Office for
Budget Responsibility

Fiscal risks and sustainability

July 2023

CP 870

Office for Budget Responsibility: Fiscal risks and sustainability

Presented to Parliament by the
Exchequer Secretary to the Treasury
by Command of His Majesty

July 2023

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Foreword

The Office for Budget Responsibility (OBR) was established in 2010 to examine and report on the sustainability of the public finances. A central feature of our efforts to meet that remit has been finding better ways to capture and communicate economic and fiscal risks. Ever since our first *Economic and fiscal outlook* (*EFO*) in 2010, we have emphasised the degree of uncertainty around our central forecasts by using probabilistic ranges ('fan charts'), alternative scenarios, and sensitivity analysis. Our *Fiscal sustainability reports* (*FSR*s) that included long-term projections of the public finances also included sensitivity analysis to changes in key demographic, macroeconomic, and other assumptions. Between 2017 and 2021, we produced a biennial *Fiscal risks report* (*FRR*), setting out the main risks to the public finances, including macroeconomic and specific fiscal risks.

In the January 2022 update to the *Charter for Budget Responsibility*, Parliament amended the OBR's remit to, in effect, give us greater discretion to determine the content of our annual sustainability report, which had previously alternated each year between the long-term projections in the *FSR* and the focus on risks in the *FRR*. Last year, we published our first combined *Fiscal risks and sustainability* report (*FRS*), which incorporated both our biennial long-term projections and updated analysis of major potential fiscal risks. As required under the *Charter*, the Treasury responded to this report alongside the March 2023 Budget.

In this, our second *FRS*, we focus on three specific risks: the rise in health-related inactivity in the labour market; the effect of higher gas prices on the demand for and supply of energy; and the effects of rising interest rates and high inflation on the UK's public debt. We have also updated our fiscal risks register, which we have amended to present risks across three high-level themes: shocks; policy risks; and long-term trends.

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

We have also drawn on the help and expertise of officials across numerous government departments and agencies, including HM Treasury, the Bank of England, the Chief Medical Officer, the Climate Change Committee, the Debt Management Office, the Department for Energy Security and Net Zero, the Department of Health and Social Care, HM Revenue and Customs, the Department for Work and Pensions, the National Infrastructure Commission, NHS England, and the Office for National Statistics. We are very grateful for their insight.

In addition, we have benefited from discussions with experts from outside government. In particular, we would like to thank the Health Foundation, the Institute for Fiscal Studies, the International Monetary Fund, the Institute for Government, the Institute for Public Policy Research, the National

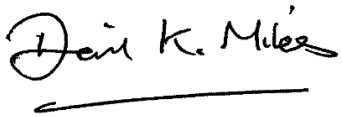
Institute of Economic and Social Research, the Resolution Foundation, Professor Ben Baumberg Geiger at King's College London, Professor Clare Bambra at Newcastle University, Spencer Dale at BP, Jacob Nell from EDF Trading, Selma Mahfouz at the French General Inspectorate of Finance, Gene Frieda and colleagues at PIMCO, and students from U3A. We would also emphasise that despite the valuable assistance received, all judgements and interpretation underpinning the analysis and conclusions of the *FRS* are ours alone.

We provided the Treasury with a summary of our main conclusions on 23 June, and an updated version of these on 3 July. Given the importance of the report to the Treasury in managing fiscal sustainability and risks, we have engaged with Treasury officials throughout the process. We provided a full and final copy of this document once it was complete.

At no point in the process did we come under any pressure from Ministers, special advisers or officials to alter any of our analysis or conclusions.

We would be pleased to receive feedback on any aspect of the content or presentation of our analysis. This can be sent to feedback@obr.uk.

Richard Hughes



Professor David Miles CBE

Andy King

The Budget Responsibility Committee

Executive summary

1.1 The 2020s are turning out to be a very risky era for the public finances. In just three years, they have been hit by the Covid pandemic in early 2020, the energy and cost-of-living crisis from mid-2021, and the sudden interest rate rises in 2022, whose consequences continue to unfold. This rapid succession of shocks has delivered the deepest recession in three centuries, the sharpest rise in energy prices since the 1970s, and the steepest sustained rise in borrowing costs since the 1990s. And they have pushed government borrowing to its highest level since the mid-1940s, the stock of government debt to its highest level since the early 1960s, and the cost of servicing that debt to its highest since the late 1980s.

1.2 From this more vulnerable position, governments face growing costs from an ageing society, a warming planet, and rising geopolitical tensions – challenges that no longer loom in the distance in our 50-year projections but pose significant fiscal risks in this decade:

- as the 'baby boom' cohorts enter retirement and high inflation ratchets up the cost of the triple lock, state pension spending is expected to be £23 billion in today's terms (0.8 per cent of GDP) higher in 2027-28 than at the start of the decade;
- as global temperatures rise and the 2050 deadline for reaching net zero draws closer, rising take-up of electric vehicles is expected to cost £13 billion a year in forgone fuel duty by 2030, while the public investments needed to support the decarbonisation of power, buildings, and industry could reach £17 billion a year by that date; and
- in response to growing security threats in Europe and Asia, the Government has said it aspires to increase defence spending – for the first time in seven decades – from 2 to 2.5 per cent of GDP, at a potential cost of £13 billion a year in today's terms.

1.3 In this second integrated *Fiscal risks and sustainability* report, we examine the aftershocks of three key risks that have crystallised since 2020 and consider their future fiscal implications:

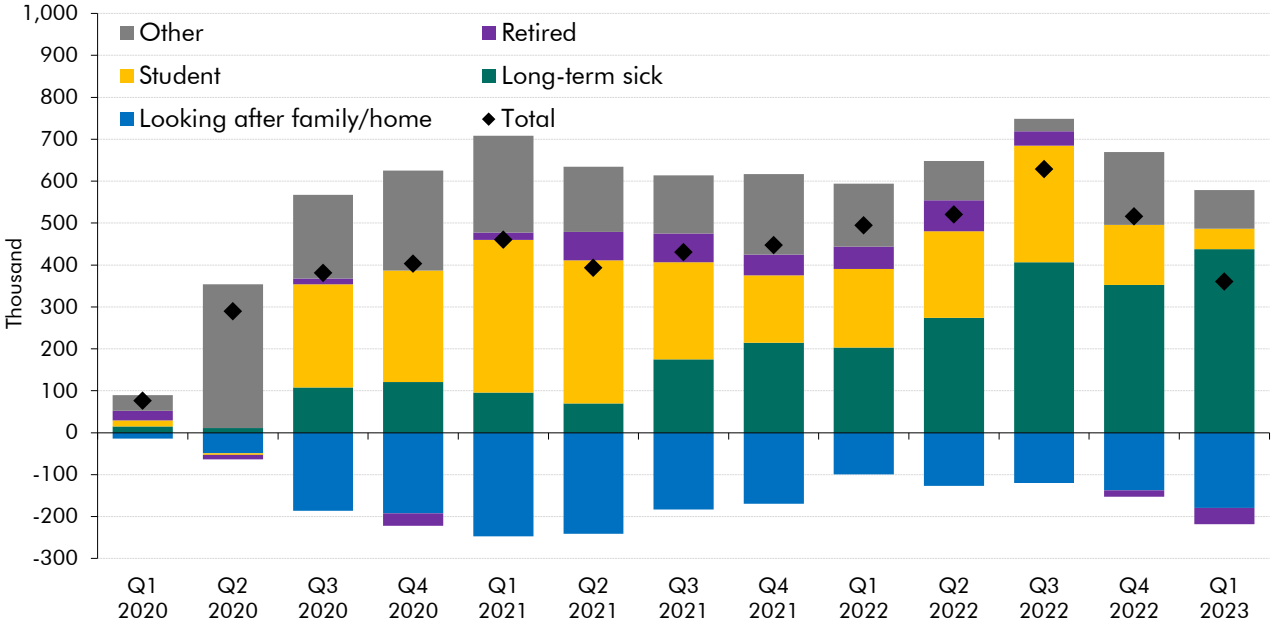
- **Chapter 2** explores the drivers of, and prospects for, one of the most worrying post-pandemic trends, the rise in **health-related inactivity** among working-age adults;
- **Chapter 3** considers the impact of the rise in gas prices on **energy** demand and supply and the fiscal costs of meeting or missing the net zero emissions target in 2050;
- **Chapter 4** examines the vulnerability of current government **debt** levels, the impact of recent interest rate rises, and prospects for reducing debt over the medium term; and
- **Chapter 5** covers other risks in our **fiscal risks register**, how they have evolved since our last update in July 2021, and any mitigating actions the Government has taken.

Inactivity and health (Chapter 2)

1.4 After rising to an all-time high in early 2020, working-age labour market participation has fallen in the aftermath of the pandemic. In the decade following the financial crisis, rising labour force participation was a bright spot in an otherwise disappointing decade for economic growth. Over the 2010s, the working-age employment rate rose from 70 to 77 per cent, making up for relatively meagre growth in productivity over this period. The pandemic saw a sudden and dramatic reversal of this trend, with the working-age inactivity rate rising by 1.5 percentage points to 21.7 per cent at its peak in mid-2022 and the number of people classed as inactive rising by almost 650,000. Today, working-age inactivity remains 350,000 above pre-pandemic levels, and the post-pandemic jump in inactivity seen in the UK was unusual compared to other advanced economies, which saw their working-age inactivity rates *fall* by an average of 0.4 percentage points between late 2019 and late 2022.

1.5 The largest and most durable source of this rise in inactivity has been among those citing ill-health as their principal reason for being out of the labour market. An influx of students into higher education and a spate of early retirements added 390,000 and 80,000 respectively to the ranks of the newly inactive at their peaks in 2021. But by early 2023, these temporary surges had run their course, and the number of early retirees has fallen below pre-pandemic levels in recent months. By contrast, the number of people outside the workforce for health reasons has continued to rise. It reached 440,000 in the three months to April 2023, exceeding the net post-pandemic rise in inactivity of 350,000. As of early 2023, there were 2.6 million working-age people (6.1 per cent of the working-age population) outside the labour force for health reasons, making this group, for the first time, the single-largest segment of the economically inactive population.

Chart 1.1: The rise in working-age inactivity since early 2020



Note: Changes are shown relative to December-February 2020 – the pre-pandemic low-point for the 16-64-year-old inactivity rate.
Source: ONS

1.6 This rise in health-related inactivity seems to be driven by the interplay of three main causal factors, some of which pre-date the pandemic:

- **a slowdown, and partial reversal, in the rate of improvement in the health of the working-age population** over the past decade, reflecting both worsening trends in some specific health conditions – particularly mental health conditions – and an increase in the average age of the working-age population;

- **the impact of the pandemic on the health of the working-age population** both as a direct result of Covid on people's physical health, and due to the disruptive effects of the pandemic on people's mental health and the treatment of non-Covid health conditions; and

- **rising onflows to health-related benefits**, which may partly reflect the degree of ongoing assessment, conditionality, and return-to-work support for those on health-related benefits versus other out-of-work benefits, alongside the role of a sustained period of weak household income growth and rising cost-of-living pressures increasing the incentives to claim the former, more generous, benefits.

1.7 The increase in health-related inactivity has been concentrated among certain age groups, those with particular health conditions, those from lower socioeconomic groups, and those from certain types of prior employment. Specifically, the post-pandemic rise in health-related inactivity has been particularly pronounced among those who:

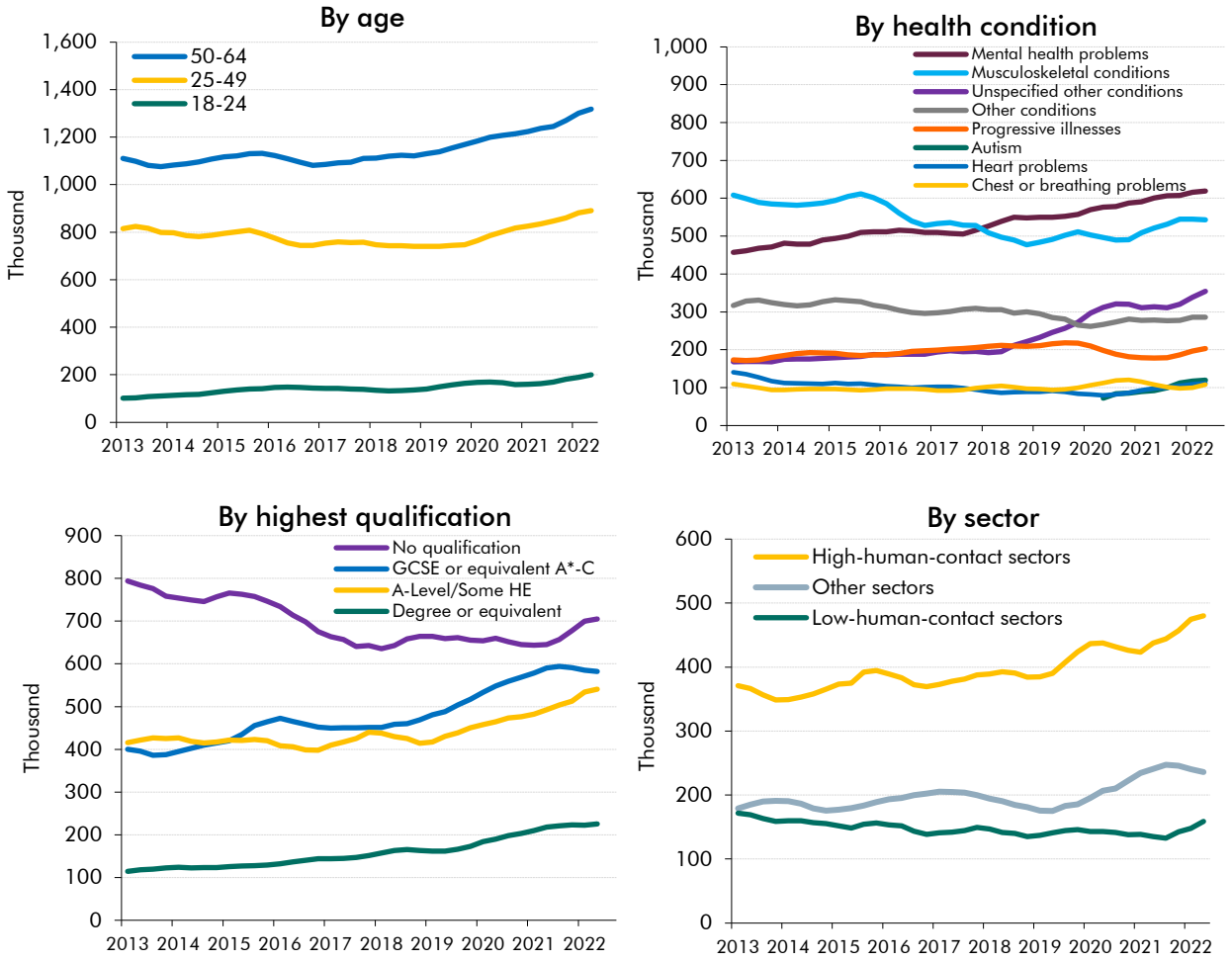
- are **older**, with those aged 50 to 64 accounting for around half of the post-pandemic increase in health-related inactivity, despite accounting for less than a third of the working-age population;

- are suffering from **mental health problems or other unspecified conditions**, which together account for around half of the total rise in health-related inactivity since the pandemic;

- are **relatively low skilled**, with those with either no qualifications or qualifications at A-level and below accounting for three-quarters of the total long-term sick inactive population and nearly three-fifths of the increase in that population since the start of 2020, despite making up only half of the working-age population; and

- have previously worked in **lower-paid, customer-facing service industries and occupations**, with the largest increases in health-related inactivity being among those who had previously worked in caring, leisure, and other services; sales and customer services; and elementary occupations (such as cleaners and hospital porters).

Chart 1.2: Characteristics of the working-age, long-term sick inactive population



Note: High-human-contact sectors include distribution, hotels, restaurants, health and education; other sectors include other services, transport and communication; low-human-contact sectors account for the rest. Autism data only available from 2020. Data cover working-age adults only and are smoothed using annual rolling averages.
Source: OBR analysis of unpublished LFS microdata

1.8 However, the vast majority of those currently inactive for health reasons have been out of work since before the pandemic. 1.5 million (62 per cent) of the working-age inactive population have been out of work for more than three years, and 560,000 (23 per cent) have never had a job. Only 100,000 (4 per cent) have been out of work for less than a year. Given that a person's likelihood of returning to work declines rapidly the longer they are out of work – among those with health problems, an average of one-in-six people return to work each quarter in the first year after leaving, whereas only one-in-twenty do when they have been out of work a year or longer – this clearly presents a challenge for efforts to reverse this recent trend.

1.9 Only a relatively small proportion of those inactive for health reasons are on the NHS waiting list. The post-pandemic rise in health-related inactivity was accompanied by a steep rise in the number of waits for NHS treatments (with many people waiting for more than one) from 4.6 million in January 2020 to 7.4 million in May 2023. The coincident rise in these indicators suggests the possibility of a causal link, but we estimate that only 2.9

million *working-age people* were on the waiting list in 2022, of whom only around 650,000 were *inactive due to long-term sickness* (or a quarter of the long-term sick inactive population). While the disruption to and difficulties in accessing NHS services may have played a role in the worsening physical and mental health of the working-age population during this period, tackling the NHS waiting list alone is likely to make only a modest difference in the number of people out of work. We estimate that halving the NHS waiting list over five years – returning it to its mid-2015 level of around 3½ million – would only reduce working-age inactivity by around 25,000.

1.10 The large and growing number of people out of the workforce for health reasons or working with a health condition puts pressure on the public finances via three potential channels:

- **Higher welfare spending for those claiming health-related benefits**. Over four-fifths of those inactive for health reasons, and more than 100 per cent of the change in this group over the past three years, are in receipt of incapacity benefits. With an average increase in universal credit awards of around £10,000 a year for this group, combined with rising disability benefit claims among both those in and out of work, the total increase in welfare spending associated with the 440,000 increase in health-related inactivity and 490,000 increase in ill-health among those *in work* is estimated to be around £6.8 billion in 2023-24.

- **Foregone tax revenue from people either not working, or working fewer hours and earning less**. These fiscal costs are somewhat smaller than might be expected as the vast majority of those inactive for health reasons would have been likely to work in relatively low-wage occupations due to their lower qualifications. So the average income tax and NICs loss when employment falls and health-related inactivity rises – based on the evidence of the past three years – is estimated to be around £5,000 a year for each person, or £2.2 billion in total. Combined with lost income tax and NICs revenues as a result of rising ill-health within the working population (£3.0 billion) and indirect effects on other taxes (£3.7 billion), the total annual tax loss as a result of rising health-related inactivity and in-work ill-health over the past three years is likely to have risen to around £8.9 billion a year in 2023-24.

- **Higher health care spending, reflecting the two-way relationship between the duration of economic inactivity and deterioration in health**. We estimate that each individual moving into health-related inactivity costs the NHS between £900 and £1,800 a year, as well as precipitating further costs in future given the well-documented negative effect of worklessness on people's health.

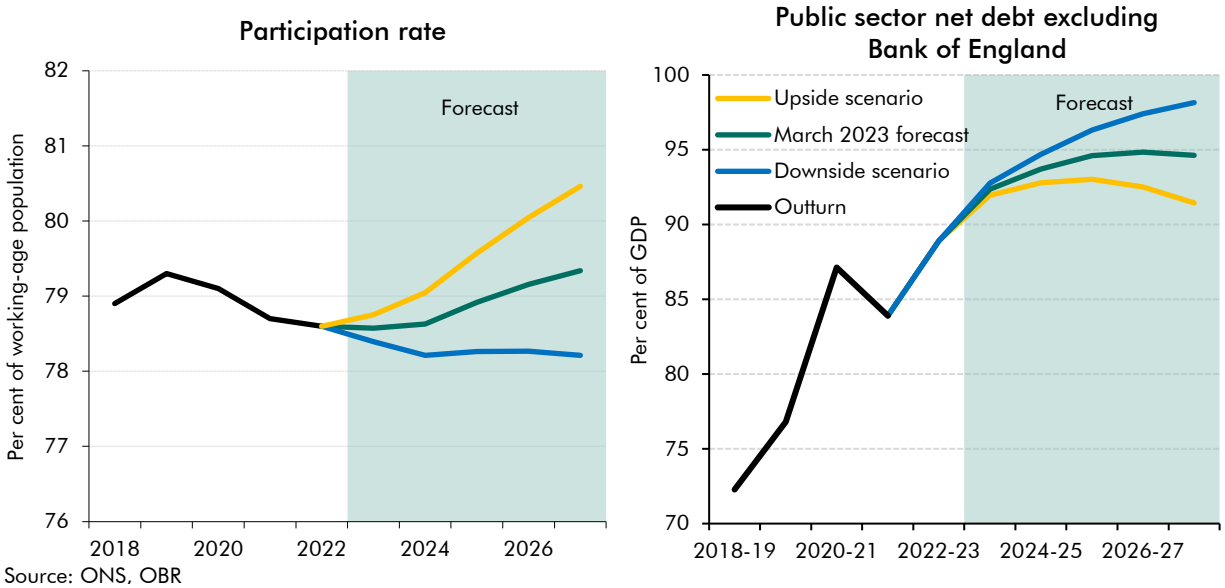
1.11 Arresting and partially reversing the recent rise in health-related inactivity and in-work ill-health could significantly reduce a large and growing pressure on the public finances. Based on these estimates, we look at three scenarios for the future evolution of health-related inactivity:

- The **central forecast** from our March 2023 *Economic and fiscal outlook* (*EFO*), in which working-age participation recovers from 78.6 per cent in 2022-23 to 79.3 per cent in 2027-28. In this forecast, borrowing falls from 2023-24 onwards, reaching £49.3 billion (1.7 per cent of GDP) by 2027-28, but debt (excluding the Bank of England) rises until 2026-27, before falling slightly to 94.6 per cent of GDP in 2027-28.

- An **upside scenario** in which the pace of improvement in working-age participation returns to its pre-pandemic trajectory during the 2010s, with the rate rising to 80.5 per cent by 2027-28. This is driven by a 500,000 (20 per cent) reduction in health-related inactivity (and an equivalent decline in in-work ill-health) relative to our central forecast. Relative to our central forecast, this scenario reduces borrowing by £18.7 billion (0.6 per cent of GDP) by 2027-28, of which £6.5 billion comes from lower welfare spending, £10.9 billion from higher tax revenues, and £1.3 billion from lower debt interest spending. Debt falls from 2025-26 onwards, to reach 91.6 per cent of GDP in 2027-28.

- A **downside scenario** in which working-age participation falls for another year to 78.2 per cent and then remains around that level until 2027-28. This scenario symmetrically sees 500,000 more people out of work for health reasons by 2027-28 relative to our central forecast. Relative to our central forecast, borrowing rises by £21.3 billion (0.8 per cent of GDP) by 2027-28, of which £7.6 billion comes from higher welfare spending, £10.9 billion from lower tax revenues, £1.3 billion from higher NHS pressures, and £1.5 billion from higher debt interest spending. The borrowing change is slightly larger than in our upside scenario due to the inclusion of higher NHS spending and some persistence in disability benefits spending when people move into work. Debt continues to rise reaching 98.0 per cent of GDP in 2027-28.

Chart 1.3: Changes in participation and debt in the scenarios

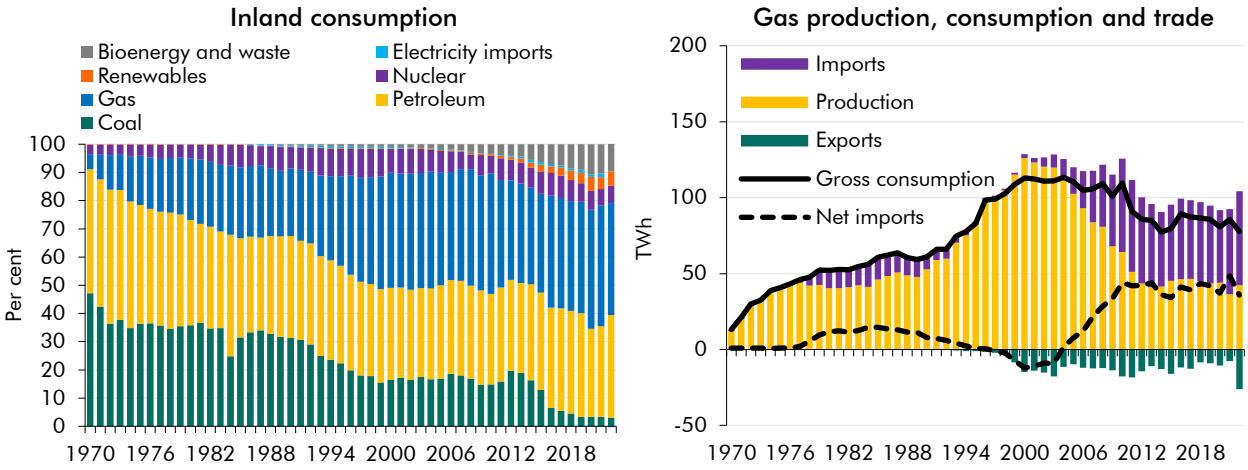


Source: ONS, OBR

Energy (Chapter 3)

1.12 Despite our comparatively rapid progress in decarbonising over the past 30 years, the UK remains one of the most gas-dependent economies in Europe. The UK has achieved the largest reduction in CO_2 emissions of any G7 country since 1990, largely by switching from coal to gas as our principal source of energy. Gas has therefore risen from 24 per cent of total inland energy consumption in 1990 to 40 per cent in 2022 (left panel of Chart 1.4). This left the UK the fourth most gas-intensive economy of 40 European countries prior to the Russian invasion of Ukraine. And net imports have risen since 2000 to now make up around half of the gas consumed in the UK today (right panel of Chart 1.4). So changes in global gas prices represent more of a 'terms of trade' shock for the UK than for many other advanced economies.

Chart 1.4: Energy consumption and trade in the UK



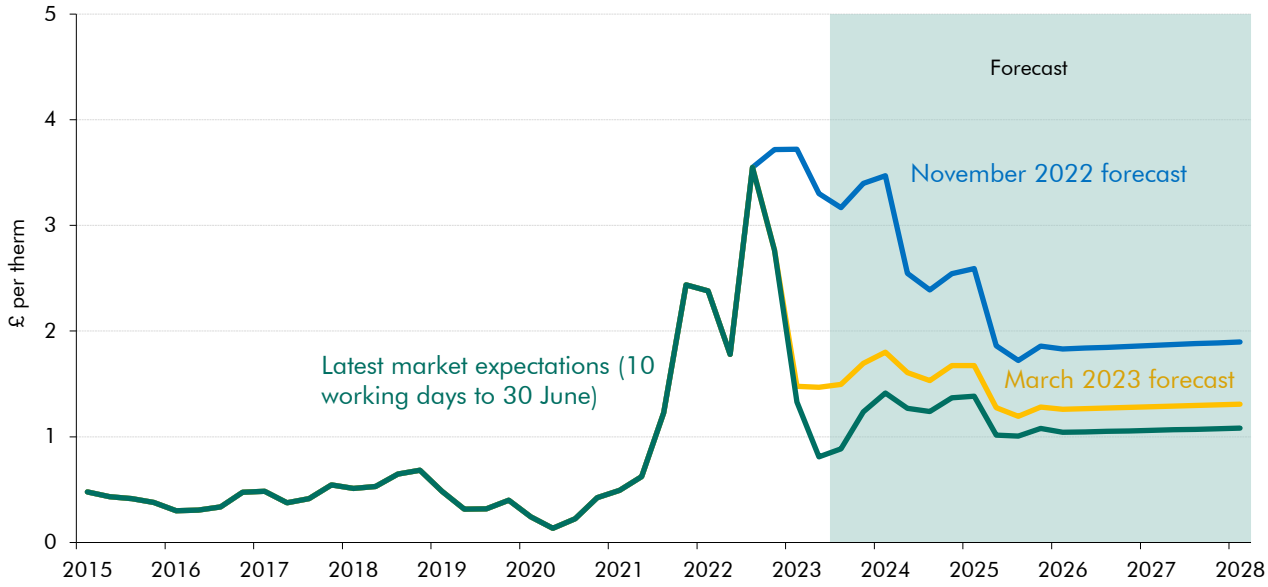
Note: Before 1998, gas exports includes exports of primary electricity.
Source: DESNZ

1.13 Having risen thirteen-fold in the wake of the Russian invasion of Ukraine in 2022, gas prices have fallen back more recently but are expected to remain at over twice their historical average into the mid-2020s. European wholesale gas prices were relatively stable at around 50p a therm in the decade leading up to the pandemic, reflecting a steadily growing supply of pipeline gas from Norway and Russia matching steadily rising demand from European households and businesses. The interruption of Russian pipeline gas sent daily spot prices soaring to £6.40 a therm in late August, before falling to £1.10 at the time of our latest forecast in March 2023. Markets expect prices to settle at around £1 a therm in the second quarter of 2025, as additional capacity to import liquified natural gas (LNG) from the United States and Qatar comes on stream.

1.14 Globally, the rise in gas prices has made renewable energy sources cheaper than gas for the first time. Despite significant falls in the cost of renewable energy sources over the past decade, gas-fired power remained cost competitive with other forms of electricity with an average lifecycle or 'levelised' cost of energy 58 per cent lower than offshore wind, 8 per

cent lower than onshore wind, and 35 per cent lower than solar energy in 2020.[1] However, estimates of the lifetime cost of generating electricity using gas in 2022 rose above the price of renewable energy, by between 3½ to 8 times depending on the choice of technology. But if global gas prices follow market expectations, gas is likely to return to being competitive with low-carbon technology in lifetime unit cost terms, at least for a period.

Chart 1.5: Gas prices



Note: As in our March 2023 forecast, latest market expectations from the first quarter of 2026 are held constant in real terms.
Source: Datastream, Eikon, OBR

1.15 Higher gas prices in the near term have reduced energy demand but also household incomes. The overall reduction in the energy intensity of the UK economy since the last energy crisis in the 1970s means that a *larger* rise in average energy prices over the past two years has had a *more modest* impact on output and consumption. And while the impact of higher wholesale gas prices on consumers was cushioned by the Ofgem price cap and the Government's energy price guarantee, the price of gas for households nonetheless rose by 150 per cent from the first quarter of 2019 to the final quarter of 2022. This resulted in a 15 per cent reduction in household demand for energy over the previous winter, even after adjusting for the milder-than-average temperatures last winter. However, the scope for greater substitution away from electricity and heat has been limited by the lack of alternatives. There were similar falls in energy consumption among businesses, although some of the most energy-intensive industries reduced energy use by over 50 per cent.

1.16 Higher gas prices have also spurred a significant supply response from gas-exporting countries outside Russia. While Russian imports to the UK fell to zero after the invasion, imports of liquified natural gas (LNG) from Qatar and the US rose by 40 and 230 per cent respectively in 2022, more than replacing the shortfall from Russia. So far, much of the LNG imported in the UK has been re-exported to Europe, whose capacity to import LNG

[1] See Box 3.2 in Chapter 3 for a discussion of the levelised costs of energy.

has been hampered by a lack of infrastructure. But global investment in natural gas supply rose by almost $30 billion (12 per cent) in 2022 and is expected to increase by another $15 billion in 2023, with significant investment in expanding European LNG import and then global export capacity expected to occur over the remainder of the decade.

1.17 By contrast, there is so far limited evidence of as strong a supply response to the lower *relative* cost of renewable energy in the UK. The renewable share of electricity generating capacity had risen from under 5 per cent in 2000 to over 45 per cent in 2021. And in 2022, the UK saw an increase of 11 per cent in its wind generation capacity and 4 per cent in solar generation capacity (compared to increases of 8 and 22 per cent respectively in European countries). But despite the fact that the lifetime cost of renewable energy is now cheaper, there is little sign of a step-change in renewable energy investment in the UK following the recent gas price spike. Whole-economy investment in low-carbon technologies in 2022 rose by 0.1 per cent of GDP in France, 0.2 per cent of GDP in Germany, and 0.2 per cent of GDP in Italy in 2022 but actually fell by 0.2 per cent of GDP in the UK.

1.18 Announced UK Government investments in green technologies are also behind our central scenario for what could be needed to transition to net zero carbon emissions by 2050. Our 2021 *Fiscal risks report* (*FRR*) estimated that total public investment might be around £327 billion over the next 30 years in the transition to net zero by 2050 (in 2019 prices), with £25.4 billion over the four years to 2024-25 in our central scenario. The Government has so far committed the equivalent of £22.5 billion. Its planned investment of £3.8 billion in the power sector is higher than the £2.4 billion assumed in our central scenario. And in its energy security strategy the Government has set out plans to develop up to eight more nuclear reactors. By contrast, the Government's planned investment of £8.6 billion in decarbonising buildings is below the £10.9 billion assumed in our scenario. And little progress has been made in replacing the over 20 million household gas boilers with carbon-neutral alternatives, which is critical to ending our reliance on gas for domestic heating.

Table 1.1: Net zero public investment plans to 2024-25 and our 2021 scenarios

	Announced Government investment	2021 *Fiscal risks report* public investment scenarios					
		Total			Difference		
		Low	Central	High	Low	Central	High
Total	**22.5**	16.5	25.4	33.7	6.0	-2.9	-11.3
of which:							
Surface transport	**6.4**	5.9	6.2	6.4	0.5	0.2	0.0
Buildings	**8.6**	4.1	10.9	17.2	4.5	-2.2	-8.6
Power	**3.8**	1.9	2.4	2.9	1.9	1.4	0.9
Industry	**1.2**	0.4	1.0	1.7	0.8	0.2	-0.5
Other	**2.5**	4.2	4.9	5.6	-1.7	-2.4	-3.2

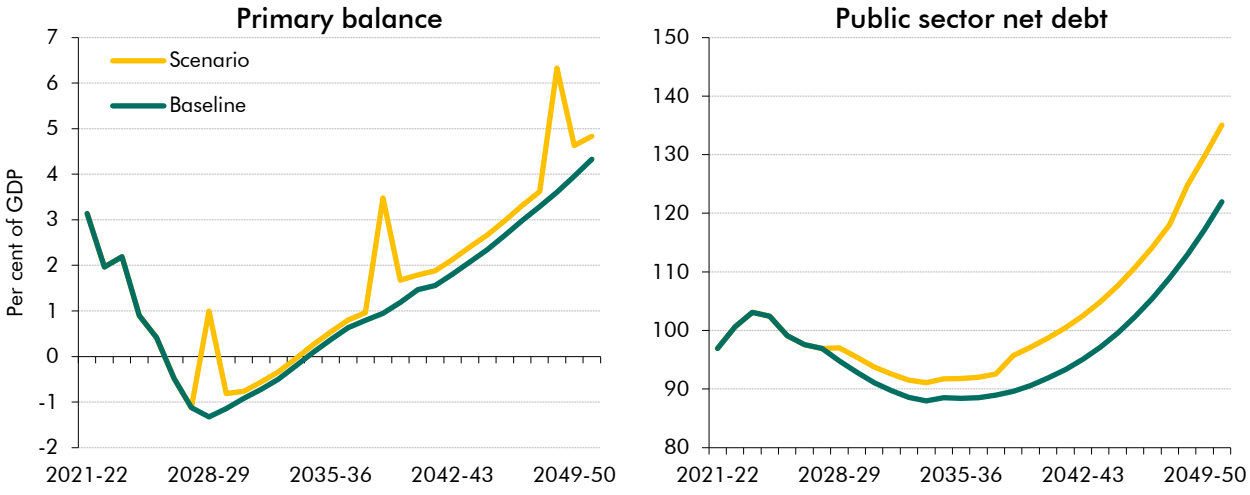
Note: More details on this comparison are provided in the note to Table 3.1.

1.19 As additional global LNG supply comes on stream, there is a risk that the UK economy remains relatively highly dependent on imported gas rather than completing the switch to renewables. Investments in LNG processing and transport capacity are expected to

significantly increase European gas imports and reduce wholesale gas prices back toward their pre-crisis levels by the second half of this decade. This could further erode the price incentive for producers to invest in, and consumers to switch to, renewable energy sources. This would leave gas as the UK's dominant, and importantly for retail prices, marginal fuel source for longer than anticipated in the Government's Net Zero Strategy. In the event of future adverse demand- or supply-driven price swings in the more global market for LNG, the UK economy would face further terms of trade shocks of the kind just experienced.

1.20 Continuing our dependence on gas at the current level could, in an adverse scenario, be as expensive fiscally as completing the transition to net zero. We consider a stylised scenario in which the UK's reliance on gas remains unchanged and adverse shocks in global gas prices, of a similar magnitude to that experienced last year, recur every decade. If fiscal policy responds in a similar manner to protect households and businesses from equivalent rises in retail prices, these shocks could cost the Exchequer between 2 and 3 per cent of GDP per year. Taking account of additional debt interest costs and the impact on economic activity, such recurring gas price spikes would add around 13 per cent of GDP to public debt by 2050-51. This is about twice as much as the 6 per cent of GDP central estimate for the total cost of public investment to complete the transition to net zero by the middle of the century.

Chart 1.6: The fiscal impacts of possible future gas price shocks



Source: OBR

Debt sustainability (Chapter 4)

1.21 Public sector net debt fell by over 200 per cent of GDP in the decades following the Second World War, falling by an average of 4 percentage points a year between 1945 and 2000. Having peaked at an all-time high of just over 250 per cent of GDP in 1946, public debt fell to a low of 28 per cent of GDP at the turn of this century. This steady decline in post-war public indebtedness was facilitated by relatively favourable:

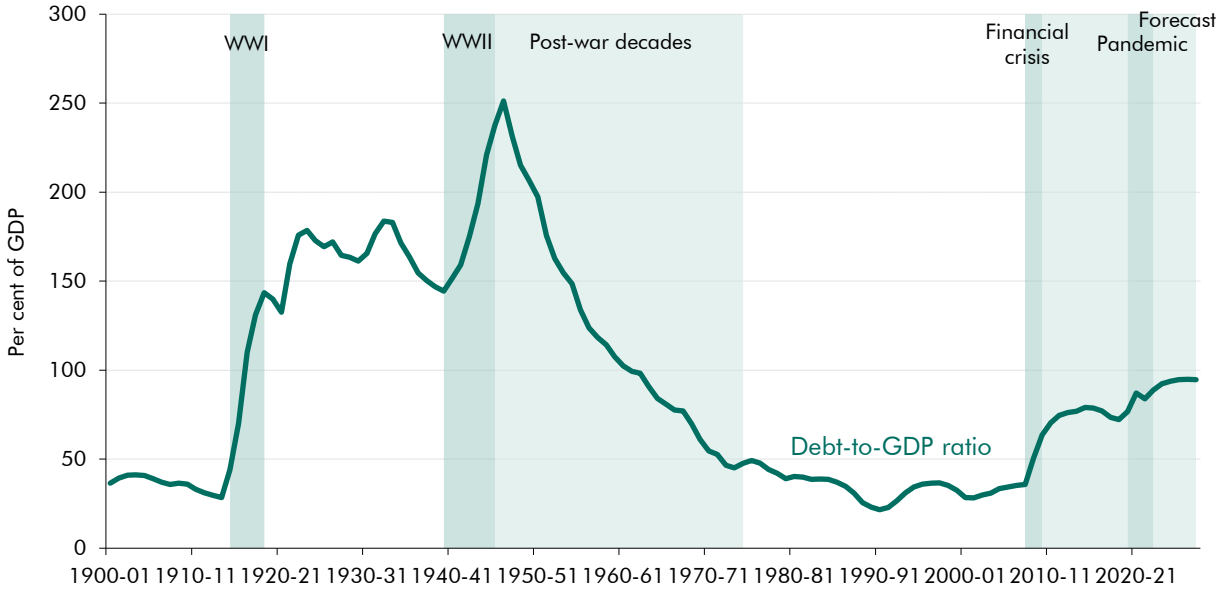
- **demographic trends**, thanks to the 'baby booms', rising female employment rates, and the steady extension of working lives;

- **economic trends**, with the rate of economic growth exceeding the interest rate on government debt for much of this period, often thanks to policies of 'financial repression'; and

- **geopolitical trends,** with falling defence spending making space for the welfare state to expand without putting pressure on borrowing and debt.

1.22 Government debt levels have risen three-fold since the start of this century and, at around 100 per cent of GDP, are at their highest level in over 60 years. This dramatic increase in public debt is partly due to the extraordinary series of crises the UK and other advanced economies have faced so far this century. Of the 72 per cent of GDP increase in public debt since the start of this century, three-quarters occurred in the six years hit hardest by the financial, pandemic, and energy crises. But public debt has also proven to be more difficult to reduce between crises than in the previous century. In the UK, despite all Chancellors since 2010 being committed to reduce some measure of public sector indebtedness as a share of GDP, this objective was achieved in only three of the last 12 years – and by a relatively small 3.4 percentage points in total.

Chart 1.7: Debt-to-GDP ratio since 1900



Note: This is for underlying debt, i.e. excluding Bank of England.
Source: ONS, OBR

1.23 While other governments also face rising interest rates on debts close to or in excess of 100 per cent of GDP, several factors make the UK's public debt position more vulnerable to some shocks than in the past or in other advanced economies. In particular, the UK government has:

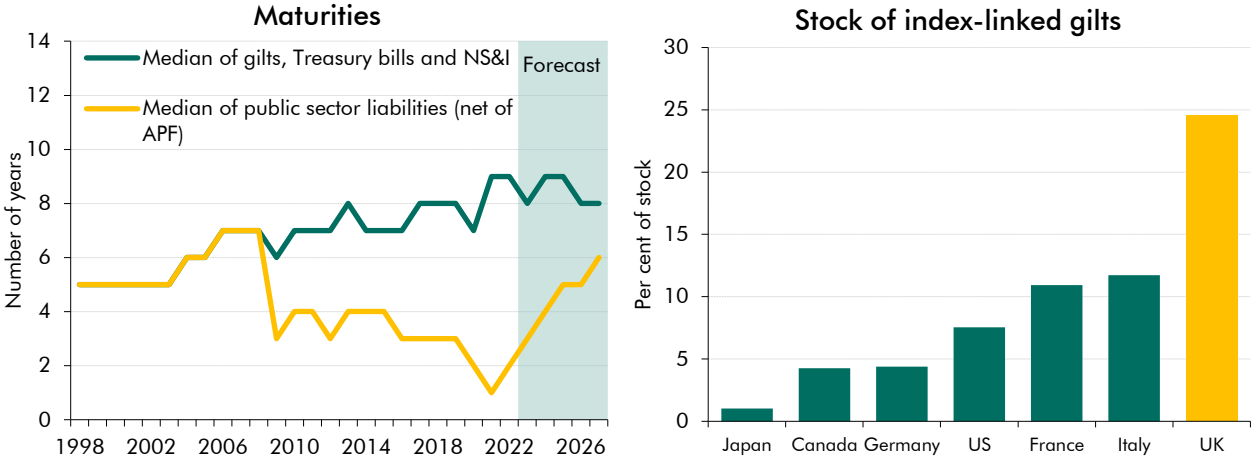
- **The shortest average maturity on its public liabilities on record**. Looking at *central government* liabilities alone, the median maturity of the UK's stock of gilts and other Treasury liabilities reached a high of 8½ years in 2022. But since 2008 one-third of

the liabilities have been purchased by the Bank of England as part of its quantitative easing (QE) operations in exchange for central bank reserves. These reserves carry a floating interest rate and therefore are, in effect, of an overnight maturity. The net impact of these QE transactions on the median maturity of the *consolidated liabilities* of the UK *public sector as a whole* has been to shorten it from seven years in 2008 to currently two. This leaves the UK public finances much more exposed to the sudden rise in interest rates we have witnessed over the past year.

- **The highest proportion of inflation-linked debt of any major advanced economy**. The share of UK gilts whose value is directly indexed to RPI inflation ('index-linked gilts') has risen from about 10 per cent in the late 1980s to around 25 per cent last year, more than twice as much as the second largest advanced-economy issuer, Italy, at 12 per cent. This, together with the shortening of average maturities, has meant that higher inflation will more quickly raises debt servicing costs and nominal debt levels than it did at times in the past or has done at times in other countries.

- **More of its debt in the hands of private foreign investors than most other G7 countries**. The UK Government has historically relied upon a large pool of long-term domestic savers, in particular pension and insurance funds, as end investors in its debt. However, over the course of this century the share of UK government debt in foreign (non-official) hands has almost doubled from 13 to 25 per cent, the second highest in the G7 and 2 percentage points below France. This potentially renders the UK public finances more vulnerable to sudden changes in global investor sentiment regarding the relative attractiveness of UK sovereign assets. That risk, in part, arises from the likely reduction over time in the demand for sterling debt from pension funds with sterling liabilities, which has generated a fairly inelastic demand for gilts.

Chart 1.8: UK public debt: Median maturity and share of inflation-linked issuance



Note: Consolidated public sector liabilities are proxied here by the stock of Bank reserves, Treasury bills, NS&I products and gilts net of those held in the APF. The median shows the year in which half of the outstanding public sector liabilities would be impacted by a change in interest rates.
Source: Bank of England, DMO, Herriot-Watt, ONS, OBR Source: Bloomberg

1.24 The greater vulnerability of the UK government debt position has been illustrated by the events of the past year. Specifically, over the past 12 months:

- **UK government borrowing costs have risen more than in any other G7 economy and been more volatile than at any time in the past 40 years**. Yields on UK 10-year government bonds rose by 2.0 percentage points compared to a G7 average of 0.5 percentage points over the 12 months up to the end of June this year. The volatility of 10-year gilts hit a peak by the end of September and beginning of October last year. Yields rose by 190 basis points over a monthly period, the sharpest rise since 1986.

- **The rise in global interest rates has fed through to the UK's debt servicing costs more than twice as fast as in the past or elsewhere**. The shortening of UK debt maturities meant that this rise in interest rate fed six times more quickly into our debt servicing costs than in the past and faster than in other G7 countries. The UK government's net interest cost rose by 2.6 per cent of GDP between 2019 and 2022 compared with 0.5 and 1.0 per cent of GDP in France and Italy respectively, whilst US interest costs fell by 0.2 per cent of GDP. This is despite all of these countries having between 10 and 40 per cent of GDP *more* gross debt than the UK in 2022.

- **The rise in global inflation has delivered little net benefit to the UK public finances relative to other countries**. With monthly inflation rates reaching double digits across the continent, UK general government gross debt is forecast to *rise* by 3.1 per cent of GDP in 2023 while average debt-to-GDP ratios are forecast to *fall* by 1.8 percentage points in other European countries. From a fiscal perspective, the UK, in particular, experienced the 'wrong sort of inflation' in 2022 with RPI and CPI (which drive increases in index-linked debt, pensions and working-age welfare payments) rising far more than both average earnings (a key driver of tax revenues) and the GDP deflator (the measure of inflation used to calculate nominal GDP). Indeed, the gaps between both RPI (at 11.6 per cent) and CPI (9.1 per cent) and the GDP deflator (5.4 per cent) in 2022 were the highest on record.

1.25 Looking ahead to the next five years, the UK Government's plans for stabilising and then reducing debt as a share of GDP are relatively modest by historical and international standards. Our March 2023 central forecast saw the UK Government's target measure of underlying debt (excluding Bank of England) as a share of GDP rise by more than 5 per cent of GDP, from 88.9 per cent last year to 94.8 per cent in 2026-27, before falling slightly to 94.6 per cent in 2027-28. The UK saw several episodes of rising debt in the 1970s, the early 1980s, and the early 1990s, but these episodes were typically brief, intermittent, and reversed in a few years. So, overall and in most years, the history of the second half of the last century was one of falling debt. Elsewhere in Europe, three-quarters of governments, including those of all major economies, are forecast to begin reducing their gross debt by 2024, and by 9.1 per cent of GDP as a whole between 2020 and 2024.

1.26 Looking out over the next 50 years, a new set of long-term fiscal projections illustrates the challenges in trying to keep debt from rising inexorably. Based on an updated fiscal starting

point provided by our March 2023 *EFO* and taking account of the latest population and interest rate developments, our new *baseline* long-term fiscal projection shows:

- The **ageing of the population** is projected to reduce the ratio of the working age to retired population from four-to-one to three-to-one over the next 50 years, despite an upward revision to assumed levels of net inward migration from 129,000 to 245,000 a year in steady state (which boosts the working-age population by more than the pensioner-age population, even when factoring in the ageing of migrants themselves).

- This puts downward pressure on tax receipts, upward pressure on primary (non-interest) spending, and leaves a growing gap between the two so that the **primary balance** deteriorates from a 1.1 per cent of GDP surplus in 2027-28 to a 10 per cent of GDP deficit by the mid-2070s.

- The rapid rise in gilt yields means that the effective interest rate on government debt ('R') is close to the growth rate of the economy ('G'), removing the beneficial impact that negative 'R-G' has had on debt dynamics in recent years. Higher **interest rates**, and a rising debt stock, push debt interest costs from 4 per cent of GDP today up to what would be an all-time high of 13 per cent of GDP by the mid-2070s.

- The debt-to-GDP ratio falls to a low of 88 per cent in the mid-2030s thanks to the starting primary surplus and falling pupil numbers in education. But thereafter, a growing primary deficit and spiralling interest costs put **debt** on an accelerating trajectory to 310 per cent of GDP by the mid-2070s, 31 percentage points higher than in last year's projection.

1.27 While alarming in itself, this *baseline* projection likely understates the full range of potential long-term pressures on the public finances. Specifically, the baseline projection:

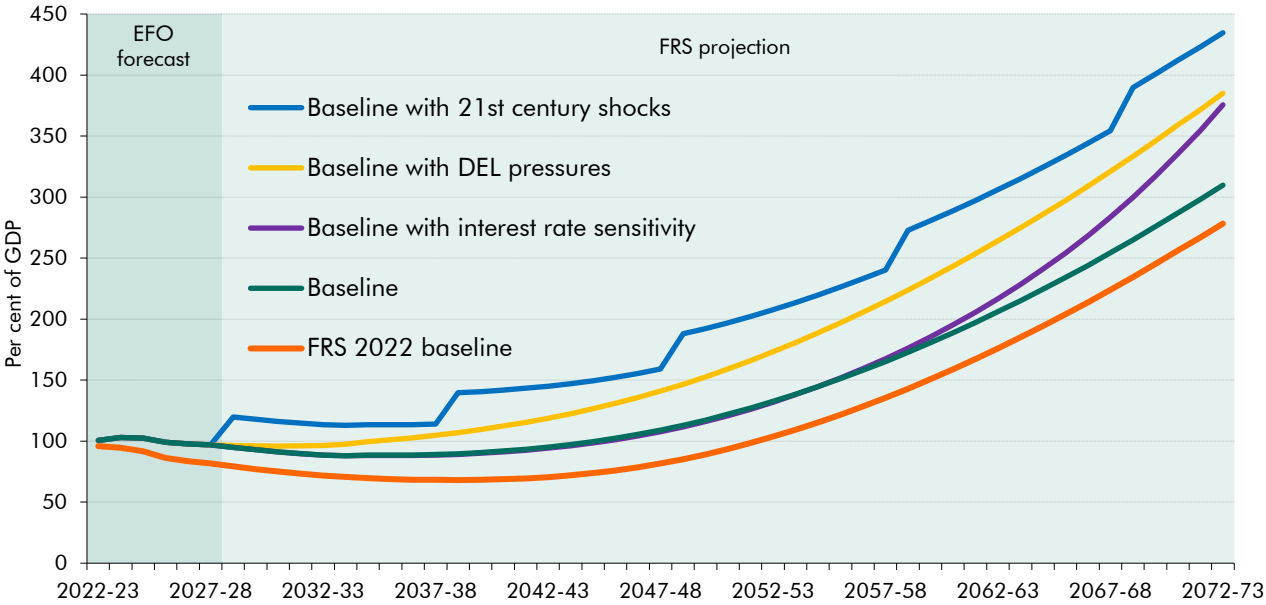
- **Assumes there is no feedback between the level of debt and the interest rate** paid on it by the government. In practice, interest rates often rise as governments become more indebted, the market becomes saturated, and investors charge a premium to compensate them against the growing risk of default. Estimates of the sensitivity of sovereign borrowing costs to increases in debt range from a 17 to 30 basis point rise for every 10 percentage point increase in the debt-to-GDP ratio. Applying the lower of these sensitivities to our projections would add a further 65 per cent of GDP to debt by the mid-2070s, seeing it reach 376 per cent of GDP by then.

- **Makes no provision for other unfunded policy ambitions or other known risks** discussed elsewhere in this report beyond the accommodation of demographic and some non-demographic pressures on public spending. These include: (i) the potential for public investments to make the transition to net zero which could cost 0.4 per cent of GDP a year between now and 2050; (ii) the Government's ambition to increase defence spending to 2.5 per cent of GDP which could cost 0.5 per cent of GDP a year; (iii) the Government's ambition to make 100 per cent capital allowances permanent and its serial failure to index fuel duties, which together could cost 0.4 per cent of GDP

a year; and (iv) the planned squeeze in departmental expenditure limits (DELs) in the years beyond the current Spending Review which, if past history were to be a guide, could be topped up by around 1.5 per cent of GDP by the time the next review takes place in the mid-2020s. Assuming just the last of these risks crystalises in the late 2020s would mean debt is no longer falling through the 2030s and reaches 385 by the mid-2070s.

- **Ignores potential future shocks to the public finances**, when in fact adverse shocks seem to have become more frequent, severe, and costly. So far this century, we have experienced three major shocks, adding around 20 per cent of GDP to debt on average. This is twice the intensity and twice the fiscal cost of the shocks that the UK witnessed over the latter half of the 20th century. If such shocks were to be repeated into the future, this could add a further 125 per cent of GDP to the already unsustainable levels of debt implied by the above baseline dynamics taking debt to 435 per cent of GDP by the mid-2070s.[2]

Chart 1.9: Long-term debt projections under different scenarios



Note: This is for the headline measure of debt, i.e. including Bank of England.
Source: OBR

1.28 The range of internal fiscal pressures and frequency of external fiscal shocks suggest that if governments wanted debt not to rise as a share of GDP *ex post*, they need plan for it to fall significantly *ex ante*. This reflects the fact that a mean or risk-adjusted path for public debt will be higher than a median path conditioned on current policy (which is the basis of our forecasts, as required by Parliament) because the impact of fiscal risks on debt is skewed to the upside rather than being symmetric around zero. Making provision for external fiscal shocks of a similar intensity as we have witnessed so far this century would call for an *ex ante* fiscal stance that had the debt-to-GDP ratio falling by 12 per cent of GDP over a given

[2] For completeness, it would not be impossible for all of these risks and pressures to materialise. Under such a combined scenario, debt would rise above 500 per cent of GDP by the mid-2070s, or twice its historic high at the end of the Second World War. However, one would assume that policymakers would take action long before debt would be allowed to reach that level.

five-year period or 2.5 per cent of GDP a year on average. Making provision for just the likelihood of DEL rises at future spending reviews would require aiming for debt to fall by a smaller but still significant 1.6 per cent of GDP each year *ex ante* to prevent debt from rising. If the recent past is any guide for the future, making no *ex ante* provision for either is more likely than not to see debt continue on an ever-rising trajectory.

Fiscal risk register (Chapter 5)

1.29 In addition to exploring the above risks in depth, this report also takes stock of the range of other key threats to the public finances included in our fiscal risks register. Since our last stocktake in our 2021 *FRR:*

- **Shocks to the public finances in the first part of this century continue to prove more frequent, more severe, and most costly than in the latter half of the previous century**. On top of the once-in-a-century shocks of the financial crisis and pandemic whose aftershocks are still being felt, the UK and other European economies are now in the midst of a once-in-a-generation energy crisis. Each of these shocks has brought with it unprecedented multi-billion-pound fiscal interventions, including in the form of bank bailouts, the furlough scheme, and now the energy price guarantee. Risks from cyber-attacks, financial sector disruption, rising global trade tensions, and the deteriorating security situation in Europe are also more elevated than was the case two years ago. And the sharp rise in mortgage interest rates that is working through the economy as fixed-rate deals are refinanced poses near-term risks that we can expect to be a material consideration in our next *EFO* forecast this autumn.

