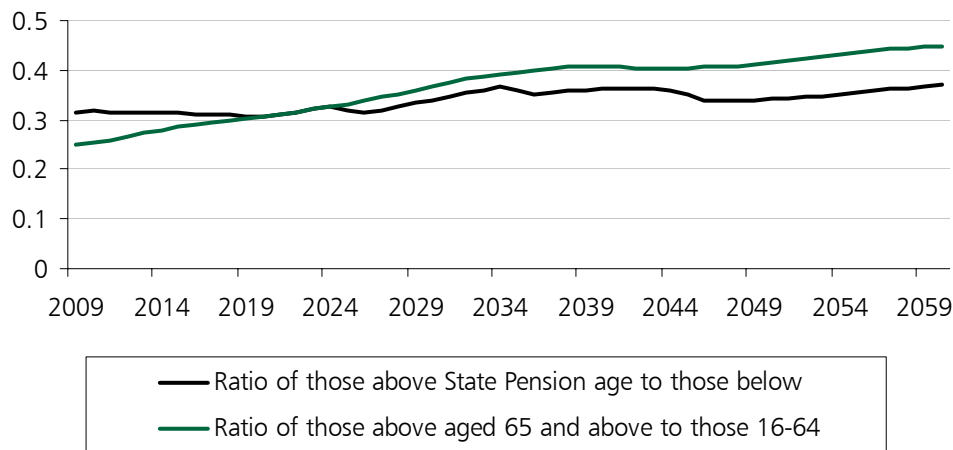
Source: Government Actuary's Department and Office for National Statistics

2.20 Notwithstanding the uncertainties, particularly around fertility rates and net migration, it is likely that the population will grow from its current levels. A growing population could pose challenges for the UK, as it could potentially put pressure on infrastructure and public services. However, a growing population could also have positive implications, for example, to the extent that the greater population is also reflected in a greater workforce this will underpin long-term economic growth.

An ageing population

2.21 The extent to which the number of elderly people is increasing relative to the working-age population is captured by the old-age dependency ratio. The ratio can be calculated by dividing the number of people aged 65 and above by the number of people aged 16 to 64. This is set to increase from around 1 in 4 to nearly 1 in 2 by 2060. The ratio can also be calculated with a more specific link to the age at which people retire. The ratio of those above State Pension age to those of working age changes from just below 1 in 3 to just above 1 in 3. The reason this differs from the ratio that is purely linked to age, is that the State Pension age is set to change over the coming decades, from 60 for women and 65 for men to 68 for both women and men by 2046.

Chart 2.G: Old-age dependency ratios



Source: Government Actuary's Department and Office for National Statistics

Box 2.B: Government Ageing Strategy

The Government published its refreshed Ageing Strategy: *Building a Society for All Ages* in the summer, outlining a strategy for how society as a whole can realise the opportunities provided by demographic change. The strategy builds on the following pillars:

- having the later life people want;
- older people at the heart of families;
- engaging with work and the economy;
- improving financial support;
- better public services for later life;
- building communities for all ages; and
- working together to build a society for all ages.

These are intended to create more opportunities for the older workers who wish to carry on working and to ensure that high levels of job satisfaction are also maintained.

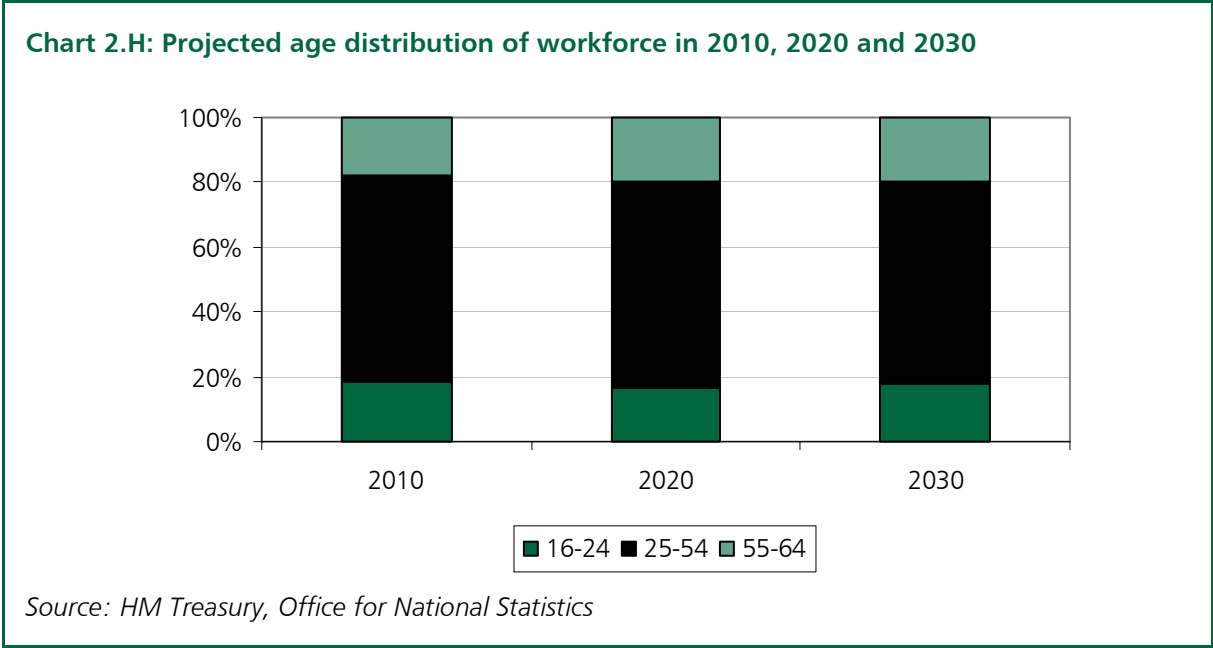
Demographic change and effects on productivity

2.22 It is sometimes argued that productivity of individual workers changes with age. This could have important implications if a change in the age structure of the population also results in a change in the age structure of the workforce. However, the evidence is not conclusive about the direction of the change.⁵ Older workers will often have more experience, requiring less on-site

⁵ See *Ageing and productivity: some physiological issues*, Shepherd, 2000 and *The impact of population ageing on innovation and productivity growth in Europe*, Prskawetz et al, 2006.

job training and hence may be more productive. However, physical and mental fitness have been found to deteriorate with age, which could adversely affect productivity.⁶

2.23 The age composition of the workforce will change gradually over the next 20 years, with the share of 55-64 year old age group in employment projected to increase by just under 2½ percentage points, as shown in Chart 2.H. This change is relatively small and in the absence of conclusive evidence on the impact of an ageing workforce on productivity it is assumed that any impact from an ageing population on productivity is small.

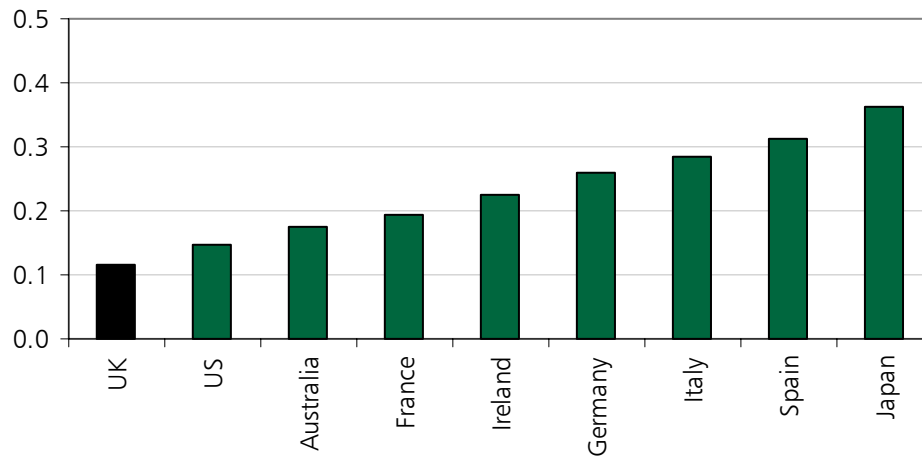


International comparisons

2.24 As explained at the start of this chapter, most developed countries are experiencing an ageing of populations. A comparison of increases in old-age dependency ratios across the UK’s main competitors in Chart 2.I shows that the projected degree of ageing is relatively modest in the UK compared with other countries, as a result of projected rates of fertility and net migration.

⁶See *Age and individual productivity: a literature survey*, Skirbekk, 2003.

Chart 2.1: Increase in the old-age dependency ratio between 2010 and 2050



Source: World Population Prospects: The 2009 Revision. Department of Economic and Social Affairs, UN Secretariat

2.25 As set out at the start of this chapter, the age structure of the population is relevant for both economic growth and the public finances. The effect of demographic change on economic growth is explained in Chapter 5, while Chapter 6 shows the projected impact that demographic change will have on public spending and revenues.

3

Environmental change

Pressures on natural resources and the climate are a key challenge facing the UK and the world. Climate change poses a serious threat to the world economy in the future and developing countries, which face the most serious implications, are also those least able to bear the burden of adaptation.

Global action is needed to avoid any further damage, and the UK, in line with many other countries, has committed to significantly reduce its own carbon emissions compared to levels of emissions in 1990 and is leading efforts to secure a deal at the UN Climate Change Summit in Copenhagen in December 2009.

Policy action is needed to reduce emissions and the three most cost-effective approaches are:

- putting a price on carbon;
- supporting R&D and investment in low-carbon technology; and
- changing behaviours.

This market-led approach to the transition to a low-carbon economy will ensure that although there may be some direct pressure on the public finances (e.g. spending on R&D and investment, and spending to raise awareness and change behaviour) the effect is likely to be manageable. Policies will also impact on the economy and therefore indirectly affect the public finances. Again, however, this effect is likely to be modest.

3.1 To ensure economic growth that is sustainable in the long term, it is crucial to be aware of the potential impacts of economic activity on the natural environment and the resources on which long-term growth depends.

3.2 The effects of human-induced climate change are already evident, with increasing global average air and ocean temperatures, widespread melting of snow and icecaps, and rising average sea levels. Eleven of the twelve years from 1995 – 2006 rank among the warmest years for global surface temperature since 1850. Carbon dioxide is the main greenhouse gas responsible for global warming. Since pre-industrial times, carbon dioxide concentrations have increased by just over one third, from 280 parts per million (ppm) to around 380ppm today. Unchecked emissions increases will significantly raise the risks of substantial global temperature rises, and could pose a significant risk of abrupt and catastrophic climate change.

3.3 In 2006, the Stern Review developed a detailed understanding of the long-term economic challenges posed by climate change and how they can be met – both within the UK and internationally. In particular, the review estimated that the economic cost of action to tackle climate change is around 1 to 2 per cent of world GDP.¹ This is significantly less than the estimated global cost of inaction, which the Stern Review estimated to be between 5 per cent

¹ *Economics of Climate Change*, Stern Review, October 2006

and 20 per cent of world GDP per annum, and it has since been suggested that this cost could be higher still.

Policies to reduce carbon emissions

3.4 The need for urgent action to tackle climate change is now recognised across much of the globe and all of the world's most developed economies. G20 leaders underscored their resolve to take strong action to address the threat of dangerous climate change and committed to efforts to reach a successful outcome of the UN climate conference in Copenhagen. At their meeting in St Andrews in November, G20 Finance Ministers and Central Bank Governors committed to take forward work on climate change finance, to define finance options and institutional arrangements.

3.5 The Government believes that global temperature rises must be limited to 2°C in order to avoid the risk of dangerous climate change. To achieve this, global emissions must peak by 2020, and fall by at least 50 per cent from 1990 levels by 2050. Developed countries such as the UK will need to make a greater contribution, reflecting their responsibility for past emissions and higher level of economic development.

3.6 In addition to the commitment of reducing greenhouse gas emissions by at least 80 per cent with respect to 1990, the Government's Climate Change Act 2008, introduced carbon budgets that set legal limits on emissions from the UK economy over successive five-year periods. The first three carbon budgets, covering the periods 2008-12, 2013-2017 and 2018-2022, came into force on 1 June 2009 and are set at levels leading to a 34 per cent reduction in emissions by 2020.

3.7 In practice, curbing greenhouse gas emissions and incentivising a transition to low-carbon growth requires Government intervention. Unless the government intervenes, emitters do not adequately take into account the costs of their emissions because they do not pay for the damage they cause. Even where there is an observed cost associated with emissions of greenhouse gases, lack of information about relative costs of different approaches to emissions reduction, or a lack of investment in the technologies needed, may act as a barrier to action by businesses or individuals. Addressing this problem – described in the Stern Review as “the greatest and widest ranging market failure ever seen” – implies a role for governments.² Moreover, the global nature of the climate change challenge, where action by one country brings benefits worldwide and vice versa, makes international co-ordination particularly important, and strengthens the role for governments.

3.8 Policy to reduce emissions should aim to achieve this by providing the right incentives for businesses, households and the public sector. Cost-effective policy action should be based on the following three approaches:

- **Putting a price on carbon** through tax, trading or regulation. This will incentivise low-carbon investment choices in the private sector and hence drive decarbonisation of the economy as a whole, but without necessarily putting pressure on the public finances.
- **Stimulating technology and infrastructure development:** The nature of research and development, and many types of infrastructure, mean that the benefits of these activities to society go beyond the profits for those making the investment. Government support can ensure a more optimal level of this activity, justifying the

² “Economics of Climate Change”, Stern Review October 2006

intervention. These arguments are particularly strong in the case of low-carbon technology and infrastructure, due to the additional benefits to society of investment in technology or infrastructure to reduce emissions. This approach would potentially have direct, but manageable, implications for the public finances.

- **Tackling behavioural change:** Lack of information on the benefits of emissions reduction can act as a barrier to behavioural change by consumers and businesses. Raising awareness of potential cost savings through energy efficiency offers an approach that reduces emissions by individuals and businesses, but that is likely to only have a modest effect on the public finances in the long term.