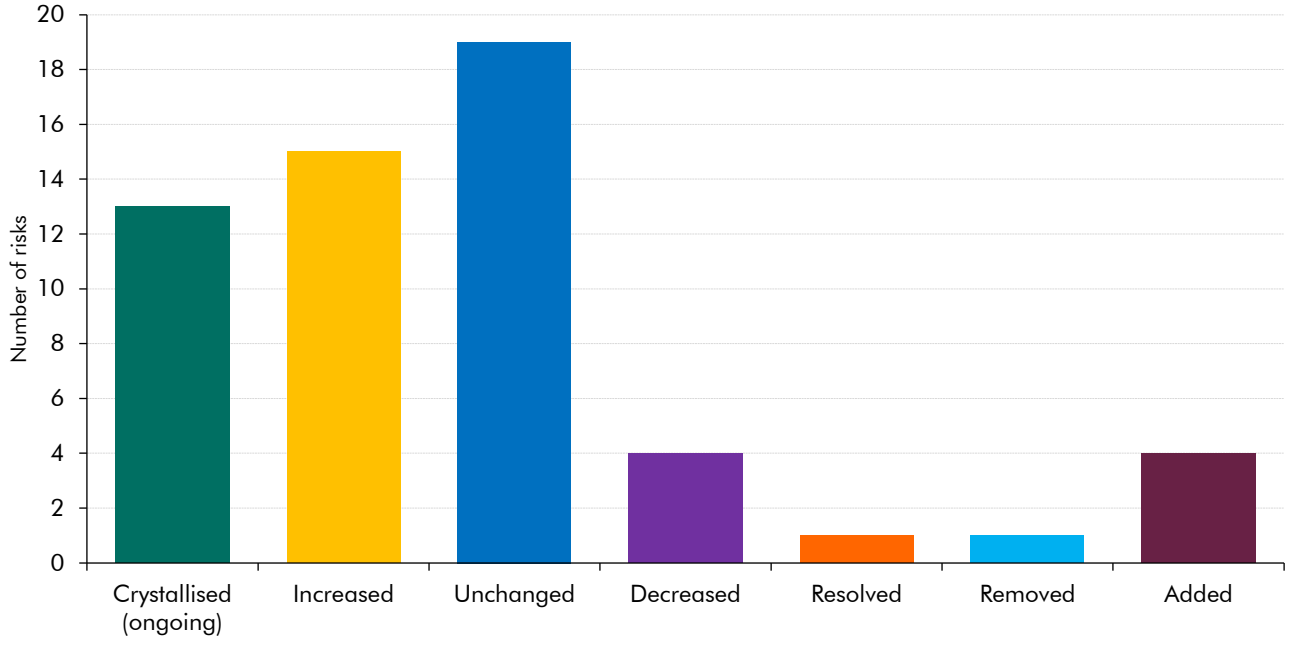
- **Policy-related fiscal risks have grown as the Government's (i) aspirations for the future have outpaced its current resources, (ii) existing policies have proven challenging to implement, and (iii) fiscal management frameworks have come under strain**. The first category includes the Government's roughly £10 billion a year ambition to make temporarily generous capital allowances permanent and roughly £13 billion a year (in today's terms) ambition to lift defence spending to 2.5 per cent of GDP. The second category includes a loss of receipts that would reach £4 billion in 2027-28 if the Government continues to freeze the rate of fuel duty, as it has in every year since 2011. In the third category, the last two years have seen major fiscal policy announcements being made outside of fiscal events, repeated changes to fiscal rules, and a growing number of *de facto* insolvencies among local authorities.

- **Longer-term trends are becoming near-term realities**. The ageing of the population, disruptions wrought by the pandemic, and spike in inflation have significantly increased pressures on pensions, health-related benefits, and the NHS. Efforts to tackle climate change by transitioning away from fossil fuels are rapidly eroding the £39 billion the Government currently receives in tax revenues from petrol and diesel driven vehicles. And the rapid normalisation of interest rates over the past 18 months has added £22 billion to what the Government will need to spend on servicing its growing stock of debt in 2022-23, consuming fiscal headroom available to respond to other threats and pressures.

1.30 For all of these reasons, the past two years have seen an intensification in severity of fiscal risks. Looking across the universe of 53 risks included in our 2021 fiscal risks register (after some technical consolidation of risks), the changes in risks over the past two years are:

- **13 have crystallised**, including the increased sensitivity of debt interest spending to inflation, the revision of fiscal rules in line with the forecast and total factor productivity weighing on potential output in the medium term. All 13 remain active risks.
- **15 have increased**, including higher cost and demand pressures on health and social care spending, increased spending on the state pension in the long term, and the risk of delayed transition to net zero raising the associated fiscal cost.
- **4 have decreased**, including the high cost of tax expenditures, lower potential growth from a reduction in labour supply (due in part to actions taken in the March 2023 Budget), and the long-term pressure on excise duties from behavioural and technological change.
- **19 remain unchanged**, including the risks of financial crises and recessions, those around the implementation of planned welfare reforms, and those around non-payment of taxes.
- **2 have been resolved and removed** from the register: the post-pandemic effect on receipts and public services, and a structural shift in receipts due to the pandemic.
- **4 risks have been added** in this report: persistent and high inflation, rising global trade tensions, global security threats, and cyber-attacks. **This takes the total number of risks in our register to 57**.

Chart 1.10: OBR fiscal risk register: changes since our 2021 *Fiscal risks report*



Source: OBR

2 Inactivity and health

Introduction

2.1 Having fallen steadily over the preceding decade, labour market inactivity has risen sharply since the pandemic. Much of this recent increase has been driven by a rise in those citing long-term ill-health as their principal reason for being out of the labour force. A sustained rise in health-related inactivity poses a significant risk to fiscal sustainability by reducing the UK's medium-term economic growth prospects and tax receipts while simultaneously putting upward pressure on health and welfare spending. The increase in working-age inactivity due to long-term sickness since the pandemic (alongside rising ill-health among those in work) has already added £6.8 billion to the annual welfare bill, cost £8.9 billion in foregone tax receipts, and therefore added £15.7 billion (0.6 per cent of GDP) to annual borrowing.

2.2 This chapter explores the fiscal risks posed by this sudden fall in labour participation and rise in inactivity among the working-age population.[1] In doing so, it considers:

- **longer-term trends in activity and inactivity** prior to, and in the wake of, the pandemic, and the respective contributions of ill-health and other factors to those trends;
- the **sources of the recent increase in health-related inactivity** including the contributions of pre-pandemic health trends, the pandemic itself, and the welfare system;
- the **characteristics of the long-term sick inactive population,** including their age, health condition, prior occupation and sector of employment, and qualifications;
- the **fiscal implications of rising health-related inactivity** and in-work ill-health for tax receipts, welfare, and health spending; and
- **potential scenarios for the future evolution of health-related inactivity**, and their implications for the public finances.

[1] We define 'working age' as 16-64-year-olds. Following the ONS, we define participation, or economic activity, as those in employment plus those who are unemployed (seeking work within the last four weeks and able to start work within the next two weeks); those not in this group are economically inactive. We focus entirely on the working-age population because participation trends across all adults are dominated by the ageing of the population, with a rising share of adults over the State Pension age, where age-specific activity rates are much lower.

Trends in working-age economic activity and inactivity

2.3 Having risen by 3.3 percentage points to a record high of 79.8 per cent in the decade to early 2020, the share of working-age people participating in the labour force (either by working or looking for a job) fell by 1.5 percentage points up to the middle of 2022 and remains 0.7 percentage points below its pre-pandemic peak in the three months to April 2023. Prior to the pandemic, labour participation was a major driver of GDP growth, repeatedly outperforming our forecasts and partially offsetting repeated downside surprises on productivity growth.[2] Falling working-age participation rates and rising inactivity rates over the past three years have unwound around a fifth of this post-financial crisis improvement, and are relatively unusual among advanced economies whose participation rates have generally continued rising post pandemic (see Box 2.1 below).

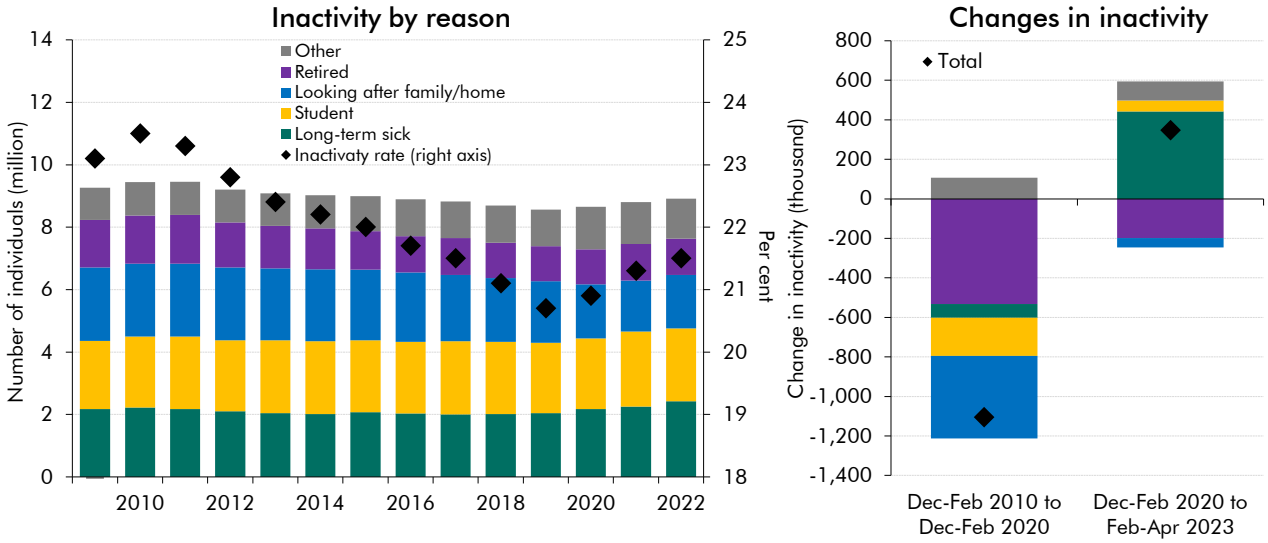
Sources of falling inactivity prior to the pandemic

2.4 The steady decline in working-age inactivity from 9.5 million to 8.4 million people in the decade prior to the pandemic largely reflected falling inactivity due to family or caring responsibilities and an increase in the average age of retirement – both largely driven by the participation of women.[3] Chart 2.1 shows levels of working-age inactivity over time split by the main reason survey respondents give for being economically inactive, as self-reported in the Labour Force Survey (LFS). It shows that of the 1.1 million fall in the total number of working-age people classed as inactive between early 2010 and early 2020:

- those classed as **looking after their family or home** fell by 530,000 from 2.4 million to 1.8 million;
- the number of inactive **students** remained largely stable over the pre-pandemic period at around 2¼ million;
- the number citing **long-term sickness** as their principal reason for inactivity was stable at around 2 million;
- the number of **'early' retirees** trended down from 1.5 to 1.1 million in the decade prior to the pandemic, reflecting the equalisation of female and male State Pension ages at 65 by November 2018 and the increase to 66 by October 2020; and
- those inactive for **'other' reasons** rose slightly over the decade prior to the pandemic from 1.1 to 1.2 million.[4]

[2] See: OBR, *Briefing paper No.8: Forecasting potential output – the supply side of the economy*, November 2022.
[3] Working-age inactivity fell by 910,000 in the decade to the beginning of 2020 for women, and 200,000 for men.
[4] 'Other' includes discouraged workers, those temporarily sick, those waiting the results of a job application, those who have not yet started looking for work, those who do not need or want employment, those who have given an uncategorised reason for being economically inactive, and those who have not given a reason for being economically inactive.

Chart 2.1: 16-64-year-old economic inactivity by main reason



Source: ONS

Sources of the post-pandemic rise in inactivity

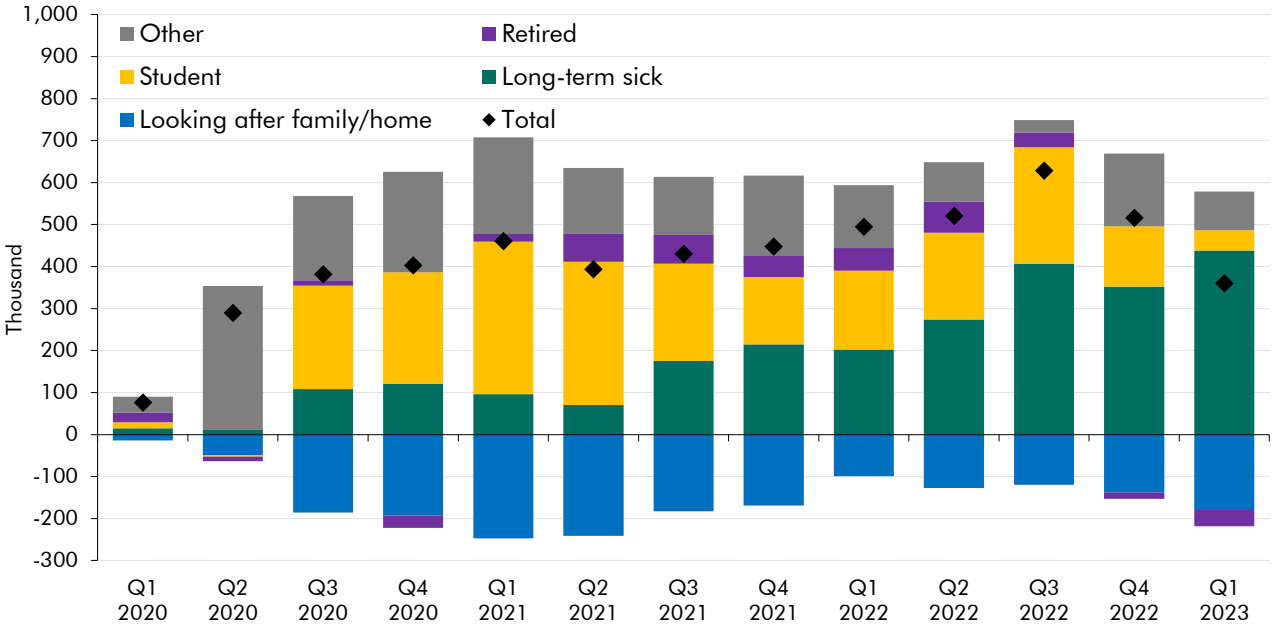
2.5 Following the pandemic, the number of working-age people classed as inactive jumped by almost 650,000 at its peak, and it remains 350,000 above pre-pandemic levels. Chart 2.2 shows how the composition of this recent surge in inactivity has evolved since the start of the pandemic.[5] It shows that of the 350,000 rise since the beginning of 2020:

- The number of people outside the labour force due to **looking after their family or home** has continued to decline by a further 200,000, reflecting the continuation of two pre-pandemic trends up until early 2021: a declining birth rate reducing the number of mothers of young children and rising employment rates within this group.[6]
- The number of inactive **students** had risen by 390,000 by early 2021, reflecting the scarcity of labour market opportunities at the height of the pandemic and the surge in A-level grades when exams were cancelled. However, the number of inactive students has since fallen back close to its pre-pandemic level as the economy has reopened.
- There was a modest and temporary increase in the number of **early retirees**, by 80,000 at its peak in mid-2021, and a much larger rise in flows from employment to retirement (offset by rising flows from retirement to other main reasons for inactivity).[7] But this had entirely unwound in the most recent data, which show that the number of working-age retirees is now 50,000 below pre-pandemic levels.
- The number of people citing **long-term sickness** as their main reason for being inactive has proven to be the most significant and persistent legacy of the pandemic, rising steadily over the past three years and by 440,000 by early 2023, and so now more than explains the overall increase in inactivity relative to pre-pandemic levels.

[5] See Box 2.3 of our March 2023 *Economic and fiscal outlook* for further detail.
[6] Since early 2021, the employment rate of mothers of young children has stopped rising for the first time in over a decade, likely partly explaining why the number of working-age inactive people inactive due to looking after their family or home stopped falling at that point. Source: OBR analysis of unpublished LFS microdata.
[7] See: Boileau, B., and J. Cribb, *The rise in economic inactivity among people in their 50s and 60s*, June 2022.

- Those inactive for **'other' reasons** initially rose in 2020 – probably reflecting the initial pandemic disruption leading people to class themselves as inactive because they did not want employment but without giving one of the usual reasons – but by early 2023 this category was just 100,000 above pre-pandemic levels.

Chart 2.2: The rise in working-age inactivity since early 2020



Note: Changes are shown relative to December-February 2020 – the pre-pandemic low-point for the 16-64-year-old inactivity rate.
Source: ONS

2.6 Of the various drivers of the increase in inactivity since the pandemic, the 440,000 increase in long-term sickness is of particular concern from a fiscal perspective as:

- it is the source of **the largest and most durable rise in inactivity** over the past three years and now represents the largest single group of working-age people outside the labour force;

- numbers **remain on an upward trajectory**, with almost half of the increase of the past three years happening between early 2022 and early 2023;

- **previous increases in health-related inactivity have proved persistent**. The proportion of the 16-64-year-old population that are inactive due to long-term sickness rose through to the late 1990s – precipitated by mainly older working-age men leaving the labour market during and after the early-1980s recession and gradually flowing onto incapacity benefits.[8] This rate did not begin falling sustainably until the mid-2000s; and

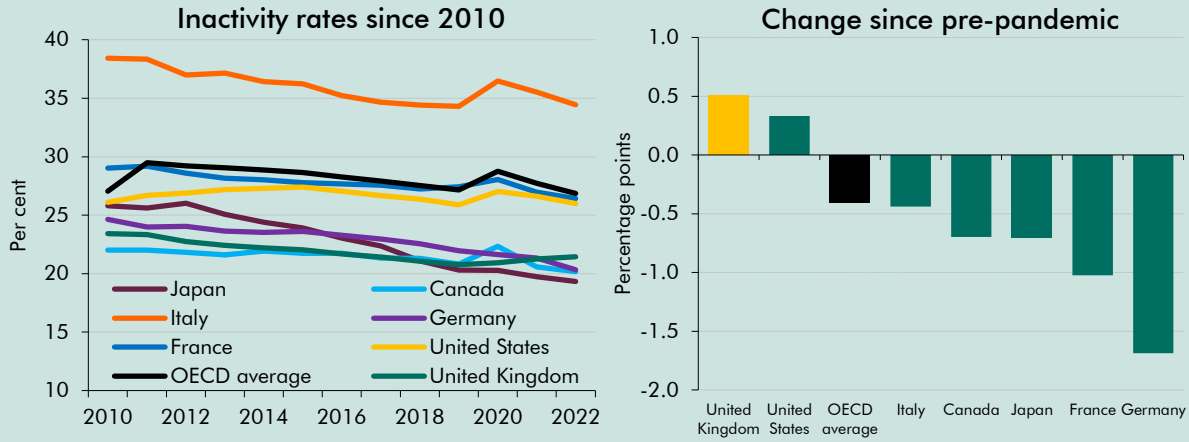
- inactivity for health reasons is **more likely to generate a fiscal cost** not only in the form of foregone income tax and NICs revenues from employment income but also additional welfare and health spending (as explored later in this chapter).

[8] For further discussion of these trends, see our 2022 *Welfare trends report*.

Box 2.1: How does economic inactivity compare across advanced economies?

Between 2010 and the onset of the pandemic in early 2020, the UK consistently had one of the lowest 15-64-year-old inactivity rates among G7 economies, with only Japan recording a lower rate in late 2019 (left panel of Chart A). The initial phase of the pandemic saw inactivity rise everywhere bar Germany, before falling everywhere but the UK in 2021 and 2022. This means that since the pandemic, the 15-64-year-old inactivity rate has increased in the UK by 0.5 percentage points and by 0.3 percentage points in the US (where modest falls in inactivity in 2021 and 2022 have not offset the rise in 2020), but fallen in the other five G7 economies (as shown in the right panel of Chart A). As a result, the UK's inactivity rate has moved above that of Canada and Germany over this period, but remains below the OECD average.

Chart A: 15-64-year-old inactivity rates across G7 economies



Note: The inactivity rate for Germany in 2021 was unavailable, so we have interpolated the data. Pre-pandemic is the fourth quarter of 2019.
Source: OECD

Comparable data on the reasons why people are inactive across advanced economies is much more limited, although most countries run similar labour force surveys that provide some self-reported information, including a measure of illness or disability as the main driver. Pre-pandemic analysis showed that illness or disability consistently made up a larger proportion of inactivity in the UK than in European economies, although not to the degree that it did in the US. In the mid-2010s, the proportion of the working-age population inactive due to illness or disability stood at just under 6 per cent in the UK, compared to around 4 per cent in the euro area and around 7 per cent in the US.[a] More up-to-date data are available for European economies but focus only on the subset of economically inactive people who say that they want a job (a small minority in the UK – around one-fifth of working-age inactive people). Similarly, this shows that the proportion of both the younger and older working-age populations inactive due to 'own illness or disability' and wanting a job has been persistently higher in the UK than in Germany, France and Italy over the course of the 21st century. And these gaps widened between 2019 and 2021 thanks to rates in the UK staying flat or rising, while they fell in Germany and France.[b]

In conclusion, the available international evidence suggests that while the UK has consistently been a strong performer internationally in terms of working-age participation, its post-pandemic rise in inactivity stands out. And ill-health has consistently been a bigger factor behind inactivity

in the UK than in most other advanced economies, with post-pandemic trends likely to have amplified these differences.

[a] 'Working age' is here defined as 20-64-year-olds. Based on data from the U.S. Census Bureau and Eurostat. See: Romei, V., 'The high and rising US inactivity due to illness and family care', *Financial Times*, 6 November 2015.
[b] Younger working age is 15-24 years old; older working age is 50-64 years old. See: IMF, *The Recent Decline in United Kingdom Labor Force Participation: Causes and Potential Remedies*, July 2023.

Drivers of the recent increase in health-related inactivity

2.7 The recent rise in health-related inactivity in the UK seems to be driven by a confluence of three main factors which are explored in more detail below:

- a **slowdown, and in some cases partial reversal, in the rate of improvement in many health conditions that pre-dated the pandemic**. This reflects a combination of a worsening trend in some specific health conditions together with an increase in the average age of the working-age population;

- the **impact of the pandemic on the health of the working-age population** as a result of the effects of Covid on people's physical health, the disruptive effects of the pandemic on people's mental health and the treatment of non-Covid-related conditions; and

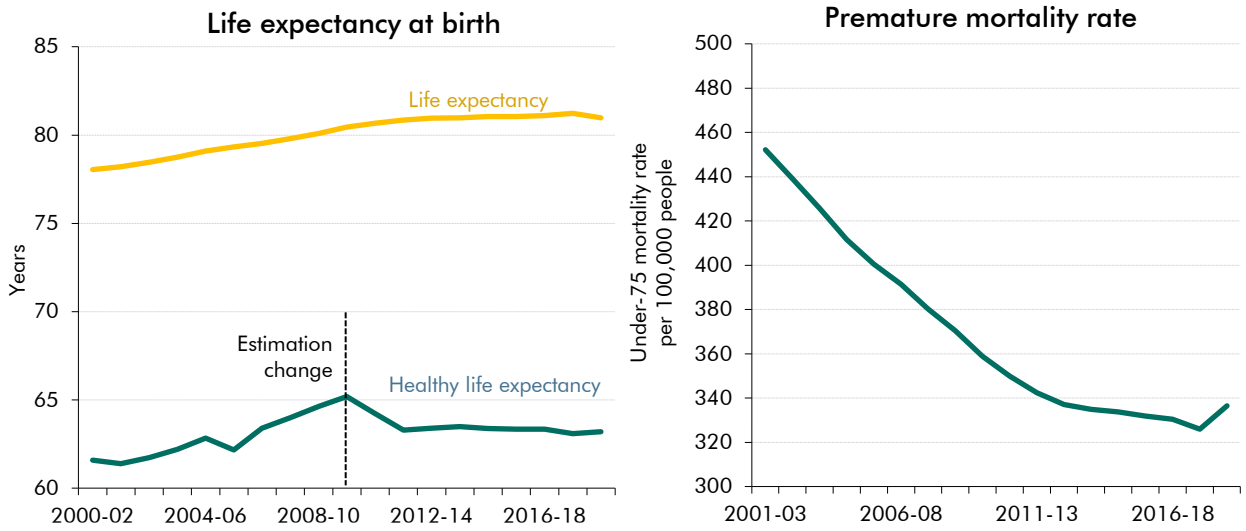
- the **degree of ongoing assessment, conditionality, and return-to-work support for those on health-related benefits** versus other out-of-work benefits, alongside the role of a sustained period of weak household income growth and more recently intense cost-of-living pressures increasing the incentives to claim the former.

Pre-pandemic health trends

2.8 Part of the recent increase in health-related inactivity can be traced back to longer-term, pre-pandemic health trends. The steady advancement of medical science and rising standards of working and living conditions have contributed to gradual improvements in health at all ages for over a century. These continued into the beginning of the 21st century, as shown by the rises in life expectancy and healthy life expectancy and decline in premature mortality in Chart 2.3. But Chart 2.3 also shows a stagnation in these measures over most of the 2010s, with healthy life expectancy at birth (which is calculated by combining life expectancy data with self-reported survey data on the quality of people's health) marginally falling in the two years prior to the pandemic, especially in more deprived parts of the country.[9] While life expectancy and healthy life expectancy improvements have slowed down or stalled across advanced economies, the 2010s stagnation in healthy life expectancy is more pronounced in the UK than across Europe (as set out in Box 2.2).[10]

[9] This gradient in changes in healthy life expectancy by deprivation level is relevant to our findings on the rise in health-related inactivity within lower socioeconomic groups, discussed below. See: Bambra, C., and M. Marmot, *Expert Report for the UK Covid-19 Public Inquiry: Module 1: Health Inequalities*, May 2023.
[10] The measure of healthy life expectancy in Box 2.2 uses a different methodology, that is applied consistently across countries, to the ONS's measure of healthy life expectancy (shown in (Chart 2.3).

Chart 2.3: Life expectancy, healthy life expectancy and premature mortality



Note: The ONS's life expectancy and mortality estimates cover rolling three-year intervals. Estimates for healthy life expectancy from 2009-11 onwards are based on the Annual Population Survey (APS), so are not comparable with previous estimates.

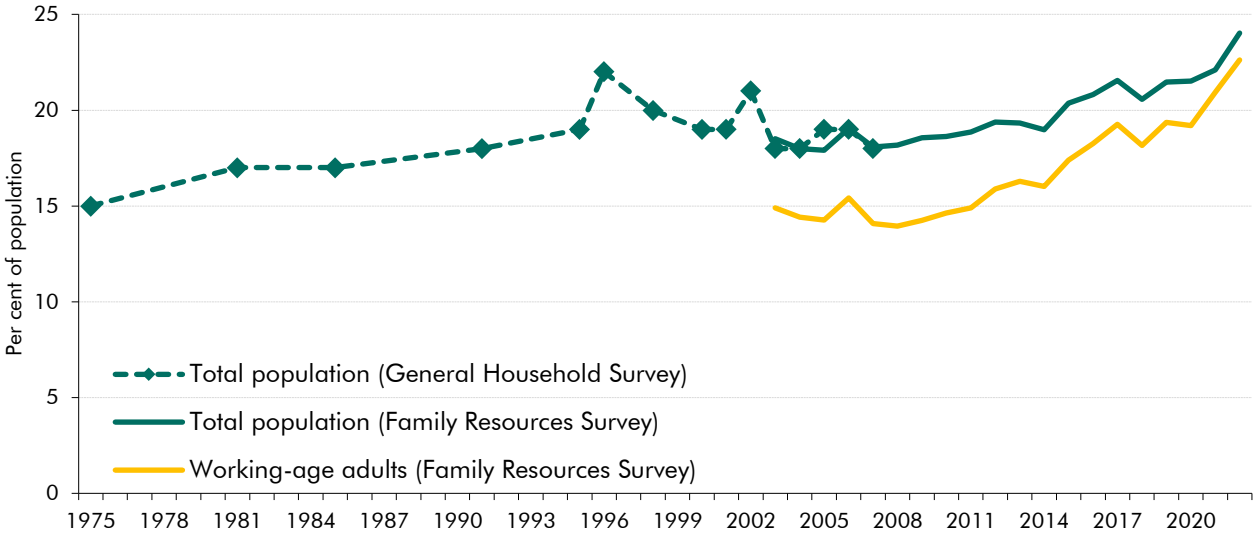
2.9 Purely self-reported health data also point to a rising trend in ill-health in the decade prior to the pandemic. Reported disability prevalence across the population rose slowly between the mid-1970s and mid-1990s from around 15 to around 20 per cent, flattened off in the 2000s, and then rose to 24 per cent in 2022 (Chart 2.4).[11] And self-reported disability prevalence for working-age adults has risen particularly sharply in recent years, from 15 per cent in 2010 to 23 per cent in 2022.[12]

2.10 Self-reported data on disability and ill-health seem to show a more sharply rising long-term trend than life expectancy and mortality data. In part, this is likely to be related to the fact that many of the medical advancements that contributed to rising life expectancy and falling mortality in the late 20th and early 21st centuries prevented deaths but meant that people were more likely to live with, often severe or chronic, health conditions that adversely affect daily lives.[13] This is evidenced by the fact that morbidity rates were broadly flat between 1990 and the mid-2010s.[14] In addition, over a long time-frame, a range of public health and societal changes are likely to have influenced self-reported health trends relative to more clinical or 'objective' measures. These include increased diagnosis rates resulting from improved or increased medical testing and intervention; higher awareness of, and reduced stigma around, physical and particularly mental health conditions; changes in how the demands of everyday life and standards of living interact with perceived health status; and

[11] Definitions of disability have changed – the current most commonly used, Equality-Act-established definition in the UK is those with a physical or mental impairment with a 'substantial', 'long-term' negative effect on their ability to do normal daily activities.
[12] In the LFS, self-reported working-age disability prevalence rose from 16 to 23 per cent from 2013-14 to 2022-23 (a steeper rise than that in the prevalence of long-term, work-limiting health conditions – the measure we focus on in the analysis that follows). Estimates of working-age disability prevalence in surveys like the UK Household Longitudinal Study, are higher than those in the LFS and FRS.
[13] These changes affected pensioners more than the working-age population, but also affected health in (particularly older) working age.
[14] The total burden of morbidity, measured by the number of years lived with disability (based on the Global Burden of Disease study's rigorous measure that combines the prevalence of each disease with a rating of the severity of its symptoms in the population), increased by over a sixth between 1990 and 2016 (while the population grew at a slightly slower rate). Age-standardised morbidity rates – which account for changes in population size and ageing – fell by 2.1 per cent. See: Public Health England, Health Profile for England, 2018.

changes in social survey methodologies.[15] While a range of studies continue to suggest that self-reported health data are a good predictor of future health and care needs, and mortality,[16] these factors should be borne in mind throughout this chapter, which draws mainly on self-reported data on the interactions between ill-health and labour market participation.

Chart 2.4: Self-reported disability prevalence of different age groups



Note: Definitions of disability used in these surveys (and interpretations of these) have changed over time – see our January 2019 *Welfare trends report* for more details. The General Household Survey (GHS) covers Great Britain rather than the UK as a whole. In the absence of UK disability prevalence data prior to 2003, we assume that the GB prevalence rates recorded in the GHS are a good approximation for UK prevalence rates.
Source: DWP, ONS, OBR

2.11 Abstracting from these reporting challenges, what has driven the slowdown in long-run health and mortality improvements, especially for adults below pension age, over the pre-pandemic decade? Three factors stand out:

- First, **a deterioration in both clinically measured and self-reported mental health**. Self-reported mental ill-health has been rising within the long-term sick inactive population since the early 2010s (as detailed below), and while it is particularly difficult to assess mental health trends over time, this appears to be backed up by other data. The Adult Psychiatric Morbidity Survey (designed for use by clinically experienced interviewers such as psychiatrists) showed an increase in symptoms of common mental disorders among 16-64-year-olds of around a quarter between 1993 and 2014 (from 14.1 per cent to 17.5 per cent), while the similarly constructed Mental Health of Children and

[15] For more details, see Box 2.1 in our January 2019 *Welfare trends report*, and Baumberg, B., M. Jones, and V. Wass, 'Disability prevalence and disability-related employment gaps in the UK 1998-2012: Different trends in different surveys?', *Social Science & Medicine* 141, September 2015.
[16] Several UK studies have examined the accuracy of self-reported health data compared with clinically gathered data for specific conditions, for example: Johnston, D., C. Propper, and M. Shields, 'Comparing subjective and objective measures of health: Evidence from hypertension for the income/health gradient', *Journal of Health Economics* 28(3), May 2009; and Oyebode, O., and J. Mindell, 'Use of data from the Health Survey for England in obesity policy making and monitoring', *Obesity Review* 14(6), June 2013. Evidence from other countries includes: Palladino, R., et al., 'Associations between multimorbidity, healthcare utilisation and health status: evidence from 16 European countries', *Age and Ageing* 45(3), May 2016; and Wuorela, M., et al., 'Self-rated health and objective health status as predictors of all-cause mortality among older people: a prospective study with a 5-, 10-, and 27-year follow-up', *BMC Geriatrics* 20, March 2020.

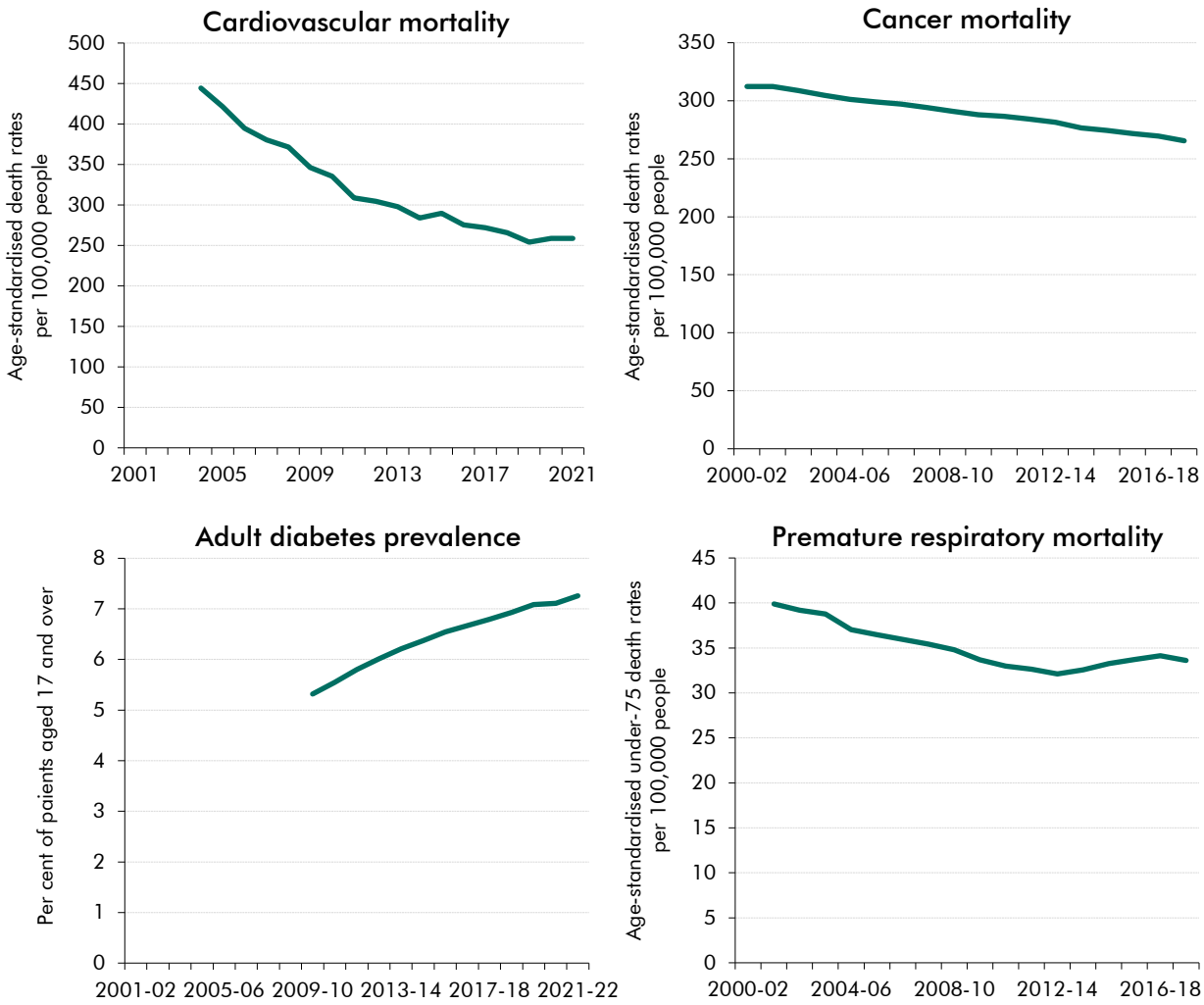
Young People Survey suggests this trend continued through to 2020 for younger working-age adults. And the proportion of patients on GP practice registers in England with severe mental disorders increased by a little under a fifth, from just over 0.8 per cent to just under 1.0 per cent between 2012-13 and 2018-19 (which could be a sign of increased diagnosis or treatment, in addition to or as well as deteriorating mental health itself).[17]

- Second, **a mixed picture on physical health, with continued improvement in some areas and a worsening picture in others**. The Chief Medical Officer's (CMO's) 2020 annual report highlights a range of metrics on which physical health outcomes continued improving up to the pandemic, for example in terms of mortality related to cardiovascular disease and cancers (shown in the top half of Chart 2.5). But it also highlights areas in which health deteriorated or prior improvements were partially reversed, for example in relation to the prevalence of diabetes, and mortality from respiratory diseases among the under-75s (shown in the bottom half of Chart 2.5). While many of the conditions discussed here are most prevalent among pension-age adults, they affect the (particularly older) working-age population too. Some of this appears to be related to trends in behavioural or risk factors. While smoking continued to decline across age groups and heavy drinking of alcohol declined among young adults through the 2010s, sexually transmitted infections and drug misuse deaths ticked up. But most importantly, obesity (strongly associated with diabetes, heart disease, some cancers and osteoarthritis) continued its long-term upward trend,[18] and has been rising faster in the UK than in most other advanced economies over the 21st century (see Box 2.2).

- Third, **the ageing of the working-age population** means that even if the average health status of UK adults of a given age had remained constant, the health status of the overall workforce would nonetheless have deteriorated as the large 1960s 'baby boom' cohort works its way towards pension age. Using a more stringent self-reported definition than the standard measure of disability – one of long-term, *work-limiting* ill-health[19] – we find that just under a fifth of the 1.0 percentage point rise in the proportion of 16-64-year-olds in ill-health between 2014 and 2019 reflects the ageing of the working-age population. This change alone, ignoring any deterioration in age-specific health statuses, was sufficient to raise the number of people inactive due to long-term sickness by almost 50,000 between 2014 and 2019.

[17] Department of Health and Social Care, *Chief Medical Officer's annual report 2020: health trends and variation in England*, December 2020.
[18] For more detail on obesity trends and their wider health impacts, see: Public Health England, *Adult obesity and type 2 diabetes*, July 2014.
[19] This definition captures individuals who report having a health condition that lasts 12 months or more *and* limits the type of paid work they can do. It follows that used in Haskell, J., and J. Martin, *Economic inactivity and the labour market experience of the long-term sick*, July 2022.

Chart 2.5: 21st century trends in selected physical health measures



Note: Cardiovascular and cancer mortality data cover the UK; diabetes prevalence and respiratory mortality data cover England.
Source: British Heart Foundation, Cancer Research UK, DHSC, NHS Digital, Office for Health Improvement & Disparities, OBR

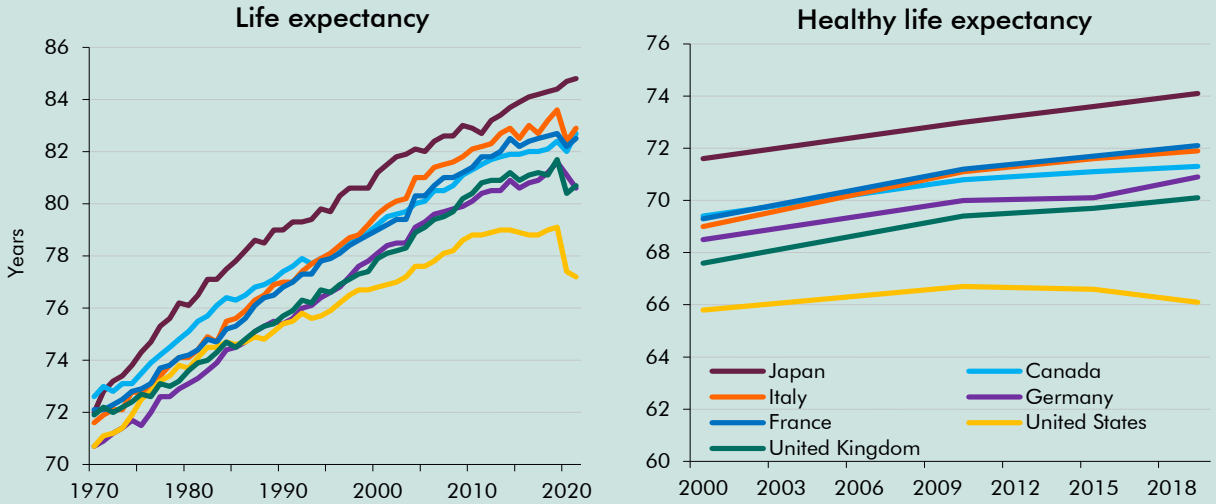
Box 2.2: How do pre-pandemic health trends in the UK compare internationally?

Understanding trends in health across countries and over time adds a further level of complexity on top of the challenge of interpreting changes just in the UK. In this box we do not seek to provide a comprehensive assessment, but instead present selected international comparisons of the metrics explored elsewhere in this chapter and draw some tentative conclusions.

In relation to life expectancy, the left panel of Chart B shows that the slowdown in life expectancy improvements in the 2010s, and sharp reversal during the pandemic, was also seen in most other major developed countries. But, over a longer period, the UK's relative position has declined, moving below Italy and further away from Japan, France and Canada over the past half century. The right panel of Chart B, which covers a more recent period, shows (using a slightly different metric to that in Chart 2.3 above) that the UK has the lowest healthy life expectancy at birth of any major developed economy bar the US, and had a slower rate of progress over the 2010s than all

apart from the US and Canada. Recent analysis by the IPPR suggests that these trends have occurred alongside persistently higher treatable mortality than other G7 countries bar the US.[a]

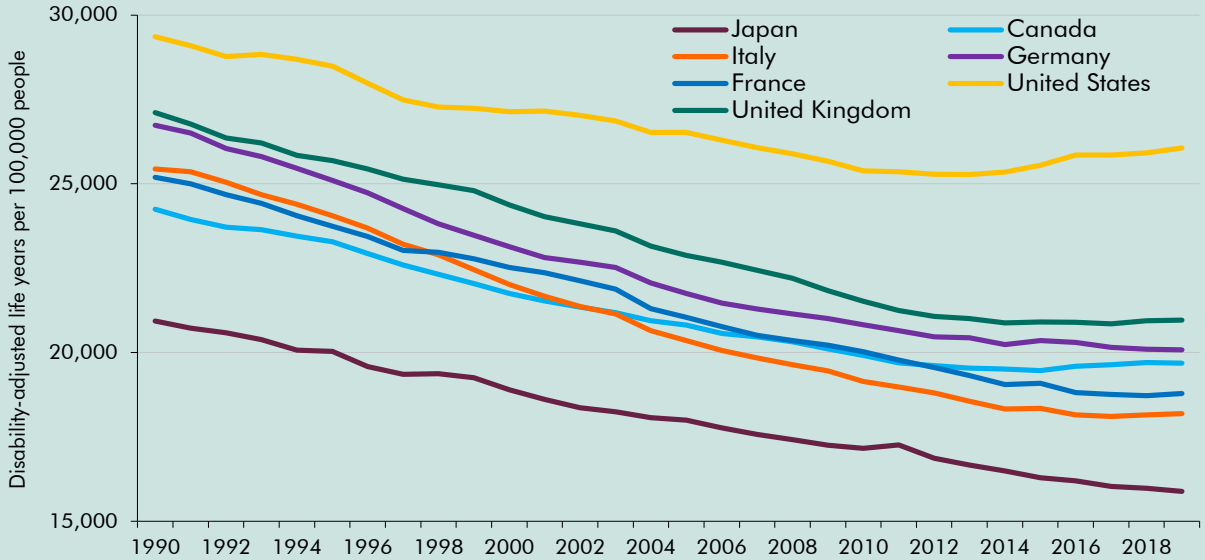
Chart B: Life expectancy and healthy life expectancy at birth across G7 economies



Note: The measure of healthy life expectancy shown here uses a methodology that is applied consistently acrss countries and differs from the ONS's measure for the UK.
Source: Our World in Data, WHO

Mirroring the picture on healthy life expectancy, Chart C presents the burden of disease, a measure that reflects the years of life spent either with a specific health condition or lost due to that health condition, across G7 countries. It shows that the UK has had the second-highest burden of disease in the G7 after the US since 1990, with improvements stalling across most countries since 2010, and the disease burden rising slightly in the US, Canada and the UK in the years immediately prior to the pandemic.

Chart C: The burden of disease across G7 economies

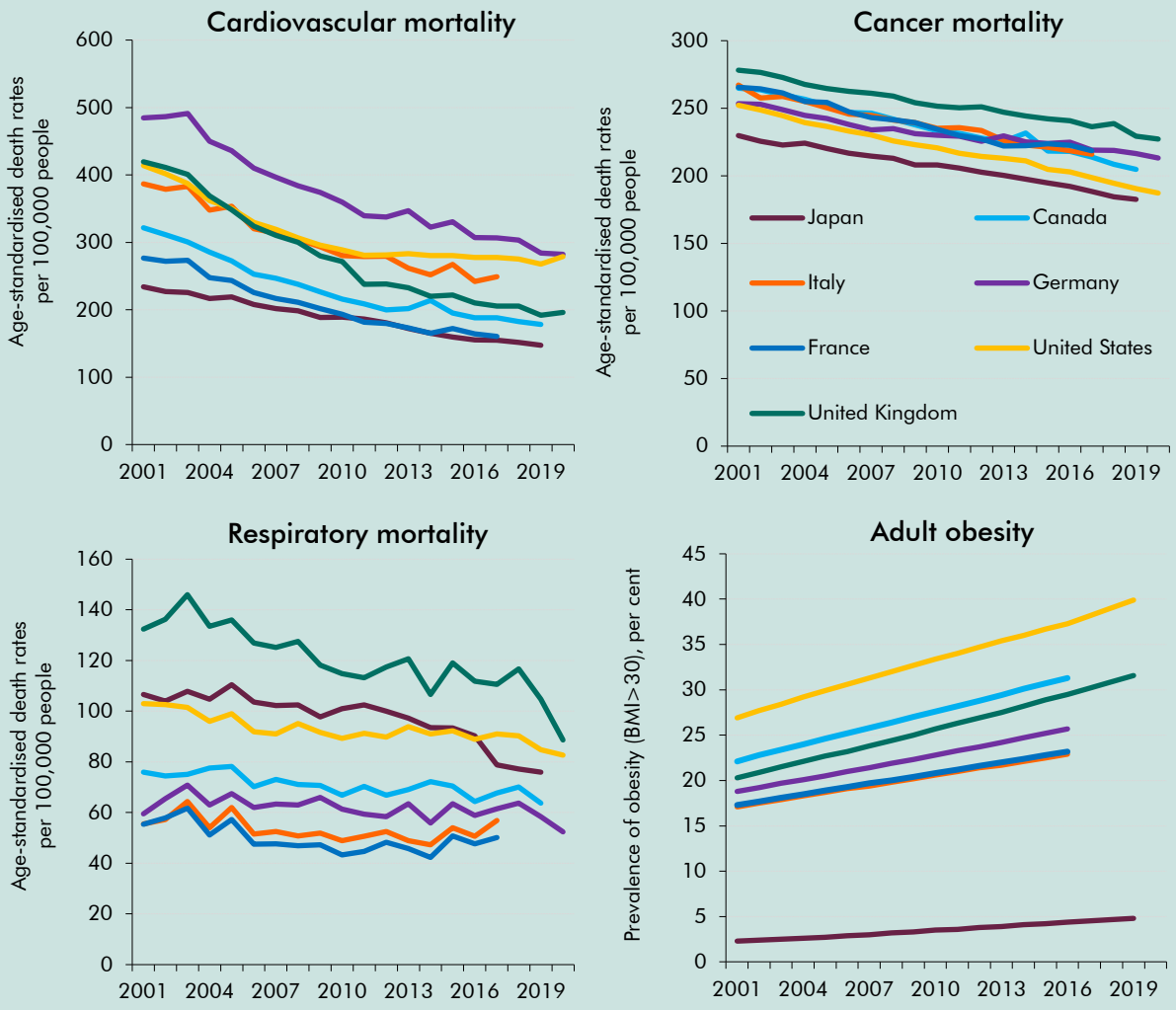


Note: Disability-adjusted life years measure the total burden of disease, both from years of life lost due to premature death and years lived with a disability. One disability-adjusted life year equals one lost year of healthy life.
Source: Our World in Data

Chart D presents trends in various mortality rates and obesity (which is associated with various chronic conditions, as set out elsewhere in this chapter) since the turn of the century. It shows that:

- Declining cardiovascular mortality has been common across countries, with the UK if anything showing some relative improvement during the 2010s, particularly versus the US.
- The UK has persistently higher mortality rates from cancers and respiratory diseases than other advanced economies,[b] with similar trends over the past two decades (although there has been a more marked decline in respiratory mortality in the UK over the past few years). Age-specific data suggest rates of improvement in cancer mortality for adults under 50 stalled relative to other advanced economies during the 2010s.[c]
- The UK has higher rates of adult obesity than Germany, France, Italy and Japan, and has seen faster growth in the prevalence of obesity since the turn of the century than all advanced economies bar Japan (from its very low starting point).

Chart D: Incidence of selected health outcomes across G7 economies



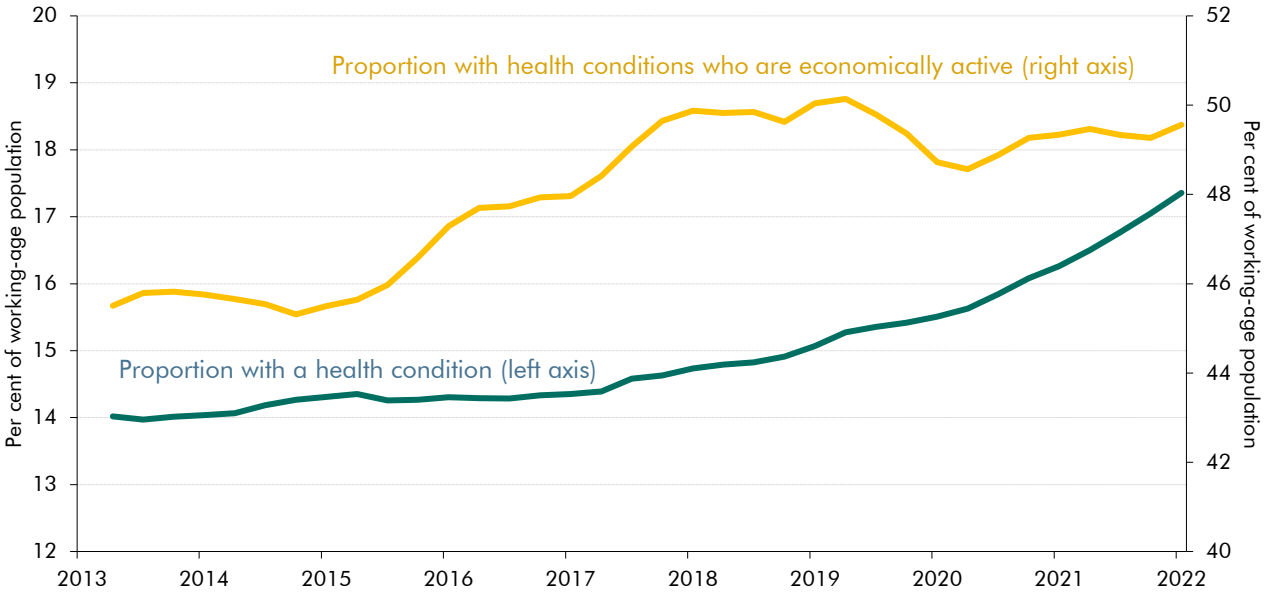
Note: Post-2016 obesity data have been estimated based on trends in OECD and NHS Digital data.
Source: NHS Digital, Our World in Data, OECD, OBR

Other data paint the UK in a more favourable light, with faster progress on smoking cessation than other advanced economies and below-average suicide rates, for example.[d] But the tentative conclusion from these international comparisons is that the UK has experienced worse health outcomes than other G7 countries bar the US on a range of metrics during the 21st century, with some signs of a more pronounced slowdown in health improvements in the pre-pandemic years. This conclusion is backed up by a recent cross-country comparison of health systems and outcomes by The King's Fund, which concluded that *"the UK performs substantially less well than its peers – and is more of a laggard than a leader – on many measures of health status and health care outcomes."* [e]

[a] Thomas, C., et al., *Healthy people, prosperous lives: The first interim report of the IPPR commission on health and prosperity*, April 2023.
[b] The measure of respiratory mortality shown here differs from that shown elsewhere in the chapter because it covers all ages rather than just under-75s.
[c] Source: Institute for Health Metrics and Evaluation, *Global Burden of Disease*, 2019.
[d] Source: Our World In Data.
[e] Anandaciva, S., *How does the NHS compare to the health care systems of other countries?*, June 2023.

2.12 With various measures suggesting a slowdown in health improvements and a deterioration in *self-reported* working-age ill-health prior to the pandemic, one might ask why health-related economic inactivity has only risen over the past three years. As shown in Chart 2.6, this reflects the fact that in the years prior to the pandemic, rising rates of self-reported, work-limiting ill-health within the working-age population (up by 7 per cent between 2014 and 2019, from 14.0 to 15.1 per cent) were broadly offset by rising activity rates among those with self-reported, work-limiting health problems (up by 9 per cent, from 45.8 to 50.0 per cent). The economic and fiscal implications of this parallel rise in self-reported ill-heath among the *working* population are explored later in this chapter.

Chart 2.6: Long-term, work-limiting health conditions and economic activity rates



Note: Data cover working-age adults only and are smoothed using annual rolling averages. Long-term, work-limiting health conditions are those that last 12 months or more and limit the type of paid work people can do.
Source: OBR analysis of unpublished LFS microdata

Health consequences of the pandemic

2.13 As the most acute public health crisis that the UK has faced in a generation, the pandemic has also had significant adverse consequences for the health of the working-age population. This came via three main channels:

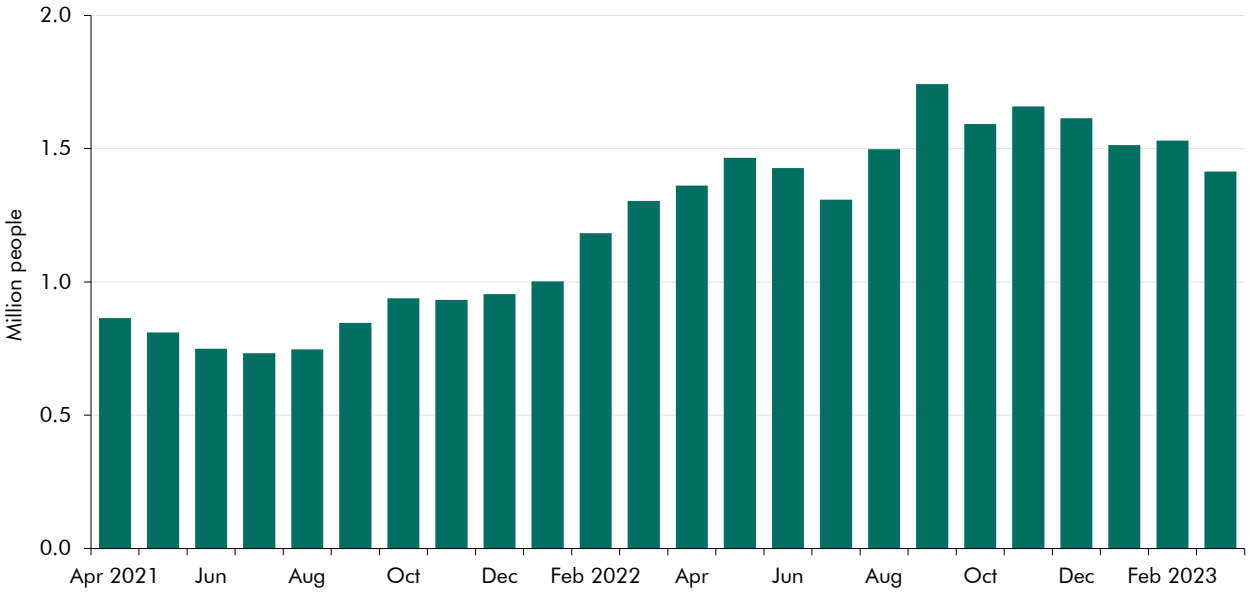
- **long Covid,** defined by the ONS as experiencing Covid symptoms more than four weeks after original infection, and the broader risk of contracting Covid;
- deteriorations in people's **mental health** during and after the pandemic; and
- disruption to the provision of **wider health services** to those with other conditions during and after the pandemic.