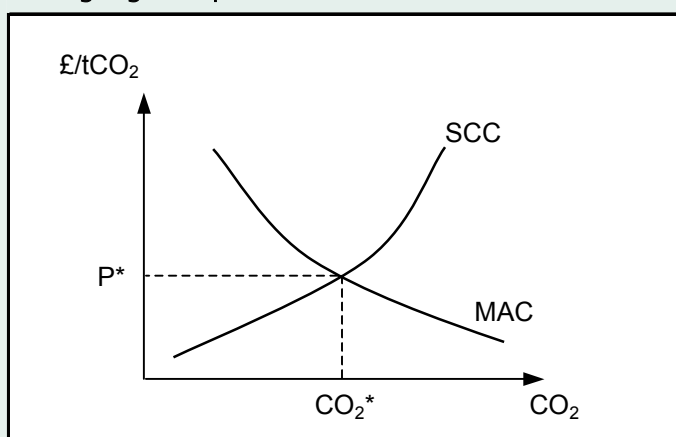
Box 3.A: Carbon pricing

Putting a price on carbon represents the key policy instrument for tackling climate change, as this ensures that the cost of carbon emissions is factored into economic decisions.

A carbon price can be set either implicitly through regulation, or explicitly by adopting market-based instruments, such as taxes or trading of emission permits. Explicit pricing is generally more efficient as it allows those firms for whom reduction is cheapest to undertake most of the effort. Explicit pricing also provides a continuous incentive for firms to invest in cutting emissions, rather than only providing that incentive up to the mandated standard – as in the case of regulation.

Climate change is a global problem and requires global solutions. Global carbon pricing represents one of such solutions. A global carbon price (P^* in the chart below) should be set at the level where the cost of reducing emissions by one unit (marginal abatement costs, MAC in figure 1) is equal to the damages incurred by society as a result of such unit of emissions (social cost of carbon, SCC in figure 1). Imposing a global carbon price would be a way to incentivise individuals to reduce emissions to a level that is closer to the 'optimal' level (CO_2^* in the chart).*

Setting a global price for carbon



The international community is working to develop initiatives that will eventually lead to the set up of a global mechanism for carbon pricing. For example, heavy industries and power generators, responsible for around half of EU emissions, have been included in an EU Emission Trading Scheme (EU ETS), which creates an explicit carbon price by capping emissions and tightening the cap over time. Those sectors of the economy not covered by the EU ETS (non-traded sector) have to make up the remainder of the emissions reductions. At Copenhagen, the UK will seek to agree an international framework, which promotes linking of emissions trading schemes in developed countries and establishes new sectoral trading systems in emerging economies, with a view to achieving a common international carbon price in the long term.

* For simplicity, the chart only indicates the carbon price consistent with the long-run stabilisation level – CO₂ concentration, measured in parts per million, however, carbon pricing represents a dynamic process, with the price of carbon increasing in line with the emission pathway leading to the optimal CO₂ concentration. See the Stern Review for more detailed analysis.

Economic impact of reducing emissions

3.9 Policy actions may have indirect effects on the public finances through any impacts they may have on economic growth. The Committee on Climate Change estimated that meeting the UK's target of an 80 per cent reduction in emissions by 2050 would cost around 1 to 2 per cent of GDP in 2050.³

3.10 The costs of tackling climate change in the UK are dominated by the cost of measures to save energy or move to lower carbon sources of energy. These costs will depend on input and technology costs, on international competition for relevant skills, and on UK-specific factors such as the extent to which consumers or companies will change behaviours, or the impact of the UK's population density on construction costs. In addition, economic impacts of tackling climate change include opportunity costs, such as the costs of skewing the economy's investment capacity towards less productive forms of investment. Any resulting negative impacts on economic growth would also have negative implications for the public finances.

3.11 In the long-term, reducing the carbon intensity of the economy is also expected to lead to a change in the sectoral make-up of the economy, through shifts away from carbon-intensive industries towards lower carbon sectors. Any resulting impacts, for example on the tax base, would have implications for the public finances.

Minimising direct costs

3.12 Governments will seek to put in place a policy framework that provide incentives for business, households and the public sector to adopt the most cost effective ways to reduce emission. This will minimise the economic cost of meeting a particular emission target and therefore also minimise the impact on the public finances.

3.13 Globally, carbon markets provide a means for minimising economic costs by ensuring that reductions take place in the most cost-effective locations worldwide. Emissions trading schemes such as the European Emissions Trading System enable companies to choose whether to reduce their own emissions or invest in emissions reductions overseas. As such global carbon prices will also impact on the cost of achieving UK emissions reductions targets.

Opportunities supporting long-term economic growth

3.14 The combined economic impact of climate policy that is necessary in response to climate change, will be to drive a profound and long-term shift in the structure of the economy, but one that is also expected to bring significant benefits. Changes in the relative prices of carbon and energy-intensive goods will alter household and firm consumption decisions in favour of non-energy intensive or lower-carbon options. This stimulus to demand for low-carbon goods and services will lead to a gradual shift in production and employment away from carbon or energy-intensive goods and towards cleaner, low-carbon goods and services.

3.15 In the longer-term, this is expected to be a driver of innovation and hence technological change and economic growth. The requirement to innovate, driven by climate policy is likely to stimulate research and development in low-carbon technologies, and the deployment of mature low-carbon technologies could potentially lead to a new wave of innovation as production and services adjust to take advantage of the new opportunities offered by these technologies. This innovation-led technological change could drive job creation and productivity improvements, underpinning long-term economic growth that in turn is vital to maintain the sustainability of the public finances.

³ *Building a low-carbon economy - the UK's contribution to tackling climate change*, Committee on Climate Change Report, December 2008

4 Global uncertainties, globalisation and technological change

The world is becoming increasingly interconnected. Technological change and globalisation are key to future productivity growth, which is in turn a vital driver for economic growth and long-term fiscal sustainability.

The recent global financial crisis is unlikely to change this long-term dynamic, but it has created uncertainties in the short-term and posed further challenges which will need to be addressed to secure the benefits of globalisation.

The UK economy needs to remain flexible to exploit the new opportunities and respond to the challenges further globalisation will bring.

4.1 Over the last two decades, there has been a dramatic growth in trade, global capital flows and global sourcing of goods. The value of trade (in good and services) between 1980 and 2007 increased from 42 per cent to over 62 per cent as a share of world GDP.¹ Foreign direct investment (FDI) stocks increased from over 6 per cent of world GDP in 1980 to over 24 per cent in 2008.² The UK has been an integral part of these increased trade and capital flows with the highest stock of both inward and outward FDI, as a percentage of GDP, in the G7.

4.2 The global financial crisis has shown that increasing financial globalisation can give rise to substantial risks, and that problems in different parts of the world can spread to countries across the world. Nevertheless, globalisation can bring significant benefits and support long-term economic growth. Globalisation, through the elimination or reduction in trade barriers, enables greater trade and competition between different economies. The growth in global markets has helped to promote efficiency through competition and the division of labour, the specialisation that allows countries to exploit their comparative advantages. Global markets also offer greater opportunities for firms to tap into more diversified and larger markets around the world, accessing more capital, technology and cheaper imports.

4.3 This will continue to drive improvements in productivity, which is vital for economic growth and therefore also for the public finances. Increased globalisation and competition may also have some direct implications for the public finances. For example as business continues to become increasingly global it will be more and more important to ensure that the UK is a good place to do business in order to maintain the tax base for corporation tax. However, the biggest impact will come through the effect on economic growth, which will determine the resources that are available to governments to meet future obligations.

¹ *Globalisation: a brief overview*. IMF Staff paper, 2008

² Includes FDI stocks and flows, UNCTAD FDI statistics

Key trends in globalisation and technological change

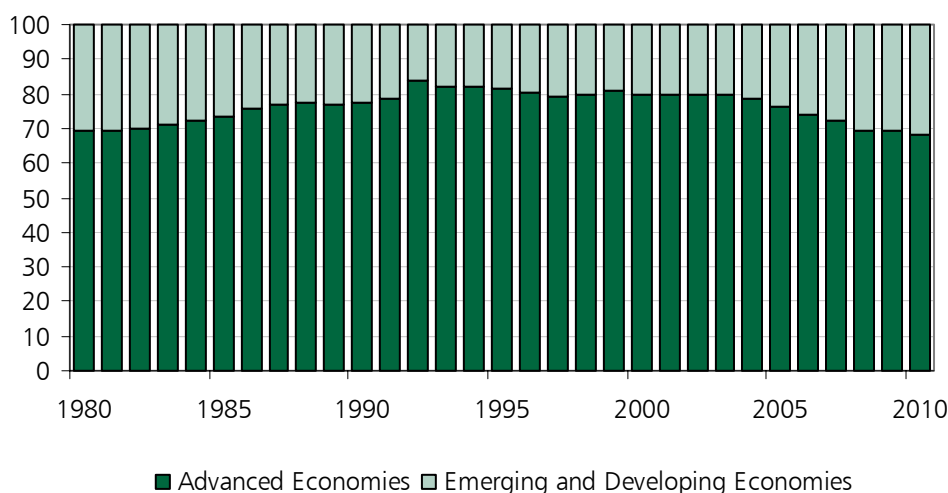
4.4 This section outlines five key trends in globalisation and technological change and discusses the opportunities and challenges they create for the UK economy, which in turn will have implications for the sustainability of the public finances. These are:

- growth in emerging markets;
- international trade and specialisation;
- financial globalisation;
- technological change; and
- increasing demand for commodities.

Growth in emerging markets and changing balance of economic activity

4.5 In the last two decades, emerging markets have had a major impact on global growth and global patterns of production. In 2009 emerging economies made up 50 per cent of world GDP (according to purchasing power parity valuation of country GDP), an increase from 41 per cent in 2000. This is expected to increase to 55 per cent by 2014.³ These economies are already playing an important role in the global economy through production, consumption and investment. Their role and influence is likely to increase as they continue to grow and the balance of global economic activity will continue to shift from advanced economies to emerging markets.

Chart 4.A: Advanced, emerging markets and developing economies share in world GDP



Source: International Monetary Fund, World Economic Outlook Database, October 2009

4.6 On the demand side, rising per capita incomes in emerging market economies will lead to larger markets and a growing middle class that will increasingly demand high-value goods and services. This increasing potential consumer base will provide opportunities for UK firms, firstly

³ World Economic Outlook, International Monetary Fund, 2009

through lower production costs by exploiting the economies of scale possible from supplying larger markets and secondly by opening up new markets.

4.7 In the long term, as emerging economies continue to integrate into the global economy and acquire technological expertise, firms in these countries are likely to move up the value chain, producing more higher-end goods and services. To remain competitive, UK firms will need to invest and innovate, increasing the need for skilled labour. So long as the UK responds positively and flexibly to these trends, the growth in emerging markets should bring benefits to UK consumers.

Trade and specialisation

4.8 Trade can substantially enhance productivity and economic growth through specialisation, economies of scale, and greater exposure of firms to global competition, which stimulates investment and innovation. Increased trade also benefits UK consumers as it offers greater choice and cheaper goods and services.

4.9 As a result of the global financial crisis, between July 2008 and February 2009, world trade fell by 42 per cent.⁴ In the short- to medium-term, trade is likely to remain sluggish and lower than its pre-crisis levels, due to weak global demand. In the longer-term, as the global economy recovers, countries develop new capabilities in new areas, and technological progress reduces trade and transport costs, long-term trends in international trade and country specialisation in the production of goods and services are likely to continue. As domestic markets grow in emerging and developing countries, new trade corridors are likely to open and support global trade flows, potentially changing the pattern of trade.

4.10 There are some risks that the protectionist measures taken during the recession to support national economies, such as subsidies and tariffs, are not rolled back during recovery. This could lead to permanent barriers to trade, which would constrain the benefits that trade can bring and reduce the competitiveness of these economies.

Financial globalisation

4.11 Financial globalisation has grown even faster than trade over the last decade.⁵ The global financial crisis has shown that it carries substantial risks, and can lead to significant instability in financial markets.

4.12 However, financial globalisation also opens up opportunities and the flow of cross-border capital can contribute to economic growth by:

- improving the allocative efficiency of capital – where capital flows to its most productive use;
- intensifying internal competition – greater competition for inward investment forces less productive firms out of the market and also reinforces incentives for innovation;
- spreading technology and managerial expertise – providing access to technologies speeds the process of technology diffusion; and
- spurring the development of secondary market liquidity – providing liquidity to the domestic market.

4.13 Capital flows can be categorised into debt, portfolio and foreign direct investment (FDI), which is argued to have the greatest benefit on a country's long-term economic growth

⁴ *Explaining trade busts: output versus trade costs in the great depression and today*, Campbell, D and Meissner, C , VOX EU, September 2009.

⁵ *Embracing financial globalisation*, HM Treasury, 2008

outlook.⁶ As the second largest recipient of FDI flows until 2007, the UK has benefited significantly from financial globalisation. Foreign investment in the UK has helped create jobs, and brings with it technological and managerial expertise.

4.14 While the crisis has led to a period of financial de-globalisation, the long-term fundamentals driving cross-border capital flows are likely to return. Essential to this is the continued development of domestic financial markets in emerging economies and economies maintaining openness.

Technological change

4.15 Technological advances are a key driver of productivity and of economic growth. Rapid advances in technology and innovation have occurred in many areas of science and technology, including energy, manufacturing, information and communication technologies (ICT) and medical knowledge. Adopting or inventing new technology underpins productivity when it increases output per unit of labour.

4.16 The spread of new technologies through countries and economic activity together with falling transportation costs has driven market integration and enabled the realisation of gains from trade. Advances in ICT and digitalisation for example have increased the tradability of goods and services, providing opportunities for the UK to capitalise on its comparative advantage, exploit economies of scale and increase productivity levels. This ensures that the UK economy remains competitive, increases profits and contributes to economic growth. Continuing developments in ICT also help diffuse knowledge and new technologies, generating innovations as ideas are combined and developed.

4.17 Changes in the global economy are likely to place increased pressure on UK firms to foster innovative activities and promote new technologies. Firms that foster research and development, and innovation have the opportunity to attract business from potential high growth areas. As these firms apply new technologies and ICT, to existing production processes they will expand production possibilities, improve efficiency, and enhance attractiveness as centres for high value investments.

4.18 Emerging market economies are likely to make rapid advances in technological advancement and adaptation, enabling these countries to challenge advanced economies such as the UK in the production of high-end manufactured goods and services. Unless UK firms continue to be at the cutting edge of R&D and innovation, and remain competitive in domestic and international markets, they risk losing their market share to products from other countries.

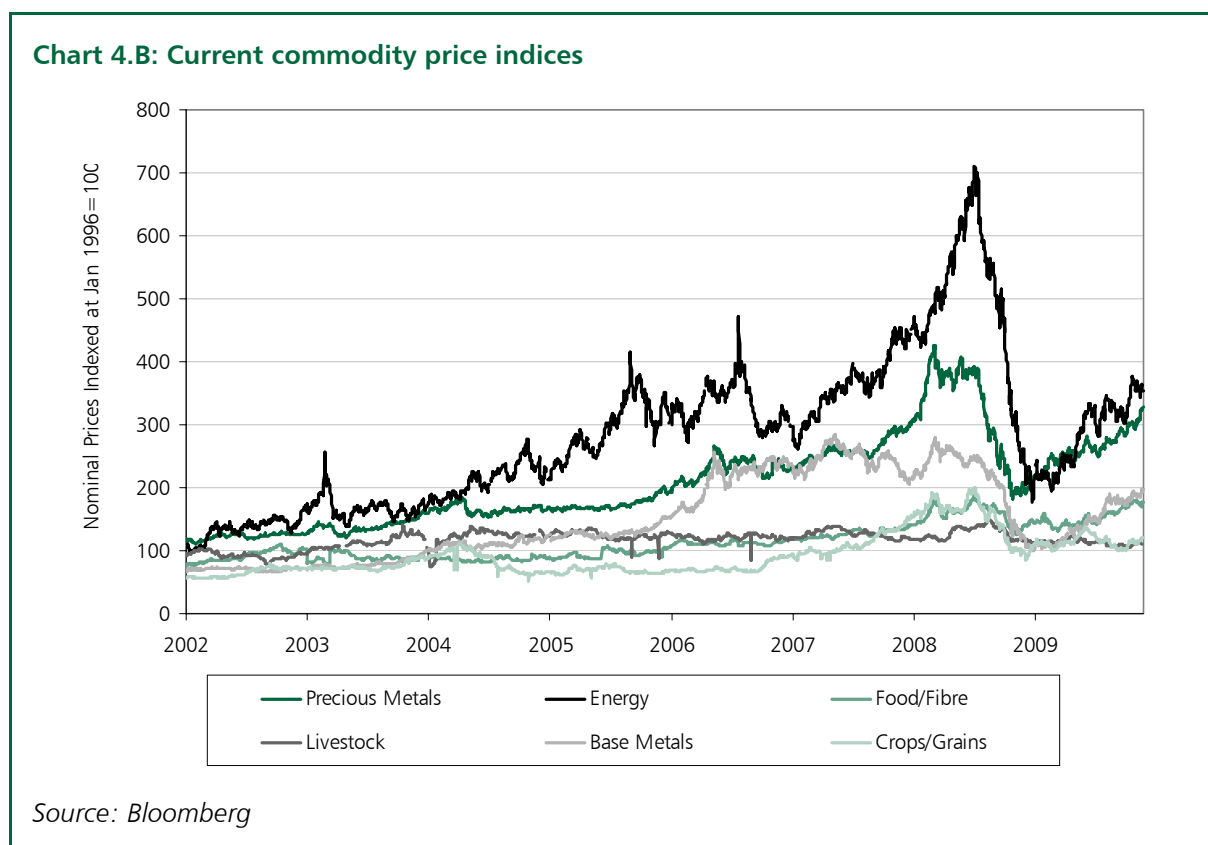
Increased demand for commodities

4.19 Demand for commodities is expected to continue rising over the long-term. Global economic growth (particularly in emerging markets), anticipated world population increase, rising incomes, and trends towards industrialisation and urbanisation in the developing world, will all contribute to growing demand for commodities and in turn influence prices.

4.20 The overall impact of increasing demand on commodity prices will depend on the global supply response, and the efficiencies that can be gained in the use of commodities in output. For example, the World Development Report forecasts that in agriculture markets, to meet projected demand by 2030, cereal production will have to increase by 50 per cent and meat

⁶ *Reaping the benefits of financial globalisation*, Giovanni Dell'Ariccia, Julian di Giovanni, Andre Faria, Ayhan Kose, Martin Schnidler, and Marco Terrones, IMF Occasional paper, 2008

production by 85 per cent between 2000 and 2030.⁷ Chart 4.B shows that commodity prices since 2002 have shown some upward tendencies, but have also been very volatile.



4.21 The UK, as a net importer of commodities, would be adversely affected by rising commodity prices, without investment in alternative sources or efficiency improvements. Higher prices would adversely affect UK households' standards of living, as a greater proportion of peoples' income would be spent on essential commodities. Moreover, firms would have to absorb higher costs, reducing profitability with potential repercussions for investment, productivity growth and therefore economic growth. However, an increase in renewable energy and low-carbon technologies will help reduce the UK's dependence on commodity imports and could mitigate these impacts.

Potential implications for public finances

4.22 The key trends in globalisation and technological change, as set out above, are likely to affect productivity and economic growth in the coming decades and are therefore important for the sustainability of the public finances. However, the significant uncertainties surrounding these trends mean that their impact is best illustrated by use of productivity and growth scenarios, as set out in the next chapter.

⁷ *Agriculture For Development*, World Bank, 2008

5

Long-term economic growth

The global recession has triggered a restructuring of economies around the world. As the UK economy begins to recover, it is expected to rebalance away from consumption and towards investment and net exports. Government policies are set to support recovery to secure stable, sustainable and balanced long-term economic growth.

Fiscal sustainability depends crucially on long-term economic growth as this determines the resources that future governments can draw on to meet obligations, such as the provision of high quality public services. In the long term, economic growth is determined by productivity growth and changes in the size of the workforce. Previous chapters have set out how long-term challenges may affect long-term economic growth, by changing the size or productivity of the workforce. This chapter takes this analysis of long-term challenges as a base for projecting long-term economic growth.

Productivity growth will depend on future innovations and improvements in processes, supported by globalisation and technological change. While future developments are unknown to date, the world has seen a constant stream of innovations in the past. Therefore it is reasonable to expect that these will continue going forward and support productivity growth in the future.

The most important driver of workforce growth is demographic change. While the number of those above retirement age is set to grow faster, the number of people at working age is also projected to grow, albeit at a slower rate. This means that, unlike most other European countries, the UK is likely to continue to see workforce growth contributing to economic growth.

As result of continued productivity growth and workforce growth, the UK economy is set to continue to grow – and projected to do so at a faster rate than its main European competitors.

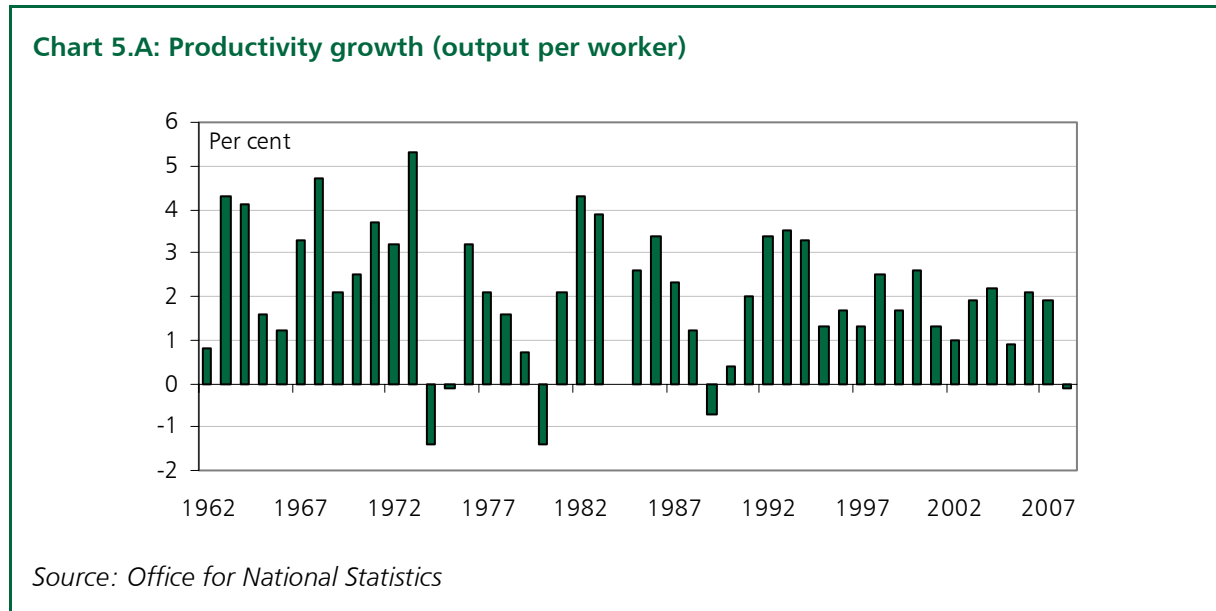
5.1 Long-term economic growth is generated through increases in productivity and increases in employment:

- **productivity growth:** Increases the output of each unit of labour input in the economy; and
- **employment growth:** Increases the labour input, by increasing the size of the workforce or the hours worked.

5.2 This chapter describes the long-term outlook for these two components of economic growth and explains how the long term challenges set out in earlier chapters are likely to affect them.

Productivity

5.3 In real terms, the UK economy has grown on average by around 2½ per cent over the past fifty years. The main driver of this has been growth in productivity. Chart 5.A shows productivity growth in the past 50 years, and while it has fluctuated substantially, on average productivity has grown by around 2 per cent over this horizon.



5.4 Productivity growth can be achieved through raising the average amount produced per worker. This can be done, for example, through:

- improving the quality of labour – for example, by hiring more skilled workers, improving the skills of existing workers, or providing incentives for workers to work more efficiently;
- increasing the intensity with which labour uses capital – likely to occur through increasing the quantity or quality of capital, for example installing a new IT system to allow workers to undertake tasks more quickly;
- new technology – adopting or inventing a new technology that allows workers to produce more output per unit of labour or to produce a new product, for example through the introduction of faster microprocessors; and
- innovative work practices – finding more efficient ways of combining capital and labour in production.

5.5 The Government’s framework for increasing productivity growth has been based on seeking to secure and maintain macroeconomic stability, so as to ensure businesses and individuals have the required certainty to make long-term investment decisions; and undertaking microeconomic reforms to tackle market failures around the drivers of productivity.

5.6 The drivers of productivity growth are:

- **competition** – encouraging the adoption of innovative business practices and increased business efficiency;
- **enterprise and entrepreneurship** – strengthening the UK’s enterprise culture;

- **science and innovation** – ensuring that the UK capitalises on the creation of new knowledge and its translation into new goods and services;
- **skills** – supporting the development of a more flexible, responsive and productive workforce; and
- **investment** – enhancing the stock of physical capital and ensuring its efficient utilisation.

Productivity and long-term challenges

5.7 It is not straightforward to quantify how the long-term challenges summarised in previous chapters, and indeed other future challenges, may affect productivity growth over the next fifty years.

5.8 Demographic change, and in particular the ageing of the population, could have both positive and negative impacts on the productivity of the workforce. However, as the age structure of the workforce itself is not set to change significantly it is unlikely that there will be a major impact on productivity. The effect of demographic change on the size of the workforce, as well as the direct implications for the public finances, are discussed below.

5.9 The economic impact of policy action to mitigate climate change has been quantified, although still with considerable uncertainty, and is estimated to reduce GDP by around 1 to 2 per cent by 2050, as set out in Chapter 3. While this effect is not insignificant, over a fifty-year horizon it would be equivalent to an average reduction in annual productivity growth of around 0.04 per cent, which is manageable when compared with average annual productivity growth of 2 per cent over the past fifty years.

5.10 The nature of global uncertainty, globalisation and technological changes, makes it very difficult to determine how it will develop in the future. By definition, global uncertainty is not foreseeable. And technological change is similarly difficult to predict - if it were possible to set out accurately what innovations will take place in the future then these would instead be innovations today. Notwithstanding this uncertainty around the future, it is likely that globalisation and technological change will continue to be key to productivity growth. Box 5.A summarises some of the major technological innovations that have driven improvements in productivity in the past.

Box 5.A: Major technological innovations in the past

Although technological progress is an incremental process historically there have been a number of innovations that have had very significant growth and social welfare implications. Examples include the steam engine, electricity and computers. Such innovations are sometimes referred to as general-purpose technologies (GPTs).

The criteria used to classify a major innovation as a GPT is not clearly defined and is a matter of ongoing debate. However, it is generally accepted that such major innovations have a significant impact on economic growth and social welfare. It is also the case that such major innovations have happened continually throughout history.

It is impossible to predict what major innovations are likely to be made over the next 100 years but history tells us that we should expect to see some major innovations in the 21st Century. These major innovations could be in the fields of nanotechnology, health or environment related areas. Whether and where such innovations take place will have major implications for both economic growth and social welfare.

5.11 As a central estimate it is reasonable to assume that productivity growth in the next fifty years will be similar to productivity growth over the past fifty years, which as shown above was on average around 2 per cent per year. However, this is of course not guaranteed, and it will continue to be important that the right conditions are maintained for the UK economy to take advantage of opportunities that arise. To allow for different pressures that could lead to both higher and lower productivity growth, the economic projections are also shown for scenarios based on productivity growth that is $\frac{1}{4}$ percentage point higher and lower. By 2060, this means that the economy would be around 25 percentage points smaller in the 'low productivity' scenario than in the 'high productivity' scenario, which allows for a broad range of outcomes.