Covid and long Covid

2.14 The number of working-age people reporting long Covid symptoms, including fatigue, aching muscles and shortness of breath, increased steadily from 0.7 million in July 2021 to a peak of 1.7 million in September 2022 before falling back to 1.4 million (3.4 per cent of the UK working-age population) in March 2023 (Chart 2.7). The likelihood of experiencing long Covid was more than twice as high for the non-student, non-retired economically inactive population as for those in employment (at 7.4 per cent and 3.5 per cent of these groups, respectively), and the ONS estimates that inactivity rates among working-age people with self-reported long Covid increased by 3.8 percentage points between mid-2021 and mid-2022, compared with 0.4 percentage points among those without.[20] In addition, of the 1.9 million people (of all ages) reporting long Covid symptoms in March, 1.3 million (69 per cent) reported having had Covid symptoms for at least a year, which if replicated within the working-age population would suggest that around 1 million 16-64-year-olds have had Covid symptoms for over a year. These relatively long durations, and the greater prevalence of long Covid among the economically inactive, suggest it may have contributed to the concurrent rise in health-related inactivity in recent years.

[20] See: ONS, *Self-reported long COVID and labour market outcomes, UK: 2022*, December 2022.

Chart 2.7: Prevalence of long Covid among working-age people in the UK



Note: We have estimated the number of working-age people reporting long Covid symptoms using the broad age categories published by the ONS.
Source: ONS, OBR

2.15 Beyond long Covid itself, the ongoing threat of an airborne respiratory disease may also have limited people's propensity to work and engage in everyday social contact – particularly those with pre-existing respiratory conditions. For example, ONS sickness absence data show that the proportion of occurrences of sickness absence owing to respiratory conditions more than doubled from 3.6 per cent in 2019 to 8.3 per cent in 2022 (likely to be a mix of Covid and long Covid themselves, and other respiratory conditions). And the rise in inactivity due to long-term sickness has been greatest among those previously employed in high-human-contact sectors, where the prospect of contracting the virus is likely to be greatest (as shown in Chart 2.15, below).

Mental health and the pandemic

2.16 The pandemic also saw a sharp and lasting rise in the number of working-age people reporting mental health problems, accelerating the pre-pandemic rises detailed above. The most striking evidence comes from ONS surveys showing that the share of 16-64-year-olds in Great Britain reporting moderate-to-severe depressive symptoms increased from 10 per cent in early 2020 up to a peak of 23 per cent (9.9 million) in early 2021, before falling back to 19 per cent in late 2022 – equivalent to 3.6 million more working-age adults experiencing these symptoms than before the pandemic.[21] Other data show less sharp but still material increases: the number of working-age adults reporting a mental health condition has risen by a more modest 530,000 (from 6.2 to 7.5 per cent of the working-age population) since the onset of the pandemic, while among long-term sick inactive people the increase is 70,000. Clinically measured mental health data for young adults

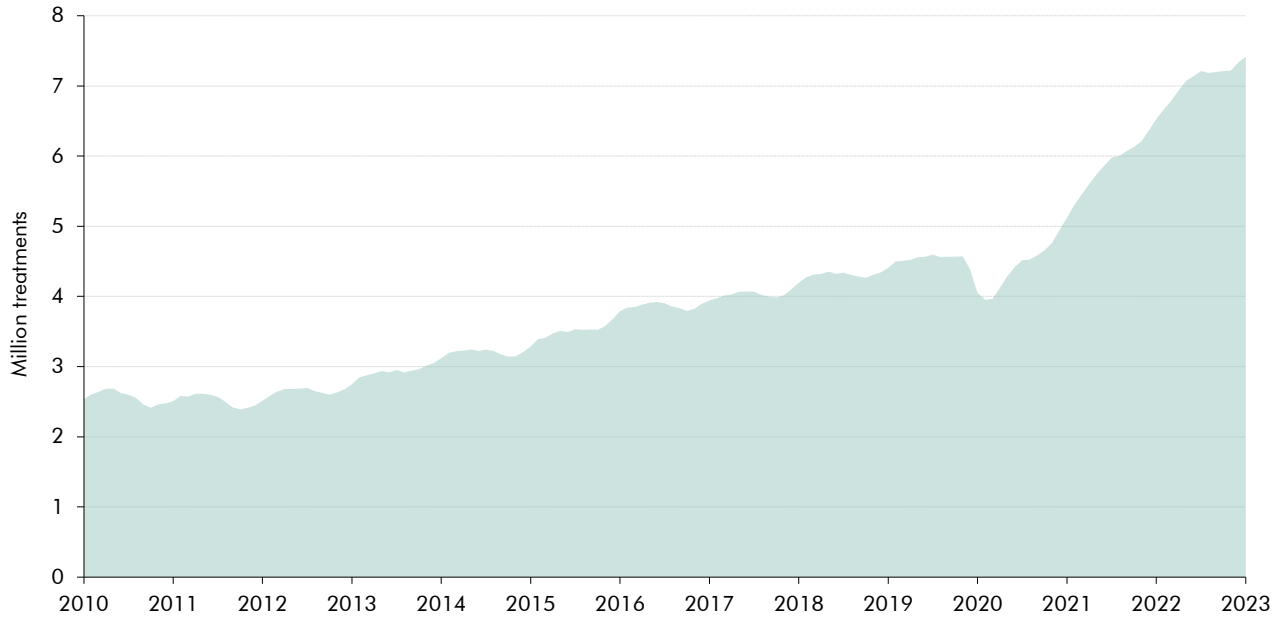
[21] Estimates for the working-age population are based on the broad age groupings within successive ONS surveys (mainly the Opinions and Lifestyle Survey) tracking the prevalence of depressive symptoms in the adult population. Other data sources, such as the UK Household Longitudinal Study, show different trends, with rises in the proportion of respondents experiencing clinically significant psychological distress alongside the imposition of lockdown restrictions, followed by sharp post-Covid declines.

show similar trends.[22] And referrals for talking therapies for anxiety and depression, which measure demand for (and provision of) NHS therapies for a variety of mental health conditions, have also risen, from 1.7 million to 1.8 million between 2019-20 and 2021-22.[23] A range of pandemic-related factors are likely to have contributed to these increases – including social isolation, fear of job loss and reduced access to mental health services.[24]

Disruption to the health service

2.17 The volume of patients requiring hospital care due to contracting Covid – and the procedures required to stop infections spreading within health settings – placed significant pressure on the NHS, preventing or delaying many of its routine operations and treatments through 2020 and into 2021. The ongoing effects of these disruptions are reflected in the NHS referral-to-elective-treatment waiting list in England, which measures the number of non-mental-health-related treatments being waited for once a referral has been received, and had risen from 4.6 million in January 2020 to 7.4 million in May 2023 (Chart 2.8). Waiting lists have similarly risen in Scotland and Wales.[25]

Chart 2.8: NHS England's referral-to-elective-treatment waiting list



Source: NHS England

[22] The Mental Health of Children and Young People Survey reported a 15.6 percentage point rise in the share of those aged 17 to 19 deemed likely to have a mental health disorder, from 10.1 to 25.7 per cent, between 2017 and 2022. There was also a 2.2 percentage point rise among those aged 20-23 between 2021 and 2022.
[23] The data only reflect referrals for treatment so will not fully capture trends in mental health conditions among individuals who have previously been referred for treatment or those who are not currently seeking treatment from the NHS.
[24] See: Marshall, L., J. Bibby, and I. Abbs, *Emerging evidence on COVID-19's impact on mental health and health inequalities*, June 2020.
[25] Treatments being waited for rose by 85 per cent in Scotland and 62 per cent in Wales between March 2020 and March 2023.

2.18 While drawing firm conclusions is challenging due to a lack of data linking movements in the waiting list and those in the labour market, the rising NHS waiting list itself looks unlikely to have been a significant causal driver of rising long-term sick inactivity in recent years. Combining several data sources,[26] we estimate that:

- accounting for the fact that over half of the waiting list was comprised of either children or adults of pension age, and that the same individuals can be on the waiting list for multiple treatments,[27] there were **2.9 million *working-age adults* on the NHS waiting list in 2022**;
- around 1 million of these working-age adults were economically inactive, of whom **around 650,000 were inactive due to long-term sickness** (or around a quarter of the long-term sick inactive population);[28]
- **the median duration on the waiting list is 15 weeks** – a figure that is similar across age groups and has stayed relatively stable since mid-2021 – meaning that (in contrast to health-related inactivity) the waiting list has a relatively high turnover; and
- there appears to be **limited correlation in waiting list trends by age and 'treatment function' between mid-2021 and the end of 2022 and concurrent changes in inactivity due to long-term sickness**. For example, 32 per cent of the rise in working-age adults on the waiting list over this period came from those aged 55-64, compared to only 16 per cent of the concurrent rise in health-related inactivity. And the biggest drivers of the working-age waiting list increase – musculoskeletal treatments and those for progressive illnesses – do not match the biggest drivers of changes in the health-related inactivity data over this period (detailed in Chart 2.13), below.[29]

2.19 While the NHS waiting list itself appears unlikely to have been a significant driver of the recent uptick in inactivity due to long-term sickness, it is possible that the general disruption to NHS services and treatments over the pandemic period remains an important factor. For example, these disruptions may have caused people to delay seeking health advice or treatment, or find themselves unable to do so (without joining a waiting list). And the normal use of 'fit notes' by health professionals, which provide advice to employees and employers about fitness to work and supporting the return to work, was paused (with a much-extended period of self-certification for statutory sick pay, for example). These outcomes may have increased the severity of health problems and detachment from the labour market.

[26] These sources are: disaggregated referral-to-elective-treatment (RTT) waiting list data for England supplied by NHS England, available from September 2021 onwards; Labour Force Survey microdata (which provides information on the working-age population split by age group, main health condition, and labour market status); and the ONS's Winter Survey, undertaken using participants who had previously taken part in the Opinions and Lifestyle Survey (which provides estimates of the proportion of people waiting for an NHS treatment – a broader definition than just the RTT waiting list – split by age group and labour market status).
[27] NHS England estimated that the number of people on the waiting list in mid-2022 was 5.5 million, 1.5 million lower than the headline figure of 7 million, which counts the number of *treatments* rather than *individuals*.
[28] The ONS's Winter Survey suggests that, although working-age adults are roughly twice as likely to be waiting for treatment if they are economically inactive compared to active, it remains the case the majority of those waiting are economically active. We combine these insights with LFS data to disaggregate by age group and reason for inactivity, and calibrate these estimates to our estimate of the total number of working-age adults on the waiting list in England in 2022.
[29] The waiting list is split into broad 'treatment function' categories, which we have grouped together to match the health conditions reported in the LFS as closely as possible, but this is unavoidably a rough exercise from which only tentative conclusions can be drawn.

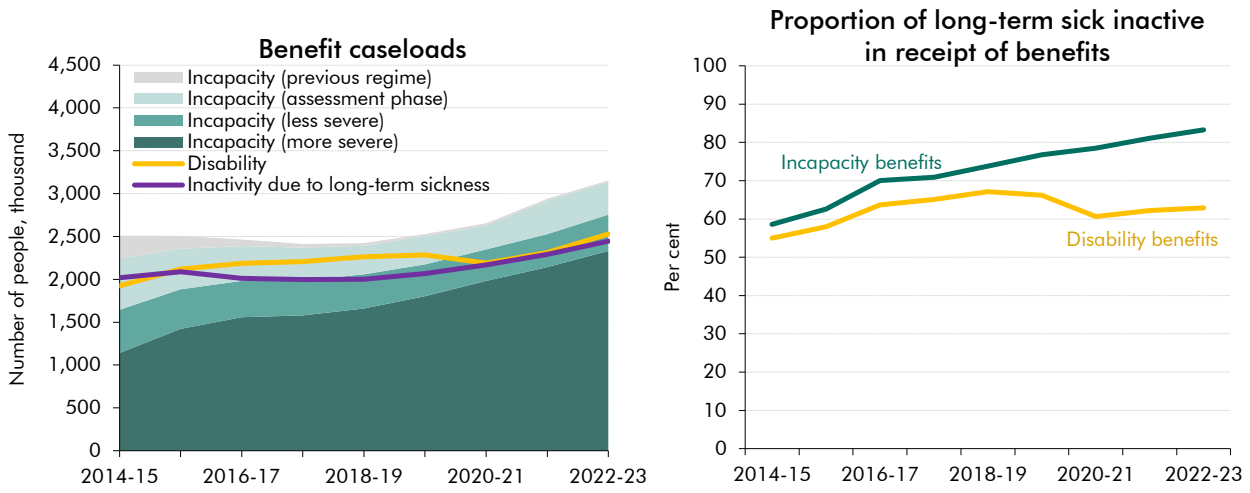
The health-related welfare system

2.20 Health-related, working-age welfare caseloads have increased significantly over the past decade (left panel of Chart 2.9). Our analysis splits the health-related welfare system into two parts: 'incapacity' benefits – health-related universal credit (UC) and employment and support allowance (ESA) – which are means- and needs-tested for those out of work; and 'disability' benefits – personal independence payment (PIP) and its predecessor disability living allowance (DLA) – which are needs- but not means-tested and intended to cover the extra costs faced by disabled people, both in and out of work (see Box 2.3). The rise in caseloads for both incapacity and disability benefits reflects the fact that compared to 2016-17, monthly onflows in 2022-23 had nearly doubled for disability benefits (up 97 per cent) and had nearly tripled for incapacity benefits (up 180 per cent).[30]

2.21 The left panel of Chart 2.9 shows that the rise in health-related benefit caseloads tracks the rise in the number of people economically inactive due to long-term sickness. In addition, the recent growth in the PIP caseload – where a large proportion of the rise has been among 16-44-year-olds with mental health conditions[31] – is consistent with concurrent changes in health-related inactivity, with similar age-group trends seen in the growth in incapacity benefits.[32] And as the right panel of Chart 2.9 shows, the estimated proportion of the long-term sick inactive population claiming these benefits has been rising, particularly for incapacity benefits (from 59 per cent in 2014-15 to 83 per cent in 2022-23). This means that more than 100 per cent of the change in this group over the past three years is in receipt of incapacity benefits (likely reflecting the majority of inflows to the long-term sick inactive group claiming, alongside some existing long-term sick inactive people newly claiming incapacity benefits, and perhaps some non-claimants leaving the long-term sick inactive group).

[30] Part of this rise captures differences between the legacy and UC regimes, most notably the fact that short-term sick people are now able to flow onto health-related UC (which was not the case in the ESA regime).
[31] See: OBR, *Supplementary forecast information release: Upward revisions to welfare spending since March*, November 2022.
[32] Between May 2019 and November 2022, 55 per cent of the growth in the PIP caseload came from those aged 16-49 and 33 per cent from those aged 50-64; in terms of growth in the incapacity caseload over the same period, 52 per cent and 36 per cent came from those aged 16-49 and 50-64 respectively.

Chart 2.9: Health-related benefit caseloads and inactivity due to long-term sickness



Note: Prior to 2019-20, the incapacity series use internal DWP data to split out the UC health caseload into its different groups. There may also be some small overestimation of the incapacity series due to people being counted as claiming both ESA and UC. The share of the long-term sick inactive population on benefits is estimated using LFS data, which is scaled to total caseloads (as measured in DWP's administrative data) to account for some under-recording of benefit receipt in the LFS.
Source: DWP, ONS, OBR analysis of unpublished LFS microdata

2.22 On this basis, it is worth considering whether the welfare system itself might have contributed to the rise in measures of health-related economic inactivity. One reason for a link is that people's responses to inactivity-related questions in the LFS are likely to be strongly influenced by how the welfare system classifies and engages with them. A causal link between welfare and inactivity might arise due to changes in some combination of the generosity of support (relative to unemployment benefits), their degrees of conditionality, the functioning of the assessment regimes, and the extent of back-to-work support provided to people on health-related benefits. As context for addressing these questions, Box 2.3 provides a brief summary of the structure of the health-related benefits system in the UK, and how caseloads in different parts of the means-tested system have changed over time.

Box 2.3: The working-age, health-related welfare system in the UK

To understand the possible role that the welfare system may have played in the rise in health-related inactivity, one has to understand its structure. Of the £100.6 billion the Department for Work and Pensions is expected to spend on working-age claimants in 2023-24, the majority is on universal credit (UC) and its legacy equivalents (£73.7 billion), and on disability benefits (£18.9 billion). The latter is, these days, mainly in the form of personal independence payment (PIP), which has largely replaced disability living allowance (DLA) for those of working age.[a]

UC – in a decade-long process of being rolled out to replace a number of different benefits and tax credits[b] – is now the main means-tested, working-age benefit for people in a range of circumstances, including those in and out of work and people with different income needs and work capabilities in relation to housing, caring responsibilities and health. We do not attempt to describe all the features of this complex and far-reaching benefit here,[c] but instead focus on the experience of out-of-work claimants with health problems, in comparison to those without.

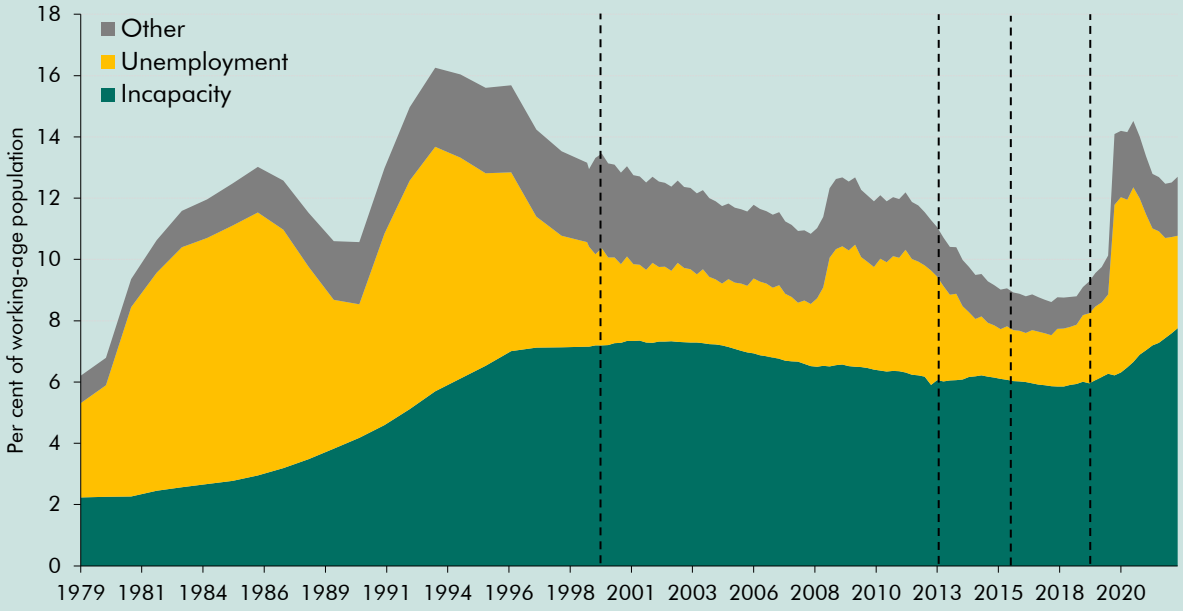
Claimants can report that they have a health condition or disability that affects their ability to work when they apply for UC. They provide a range of medical evidence from health professionals (including a 'fit note') alongside completing a health-related questionnaire. This evidence is then referred to healthcare professionals contracted by DWP who conduct a Work Capability Assessment (WCA), in most cases including an appointment over the phone, via video call or in person. These assessments place out-of-work claimants into one of three groups:

- '**Fit for work**' (which we term '**unemployment**'), which means claimants are expected to prepare for, look for and take up work. They receive the standard UC allowance (around £4,400 a year for single adults aged 25 and over, plus any additions for couples, children and housing costs), and are placed in the 'intensive work search' conditionality group, meaning they can be required to search for up to 35 hours a week alongside attending weekly meetings with a work coach. 1.3 million out-of-work or very-low-earning claimants were in this conditionality group in 2022-23.[d]
- '**Limited capability for work**' (LCW, which we term '**less severe incapacity**'), which means claimants cannot work now but are expected to prepare for working in future. Their out-of-work UC award is the same as that for those found fit for work (although they keep more of their earnings if they move into work via a higher 'work allowance'). They are placed in the 'work preparation' conditionality group, meaning they meet with a work coach regularly and may be expected to undertake training or other preparation activities. Including those in the equivalent part of the legacy system (largely income-based employment and support allowance (ESA)) and the contributory system, there were 425,000 claimants in this group in 2022-23 (as shown in Chart 2.9, above).
- '**Limited capability for work and work-related activity**' (LCWRA, which we term '**more severe incapacity**'), which means claimants are not expected to look for or prepare for work. They receive an additional £4,700 a year on top of the £4,400 standard allowance (more than doubling the standard award for single claimants), and face no conditionality. Including those in the equivalent parts of the legacy and contributory systems, there were 2.3 million claimants in this group in 2022-23 (Chart 2.9, above).

Adding those waiting for their WCA to the LCW and LCWRA groups, 3.2 million claimants were in the health-related part of the means-tested, working-age welfare system in 2022-23, which we collectively term the 'incapacity' caseload.[e] Chart E puts this group within the UC and predecessor systems in the context of wider means-tested welfare caseloads since the late 1970s – split into incapacity, unemployment and 'other' (historically, mainly benefits for parents and those with caring responsibilities). The tightening of conditionality for unemployment benefit in the second half of the 1980s was followed by a simultaneous fall in the unemployment caseload and rise in the incapacity caseload. The growth of the incapacity caseload then slowed from 1995, when 'invalidity benefit' was replaced with the less generous 'incapacity benefit', which introduced the gateway 'all work test', effectively reducing eligibility. The incapacity caseload then began to decrease for the first time following the introduction of reassessments in 2000. It continued to decline as ESA replaced incapacity benefit from 2008 onwards, thanks in part to the WCA acting as a more stringent gateway. But numbers on incapacity benefits have increased sharply over the past three years (some of which is likely to relate to the introduction of UC

counting more people within the incapacity group relative to the legacy system[f]), reaching an all-time high of 7.8 per cent of working-age adults in late 2022.

Chart E: Working-age, out-of-work benefit caseloads over time



Note: Dashed lines show breaks in the data series that lead to some inconsistencies.
Source: DWP, OBR

The other health-related benefit that working-age claimants can claim is personal independence payment (PIP), and previously disability living allowance (DLA), which we collectively term 'disability' benefits. These are intended to meet extra costs associated with daily living and mobility for those with long-term health conditions. They are not means-tested, not subject to conditionality and can be claimed at the same time as other benefits and by people either in or out of work. In practice, they are much more commonly claimed among those out of work – only around 16 per cent of the working-age PIP caseload works.[g] Similar to incapacity benefits, to claim disability benefits a claimant needs to submit evidence of their disability, and typically undergoes an assessment with a healthcare professional. There are various different award levels for PIP depending on need, ranging from £1,400 to £9,000 a year.

[a] The remaining £8.1 billion consists primarily of carer's allowance (£3.8 billion) and statutory maternity pay (£2.8 billion).
[b] Working tax credit, child tax credit, working-age housing benefit, (income-based) employment and support allowance, (income-based) jobseeker's allowance, and income support.
[c] For a detailed discussion of universal credit, see our 2018 *Welfare trends report*.
[d] This figure includes those claiming contributory jobseeker's allowance.
[e] This caseload also includes those who remain in the 'incapacity benefit' caseload, the predecessor to ESA; in 2022-23 there were just under 20,000 people in this group.
[f] For example, some working partners and short-term sick people. The scale of this effect is currently unknown.
[g] Based on DWP analysis of unpublished administrative data.

Changes in the relative generosity of different benefits

2.23 There is relatively little evidence to support the idea that changes in the *relative* generosity of different parts of the working-age welfare system have contributed to rising health-related inactivity by making health-related, out-of-work benefits more attractive. Chart 2.10 summarises stylised, typical awards for new claimants in different parts of the means-tested benefit system since 2010-11. (We focus only on this part of the system because disability

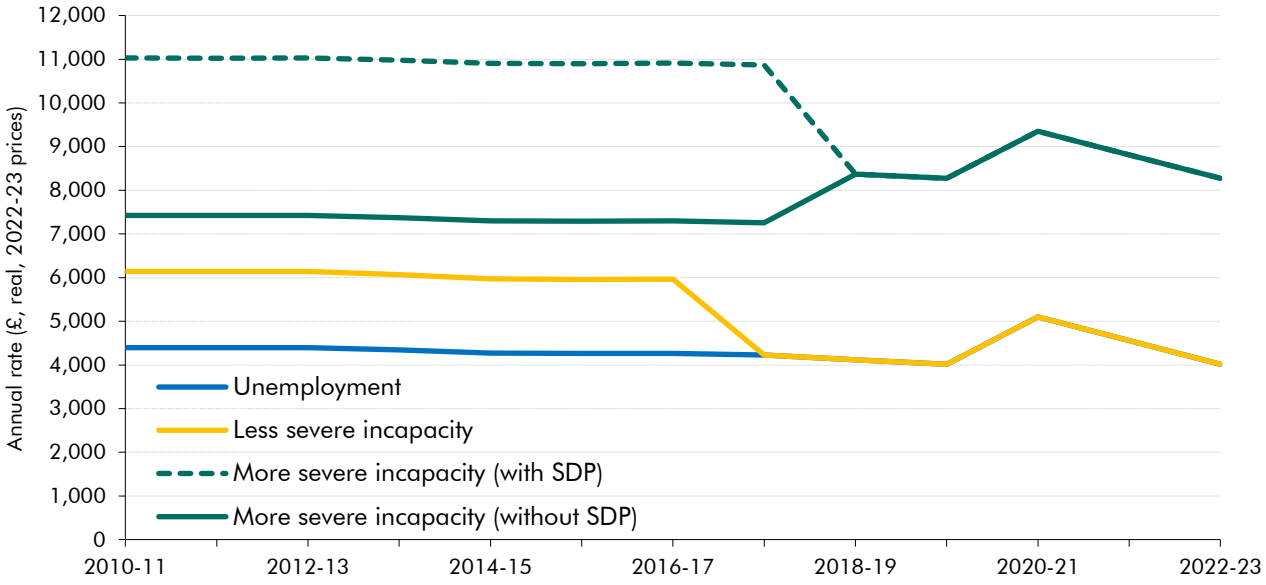
benefits can be claimed by those in work and at the same time as means-tested benefits – see Box 2.3.) It shows that:

- Since **2010-11**, **awards for those in the more severe incapacity group have been much higher than unemployment benefit awards**, and were more than twice as high in 2022-23. So before considering any changes in this gap over time (which are more relevant to the *change* in incapacity caseloads in recent years) it is worth noting that there is, and has always been, a financial incentive to be placed in this group if one's health conditions and the means of accessing these benefits allow.
- Between **2010-11 and 2017-18**, **there was little change in real awards** across either unemployment or incapacity benefits, with the 1 per cent cap on uprating and later freeze having little relative impact due to low inflation during that period.
- In **2017-18**, **the generosity of less-severe incapacity benefits fell sharply** as award rates were cut to be equal to unemployment benefits, announced in Summer Budget 2015.
- This switch to UC – which we show happening in **2018-19**, once it had been rolled out nationwide for new claims – then **increased generosity relative to unemployment benefits for some 'more severe' incapacity benefit claimants, while reducing it quite sharply for others**. Which group claimants fall into depends on whether they would previously have been eligible for the severe disability premium (SDP), which UC removes – around half of incapacity benefit claimants would have received the SDP in the legacy system, while the other half would not.[33]
- The £20 a week uplift to UC in **2020-21 temporarily increased the generosity of both unemployment and incapacity benefits**, but this effect had fully unwound by 2022-23.

2.24 Two of the three stylised incapacity benefit routes shown in Chart 2.10 have therefore become relatively less generous than unemployment benefits since 2010-11, while more severe incapacity benefits for those who would not have received the SDP in the legacy system have become relatively more generous (the typical award moving from 70 per cent higher than unemployment benefits in 2010-11 to 105 per cent higher in 2022-23). With this increase in relative generosity applying to only around half of new incapacity benefit claimants, and in a way that is relatively untransparent at the point of claiming, there appears to be limited evidence that *rising* relative welfare generosity is a major factor in explaining higher levels of inactivity due to long-term sickness in the UK. Nor is there much evidence that the generosity of the UK's health-related benefit system stands out as above average internationally – see Box 2.4.

[33] Emmerson, C., and R. Joyce, *Benefit and tax credit claimants to resume moving to universal credit from today*, May 2022.

Chart 2.10: The relative generosity of means-tested benefits over time

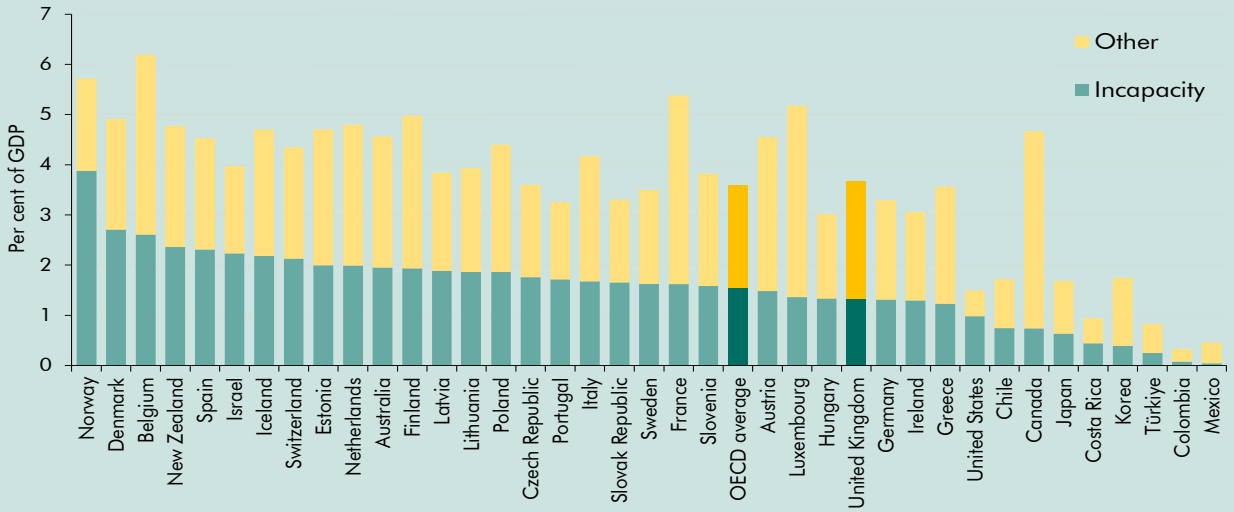


Note: The time series switch from their respective legacy benefit rates to their UC counterparts in 2018-19, when UC had been rolled out nationwide. The awards are for a new claimant, who is single, aged 25 or over and has no dependents.
Source: DWP, IFS, OBR

Box 2.4: International comparisons of health-related welfare spending and generosity

Immediately prior to the pandemic in 2019, the UK's spending on total non-pensioner cash welfare benefits was similar to the average across OECD countries, at 3.7 and 3.6 per cent of GDP respectively (Chart F). Within this, the UK's spending on incapacity-related benefits (1.3 per cent of GDP) was slightly below the OECD average (1.6 per cent of GDP), by a margin that has remained broadly consistent since 2010 (when these figures were 1.5 and 1.7 per cent of GDP, respectively).

Chart F: Spending on non-pensioner cash benefits across OECD countries, 2019



Note: We estimate public spending on cash benefits for *non-pensioners* by subtracting 'old age' and 'survivors' spending from total cash benefits spending.
Source: OECD, OBR

Of course, health-related cash benefit spending as a share of GDP is only a rough proxy for the relative generosity of different aspects of a country's welfare system. It is difficult to make more granular comparisons across countries due to large differences in the way their health-related welfare systems operate, particularly in terms of the respective roles of the social security system itself, broader public service provision and employers. For example, some countries provide cash payments to meet extra costs (as with PIP in the UK), while others, such as the Nordic countries, provide services in kind instead.[a] And some – such as the Netherlands and Spain – place heavy obligations on employers to support employees who fall ill or meet the associated welfare costs; which partly explains the more extensive occupational health systems available in many European economies than the relatively fragmented and voluntary one in the UK.[b] All that said, comprehensive OECD studies produced before the pandemic found that the generosity of health-related benefits in the UK is close to average both as a share of average earnings and as a share of unemployment benefits.[c]

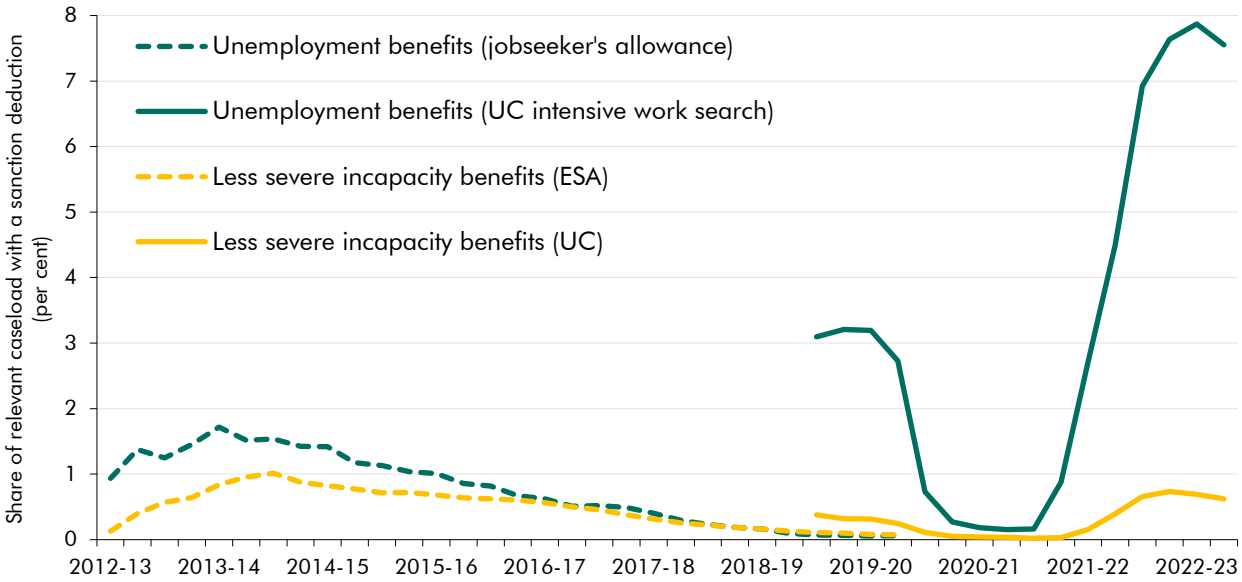
[a] MacInnes, T., et al., *Disability, long-term conditions, and poverty*, July 2014.
[b] See: Hassard, J., A. Jain, and S. Leka, *International Comparison of Occupational Health Systems and Provisions: A Comparative Case Study Review*, DWP Research Report No.993, July 2021; Gardiner, L., and D. Gaffney, *Retention deficit: A new approach to boosting employment for people with health problems and disabilities*, June 2016.
[c] Browne, J., et al., *Benefit generosity and work incentives for recipients of disability benefits in 12 EU member states*, July 2018; OECD, *OECD Employment Outlook 2009: Tackling the Jobs Crisis*, September 2009.

Changes in conditionality regimes

2.25 There is more evidence to support the idea that changes in conditionality and sanctions in non-health-related parts of the means-tested welfare system have contributed to rising health-related inactivity. Reforms to the UK's welfare system over the past 13 years have increased the range of claimants subject to conditionality, notably by gradually moving lone parents with younger children into the unemployment group subject to the highest conditionality, and imposed stricter conditions on unemployment and less severe incapacity claimants. These changes have been accompanied by varying rates of sanctioning (reductions in benefit awards when conditions are not met) over the past decade. Chart 2.11 shows that the sanction rate within jobseeker's allowance increased in the early 2010s to a peak in late 2013, after which it declined.[34] Since the pandemic, the rate in the equivalent group within UC has spiked to far above its pre-pandemic levels (differences between the UC and legacy sanction regimes and data do not allow comparisons that are in any way like-for-like). Sanction rates within the elements of incapacity benefits where some conditionality applies have remained low, while no sanctions apply in the more severe incapacity group (which makes up 74 per cent of those on incapacity benefits).

[34] Jobseeker's allowance (JSA) sanction rates taken from Table 2.2 of DWP's *Benefit sanction statistics to July 2022*. Previous estimates of JSA sanction rates based on older methodologies have been much higher.

Chart 2.11: Monthly sanction rates for different benefits



Note: UC sanction rates data are only available from April 2019 onwards. Sanction regimes differ between legacy benefits (JSA and ESA) and UC and therefore direct comparison is not suitable.
Source: DWP, OBR

2.26 The expansion of conditionality and rising rates of sanctioning in the non-incapacity parts of the means-tested, working-age welfare system may have made applying for (largely unconditional and often-more-generous) incapacity benefits more attractive. Academic evaluations suggest that tightening conditionality in other parts of the system can lead to rising claims for unconditional incapacity benefits. These include the introduction of jobseeker's allowance – which first set conditions for unemployed claimants in 1996 – and the lone parent obligation – which gradually reduced the maximum age at which single-parents with a child could claim unconditional income support benefits, from 16 to five (an age which has since been reduced further to three).[35] It is also possible that cost-of-living concerns related to the pandemic and energy crisis – coming on top of a decade in which real incomes were squeezed by weak productivity growth and, for some people, real-terms cuts to benefits – may have incentivised claimants to seek out those parts of the system that are more generous and subject to less stringent conditionality (and therefore leave them less at risk of facing sanctions and loss of income). We explore this in more detail below in relation to the volume of health-related claims submitted for a WCA.

Changes in assessment regimes

2.27 There is also evidence to support the idea that changes in the incapacity assessment regime may have contributed to rising health-related inactivity. Since 2008, new claimants for incapacity benefits (claimants are not commonly reassessed once on incapacity benefits – as discussed below) have been required to undertake a work capability assessment (WCA) and have to be found to have a limited capability for work (LCW, or less severe incapacity) or limited capability for work and work-related activity (LCWRA, or more severe incapacity) to

[35] Petrongolo, B., 'The long-term effects of job search requirements: Evidence from the UK JSA reform', *Journal of Public Economics* 93, 2009; Avram, S., M. Brewer, and A. Salvatori, *Lone Parent Obligations: an impact assessment*, July 2013; Codreanu, M., and T. Waters, *Do work search requirements work? Evidence from a UK reform targeting single parents*, February 2023.

be eligible to receive incapacity benefits (see Box 2.3). We term the proportion of WCAs resulting in claimants being placed in one of these groups the 'incapacity approval rate'. Chart 2.12 shows three key trends in relation to WCA volumes and outcomes:

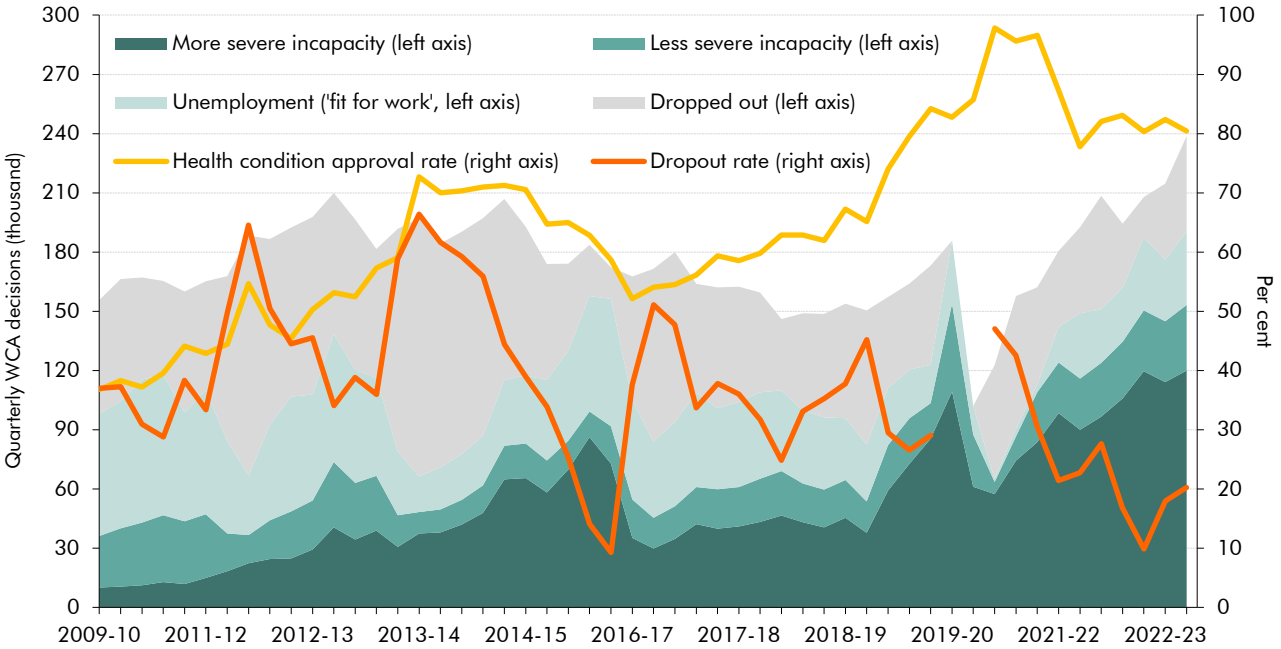
- First, **the incapacity approval rate has risen over time**. In the WCA's first full year of operation in 2009-10, 35 per cent of new claimants assessed were approved. This share increased rapidly over the following years, doubling to 70 per cent in 2014-15. This was driven in part by independent DWP reviews that led to some easements in criteria and extra support being provided for claimants;[36] the withdrawal of the original provider after a series of challenges; a high volume of decisions overturned at appeal in the early years, followed by the introduction of mandatory reconsiderations; and the development of advice and support from external organisations on approaching the WCA. The approval rate then fell to 55 per cent in 2016-17 before continuing to rise up until the pandemic, with 81 per cent of new claims approved in 2019-20. Various Covid easements temporarily increased this share close to 100 per cent, before it fell back to roughly its pre-pandemic level in 2022-23 (82 per cent). To put these changes into context, from March 2017 to November 2022, there were a cumulative 2.2 million approved onflows to the incapacity caseload. Had the incapacity approval rate remained at its 2016-17 levels, there would have been 670,000 (30 per cent) fewer approved claimants.

- Second, **the proportion of new claims reaching an assessment has risen in recent years**, shown by the 'dropout rate' (the proportion of WCA applications that were withdrawn before the assessment had been completed) falling from 43 per cent in 2016-17 to just 14 per cent in 2022-23. To put this change into context, had the dropout rate remained at its 2016-17 levels, there would have been 510,000 (23 per cent) fewer approved incapacity onflows between March 2017 and November 2022.

- Third, having remained broadly stable through most of the decade prior to the pandemic, **WCA applications have increased** from an average of 160,000 a quarter in 2019-20 to 220,000 a quarter in 2022-23. More applications have not been a driver of higher *cumulative* onflows between March 2017 and November 2022 in the way that approval and dropout rates have, because the rise in applications has only happened recently and followed a sharp drop during the pandemic.[37]

[36] Litchfield, P., *An Independent Review of the Work Capability Assessment – year four*, December 2013; see also similar independent reviews for each of the first three years.
[37] Following the pandemic, applications have been much higher than pre-covid. Had applications remained at pre-covid (2019-20) levels rather than increasing, there would have been 190,000 (20 per cent) fewer approved incapacity benefit onflows between March 2021 and November 2022.

Chart 2.12: Work capability assessment onflows, approval rates and dropout rates



Note: As with Chart 2.9, internal DWP data is used prior to 2019-20 for UC WCA outcomes, with small differences to published data. There is a time lag between the 'dropped out' series (counted at the start of the application) and the other series (counted at the date of the WCA decision), with the typical gap between the application start and the date of decision around two months. This leads to some inconsistencies in the applications time series, most significantly around the beginning of the pandemic where there is a gap in the dropout rate series. Periodic WCA backlogs across the last decade may also contribute to fluctuation in the dropout rate series.
Source: DWP, OBR

2.28 For disability benefits, the approval rate for new claimants has a different trend to WCAs: falling from 60 per cent in 2016-17 to 53 per cent in 2019-20, and 51 per cent in 2022-23. This has recently been somewhat offset by a significant fall in the dropout rate, from 29 per cent in 2019-20 to 13 per cent in 2022-23. One key factor behind this falling dropout rate has been DWP flagging many more claims as requiring additional support, partly in response to new guidance that followed the Philippa Day case.[38]

The role of the welfare system – conclusion

2.29 There appears to be little evidence that changes in the generosity, purely in money terms, of different parts of the welfare system have contributed significantly to rising health-related benefit caseloads and therefore to people describing themselves as inactive due to long-term sickness (although more severe incapacity benefits remain much more generous than unemployment benefits). But changes in conditionality and sanctioning elsewhere in the system, and a shift in assessment outcomes, could plausibly have played a role. These factors might have combined with recent cost-of-living pressures that come on top of a decade of weak household income growth and increasing financial strain for some, to raise onflows, alongside broader health changes in the working-age population.

[38] Philippa Day, a claimant for PIP, died in October 2019 following an overdose, with the handling of her claim considered a factor in her death. The inquest into her death criticised DWP and PIP contractors for rigidly applying processes and deadlines in a case where the claimant had very serious mental health issues.

2.30 The factors discussed here have largely focused on the rise in health-related benefit *onflows*. It is also worth considering what happens to people after that. Once claimants are approved as having a health condition, there is little regular engagement with them, either in terms of encouraging employment or reassessing their health (while reassessment volumes for ESA claims averaged 30,000 a month in the decade up until the pandemic, all WCA reassessments were paused in response to Covid and have only restarted slowly in recent months).[39] As the recent *Health and Disability White Paper* sets out, these features (which are largely long-standing rather than something that has changed in recent years) may create barriers to work among incapacity claimants, for example due to fear of losing benefits. The implication is that rising health-related benefit *onflows* result in large and enduring changes in *caseloads* due to low *off-flow rates*. These higher caseloads are likely to be reflected in data on self-reported inactivity, alongside the impact of rising ill-health.

Characteristics of the health-related inactive population

2.31 Having explored the key drivers of the rise in health-related inactivity, this section looks in more detail at the characteristics of those who are outside the workforce for health-related reasons. This helps us to estimate their likely taxpaying status and welfare-intensity, in order to inform our scenarios detailing the fiscal costs or gains arising from variations in health-related inactivity in the future. We focus on individuals who report long-term sickness as their main reason for inactivity. However, we have also cross-checked our findings against those who give long-term sickness as a secondary reason for inactivity (140,000 in 2022), and a wider group within the working-age inactive population (1.3 million in 2022) who list other reasons for inactivity, but report having a *work-limiting* health condition.[40] Recent trends in the size of these two alterative groups – and their characteristics – are broadly the same as those for the long-term sick inactive population that we focus on here.

2.32 Drawing on a decade's worth of detailed Labour Force Survey data for those citing long-term sickness as the main reason for being inactive,[41] we examine:

- their **age, gender, and geographic distribution**;
- the **health conditions** they report as preventing them from working;
- the **amount of time they have been out of the workforce**;
- their **previous sector of employment**; and
- their **previous occupation, level of qualification, and housing tenure**.

[39] Nearly all known WCA reassessments in 2022-23 resulted in an incapacity approval (97 per cent), keeping claimants in the incapacity caseload.
[40] See: Haskell, J., and J. Martin, *Economic inactivity and the labour market experience of the long-term sick*, July 2022.
[41] The numbers reported throughout this section are slightly different to those drawn from the published ONS labour market statistics set out at the outset of this chapter, because the latter are seasonally adjusted while our analysis of unpublished LFS microdata is not. Throughout this section, we present data using annual rolling averages to smooth seasonal variation and capture appropriate sample sizes for various subgroups. All analysis in this section refers to working-age adults only.

Age, gender, and geographic distribution

2.33 Table 3.1 shows the average number of working-age adults inactive due to long-term sickness in 2014, 2019 and 2022 and breaks down changes by age, gender and region, both in levels (top panel) and rates (bottom panel, showing that group of long-term sick inactive people as a share of the wider group within the working-age population). Taking each in turn:

- **Gender:** there have consistently been more women who are inactive due to long-term sickness than men and both the rate and level of long-term sick inactivity has increased more for women, who accounted for over two-thirds of the increase since 2014. Some of this will relate to the rising female State Pension age from 60 to 65 between 2010 and 2018.[42]

- **Age:** 50-64-year-olds accounted for around half of the total long-term sick inactive population in each year shown, with the rate of long-term sick inactivity in this group more than double that in any other age group. This group also accounts for around half of the increases in inactivity due to long-term sickness since both 2014 and 2019, despite making up only around a third of the working-age population (again the rising State Pension age – first for women and then for both women and men – is likely to have played a role here). While their numbers are smaller, rates of inactivity due to long-term sickness have also increased sharply for 18-24-year-olds since 2014.

- **Region:** the rate of inactivity due to long-term sickness was highest in Northern Ireland and lowest in London and the South East in each year shown. The largest increases in long-term sick inactivity rates since 2014 were in Northern Ireland, Wales, and Yorkshire and Humberside, which saw significant pre-pandemic rises in inactivity. Since 2019 the largest increases have been in Northern Ireland and Wales, while the number of people inactive due to long-term sickness has increased significantly in every region aside from London. Larger increases in long-term sick inactivity rates in lower-income regions indicate that the rise in inactivity is likely to be concentrated among those from lower socioeconomic backgrounds (as we discuss further in paragraph 2.39).

[42] This may have driven more women aged 60-64 to classify themselves as inactive due to long-term sickness in the LFS, rather than retired.

Table 2.1: The long-term sick inactive population by gender, age and geography

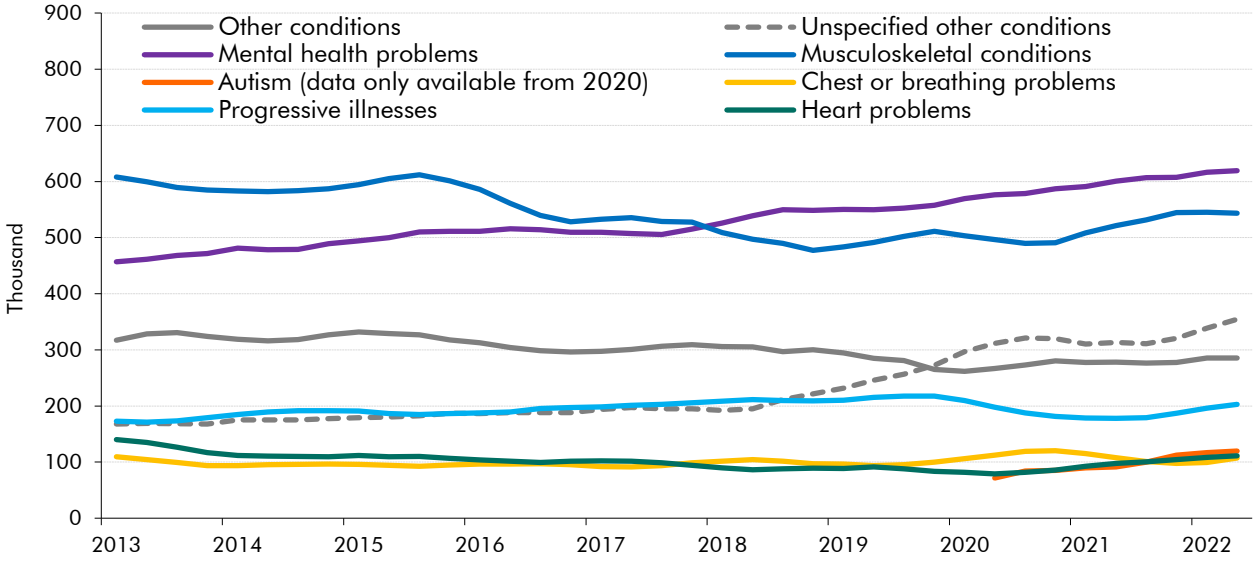
	Total (thousand)				
	Outturn (average)			Change between	
	2014	2019	2022	2014-2022	2019-2022
Sex					
Female	1,009	1,079	1,293	284	214
Male	987	947	1,116	129	169
Age					
18-24	116	149	200	84	51
25-49	785	740	891	106	151
50-64	1,088	1,138	1,318	230	180
Region					
North East	112	115	129	17	14
North West	318	255	296	-22	41
Yorkshire and Humberside	168	180	218	50	38
East Midlands	149	153	178	29	25
West Midlands	192	167	179	-13	12
East of England	131	157	171	40	14
London	205	238	249	44	11
South East	175	198	224	49	26
South West	138	138	176	38	38
Wales	116	106	150	34	44
Scotland	214	214	238	24	24
Northern Ireland	85	91	119	34	28
	Per cent of total population				
Sex					
Female	4.9	5.2	6.2	1.3	1.0
Male	4.9	4.6	5.4	0.5	0.8
Age					
18-24	2.0	2.7	3.7	1.7	1.0
25-49	3.6	3.4	4.1	0.5	0.7
50-64	9.3	8.9	10.1	0.8	1.2
Region					
North East	6.8	7.0	8.0	1.2	0.9
North West	7.1	5.7	6.6	-0.5	0.9
Yorkshire and Humberside	5.0	5.3	6.5	1.5	1.1
East Midlands	5.1	5.2	6.0	0.9	0.8
West Midlands	5.4	4.6	4.9	-0.5	0.3
East of England	3.5	4.2	4.5	1.0	0.3
London	3.6	3.9	4.1	0.5	0.1
South East	3.2	3.5	4.0	0.8	0.4
South West	4.2	4.2	5.3	1.1	1.1
Wales	6.1	5.6	7.9	1.8	2.3
Scotland	6.3	6.2	6.9	0.7	0.7
Northern Ireland	7.4	7.8	10.2	2.9	2.4

Note: All data cover working-age adults only and are smoothed using annual rolling averages. The colour scheme in the final two columns highlights the largest increases in shades of red and the smallest in shades of green.
Source: OBR analysis of unpublished LFS microdata

Health condition

2.34 The largest increase in inactivity due to long-term sickness has come from individuals with a mental health problem and other unspecified conditions. While the prevalence of mental health conditions has trended up since 2013, the rise in unspecified conditions began in 2018. It is not possible to disaggregate this group further using the LFS, however it may be that these individuals have a condition that does not easily fit into any of these groups, such as long Covid (as discussed in relation to economic inactivity in paragraph 2.14, above). Additionally, there was a small rise in chest and breathing problems in the early stages of the pandemic, but this subsided through 2021.

Chart 2.13: The long-term sick inactive population by health condition



Note: Data cover working-age adults only and are smoothed using annual rolling averages. Other conditions include epilepsy, learning difficulties, stomach, liver and kidney conditions and sight, hearing and skin conditions.
Source: OBR analysis of unpublished LFS microdata

2.35 Disaggregating the long-term sick inactive population by both health condition and age, we find that:

- For **those aged 16-49**, mental health conditions are most common, and have been trending up for the past 10 years. Of the over 200,000 rise in long-term sick inactivity in this age group between 2019 and 2022, 50,000 (25 per cent) is accounted for by rising mental health conditions, while a further 30,000 (14 per cent) relates to unspecified conditions. Aside from musculoskeletal conditions, which have trended down, all other conditions have remained broadly flat over the past decade.