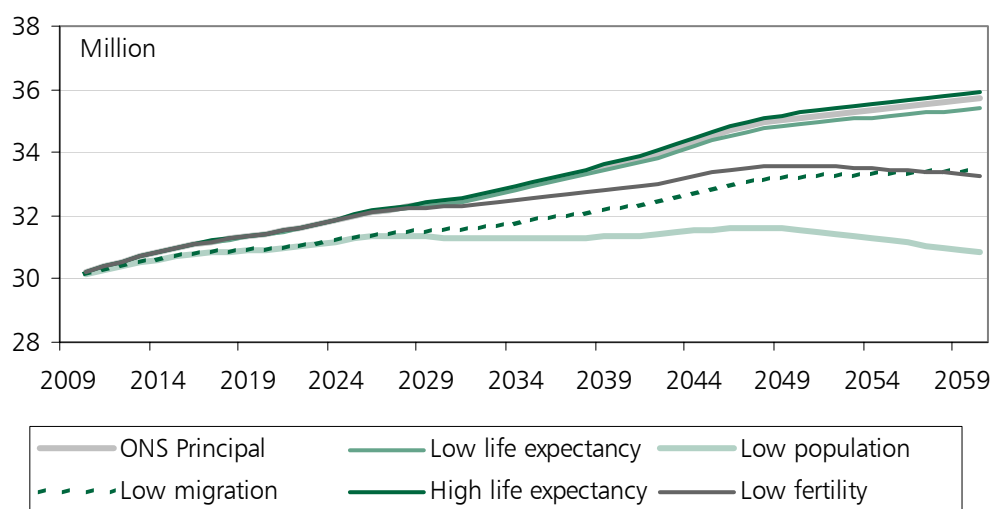
Employment and workforce growth

5.12 Demographic change has implications for the size of the workforce. As set out in chapter 2, the workforce in the UK is likely to continue growing, as the number of people of working age continues to grow. In addition to the size of the workforce, trends in labour participation will also affect total employment. For example it is likely that participation of females will continue to increase and labour participation among older workers is likely to continue increasing as healthy life expectancy improves. To capture both the change in size of the workforce and developments in participation rates, HM Treasury uses its 'cohort model', which is explained in detail in the 2005 *Long-term public finance report*.

5.13 The ONS population projections are used as the main input to the cohort model. Employment levels can then be projected by using these estimates and taking into account the impact of an ageing workforce on overall participation (with older workers generally having lower participation rates than younger workers). This also takes into account differences in participation rates of different cohorts, allowing younger cohorts to gradually replace current older cohorts. Trends such as the growing tendency for females of all ages to participate in the labour market are captured in this way.

5.14 Chart 5.B shows the results of this analysis for different population variants. It is apparent that, notwithstanding demographic change, under most of the population variants employment is set to continue to grow. This is also the case for population variants that project a lower number of workers compared with the principal variant, as shown in the low migration and low population variants.

Chart 5.B: Employment projections



Source: HM Treasury, Office for National Statistics

5.15 Table 5.A shows employment growth for a range of demographic scenarios. As shown, employment growth is relatively small and eventually becomes negative in the low population and low fertility variants. All other demographic variants imply a significant rate of employment growth over the entire projection horizon, driven by continuous increases in the projected size of the workforce.

Table 5.A: Average employment growth per year

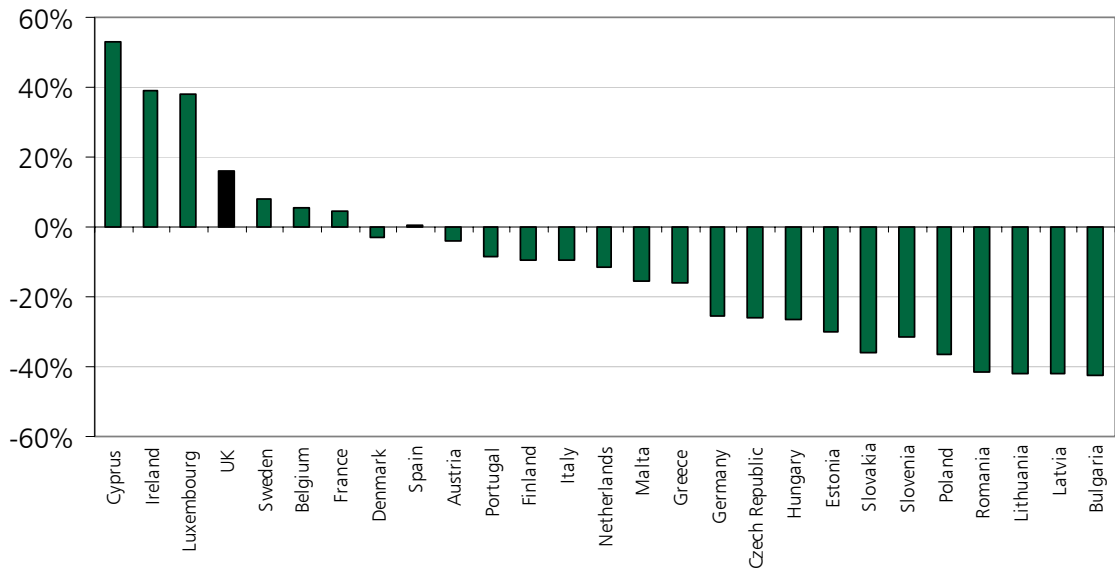
	2019-20 to 2028-29	2029-30 to 2038-39	2039-40 to 2048-49	2049-50 to 2059-60
High longevity	1/2	1/2	1/2	1/4
Low longevity	1/2	1/2	1/2	1/4
ONS Principal	1/2	1/2	1/2	1/4
Low migration	1/4	1/4	1/2	0
Low population	1/4	0	0	-1/4
Low fertility	1/2	1/4	1/2	0

Source: HM Treasury, Office for National Statistics

5.16 The projected increase in the size of the workforce is set to contribute to economic growth in the coming decades. This contrasts with developments in many other European countries, where the workforce is projected to shrink, with potentially negative impacts on GDP growth. Comparisons of population trends in EU countries show that the UK is one of only seven Member States that is set to see an increase in its working-age population (aged 15-64) whereas others are projected to see a decline.¹

¹The 2009 Ageing Report: Underlying assumptions and projection methodologies for the EU-27 Member States (2007-2060), European Commission, 2008

Chart 5.C: Increase in labour supply in European Member States between 2007 and 2060

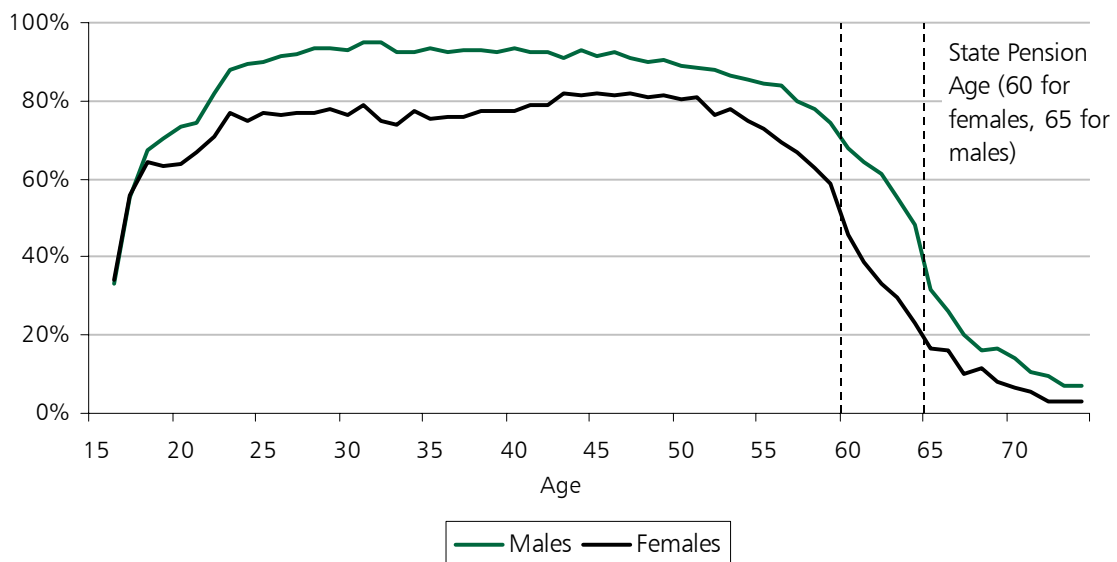


Source: European Union Economic Policy Committee

Labour market participation near State Pension age

5.17 Participation rates amongst both males and females begin to fall for workers in their 50s – well before they reach the current State Pension age of 60 for females and 65 for males. By the time they reach 60, only around two-thirds of males and half of females are likely to still participate in the labour market, as shown in Chart 5.D below.

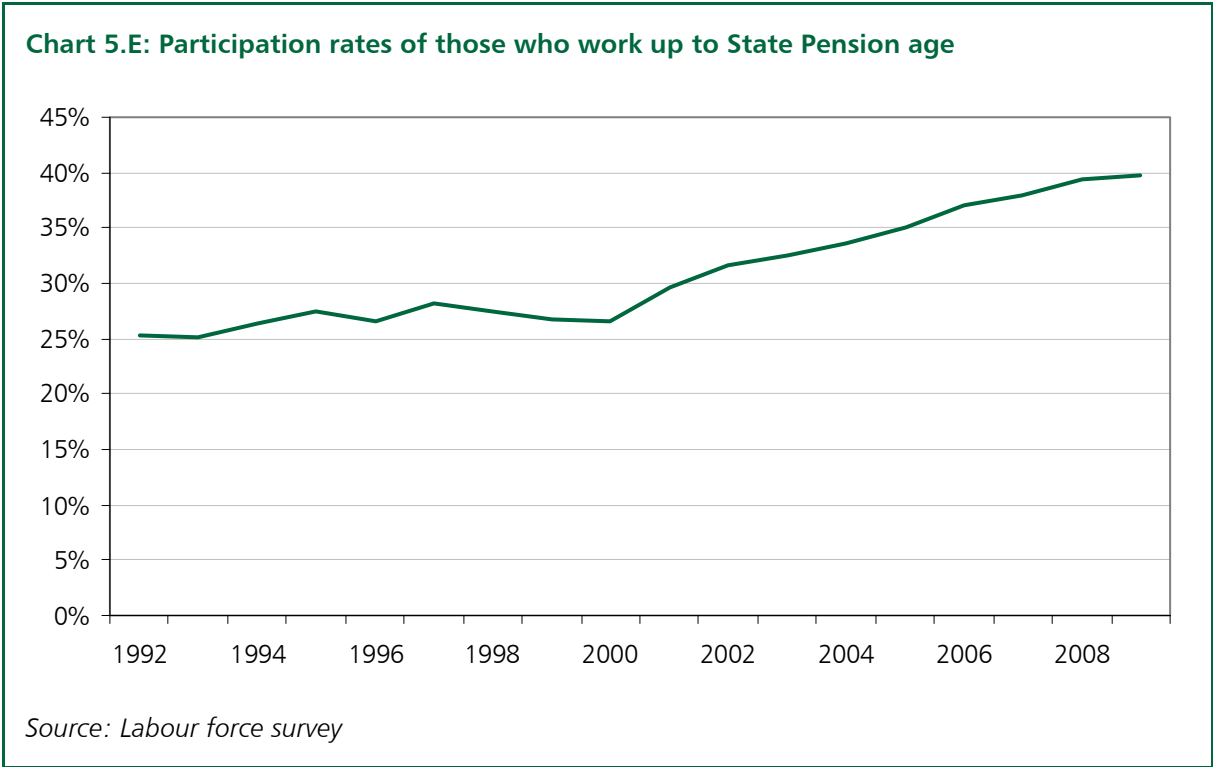
Chart 5.D: Labour market participation, 2008



Source: Office for National Statistics, Labour Force Survey

5.18 The fall in participation rates before the official State Pension age suggests that there is the potential for labour supply of those close to State Pension age to increase. As explained in Chapter 2, healthy life expectancy has been increasing. This trend is likely to continue and as a result people may increasingly decide to retire at older ages, potentially improving their lifetime earnings.

5.19 Moreover, future increases in the State Pension age are likely to play an important part in raising the age at which people will actually retire.² Chart 5.E below shows the proportion of those who work up to and beyond State Pension age, as opposed to those who retire before reaching State Pension age. As the chart shows, this proportion has accelerated in the past ten years.



Long-term economic growth

5.20 Table 5.B below sets out rates for long-term economic growth under a range of different productivity growth assumptions and population variants. All population variants are combined with the assumption that productivity grows at 2 per cent. Assuming 2 per cent productivity growth and employment growth as projected under the principal population variant, the economy is likely to grow at a rate between 2¼ and 2½ per cent in the long term. At this rate of growth, the economy would double in size within the next thirty years, while per capita real GDP would increase by over two thirds.

² The State Pension age will increase from 60 to 65 by 2020 for women and from 65 to 68 between 2024 and 2046 for men and women.

Table 5.B: Annual average real GDP growth for a range of productivity scenarios and population variants

	2019-20 to 2028-29	2029-30 to 2038-39	2039-40 to 2048-49	2049-50 to 2059-60
High productivity ($2\frac{1}{4}$)	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{3}{4}$	$2\frac{1}{2}$
Low productivity ($1\frac{3}{4}$)	2	2	$2\frac{1}{4}$	2
High longevity	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{4}$
Low longevity	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{4}$
ONS Principal	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{4}$
Low migration	$2\frac{1}{4}$	$2\frac{1}{4}$	$2\frac{1}{2}$	2
Low population	$2\frac{1}{4}$	2	2	$1\frac{3}{4}$
Low fertility	$2\frac{1}{2}$	$2\frac{1}{4}$	$2\frac{1}{2}$	2

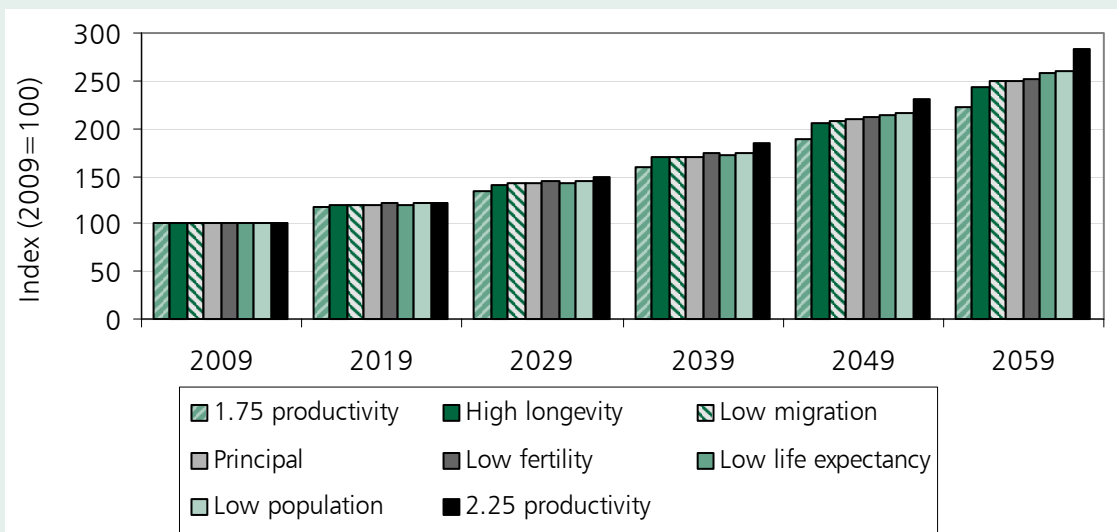
Source: HM Treasury

Box 5.B: Projected size of the economy and GDP per capita

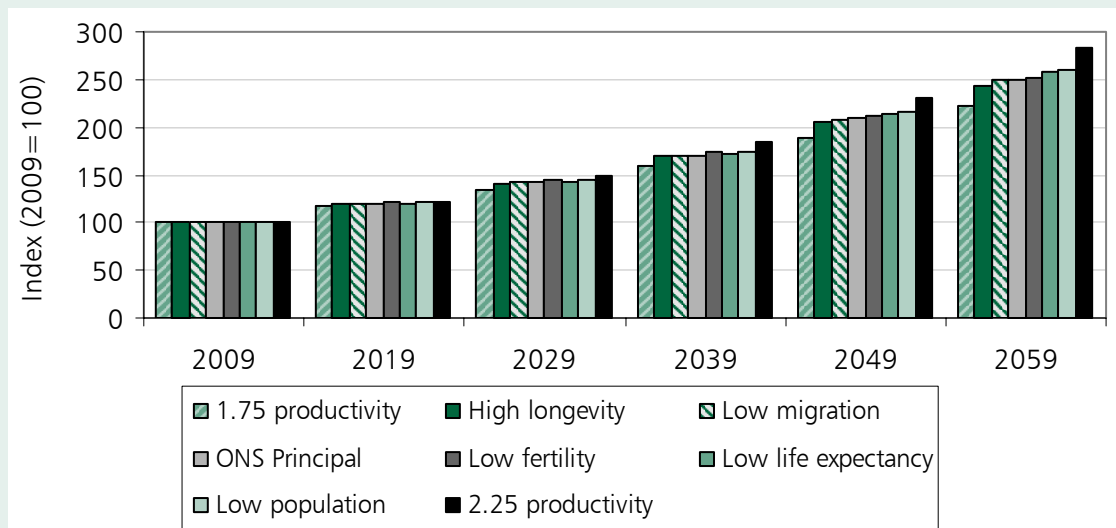
Table 5.B sets out a range of possible long-term economic growth rates. The charts below show the size of the economy (i.e. GDP) and GDP per capita over the next fifty years for the different scenarios. The size of the economy in 2009 is indexed as 100. As the first chart shows, under all scenarios the economy grows to an index of close to 300 by 2059. This means that the economy would be close to three times the size in 2059 as it is today.

Part of this increase is the result of a projected increase of the population. The second chart therefore illustrates the effect when taking into account population growth, as it shows how GDP per capita is projected to change. As the chart shows, this increases to around 250, which means that GDP per capita in 2059 would be around two and a half times greater than GDP per capita in 2009.

GDP



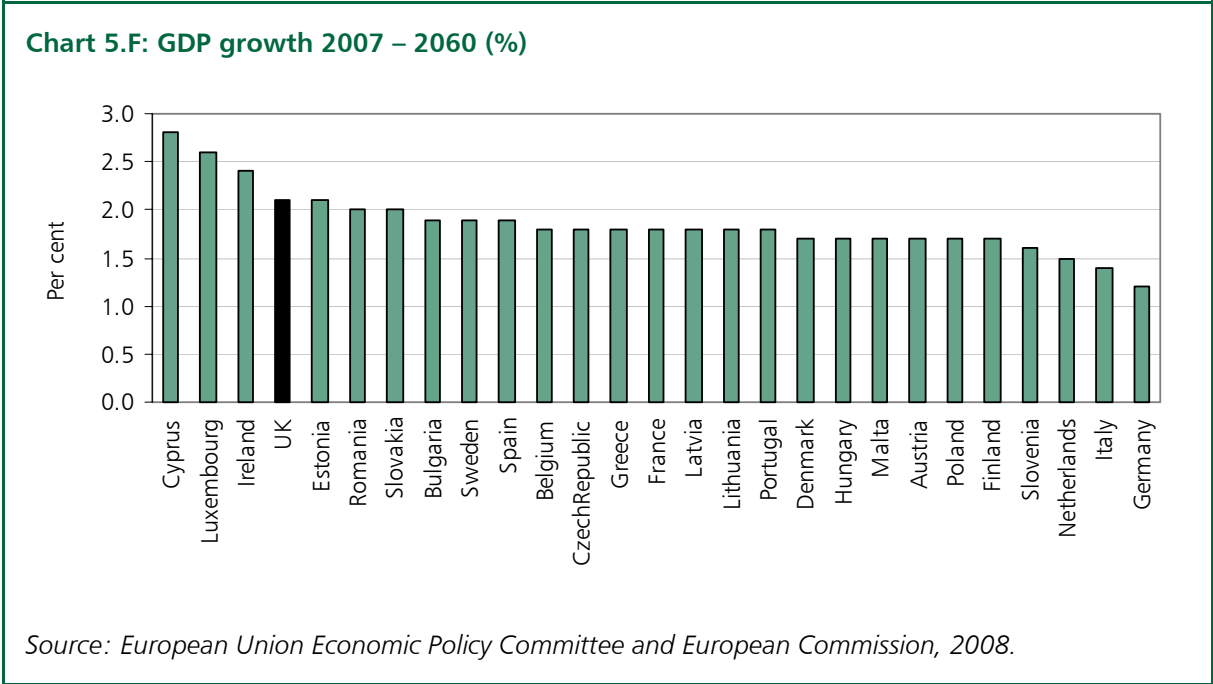
GDP per capita



Source: HM Treasury

International comparison

5.21 The European Union’s Economic Policy Committee (EPC) projects economic growth for the purpose of its latest long-term public expenditure projections.³ The projections of economic growth are based on slightly different methodologies and assumptions about population growth to those underlying this Report, but while this means they are not comparable to the projections shown above, they provide a useful illustration of the differences across EU countries. As Chart 5.F below shows, the UK is projected to grow at a faster rate than most other EU countries.



³ The 2009 Ageing Report: Underlying assumptions and projection methodologies for the EU-27 Member States (2007-2060), European Commission, 2008.

6

Long-term fiscal projections

Previous chapters have set out analysis of long-term challenges and discussed why these may put pressures on the public finances in the long term. As described, the effect can be direct, through their impact on spending and receipts, or indirect by affecting economic growth.

In the long term, the Government expects the path of the public finances to be determined by its fiscal objectives and fiscal policy settings. However, it is important to understand the pressures that the public finances may face.

This report illustrates the potential pressure that long-term challenges and trends could put on the public finances. Given these and other pressures the Government has set out fiscal consolidation plans in the Pre-Budget Report, which are consistent with debt returning to lower levels. These plans will ensure the public finances are on a sustainable path, which in turn will promote long-term economic growth. It will also ensure the public finances are able to manage any unexpected economic shocks in future.

6.1 This Report shows two different approaches to long-term fiscal projections:

- a ‘top-down’ projection, which sets out the future path of the fiscal aggregates, in line with the Government’s fiscal policy objectives; and
- ‘bottom-up’ projections, which illustrate the pressures that long-term trends could exert on public expenditure and revenues.

6.2 Long-term fiscal projections, unlike forecasts, are not based on a detailed analysis of all relevant factors. They are an illustration of how spending and revenue would evolve under a set of given assumptions and should therefore be caveated as involving a high degree of uncertainty. However, long-term fiscal projections do provide an illustration of the pressures on future public spending and revenues that governments will need to manage.

Top-down fiscal projections

6.3 Top-down projections set out the future path of fiscal aggregates, in line with the Government’s fiscal policy objectives. These projections take into account the plans for consolidation set out in the 2009 Pre-Budget Report and therefore illustrate the expected path of the fiscal aggregates.

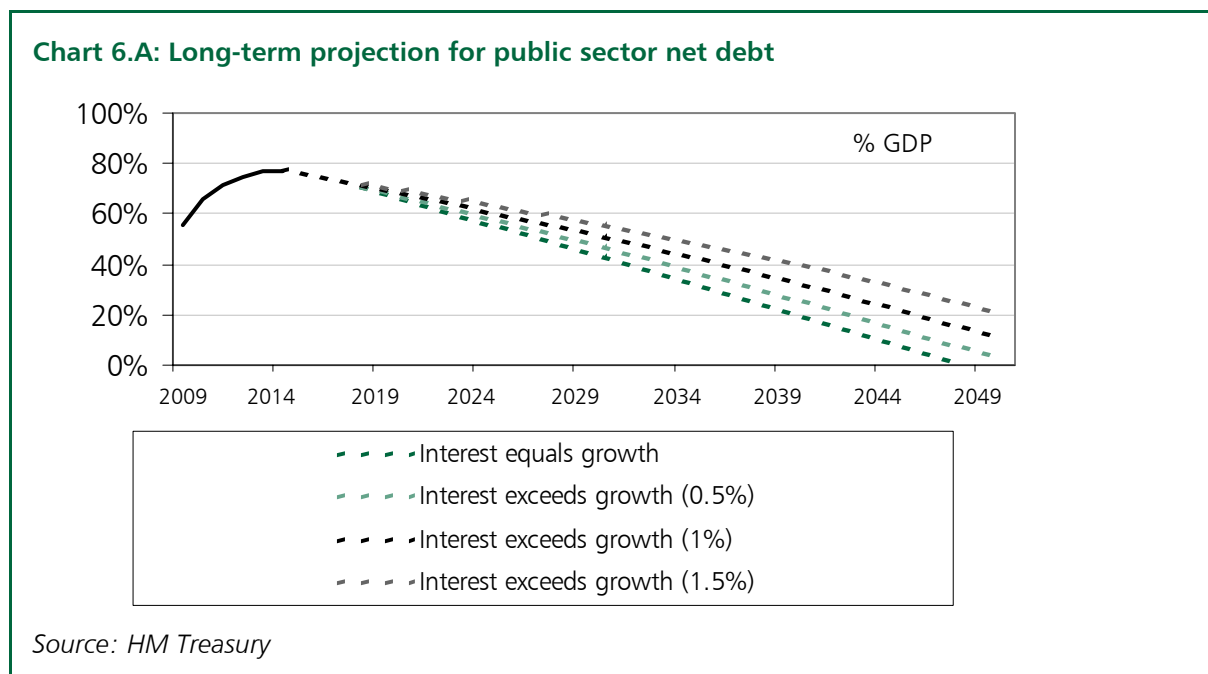
6.4 An alternative approach used by some international organisations, for example the European Commission, would be not to take into account forecasts and projected consolidation plans when modelling the future path of fiscal aggregates. This type of mechanistic projection is informative under relatively normal economic circumstances as it helps illustrate the implications of continuing along a given fiscal trajectory. However, such projections are misleading during times when the economy is operating significantly below its full potential, because current policy is set to deal with exceptional short-term issues. It would therefore be misleading to project the

fiscal stance resulting from these exceptional circumstances over the long term, and resulting long-run deficit projections would be implausible.

6.5 A long-term projection for public sector net debt is shown in Chart 6.A. This chart takes into account consolidation plans and projections as set out in the 2009 Pre-Budget Report and thereafter assumes that expenditure and receipts (excluding interest payments and receipts) grow in line with the economy. The chart is based on assumptions covering three future periods:

- the 2009 Pre-Budget Report medium-term forecast covers the period 2009-10 to 2014-15;
- beyond 2014-15, projected further reductions in borrowing mean that debt begins to fall and the current budget reaches balance as set out in the 2009 Pre-Budget Report;
- thereafter, the projections are based on a long-term economic growth rate of between 2¼ and 2½ per cent and the assumption that expenditure and receipts (excluding interest payments and receipts) grow in line with the economy. Interest payments are determined by assumptions about the rate of interest and projected debt levels. A range of outcomes is illustrated for the long term, depending on the relationship between growth and interest rates. These include a projection that assumes the real interest rate is equal to the real growth rate of the economy and projections that assume interest exceeds growth by between 0.5 and 1.5 per cent. The historic average in the UK is for the real interest rate to exceed the real growth rate of the economy by around 1 per cent.