- For **50-64-year-olds**, musculoskeletal conditions are most common. They were trending down prior to the pandemic but have risen since (by 40,000, or 22 per cent of the total rise in health-related inactivity in this age group). However, since the onset of the pandemic the largest rise has come from those reporting unspecified conditions, which account for 79,000 (44 per cent) of the overall rise in long-term sick inactivity in this age group. Rises in mental health conditions and chest and breathing problems

account for a further 18,000 (10 per cent) and 14,000 (8 per cent) respectively of the overall rise between 2019 and 2022.

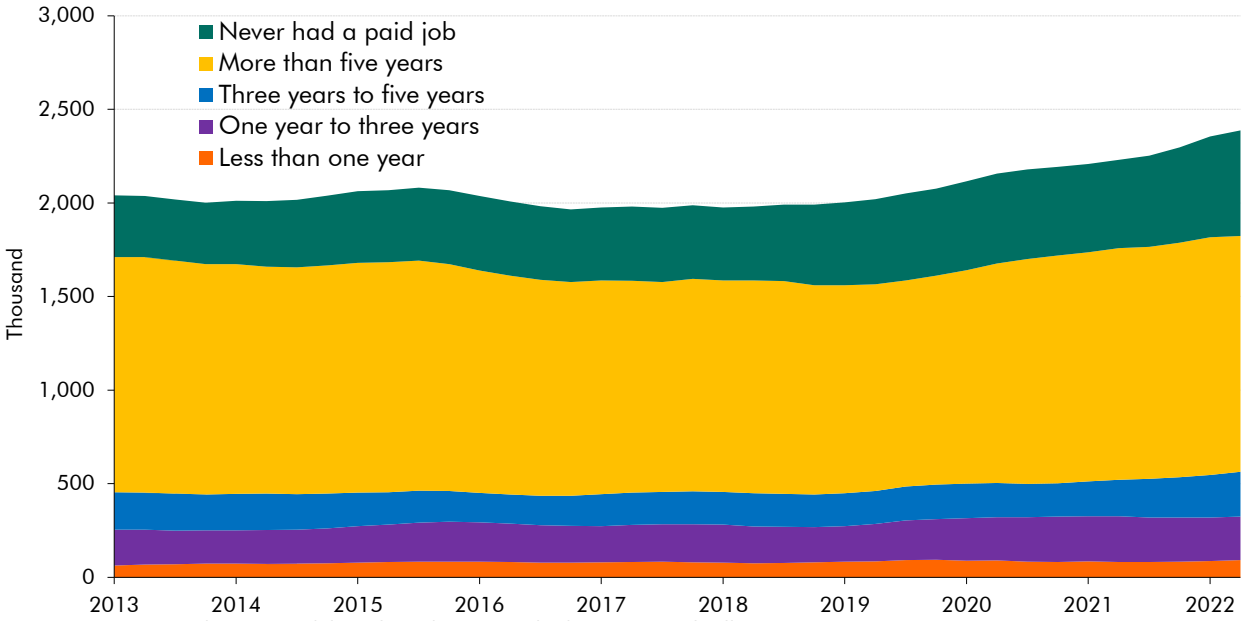
Duration of inactivity

2.36 The majority of working-age adults inactive for health reasons today have been so since before the pandemic began. Chart 2.14 shows that of the 2.4 million working-age long-term sick inactive population in 2022, 1.5 million (62 per cent) had been out of work for more than three years, and 560,000 (23 per cent) have never had a job (the majority of whom will be young people leaving education[43]), with these two groups trending upwards since the start of 2020. This tallies with analysis of longitudinal data, which suggests that much of the increase in inactivity due to long-term sickness has come from individuals who were already inactive changing their main reason for inactivity.[44] This could be due to individuals previously inactive for other reasons, who have seen a worsening of health conditions and a decline in incomes during the pandemic, becoming eligible for health-related benefits and reassessing their main reason for inactivity. It also suggests that while the UK's more limited occupational health system relative to other European economies may have played a role in longer-run health and labour market trends (see Box 2.4), it is unlikely to have been a proximate driver of the recent increase in inactivity due to long-term sickness.

2.37 The same analysis of longitudinal data suggests that flows from inactivity into employment are low, and have fallen over the pandemic. And a person's likelihood of returning to work declines rapidly the longer they are out of work – among those with health problems, an average of one-in-six people return to work each quarter in the first year after leaving, a figure which drops to one-in-twenty when they have been out of work a year or longer.[45] This clearly presents a challenge for those seeking to reverse recent health-related inactivity trends, given rising durations out of work within this group.

[43] Gardiner, L., *Never ever: Exploring the increase in people who've never had a paid job*, January 2020.
[44] See Box 2.3 in our March 2023 *Economic and fiscal outlook*.
[45] Gardiner, L., and D. Gaffney, *Retention deficit: A new approach to boosting employment for people with health problems and disabilities*, June 2016.

Chart 2.14: The long-term sick inactive population by time since last worked



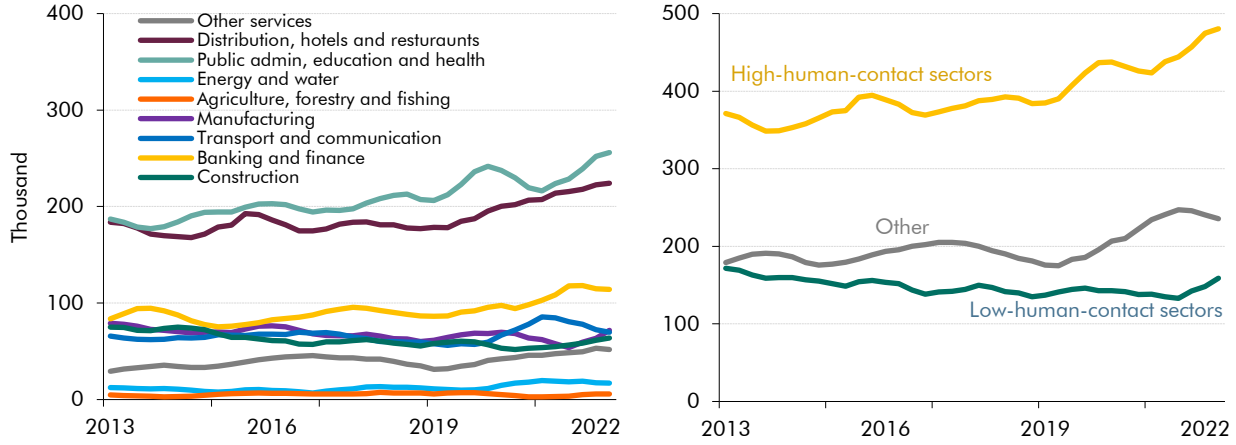
Note: Data cover working-age adults only and are smoothed using annual rolling averages.
Source: OBR analysis of unpublished LFS microdata

Previous sector of employment

2.38 The increase in working-age long-term sick inactivity has been concentrated among individuals who previously worked in sectors where there are typically higher levels of face-to-face contact with the public, such as hospitality, health and education. Chart 2.15 looks at the previous sector of employment of the subset of the long-term sick inactive group for whom this data is available.[46] The number who report previously working in a high-human-contact sector has risen by around 90,000 since 2019, while there was relatively little change in those who previously worked in low-human-contact sectors, like manufacturing and agriculture. These changes may be associated with the risk of contracting Covid in these jobs (discussed above). In addition, high-human-contact sectors tend to offer below-average earnings, meaning these trends are consistent with our findings in relation to prior occupation and qualification, discussed below.

[46] Around a third of the total, given some have never worked or been out of work for a long time, and so do not respond to these questions.

Chart 2.15: The long-term sick inactive population by previous sector of employment



Note: Data cover working-age adults only and are smoothed using annual rolling averages. High-human-contact sectors include distribution, hotels, restaurants, health and education; other sectors include other services, transport and communication; low-human-contact sectors account for the rest. Totals on this chart do not sum to the total working-age population inactive due to long-term sickness because some of this group have not previously worked, been out of the workforce for an extended period or do not respond to questions on their previous employment.
Source: OBR analysis of unpublished LFS microdata

Previous occupation, qualifications, and housing tenure

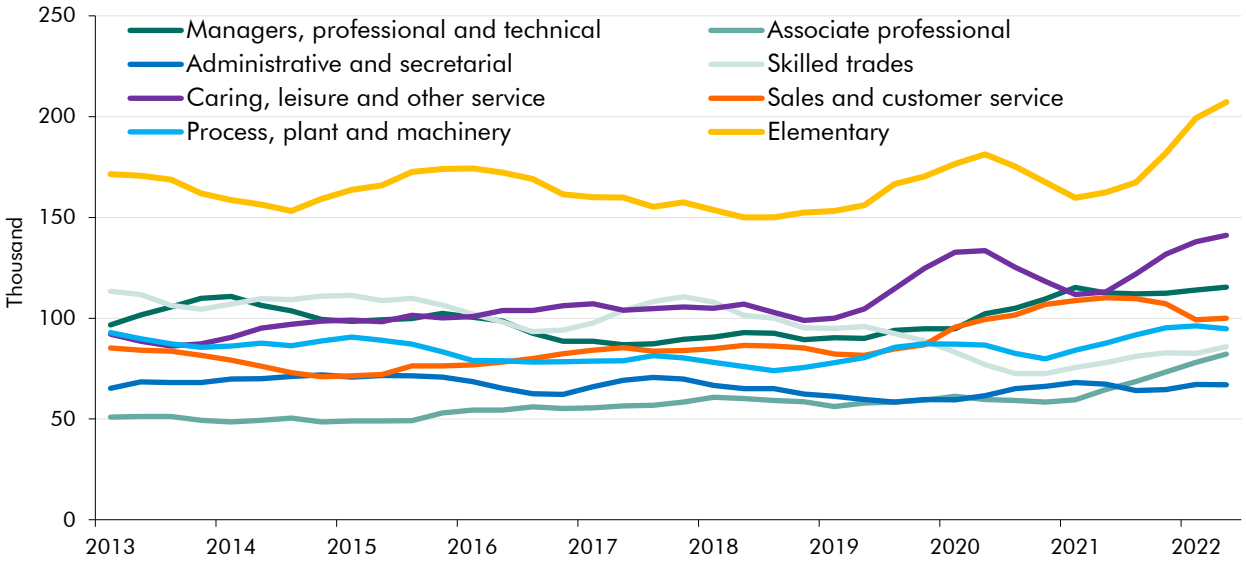
2.39 The LFS does not include data on the previous earnings or wealth of the long-term sick inactive population. Instead, as proxies, we consider: previous occupation, highest qualification level and housing tenure. All of these are strongly associated with wealth, earnings, and socioeconomic status. We find that:

- **The increase in inactivity due to long-term sickness since 2019 has been concentrated among those who previously worked in lower-paid occupations** (Chart 2.16). Again, these data apply to only a subset of the total long-term sick inactive population who report this information, among whom elementary occupations; caring, leisure and other service occupations; sales and customer service roles; and process, plant and machinery occupations have accounted for most of the increase – all of which pay at least 25 per cent below the average weekly wage across employees. These occupations are also likely to involve higher levels of contact with the public and are less able to be done from home, which reinforces our findings relating to previous sector of employment, discussed above.

- **The rise in health-related inactivity has been particularly pronounced among individuals with qualifications at A-Level or below** (Chart 2.17, left panel). The share of those with no qualifications who are also inactive due to long-term sickness has risen particularly sharply, from 21 per cent in 2019 to 25 per cent in 2022.

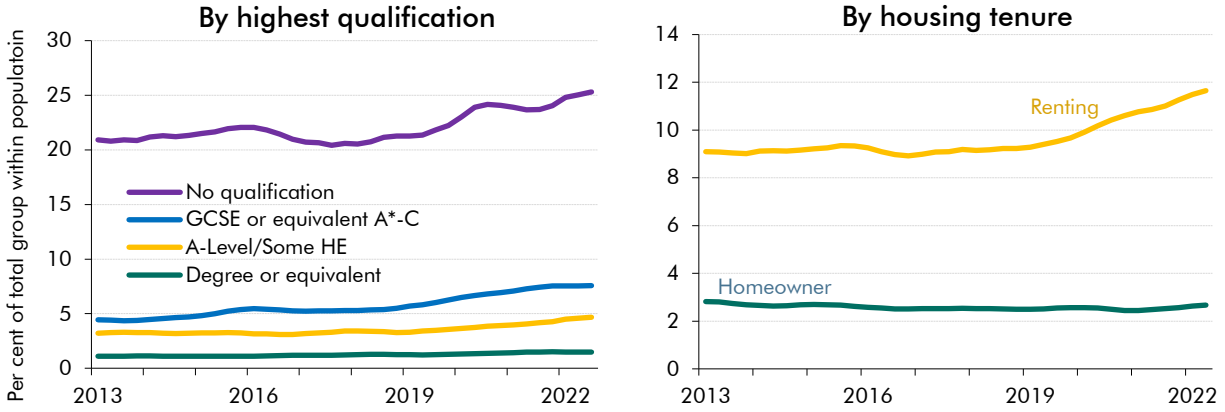
- **Those who are inactive due to long-term sickness are disproportionately and increasingly likely to be renters** (Chart 2.17 right panel), the share of renters who are inactive due to long-term sickness rose from 9.4 per cent in 2019 to 11.6 per cent in 2022, while the share among homeowners has remained broadly flat at 2½ per cent. This further supports the conclusion that the stock of, and increase in, inactivity due to long-term sickness are concentrated among those from lower socioeconomic groups.

Chart 2.16: The long-term sick inactive population by previous occupation



Note: Data cover working-age adults only and are smoothed using annual rolling averages. Totals on this chart do not sum to the total working-age population inactive due to long-term sickness because some of this group have not previously worked, been out of the workforce for an extended period or do not respond to questions on their previous employment.
Source: OBR analysis of unpublished LFS microdata

Chart 2.17: The long-term sick inactive population by qualification and tenure



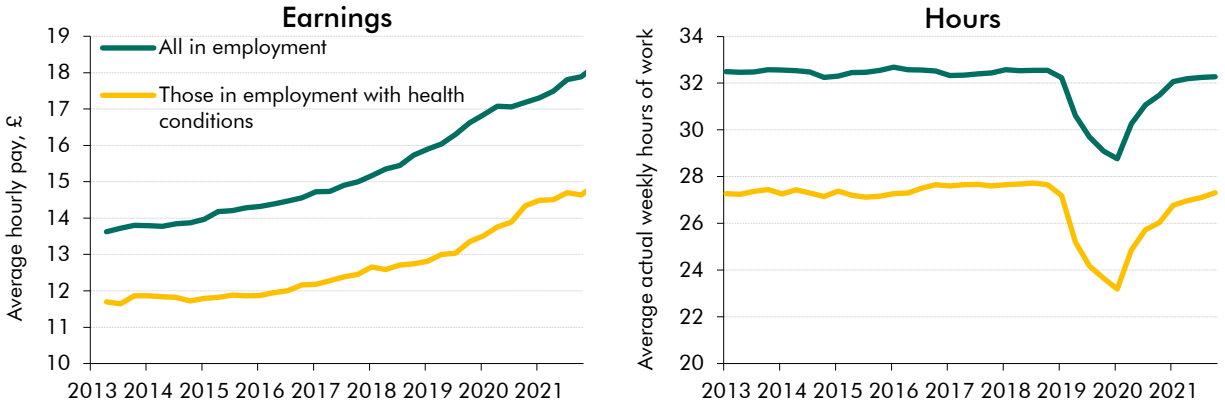
Note: Data cover working-age adults only and are smoothed using annual rolling averages. We exclude those with other or unspecified qualifications from our analysis by highest qualification, and those living in shared ownership, rent free or squatting from our analysis by housing tenure.
Source: OBR analysis of unpublished LFS microdata

The effects of rising sickness among those in work

2.40 In addition to the increase in the number of people who cite long-term sickness as their main reason for being inactive, there has also been a large rise in the number of people who are in work but report having a work-limiting health condition, from 7.5 per cent of working 16-64-year-olds in 2014 to 9.0 per cent in 2019 and 10.4 per cent in 2022. Like the rise in inactivity due to long-term sickness, this matters fiscally because pay and hours worked for those with a work-limiting health condition have been consistently below average (Chart 2.18), by an average of 15 to 20 per cent in each case.[47]

[47] Sickness absence rates have also increased both among those with a work-limiting health condition and those without one, and there is a much higher rate of sickness absence among those who have a work-limiting health condition.

Chart 2.18: Earnings and hours of those with work-limiting health conditions



Note: Data cover working-age adults only and are smoothed using annual rolling averages. Hourly pay data cover employees only. Individuals with long-term, work-limiting health conditions are those who report having a health condition that lasts 12 months or more that limits the type of paid work they can do.
Source: OBR analysis of unpublished LFS microdata

Fiscal implications of rising health-related inactivity

2.41 This section explores the fiscal implications of rising health-related inactivity (and rising ill-health more generally), which come from three main routes:

- **forgone tax revenue** from more people either not working or working fewer hours and earning less;
- **higher welfare spending** on those claiming disability benefits such as PIP or health-related elements of UC or other incapacity benefits; and
- **higher spending on healthcare services**, especially given the two-way linkage between time spent economically inactive and deteriorations in health.

The impact of rising health-related inactivity on tax receipts

2.42 Tax losses from a rise in inactivity due to long-term sickness (and a corresponding reduction in the number of people in employment), and rising ill-health more generally, arise from two broad channels:

- First, a **direct effect from lower employment, and lower hours and earnings among those who remain in work**, which collectively **reduce income tax and National Insurance contributions**. Drawing on the characteristics of the long-term sick inactive population set out in paragraphs 2.31 to 2.40, we assume that those who become inactive previously had below-average earnings, which means that the compositional effect of these people leaving employment raises average earnings among those still in work.[48] And we assume that the share of people in work with a work-limiting health condition rises, which reduces average earnings (shown in Chart 2.18).

[48] In reality, we know that much of the rise in inactivity due to long-term sickness has not come directly from employment but rather relates to people flowing from other reasons for inactivity (see paragraph 2.36), with outflows from employment or unemployment to other reasons for inactivity happening at the same time. In our fiscal calculations we abstract from these complicated, multi-state flows dynamics, for simplicity.

- Second, an **indirect effect from these labour market changes on potential output**, leading to a smaller nominal economy. This feeds through to lower consumption and corporate profits and lower associated revenues from taxes such as VAT and corporation tax.

2.43 We estimate that the 440,000 rise in inactivity due to long-term sickness and 490,000 increase in in-work ill-health since just before the pandemic, have been associated with a £8.9 billion (0.4 per cent of GDP) reduction in tax receipts (Table 2.2). Of this, £5.2 billion is direct – with £2.2 billion coming from lower employment among relatively low-paid people and £3.0 billion from fewer hours worked and lower earnings for those still in work – and £3.7 billion is indirect. This is £2.1 billion less than the reduction in receipts from a fall in the general labour market participation of the same size, reflecting the fact that the recent rise in inactivity has been concentrated among people whose age, qualifications, housing tenure and prior occupation suggest they earn around two-thirds of average weekly earnings.

Table 2.2: The effects of rising health-related inactivity on receipts

	People, thousand	Tax loss per person, £	Total cost, £ billion
Total change in receipts			**8.9**
of which:			
Direct effect: income tax and NICs	912	5,720	5.2
of which:			
Employment effect at lower-than-average earnings	422	5,222	2.2
Effect of deterioration in the health of the working population[1]	490	6,150	3.0
Indirect effect: other taxes			3.7

[1] This captures the effect of an increase in the number of people who are in work and report having a work-limiting health condition. This means that a greater proportion of those in employment are working fewer-than-average hours and earning below-average incomes.

Note: This table uses the convention that a positive figure means an increase in borrowing, i.e. a reduction in receipts has a positive effect on borrowing. It refers to costs in 2023-24. The total income tax and NICs loss per person is calculated as a weighted average of the tax loss per person from the 'employment effect at lower-than-average earnings' and the 'effect of deterioration in the health of the working population'. The £5,222 per-person loss in tax from the employment effect is comprised of £2,071 of income tax, £1,908 of employer NICs and £1,243 of employee NICs. The number of people affected by it is below the 440,000 rise in health-related inactivity since before the pandemic because a small minority of this group is assumed to come from unemployment rather than employment.

The impact of rising health-related inactivity on welfare spending

2.44 An increase in the number of people who are inactive due to long-term sickness creates upward pressure on welfare spending, in particular via expanding caseloads for:

- **Incapacity benefits**. The increase in the number of working-age long-term sick inactive people on incapacity benefits from 2019-20 to 2022-23 was larger than the increase in the long-term sick inactive population as a whole (as discussed in paragraph 2.27), indicating that the vast majority of these flows coincide with new claims for incapacity benefits. Of the health-related inactivity rise, we assume that around three-fifths were

already on UC when working;[49] this still implies upward pressure on spending as health-related, out-of-work UC awards are typically much higher than in-work UC awards. We assume that the other two-fifths of the rise in health-related inactivity relates to people who were new onflows to the UC caseload.

- **Disability benefits**. 63 per cent of the long-term sick inactive population claim PIP (see Chart 2.9), compared to 2.6 per cent of people in employment with similar characteristics.[50] This indicates that as people move from employment to long-term sick inactivity, they are more likely than not to begin claiming PIP. Additionally, we assume that the number of in-work PIP claimants rises in line with rising work-limiting ill-health among those in employment, with 13 per cent of this group claiming PIP.

2.45 The 440,000 rise in inactivity due to long-term sickness since the onset of the pandemic, along with the 490,000 increase in ill-health among those in work, is associated with an increase in welfare spending of £6.8 billion a year. Table 2.3 splits this out by benefit, and disaggregates the total cost of each into the number of people affect and the average change in awards. £4.5 billion of the increase relates to incapacity benefits spending, with an average increase in UC awards of £10,300 a year. The remainder (£2.3 billion) relates to disability benefits, where we assume awards of £6,900 a year for new claimants.

Table 2.3: The effects of rising health-related inactivity on welfare spending

	People, thousand	Cost per person, £	Total cost, £ billion
Total change in welfare			**6.8**
of which:			
Incapacity benefits	440	10,334	4.5
of which:			
Already on UC	251	8,956	2.2
New to UC	189	12,162	2.3
Disability benefits	328	6,890	2.3
of which:			
New inactive PIP claimants	265	6,890	1.8
New in-work PIP claimants	63	6,890	0.4

Note: This table uses the convention that a positive figure means an increase in borrowing, i.e. a rise in spending has a positive effect on borrowing. It refers to costs in 2023-24. The incapacity benefits cost per person is a weighted average of the cost per person for those already on UC and those new to UC.

The impact of rising health-related inactivity on health spending

2.46 A further direct fiscal consequence of rising health-related inactivity is the pressure the long-term sick put on current spending on health services. Here we set out estimates of these costs, which feed into our downside scenario presented below. We model increased pressure on health spending from rising health-related inactivity and in-work ill-health based on best estimates of the net unit costs to the NHS. Previous analysis has shown that health spending on working-age people with employment-limiting conditions makes up approximately 6 per cent of working-age general practice and 9 per cent of working-age

[49] Based on internal DWP analysis.
[50] Based on OBR analysis of unpublished LFS microdata.

hospital spending in England;[51] we use an updated version of this analysis to disaggregate spending by health and labour market status (based on LFS data).[52] We estimate the NHS costs of people inactive due to long-term sickness at £3,660 a year, economically inactive people with work-limiting health problems at £2,760 a year, and economically active people without health problems at £1,850 a year. This results in additional costs of £1,800 when people move from being active without health problems to health-related inactivity; £910 when people with health problems move from activity to inactivity; and £910 when economically inactive people develop work-limiting health conditions.[53]

2.47 These estimates are similar to previous DWP analysis which found that health costs increase by around 50 per cent following a move from employment to unemployment.[54] In today's prices, this suggests that an employed person moving out of work costs the NHS around £1,000 a year more on average than if they had remained in work. For someone with a disability, this rises to around £2,000 a year.[55]

2.48 In addition to the direct costs incurred from worsening health, there is a further risk from higher inactivity putting pressure on health budgets in the future, because worklessness generally has negative effects on an individual's health in the longer term. Simply comparing those in employment to those out of work captures the fact that causality runs in both directions, i.e. people with health problems are more likely to be out of work, and unemployment itself has negative effects on health. Studies using natural experiments or longitudinal data to isolate the latter relationship typically find that that leaving employment causally worsens an individual's health due to a combination of lower income leading to worse health outcomes, and the negative effect of worklessness on mental health.[56]

Scenarios for health-related inactivity and its fiscal costs

2.49 In this section, we examine the economic and fiscal implications of a downside and an upside scenario for health-related inactivity and in-work ill-health against the baseline of our March 2023 *Economic and fiscal outlook* (*EFO*). We think this remains a reasonable baseline – while the latest participation data has been slightly above our March forecast (by 0.5 percentage points in the first quarter of 2023), inactivity due to long-term sickness has continued to rise.

[51] DWP, *Work, Health and Disability Green Paper Data Pack: Background information and methodology*, October 2016.
[52] Oxera, *The economic cost of ill health among the working-age population*, January 2023.
[53] We additionally assume that half of the rise in health-related inactivity comes from those who were previously active without health problems, while the other half comes from those who had work-limiting health conditions while economically active.
[54] Fujiwara, D., *The Department for Work and Pensions Social Cost-Benefit Analysis Framework: Methodologies for estimating and incorporating the wider social and economic impact of work in Cost-Benefit Analysis of employment programmes*, DWP Working Paper No.86, 2010.
[55] The costs for moving from unemployment to employment in the DWP paper are £508 and £1,016, with the authors stating that the costs of moving from employment to unemployment are 1.5 times greater. We uprate using the health cost deflator.
[56] For a review of the evidence, see: van der Noordt, M., et al., 'Health effects of employment: a systematic review of prospective studies', *Occupation and Environmental Medicine* 71(10), October 2014; and Fujiwara, D., *The Department for Work and Pensions Social Cost-Benefit Analysis Framework: Methodologies for estimating and incorporating the wider social and economic impact of work in Cost-Benefit Analysis of employment programmes*, DWP Working Paper No.86, 2010.

Inactivity and in-work ill-health assumptions

2.50 In our scenarios, we assume that a combination of changes in the underlying health of the working-age population, and the functioning of the labour market and health-related welfare system, combine to affect the labour market via two channels:[57]

- The number of people **inactive due to long-term sickness** increases or decreases by 500,000 in 2027-28 compared to our March 2023 forecast, close to the increase in the number of working-age people inactive for health reasons since before the pandemic.

- The proportion of **the working population with a long-term, work-limiting health condition** rises or falls by an additional 500,000 in 2027-28, which is also calibrated to the increase since 2019.

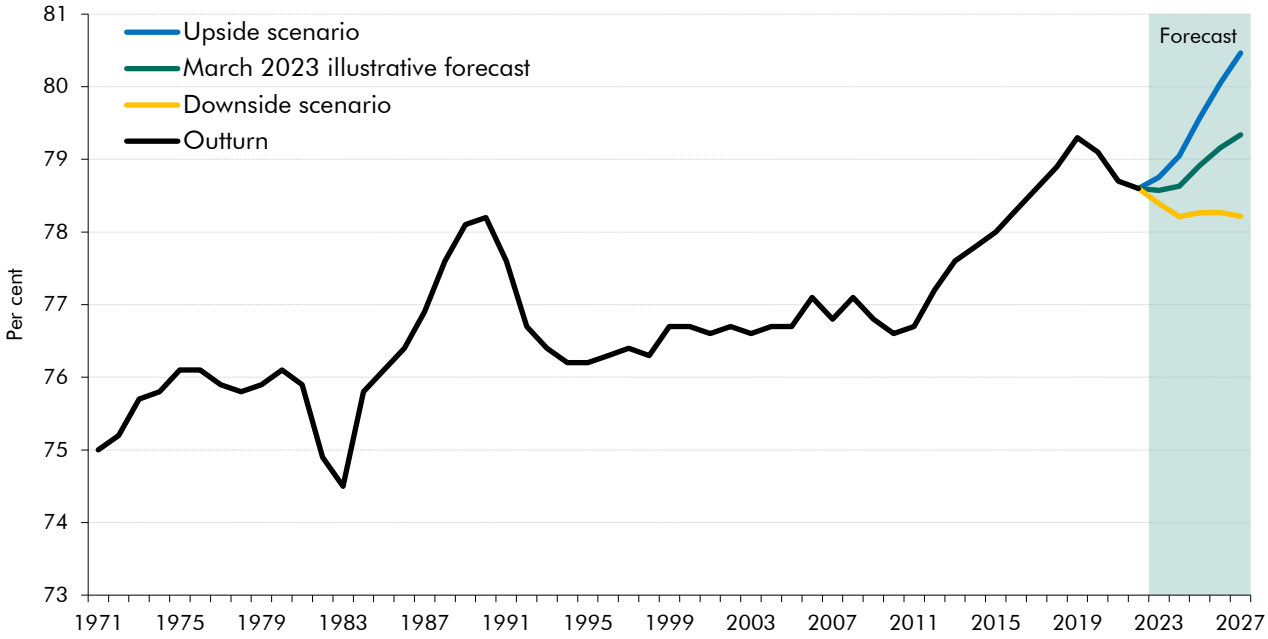
2.51 In our March 2023 *EFO* we provided an illustrative decomposition of overall participation into age groups, which showed the working-age participation rate rising from 78.6 per cent in 2022 to its pre-pandemic level of 79.3 per cent at the forecast horizon.[58] This and our two alternative scenarios for the working-age participation rate are shown in Chart 2.19:

- In our **downside scenario**, the working-age participation rate falls for around another year and then remains broadly flat, reaching 78.2 per cent in 2027-28. This is 1.2 percentage points below our March 2023 forecast, and undoes over half the rise in the participation rate since 2010.

- In the **upside scenario**, the working-age participation rate rises 1.2 percentage points above our central forecast to 80.5 per cent in 2027-28, which today would be the second highest in the G7 after Japan. To reach this level, the participation rate broadly resumes the pace of increases achieved in the decade before the pandemic. As discussed in Box 2.5, we estimate that an optimistic trajectory for reductions in the NHS waiting list would contribute only around 5 per cent to this overall rise in participation, implying that broader health, health service, welfare system and labour market improvements would be required to drive the vast majority of these changes.

[57] We have not included any changes in the 1.3 million working-age inactive people who do not give long-term sickness as their main reason for being inactive but report having a work-limiting health condition (discussed in paragraph 2.31). In reality, some of the increase in long-term sickness is likely to show up in this category, but the fiscal consequences would be similar to those described in our scenarios.
[58] See Chart 2.10 in our March 2023 *EFO*.

Chart 2.19: Participation rate of 16-64-year-olds



Source: ONS, OBR

Box 2.5: How much could reducing the NHS waiting list contribute to falling inactivity in our upside scenario?

Our analysis of disaggregated data on the NHS referral-to-elective-treatment waiting list in England, in combination with other data sources (set out in paragraph 2.18), suggests that the rising NHS waiting list itself is unlikely to have been a significant driver of rising inactivity due to long-term sickness in recent years. This stems from the fact that a large majority of those on the waiting list are either in employment or not of working age. We estimate that there were 2.9 million working-age adults on the NHS waiting list in 2022, of which around 1 million were inactive and 650,000 inactive due to long-term sickness (so around a quarter of the long-term sick inactive population). In addition, there appears to be limited correlation between changes in the waiting list by age and treatment group and recent rises in health-related inactivity. And the median duration on the waiting list is 15 weeks, making those on it a vastly higher-turnover group than those who are inactive due to long-term sickness.

Building on this analysis, we construct a stylised model to estimate the extent to which reducing the waiting list in England might contribute to higher employment and lower inactivity in our upside scenario. This model draws on the following data and assumptions:

- We derive **age-specific activity inflow and outflow rates for people with health conditions and those without from longitudinal LFS data**. For example, for 45-54-year-olds, we estimate that 2 per cent of economically active people without work-limiting health conditions flow into inactivity each quarter (rising to 5 per cent among those with health problems); and 12 per cent of economically inactive people without health problems flow into activity each quarter (falling to 2 per cent for those with health problems).

- We **apply these flow rates for 15 weeks (the median time on the waiting list)** to working-age adults on the waiting list disaggregated by age and labour market status – subtracting net activity inflows from outflows to derive an overall effect on working-age inactivity of the waiting list remaining at its current levels.
- We then apply **assumptions – informed by conversations with health experts – about the extent to which the treatments being waited for switch people from 'sick' to 'well' from a labour market flows perspective**, ranging from 50 per cent for musculoskeletal and heart treatments, to just 10 per cent for treatments related to progressive illnesses and skin, sight, hearing and speech problems. We repeat the 15-week flow-rate exercise on the basis of these changed flow rates, to derive an overall effect on working-age inactivity were the waiting list to be eradicated entirely.
- Finally, we apply an **optimistic declining path for the waiting list over the coming five years – such that it halves from 7.4 million today to around 3.5 million in 2027-28** – a level last achieved in mid-2015 and similar to the most optimistic scenario included in modelling by the Institute for Fiscal Studies.[a]

Relative to the waiting list remaining at current levels, this modelling exercise suggests it falling by half would **reduce working-age inactivity by around 25,000** in 2027-28. We have also tested some sensitivities around this estimate: for example, a more optimistic outlook for the extent to which treatments switch people from 'sick' to 'well' – where all treatments have a 50 per cent chance of doing so – would imply a reduction in inactivity of around 50,000. By contrast, a less optimistic outlook for the speed at which the waiting list falls – in which it reaches 5 million by 2027-28 – would imply a reduction in inactivity of only around 15,000.

This range of estimates suggests that the contribution of bringing down the NHS waiting list to raising participation is likely to be relatively small – contributing only around 5 per cent of the participation increase in our upside scenario on the central estimate. This reflects the estimated age, labour market status, treatment types, and duration of those currently on the waiting list, alongside the fact that many of the treatments being waited for appear unlikely to have a clear impact on work capability. And while the waiting list is high turnover, the labour market is not, so making someone 'well' several weeks earlier from a labour market perspective only has a limited impact on labour market aggregates based on observed flows rates.

[a] IFS, *Selected scenarios for waiting lists*, February 2023.

Scenario results

Economy

2.52 The main economic impact of the scenarios is via potential output. The change in the participation rate directly raises or lowers the quantity of labour supplied,[59] while there is a small offset via average productivity as those leaving or joining the labour force in the

[59] Our potential output forecast is based on the participation rate of those aged 16-and-over, not 16-64-year-olds as shown in Chart 2.19.

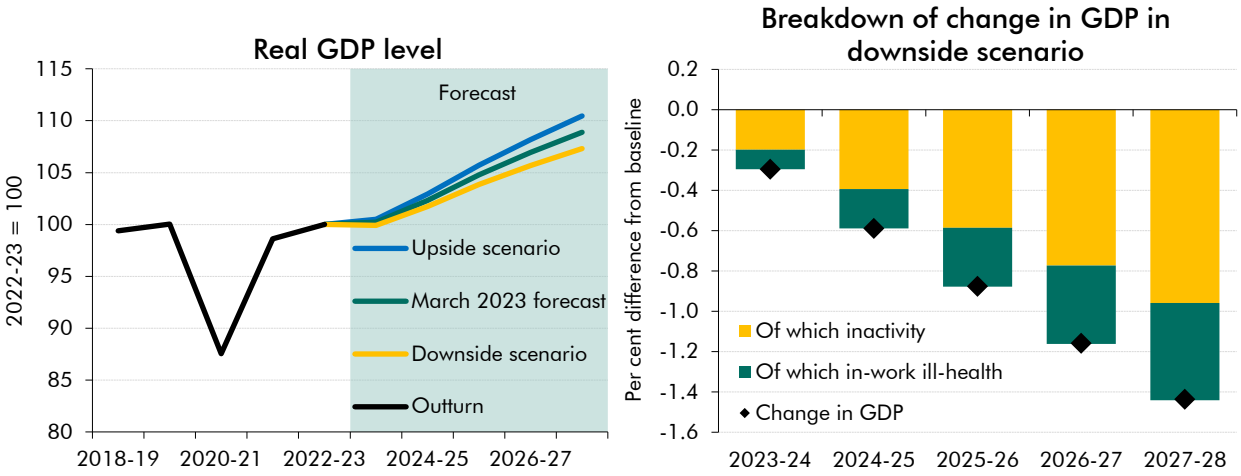
scenarios are less productive than the average worker.[60] Changes in in-work ill-health also affect potential output by changing productivity and average hours.[61] We assume real and nominal GDP change in line with potential output in each scenario.

2.53 The implications of the different scenarios for health-related inactivity for GDP are shown in Chart 2.20:

- In the **downside scenario**, GDP falls to around 1½ per cent below our March forecast in 2027-28, reflecting lower labour supply and worsening in-work health hitting productivity. Around two-thirds of the impact is from lower participation due to long-term sickness, and the remaining third due to a sicker in-work population (Chart 2.20, right panel). Economy-wide average earnings per employee are broadly unchanged as lower productivity due to in-work ill-health is broadly offset by the compositional effect of lower-productivity workers leaving the labour force.

- The **upside scenario** is symmetric, so GDP rises to around 1½ per cent above our March forecast in the final year of the scenario, and economy-wide average earnings are broadly unchanged.

Chart 2.20: Real GDP in the scenarios



Source: OBR

Fiscal

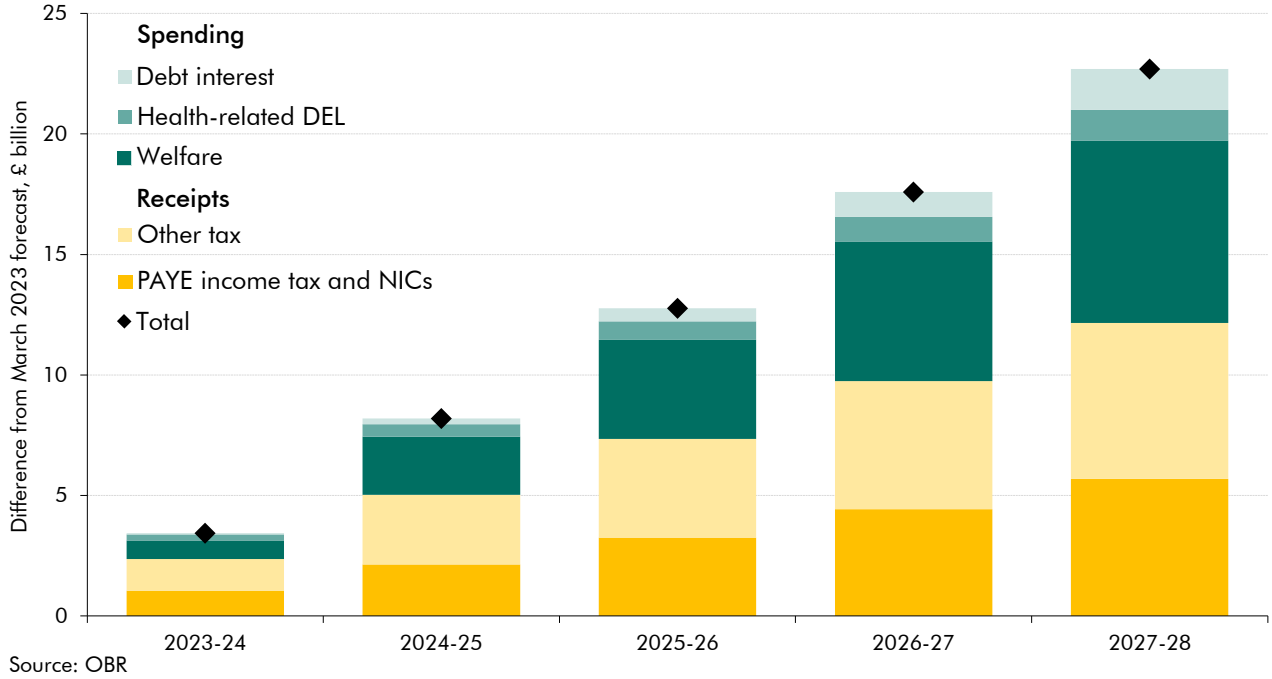
2.54 To calculate the effects of changes in health-related inactivity on borrowing and debt we have used a combination of ready-reckoning and stylised adjustments. The latter draws on the analysis set out above of the fiscal costs associated with the post-pandemic rise in health-related inactivity and in-work ill-health.

[60] Based on the characteristics in the LFS of the change in inactivity due to long-term sickness since 2019, we assume that those leaving or entering the labour force are around two-thirds as productive as the average worker.
[61] Drawing on our analysis of LFS data (see Chart 2.18 above), we assume that those in work with a long-term, work-limiting health condition work 84 per cent of the economy-wide average hours and are 83 per cent as productive as the average worker (based on comparing hourly pay).

2.55 In our **downside scenario**, public sector net borrowing (PSNB) is £2.9 billion higher than our March forecast in 2023-24 and £21.3 billion higher in 2027-28 (Chart 2.21). Of this £21.3 billion:

- **Tax receipts** are £10.9 billion lower, with PAYE income tax and NICs receipts accounting for nearly half the shortfall. In turn around half of this is due to fewer people in employment, with the remainder due to lower earnings among those in work.
- **Welfare spending** is £7.6 billion higher. Around two-thirds of this rise relates to incapacity benefits spending, with the other third relating to disability benefits.
- **Health-related departmental spending** is £1.3 billion higher, on the basis of the unit health costs for different groups set out in paragraph 2.46 above. It is worth noting that this increase in health spending is small relative to the size of past governments' health budget top-ups. Actual UK health spending has exceeded planned health spending in all but two of the 23 spending rounds since 1982, with health spending growing on average by 4.1 per cent a year in real terms, compared to planned growth of 2.7 per cent.[62] If the UK health budget were to grow in line with the typical premium above planned growth of 1.4 percentage points, then the Government would spend £2.5 billion more in 2024-25 than it currently plans to.
- **Debt interest spending** exceeds our March forecast by £1.5 billion a year by 2027-28, reflecting the impact of higher borrowing in each year of the scenario.

Chart 2.21: PSNB breakdown in the downside scenario



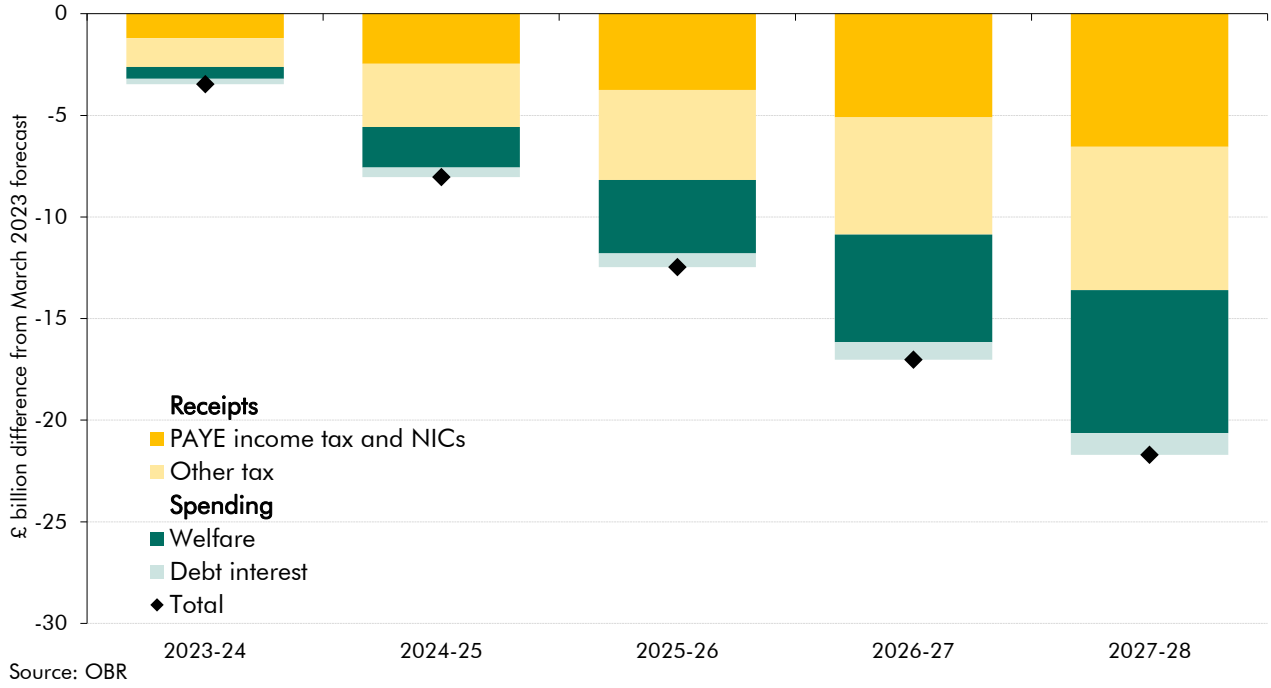
Source: OBR

[62] The IFS compared plans and outturn in budgets for the years between 1982 and 1998, before Spending Reviews. See: Zaranko, B., *An ever-growing NHS budget could swallow up all of this week's tax rise, leaving little for social care*, September 2021.

2.56 In our **upside scenario**, borrowing is £2.9 billion lower than our March forecast in 2023-24, and £18.7 billion lower in 2027-28 (Chart 2.22). Of this £18.7 billion:

- **Tax receipts** are £10.9 billion higher, symmetric to our downside scenario.
- **Welfare spending** is £6.5 billion lower, £1.1 billion smaller in magnitude than the cost in the downside scenario. This difference is because we assume that disability benefits spending does not fall as quickly as it rises in the downside scenario because off-flows from the PIP caseload are typically lagged relative to changes in health. This is thanks to the lagged reassessment process, alongside the fact that PIP can continue to be claimed when someone moves into work. The change in the cost of incapacity benefits is symmetric to the downside scenario.
- **Health-related departmental spending** remains unchanged in our upside scenario, as we assume that available funds resulting from reduced pressures from this group would be reallocated elsewhere in the health budget, rather than the budget reducing.
- **Debt interest spending** is £1.3 billion lower, £0.2 billion smaller in magnitude than the cost in the downside scenario.

Chart 2.22: PSNB breakdown in the upside scenario



Source: OBR

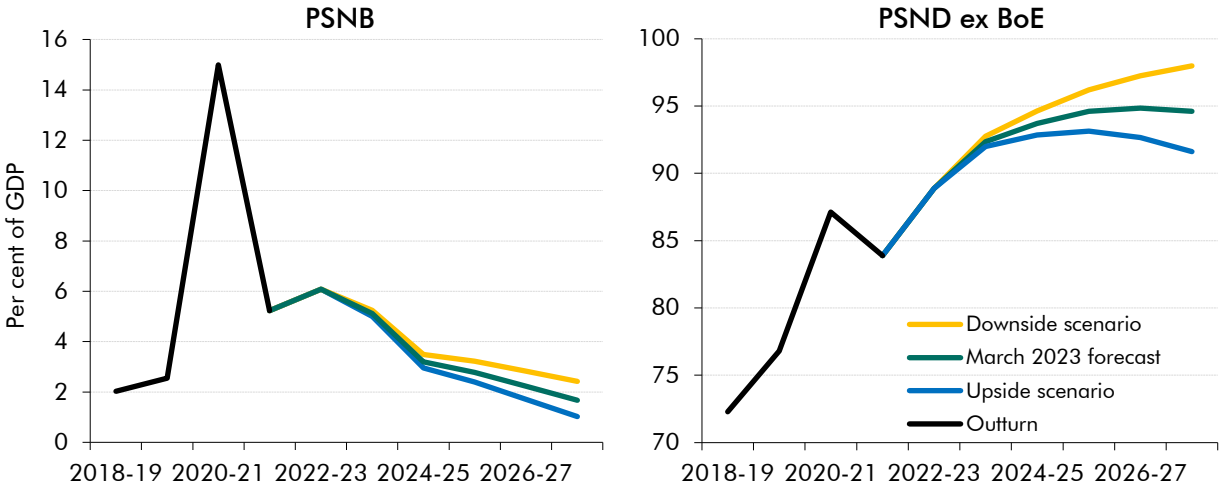
2.57 Chart 2.23 summarises the impact of the scenarios on borrowing and public sector net debt (PSND) as a share of GDP:

- In the **downside scenario**, borrowing is higher than our March forecast in every year, reaching 2.4 per cent of GDP (£70.5 billion) in 2027-28, up from 1.7 per cent (£49.3

billion) in our March forecast. This pushes the debt-to-GDP ratio to 98.0 per cent in the same year, 3.4 percentage points above our March forecast.

- In the **upside scenario**, borrowing is lower in every year, falling to 1.0 per cent of GDP (£29.1 billion), 0.6 percentage points (£18.7 billion) lower than our March forecast, and the debt-to-GDP ratio falls to 91.6 per cent, 3.0 percentage points below our March forecast. The smaller changes from our March 2023 forecast in the upside scenario reflect the asymmetries in our assumptions for welfare spending, health-related departmental spending, and the knock-on impact on debt interest spending described above.

Chart 2.23: Borrowing and debt in the scenarios



Source: OBR

2.58 Health-related inactivity has continued to rise in the latest labour market data even as the overall working-age inactivity rate has fallen. And as the scenarios explored in this chapter make clear, the trajectory for inactivity due to long-term sickness over the coming years could represent the difference between the Government meeting its target of getting debt falling by a comfortable margin, or finding itself far off track. As such, trends in inactivity – and its health-related, and other, drivers – will remain a core focus of our forecasts, and our analysis of risks and uncertainties around them.

3 Energy

Introduction

3.1 While the UK has led the world in decarbonising its energy supply over the past thirty years, it remains one of the most gas-dependent economies in Europe. The UK's overall CO_2 emissions have fallen significantly since the 1970s, in large part by switching from higher-emission coal to lower-emission gas in power generation – with gas now setting the wholesale price of electricity virtually all the time. And the UK used to be a net exporter of gas, but is now a net importer – reflecting increased consumption and falling production as North Sea reserves decline. This has left the UK more exposed economically and fiscally to sudden changes in global gas prices, as explored in our 2022 *Fiscal risks and sustainability* report *(FRS)*. And it has left the UK with a significant residual cost to complete the transition to net zero in the energy sector in the form of replacing gas-fired power stations with low-carbon energy sources and gas-fuelled heating systems with clean alternatives. The full cost of the net zero transition was explored in our 2021 *Fiscal risks report* (*FRR*).

3.2 Having reached a peak of 13 times its historical average in the summer following the Russian invasion of Ukraine, wholesale gas prices have fallen back in recent months. But market expectations of future gas prices over the next couple of years remain around 2½ times their historical averages. For the UK, higher and more volatile gas prices pose an ongoing fiscal risk, by reducing aggregate demand, shrinking potential output, and putting pressure on government to shield households and businesses from their full financial impact. But higher gas prices might also present a fiscal opportunity by strengthening market incentives to move to, now cheaper, renewable forms of energy, and thereby reducing the pressure for government support to fund the transition to net zero. This chapter explores how higher and more volatile gas prices over the past two years have exacerbated or alleviated the Government's overall fiscal exposure to the energy market. In doing so it:

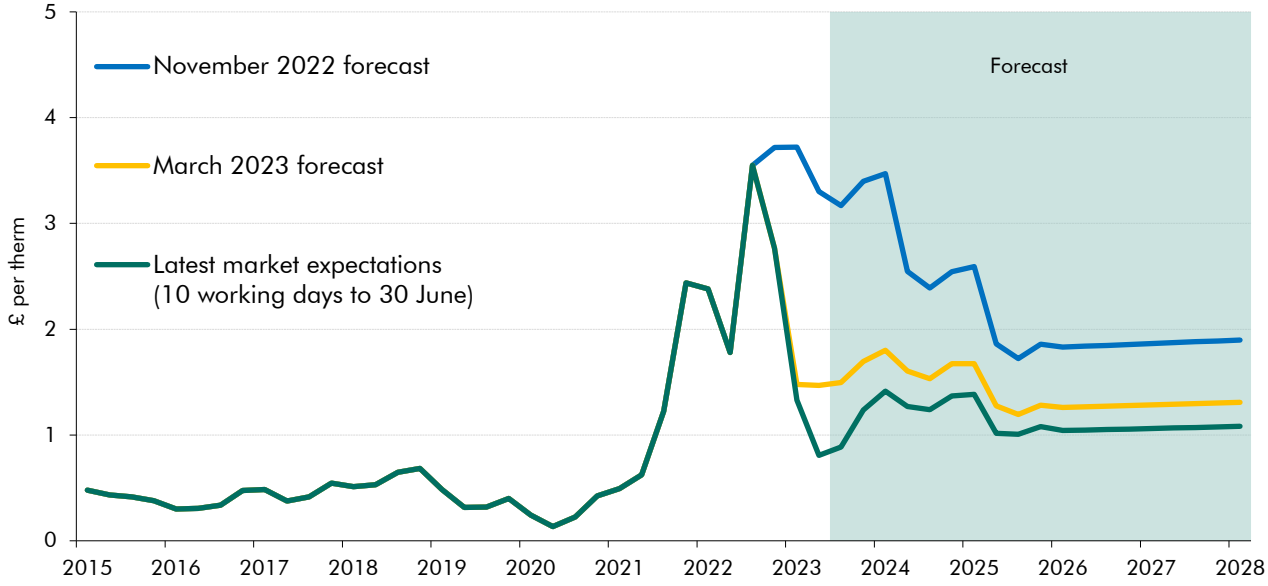
- examines **recent movements in average and relative energy prices** in historical context;
- assesses the impact that higher gas prices have had on the **demand for energy** by households and businesses;
- explores the impact that higher gas prices have had on the **supply of energy** from renewable and non-renewable sources;
- compares the currently planned **government investments in decarbonising** against estimates of **what might be needed to reach its target of net zero** by 2050; and
- compares the fiscal risks associated with **continuing with our current level of gas dependency** to the fiscal costs of completing the transition to net zero.

The energy price shock in historical context

The scale of recent energy price rises

3.3 In the wake of the Russian invasion of Ukraine in February 2022, UK wholesale gas prices rose to a peak of £6.40 per therm in August 2022, almost 13 times their pre-pandemic average of 50 pence a therm.[1] This spike in gas prices was the largest increase on record. By the time of our March 2023 *Economic and fiscal outlook* (*EFO*), wholesale gas spot prices had fallen back to £1.10 a therm, but market expectations of future prices remained around £1.30 a therm, more than two-and-a-half times their historical average. Spot prices fell again in the past two months to a low of 54 pence a therm in early June, with futures prices settling at around £1 a therm from the second quarter of 2025 as seen in Chart 3.1. The associated increases in retail energy prices (for both electricity and heat) have also been of historic magnitudes, although their impact on households and businesses have been mitigated by government policy measures, such as the energy price guarantee (EPG) and energy bill relief scheme (EBRS). The former kept typical household gas bills in the final quarter of 2022 to an annualised cost of £1,300, more than double the Ofgem price cap of £600 in the final quarter of 2019. Without the EPG and Ofgem price cap, the typical household energy bill in the final quarter of 2022 would have reached £3,500.