6.6 Under this range of assumptions, debt is projected to fall to between 0 and 30 per cent of GDP by 2050.



Bottom-up fiscal projections

6.7 Bottom-up fiscal projections illustrate the potential pressures on individual components of the public finances. They are predicated on the assumption that there is no change in the fiscal position or in policy from 2009-10. They are therefore not intended to be a realistic forecast of

expenditure and revenue but an illustration of the potential pressures facing the public finances in the long term.

6.8 Chapters 2 to 4 have set out the main long-term trends and challenges facing the UK economy: demographic, environmental and technological change, globalisation and global uncertainty. The bottom-up fiscal projections that follow illustrate the pressures that these trends could place on the UK public finances. Different scenarios are used in the modelling to illustrate the range of possible outcomes. Specifically:

- a range of population variants, explained in Chapter 2, is modelled to illustrate the potential pressure on the public finances of changing demographics;
- different scenarios for economic growth and productivity are modelled to illustrate the potential pressures of environmental change, technological developments, globalisation and global uncertainty on the public finances; and
- other scenarios specific to particular expenditure and revenue components are also illustrated.

6.9 The purpose of these projections is to show how the key trends may put pressure on the public finances. Therefore, only those components of public expenditure and revenue that are most relevant have been modelled:

- for expenditure, bottom-up projections are shown for health, long-term care, education, state pensions and public sector pensions; and
- for revenues, bottom-up projections are shown for taxes on income and wealth (in particular income tax and corporation tax) and taxes on consumption and production (e.g. VAT, fuel duty and excise duties).

6.10 Other parts of public expenditure that are not directly affected by the trends and challenges analysed in this Report have not been modelled.

Public expenditure

Health

6.11 Pressures on health spending could arise from changes in the level of demand for medical treatments, as well as technology-driven changes to the cost of providing treatments.¹

6.12 Health needs and demands of the population will depend on a range of factors. One of the most important is demographic change, in particular the increase in the number of elderly, as result of the ageing of the 1940s and 1960s baby-boomers, as well as increases in life expectancy. However, the relationship between life expectancy increases and cost pressures is not necessarily linear: the key determinant of how much health expenditure increases as life expectancy increases is the extent to which healthy life expectancy increases. The discussion in Chapter 2 shows that the relationship between increases in longevity and healthy life expectancy is relatively close.

6.13 Greater public engagement in health issues could also result in changing demands. On the one hand demand for health care could increase even if the underlying health of the population remains constant, for example as people become more aware of treatment options. On the other hand, as people become more conscious of the impact that life-style choices, such as

¹ *Spending on Health Care: How much is enough?* Appleby and Harrison, 2006

smoking, can have on health, they may adjust behaviours and as result reduce demands on health care provision.

6.14 While these mostly affect the demand for health care, there are also potential effects on the costs and configuration of the supply of health care in the future. Literature suggests that one of the most significant factors in rising health care costs over the past twenty years has been through technological development in the form of medical advances. In very broad terms, when developments occur in health technologies there can be three different impacts, exerting both up and downward pressures on health expenditure:

- new treatments become available, allowing previously untreatable conditions to be treated;
- existing treatments become available and safe to use on a wider range of people; and
- existing treatments become more efficient and cheaper.

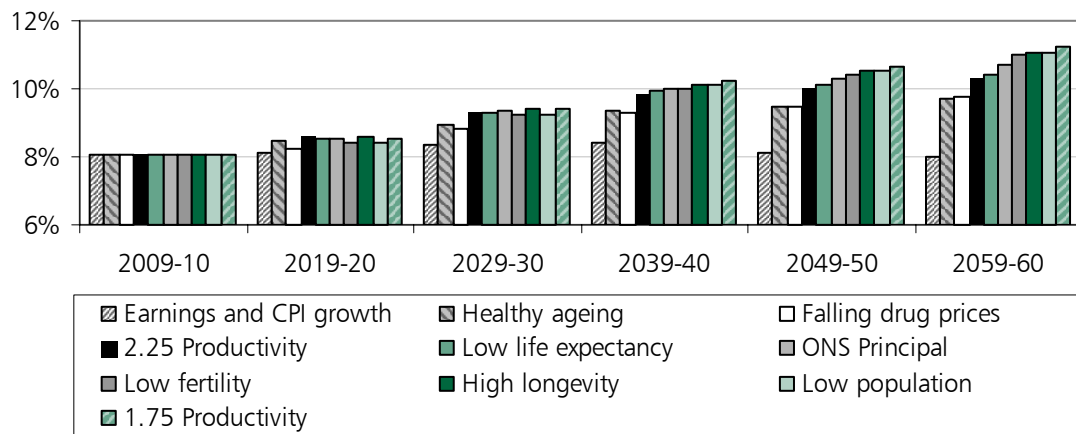
6.15 Changes in the costs of the inputs to health care can also affect expenditure.² Drug prices, for example, are influenced by the rate at which existing drugs become cheaper as patents expire and generic production begins. It also depends on the rate at which new drugs become available, as these are more costly at first.

6.16 Chart 6.B shows projections for health expenditure for a range of different demographic variants and productivity scenarios. In addition to this, the chart shows a projection for health expenditure that assumes that non-wage costs, such as expenditure on equipment, grow in line with inflation, rather than earnings. It also shows a projection that assumes all expenditure grows in line with earnings, except for expenditure on drugs, assumed to fall by 2 per cent. These are shown in the chart as 'Earnings and CPI growth' and 'Falling drug prices' respectively.

6.17 Over the next fifty years, it is reasonable to assume that wage costs increase in line with earnings. However, for non-wage costs, the projections show scenarios that are based on two different potential assumptions. Costs can be assumed to increase in line with earnings, which would capture to some extent improvements in technology or services. Or they can be assumed to grow in line with prices, which would imply, for example, the same technology and service provision. Similarly, one can assume that drug prices would increase in line with productivity, taking into account the availability of new and improved drugs, or assume a fall in prices of existing drugs, to reflect, for example, the expiry of patents.

² *Benefits and Costs of Newer Drugs: An update*, Lichtenberg, 2002

Chart 6.B: Health spending (% of GDP)



Source: HM Treasury

6.18 The projections show a range of different outcomes. Demographic changes are likely to put upward pressure on expenditure, in particular from around 2029-30 onwards. The lowest pressure is shown when non-wage costs grow in line with prices, rather than earnings, but pressures will also be lowered through improvements in health of the elderly or through higher productivity growth, which increases GDP. Low productivity growth implies that the economy will be comparatively smaller, and the increased pressure on health expenditure as share of GDP would thus be greater.

Long-term care

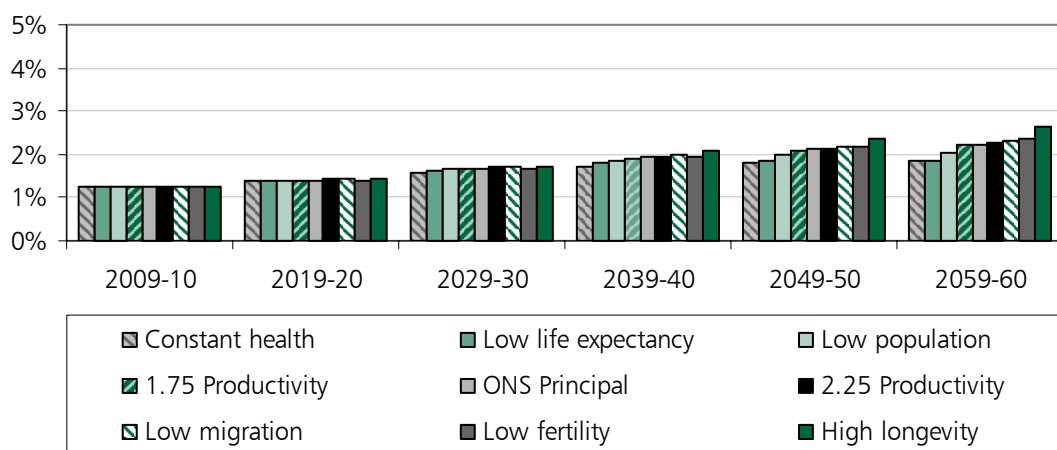
6.19 Long-term and social care services are provided for conditions where one is unable to manage or undertake personal tasks, unable to manage or undertake daily routines, unsafe or unhealthy through harm, abuse and neglect, or uninvolved in family and wider community life. The main drivers for these services in the long-term are unit costs and the prevalence of need among the population.

6.20 The Government is looking at reform of the care and support system to help deal with some of the long-term pressures facing the social care system. The social care green paper *Shaping the future of care together*³, set out a vision for a new National Care Service that is fairer, simpler and more affordable.

6.21 Chart 6.C shows that there is relatively little variation between different scenarios. Long-term care expenditure will be under pressure to increase, and while the absolute effect is likely to be small, i.e. less than 1 percentage point of GDP, compared with the size of expenditure on long-term care this is relatively significant. The 'constant health' scenario assumes that the average costs per person of long-term care does not deteriorate after age 65, and as result the pressures shown by this scenario are smaller than most other projections.

³ *Shaping the future of care together*, Social Care Green Paper, July 2009

Chart 6.C: Long-term care spending (% of GDP)



Source: HM Treasury

Education and skills

6.22 The main driver of pressures on expenditure on education is the number of children and young people in the population. While the number of children is set to increase by just over 2 million in the next fifty years, as share of the population the number of children falls by nearly 2 percentage points to 18 per cent in 2060. As explained in Chapter 2, this trend is common across developed countries and in fact, when compared with other EU countries, the UK has a relatively high fertility rate.⁴

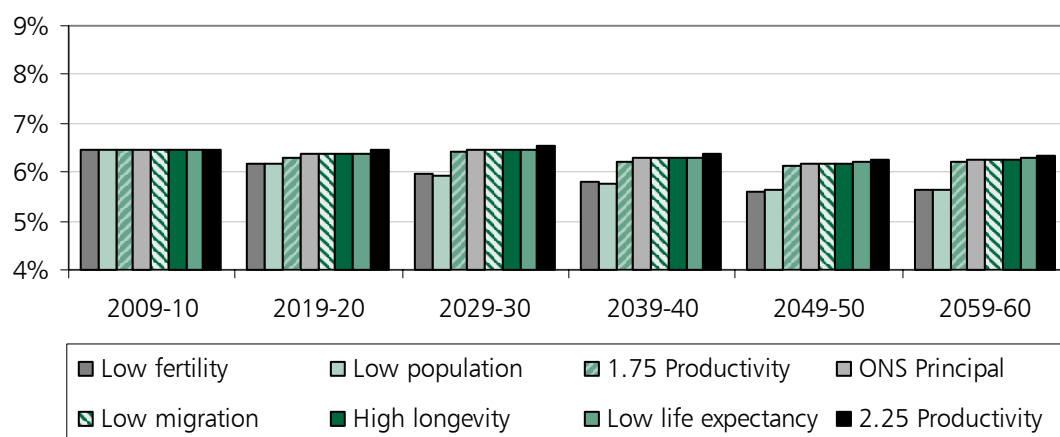
6.23 As a result, projecting education expenditure to adjust only for the number of children would mean that, as share of GDP, expenditure in the long term would be relatively constant, as shown in Chart 6.D. The low fertility variant, which assumes a smaller number of children in the future, shows downward pressure on expenditure as a share of GDP. Under all projection scenarios shown, expenditure per child is assumed to grow in line with earnings growth.

6.24 Aside from demographic change, globalisation and technological change may increase pressure on education and skills expenditure. The shifting balance of economic activity from G7 countries towards emerging market economies, for example China and India, will create significant opportunities and risks over the next decade and onwards. The general long-term impact is described in Chapter 4. The specific effect on skills spending is the need to focus on promoting higher skills within the economy in order to maintain its competitive advantage. Technological change may also affect education spending as developments in the workplace may require the education system to adapt to keep pace with these changes. At the same time, technological developments could also open up new, more effective, approaches to learning.

6.25 Other factors are also important, though difficult to model. Pertinent socio-economic developments include the increasing female participation in the workforce, which may create pressures for early years schooling provision.

⁴ 2009 Ageing Report: Underlying assumptions and projection methodologies for the EU-27 Member States (2007-2060), European Commission, 2009

Chart 6.D: Education and skills spending (% of GDP)



Source: HM Treasury

Public service pensions

6.26 The main Pay-As-You-Go (PAYG) public service pension schemes covered in the projections below are those for the NHS, teachers, the civil service, the armed forces, the police, fire-fighters, the judiciary and the UK atomic energy authority. To manage increasing pension costs, these schemes (along with the Local Government Pension Scheme and the Parliamentary Contributory Pension Scheme) have already undergone reforms, such as the introduction of higher pension ages for new entrants, the reform of ill-health benefits. In addition, the introduction of a cap and share mechanism will control the increasing cost pressures arising from such things as improving life expectancy.