Chart 3.1: Latest gas price futures versus previous OBR forecast assumptions



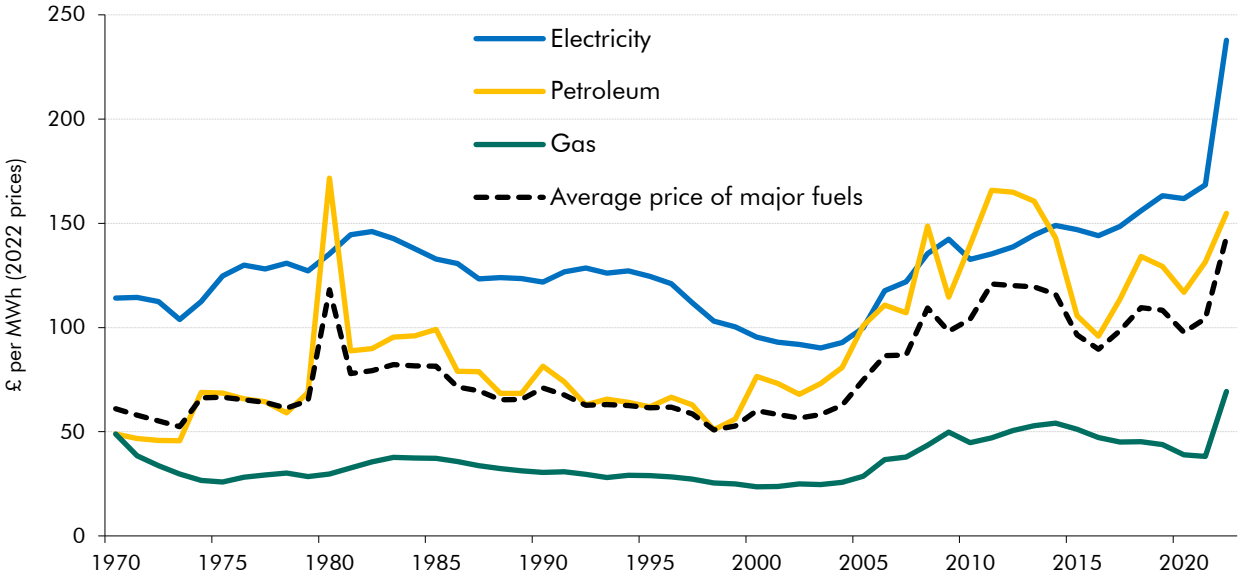
Note: As in our March 2023 forecast, latest market expectations from the first quarter of 2026 are held constant in real terms.
Source: Datastream, Eikon, OBR

3.4 Despite these interventions to shield households and businesses from the rise in energy prices, and after taking account of changes in the composition of energy consumption, the recent energy price rises are the largest the UK has faced. During the 1970s and 1980s oil shocks, the cost of petrol (expressed in 2022 prices) rose from £49 per MWh in 1970 to a

[1] The average gas spot price from the first quarter of 2012 to the final quarter of 2019.

peak of £172 in 1980. The impact of more recent oil price spikes, when petrol prices rose to £166 per MWh in 2011-12, was magnified by more widespread car ownership, offset by increased fuel efficiency. However, these spikes in fuel prices had a less widespread and severe impact on the UK economy as consumption of oil and petrol was largely limited to the transport sector. Gas, however, has become a far more important energy input into the UK economy over the past 50 years, providing heat for over 80 per cent of UK houses, generating around 40 per cent of UK power, and typically setting the marginal price for wholesale electricity in the UK. Adjusting for changes in the composition of total UK energy consumption over the years across different fuels, the Russian invasion of Ukraine has taken average energy prices to an all-time high. The average price of major fuels in 2022 is around 20 per cent higher than the inflation-adjusted peaks of the 1979 and 2011-12 oil shocks, even after adjusting for the Ofgem price cap and the EPG (Chart 3.2).

Chart 3.2: Domestic fuel prices



Note: 2020 to 2022 fuel prices are calculated by growing the outturn price with the relevant CPIH component. E.g., the 2020 electricity price was calculated by growing NIC's 2019 electricity price in line with the electricity component of CPIH in 2020.
Source: DESNZ, NIC, ONS

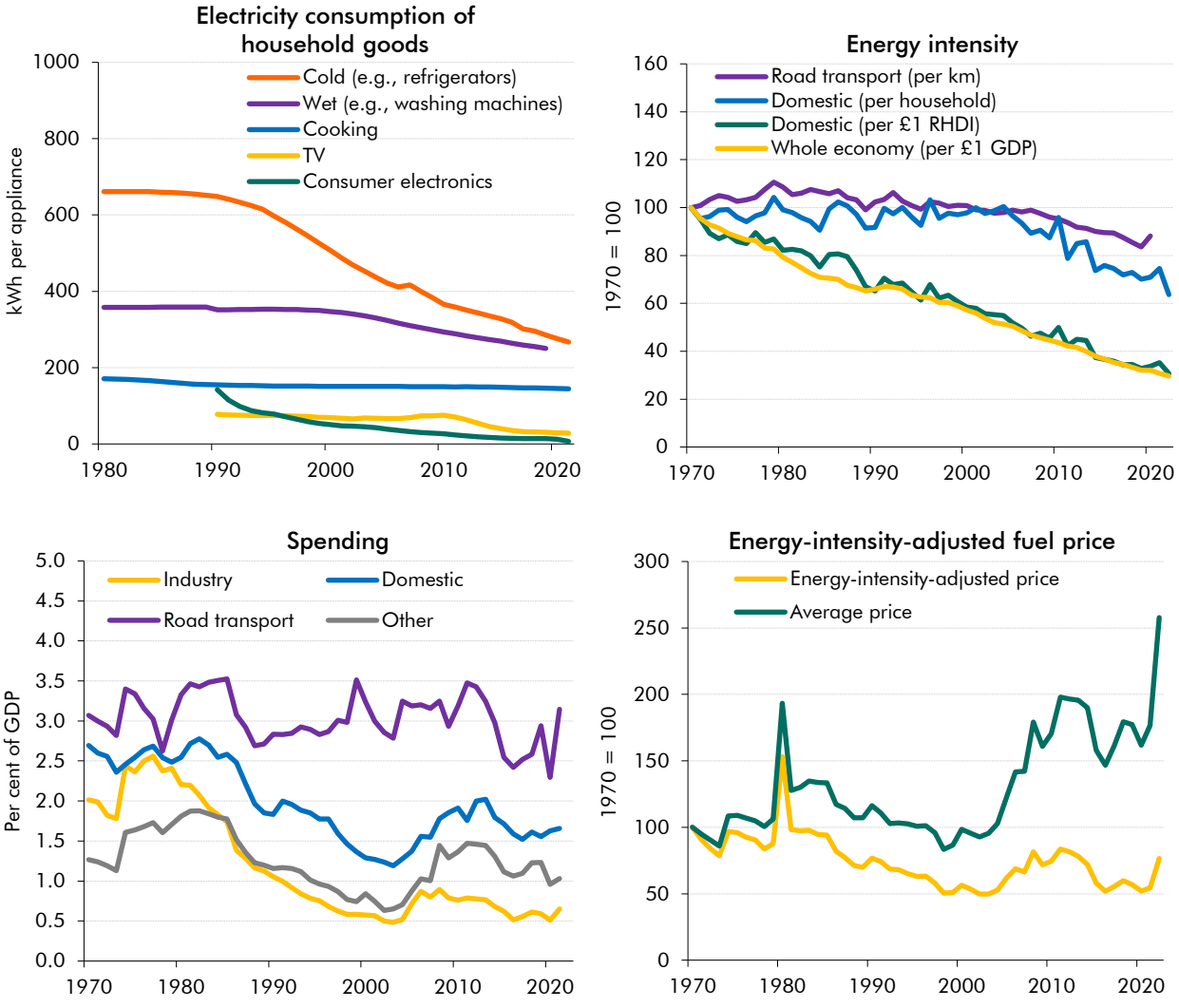
The economic and fiscal impact of higher energy prices

3.5 While energy prices have risen more over the past two years than in the 1970s, their direct impact on economic output is likely to be less significant. Domestic uses of energy have remained at similar levels, reflecting the combined effect of household goods consuming less electricity (as seen in Chart top-left panel of 3.3), rising living standards allowing more widespread ownership of those goods, and substantial population growth over the intervening period.[2] At the same time, energy consumption per unit of GDP has fallen by two-thirds since 1970, partly reflecting the efficiency gains from switching to gas from coal, improvements in energy efficiency, and whole-economy productivity growth. Industrial

[2] This uses DESNZ's sectoral classification of energy use, which differs from the sectoral classification used to measure the economy in the National Accounts. So, while domestic includes residential heating and other home uses, transport includes the fuels used to power both households' and businesses' cars, as well as other transport-related uses. Industry involves industrial uses such as energy used in manufacturing processes, and so does not include 'other' uses such as the cost of heating commercial businesses and public buildings.

energy use, in particular, fell by two-thirds as the UK transitioned to a more services-based economy. So, both domestic and economy-wide energy intensity have fallen steadily, albeit with less of a fall in road transport (top-right panel of Chart 3.3). Overall, industrial spending on energy as a share of GDP has fallen by two-thirds, domestic spending has fallen by half, but there has been no reduction at all in the road transport sector, as seen in bottom-left panel of Chart 3.3. To illustrate the impact this latest energy price rise has had on our less energy-intensive economy relative to past shocks, we have adjusted the increase in real prices in the bottom-right panel of Chart 3.3 for the decline in whole economy energy intensity in the top-right panel of Chart 3.3.

Chart 3.3: Energy intensity, efficiency, spending and intensity-adjusted fuel price

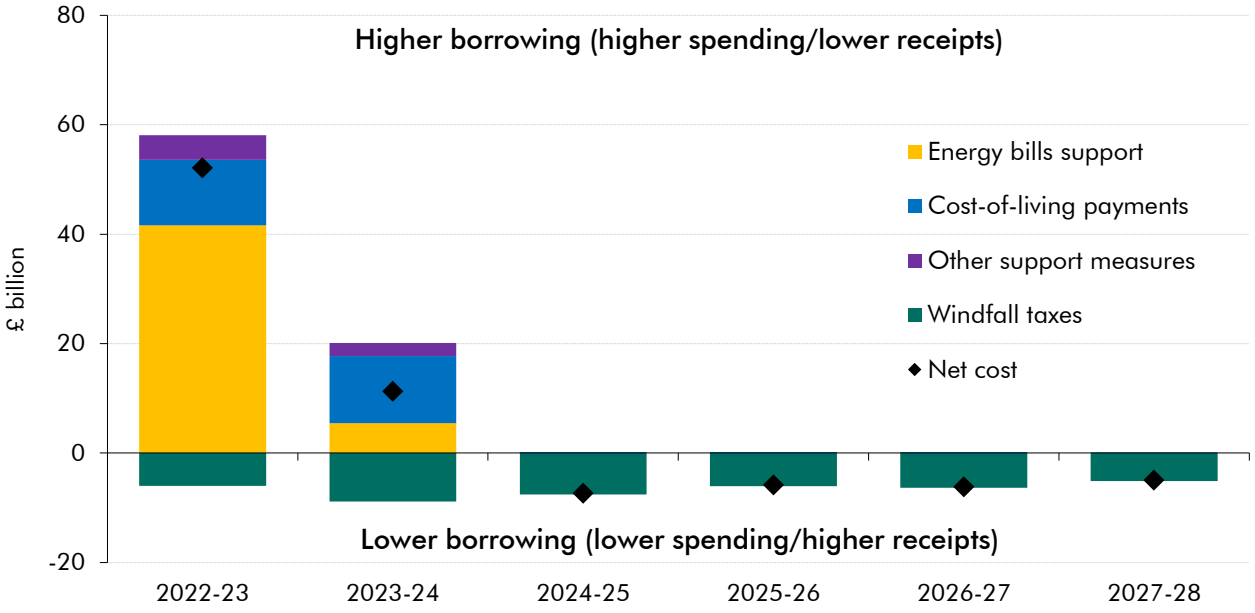


Source: DESNZ, ONS

3.6 The energy shocks of the late 1970s were a major factor behind the sharp and deep contraction in output of 3.4 per cent and rise in unemployment of 3.1 percentage points between the first quarter of 1980 and the first quarter of 1981. By contrast, the current energy price shock has most immediately and acutely hit households' real household disposable incomes, while the immediate impact on output and employment has been more

muted. The impact of the current energy price shock on household incomes and consumption has been further mitigated by the combination of the 2.3 per cent of GDP worth of government spending on energy support schemes over this period and the running down of pandemic-era savings (Chart 3.4). In our March 2023 forecast we still expected real household disposable income per person to decline by an historic 3.2 per cent in 2023 following a 3.1 per cent fall in 2022. But we expected this to have a smaller impact on total output, which in our central forecast falls by just 0.2 per cent this year, and unemployment, which rises only marginally, by 0.4 percentage points.

Chart 3.4: The Government's fiscal response to higher energy prices



Source: OBR

3.7 As Chart 3.5 shows, wholesale energy price rises, starting in 2020 and accelerating through 2022, fed through to the bills that households and firms pay for gas and electricity, with businesses and households having seen similarly sized increases in the price of energy (in percentage terms):

- **Wholesale prices**, as seen in Chart 3.1 above, began rising in the second half of 2021 before spiking upwards after Russia's invasion of Ukraine in early 2022. Wholesale gas prices rose from 40 pence a therm in the quarter prior to the pandemic to a daily peak of £6.40 a therm in August 2022. With the marginal cost of electricity typically much more sensitive to gas prices in the UK than in some other European countries, these increases quickly fed through to wholesale electricity prices.[3]

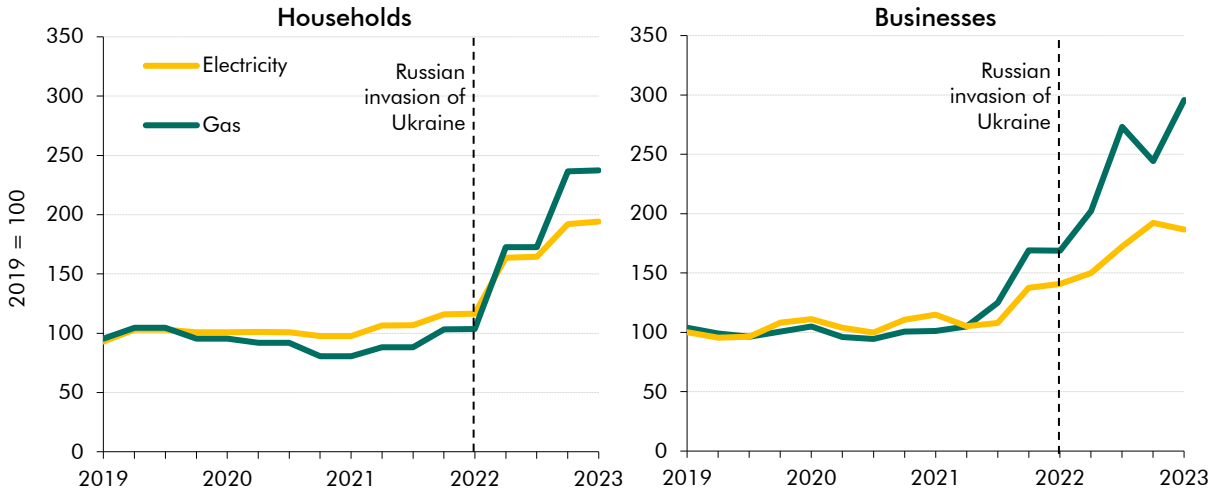
- The Ofgem price cap meant the majority of this increase did not pass through to **household bills** until winter 2021-22 had passed. By the final quarter of 2022 households saw gas and electricity prices rise by 150 per cent and 110 per cent

[3] See, for instance, Zakeri, B., and I. Staffell, *The Role of Natural Gas in Electricity Prices in Europe*, 13 January 2023.

respectively, relative to the level in the first quarter of 2019. Fiscal support lowered the peak impact of the wholesale gas price spike, with the EPG limiting household gas prices in the final quarter of 2022 to two-and-a-half times their levels in the first quarter of 2019 and keeping the increase in the price of electricity to around double its level in the first quarter of 2019.[4] This saved the typical household £1,100 against undiscounted energy prices, by limiting annualised bills to £2,500.

- In percentage terms, the increase in average **business energy prices** from 2019 to their post-invasion peak has been larger. Different hedging behaviour by suppliers and the lack of a price cap to delay the initial impacts of higher prices meant that businesses were more exposed to increases earlier, with electricity prices beginning to fall in the first quarter of 2023. The Government also provided cash support to business and industry in the form of the EBRS, worth an estimated £6.7 billion in 2022-23.[5]

Chart 3.5: Household and business energy prices

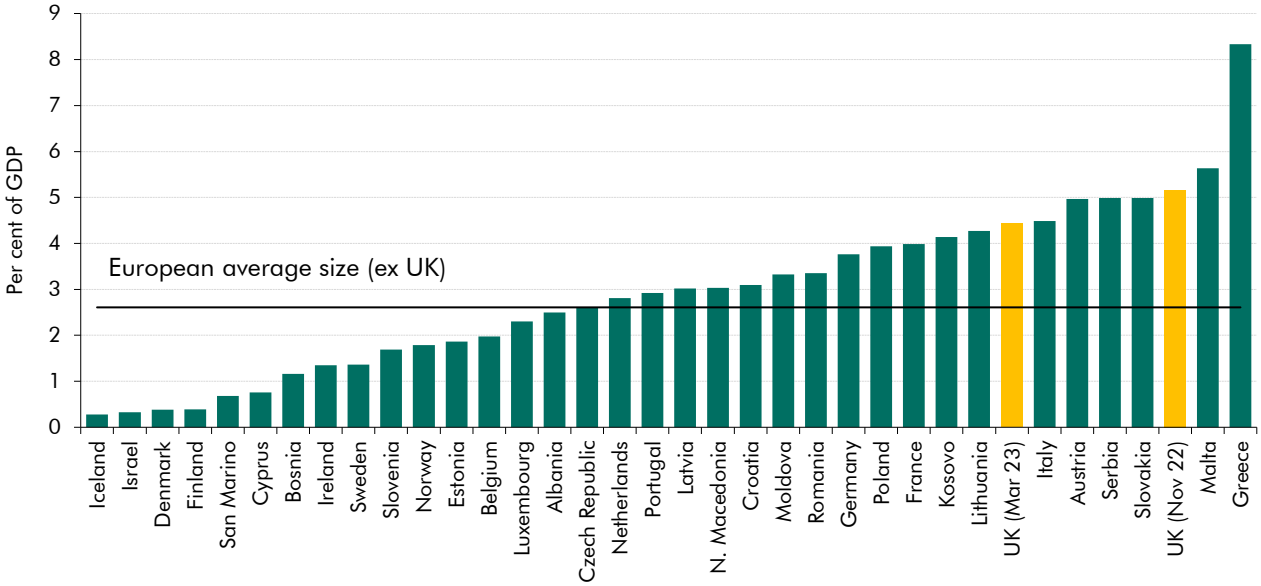


Source: DESNZ, ONS

3.8 Governments across Europe have been much more active than during previous energy shocks in providing large-scale support to soften the blow to household disposable incomes. The level of fiscal support with energy costs provided in the UK has been among the most generous in Europe and around 150 per cent of the European average over the past two years (Chart 3.6). That said, in our March 2023 forecast we expected that just over half the cost of UK fiscal support to households and businesses would be recouped by windfall taxes on energy producers (Chart 3.4). This relatively generous support will have supported consumption and output over the past year, but also raises questions about whether future governments will be expected to provide similar levels of support in the event of future energy price shocks. And with North Sea output continuing to decline, it is not clear to what extent future governments will be able to recoup any future support costs via windfall taxes on oil and gas producers.

[4] While the prices shown are indexed to the average 2019 levels, in practice households face higher prices as domestic customers tend to consume more at peak times, facing higher wholesale prices. Larger industrial users face lower costs as they are more able to negotiate their contracts and leverage their economies of scale. In addition, electricity is typically more expensive per kWh than gas.
[5] In November 2022, the EBRS was forecast to cost £18.4 billion in 2022-23. This fell to £6.7 billion as energy costs fell and take-up was lower than expected.

Chart 3.6: Size of European energy support packages



Note: UK includes the cost of the health and social care levy reversal and the increase in National insurance contributions thresholds to ensure comparability with IMF. Loan guarantee commitments are excluded from costs.
Source: IMF, OBR

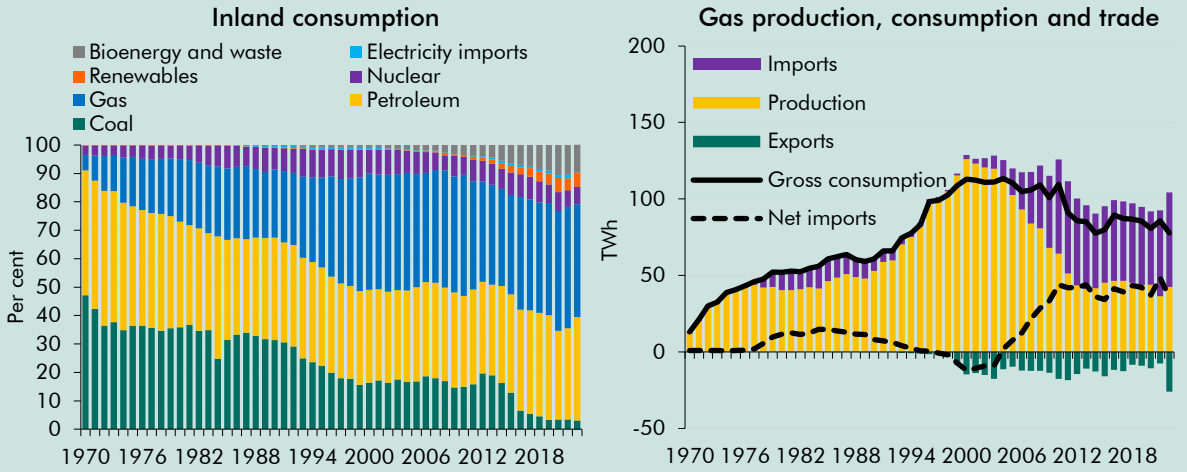
Box 3.1: A history of natural gas in the UK

Since 1970, the UK's energy sector has undergone significant shifts in response to domestic and international developments. In 1970 coal made up almost half of UK inland energy consumption. Coal was used heavily in what was then a much larger industrial sector, as well as in homes for heating and in the power sector as a primary fuel – accounting for 67 per cent of electricity generation.[a] By 2000, this had fallen to 35 per cent and in 2022 it fell to just 2 per cent as coal was almost entirely phased out in the power sector. This was a result of a succession of major shifts in the composition of both energy production and consumption:

- In the **1970s**, following the discovery of several large deposits of crude oil and natural gas in the North Sea in the 1960s, the UK started the shift to natural gas for heating, switching en masse from other fuel sources through a government-led programme, as discussed in detail in our 2021 *Fiscal risks report*.[b] Although the North Sea's location and weather makes the cost of development and production higher than in Russia or the Middle East,[c] the 1973 oil crisis made extraction much more competitive as the price of oil nearly quadrupled, encouraging investment in the sector. From 1972 to 1977 capital investment in oil and gas increased 16-fold, leading to oil and gas production more than tripling by 1979.[d]
- In the **1980s**, expanding North Sea oil and gas production saw the UK becoming a net exporter of energy in 1981. But, as shown in Chart A, the UK would increase its consumption of gas at a faster rate than production. Consumption from households rose by 18 per cent between 1980 and 1989 as gas central heating became more popular, meaning the UK has almost always been a net importer of gas.

- From the **1990s**, natural gas accounted for a rising share of the UK's energy mix. By 1993 gas made up a higher proportion of energy consumption than coal, driven by its replacement of coal in the electricity sector and a rise in gas central heating take-up in homes. By 1999, gas accounted for 40 per cent of UK total inland energy consumption. Meanwhile, as domestic production of coal fell 79 per cent between 1970 and 2000, domestic gas production in the North Sea rose by over 900 per cent in the same period.
- From the **mid-2000s**, North Sea gas and oil production fell significantly, with gas production falling from a peak of 126 TWh in 2000 to 42 TWh in 2022 as operating costs rose and investment in extraction and discovery of new oil and gas fields fell.[e] The UK's proven North Sea gas reserves are now 19 per cent of what they were in 1997,[f] with European and domestic demand for gas expected to fall in the transition to net zero.

Chart A: Energy consumption and gas supply



Note: Before 1998, gas exports includes exports of primary electricity.
Source: DESNZ

Until the UK reduces its dependence on gas, the country is likely to remain heavily reliant on gas imports from abroad, given declining North Sea reserves. In the event of further gas price spikes similar to the scenario covered at the end of this chapter, the UK, as a large net importer of gas, would see further significant negative terms of trade shocks in the future. Households reliant on gas for both heating and electricity would be among the worst affected.

[a] BEIS, *Energy Consumption in the UK 1970 to 2019*, October 2020.
[b] OBR, *Fiscal risks report*, July 2021. See *Box: 3.3: Decarbonising domestic heating: lessons from the switch to natural gas*.
[c] Wall Street Journal, *Oil barrel breakdown of production costs*, April 2016.
[d] The investment and operating cost figures in this box come from North Sea Transition Authority, *Income and expenditure*, 2023.
[e] McKinsey & Company, *Meeting the challenge of increasing North Sea costs,* June 2014.
[f] ONS, *Oil and gas: reserves and resources*, June 2023.

Demand responses to higher prices

3.9 While the increase in wholesale gas and retail energy prices has brought with it significant economic and fiscal costs, it also strengthens incentives to curtail energy consumption and accelerate the transition to renewable energy sources. In this section, we examine the impact of higher wholesale gas and retail energy prices on energy consumption by households and

businesses. In the next section we consider the extent to which changes in the relative prices of gas versus renewable sources of energy have affected decisions regarding the supply of different forms of energy.

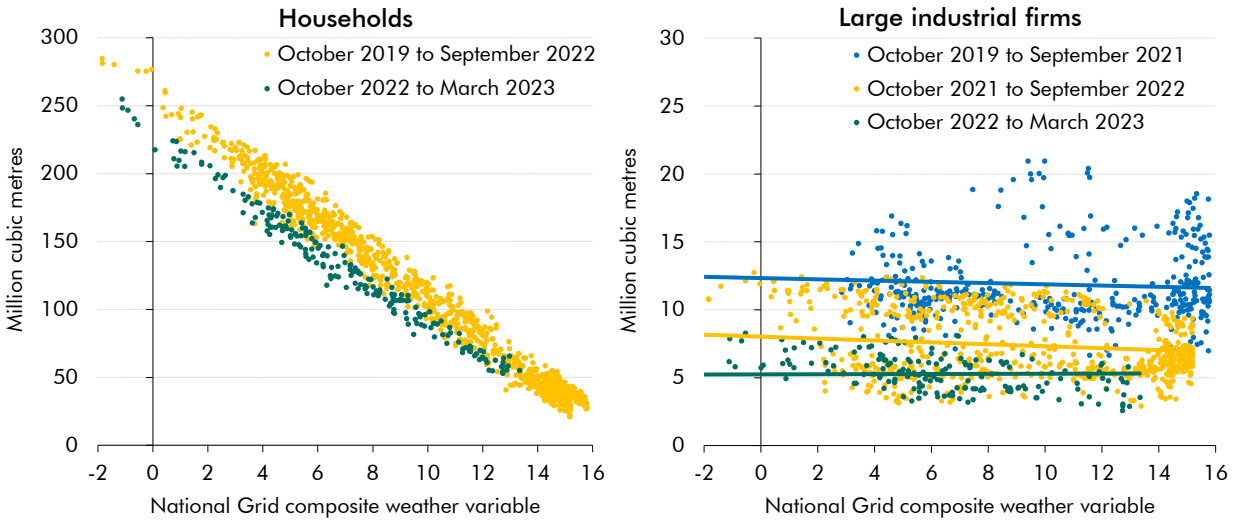
3.10 The increase in retail energy prices has, so far, resulted in a significant reduction in household energy consumption in the UK.[6] With price rises being limited by the EPG, the typical UK household saw its annualised gas bill rise from £600 in October 2021 to £1,300 in October 2022, a 110 per cent increase. Without the EPG, the typical household gas bill would have followed the Ofgem price cap and risen to £1,800 in October 2022. In the same period the typical UK household saw its annualised electricity bill rise from £700 in October 2021 to £1,200 in October 2022, a 60 per cent increase. Because part of households' bills (the standing charge) does not vary with consumption, the increase in the *unit price* of gas since the fourth quarter of 2021 was 170 per cent (and 190 per cent since the fourth quarter of 2019).

3.11 Over the entirety of 2022, domestic natural gas consumption (as measured by the Department for Energy Security and Net Zero, or DESNZ) fell by 10 per cent relative to the 2019 level, and by the largest amount on a year-on-year basis since 2011. The left panel of Chart 3.7 looks at daily household consumption of gas (as recorded by the National Grid) and a measure of weather conditions. In keeping with past empirical estimates of the household price elasticity of consumption of around -0.1,[7] as set out in further detail in Box 2.1 of our March 2023 *EFO*, we estimate that this resulted in a 15 per cent reduction in household gas consumption compared to the previous winter (even after controlling for the milder-than-usual weather conditions experienced over the whole year).

3.12 Industrial consumption in 2022 (as measured by DESNZ) was also 10 per cent lower than the 2019 level, although the more gradual increases in the prices faced by industrial firms in recent years meant a larger proportion of this fall has occurred by 2021. But, as the right panel of Chart 3.7 shows, reductions in consumption (as recorded by the National Grid) among some of the most gas-intensive industrial firms was much greater: for these firms, average gas consumption in the period of October 2021 to September 2022 was 50 per cent lower than the period of October 2019 to September 2021, while during the winter of 2022-23 it was 54 per cent lower than the period of October 2019 to September 2021. These falls in gas consumption may also be a reflection of the fact that industrial output is more dependent on international and domestic demand for goods, whereas household consumption is influenced more by the weather, and the relocation of some industrial production to places where gas prices are lower.

[6] As measured using the National Grid's LDZ (Local Distribution Zone) dataset. This covers residential, most commercial and some industrial demand.
[7] See Department of Energy and Climate Change, *Gas price elasticities: the impact of gas prices on domestic consumption – a discussion of the available evidence*, June 2016.

Chart 3.7: Household and large industrial firms' demand responses to higher prices



Note: National Grid composite weather variable combines temperature and other weather variables like wind speed (higher values indicate warmer-feeling weather). Large industrial firms is the National Grid's NTS industrial energy offtake variable, which mainly comprises large chemicals firms.
Source: National Grid

3.13 Our March 2023 forecast assumed that sustained higher energy prices reduce not just demand but also potential output, due to the increase in the cost of an important intermediate input to production.[8] We would expect energy-intensive parts of the economy such as manufacturing, which makes up 10 per cent of GVA, to be more heavily impacted by the rise in gas prices than the services sector. Indeed, as of the first quarter of 2023 the manufacturing sector's output is 4 per cent lower than its annual peak in 2021, whereas output in the services sector of the economy is 6 per cent higher than level in 2021.

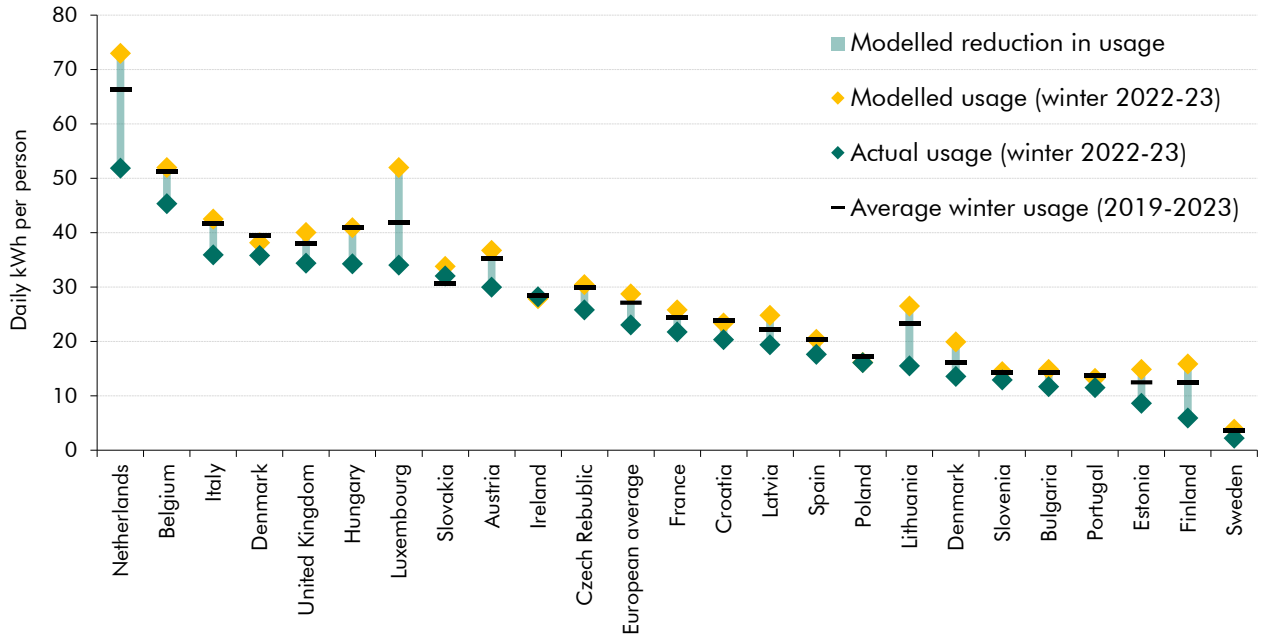
International comparisons of demand-side responses

The demand for energy

3.14 The UK's reduction in gas usage in response to the spike in prices was less than the European average. Reductions in gas usage due to higher prices across European countries varied greatly over the winter of 2022-23. Using a regression of gas usage per person at the country level against temperatures in winter months from 2013 to 2022, we can predict the gas usage during the winter of 2022-23 that history says would be consistent with the warmer-than-usual weather that was experienced in much of Europe.[9] Chart 3.8 illustrates that the actual reduction in demand cannot be wholly explained by warmer winter months, suggesting higher prices had a significant impact. Against an average European temperature-adjusted reduction in gas usage of 20 per cent, the UK experienced a 14 per cent reduction – smaller than the Netherlands' 29 per cent reduction but larger than Germany's 6 per cent. Some of the largest falls in demand relative to the weather-related model's prediction come in countries where prices increased the most – notably the Netherlands, which did not introduce an energy price ceiling until January 2023.

[8] See Box 3.2 of our 2022 *FRS*.
[9] This approach is based on analysis in: The Economist, *Europe drastically cut its energy consumption this winter*, April 2023.

Chart 3.8: International demand responses to higher energy prices: winter 2022-23



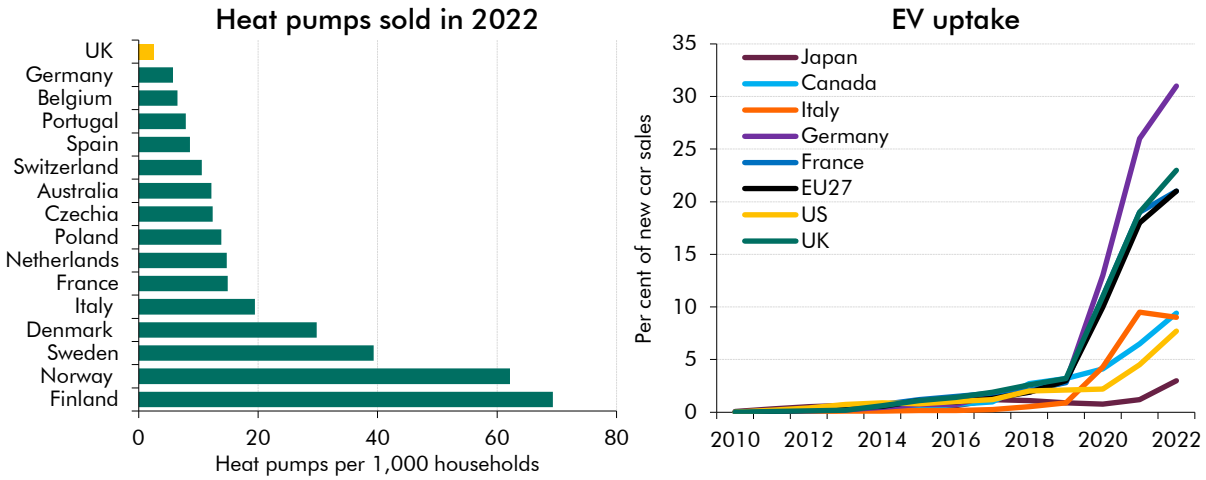
Source: DESNZ, ECMWF, Eurostat, OBR

The demand for energy-efficiency-improving durable goods

3.15 In addition to reducing demand for energy, higher expected energy prices should raise demand for durable goods that lower future energy demand – and particularly those less exposed to the price of gas or oil, such as heat pumps and electric vehicles. But as Chart 3.9 shows, only 2.5 heat pumps were sold for every 1,000 households in the UK in 2022, behind all major European countries, and far below the Government's ambition to grow the market in heat pumps to 600,000 installations per year by 2028 (equivalent to 21 heat pumps per 1,000 households). By contrast, we have seen strong uptake of electric vehicles (EVs) over the past five years, leaving the UK slightly above the European average and well above some other major advanced economies like the US and Japan, although still behind Norway, where EVs reached 88 per cent of sales in 2022.[10] However, absolute growth in EV sales slowed in 2022, perhaps due to supply chain issues, falling consumer confidence (internal combustion engine vehicle sales also slowed, with the EV share of total sales increasing), or the fact that petrol prices fell back somewhat after the initial price spike (combined with a cut in fuel duty) while electricity prices rose – reducing the incentive to switch to EVs.[11]

[10] Based on IEA data, EVs refer to battery electric vehicles and plug-in hybrid electric vehicles.
[11] Society of Motor Manufacturers and Traders, *New car registrations – Full year and December 2022*, January 2023.

Chart 3.9: International uptake of low-carbon technology



Source: EHPA, IEA, OBR

Supply responses to the change in relative prices

3.16 As well as incentivising households and business to reduce their demand for gas and gas-fuelled electricity, higher European gas prices also change the incentives faced by energy producers and generators. The net impact of higher gas prices on the overall energy mix of the UK depends upon the interplay between two opposing effects. On the one hand, higher European gas prices increase the incentives for regional pipeline gas producers and overseas producers of liquified natural gas (LNG) to expand their output and transport it to Europe. On the other hand, higher gas prices improve the competitiveness of alternative energy sources and strengthen incentives to invest in cleaner forms of power generation such as wind, solar, and nuclear power. This section considers how changing incentives have stimulated a gas and renewables supply response.

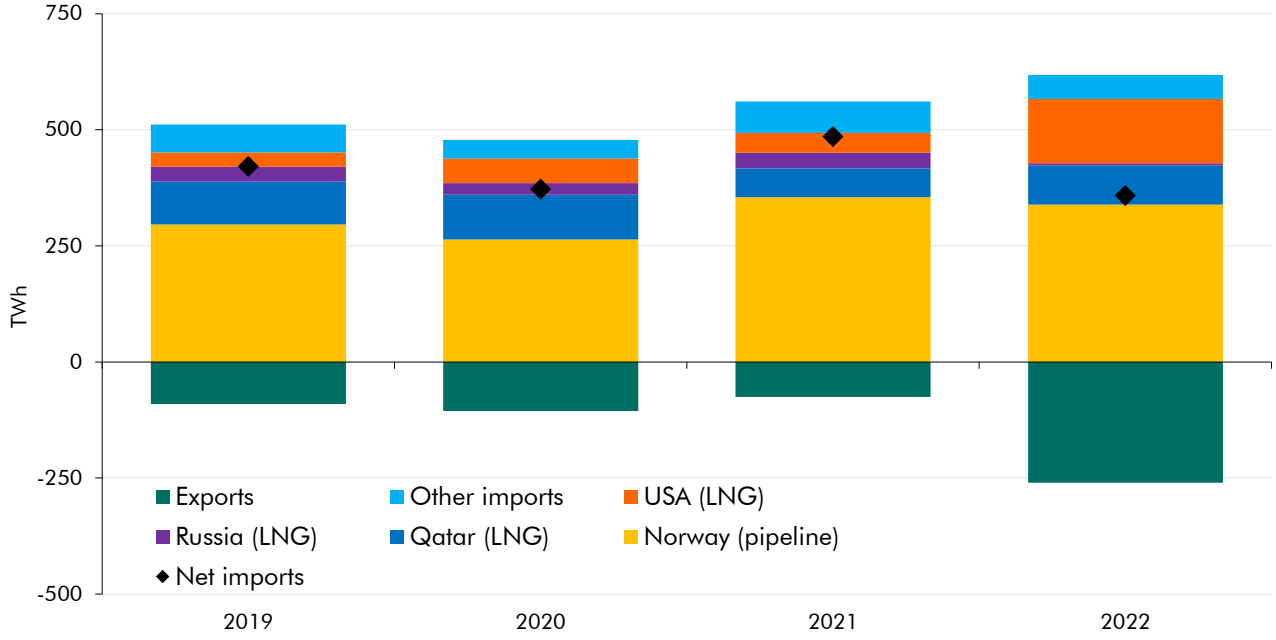
Changes in gas supply to Europe and the UK

3.17 Gas producers have responded strongly to the rise in European gas prices following Russia's invasion of Ukraine. North American and Middle Eastern production increased notably in 2022 (as did production in Europe outside Russia). The International Energy Agency (IEA) expects a further increase from these suppliers in 2023 as further capacity comes on stream.[12] However, with Russian production falling sharply in both years, global output is expected to remain flat. Much of the rotation in supply is being routed to the high-return European market, with average weekly European gas imports from Norway having increased by 160 million cubic metres (9 per cent) in 2022 relative to 2021. And an even greater 980 million cubic metre (70 per cent) increase in weekly LNG imports to Europe occurred in 2022, with these trends so far sustained into 2023.[13]

[12] See International Energy Agency, *Q2 2023 Gas Market Report*, 2023.
[13] See Bruegel, *European natural gas imports*, 2023.

3.18 The UK has followed other European countries and shifted its supply of gas away from Russian gas, with imports falling from 34 terawatt hours in 2021 to zero from the second quarter of 2022 onwards. As elsewhere in Europe, imports of LNG have increased. As seen in Chart 3.10, LNG imports from Qatar and the US in 2022 were 40 and 230 per cent higher than in 2021 respectively, as rerouting supply from these markets to the UK became more profitable than selling it domestically or in other markets. UK gas exports have more than doubled as some of the LNG imported into the UK was processed and exported to Europe through gas interconnectors, so net imports fell in response to higher prices.[14]

Chart 3.10: UK net imports of gas by country

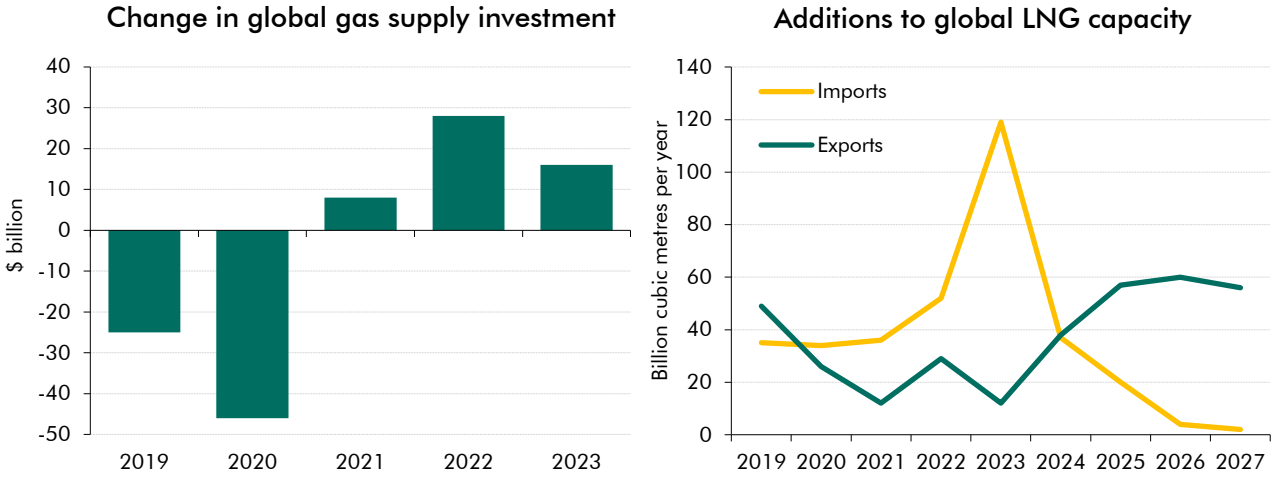


Source: DESNZ

3.19 The International Energy Agency (IEA) estimates that, having fallen in 2019 and 2020, global investment in natural gas supply rose by almost $30 billion (around 12 per cent) in 2022 and is expected to increase by another $15 billion in 2023 (Chart 3.11).[15] In the near term, this will create a significant expansion in global, and particularly European, LNG import capacity. This includes a 50 billion cubic metre expansion in European regasification capacity from 2022 to 2025 (which is expected to increase Europe's overall LNG import capacity by 20 per cent). So, global import capacity is expected to rise by 120 billion cubic metres in 2023 (almost a quarter of 2022 imports and far in excess of the less than 40 billion annual additions seen from 2019 to 2021). Global exporters' capacity will also increase to match this demand: additions to capacity have averaged 20 billion cubic metres a year since 2020 but are expected to jump to 60 billion a year from 2025 onwards.

[14] The UK had roughly one-quarter of the LNG processing facilities in Europe prior to the pandemic, so became an LNG import hub. However, Germany has commissioned new LNG processing facilities, some of which are due to be completed in 2023, with several other LNG facilities in the pipeline for development across Europe, reducing its future reliance on UK exports. See Gas Infrastructure Europe's *LNG database,* November 2022.
[15] International Energy Agency, *World Energy Investment*, 2023.

Chart 3.11: Investment in global gas supply and LNG infrastructure

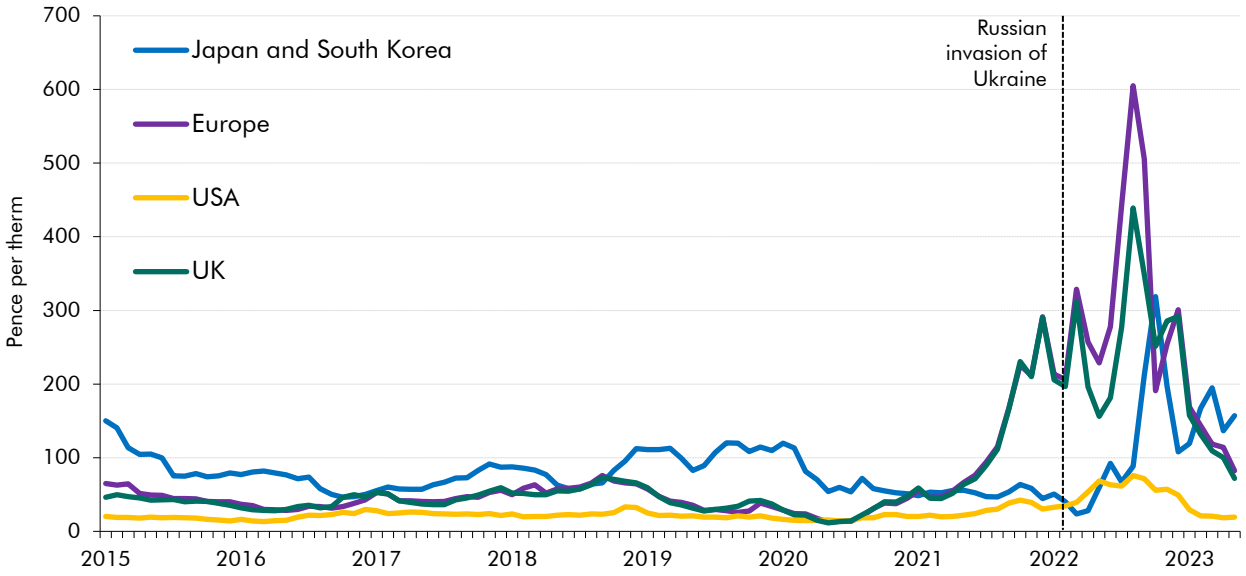


Source: IEA

3.20 The rapid expansion of LNG production, processing, and transport capacity to Europe is a major driver of the fall in market expectations of future European wholesale gas prices. However, LNG is likely to be a more expensive and equally, if not more, price volatile source of energy than pipeline gas. The costs of regasification and transport mean that countries that rely heavily on imports of LNG (such as Japan and Korea) have paid higher prices for gas than those in the UK and European gas markets, which have historically had access to cheap, local pipeline gas from Russia and Norway (Chart 3.12). And greater reliance on the US and Qatar does not necessarily imply more certain supply, as the recent blockade of Qatar by its neighbours and US-EU-UK steel trade disputes illustrate. In addition, buying gas on the global LNG market exposes the UK to uncertainty surrounding global demand for gas: as the developing world grows, the Chinese manufacturing sector reopens, and some other economies make a transition toward net zero targets.[16] We explore the potential economic and fiscal impacts of continued price volatility over the coming decades at the end of this chapter.

[16] The IEA has advised that *"the improved outlook for gas markets in 2023 is no guarantee against future volatility and should not be a distraction from measures to mitigate potential risks. Global gas supply is set to remain tight in 2023 and the global balance is subject to an unusually wide range of uncertainties"*. See the IEA's *Gas Market Report, Q2-2023*, for discussion.

Chart 3.12: Wholesale gas prices in the UK, USA, Europe, Japan and Korea



Note: Henry Hub, National Balancing Point, Dutch TTF and Japan Korea Marker prices are used for USA, UK, European, and Japan and South Korea. Spot exchange rates have been used to convert foreign prices into sterling.
Source: Bank of England, NASDAQ, Refintiv

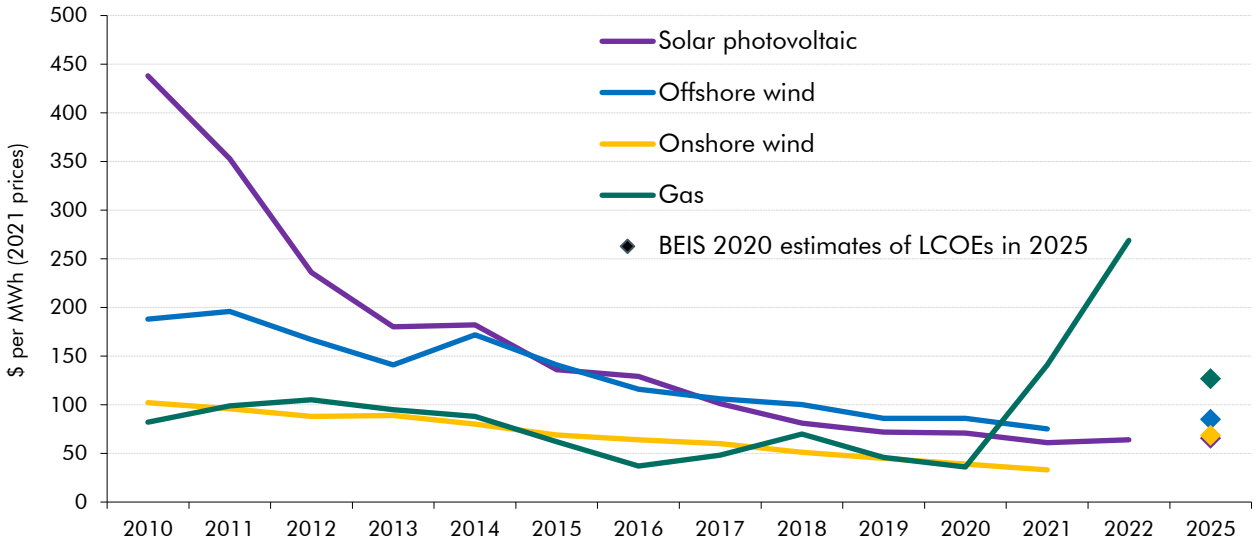
The impact of higher gas prices on the relative costs of different fuels

3.21 The recent increase in the European wholesale price of gas has also made renewable energy sources more competitive. Their absolute competitiveness relative to gas depends upon the range of investment and operating costs that affect the lifetime unit cost of producing electricity under different technologies. Chart 3.13 shows recent estimates of the cost of producing electricity using different technologies: gas, onshore wind, offshore wind, and solar power.[17] We do not consider nuclear power for the purposes of this analysis given the very long lead times in construction.

3.22 The measure of the relative cost-effectiveness of different energy sources that we use is the 'levelised cost of energy' (LCOE). This reflects the discounted sum of the hypothetical lifetime costs of a plant built today – including capital, fuel, and other operating costs – relative to each megawatt of electricity it will produce. So, the cost of producing electricity with gas moves in line with the cost of purchasing gas, plus any changes to prices paid for emitting CO_2. As Chart 3.13 shows, European gas prices have risen dramatically in Europe since 2020, raising the cost of gas-fired generation. This pushed them well above the average global costs of wind and solar (which have zero fuel costs). These estimates were made when gas prices were near their post-invasion peaks (at an assumed price of around £2.60 a therm, near the £2.50 a therm 2022 average). So, we also show BEIS's pre-invasion UK-specific estimates of levelised costs as represented by the diamonds (made when the assumed gas price was just 56p a therm).[18] The latest cost is likely to lie somewhere between these figures (our March forecast assumed the cost of gas in 2025 would be £1.40 a therm on the basis of futures prices at the time).

[17] Figures are from BEIS, *Electricity generation costs 2020*, 2020, and IRENA, *Renewable Power Generation Costs in 2021*, July 2022.
[18] All prices in text are in 2021 terms.

Chart 3.13: Trends in the levelised cost of electricity generation



Note: The IRENA figures show global-weighted-average LCOEs for onshore and offshore wind and solar. For gas, the figures cover Europe specifically, and show fuel and CO2 costs only (as these make up the majority of costs). BEIS figures show the predicted LCOEs for different power-generating technologies coming online in 2025.
Source: BEIS, IRENA, OBR

3.23 This rise in medium-term gas prices over the past two years, combined with the long-run and continuing falls in the costs of renewable technologies, has made the cost of renewable energy much more competitive. In our March 2023 forecast, we expected wholesale gas prices in 2027 to be almost 250 per cent higher than the 2019 level. These increases have now rendered gas the most expensive fuel in pounds per megawatt hour of generating capacity in the UK. Furthermore, the falls in the levelised cost of renewables have been continually underestimated by forecasters and presents a less volatile option than gas as the fuel costs are zero, while construction costs are much more predictable than those of nuclear plants.[19] From a whole-economy and fiscal perspective, it is worth considering wider systems costs beyond the basic factors that underpin LCOEs that attempt to estimate more comprehensive lifetime costs of different technologies, as discussed in Box 3.2. But even these more comprehensive metrics do not change the conclusion that large increases in current and expected future gas prices leave renewable technologies *relatively* cheaper.