Box 6.A: Cap and share reforms in the public service pension schemes

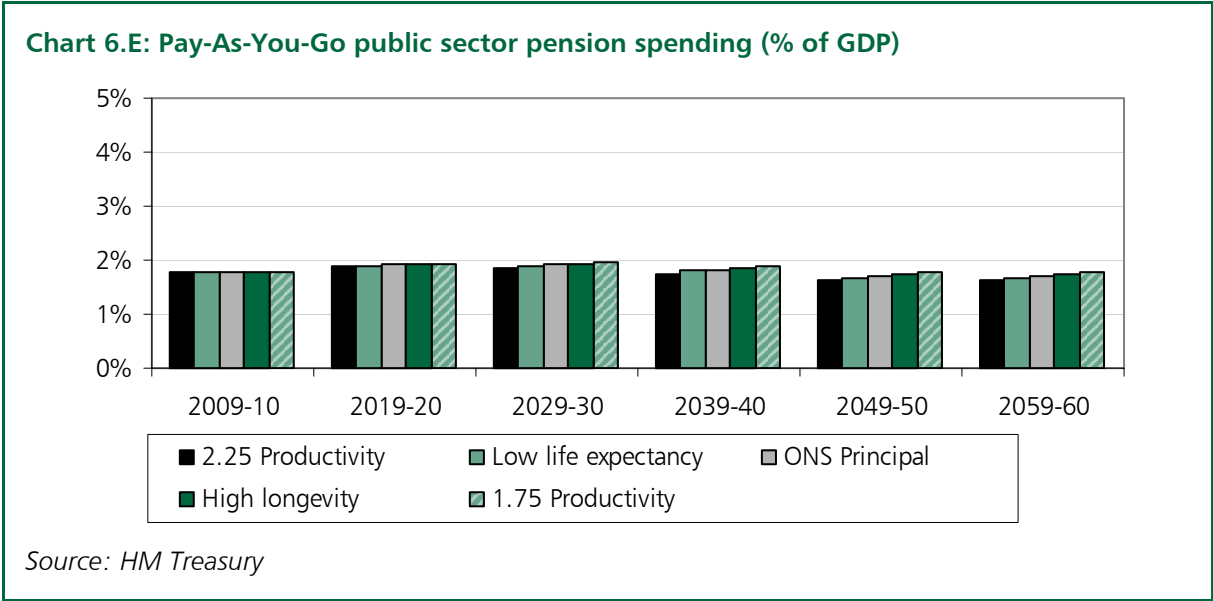
Following the Public Service Forum 2005 agreement to deliver sustainable and affordable public service pensions, it was agreed that public service pension schemes would introduce the cap and share mechanism.

The cap and share policy is designed to ensure that the cost pressures associated from the rising cost of providing pension scheme benefits (such as improving longevity) are shared between employers and employees up to an agreed employer contribution cap, beyond which all further increases will be the responsibility of employees. This sets a maximum limit to employer contributions thus protecting the public finances and taxpayer. The costs will be assessed through the periodic scheme valuations that take place every 3 or 4 years.

The Parliamentary Contributory Pension Fund is the first to implement this policy with a combination of increased contributions and benefit changes. It has also been incorporated in the rules of the Principal Civil Service Pension Scheme, the Teachers' Pension Scheme, and the NHS Pension Scheme. Any increased costs that fall to employees would result in either increased employee contributions or reduced benefits for future service or both. The weighting between increased contributions and reduced benefits would be decided at the time, and evidence for the typical outcome has not yet emerged.

The Local Government Pension Scheme and the Parliamentary Contributory Pension Fund (PCPF) are not included in the projections because they are funded.

6.27 Chart 6.E shows a range of possible scenarios and the pressures that varying demographic scenarios would put on PAYG Public Service Pension expenditure. As the chart shows, the projections remain stable as share of GDP, at around or below 2 per cent, between 2018-19 and 2059-60.



6.28 The scenarios for the PAYG public service pension schemes shown in Chart 6.E include allowance for the potential savings as a result of cap and share due to increasing life expectancies. The projections show gross benefit expenditure, which is not affected by changes in employee contributions, and the allowance for cap and share in these projections assumes that two-thirds of the savings are realised by reductions to benefits. This is a purely illustrative assumption for the purpose of these projections of gross benefit expenditure and does not prejudice the decisions that will be taken at the time. However, it is consistent with the figures in the PBR forecasts for the spending effects of increasing employee contributions under the cap and share policy.

Box 6.B: Total liability figure for Pay As You Go Public Service Pension Schemes

Annual public expenditure on the Pay As You Go (PAYG) public service occupational pension schemes equals the amounts spent on paying cash benefits to pensioners of those schemes. The cost of this expenditure is covered by current Government revenue, as it falls due. As shown in Chart 6E, the cost is projected to be a low and stable share of GDP, at around or below 2 per cent, up to 2059-60.

The Government follows private sector practice by using two separate mechanisms for monitoring and controlling costs. The first involves regular actuarial valuations of the individual schemes every 3-4 years, which estimate the value today of the pension benefits that will be paid in future, and set an appropriate level of cash contributions for employers and employees to reflect that value. The main schemes publish their actuarial reports and these set out all the key assumptions employed in valuing the schemes and setting contribution levels. The Government has legislated to cap employer contributions in the main pension schemes, which means that future cost increases above the caps will be met by employees either through higher contributions or adjustments to benefits received.

The second mechanism is annual accounting for the cost of the pension schemes, which uses the same accounting standard that applies to equivalent private sector organisations (FRS 17/IAS 19). Using this mechanism, the gross liability (net present value of future payments to pensioners) of all the PAYG public service pension schemes was estimated by the Government Actuary's Department (GAD) to have been £810 billion as at 31 March 2007 and to have fallen to £770 billion as at 31 March 2008. The main schemes covered are those for the NHS, teachers, civil service, armed forces, police, firefighters, judiciary and the UK atomic energy authority. The majority of the fluctuations in the liability figure are due to accounting effects (changes in the discount rate and the unwinding of the discount rate) that do not affect the actual cash amounts that will be paid to pensioners. This reflects the requirement on discounting of the FRS17 accounting standard, with minor adaptations for the public service context as agreed by the Financial Reporting Advisory Board (this effect is explained in more detail in Box 4.3 of the 2008 Long Term Public Finance Report). The total liability figures also reflect assumed increases in longevity. However, this and other cost pressures are now being managed so that the cost to taxpayers is capped, with employees bearing all the rest of the cost themselves or through reduced benefits (through the cap and share policy set out in Box 6.A).

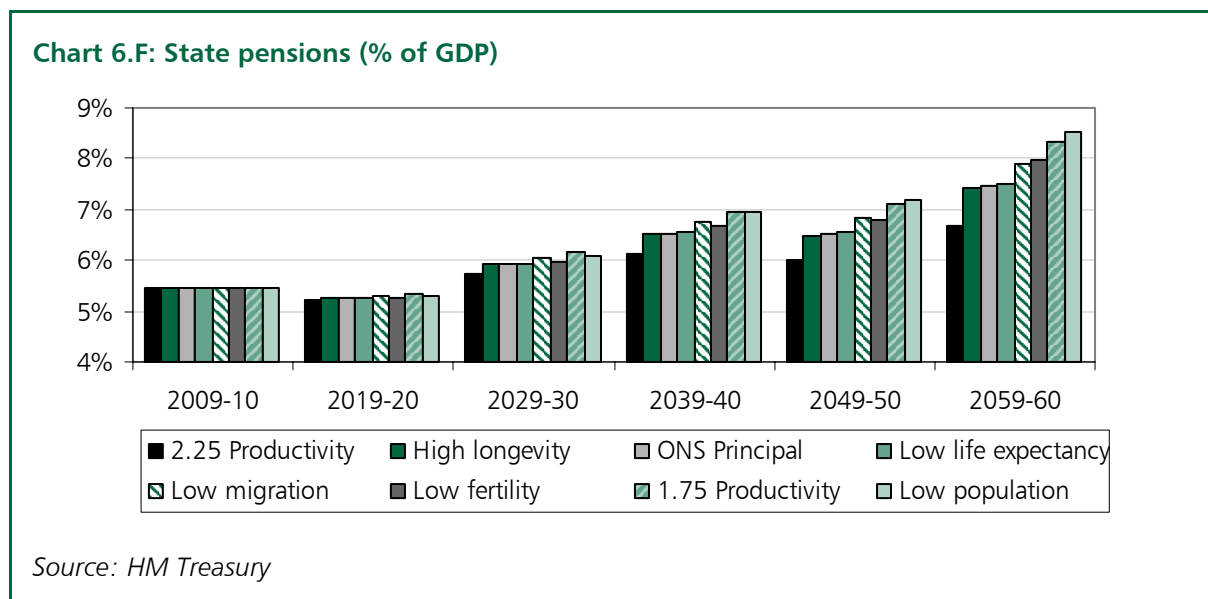
State pensions

6.29 Pensions are intended to provide incomes for people when they have retired. The longer people live, the more income they will need for a given retirement age. Between 2009 and 2059, number of those aged 68 and above (i.e. State Pension age in 2060) is projected to increase by over 9m.⁵

6.30 An important long-term solution to increasing life expectancy is to increase working lives. Many developed countries, including the UK, have therefore legislated for increases in the official retirement age. Starting from April 2010, the State Pension age for females will gradually rise from 60 to 65 to equalise with the male State Pension age of 65 by 2020. Between 2024 and 2046 the State Pension age will further rise to 68 for both men and women.

⁵ ONS 2008-based Population Projections, Office for National Statistics, 2009

6.31 The significant increase in the number of elderly approaching retirement age, as described in Chapter 2, increases pressures on state pension expenditure in the coming decades in each of the scenarios shown in Chart 6.F. The most marked difference in the scenarios results from different assumptions on productivity, and therefore earnings growth. However, demographic assumptions are also important, in particular those that imply a smaller workforce, namely low migration and low fertility projections.



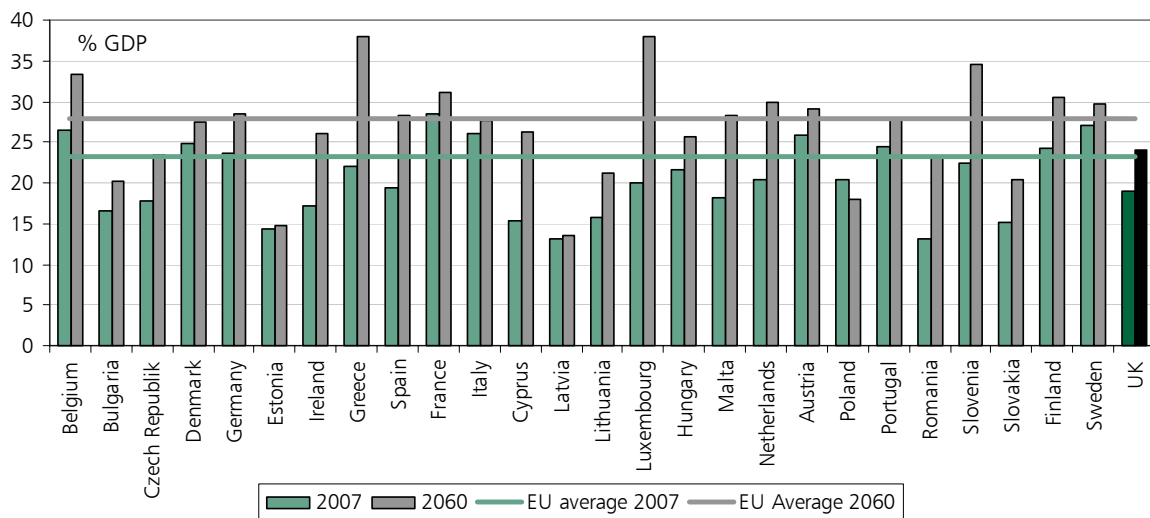
Environment-related spending

6.32 As set out in Chapter 3, action to tackle climate change is expected to lead to increased infrastructure investment levels over the coming decades. Much of this investment is expected to come from the private sector. Spending on the environment will be driven by strategies to mitigate the most damaging effects of climate change, for example by investing in research and development of low carbon technologies and by adapting to the unavoidable climate change expected in any event. Government spending on low-carbon technology development and deployment will create incentives would ease pressures to support such activities through public spending in the UK.

International comparison of age-related spending projections

6.33 The European Union’s Economic Policy Committee recently published its 2009 Ageing Report. As Chart 6.G shows, age-related expenditure in the UK is significantly lower than in most EU countries and is projected to remain well below the EU average by 2060.

Chart 6.G: EU EPC Spending projections



Source: EU Economic Policy Committee, 2009

Tax revenues

6.34 This section sets out bottom-up projections for the pressures on taxes on income and wealth, mostly made up by income and corporation taxes, and taxes on consumption and production, such as VAT, fuel duty and excise duties. The long-term trends identified in this report could affect tax revenues in different, and in some cases offsetting, ways.

Taxes on income and wealth

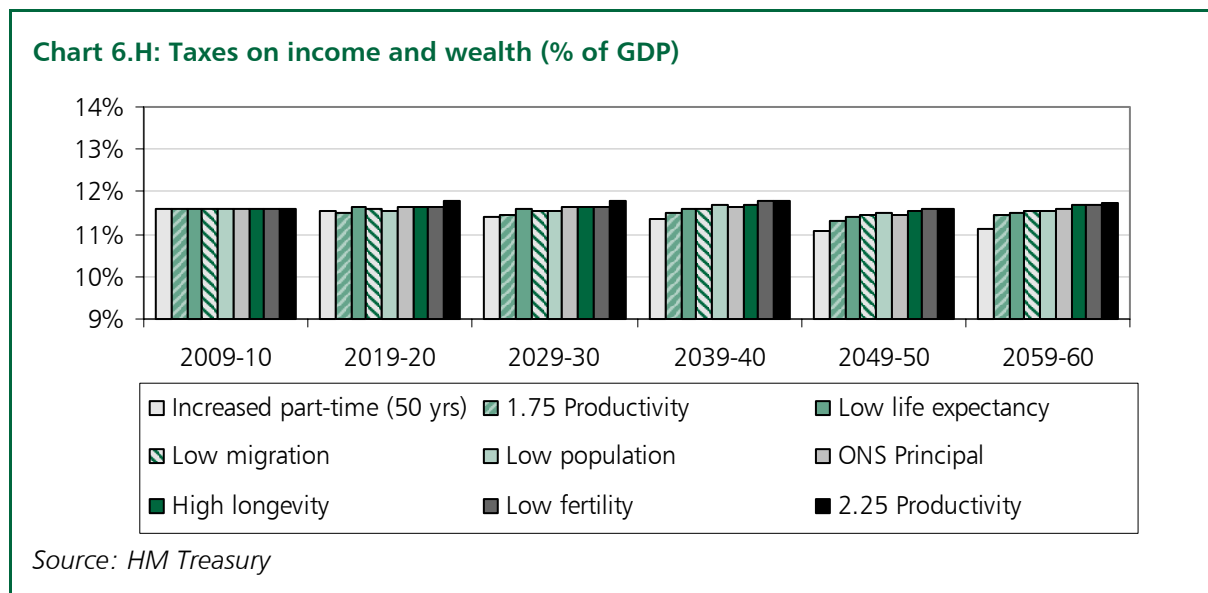
6.35 In broad terms, long-term changes in receipts from taxes on income and wealth are likely to be closely linked to long-term economic growth. The long-term challenges set out in earlier chapters are therefore likely to affect the amount of tax receipts from income and wealth in the same way as they affect the economy, and therefore, as a share of GDP, receipts are likely to remain relatively constant.