Box 3.2: A more comprehensive measure of the costs of energy

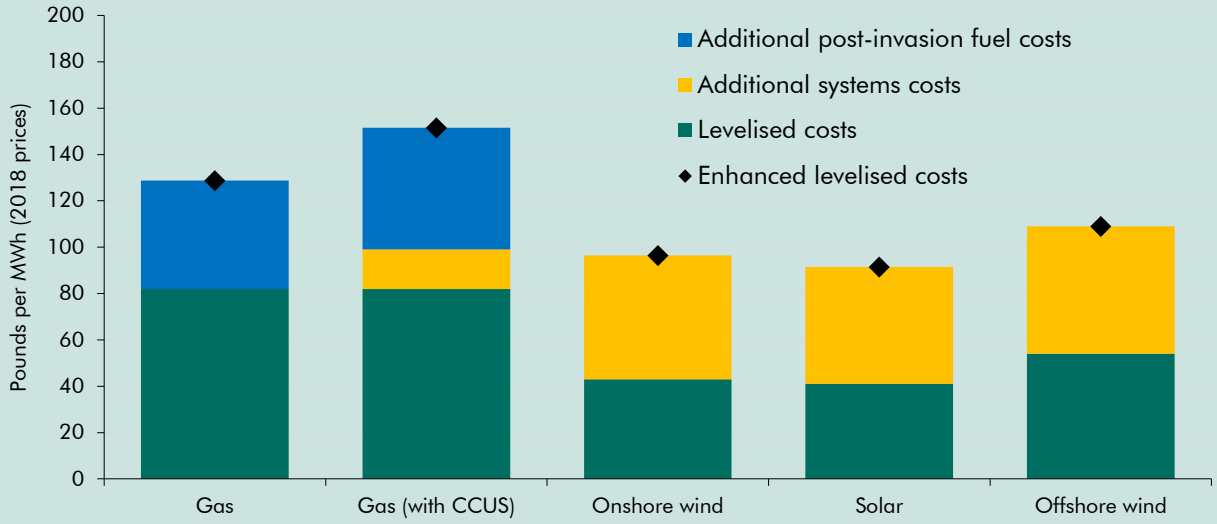
An estimate of the full cost of different energy sources to the power system would need to reflect more than just the construction and operating costs of energy generators that are captured in the levelised cost of electricity (LCOE). For example, the dispatchability of the energy source would need to be taken into account: gas-fired power is very responsive to demand and can be turned on only when a unit of electricity is most valuable, whereas many renewables are weather-dependent. And, for a gas power plant, capacity at a given point in time is not correlated with the capacity of other generating technologies, whereas when the wind is not blowing or the sun not shining, all wind farms or solar plants in the same vicinity generate less energy, regardless of

[19] Way, R., et al., *Empirically grounded technology forecasts and the energy transition*, 2022.

demand conditions. Where generation takes place further away, rather than closer to where it is needed, as is the case for offshore wind, this adds to the overall costs of delivering power to where it is used. And compared to gas-powered generators, where there are a few big stations to connect and integrate with the grid, many renewables (particularly solar and onshore wind) require many more smaller-scale generators to be connected and balanced on the grid, increasing the overall system costs.[a]

DESNZ (formerly BEIS) therefore produced estimates of 'enhanced levelised costs' (ELCOEs) in 2020.[b] In Chart B we add the 'additional systems costs' this metric incorporates on top of the basic 'electricity generation costs' of a reference technology – gas-powered generation. *At pre-invasion prices*, the ELCOEs for renewables are higher than the levelised cost of gas (the green bars), reflecting the greater additional systems costs (the yellow bars) associated with renewable generation compared to gas generation. Adding in the costs of the carbon capture usage and storage (CCUS) necessary to render gas carbon neutral (the yellow block in the second bar) leaves overall costs similar across all technologies *at pre-invasion prices*.[c]). To illustrate the additional costs of gas-fired power generation *post-invasion*, we have simply scaled up fuel costs to account for the percentage increase in gas prices in 2025 implied by our latest medium-term gas price forecast. This takes the ELCOEs for both gas measures (without and with CCUS) well above even the most expensive renewable technology.[d]

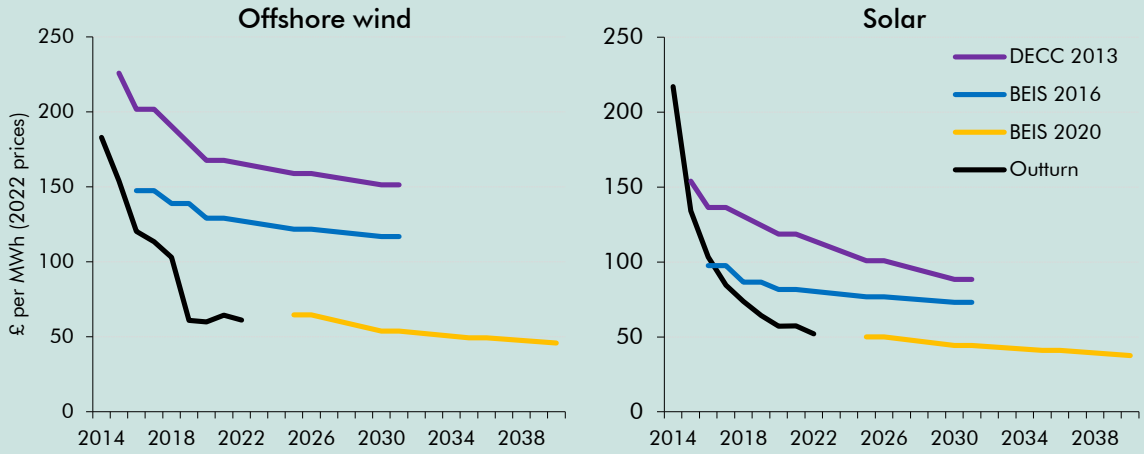
Chart B: Illustrative enhanced levelised costs of energy



Note: Additional systems costs are the mid-point of BEIS's high and low scenarios. In line with the literature, we have rebased these to be relative to a reference technology – the additional systems costs of gas. Additional fuel costs scales up BEIS's estimate of fuel costs in 2025 to account for the gas price in our March 2023 *EFO* forecast.
Source: BEIS, OBR

The relative LCOEs of different technologies, enhanced or not, will continue to evolve over time. And if the past is a reasonable guide to the future, that will make the comparison increasingly favourable to renewables, where costs have repeatedly fallen faster than predicted (Chart C).

Chart C: Successive forecasts of renewable LCOEs vs. outturns



Note: A moving average trendline has been fitted around the historical projections, as these were forecast at five-year intervals.
Source: DESNZ

[a] Imperial College London, RWE Innogy, Renewable Energy Systems, Scottish Power Renewables, *Whole-system cost of variable renewables in future GB electricity system*, 2016.
[b] Even ELCOEs only adjust for the costs to the power system as a whole, not society more generally. A completely comprehensive measure of the costs of generation technologies would take other factors into account – from any impacts on neighbouring house prices to any unpriced negative environmental externalities.
[c] CCUS technology involves capturing emissions when gas is burnt and then either using them for industrial purposes or storing them, although it does not yet exist at scale and will add additional costs to gas-fired power generation.
[d] In practice, costs depend on the path taken by gas prices over the entire period that a plant is in operation.

Changes in UK and European renewables supply

3.24 This section looks at how the improvement in the relative competitiveness of renewable energy has spurred some form of supply response in clean energy generation in the UK and Europe. Renewables supply has been increasing over the past 20 years, thanks to declining costs, the imposition of carbon pricing via the emissions trading scheme and carbon price floor, and other policy measures, most notably renewable contracts for difference, aimed at encouraging the transition from fossil fuels to alternative fuel sources. Chart 3.14 shows the composition of power generation capacity in UK and the EU over time:

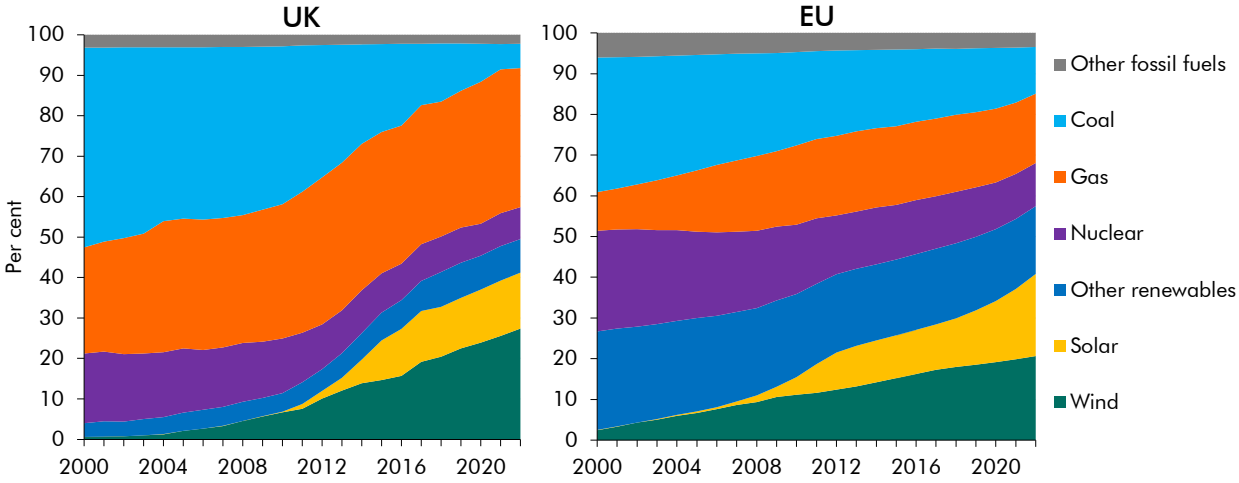
- **The UK**'s share of renewable capacity, as measured by Ember, has increased more than ten-fold from 4.4 per cent of total power generation capacity in 2002 to 49.5 per cent in 2022.[20] This reflects a large increase in wind generation capacity, whose share of the total grew by 27 percentage points over that period, and to a lesser degree solar, whose share increased by 14 percentage points. The increase in renewables offset the 41 percentage point drop in coal's share over the same period.

- **The EU** had a larger renewable capacity share than the UK in 2002 and continues to have a larger share in 2022, though the capacity gap has narrowed materially (and the UK's share of renewable power generation has now overtaken the EU's). This

[20] Ember is an energy think tank. To do our cross-country comparisons of capacity, this section uses its installed capacity data, which do not adjust down renewables supply to reflect the intermittency of some renewables. This focus is to avoid the distortive effects of year-on-year weather variation to allow us to focus on the effects of past renewable investment responses in the power sector.

reflects 20.2 and 16.3 percentage point rises in the shares of wind and solar, offset by 19.9, 13.3 and 6.9 percentage point falls in the shares of coal, nuclear and other renewables.

Chart 3.14: Composition of power generation capacity: UK versus the EU



Source: Ember

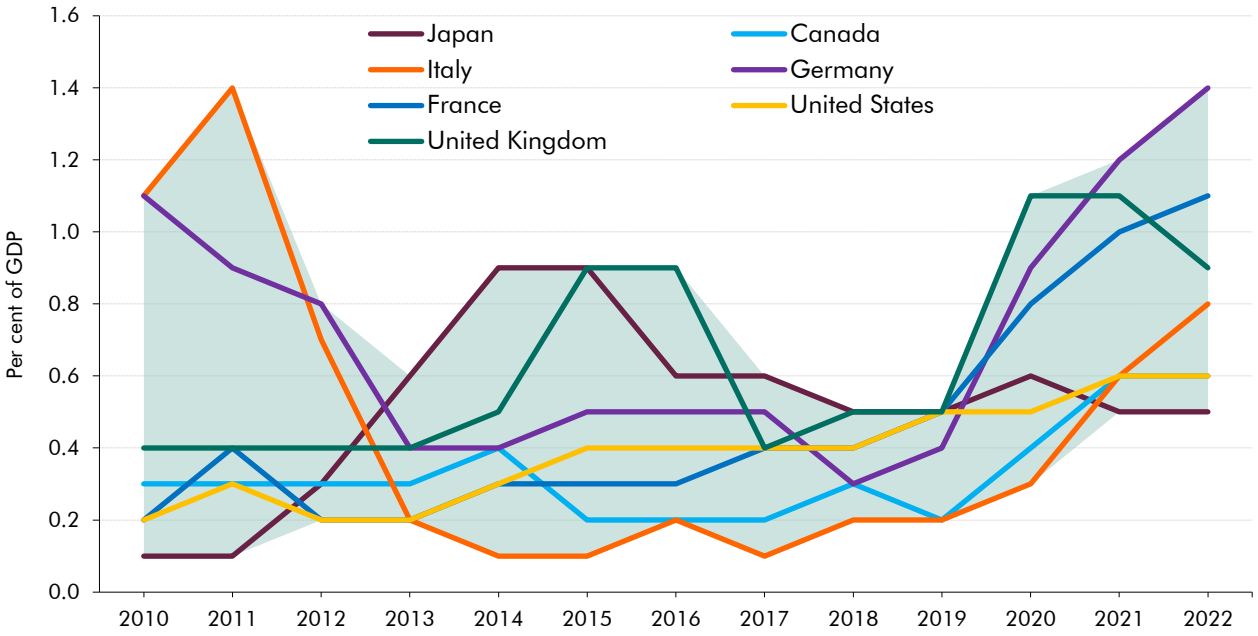
3.25 Looking at the changes in the composition of energy supply since the Russian invasion of Ukraine, the UK has seen a relatively modest increase in the generation capacity of renewables in the energy supply mix. This includes an 11 per cent increase in wind generation capacity and a 4 per cent increase in solar capacity within the UK in 2022 compared to 2021. Other European countries saw more modest expansions in wind capacity of 4 per cent on average last year, reflecting post-pandemic bottlenecks in the supply chains for their major components, and relatively lengthy planning and construction time.[21] However, other European countries saw a much stronger 22 per cent expansion in solar-power-generating capacity last year, perhaps reflecting the quicker times to purchase and install solar panels (meaning earlier responses to price signals can be picked up). Almost no capacity came on stream from other sources in either the UK or Europe, reflecting the long lags associated with the construction of hydroelectric and nuclear power plants. Overall, the increase in the renewable capacity share in the rest of Europe last year was around 1.4 percentage points greater than the rise in the share in the UK. Much of this increase in generation capacity is due to prior investment in renewable projects coming online in 2022, although some, such as solar panel uptake in Germany, was likely in response to higher gas prices.[22]

3.26 Since the Russian invasion of Ukraine, there is little sign of a step change in investment in renewable energy sources in the UK, partly reflecting significant non-financial barriers to investment.[23] Among advanced economies, the UK had been one of the larger investors in renewable energy in the decade prior to the pandemic, investing around 0.5 per cent of

[21] McKinsey & Company, *Renewable-energy development in a net-zero world: Disrupted supply chains*, 17 February 2023.
[22] There was a 47 per cent increase in new solar capacity in Europe in 2022, with particularly large increases in solar panel installation observed in Germany. See SolarPower Europe's *European Market Outlook for Solar Power 2022-2026* report, December 2022.
[23] For example, complexities with planning and permitting, and the frequency and volume of contracts for difference auctions.

GDP compared with a G7 average of 0.4 per cent. But UK investment peaked at 1.1 per cent of GDP in 2021 and actually fell back to 0.9 per cent in 2022.[24] Among the G7, only Germany has seen a take-off in renewable investments, rising three-fold from 0.4 per cent in 2019 to 1.4 per cent of GDP last year, thanks largely to a boom in rooftop solar installations following the energy price crisis.[25] This urgency no doubt partly reflects Germany's decision to close all nuclear power plants following the 2011 Fukushima disaster – with the last German nuclear plants shutting down in April 2023. The US has seen a steady increase in renewable investment, but from a low level. The passage of the Inflation Reduction Act last year may provide greater certainty for renewable energy projects until 2032, with its impact on deployment expected to become evident from 2025.[26]

Chart 3.15: International investment in low-carbon technology



Source: DESNZ

3.27 Over the long run, higher gas prices should incentivise the adoption of low-carbon technologies, provided existing barriers to a supply response – including those created by the planning system – are overcome. Since the 1990s, electricity generation and retail supply have largely been provided by privately-owned, competitive companies. In contrast, the National Grid and distribution network are provided by regulated private-sector monopolies (subject to a price control framework). So, the power system's ability to respond to market incentives is influenced by the planning system, government, and regulators. Long and uncertain wait times to go through the permitting system in the UK, and then later to connect to the grid, have been frequently cited as impediments to investment.[27] Indeed,

[24] The increase in renewable capacity in 2022 is not necessarily indicative of changes to investment patterns in 2022. This is particularly so for wind projects, which will show up much further in the future when projects come online.
[25] Clean Energy Wire, *German solar power capacity in 2022 sees fast growth, still well below target*, published online 3 February 2023.
[26] IEA, *Renewable Energy Market Update*, June 2023.
[27] For instance, a recent review of the UK's net zero target quoted Energy UK in saying that "*indicated wait times for grid connections can be more than six years, in some cases up to 10 years, creating a totally untenable position for renewable developers and financiers*". See Skidmore, C., *Mission Zero – Independent review of Net Zero*, January 2023. In addition, the IEA's *World Energy Investment 2023,* May

there are some indications that we may be seeing a stalling in renewable energy project investment within the UK, potentially hindering what is needed to reach the Government's target of a decarbonised power sector by 2035.[28]

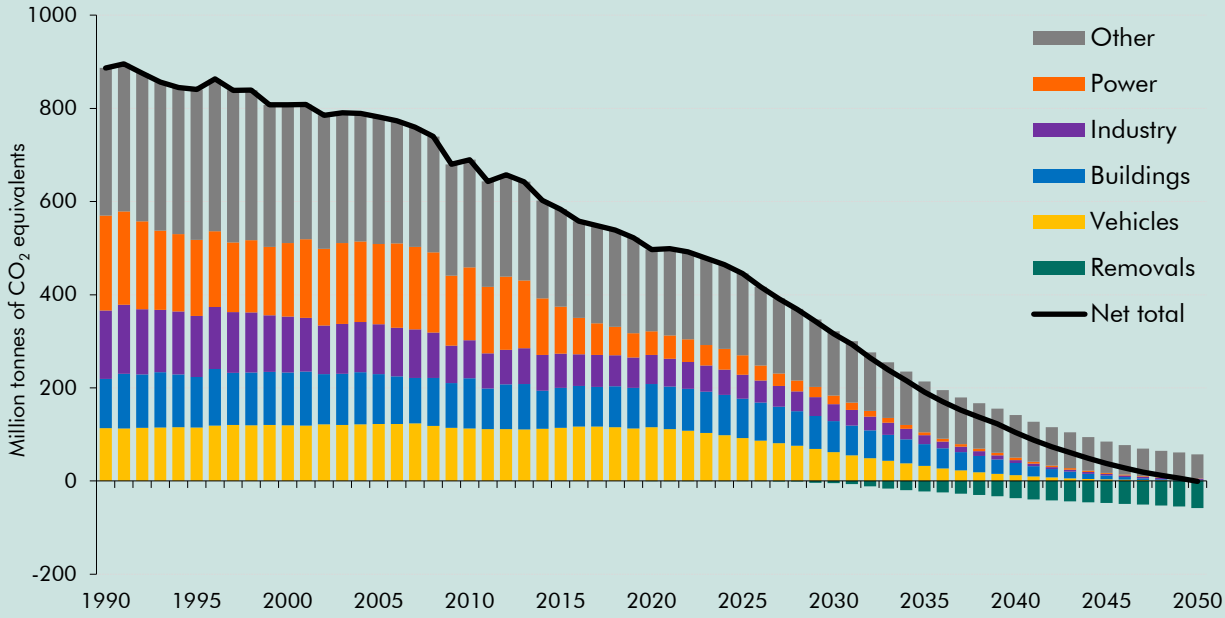
Updated fiscal cost of the net zero transition

3.28 Significant investment in the power sector is needed over the next decade to reach net zero, both in renewable energy sources and in the electrification of the wider economy. While we had estimated that the majority of this cost would fall to the private sector in our 2021 *FRR*, given the relatively muted response to date from private energy investors to the change in the relative price of renewable energy in the UK, the associated risks to the public finances remain significant. Following our 2021 *FRR* work, estimates of the fiscal costs of getting to net zero for other countries have begun to emerge, so Box 3.3 discusses how these compare to our estimates.

Box 3.3: The fiscal cost of net zero in the UK in an international context

While the UK's territorial CO_2 emissions have fallen significantly since 1990, thanks in large part to the switch from coal to gas power generation, achieving the Government's net zero target by 2050 will become increasingly difficult. Vehicles, buildings, industry, and power make up the majority of emissions remaining in 2020, and these four sectors plus the yet-to-be-developed removals sector are the largest source of future abatement in the Climate Change Committee's (CCC's) balanced net zero pathway, shown in Chart D.

Chart D: Emissions in the CCC's balanced net zero pathway



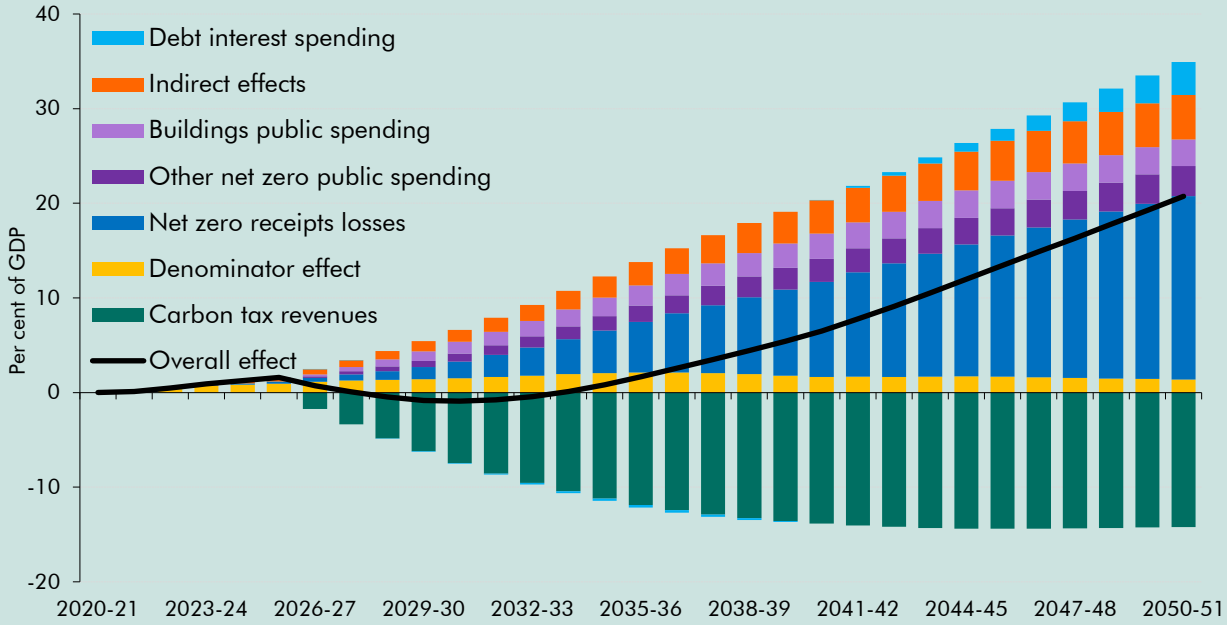
Source: CCC

2023, estimated that the average wind and solar permitting time for UK is four to seven years versus three to five years in the US and a number of European countries. Over 80 per cent of the UK's installed wind and solar capacity is waiting for a permit to begin generation.

[28] Power sector investment in the CCC's sixth Carbon Budget and in our *FRR* 2021 scenarios are discussed further in paragraph 3.32.

Our 2021 *Fiscal risks report* (*FRR*) set out a range of scenarios for the potential fiscal cost of getting to net zero by 2050. Our central estimated impact on the primary balance was around *minus* 0.8 per cent of GDP (£20 billion a year in today's terms) – equivalent to adding 21 per cent of GDP to debt by 2050 – with the loss of fuel duty revenues the largest single cost (around three times larger than public investment in net zero). Of these costs, decarbonising power generation only accounted for about 8 per cent of total investment, with the cost of decarbonising buildings (largely heating, which we assume will require electrification) estimated to account for half the investment costs, as Chart E shows.

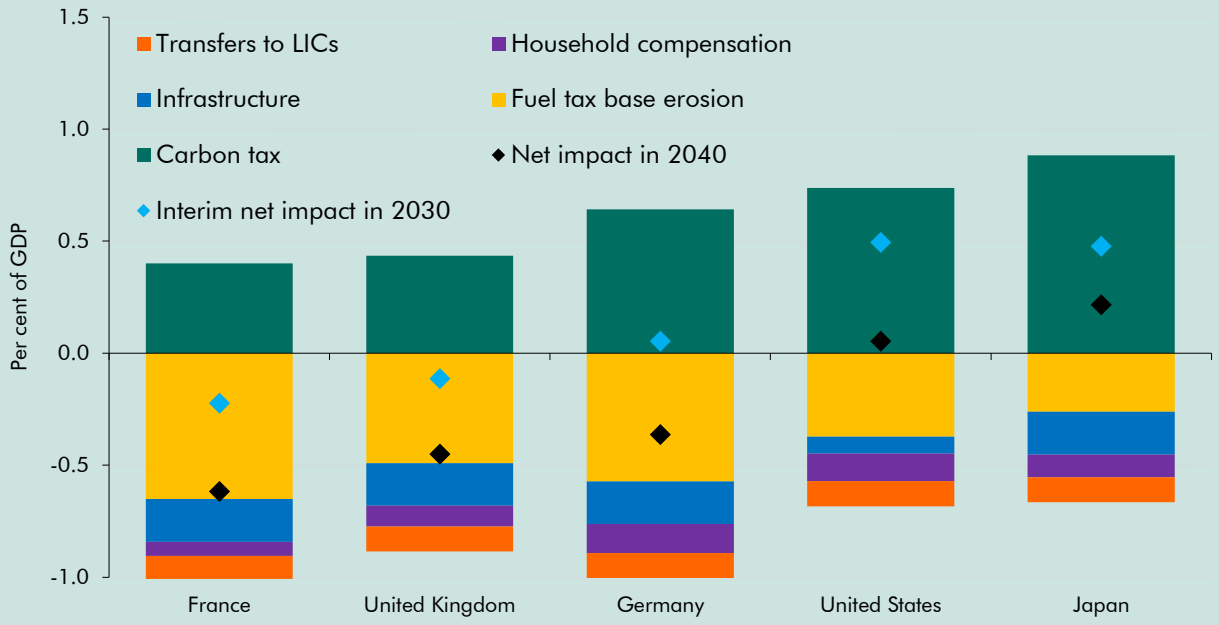
Chart E: Impact of net zero transition on public debt



Source: OBR

The IMF has recently produced cross-country comparisons of the impact on primary borrowing of a 'global deal scenario' for getting to net zero.[a] As Chart F shows, it finds that in the UK, Germany, and France, the imposition of a carbon tax is unlikely to be enough to offset the erosion of fuel tax bases and costs of public investment spending required to reach net zero, so the impact on the primary balance from decarbonisation in these countries will grow to a *deficit* of ½ per cent of GDP by 2040, compared to 1.2 per cent of GDP in 2040 in our 2021 analysis. The IMF assumes less public spending is required to decarbonise the buildings sector than in our approach, but against that is assumes that the bottom three deciles of the income distribution are compensated for the costs of net zero, and that some modest transfers to low-income countries (LICs) are provided. In both the US and Japan, the impact in 2030 is initially positive, due to the greater opportunity to tax emissions, although it falls nearer zero by 2040 as new and existing tax bases are eroded.

Chart F: Effect on 2040 primary fiscal balances of a global net zero deal scenario



Source: IMF

Two more detailed French studies present broadly comparable estimates of the fiscal costs associated with the transition to net zero in France. Unlike the IMF's, both French studies follow our assumption that significant public spending will be required in western European economies to retrofit the building stock to fit the needs of a net zero world. In 2022, the General Inspectorate of Finance produced a stylised illustration of the potential cost of net zero (assuming positive 'indirect effects' on productivity from the transition) equivalent to an addition to debt of around 10 per cent of GDP in 2040 and 15 per cent of GDP in 2050, compared to 6 and 21 per cent of GDP respectively for the UK in our *FRR 21* scenario.[b] The authors of a 2023 report to the French Prime Minister estimated the cost at 25 per cent of debt-to-GDP by 2040 (around 20 percentage points above our figure in that year).[c] This second higher estimate reflects more significant investment costs (half of which are paid by the public sector), negative indirect effects on productivity, and no assumed impact on the tax-to-GDP ratio.

[a] de Mooij, R., et al., *How does Decarbonisation Change the Fiscal Equation?*, 5 June 2023. This uses a tool developed jointly with the World Bank and outlined in a new working paper to generate the fiscal impacts on different countries of different climate change scenarios. See the IMF's *The IMF-World Bank Climate Policy Assessment Tool (CPAT): A Model to Help Countries Mitigate Climate Change*, 23 June 2023.
[b] Inspection générale des finances, *Enjeux macroéconomiques et budgétaires de la neutralité carbone*, November 2022.
[c] Pisani-Ferry, J., and S. Mahfouz, *Les incidences économiques de l'action pour le climat*, 22 May 2023.

The Government's net zero investment plans

3.29 Since our 2021 *FRR*, the Government has published a series of strategies for getting to net zero by 2050, the latest being the 2023 *Carbon Budget Delivery Plan*, which updates the 2021 *Net Zero Strategy*. But these strategies do not estimate the Government's intended split for the public and private investment required to fund the transition to net zero. So, our 2021 *FRR* remains the only published estimate of the fiscal cost of getting to net zero in the

UK, and the only benchmark we currently have against which to assess progress in public investments toward net zero.

3.30 The Climate Change Committee (CCC) has responsibility for monitoring the progress and risks to meeting the UK's declared national ambitions (known as 'nationally determined contributions', or NDCs, under the Paris Agreement) and legislated carbon budgets, and publishes a yearly progress report to this end. Comparing known public investment commitments to our 2021 *FRR* investment scenarios, in combination with the CCC's latest progress report, we can glean an overall picture of whether the UK's pace of transition to net zero has been helped or hindered by the energy crisis in key sectors.

3.31 In the 2021 Spending Review, the Government set out three-year departmental spending plans to 2024-25, including on green investments (see Box 3.3 of our October 2021 *EFO*). Table 3.1 compares the real spending figures currently implied by these plans against our 2021 *FRR*'s estimates of the public investment associated with reaching net zero.[29] This comparison shows that during the current Spending Review period, announced green public investment sits close to our central scenario, on average just £0.7 billion a year lower than our assumption. But there is considerable variation in the underlying sectors:

- **Surface transport**. In our 2021 *FRR* we assumed that much of the transition to EVs would occur without the need for public investment – just £13.6 billion, or 17 per cent, of total public investment assumed in the 2020s in our central scenario.[30] This estimate has so far been largely matched by the £6.4 billion announced in public transport investment out to 2024-25. But the CCC's latest progress report finds that there is an increased risk of not meeting the 2030 NDC for surface transport, due to delays in the development of the zero-emissions vehicle (ZEV) mandate, and low electric van uptake.

- **Buildings**. Due to the large upfront costs of decarbonising buildings, we assumed that the Government would cover the costs of the transition for all of its own estate, the poorest 15 per cent of the income distribution, many of whom will be credit-constrained, and half the costs for the middle 70 per cent of households. We assumed public investment on buildings in the 2020s would total £43 billion or 52 per cent of total public investment in the 2020s in our central scenario. So far the Government has committed the equivalent of £8.6 billion over the Spending Review period, £2.2 billion (or 21 per cent) less than assumed in our central scenario. Take-up of successive schemes to subsidise household investment in heat pumps and insulation has been less than expected, reducing actual public support relative to the amounts

[29] Set out in more detail in paragraphs 3.50 to 3.87 our 2021 *FRR*. We took the whole economy costs of net zero from the CCC's 6th Carbon Budget 'balanced pathway' scenario. We then looked at the investment costs in each sector, making high-level central assumptions around the public sector's share of costs, as well as a low scenario (the Government only pays for public sector assets and provides some assistance to the lowest-income households) and a high-share scenario (the Government also provides some assistance to middle-income households, and enhanced support to business and industry).

[30] Although it is nonetheless facilitated by Government policy, such as the ban on non-zero emissions vehicles by 2030, freeze on excise duty for electric vehicles, and generally lower fuelling costs for electricity over petrol. There has already been a strong uptake in EVs.

that have been announced.[31] The latest CCC report finds that the building sector remains significantly off track for required heat pump installations and energy efficiency measures, with energy efficiency installations *falling* in 2022 from already low levels.[32]

- Power. Given the falling relative costs of green energy, we assumed the sector could largely fund the transition itself, with any subsidy transferred to consumers (as is currently the case with the cost of contracts for difference and other schemes that are covered by environmental levies in energy bills). We assumed public investment would only be needed to cover 7 per cent of the sector's investment needs (largely to upgrade network infrastructure) in the 2020s and 5 per cent from the 2030s to 2050. This amounts to £8.5 billion in the 2020s and 8 per cent of total public investment assumed in our central scenario to 2050. Over the Spending Review period, planned public investment in the power sector of £3.8 billion has been markedly higher than what we had assumed in either our central or high scenarios.[33] Despite this, in the progress report, the CCC finds that the power sector is further off-track since its 2022 report, downgrading its assessment of renewable delivery, which was "*not at the rate required to meet the Government's stretching targets*", with both offshore and onshore wind slightly off-track, and solar significantly so. Additional risks highlighted include barriers around planning and consenting, and network connections.

- Industry. Our central scenario assumed 54 per cent of investment costs would be borne by the state in the 2020s, to prevent offshoring of capacity to countries with less stringent decarbonisation policies. This amounts to £2.9 billion in the 2020s and 5 per cent of assumed total public investment to 2050 in our central scenario. Government spending over the current Spending Review period totals £1.2 billion (in 2019 prices), between our central and high scenario assumptions. The latest CCC progress report downgrades the assessment for industry, with high risk of not meeting emissions targets – despite the Government's announced £20 billion investment in carbon capture, usage and storage over the next two decades. This downgrade is due to a combination of emissions reductions already being significantly off track, combined with the lack of a clear plan for the electrification of industries such as steel. The announcement of the US's Inflation Reduction Act and the EU's proposed Green Deal Industrial Plan are also cited as new risks to the offshoring of investment in industrial decarbonisation.

[31] In 2020-21, the government ear-marked £1.5 billion towards the Green Homes Grant voucher scheme to decarbonise homes. Of this £1.5 billion, just £256 million was spent, with less than one-tenth of the intended number of homes upgraded See NAO, *Green Homes Grant Voucher Scheme*, 2021. In 2022, the Government launched the Boiler Upgrade Scheme, with £450 million available for three years for replacing fossil fuel boilers, with the aim of supporting 90,000 installations. By May 2023, 11,700 vouchers were redeemed, less than half of the 30,000 yearly target. The scheme was extended for another three years in March 2023, with additional funding, although at current installation rates it is unclear if additional funding would be needed. See DESNZ, *Boiler Upgrade Scheme statistics*, 29 June 2023.
[32] See Figure 5.5 on *Government-funded measures for fuel poor homes* from the CCC's 2023 *Progress report to parliament*, 2023. The CCC reports that *"the energy crisis provided a clear incentive to insulate buildings, but progress in the owner-occupied and private rented sectors remains slow."* And that *"the UK's buildings are no more resilient to volatile energy prices now than before the crisis and pre-existing vulnerabilities that the crisis exposed remain. By contrast, other nations responded with significant investments in permanent measures to improve energy efficiency"*.
[33] Almost all of this public investment in the power sector was tagged by HM Treasury as going towards energy security. The Government's April 2022 British Energy Security Strategy announced plans to develop up to eight new nuclear reactors.

- **Other** sectors include waste, agriculture, land use, land use change, and forestry (LULUCF), and aviation and shipping. Government investment to date in these sectors has been significantly below what our scenario assumed, with the majority of planned investment in these other sectors going towards net zero innovation. Similarly, the latest CCC progress report finds significant risks to insufficient plans (the highest risk rating) for meeting emissions reductions targets for almost all of these sectors.

Table 3.1: Net zero public investment plans to 2024-25 and our FRS 2021 scenarios

	£ billion (2019 prices)						
	Announced Government investment	2021 *Fiscal risks report* public investment scenarios					
		Total			Difference		
		Low	Central	High	Low	Central	High
Total	**22.5**	16.5	25.4	33.7	6.0	-2.9	-11.3
of which:							
Surface transport	**6.4**	5.9	6.2	6.4	0.5	0.2	0.0
Buildings	**8.6**	4.1	10.9	17.2	4.5	-2.2	-8.6
Power	**3.8**	1.9	2.4	2.9	1.9	1.4	0.9
Industry	**1.2**	0.4	1.0	1.7	0.8	0.2	-0.5
Other	**2.5**	4.2	4.9	5.6	-1.7	-2.4	-3.2

Note: *FRR* 2021 scenarios are our low, central and high net zero real public investment scenarios over the period from 2021-22 to 2024-25. Announced spending is our October 2021 *EFO* analysis of the Government's emissions-reducing spending plans for the same years (see Box 3.3 of our October 2021 *EFO*), deflated to 2019 prices using the GDP deflator.

3.32 Although overall public investment over the current Spending Review period is similar to the amounts assumed in our central scenario, plans for the more demanding phases to come are less well specified. Detailed departmental spending plans for 2025-26 onwards have – as is usually the case – not yet been set, although notable announcements include plans to provide up to £20 billion over 20 years towards carbon capture utilisation and storage;[34] an extension to the boiler upgrade scheme for three years from 2025-26, with no firm commitment on extra funding;[35] and a proposed Energy Efficiency Taskforce to be put together for 2025-2028.[36] Two other energy-related announcements did not have immediate fiscal implications, the British Energy Security Strategy (BESS) in April 2022 and the Powering Up Britain (PUB) strategy in March 2023. It is important to note that the higher gas prices since 2021 might sharpen private incentives to adopt greener alternatives, which may result in lower public sector spending in some areas (for instance, in the buildings sector) than our 2021 work assumed. But the CCC's worsening risk assessment of the UK's position on achieving its 2030 NDC and legally binding carbon budgets increases the risk of higher public investment being needed in future.

[34] The Government has proposed to spend up to £1 billion per year for 20 years on CCUS, although the exact timing and funding mechanism has yet to be determined.
[35] This is aimed at helping households switch from gas boilers to heat pumps, and is an extension to a previously announced scheme that has currently only reached 13 per cent of its original installation target.
[36] The Government has proposed setting up an Energy Efficiency Taskforce, with the aim to make available funding worth £6 billion from 2025 to 2028.

The risks of continued exposure to volatile gas prices

3.33 Although completing the energy transition to net zero is likely to generate some significant fiscal costs, maintaining the UK economy's current reliance on natural gas would not be costless either. Exposure to volatility in the price of gas can, as the past two years have shown, have wide-reaching implications for the UK economy and public finances. In this final section, we assume that the UK remains reliant on natural gas for around 40 per cent of its energy needs rather than achieving the decarbonisation expected in a net zero scenario, and therefore remains exposed to volatility in global wholesale gas markets. This poses an ongoing fiscal risk due to the impact of volatile gas prices on the economy, the public finances, and fiscal policy.

Gas price assumptions

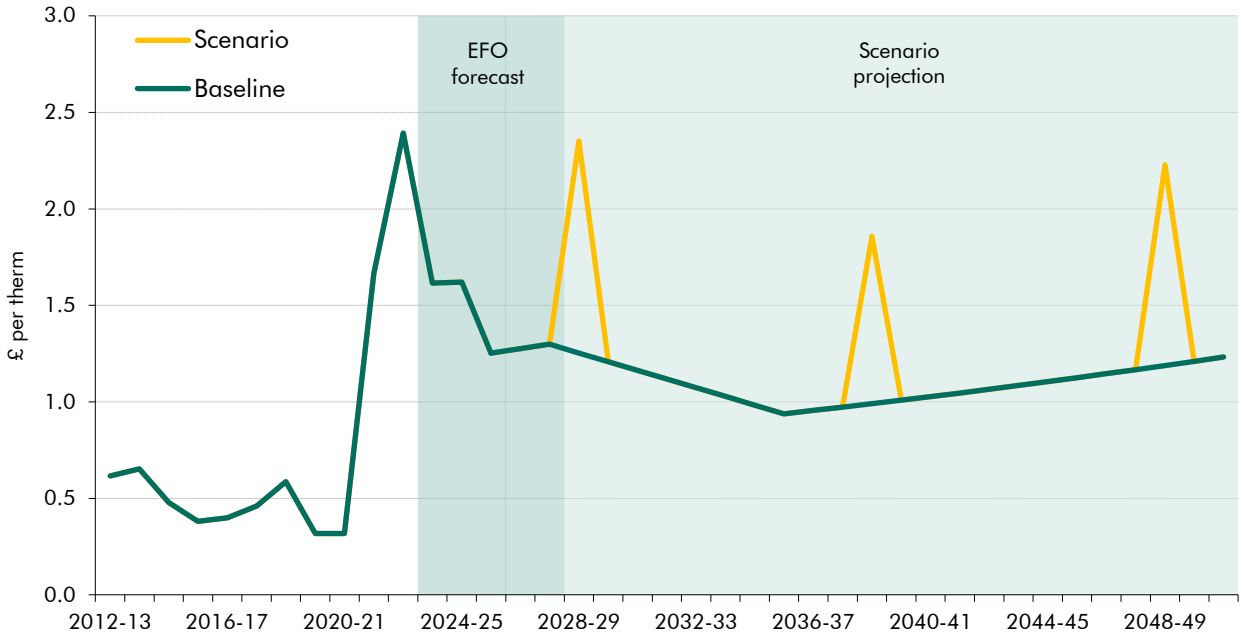
3.34 Chart 3.16 shows our medium-term *EFO* forecast, in which gas prices follow the futures curve from the five working days to 8 February 2023 over the next three years, and then rise with inflation to reach £1.30 a therm in 2027-28. Beyond that point, baseline gas prices are assumed to converge on DESNZ's[37] latest central estimate by 2035-36 and then rise with inflation. We do this in order to anchor the scenario to long-run fundamental drivers of the demand for, and supply of, natural gas.

3.35 In our scenario, we explore the impact of gas prices spiking by 90 per cent above our baseline assumption at 10-year intervals from 2028-29 onwards – an increase sufficient initially to bring prices in that year back to the levels seen in 2022-23. This volatility is designed to highlight the uncertainty around future supply and demand for gas and their influences on its wholesale price. For instance, on the demand side, the expansion of renewable sources of energy could lower prices, but factors like the transition of more coal-dependent economies, like China and India, towards natural gas could raise them. And on the supply side, significant increases in LNG capacity could put downward pressure on prices, but – as witnessed during the oil shocks of the 1970s and 1980s – geopolitical tensions could result in more hostile pricing strategies from major gas suppliers, forcing prices higher. Our scenario represents an adverse crystallisation of these risks, as while gas prices rise above our baseline forecast when shocks occur, they never fall below it. We assume that the UK's reliance on natural gas does not decline over time, so the UK remains as exposed to volatility in wholesale markets as it is today.

3.36 This continued reliance on gas would result in the UK being over 40 per cent more exposed to the price spike in the late 2020s than if gas usage followed the downward path of the Government's 2021 Net Zero Strategy's 'indicative delivery pathway' to net zero;[38] over two times more exposed to the spike in the late 2030s; and over five times more exposed to the spike in the late 2040s.

[37] BEIS, *2019 fossil fuel price assumptions*, February 2020 (now the Department for Energy Security and Net Zero).
[38] Department for Business Energy & Industrial Strategy, *Net Zero Strategy: Build Back Greener*, October 2021. This strategy set out an indicative energy mix pathway to 2037, and several scenarios for the energy mix in 2050. For our 2022 *FRS* we assumed a linear declining path for gas from the 2037 'indicative delivery pathway' out to the 2050 'high electrification' scenario: the same gas consumption assumptions are used here.

Chart 3.16: Gas prices in the scenario



Source: OBR

Economic implications

3.37 Each gas price spike results in CPI inflation reaching 5.3 per cent rather than remaining at is 2 per cent target in the baseline. The increase in wholesale gas prices is passed through one-for-one to higher consumer prices. As in our March 2023 forecast, and as set out in Box 2.2 of our March 2022 *EFO*, we raise the direct impact of higher utility prices by 25 per cent, to account for the historical importance of two indirect effects: first, the pass-through of energy prices to the prices of other goods and services (in proportion to the energy intensity of production); and second, the impact of these price changes on other macroeconomic variables – most importantly, the drag on demand from lower real incomes, taking into account any offsetting monetary policy response from the Bank of England. The price level returns to baseline the following year, after the shock has passed.

3.38 As in our March 2023 *EFO* forecast, we have modelled the short-term impact of higher gas prices on demand as a terms of trade shock. Over the long run, we assume gas and electricity make up 3 per cent of the consumption basket – their historical level – so, given the difficulty households have in substituting away from energy when prices rise, this represents a significant shock to real incomes.[39] Consumers therefore cut back on consumption as a result of each price spike, reducing real GDP by around 1 per cent each time (relative to what would otherwise have occurred). Once gas prices return to their baseline level, real GDP also returns to baseline, so there is no longer-term impact on the supply-side potential of the economy from single-year spikes in gas prices.

[39] Large spikes in gas prices would also hit potential output via a second channel. In the UK, gas is a largely imported commodity, so elevated prices lower the level of output firms can profitably produce. In Box 3.2 of our July 2022 *FRS*, we set out an approach to modelling these impacts on supply via a short-term elasticity of output to gas prices of -0.003. But given the faster historical reduction of spending in the industry than the domestic sector set out in Chart 3.3, and the difficulties associated with decarbonising buildings described in paragraph 3.32, we have focused here on the reduction in households' real incomes.

3.39 Nominal GDP also falls, although by only half per cent (relative to what would otherwise have occurred). The GDP deflator measures the price of domestically produced goods and services, so because gas is a largely imported commodity, the large increase in CPI inflation results in only a small increase in GDP deflator growth. As the rise in whole-economy prices is insufficient to outweigh the fall in real GDP, nominal GDP falls modestly, and so only has a modest fiscal implication in the scenario.

Fiscal implications

3.40 Despite the impacts on the real and nominal economy appearing relatively small, the fiscal implications are material, and result in a ratcheting up of borrowing and debt over our scenario Chart 3.17. Relative to this report's baseline projection for the public finances of steadily rising public spending and debt, further once-a-decade spikes in the price of gas, in an economy that remains reliant on gas, have the following effects on the public finances:

- **Revenues**: Oil and gas revenues rise by 0.1 per cent of GDP (£1.6 billion in today's terms) in the 2028-29 gas price spike, but the subsequent projected reductions in North Sea output mean the impact is negligible later on in the scenario. Other tax receipts are assumed to move only slightly more than one-for-one when nominal GDP falls, so are negligibly lower in gas-price-spike years (by £1 billion in today's terms).

- **CPI-linked spending** is 0.5 per cent of GDP (£12.9 billion in today's terms) higher by 2050. Several elements of government spending, like welfare and state pension spending, use the CPI in uprating on a yearly basis. The triple lock on the state pension means that when CPI drops back after a material spike, there is an additional uprating impact through the 2.5 per cent floor in the triple lock, which locks in a new higher level than in the baseline, and in this way creates an upward ratcheting impact on spending. By 2050-51, pensions spending is 0.2 per cent of GDP higher in our scenario, equivalent to £4.8 billion in today's terms. Several other elements of welfare spending are uprated with CPI, and cannot be downrated, which results in a similar, but smaller, ratcheting up of welfare spending when CPI falls (rather than when CPI inflation falls below 2.5 per cent, as occurs with the triple lock).[40] This adds an additional 0.3 per cent of GDP to spending by 2050-51 (£8.1 billion in today's terms).

- Fixed **DEL spending**: Our baseline for public spending assumes that departmental spending plans rise with nominal incomes over the very long run, as well as accommodating some other demographic and health cost pressures. When these temporary negative shocks occur, we assume that these baseline spending plans are not reduced to account for the smaller cash size of the economy, so in gas-price-spike years they increase modestly as a proportion of GDP, by 0.1 per cent (£3.7 billion in

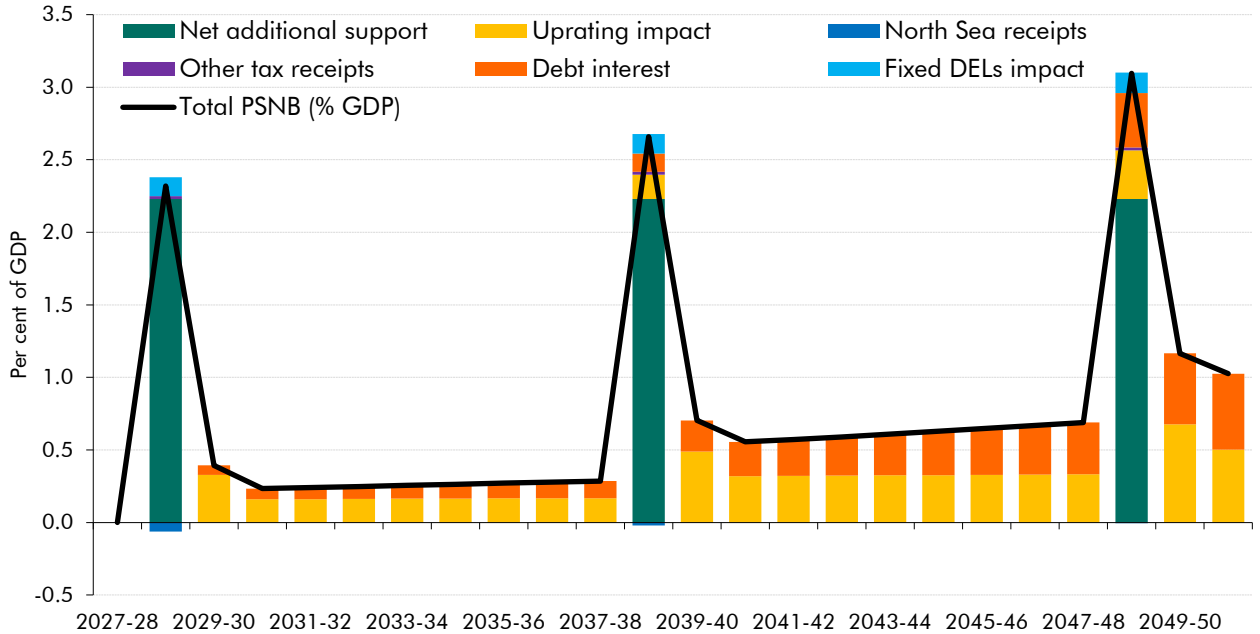
[40] This calculation assumes that non-state-pension spending that is CPI-linked in our medium-term forecast is uprated with CPI inflation over the long run. For simplicity, we have layered this effect on top of our baseline long-term projection from Chapter 4, even though this assumes other welfare spending is uprated with earnings rather than CPI over the long run (so as not to assume unrealistic falls in the incomes of benefit recipients relative to the wider population). This has little consequence for the marginal impact of the scenario *relative to* the baseline and provides the more meaningful quantification of the fiscal risk that would be posed by the gas price spikes.

today's terms). This temporarily raises the borrowing-to-GDP ratio (given nominal GDP returns to baseline outside of spike years, its long-run impact is negligible).

- Most importantly, the Government is assumed to provide a **similar level of fiscal support to households and businesses** in each gas-price-spike year as was seen in 2022-23 (as outlined in Box 3.1 of our March 2023 *EFO*), equivalent to an additional 2.2 per cent of GDP (£57.4 billion in 2022-23) when partially offset by additional revenues from windfall taxes. This makes up by far the largest contribution to the scenario's fiscal costs. In future crises, were the Government able to provide more targeted support to households adversely affected by energy price spikes more easily than has been possible over the past year, as some commentators have recommended, the risks associated with volatile energy prices would be reduced.[41]

- **Debt interest**: Another consequence of increases in government spending, and thus borrowing, is the increase in the interest that the Government has to pay to on the higher stock of public debt (orange bars in Chart 3.17). This sees debt interest spending rise to 5.4 per cent of GDP by 2050-51, 0.5 per cent of GDP (£13.5 billion) higher than in the baseline.

Chart 3.17: Impact of the scenario on public sector net borrowing



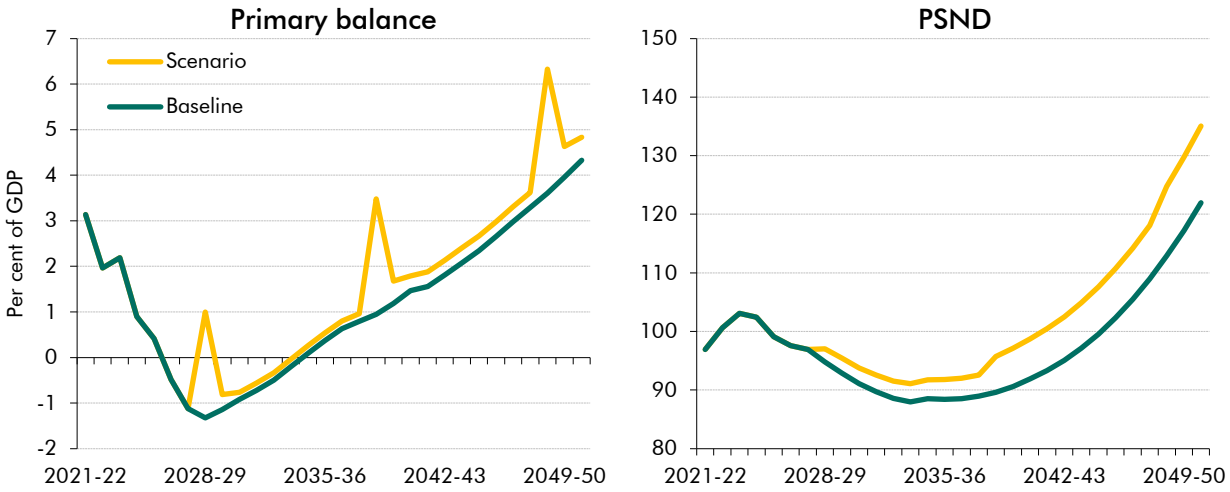
Source: OBR

3.41 Taken together, these changes in receipts and spending result in a widening primary deficit (Chart 3.18 left panel), and a higher stock of debt. By 2050-51, debt reaches 135 per cent of GDP, compared with 122 per cent of GDP in the baseline projection Chart 3.18 right panel, a difference of 13 per cent of GDP (£337 billion in today's terms). These results reflect the assumption that volatility causes gas prices to rise above our baseline

[41] For instance, the IMF recently recommended that "*implementable, second-best policy choices should now urgently replace more distortive measures.*" See IMF, *Targeted, Implementable, and Practical Energy Relief Measures for Households in Europe*, December 2022.

periodically, but not fall below it. That said, it is unlikely that downward surprises in the price of gas would have equivalently large positive fiscal impact, given, for instance, the ratchet effect of the triple lock and the fact that governments tend not to claw back the cost of support packages if beneficial shocks subsequently hit the economy.

Chart 3.18: The primary balance and PSND in the scenario



Source: OBR

Comparison with the fiscal cost of net zero transition

3.42 In our July 2021 *FRR*'s central scenario, we estimated that the net effect on the public finances of taking early action to reach net zero would reduce the primary balance by around 0.8 per cent of GDP per year and add 21 per cent of GDP to public sector net debt. This includes a loss of receipts from fuel duty and a gain from taxing carbon more heavily than is currently the case. The public sector investment component of these costs, which would be the principal source of discretionary fiscal savings in any scenario in which we remain reliant on gas, added around 6 per cent of GDP to public sector net debt by 2050-51 on a central scenario. Around half of these public investment costs – accounting for 2.8 per cent of GDP of the impact on net debt in 2050-51 – were related to buildings, to replace gas heating with net-zero alternatives, and so were most directly linked to reducing the UK's reliance on gas. Only a fourteenth was related to the power sector, where we assumed that investment would continue to be largely privately funded thanks to the additional certainty over future returns offered by contracts for difference – the costs of which are borne by consumers.

3.43 These two figures – the 6 per cent of GDP overall cost of public investment in net zero and the around 3 per cent of GDP that is most closely related to reducing reliance on gas – provide useful benchmarks against which to consider this scenario of sticking to current reliance on gas as our single most important source of energy. At 13 per cent of GDP, the fiscal cost of future volatility in gas prices is somewhat less than the overall fiscal cost of getting to net zero of 21 per cent off GDP, but rather more than both the direct public investment and the most gas-related component of that investment cost at 6 and 3 per cent of GDP. And if continued reliance on gas for some of the coming decades were then

followed by a late and abrupt process of decarbonisation, the fiscal costs could be greater still, as was illustrated by the late action scenario in our 2021 *FRR*. This assumed that abrupt change would be more costly due to the failure to develop supply chains and greater likelihood of carbon-intensive assets having to be scrapped prematurely, almost doubling net zero investment relative to the early action scenario.

Conclusion

3.44 Despite our comparatively fast progress in reducing carbon emissions over the past three decades, the UK is still one of the most gas-dependent European economies. Having risen to 13 times its pre-crisis level in the wake of the Russian invasion of Ukraine, gas prices have fallen back more recently, although they are still expected to remain around twice their pre-pandemic level into the middle of the decade. These higher prices have reduced both energy demand and household incomes, and spurred a significant supply response from gas-exporting countries outside Russia. But while the rise in gas prices has made most renewable energy sources cheaper than gas for the first time, so far it has not stimulated as strong a supply response to the lower relative cost of renewable energy in the UK. In addition, the Government's investments in green technologies are below our central 2021 *FRR* scenario for public investment in the transition to net zero carbon emissions by 2050. So, as additional global LNG supply comes on stream, there is a risk that the UK economy remains relatively highly dependent on imported gas. But, as set out above, continued dependence on gas could be as expensive fiscally as completing the transition to net zero, were periodic upward spikes to global gas prices to continue to occur.

4 Debt sustainability

Introduction

4.1 Over the first 23 years of this century, public sector net debt in the UK has trebled as a share of GDP from under 30 per cent in 2000 to around 100 per cent this year – a 62-year high.[1] This rapid rise in public debt reflects, in part, the frequency and severity of shocks the world has faced so far this century, with three-quarters of the increase in the debt-to-GDP ratio since 2000 occurring in the six years immediately following the financial crisis, pandemic, and energy crisis. And like these crises, rising public indebtedness has to a significant extent been a global phenomenon, with the average government gross debt of G7 economies rising from 76 to 131 per cent of GDP over the same period.

4.2 In the UK and many other advanced economies, debt levels have reached generational highs not only due to the *upward* pressures exerted by these shocks but also the challenges governments have faced in trying to *reduce* debt following these shocks. Fiscal tailwinds from a post-World War II baby boom, global economic integration, and easing of Cold War tensions have switched to headwinds in the first part of this century. Public finances are now under growing pressure from ageing populations, disappointing economic growth, a warming planet, and rising geopolitical tensions. Amidst these pressures, many governments have struggled to rebuild their fiscal resilience during the increasingly brief interludes between global crises. The UK Government's current fiscal plans are to have underlying debt stabilising in four years and falling by just 0.2 per cent of GDP in five years' time.

4.3 For most of this century, the fiscal burden of the Government's elevated debt stock was offset by falling interest rates and low inflation, which kept central government interest payments (net of APF flows[2]) at around 2 per cent of GDP. But both trends have suddenly reversed over the past year. Between the start of 2000 and the depth of the pandemic at the end of 2020, 10-year gilt yields fell from 5.8 to 0.2 per cent. However, 10-year gilt rates have since risen to 1.0 per cent by the end of 2021, 3.7 per cent by the end of 2022, and by 4.3 per cent by mid-2023, with even steeper rises in Bank Rate. Rising inflation, with RPI inflation peaking at 13.8 per cent in February 2023, has also pushed up interest costs on the one quarter of the Government's debt stock that is RPI-linked. Together, these have pushed net interest payments up to 3.8 per cent of GDP in 2022-23 – the highest since 1981-82. Since then, market concerns about stubbornly high inflation have pushed Bank Rate expectations and gilt rates even higher.

[1] This is referring to the headline measure of public sector net debt, which includes the Bank of England. In other sections of the chapter, particularly when discussing the Government's plans, we refer to underlying debt which excludes the Bank of England and which the Government targets for fiscal policy. Meanwhile international comparisons are on a general government gross debt basis.
[2] The Asset Purchase Facility is the vehicle that the Bank of England uses to hold the assets purchased as part of quantitative easing.

4.4 Our analyses of the long-term sustainability of the public finances have warned about the risks associated with the Government's elevated stock of debt since our first report on this subject in 2017. These risks have come into sharper focus as interest rates have risen over the past year, particularly during the adverse market reaction to last September's 'mini-budget'. Against this backdrop, this chapter discusses:

- the UK's **current debt position and prospects** in historical and international context;
- the **vulnerability of the UK's debt position** relative to history and to other advanced economies;
- **how these vulnerabilities manifested themselves** over the course of the past year;
- the **challenges of getting debt onto a falling path** over the next five years; and
- a set of **updated long-run debt projections and scenarios** based on the latest outlook for interest rates and other long-term economic determinants.

The UK's debt position and prospects

The UK's debt position and prospects in historical context

4.5 Between 2000 to 2023, debt as a share of GDP rose by over 70 percentage points from below 30 per cent to around 100 per cent of GDP. Such a large increase in debt over such a short period of time is unprecedented in peacetime. Only the Napoleonic, First and Second World Wars and their aftermath witnessed larger increases in the debt-to-GDP ratio within a given 25-year period (of about 75, 100 and 90 percentage points respectively), reflecting the existential risks these wars posed to the British state. The two World Wars, and the turbulent years between them, left the UK with a historically high public debt equal to 259 per cent of GDP in 1946, exceeding the previous record of 194 per cent of GDP in the wake of the Napoleonic Wars in 1822.

4.6 During the latter half of the 20th century, the UK also experienced periods of rising debt – most notably during the early 1970s energy crisis, the early 1980s recession, and the early 1990s recession. Yet, these episodes were typically brief, intermittent, and reversed within a few years. And so, overall and in most years, the history of the second half of the last century was one of falling debt, with public sector net debt falling by an average of 4.2 per cent of GDP a year between 1946 and 2000. This relatively consistent decline in post-war public indebtedness was facilitated by a confluence of economic and fiscal tailwinds. These included favourable:

- **Demographic trends** that increased the number of taxpayers relative to those reliant on state support, including the two baby booms that followed the Second World War, the rise of female participation in the workforce, and the extension of working lives.

- **Economic trends** that meant the rate of economic growth outpaced the rate of interest on government debt. Relatively rapid growth in productivity coupled with high rates of inflation and comparatively low rates of interest (often thanks to policies of 'financial repression'[3]) created a negative 'growth-corrected interest rate' ('R-G'[4]) that averaged *minus* 4.9 percentage points in the four decades after the Second World War.

- **Geopolitical trends** with post-war demobilisation followed by a cooling of Cold War tensions permitting a steady reduction in defence spending from 10 per cent of GDP at the end of the Korean war in the early 1950s to 2 per cent of GDP following the collapse of Communism in the early 1990s. This created fiscal space for an expansion of the welfare state which grew by a similar proportion over the same period.

4.7 The succession of global shocks that have marked the first quarter of the 21st century have left the UK with its highest level of public debt since 1960. The current Government plans to stabilise underlying debt as a share of GDP over the next four years and for it to begin falling very slightly in five years' time. However, the tailwinds that supported a period of sustained debt reduction in the later part of the last century have turned to headwinds in the early part of this century. In particular with regard to:

- **Demographic trends**. The post-war baby boom generation is moving into retirement, employment rates for prime-age adults have fallen from their all-time highs on the eve of the pandemic, and the unit costs of age-related spending (in the form of healthcare, social care, and the State pension) are outstripping the growth in the wider economy.

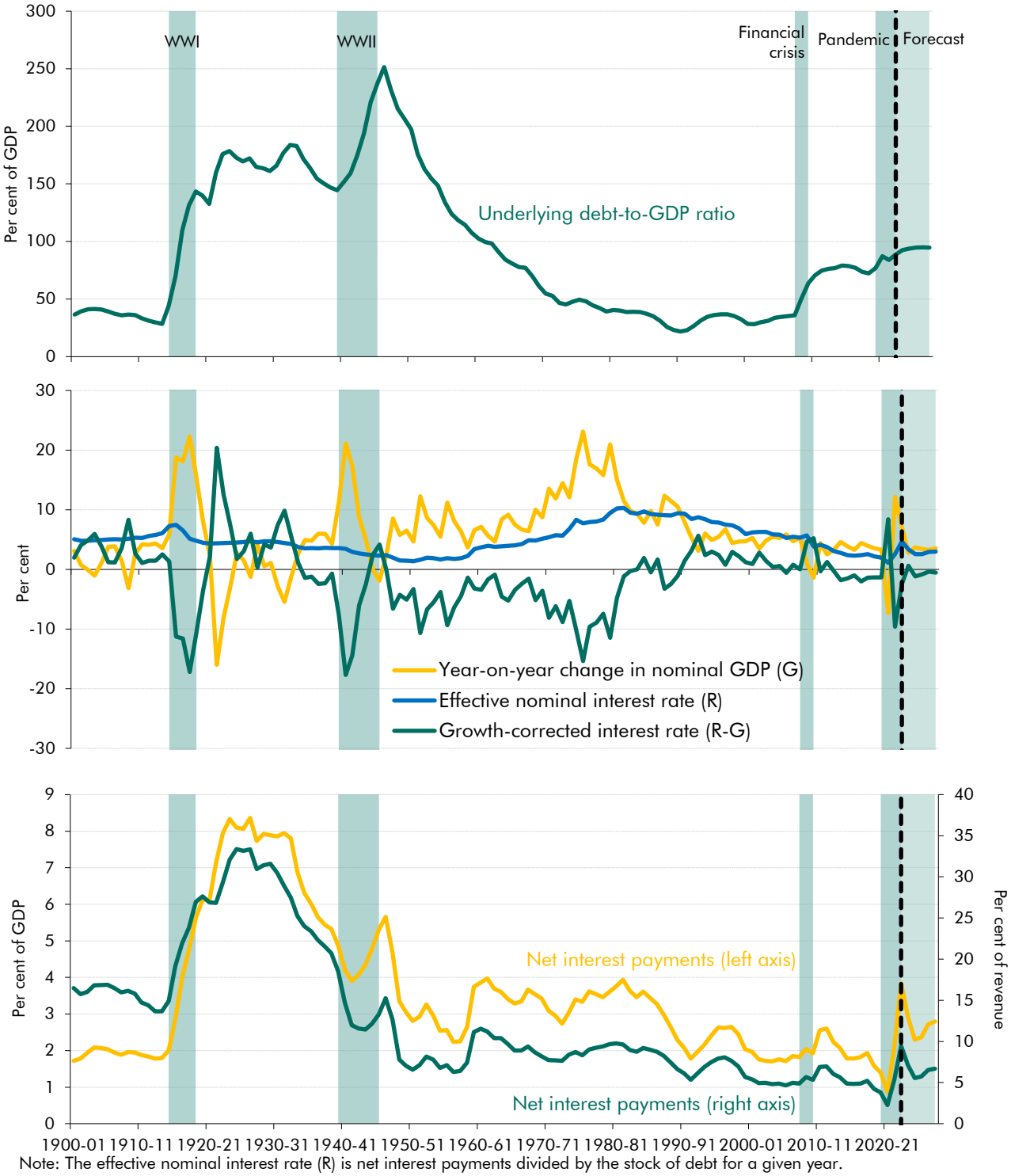
- **Economic trends**. The trend rate of economic growth has slowed and the succession of adverse shocks since 2008 have left lasting scars on both the demand and supply side of the economy. Real GDP grew by an average annual rate of 0.2 per cent between 2020 and 2022, compared to 1.3 per cent between 2008 and 2019 and 2.7 per cent between 1998 and 2007. More recently, interest rates on government debt have risen from below 1 to over 4 per cent over the past year. This has raised effective R-G, calculated using the effective nominal interest rate,[5] from *minus* 1.4 per cent in the five years prior to the pandemic to close to zero as higher inflation and interest rates feed through (Chart 4.1).

- **Geopolitical trends.** The Russian invasion of Ukraine has prompted calls for NATO members to increase defence spending above the 2 per cent of GDP benchmark and rising trade tensions with China and other countries have prompted appeals for a retreat from globalisation and more active state support for strategic industries, as discussed in detail in Chapter 2 of our 2022 *Fiscal risks and sustainability report (FRS)*.

[3] See, for example, IMF, *The liquidation of government debt*, 2015.
[4] 'Effective' R-G has 'R' measured as the effective interest rate, i.e. net interest payments as a percentage of the total stock of debt. The average interest rate on the whole outstanding stock of debt adjusts more slowly than 'marginal' 'R-G', which measures 'R' using the current 10-year gilt rate on the market – i.e. the rate paid on newly issued debt of that maturity. The marginal rate is a measure of where the effective R-G might be heading.
[5] The effective nominal interest rate is net interest payments divided by the stock of debt.

- **Environmental trends.** Rising global temperatures and the spike in European gas prices following the Russian invasion have fuelled calls for governments to facilitate the switch to renewable forms of energy and the transition to net zero carbon emissions, as discussed in more detail in Chapter 3 of this report.

Chart 4.1: UK public sector net debt, growth-corrected interest rate (R-G) and net interest payments

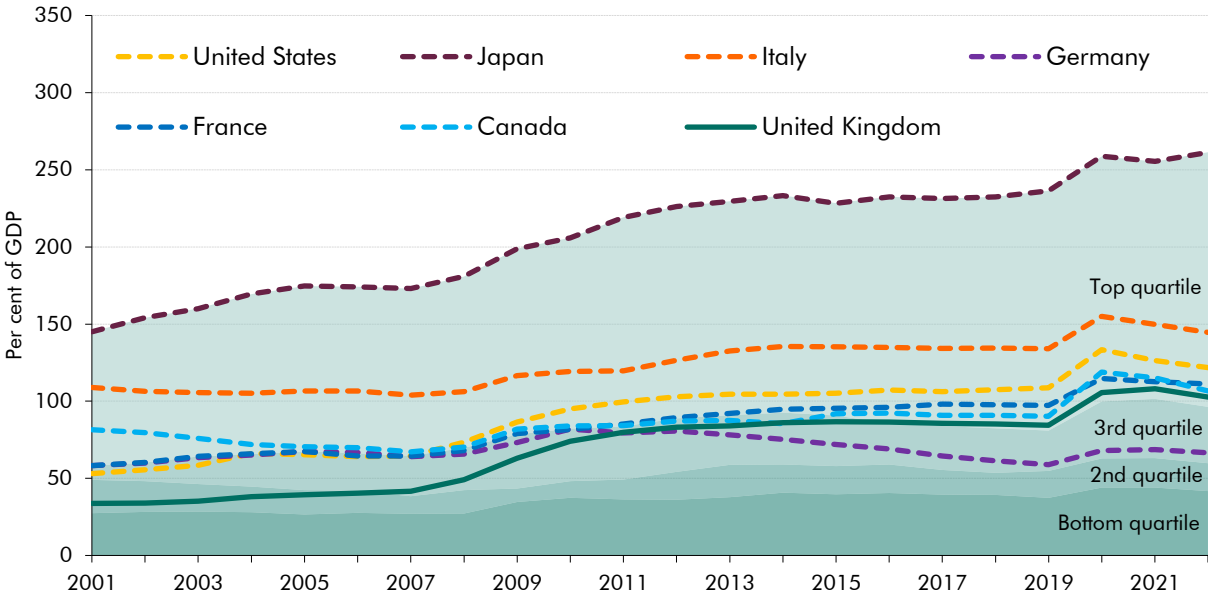


Note: The effective nominal interest rate (R) is net interest payments divided by the stock of debt for a given year.
Source: Bank of England, ONS, OBR

UK debt position and prospects in international context

4.8 The shocks that have driven government debt up in the UK since 2000 have, to some extent, been felt by most other advanced economies. The average debt-to-GDP ratio among 33 advanced economies has risen from a low of 52 per cent of GDP in 2000 to 81 per cent of GDP in 2021. Among the G7 alone, the average has risen from 76 to 131 per cent of GDP. However, the UK's public finances have been particularly hard hit over this period. The UK ended the last century with a debt-to-GDP ratio that was the lowest in the G7 and close to the bottom quartile of advanced economies (Chart 4.2). By 2022, the UK's debt level put it in the top quartile of advanced economies, although still the second lowest in the G7.

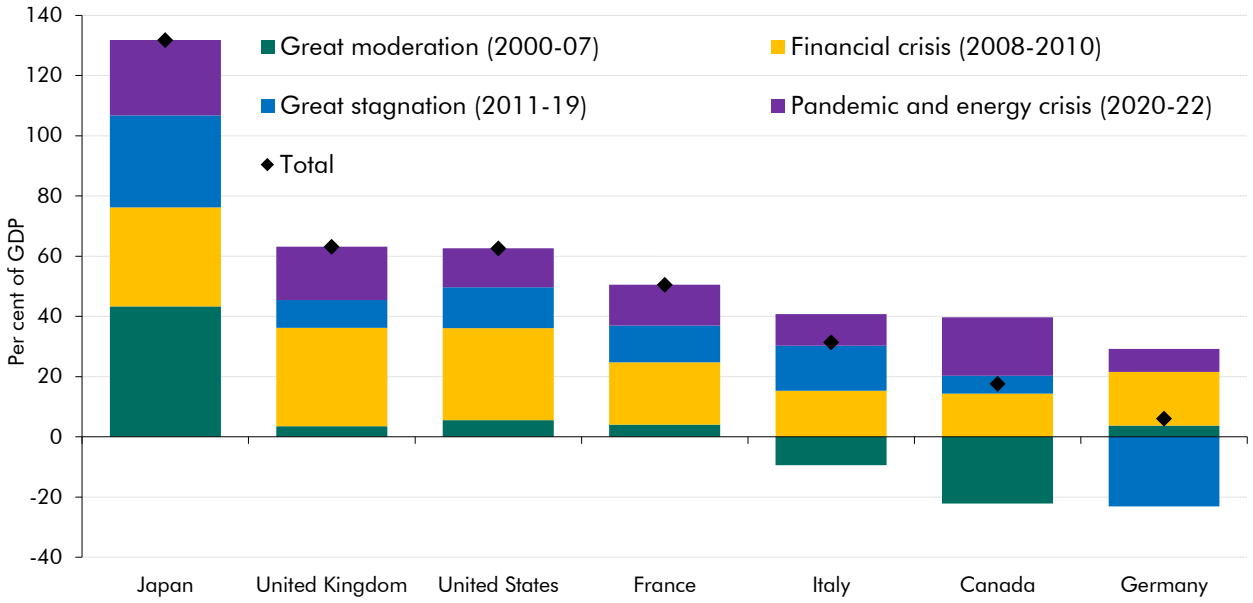
Chart 4.2: International comparisons of general government gross debt



Note: Quartiles representative of OECD member economies. Data for France in 2022 is forecast data.
Source: IMF

4.9 As in the UK, the bulk of the increase in G7 government debt levels since the start of the century occurred in the aftermath of three major shocks: the financial crisis in 2008-10, and the pandemic and energy crises in 2020-22 (Chart 4.3). Only Germany and Canada made effective use of the periods between shocks to significantly reduce their indebtedness. Canada used the period of the Great Moderation (2000-07) to reduce its debt by 22 per cent of GDP, while Germany used the Great Stagnation (2011-19) following the financial crisis to reduce its debt by a similar amount. Overall, since the start of the century, the UK has seen the second largest increase in gross debt in the G7, with four-fifths of this accruing in just six years of crisis and the UK achieving the second fewest years of retrenchment in between (with debt falling in only seven out of the last 23 years).

Chart 4.3: Periods of rising and falling debt in the G7 since 2000



Note: General government debt and nominal GDP data for France in 2022 is forecast data and all other data used is outturn.
Source: IMF

Vulnerability of the current UK debt position

4.10 While stubbornly high levels of debt are a common issue across many major advanced economies, three developments in the structure of UK liabilities have made interest costs respond more rapidly to unexpectedly high inflation, bringing forward the rise in measured interest spending after unexpected price increases, and accelerating the impact of shifts in market sentiment. These include:

- the **increase in the proportion of UK government debt whose value is directly indexed to inflation** (so called 'index-linked gilts' or ILGs);
- the **shortening in the effective maturity of the consolidated liabilities of the UK public sector**, in particular as a result of the quantitative easing (QE) operations of the Bank of England that in effect swaps long-dated gilts for floating rate bank reserves; and
- the **growing share of UK government debt that is in the hands of foreign private investors** rather than domestic private or foreign official investors.

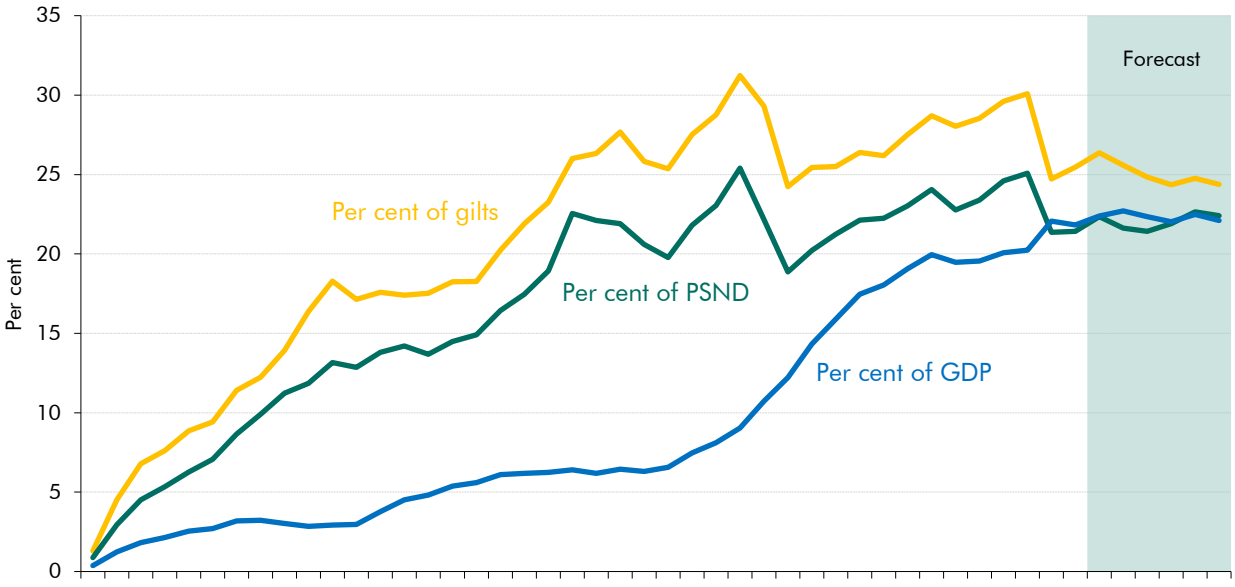
The rising proportion of inflation-linked debt

4.11 Since the last time the UK government had a debt of 100 per cent of GDP, the share whose value is directly linked to inflation has gone from zero to one-quarter, the highest share of inflation-linked debt of any G7 country. ILGs were first issued in the UK in the early 1980s and their share of total UK gilts increased from 16.4 per cent in 1990, to 23.2 per cent by the start of the century, and then sharply to a peak of 31.2 per cent by 2008 (Chart 4.4). A combination of high primary issuance (averaging 23 per cent of total gilt sales in the early

2000s), the increase in the principal owed due to inflation, and the relatively long maturity of ILGs, caused their share of the overall stock of gilts to steadily increase. In 2018, the Treasury estimated that continued issuance at these then-prevailing levels would eventually mean that ILGs made up about 40 per cent of the stock.[6] As this debt has been issued at low real yields it helped to keep the UK's real cost of servicing its public debt low. But when inflation rises, as it has recently, the debt interest cost rises fast.

4.12 Mass issuance of conventional gilts to finance higher deficits during the financial crisis and the pandemic, plus a government decision to reduce ILG issuance (which fell to 10.2 per cent of total primary issuance in 2022-23), means that the share of ILGs in the overall stock of gilts is relatively stable at an average of 25 per cent of the total over our medium-term forecast. While ILGs have reduced somewhat as the share of gilts, the total stock of gilts has risen meaning that ILGs have been stable at around 22 per cent of GDP and so overall interest costs remain highly sensitive to inflation.

Chart 4.4: Share of index-linked gilts in the UK

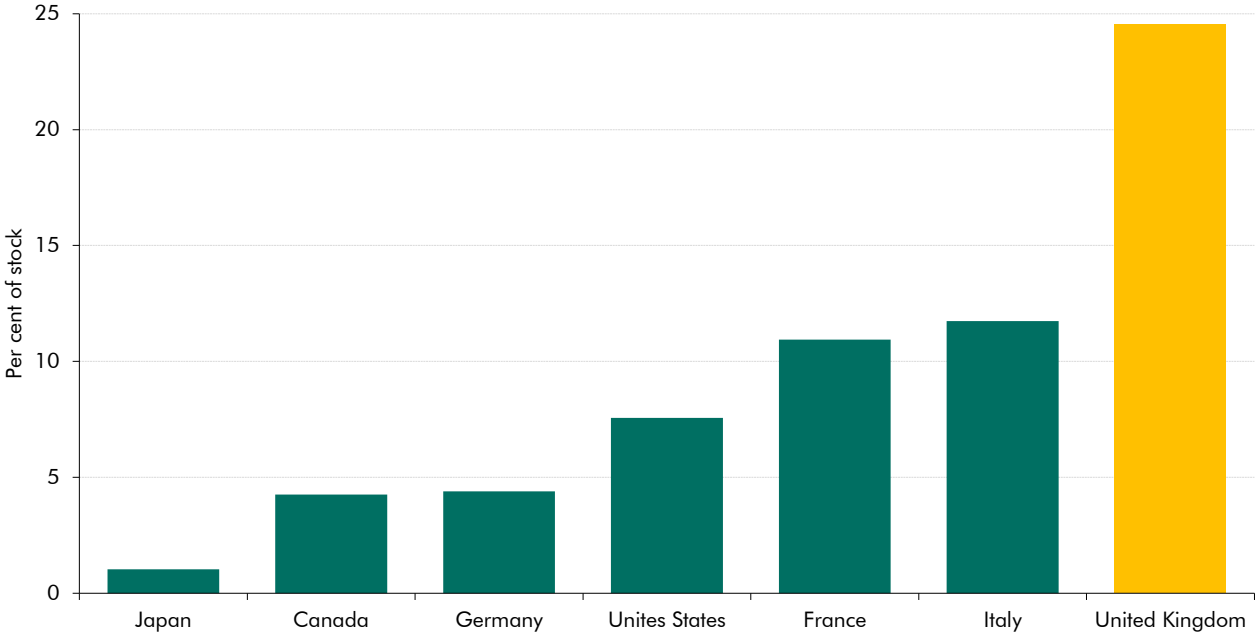


Source: Bank of England, ONS, OBR

4.13 This level of inflation sensitivity in the Government's debt stock is historically unprecedented, as there were no ILGs in issuance when debt was last at 100 per cent of GDP in the early 1960s, and issuance had only just begun the last time annual RPI inflation was in double digits (at 11.9 per cent) in 1981. The UK Government's degree of debt indexation is also unusual among advanced economies. As Chart 4.5 shows, the UK has over twice the proportion of inflation-linked debt than the next largest inflation-linked issuer, being Italy at 12 per cent.

[6] Page 55 of HM Treasury, *Managing fiscal risks: government response to the 2017 Fiscal risks report*, 2018.

Chart 4.5: Index-linked gilt stocks across the G7 in 2023



Source: Bloomberg

4.14 The UK Government's high level of debt and the high share of ILGs meant that the high inflation of the past two years has sharply increased both debt interest costs and the stock of debt itself. Expenditure on central government debt interest (net of the APF) increased by £89 billion (3.4 per cent of GDP) due to the impact of inflation on the interest costs from the stock of ILGs across 2021-22 and 2022-23. This was more than half of total central government interest costs in those years. And while the inflation-linked increase in the principal value of ILGs does not generate an immediate cash outflow (since it is paid in the future when the ILG in question is redeemed), it does cause an immediate increase in the cash value of outstanding debt, and, to the extent that RPI inflation exceeds growth in nominal GDP, an increase in the debt-to-GDP ratio too. With current Government plans consistent with debt remaining high and the stock of ILGs also relatively flat, the comparatively high sensitivity of interest costs to inflation will persist.

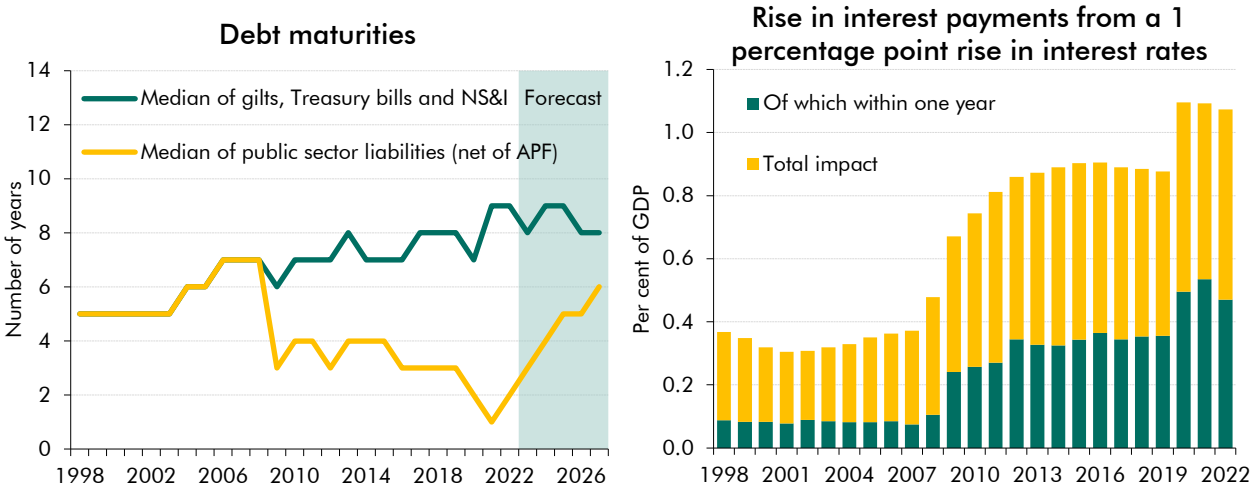
The shortening of the effective maturity of debt

4.15 The average maturity of the net liabilities of the UK public sector has also dramatically shortened since the last time its debt was at 100 per cent of GDP. This is, in large part, a side-effect to the Bank of England's quantitative easing operation which, since 2008, have purchased one-third of all conventional gilts with an average residual maturity of 15 years in exchange for its own central bank reserves. Central bank reserves are perpetual in maturity but carry a floating interest rate (Bank Rate), so in terms of interest rate sensitivity they act like debt that needs to be refinanced every day. As a result, the median maturity of public sector liabilities (that is the time taken for half the stock to respond to interest rate changes), has fallen from about seven years pre-financial crisis to two years by 2022

(left panel of Chart 4.6).[7] As these gilt purchases are reversed under quantitative tightening (QT), the median will begin to increase, potentially reaching six years in 2027 and around eight years when the APF's gilt holdings are eventually all sold. Unwinding the APF will, however, crystallise losses that add to public debt, as discussed in Box 4.1.

4.16 The swapping of longer maturity gilts for floating rate central bank reserves has rendered the net liabilities of the public sector as a whole (consolidating all government debt and the Bank of England's Asset Purchase Facility (APF)) much more sensitive to changes in conventional interest rates.[8] As a result, interest rate changes propagate through to overall debt interest costs much faster than in previous decades. This is shown in the right panel of Chart 4.6, with the impact of a 1 percentage point rise in interest rates within one year increasing by around six-fold from a less than 0.1 per cent of GDP hit to net interest costs at the beginning of the century to about a 0.5 per cent of GDP hit by 2022.

Chart 4.6: Changes in maturity of UK debt stock



Note: Consolidated public sector liabilities are proxied here by the stock of Bank reserves, Treasury bills, NS&I products and gilts net of those held in the APF. The median shows the year in which half of the outstanding public sector liabilities would be impacted by a change in interest rates.
Source: Bank of England, DMO, Herriot-Watt, ONS, OBR

[7] As was outlined in paragraph 4.42 of our 2021 Fiscal risks report (FRR) the simple average, or mean, is often employed when discussing maturities both domestically and internationally. However, this can lead to a misleading picture of the speed of pass-through of interest changes. This is due to governments having debt instruments other than bonds as well as the mean being skewed by the presence of a relatively small volume of very long maturity bonds. Therefore, the median maturity is referenced as it is seen to be more suitable when considering the short-term fiscal risks posed by interest changes.
[8] See paragraph 4.40 of our 2021 *FRR* for more detail.

Box 4.1: The lifetime impact of quantitative easing and quantitative tightening

Since quantitative easing (QE), the purchasing of government debt and other assets financed by the issuance of central bank reserves, was introduced in the wake of the 2008 financial crisis, central banks around the world have made large profits on these interventions. This is because the interest they paid on the reserves that financed QE asset purchases has been lower than the interest received on those assets for much of this period. In the UK, the cash profits of QE were originally retained inside the Bank of England's Asset Purchase Facility (APF), but since the start of 2013 they have instead been remitted to the Treasury. As Chart A shows, up to July 2022, a cumulative total of nearly £124 billion was passed to the Treasury.

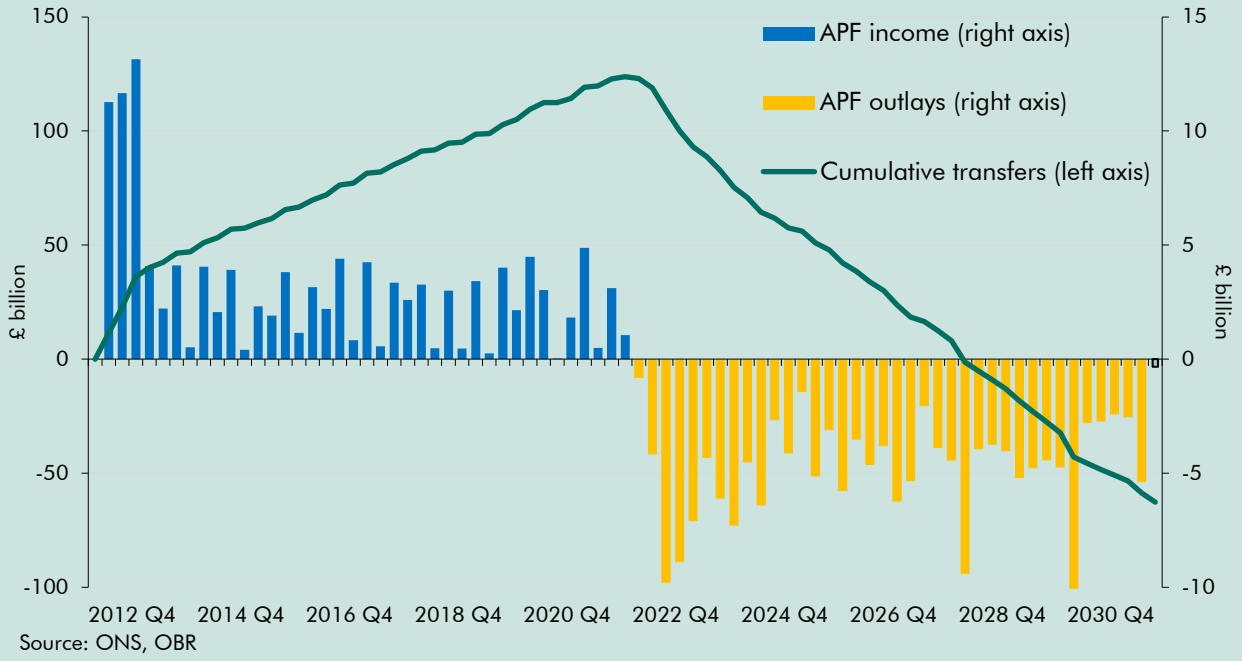
More recently, as Bank Rate and other market interest rates have risen and so market prices for government debt held by the APF have fallen, these profits have turned to losses, which are made good by transfers from the Treasury to the APF. These losses come from two sources:

- **interest losses**, as the variable rate paid on central bank reserves exceeds the fixed rates paid on the assets purchased (mainly gilts); and
- **valuation losses**, as the market value of gilts still held in the APF has fallen below the purchase value. These 'mark-to-market' losses do not crystallise until gilts are sold or redeemed.

From October 2022 to April 2023, £15 billion has been transferred from the Treasury to the APF to make up for losses. Under March 2023 *Economic and fiscal outlook (EFO)* assumptions for Bank Rate and gilt yields, and for a constant £80 billion a year run-off of gilt assets,[a] losses are expected to continue over the remaining life of the APF eventually resulting in a cumulative net loss of £63 billion. The eventual lifetime net position is very uncertain and depends particularly on how gilt prices and Bank Rate evolve over an extended period. As an illustration, between early February when we took market determinants for use in our March forecast and early June, expectations for Bank Rate rose considerably and gilt prices correspondingly fell. Under these conditions overall losses might be £55 billion larger than under March 2023 *EFO* assumptions.

It is important to stress that this narrow summing of the lifetime cashflows associated with QE and quantitative tightening (QT) is not an assessment of the overall fiscal (let alone economic) impact of the QE programme, which supported the economy, asset prices, and financial markets at various points of stress over the past 15 years. The wider economic and fiscal benefits of these interventions would need to be taken into account in any comprehensive assessment of the impact of QE.

Chart A: Forecast of cumulative flows to and from the APF



Source: ONS, OBR

[a] In practice the Bank may not run down the APF in the manner assumed here but instead maintain an elevated level of bank reserves (and gilt assets).

Market demand for gilts

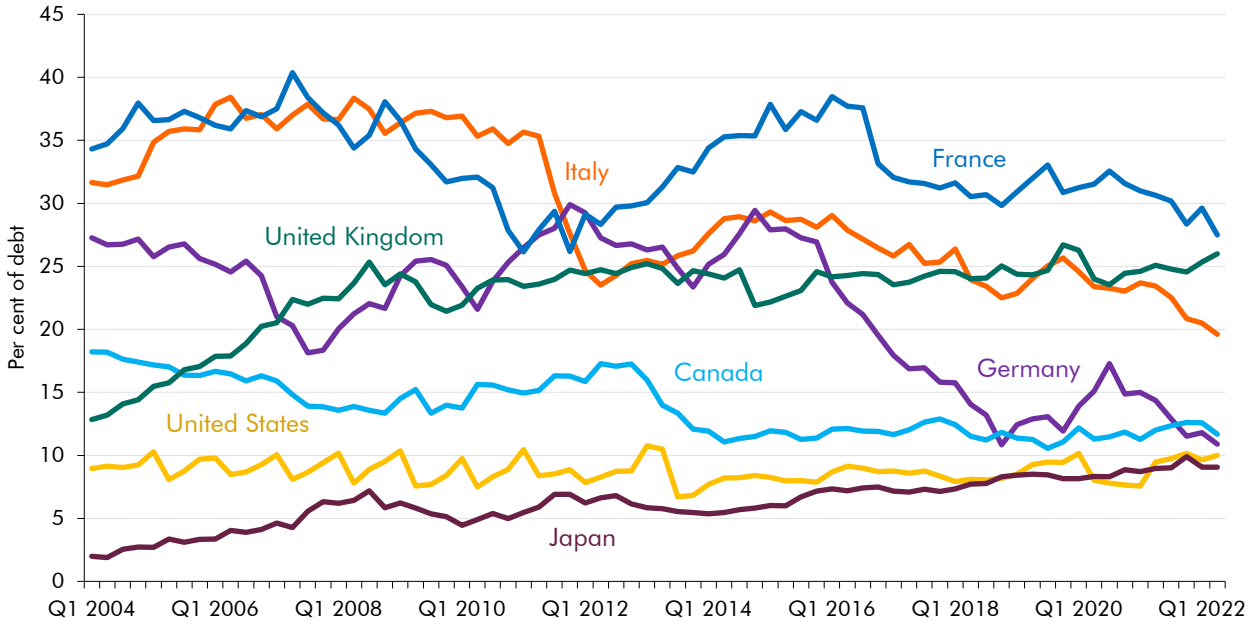
4.17 Over the last two decades, the share of UK sovereign debt in the hands of private foreign investors has doubled and is now the second highest in the G7.[9] The UK Government has historically benefitted from a broad and deep pool of domestic investors for its debt. These principally took the form of institutional investors such as private pension funds and insurance companies, for whom long-dated gilts were a good match for their own long-dated, sterling-denominated pension liabilities. These stable domestic institutional investors kept the share of foreign private ownership in the UK the lowest in the G7 after the US and Japan (Chart 4.7). However, foreign private ownership of UK debt rose significantly in the early part of this century from around 13 per cent in 2004 to 25 per cent in 2022. With the European Central Bank purchasing significant shares of German, French, and Italian government debt in the meantime, this leaves the UK with the second-highest proportion of its sovereign debt in foreign, non-official hands in the G7, behind France.

4.18 While diversifying the investor base beyond a country's borders can help reduce borrowing costs, it can also increase volatility around those costs. That is because governments lose some of the stability associated with the 'home bias' of domestic investors who prefer sterling-denominated assets issued by institutions they are familiar with. Some parts of

[9] Foreign ownership statistics should not be over-interpreted due to measurement issues. For example, some essentially domestic holders of gilts may use an overseas vehicle to hold the gilts and so are registered as foreign. This could be a material factor since LDI-related investments of UK defined benefit (DB) pension funds may account for a substantial part of the rise in foreign ownerships of gilts, although this will decline over time.

foreign holdings of gilts – the part unrelated to the sterling's role as a reserve currency – may prove more sensitive to investor perceptions about relative country risks and prospects than holdings by institutions with sterling liabilities, as is discussed further in Box 4.2. This reflects a natural tendency of institutions with sterling liabilities (such as UK pension funds and many UK insurance companies) to have a more inelastic demand than overseas investors who have a wider range of substitutes for sterling bonds that for them have no inherent currency advantage.

Chart 4.7: Foreign holdings of sovereign debt (excluding foreign official sector)



Source: IMF

Box 4.2: Potential vulnerabilities from a rising stock of foreign-held debt

As the stock of foreign holdings of UK debt has risen this century, so have questions about the risks of increasing, relatively high, levels of these holdings. Foreign privately owned UK debt as a proportion of total debt has almost doubled to 25 per cent since 2004 and is now well above the advanced economy average of 18 per cent.

For many domestic holders, gilts are a natural asset to hold in a portfolio matching and potentially hedging against other sterling assets and liabilities. These holders may therefore be relatively reluctant to move out of gilts, making their holdings less volatile and less sensitive to market movements and sentiment. Overseas holders of gilts are less likely to have a such a structural desire for sterling assets. Instead, gilts are more likely to be seen as just one of a number of government bond assets they hold. As a result, smaller changes in the relative attractiveness of gilts can mean foreign investors quickly switch to other assets in potentially large volumes.

A notable instance of the potential vulnerabilities of foreign ownership of debt manifesting was during the bond market crisis of 1994 when government bond yields rose sharply in a number of countries. The IMF suggests this crisis came about due to a combination of global movements.

The US Federal Reserve raised interest rates as the Bundesbank halted rate rises, potentially leading to pessimism in both markets. This occurred alongside a backdrop of trade disputes intensifying between the US and Japan and bond and equity prices declining in the emerging markets in Asia and Latin America.[a]

The Bank for International Settlements found that international disinvestments appeared to have caused major instabilities in the G7 European economies (France, Germany, and Italy) during 1994. Even when allowing for the relationship between withdrawals and changes in yields, there were sizeable spikes in bond market volatility due to a cumulative withdrawal of foreign investment of nearly $68 billion across the three countries. It has been suggested that foreign investment appeared to be asymmetric, with foreign investors slowly building up holdings of debt but rapidly selling them in periods of stress. By contributing to market volatility, this could mean that benefits of inflows could be outweighed by the drawbacks of outflows.[b]

Evidence of foreign ownership of debt increasing bond market sensitivities was also seen in the aftermath of the global financial crisis of 2007-08. Analysis of the euro area found that in times of crisis domestic investors will typically repatriate funds as foreign investors pull out of the market,[c] with particular evidence found in support of the 'repatriation phenomenon' between 2008 and 2014.[d] The link between private foreign investment outflows and shifts in bond market rates was notable among particularly stressed countries in the aftermath of the crisis. Table A outlines steep declines in private foreign ownership of debt as a proportion of total debt across four stressed EU member states from the final quarter of 2009.

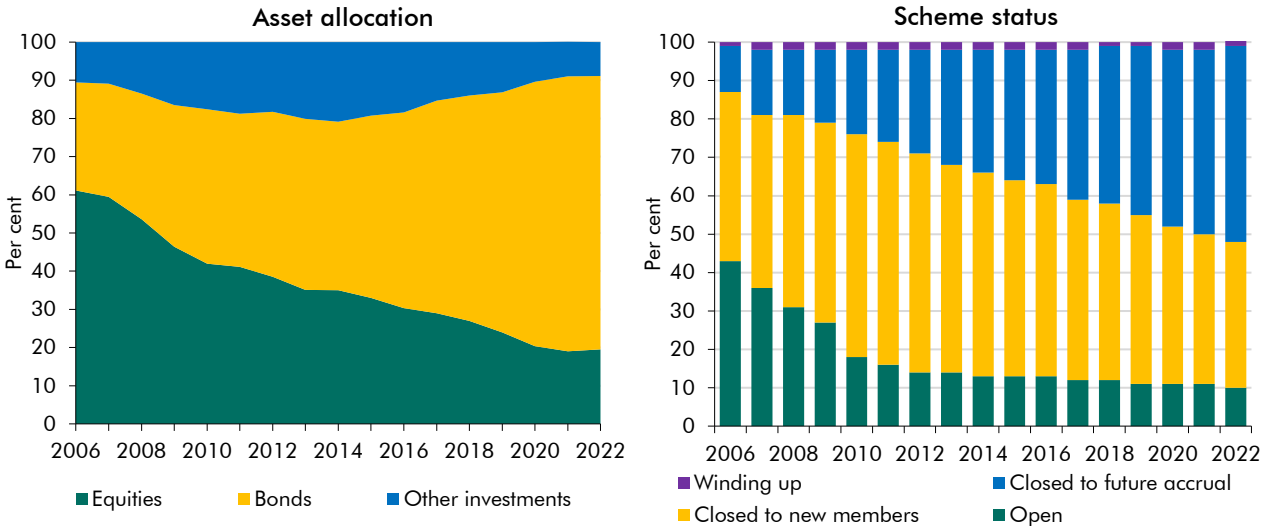
Table A: Changes in private foreign holdings of government debt and 10-year government bond yields

	Time period	Change in private foreign sector holdings as a proportion of total debt (per cent)	Increase in 10-year government bond yields (percentage points)
Italy	Q4 2009 - Q4 2011	-9.2	2.6
Ireland	Q4 2009 - Q4 2011	-27.7	3.6
Portugal	Q4 2009 - Q1 2012	-37.0	9.4
Greece	Q4 2009 - Q3 2012	-54.9	18.7

[a] IMF, *World Economic and Financial Surveys, Chapter 2: Bond Market Turbulence and the Role of Hedge Funds*, 1994.
[b] Borio, C., and R. McCauley, *The economics of recent bond yield volatility*, Bank for International Settlements Economic Papers, 1996.
[c] Broner, F., et al., *Gross capital flows: Dynamics and crises, Journal on Monetary Economics 60*(1), January 2013.
[d] Della Corte, V., and S. Federico, *Two tales of foreign investor outflows: Italy in 2011-12 and 2018*, Banca D'Italia, 2019.

4.19 Defined benefit (DB) pension funds, which had long-term sterling-denominated liabilities, have been major buyers of gilts. DB demand for gilts was strong over the latter part of the previous century as a growing workforce built up entitlements and gilts offered relatively high nominal returns. Over the past two decades, the maturing of DB schemes has seen them shift their portfolios towards bonds (left panel of Chart 4.8). The great majority of schemes are now either closed to new members or closed to the accrual of new pension rights (right panel of Chart 4.8). So, the supply of new inflows is diminishing at the same time as DB members retire and the schemes begin to pay out. This is likely to mean that the share of foreign ownership of gilts is set to remain substantial and, possibly, rising.

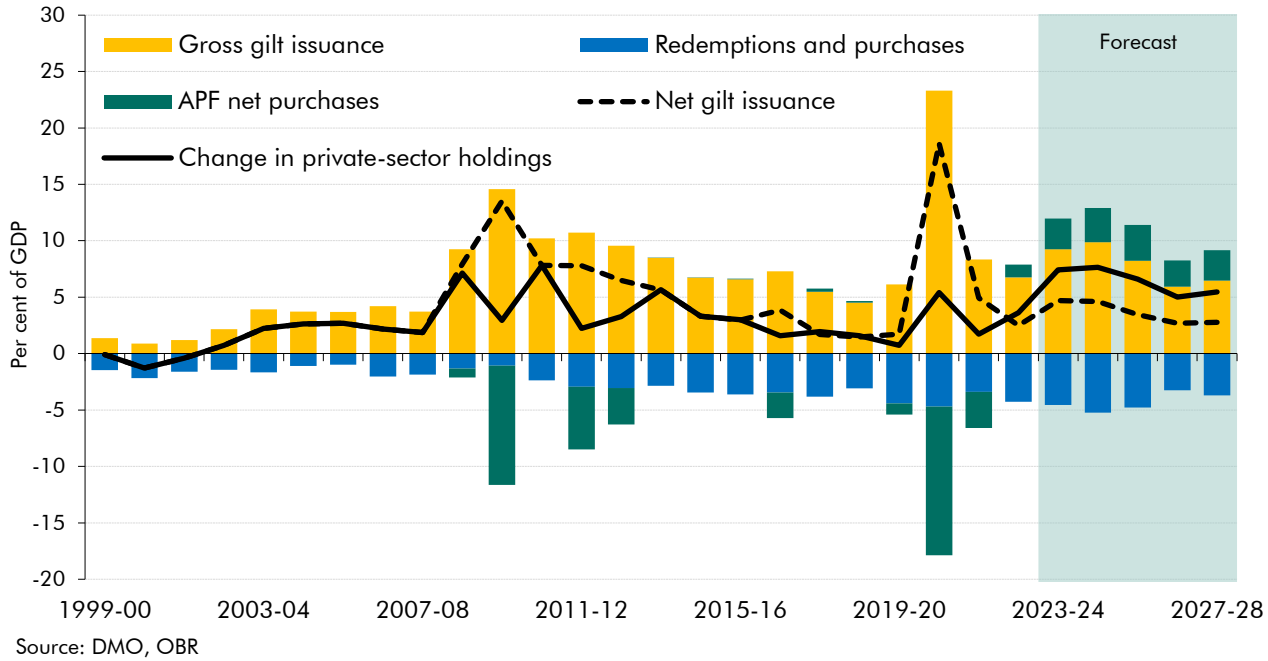
Chart 4.8: Asset allocation and status of UK defined-benefit pension schemes



Source: Pension Protection Fund

4.20 These factors – relatively high foreign ownership and the future steady decline of DB pension schemes – come at a time when the private sector is being asked to purchase elevated levels of gilts. Net issuance (gilts auctioned minus redemptions) has been high since the financial crisis. But much of this has, in effect, been purchased by the Bank of England's Asset Purchase Facility, meaning that on average between 2009-10 and 2022-23 net *private sector* holdings have increased by just 3.2 per cent of GDP a year, up from the average 2.3 per cent in the five years leading up to the financial crisis (Chart 4.9). However, with the APF now a *seller* of gilts and net issuance by government also expected to remain high across the medium term, private sector buyers will need to absorb an average of 6.5 per cent of GDP each year between 2023-24 and 2027-28, more than twice the post-financial-crisis average, and a level not seen since the financial crisis itself.

Chart 4.9: UK gilt issuance and change in private holdings since 1999-00



Source: DMO, OBR

How these debt vulnerabilities manifested themselves

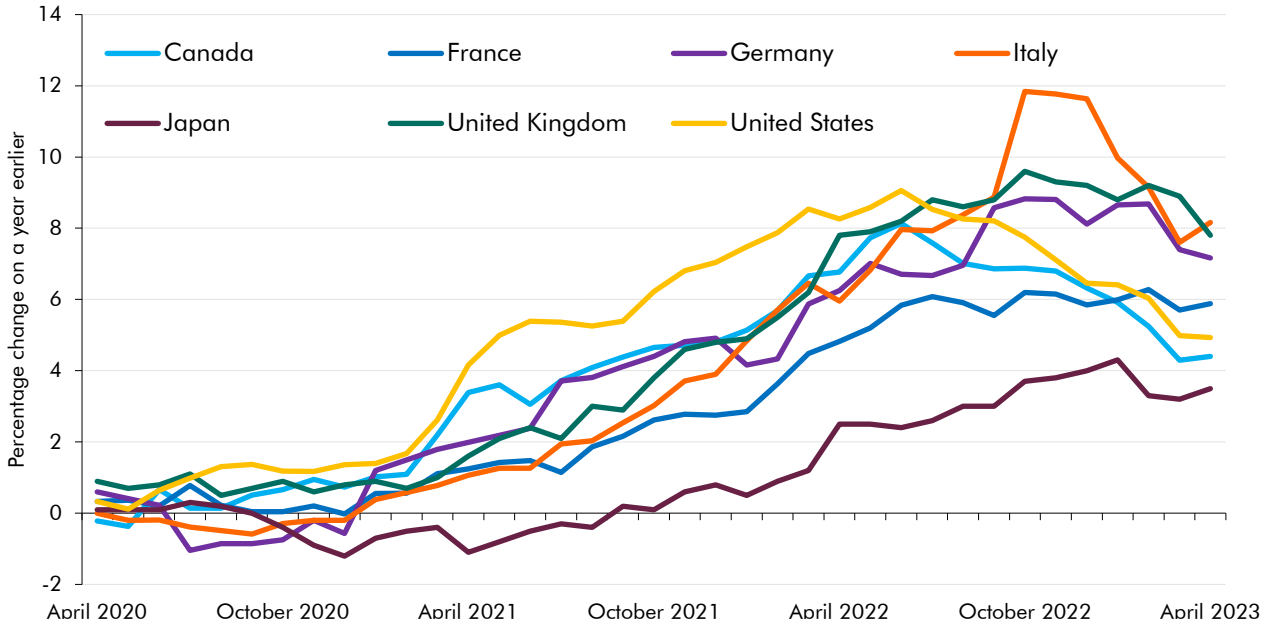
4.21 The greater vulnerability of the UK public debt position has been illustrated by the events of the past year. The heightened exposure of the UK public finances to sudden changes in economic and financial market conditions can be seen from how they have performed in the face of:

- the significant and unexpected **rise in global inflation** since late 2021;
- the sudden **rise in global interest rates** from the middle of 2022; and
- the impacts on the **volatility of UK borrowing costs** over autumn 2022.

Rising global inflation (no more 'free lunch')

4.22 Global inflation began to rise in 2021, initially as economies opened up after the worst of the pandemic had passed, and then faster after the sharp rise in energy costs triggered by Russia's invasion of Ukraine. Inflation peaks differed greatly across economies, not least due to very different exposures to gas prices. Among G7 economies, the UK's peak inflation of 11.1 per cent in October 2022 was second only to Italy's at 11.8 per cent, also in October 2022 (Chart 4.10). However, several smaller European economies were hit even harder, with inflation peaking at 24.8 per cent in Estonia in August 2022.

Chart 4.10: G7 country CPI inflation rates



Source: OECD

4.23 It is a standard trope that higher inflation is 'good' for the public finances, as it enables governments to 'inflate away their debt' without having to take any deliberate policy action. This comes from a variety of sources – primarily a higher (nominal) denominator of the

debt-to-GDP ratio. But higher inflation can also help the numerator if it is driven by wage growth dragging more people and activity into higher tax brackets and thereby boosting tax receipts (a process called 'fiscal drag'). These impacts are often assumed to outweigh the negative fiscal impacts of inflation on (often indexed) tax thresholds, welfare payments, public sector pay, and other inflation-sensitive spending items. And the net positive result of these effects may be greater than the debt interest response, especially when debt maturities are relatively long and if markets believe the higher inflation will be short-lived. IMF analysis suggests that inflation contributed roughly 1.5 percentage points a year to the fall in the debt-to-GDP ratio during debt-reduction episodes (typically lasting five years) across advanced economies from 1979 to 2021.[10]

4.24 However, the rise in global inflation since the pandemic has delivered little net benefit to the UK public finances relative to the inflation surprises of the past. This is partly because this most recent inflation shock has been closer to a pure 'terms of trade' shock, in which the rise in the prices of the things the UK imports and consumes (manufactured goods, energy, and food) has far outstripped the rise in the prices of the things the UK produces and exports (mainly services). Specifically, over the course of 2022:

- **growth in the GDP deflator**, the measure of inflation that determines nominal GDP, was comparatively muted at 5.4 per cent;
- the **rise in average earnings**, which drives nominal growth in income and consumption tax revenues, was 6.2 per cent;
- the value of the coupons and principal due on the Government's **stock of index-linked gilts** rose with RPI, which hit 11.6 per cent, the highest rate in over 40 years; and
- the **value of the state pension and working age welfare benefits** which are indexed to CPI in the year to September, rose by 10.1 per cent.[11]

4.25 The gaps between the annual rates of increase in the GDP deflator and both RPI and CPI were the largest on record (since 1949). Combined with the higher stock of ILGs (which respond to RPI) and the short effective maturity on debt (which has meant interest rate rises have fed through quickly), this has meant the fiscal benefit that the public finances have derived from this latest round of inflation has been muted compared with the more domestically driven inflation shocks of the past century. In fact, 2022 is one of only three peacetime years since the early nineteenth century in which CPI inflation exceeded 9 per cent and debt *did not* fall as a share of GDP.