6.36 However, there are some trends that may affect receipts but are not linked to economic growth. Due to the structure and progressive nature of the income tax system, a given amount of income can incur different amounts of income taxes, depending on how evenly it is spread out between different earners. For example income tax receipts from one employee earning £50,000 a year will be higher than from two employees earning £25,000 a year each. A change in the income distribution could therefore lead to changes in receipts as share of GDP in the long term.

6.37 Corporation tax receipts may also be affected by trends that affect GDP in different ways. For example a changing share of different sectors in the economy and of their corresponding levels of profitability could affect corporation tax in a similar way to the way in which changes in the income distribution might affect income tax receipts.

6.38 Chart 6.H below shows long-term projections for taxes on income and wealth for a number of different demographic and productivity scenarios, and for a scenario that implies a change in the income distribution. Varying the assumption of productivity growth and demographic change affects the long-term projections only slightly, which is the result of both tax receipts and GDP being affected in similar ways by the different assumptions.

6.39 The projections also illustrate the effect of changes in the income distribution resulting from behavioural changes. In particular, the 'Increased part-time (50 yrs)' scenario shows how revenues would change if the average tax rate of male and female taxpayers converged. This, for example, could happen if couples decided that both partners would work part-time, instead of relying on one person to be the main earner. As explained above, due to personal allowances and increasing marginal tax rates for higher incomes, the same income shared between two individuals yields lower taxes than if earned by a single person. The projection assumes that all taxpayers change their behaviours in this way. While this is unlikely it is intended to illustrate the direction of pressure that increased part-time working could place on revenues.



Taxes on consumption and production

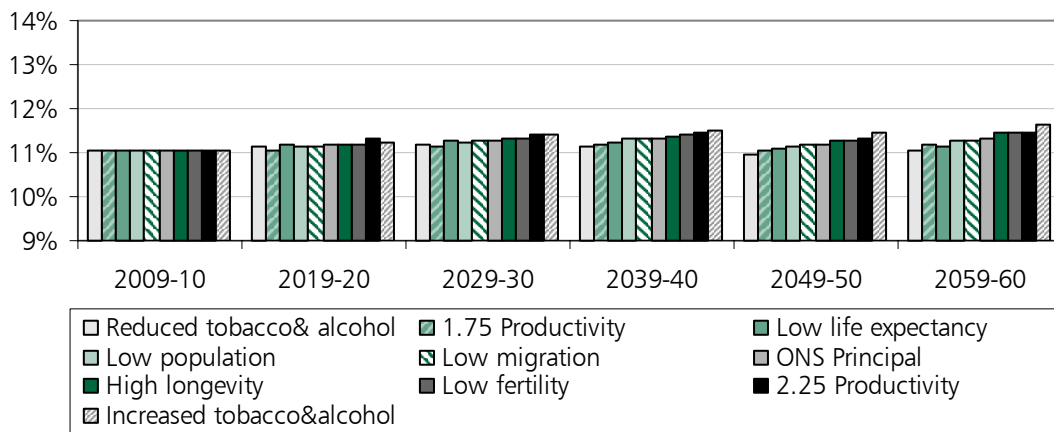
6.40 Taxes on consumption and production, like taxes on income and wealth, are closely linked to economic growth and are therefore projected to remain relatively constant as a share of GDP. Moreover, the projections change relatively little under different demographic and productivity scenarios, as shown in Chart 6.I.

6.41 Behavioural changes, such as changing consumption patterns over time, are likely to have a slightly more pronounced effect on the projections. For example receipts from excise duties on tobacco or alcohol would be affected if smoking habits or alcohol consumption change. The 'reduced alcohol and tobacco' and 'increased alcohol and tobacco' scenarios show how receipts would change if consumption of alcohol and tobacco were to either fall or increase by ½ per cent each year.

6.42 Revenues from consumption taxes are also likely to be affected by alterations in consumption patterns brought about by regulatory changes. For example the introduction of EU emissions targets are likely to increase vehicle fuel efficiency levels, which in turn could affect motoring tax revenues.

6.43 In addition to the indirect effect of increased globalisation and technological change on productivity growth and therefore tax receipts, it may also create risks and pressures on taxes from consumption and production, from increasing opportunities for cross-border shopping and distance provision.

Chart 6.I: Taxes on consumption and production (% of GDP)



Source: HM Treasury

Box 6.C: Taxes related to the environment

Environment and transport taxes are generally imposed on the consumption of high-carbon – or environmentally damaging – goods and services. They allow the Government to raise revenues while at the same time encouraging behavioural change that reduces emissions and provides incentives that lead to low-carbon economic growth. Through its statement of intent, the Government signalled its aim to reform the tax system to shift the burden of tax from ‘goods’ (e.g. employment) to ‘bads’ (e.g. pollution) over the long term.⁶

Carbon pricing is the central tool of climate change policy,⁷ as set out in Chapter 3. Fiscal instruments, both carbon trading and tax, can act to put an explicit price on carbon. By allowing the market to choose the cheapest options for reducing carbon emissions, tax or trading can produce a more efficient outcome than regulation.

Fiscal policy can play a significant role in delivering carbon budgets. Tax changes announced at Budget 2009 will save an additional three million tonnes of carbon dioxide (MtCO₂) by 2013/14, mainly through increases in fuel duty and landfill tax. Future Budgets will continue to examine options for further carbon savings while also taking account of social, fiscal and economic objectives.

Environment and transport taxes currently raise over seven per cent of the total tax take. Tackling climate change offers some opportunities to support the public finances through environment and transport taxes. But as the economy shifts in structure, there may also be indirect impacts on other tax bases, such as transport or income, which could act to offset these increases.

⁶ Statement of intent on environmental taxation (1997)

⁷ See Box 3.A for a more detailed analysis on carbon pricing.

Conclusion

6.44 This report illustrates the potential pressure that long-term challenges and trends could put on the public finances. Given these and other pressures, the Government has set out fiscal consolidation plans in the Pre-Budget Report that are consistent with debt returning to lower levels. These plans will ensure the public finances are on a sustainable path, which in turn will promote long-term economic growth. It will also ensure the public finances are able to manage any unexpected economic shocks in future.

A Bibliography

A.1 Age and Individual Productivity: A literature survey, Skirbekk, 2003

A.2 A Potential Decline in Life Expectancy in the United States in the 21st Century, Olshansky et al, March 2005

A.3 Cabinet Office: Future Strategic Challenges for Britain
http://www.cabinetoffice.gov.uk/strategy/work_areas/strategic_challenges0208.aspx

A.4 Climate Change Act, November 2008

A.5 Congressional Budget Office: The Long-Term Budget Outlook, June 2009

A.6 Department of Health: Shaping the future of care together, Social Care Green Paper, July 2009

A.7 Economic Policy Committee and European Commission: 2009 Ageing Report: Economic and Budgetary Projections for the EU-27 Member States, 2008-2060

A.8 Economic Policy Committee and European Commission: 2009 Ageing Report: Underlying assumptions and projection methodologies for the EU-27 Member States (2007-2060)

A.9 Explaining trade busts: output versus trade costs in the Great Depression and today, Campbell. D and Meissner September 2009

A.10 Economic and Social Research Council <http://www.esrc.ac.uk/ESRCInfoCentre/index.aspx>

A.11 Eurostat population projections
<http://epp.eurostat.ec.europa.eu/portal/page/portal/population/data/database>

A.12 Government Actuary's Department
<http://www.gad.gov.uk/Demography%20Data/Population/index.aspx>

A.13 HM Government: Ageing Strategy: Building a Society for All Ages, 2009

A.14 HM Treasury: Long-term public finance report: an analysis of fiscal sustainability, *HM Treasury*, 2002

A.15 HM Treasury: Long-term public finance report: fiscal sustainability with an ageing population, *HM Treasury*, 2003

- A.16** HM Treasury: Long-term public finance report: fiscal sustainability with an ageing population, *HM Treasury*, 2004
- A.17** HM Treasury: Long-term public finance report: an analysis of fiscal sustainability, 2005
- A.18** HM Treasury: Long-term public finance report: an analysis of fiscal sustainability, 2006
- A.19** HM Treasury: The UK economy: Long-term performance and strategic challenges, *HM Treasury*, 2008
- A.20** HM Treasury: Budget 2009: Building Britain's Future, April 2009
- A.21** HM Treasury: Moving to a low carbon economy: implementing the Stern Review, *HM Treasury*, October 2007
- A.22** HM Treasury: Embracing Financial Globalisation, May 2008
- A.23** International Monetary Fund, World Economic Outlook Database, April 2009
- A.24** International Monetary Fund, World Economic Outlook Database, October 2009
- A.25** IMF Occasional Paper: "Reaping the benefits of financial globalisation", Dell'Ariccia, Giovanni, Faria, Schindler and Terrones, 2008
- A.26** Labour Force Survey, 2009 <http://www.esds.ac.uk/Government/lfs/>
- A.27** Limits to Human Life Expectancy: Evidence, Prospects and Implications, Manton, Stallard and Tolley, 1991
- A.28** Office for National Statistics: 2008-based population projections <http://www.statistics.gov.uk/StatBase/Product.asp?vlnk=8519>
- A.29** Spending on Health Care: How much is enough? Appleby and Harrison, 2006
- A.30** Stern, N. Stern Review on the Economics of Climate Change, October 2006
- A.31** United Nations Conference on Trade and Development <http://www.unctad.org/Templates/Page.asp?intItemID=2921&lang=1>
- A.32** UN Secretariat: World Population Prospects: The 2006 Revision, Department of Economic and Social Affairs
- A.33** UN Secretariat: World Population Prospects: The 2009 Revision, Department of Economic and Social Affairs

LIST OF CHARTS

- 2.A Life expectancy and healthy life expectancy at age 65 (Male)
- 2.B Number of people ('000) by age in 2008
- 2.C Total fertility rate, UK countries, 1971-2008
- 2.D Total migration – gross flows into and out of the UK
- 2.E Population projections by age group (thousands)
- 2.F Population projections from different years since 2000
- 2.G Old-age dependency ratios
- 2.H Projected age distribution of workforce in 2010, 2020 and 2030
- 2.I Increase in the old-age dependency ratio between 2010 and 2050
- 4.A Advanced, emerging markets and developing economies share in world GDP
- 4.B Current commodity price indices
- 5.A Productivity growth (output per worker)
- 5.B Employment projections
- 5.C Increase in labour supply in European Member States between 2007 and 2060
- 5.D Labour Market Participation, 2008
- 5.E Participation rates of those who work up to State Pension age
- 5.F GDP growth 2007-2060, %
- 6.A Long-term projection for public sector net debt
- 6.B Health spending (% of GDP)
- 6.C Long-term care spending (% of GDP)
- 6.D Education and skills spending (% of GDP)
- 6.E Pay-as-you-go public sector pension spending (% of GDP)
- 6.F State pensions (% of GDP)
- 6.G EU EPC Spending projections (% of GDP)
- 6.H Taxes on income and wealth (% of GDP)
- 6.I Taxes on consumption and production (% of GDP)

LIST OF TABLES

- 2.A Assumptions for selected variant population projections
- 5.A Average employment growth per year
- 5.B Annual average real GDP growth for a range of productivity scenarios and population variants

LIST OF BOXES

- 2.A The interaction between age structure and the public finances
- 2.B Government Ageing Strategy
- 3.A Carbon pricing
- 5.A Major technological innovations in the past
- 5.B Projected size of the economy and GDP per capita
- 6.A Cap and share reforms in the public service pension schemes
- 6.B Total liability figure for Pay As You Go Public Service Pension Schemes
- 6.C Taxes related to the environment

LIST OF ABBREVIATIONS

DWP	Department for Work and Pensions
EPC	Economic Policy Committee
EU	European Union
EU ETS	EU Emission Trading Scheme
FDI	Foreign Direct Investment
G20	Group of Twenty
GAD	Government Actuary's Department
GDP	Gross Domestic Product
GPTs	General-purpose Technologies
IMF	International Monetary Fund
ICT	Information and Communication Technologies
NHS	National Health Service

LTPFR	Long-term Public Finance Report
MAC	Marginal abatement cost
NHS	National Health Service
NICs	National Insurance Contributions
NIESR	National Institute of Economic and Social Research
ONS	Office for National Statistics
OECD	Organisation for Economic Co-operation and Development
PAYG	Pay As You Go
PBR	Pre-Budget Report
PCPF	Parliamentary Contributory Pension Fund
R&D	Research and Development
SCC	Social cost of carbon
SPA	State Pension age
UN	United Nations
VAT	Value Added Tax
WEO	World Economic Outlook

HM Treasury contacts

This document can be found in full on our website at:

hm-treasury.gov.uk

If you require this information in another language, format or have general enquiries about HM Treasury and its work, contact:

Correspondence and Enquiry Unit

HM Treasury

1 Horse Guards Road

London

SW1A 2HQ

Tel: 020 7270 4558

Fax: 020 7270 4861

E-mail: public.enquiries@hmtreasury.gov.uk

ISBN 978-1-84532-635-7



9 781845 326357 >