4.26 Other advanced economy governments with much lower shares of inflation-linked debt have derived a more significant fiscal benefit from higher inflation. Despite experiencing the largest increase in inflation, up to April 2023 among G7 economies, the UK is the only country that is expected to see its debt-to-GDP ratio rise this year. The remaining economies

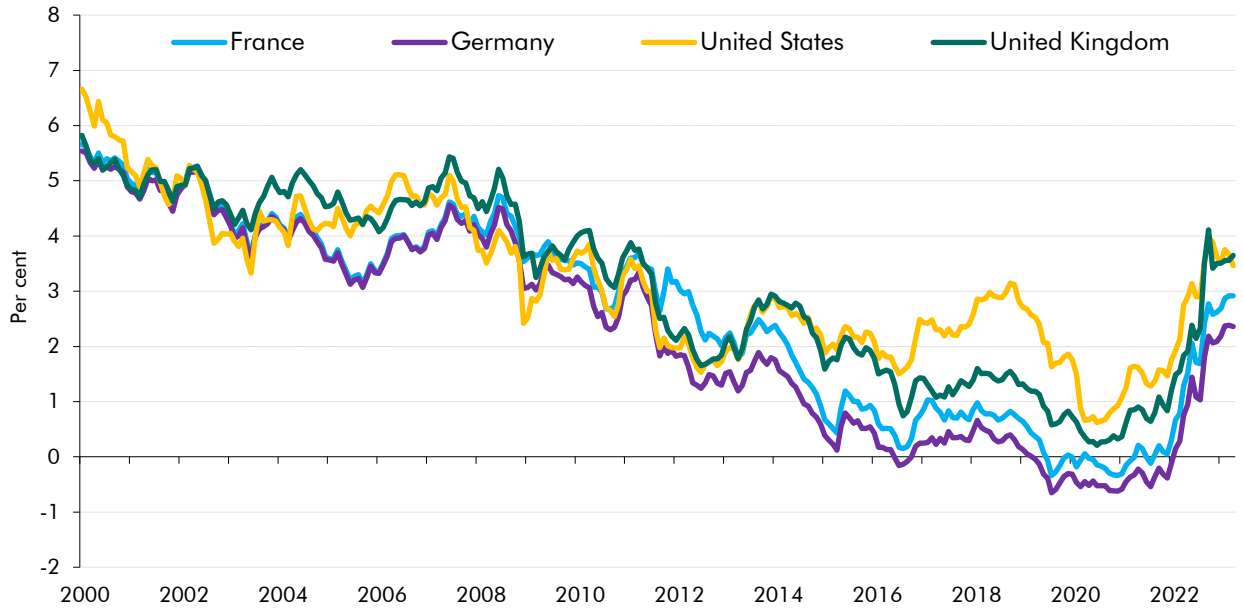
[10] See Figure 3.2 in Chapter 3 of IMF, *World Economic Outlook: A Rocky Recovery*, April 2023.
[11] The state pension and benefits did not rise at this rate until April 2023, when they were indexed to CPI in the year to September 2022.

expect to see their government debt-to-GDP ratios plateau or fall in 2023, and by an average of 7.3 per cent of GDP. Most, including the UK, see their debt begin to rise again by the mid-2020s as the temporary boost to nominal GDP fades but elevated primary deficits and interest rates persist. However, the UK is set to miss out even on this brief respite.

Rising global interest rates

4.27 As central banks responded to the surge in inflation, global interest rates also began to rise in 2022, putting strains on households, businesses, financial institutions, and on the public finances across advanced economies. Between our March 2022 and March 2023 *EFO*s, the Bank of England policy rate rose from 0.75 to 4 per cent and 10-year gilt yields from 1.6 to 3.3 per cent. Abstracting from the volatility around the 'mini-budget' last September, which we discuss in the next section, the rises in interest rates in other major advanced economies were of a similar magnitude, with an average increase in the 10-year bond yields in other G7 governments of 1.2 percentage points over this same period (Chart 4.11).

Chart 4.11: 10-year nominal government bond yields

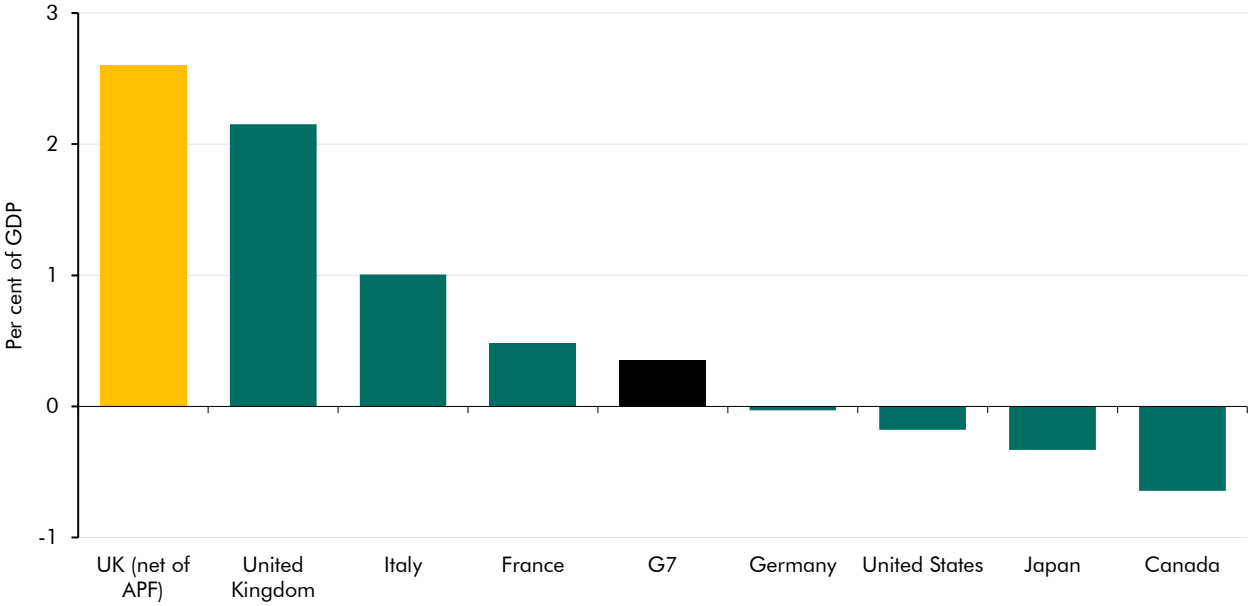


Source: OECD

4.28 However, due to the combination of factors described in the previous section, the UK's public finances have seen a larger and more rapid rise in debt servicing costs than other advanced economies since the pandemic. With a general government debt-to-GDP ratio of 103 per cent in 2022, somewhat below the G7 average of 131 per cent, and a similar rise in interest rates, one might expect the resulting rise in UK government spending on interest costs to be similar to the G7 average as well. Instead, the UK has seen its interest costs rise more than twice as fast as any other G7 country between 2019 and 2022 (Chart 4.12). Over this period, UK debt interest costs rose by 2.6 per cent of GDP net of the APF and by 2.2 per cent of GDP ignoring the rise in interest payments via the APF (a more

internationally comparable measure). By contrast, interest costs fell as a share of GDP in four of the other G7 countries, with increases only seen in Italy (1.0 per cent of GDP) and France (0.5 per cent of GDP). This reflects the much more rapid transmission of any increase in interest rates and inflation through the consolidated liabilities of the UK public sector relative to the debts of other major advanced economy governments.

Chart 4.12: Change in government net interest payments from 2019 to 2022

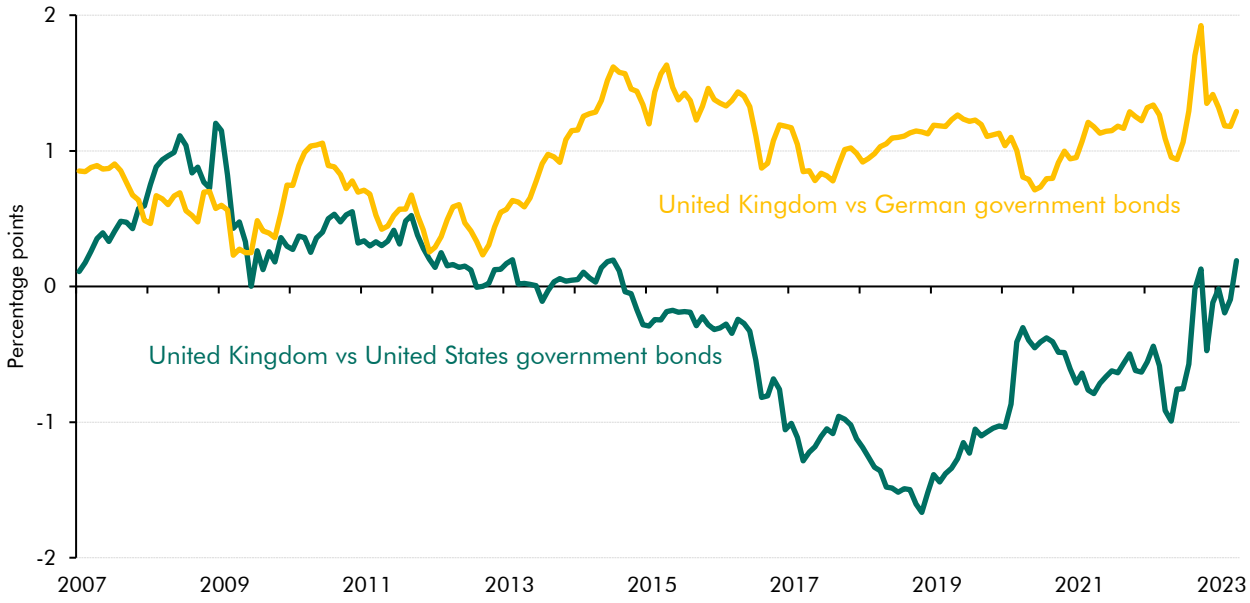


Note: This is on a general government basis.
Source: IMF, ONS, OBR

Greater volatility in UK borrowing costs

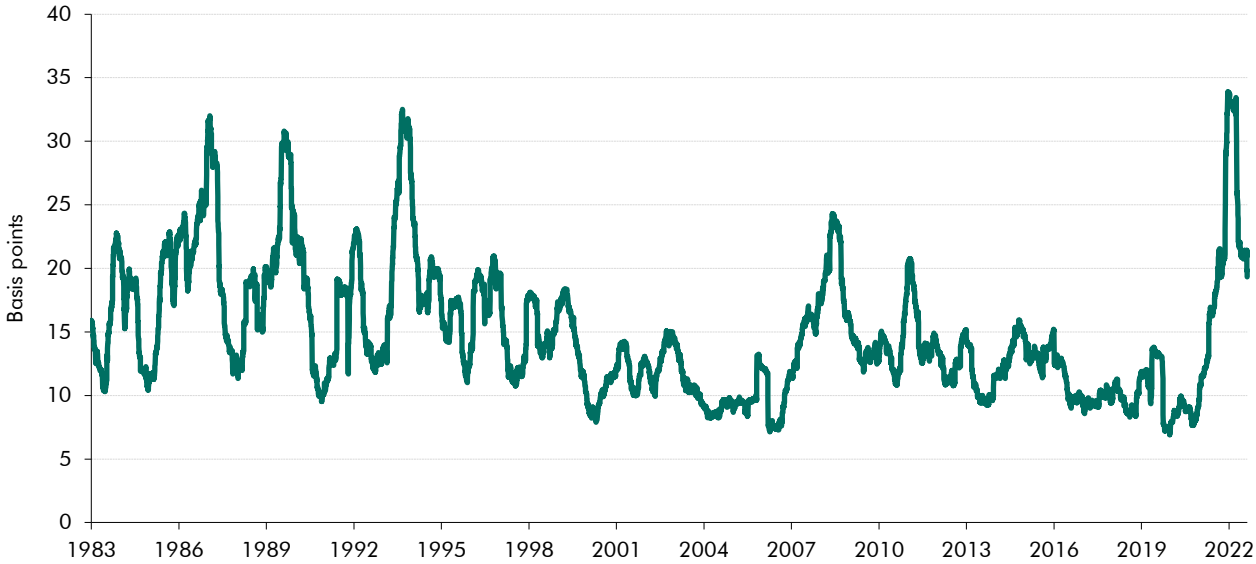
4.29 The current greater sensitivity of the UK's debt interest relative to the past and that of other advanced economies has also been illustrated by the volatility of UK borrowing costs over the past year. UK borrowing costs, as reflected in the 10-year gilt yield, have risen by 2.0 percentage points in the 12 months to 26 June of this year. That is more than any other G7 economy and 1.5 percentage points more than the G7 average of 0.5 percentage points. Spreads between UK government borrowing costs and those of other G7 countries widened initially in the build-up and aftermath of the September 'mini-budget', with a rise of almost 90 and 100 basis points against US Treasuries and German Bunds respectively between June and October 2022 (Chart 4.13). They then both fell back to historic averages following the October reversal of most of the 'mini-budget' measures and the November 2022 Autumn Statement. Spreads against US Treasuries have widened and turned positive once again in April 2023 as markets feared UK inflation would be more persistent than in other advanced economies. The overall volatility of UK government borrowing costs (proxied by 10-year gilt yields) was at its highest rate for at least 40 years in October 2022 (Chart 4.14) and has been elevated compared to other G7 countries.

Chart 4.13: UK government bond spreads vs. the US and Germany in 2022



Source: OECD

Chart 4.14: UK bond market volatility



Note: Bond market volatility is calculated as a rolling 100-day annualised standard deviation of changes in yield on 10-year UK government bonds. A similar approach to calculating bond market volatility is used by the IMF in its October 2008 Global Financial Stability Report.
Source: Datastream

4.30 Market concerns that UK inflation may have become more entrenched have risen since our March 2023 forecast driving expectations of a higher Bank Rate response. Indeed, at 5 per cent, Bank Rate has already been raised 0.9 percentage points higher than the peak in the vintage of market expectations that our March forecast was conditioned on. On 30 June, Bank Rate expectations rose to 5.8 per cent compared to 4.1 per cent during our March forecast in 2023-24, and 10-year gilt rates were on average 62 basis points higher across our five-year forecast horizon. Holding all else equal, these interest rate rises would increase

debt interest payments by £13.7 billion in 2027-28 alone and by a total of £91.5 billion across the medium term (a proxy for what they would add to the cash level of debt in 2027-28). Such large increases in a relatively short time period illustrate how sensitive the fiscal position is to increases in interest rates.

Challenges of getting debt falling

4.31 In recognition of the vulnerabilities associated with their current debt levels, especially in the face of the inevitable future shocks, the UK and many other advanced economy governments have committed to reducing debt as a share of GDP in the coming years:

- The UK fiscal mandate is to have **underlying debt falling in five years' time**, met by a headroom of 0.2 per cent of GDP in our March 2023 forecast.
- The EU's new proposed fiscal rules would require high debt countries to have **debt lower in five years than now** with three-quarters of 27 EU economies, including all major economies, projecting a fall in general government gross debt. The EU as a whole expects member states' debt to fall by 9.1 per cent of GDP on average between 2020 to 2024.[12]
- Other major advanced economies including Australia have committed to **stabilise and reduce debt**, while others including Canada have pledged to **keep debt low relative to other countries**.

4.32 In delivering on these commitments to reduce their indebtedness, the UK and other major advanced countries face a number of challenges:

- **rising interest rates and stubbornly low growth rates** have dramatically altered government debt dynamics relative to the pre-pandemic period;
- this has significantly **increased the primary surplus** (the difference between non-interest revenue and non-interest expenditure) that a government now needs to stabilise the debt-to-GDP ratio;
- there are a range of **demographic, geopolitical, and environmental developments** which are likely to put upward pressure on primary spending and downward pressure on receipts;[13] and
- if the first quarter of this century is any guide, governments need to anticipate, and make provision for, **economic shocks** that are larger, more frequent, and more fiscally costly than those experienced in the latter part of the 20th century.

[12] See Table 41 in the Statistical Annex of: *European Commission Spring 2023 Economic Forecast*, May 2023.
[13] In addition, there are a growing number of other items which do not directly affect borrowing but do push up debt (known as financial transactions).

Worsening interest rate – growth rate differentials

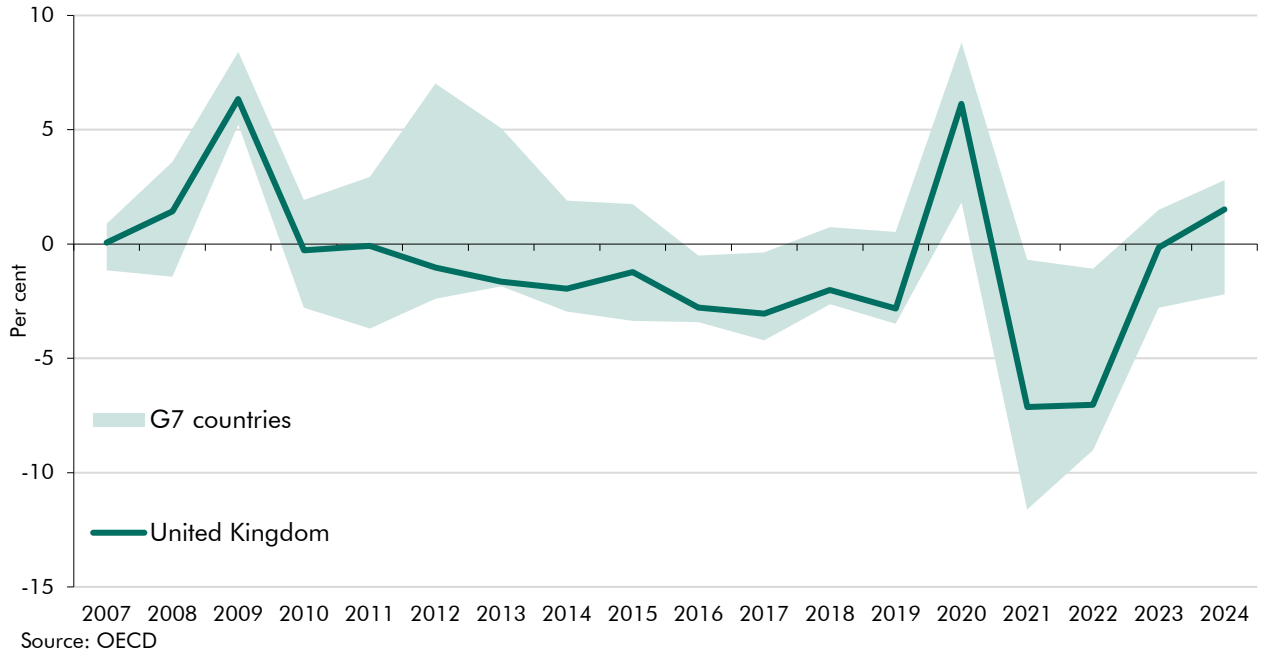
4.33 In additional to its level of debt, a key determinant of a government's debt dynamics is the difference between the interest rate it pays on its debt (R) and the growth rate of its economy (G), known as 'R-G' or the 'growth-corrected interest rate'. The more positive the value of R-G, the more difficult a government will find it to reduce debt as a share of GDP. In the UK and most G7 economies, the effective R-G was significantly negative for most of the period between the financial crisis and the pandemic and reached a 42-year low in the aftermath of the pandemic in 2021-22, helping to restrain the rise in the debt-to-GDP ratio.[14]

4.34 In the past year, rises in global interest rates have turned the marginal R-G from negative to positive for the UK and most other advanced economies (Chart 4.15). In the UK, marginal R-G (using 10-year gilt rates) went from *minus* 2.4 per cent on average over the five years prior to the pandemic to *plus* 1.5 per cent in 2024 based on market expectations.[15] This 3.9 percentage point turnaround is more dramatic than in any other G7 country, which on average saw a 2.3 percentage point change. This change has pushed effective R-G towards zero and this measure will continue to rise over time as more of the debt stock is affected. The resulting higher interest charges will put upwards pressure on debt unless offsetting fiscal action is taken.

4.35 Such a high positive marginal R-G, if persistent, would be unusual in the UK, with only the early 1990s persistently at this level since the Second World War.[16] These unusually high rates, by the standards of the past 20 years, have led many, including the IMF,[17] to argue that rates will return towards pre-pandemic levels. However, while this would significantly relieve pressure on the public finances it is very far from certain. Our analysis shows that a positive effective R-G has contributed to rising debt in five of the past 12 decades.[18] Further, it should be remembered that while global R-G may turn negative this does not mean that all countries will benefit. While over the ten-year period preceding the pandemic the UK had negative R-G in almost all years, this was not true of 12 out of 32 advanced economies, including France and Italy.

[14] 'Effective' R-G is calculated using net interest payments divided by the stock of debt. When interest rates change suddenly this effective rate may significantly lag the 'marginal' R-G which is calculated using the market rate of interest which feeds through to the stock of debt as each instrument matures and rolls over onto the new market rate.
[15] This is based on the OECD's *Main Economic Indicators* dataset.
[16] See Chapter 4 of our 2021 *FRR*.
[17] See IMF, *World Economic Outlook: A Rocky Recovery*, April 2023.
[18] See Chapter 7 of our 2019 *FRR*.

Chart 4.15: International comparisons of the growth-corrected interest rate



Source: OECD

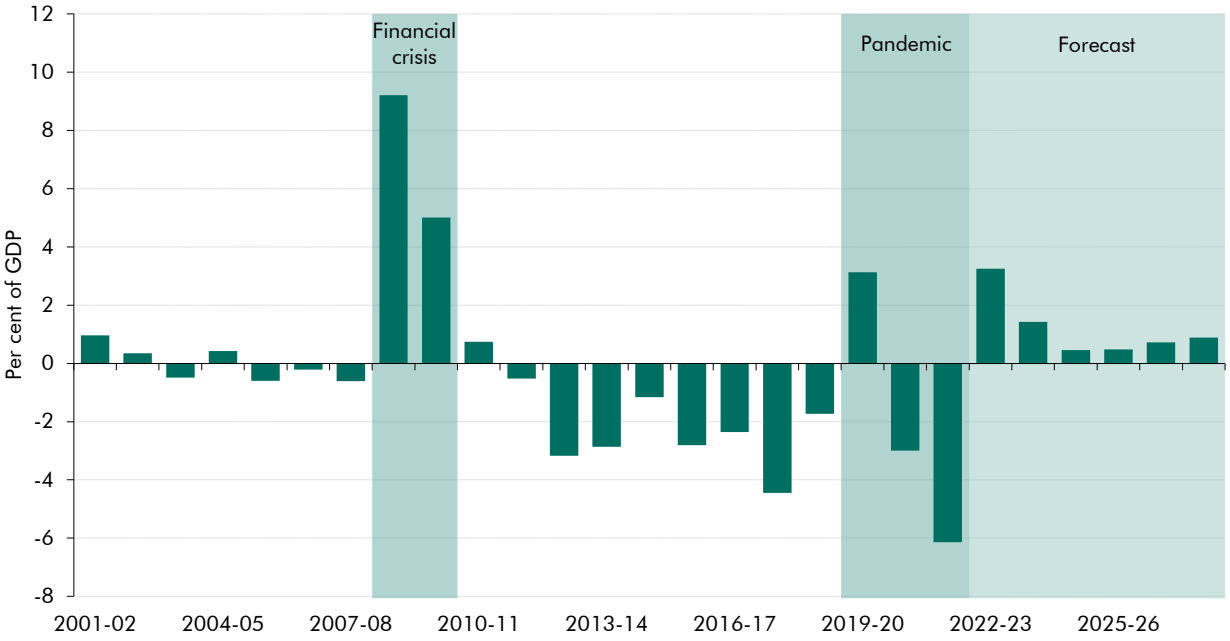
A rising debt-stabilising primary balance

4.36 If sustained, the sudden reversal in marginal R-G means that the UK and other advanced economy governments will need to run a tighter fiscal policy in future just to keep debt 'standing still'. As outlined in Box 5.1 of our March 2023 *EFO*, it has become more challenging for successive Chancellors to put debt on a falling path. This reflects a combination of weaker growth prospects, increasing interest rates, the greater severity of adverse shocks, and small headroom in meeting fiscal targets. The balance between total government revenue and primary (non-interest) spending that is sufficient to keep debt from rising as a share of GDP for a given level of the debt stock, interest rates, and growth rates is known as the debt-stabilising primary balance. The debt stabilising primary balance is also seen as a measure of the degree of 'fiscal effort' required to keep debt under control.

4.37 In the UK, the rise in effective R-G over the past year has pushed the debt-stabilising primary balance up from a *deficit* of 2.5 per cent of GDP in the five years prior to the pandemic to a *surplus* of 0.9 per cent of GDP in 2027-28, the final year of our March 2023 forecast (Chart 4.16).[19] Moreover, the debt-stabilising primary balance is in surplus in every year of the forecast, meaning the degree of sustained fiscal effort required to stabilise debt is at its highest since the OBR was created (excluding crisis periods). The even larger primary surpluses of 3.3 and 1.4 per cent of GDP required to stabilise debt in 2022-23 and 2023-24 largely reflect higher RPI inflation relative to the GDP deflator in those years.

[19] This was calculated for the underlying debt-to-GDP ratio (excluding the Bank of England).

Chart 4.16: Historical estimates of the UK's debt-stabilising primary balance



Source: ONS, OBR

Growing baseline pressures on borrowing

4.38 In addition to the long-term fiscal pressures discussed in the next section of this chapter, there are a host of medium-term tax and spending pressures that will make delivering this turnaround in the primary balance more challenging over the next five years. Based on our March 2023 forecast, the Government plans to turn a primary deficit of 2.2 per cent of GDP in 2023-24 into a primary surplus of 1.1 per cent of GDP in 2027-28. This 3.3 per cent of GDP turnaround is achieved by increasing taxes by 0.8 per cent of GDP and reducing primary spending by 2.5 per cent of GDP. The delivery of this turnaround in the primary balance is at risk on both the tax and spending sides.

4.39 Some of these risks come from areas where governments have a track record of failing to implement their stated plans for tax and spending, including:

- the **increase in tax revenues assumes an increase in fuel duty that has not been delivered in practice** in any year since the OBR has been in existence and the cancellation of which would cost 0.1 per cent of GDP or £4.0 billion a year; and

- around half of the reduction in spending (1.3 per cent of GDP or £37 billion) relies on **departmental expenditure limits (DEL) in the three years beyond the current Spending Review rising by less than nominal GDP**. Plans for reducing DEL spending as a share of GDP in years beyond Spending Reviews have been common across our forecasts but governments have been less successful in outturn, with DEL budgets being 'topped up' by an average of around 1.5 per cent of GDP at the November 2015 and October 2021 Spending Reviews.

4.40 Other pressures include areas where the Government has stated ambitions, but made this conditional such as:

- **making the 100 per cent capital allowances permanent** – these currently expire in March 2026, which would cost around 0.3 per cent of GDP, or approaching £10 billion a year;
- **increasing defence spending** from the NATO benchmark of 2 per cent of GDP to 2.5 per cent of GDP which could cost around an additional £13 billion a year in today's money; and
- **the return of Official Development Assistance spending to 0.7 per cent of GNI** (announced by the then Chancellor in July 2021) when a sustainable current budget surplus was achieved and underlying debt was falling, and that this target would be reviewed each year for the following financial year. In our latest forecast the current budget was in surplus and debt was falling in the final year, implying that the target may be reviewed in the late 2020s.

Scale and likelihood of future shocks

4.41 In addition to these well understood pressures, the experience so far this century has underscored the fiscal risks arising from unexpected shocks. Our median forecast does not assume that any new shocks hit since these are low-probability events in any given year. But shocks – whose fiscal effects have historically been skewed to the downside – will come and so public debt is likely to be higher than our median forecast implies.

4.42 The impact of these shocks on debt depends on their size, their frequency, and the fiscal policy response to them. Based on analysis of the UK's past shocks after the Second World War, and IMF estimates of the average impact of such shocks internationally,[20] we have previously assumed that shocks occur on average every nine years and add about 10 per cent of GDP to debt. But there are signs in recent years that the fiscal consequences of shocks are becoming more severe. If shocks continue at the severity we have seen so far this century, where shocks have occurred around every decade and increased the debt-to-GDP ratio by over 50 per cent of GDP, the average impact of shocks on debt would more than double to 25 per cent of GDP each decade compared to 10 per cent of GDP every nine years.

Overall risks to the medium-term baseline forecast

4.43 The inevitability of future shocks and the tendency to accommodate at least some of the upward baseline pressures on borrowing means that a risk-adjusted path for public debt would be higher than a median path conditioned on current policy (which is the basis of our forecasts, as required by Parliament). In light of this, if the Government wanted debt not to rise as a share of GDP *ex post*, it would need to plan for it to fall significantly *ex ante*.

[20] See paragraph 4.73 of our 2022 *FRS*.

Making a provision for external fiscal shocks of a similar intensity as we have witnessed so far this century would call for an *ex ante* fiscal stance that had the debt-to-GDP ratio falling by 12 per cent of GDP over a given five-year period or 2.5 per cent of GDP a year on average. Making provision for just the likelihood of DEL rises at future Spending Reviews and a lack of indexation of fuel duty would require a smaller but still significant 1.6 per cent of GDP a year fiscal adjustment elsewhere to prevent debt from rising.

Updated long-run debt projections

4.44 The medium-term outlook for UK debt has changed substantially over the course of the year since we produced out last long-term fiscal projections in the July 2022 *FRS*. Interest rates have risen sharply, inflation has reached its highest level in 40 years, and the Government has improved the medium-term primary balance in response to these and other changes to keep debt from continuing to rise in the medium term. The ONS has also produced an updated set of population projections taking account of the latest news on migration. In light of all these significant changes in underlying determinants, we have undertaken a limited update of our long-term projections reflecting these developments but not updating fully for all aspects of policy or all of the detailed components of tax and spending. A more complete update would not change the projections or our conclusions significantly.

Key assumptions underpinning the projections

4.45 The jumping-off point for these long-term projections is the latest medium-term estimates for 2027-28 from our March 2023 *EFO* fiscal forecast. Relative to our *FRS* 2022 projections, these had higher primary spending and debt interest payments which were partially offset by higher receipts. This lowers the deficit by 0.8 per cent of GDP in 2027-28 and is now at 1.1 per cent of GDP but leaves debt higher by 15 per cent of GDP at 97 per cent of GDP, largely due to higher net interest costs (as shown in Tables 4.1 and 4.2). These starting conditions are then projected forward by a similar methodology to previous years' long-term projections.[21] Three of the main assumptions in these projections – for interest rates, population growth, and for the triple lock – have been updated.

4.46 As highlighted in our previous long-term projection updates, the size, age and composition of the population is one of the main drivers of the long-term fiscal outlook, affecting health care, welfare and pensioner spending. Projections for demographics are determined by birth rates,[22] mortality and net migration assumptions – the latter of which we have revised up in our most recent projections. Last year, we assumed that at the end of our medium-term forecast net migration would settle at 129,000 a year and hold constant over our 50-year projection period. We have increased this assumption in light of emerging outturn evidence and now assume it settles at 245,000 a year in line with the ONS' 2020-based interim projections updated earlier this year.[23] This reduces the young-age and old-age

[21] See Chapter 4 of our 2022 *FRS* for full description.
[22] We use the term 'birth rates' in this report to describe what the ONS calls the 'fertility rate'. It is a measure of births per woman aged 15 to 46, therefore the projected number of births is determined by the birth rate and the number of women at these ages.
[23] The latest ONS outturn data show net migration averaged 600,000 over 2022. Just over a third of this was from Ukraine and other humanitarian and asylum routes, for which the outlook remains considerably uncertain. The ONS, drawing on expert advice, has not included these flows estimates in their latest population projections.

dependency ratios,[24] as people of working-age form a higher share of the migrant population (although there are knock-on effects from migrants having children and forming part of the old-age population in later life).

Baseline debt projections

4.47 At the starting point for the projections in 2027-28, public sector net debt (including the Bank of England) is at around 97 per cent of GDP and falls slightly for the first decade in our projection period (Table 4.1).[25] This is largely due to the Government running a primary surplus of 1.1 per cent of GDP in 2027-28 and benefitting from a few more years of primary surpluses before long-run trends begin to dominate. However, debt begins to rise again as a share of GDP from the mid-2030s as age-related spending pressures kick in and interest costs rise. Debt passes 100 per cent of GDP again in the mid-2040s and then rises exponentially to 310 per cent of GDP by 2072-73. This is 31 per cent of GDP higher than we projected at the end of our 2022 *FRS* projections last year (Table 4.2), for the reasons explained below. By contrast, if the Government were able to sustain its more favourable primary balance position of 1.1 per cent of GDP across the projection period, this would instead mean that debt falls throughout to just under 50 per cent of GDP by the projection horizon (Chart 4.17).

Table 4.1: Baseline projections of long-term fiscal aggregates

	Per cent of GDP						
	Estimate[1]		FRS projection[2]				
	2022-23	2027-28	2032-33	2042-43	2052-53	2062-63	2072-73
Primary spending	41.4	39.2	39.5	41.5	44.4	47.5	50.0
Primary receipts	39.4	40.4	40.0	39.7	39.4	39.6	39.6
Primary deficit	2.0	-1.1	-0.5	1.8	5.0	7.9	10.4
Net interest	4.1	2.8	2.7	3.5	5.3	8.3	12.7
Total managed expenditure	46.8	43.4	43.7	46.5	51.1	57.2	64.1
Public sector current receipts	40.7	41.7	41.4	41.2	40.8	41.0	41.0
Public sector net borrowing	6.1	1.7	2.2	5.3	10.3	16.2	23.1
Public sector net debt	101	97	89	95	133	206	310
Public sector net financial liabilities	88	86	77	83	123	198	302

[1] Estimates are consistent with the March 2023 *Economic and fiscal outlook*.

[2] Projections do not account for the replacement of the rolling out of vehicle excise duty for petrol and diesel vehicles.

[24] For a more in-depth discussion on old-age and young-age dependency ratios, see paragraph 4.17 of our 2022 *FRS*.

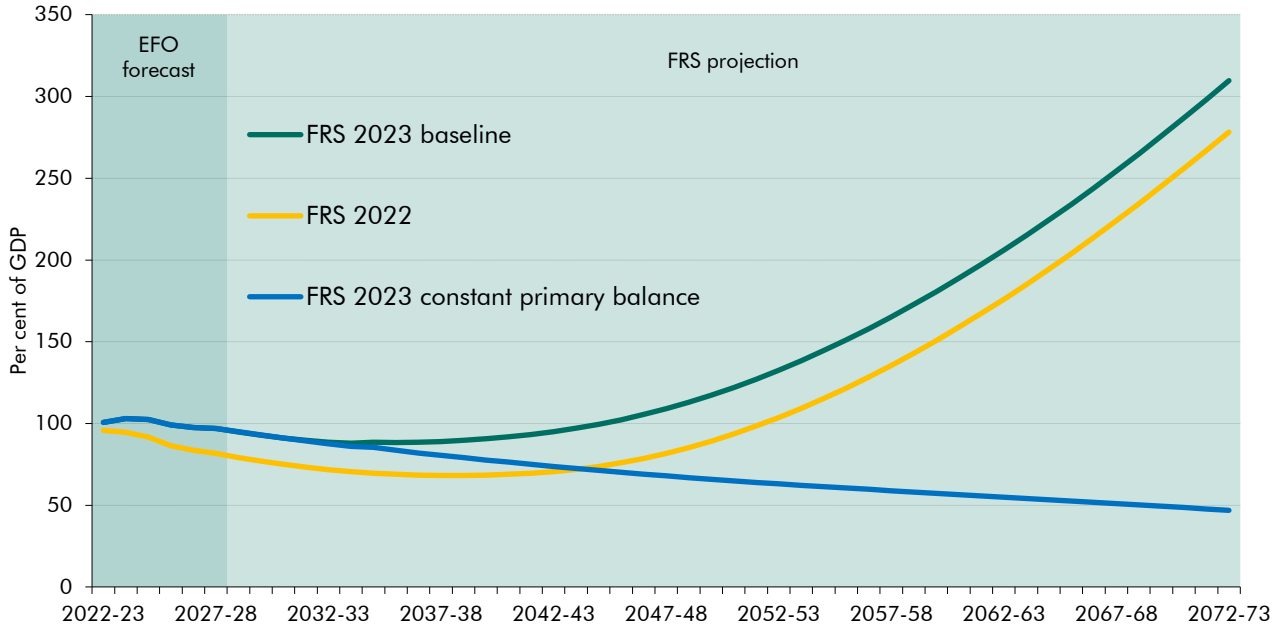
[25] Our long-term projections for debt are for the headline measure of debt, i.e. including the Bank of England.

Table 4.2: Changes to long-term fiscal aggregates since *FRS 2022*

	Per cent of GDP						
	Estimate[1]		FRS projection				
	2022-23	2027-28	2032-33	2042-43	2052-53	2062-63	2072-73
Primary spending	2.3	0.8	1.0	1.1	1.2	1.2	1.5
Primary receipts	1.2	1.6	1.9	2.1	2.3	2.4	2.4
Primary deficit	1.1	-0.8	-0.8	-0.9	-1.1	-1.2	-0.9
Net interest	1.2	1.7	2.1	2.8	2.7	2.8	3.2
Total managed expenditure	3.6	2.5	2.8	2.8	2.9	3.0	3.6
Public sector current receipts	1.2	1.7	1.5	0.9	1.3	1.4	1.2
Public sector net borrowing	2.3	0.9	1.3	1.9	1.6	1.6	2.3
Public sector net debt	4.8	15.3	16.8	24.5	29.0	30.0	31.3
Public sector net financial liabilities	4.9	13.9	16.2	24.0	29.3	30.8	32.3

[1] Estimates are consistent with the March 2023 *Economic and fiscal outlook*.

Chart 4.17: Long term projections of public sector net debt



Source: OBR

4.48 Relative to last year's *FRS* projections, the main drivers of changes in our projections are quantified in Table 4.3 and include:

- **A more favourable starting primary fiscal position.** By the end of our latest medium-term forecast in 2027-28, the primary balance is 0.8 per cent of GDP higher than we estimated last year, due to underlying improvements in tax from higher fiscal drag and from tightening policy. This has contributed to a 39 per cent of GDP *reduction* to debt by the end of our projection period.

- **A less favourable starting level of debt.** By the end of our latest medium-term forecast in 2027-28, the debt-to-GDP ratio is 15 per cent of GDP higher than we estimated last year largely following increases to the near-term cost of support measures, inflation and net interest spending.

- **Higher nearer-term interest rates.** Past our medium-term forecast period, our assumptions for interest rates are higher than we had assumed last year in our long-term economic determinants. This has resulted in a less negative marginal R-G than we had assumed last year as shown in the left panel of Chart 4.18. This has also significantly increased the effective interest rate and effective R-G relative to our *FRS* 2022 projections (middle and right panel of Chart 4.18) as higher marginal gilt rates feed through the stock of new issuance. Compared to last year's projections, this has increased the cost of debt servicing by 3.2 per cent of GDP at the projection horizon to 12.7 per cent of GDP (see Table 4.2). Overall, the less favourable marginal R-G contributes to a 36 per cent of GDP increase in debt by the projection horizon.

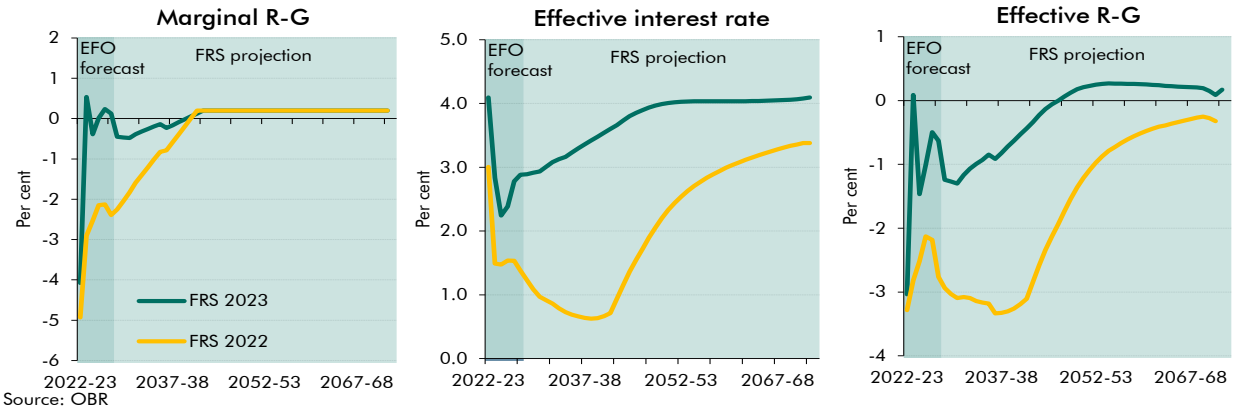
- **Triple lock changes.** The pension triple lock is expected to be more expensive than we estimated last year. In particular, higher CPI inflation has caused us to revise up our estimate of the long-run 'triple lock wedge' from 0.47 to 0.58 percentage points.[26] The resulting increase in pensions spending contributes to a 0.4 and 8 per cent of GDP increase to the primary deficit and debt respectively by 2072-73.

- **Changes to the demographic composition of the population.** As mentioned in paragraph 4.46, the upward revision to our net migration assumption has led to a fiscal saving for the Government due to new migrants being more likely to be of working age than the resident population. Under the current migration regime, migrants are provisionally assumed to add to employment and GDP at the same rate as residents of a similar age. The resulting benefit to GDP and tax revenue has been slightly offset by an increase in welfare spending on working-age adults and welfare and education spending on migrant children. Overall, the increase in our net migration assumption from 129,000 to 245,000 per year has led to a 1.1 and 30 per cent of GDP reduction in the primary deficit and net debt by 2072-73.

- **Other forecasting changes.** These are largely compositional changes to the structure of borrowing and cause the primary deficit and debt to increase by 0.7 and 41 per cent of GDP respectively by 2072-73.

[26] The 'wedge' is how much higher we project growth in average state pension awards to be relative to our long-term assumption for average earnings growth Our estimate is based on the historical difference between the triple lock and average earnings growth over the period 1991-92 to the end of our latest forecast horizon.

Chart 4.18: Marginal R-G, the effective interest rate and effective R-G



Source: OBR

Table 4.3: Decomposition of changes to the primary deficit and debt in 2072-73 since *FRS* 2022

	Per cent of GDP	
	2072-73	
	Primary deficit	Debt
FRS 2022	11.3	278
Difference	-0.9	31
Forecasting changes	0.3	62
Starting primary deficit	-0.8	-39
Starting level of debt	0.0	15
Triple lock	0.4	8
R-G	0.0	36
Other forecasting changes	0.7	41
Higher migration	-1.1	-30
FRS 2023	10.4	310

4.49 The immediate and permanent change in the primary balance that would be needed to achieve a chosen debt-to-GDP ratio in a given year is a useful metric for considering the implications of the unsustainable path for debt in our baseline projection. This is what we refer to as the 'fiscal gap'.[27] By the end of our medium-term forecast period, we project debt to reach about 100 per cent of GDP, after which it rises to over 300 per cent of GDP by 2072-73. If a government wanted instead to keep debt from rising above 100 per cent of GDP over the long term, this would require a permanent increase in taxes and/or cut in spending of 4.4 per cent of GDP in 2028-29. There is also an alternative, and arguably more realistic, adjustment that estimates the staggered improvement in the primary balance in each decade to reach this level of debt. We estimate this to be a 1.5 per cent of GDP adjustment made to the primary balance every decade. On a like-for-like basis, these figures were 3.6 and 1.3 per cent of GDP in last year's projections.[28]

[27] See paragraph 4.62 of our 2022 *FRS* for a more detailed discussion on fiscal gaps.
[28] We have presented these on a like-for-like basis because in our *FRS* last year, we had only estimated primary balance adjustments for a targeted debt level of 75 per cent of GDP, whereas this year we have re-estimated this for a targeted level of 100 per cent of GDP.

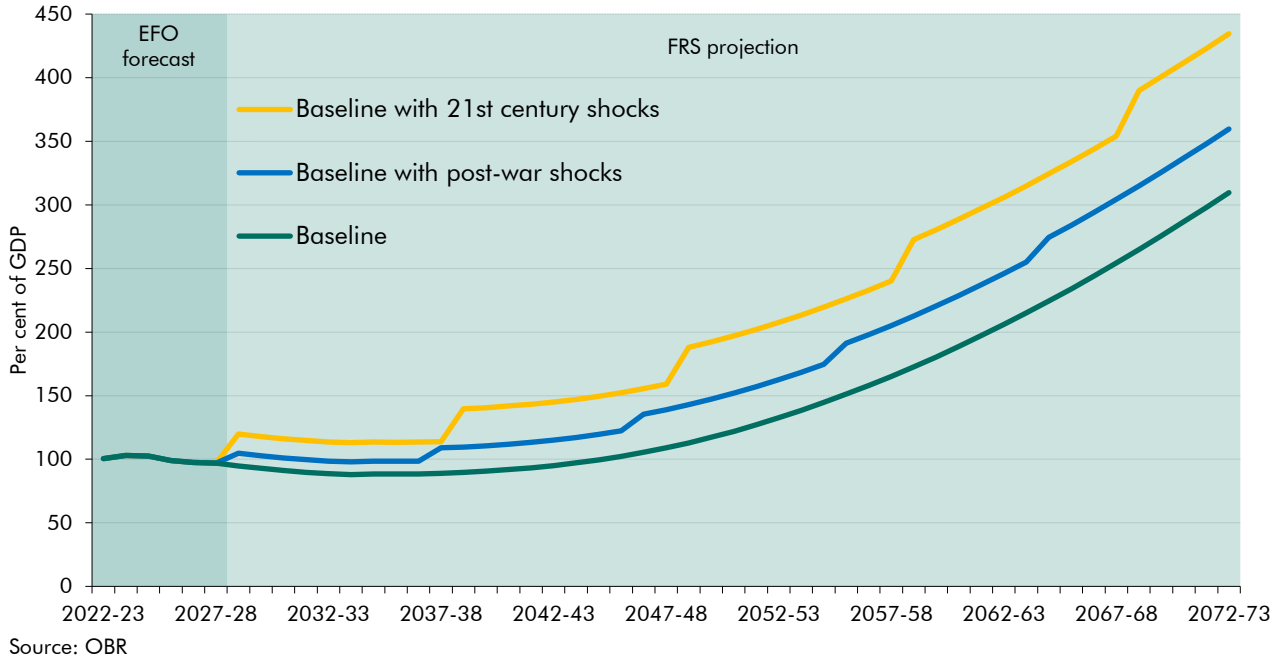
Alternative long-run debt scenarios

4.50 The baseline long-term projection shows debt falling over the late 2020s and early 2030s before picking up again in the late 2030s and then rising exponentially thereafter on an unsustainable path to 310 per cent of GDP. This section explores three main reasons why this already concerning baseline trajectory may yet understate the extent of the pressures that future governments will need to manage. In particular, the baseline projection assumes that: there are no future shocks; the current demanding medium-term fiscal path is achieved; and debt can rise inexorably without affecting interest rates.

Shock scenarios

4.51 As discussed above, shocks have been a major driver of the increase in debt so far this century (see paragraph 4.41). To illustrate their importance from a debt sustainability perspective, in our first set of long-term projections in our 2011 *Fiscal sustainability report (FSR)*, we projected an increase in net debt from 60 to 107 per cent of GDP over the course of a 50-year projection period, a rise of 46 per cent of GDP. In the interim, the shocks of the pandemic and energy crisis, have already added around 15 per cent of GDP to debt in three years, and helped propel its overall level to around 100 per cent this year, 35 years earlier than projected in our initial 2011 projections. Our first set of scenarios thus integrate the impact of these shocks into our long-term baseline projections for debt. We do not make any assumptions about how these shocks occur and what the transmission mechanisms are behind their magnitude but base them on the average frequency and severity of past shocks. In this scenario, debt shocks occur either at the long-run rate and severity of adding 10 per cent of GDP once every nine years that we have previously assumed in our risks work, or at a larger scale of 25 per cent of GDP each decade. With such shocks, debt rises to 360 and 435 per cent of GDP respectively (Chart 4.19).

Chart 4.19: Long-term debt projections with shocks

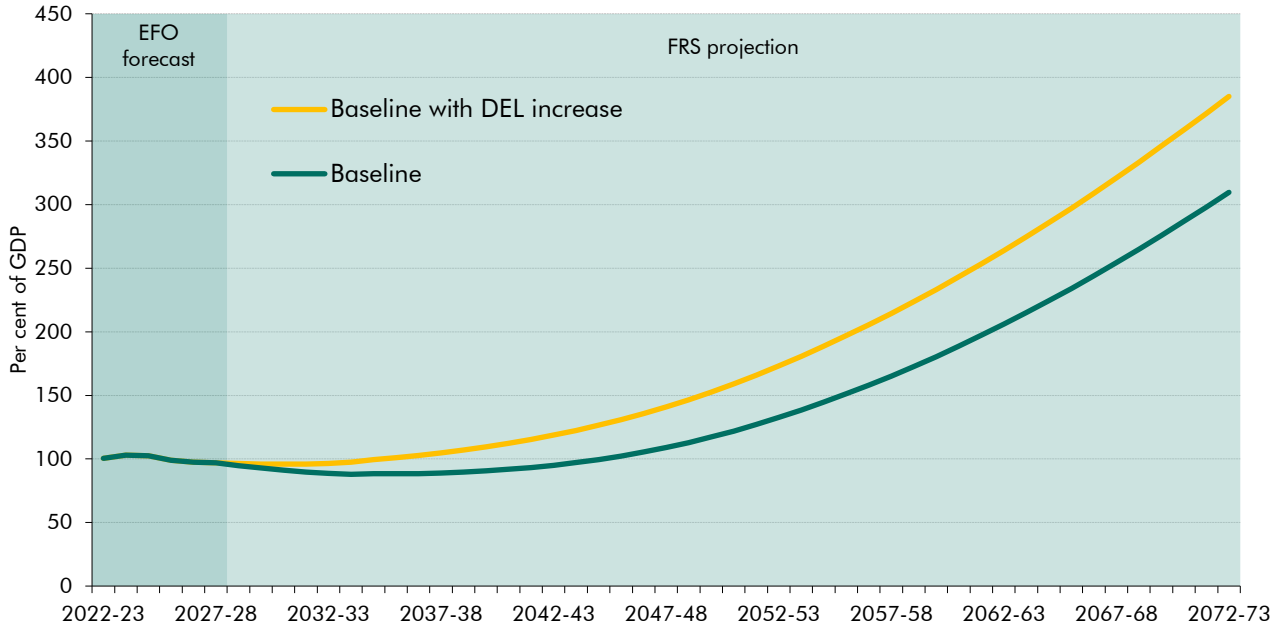


Source: OBR

DEL scenario

4.52 In this scenario, departmental spending is assumed to rise by around 1.5 per cent of GDP in 2028-29, in line with increases to DEL in the run-up to the two most recent multi-year Spending Reviews (as mentioned above in paragraph 4.39). This reduces the primary balance by about 1.5 per cent of GDP and we assume there is no adjustment to the level of taxes in response to this so this lower level of primary balance persists. This causes an initial hit to debt of around 1.5 per cent of GDP, but over time, the cumulative impact on debt of this initial fall in the primary balance builds up to 75.4 per cent of GDP across the projection period and debt peaks at 385 per cent of GDP by 2072-73 (Chart 4.20).

Chart 4.20: Long-term debt projections with higher starting DEL spending



Source: OBR

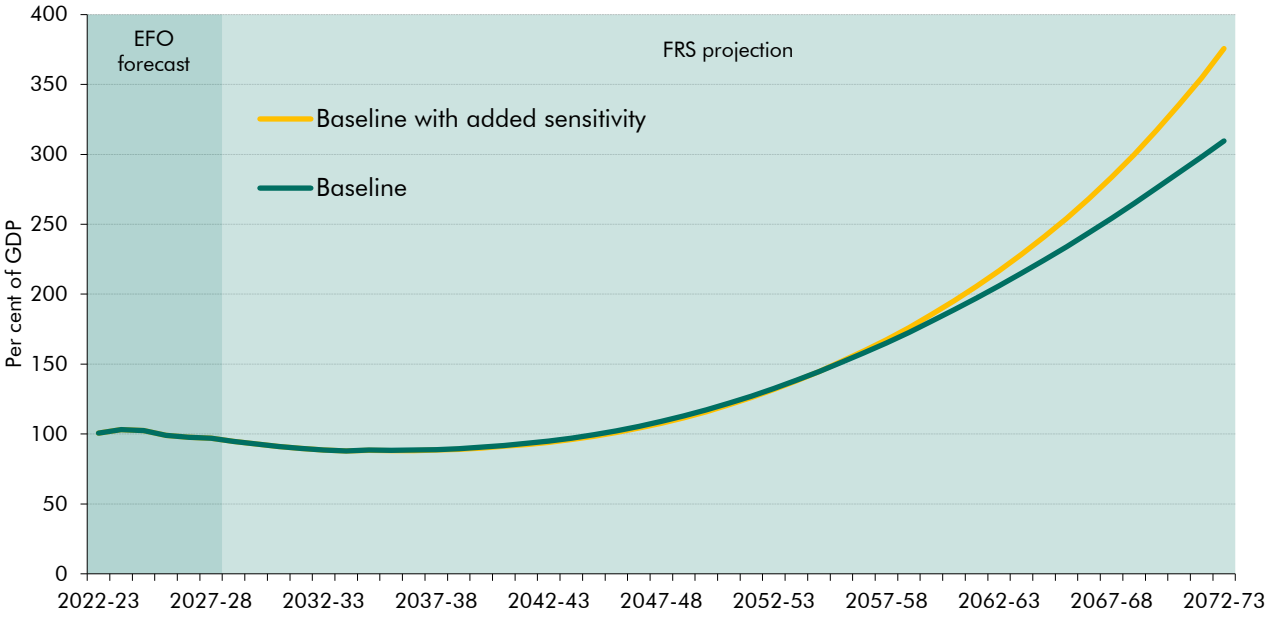
Interest rate sensitivity scenario

4.53 In this scenario, interest rates respond to changes in the level of debt over the projection period, diverging from our current assumptions where they are held flat at around 4 per cent.[29] Here we make an assumption that every 10 per cent of GDP increase in debt results in a 17-basis point increase in interest rates, as estimated empirically in a recent paper by the IMF.[30] As the year-on-year change in debt is quite small in the first few years of the projection period, the impact on interest rates is small too, but as debt increases exponentially, interest rates move higher too, reaching 7.5 per cent by the projection horizon. This feeds into higher net interest payments, which peak at 24 per cent of GDP by 2072-73, almost double the level assumed in our baseline projections. Debt ends up rising to 376 per cent of GDP in 50 years' time, which is 66 per cent of GDP higher than we assume in our baseline projections (Chart 4.21). Were we instead to use the IMF's higher

[29] See our March 2023 *EFO* long-term economic determinants.
[30] See Annex 2 of IMF, *Return to Fiscal Rules*, October 2022. This elasticity is also broadly in line with estimates in: Congressional Budget Office, *The Effect of Government Debt on Interest Rates*, Working Paper 2019-01, March 2019.

estimate of the sensitivity of interest rates to debt (a 30-basis point increase in interest rates for every 10 per cent of GDP increase in debt), interest rates instead peak at 10 per cent, net interest payments at 36 per cent of GDP, and debt at 438 per cent of GDP after 50 years.

Chart 4.21: Long-term debt projections with interest rate sensitivity



Source: OBR

4.54 Out of all scenarios, debt is at its highest level when integrating shocks at a similar intensity to what we have seen in this century so far (Table 4.4). For completeness, it would not be impossible for all of these risks and pressures materialise. Under such a combined scenario, debt would rise to above 500 per cent of GDP by the mid-2070s, or twice its historic high at the end of the Second World War. However, one would assume that policymakers would take action long before debt would be allowed to reach that level.

Table 4.4: Long-term debt projections under different scenarios

	Per cent of GDP					
	2027-28	2032-33	2042-43	2052-53	2062-63	2072-73
Baseline	97	89	95	133	206	310
21st century shocks	97	114	145	208	306	435
DEL shock	97	96	119	173	264	385
Interest rate sensitivity	97	88	94	132	217	376

5 Fiscal risk register

Introduction

5.1 The preceding chapters of this report have focused on three large threats to the public finances, but the array of other fiscal risks highlighted in previous reports has not gone away. This final chapter summarises how these other risks have evolved since our previous biennial survey in the July 2021 *Fiscal risks report* (*FRR*). It is based on the more comprehensive and detailed fiscal risks register that we have maintained since our first *FRR* in 2017, which is published in updated form on our website alongside this report.[1]

Summary of changes in fiscal risks since 2021

5.2 Since we first began producing *Fiscal risks reports* in 2017, we have sought to find the right balance between comprehensiveness and materiality. Over time, the number of specific risks that we record in our register rose from the 57 in 2017 to 106 in 2019, before falling back to 87 in 2021. With two of the largest fiscal risks in a generation crystalising during this period, in the form of the Covid pandemic and the European energy crisis, we have also focused more of the substance of these reports on understanding the fiscal implications of these larger, and potentially catastrophic, sources of risks.

5.3 In a further effort to reduce the number of risks we report against without materially reducing the comprehensiveness of our surveillance, we have recast and consolidated some of the 87 risks that were identified on our 2021 register, bringing the total down to 53. This has largely been done by removing any double-counting of risks with both medium-term and long-term impacts, reducing duplication of risks across thematic and specific sources, and consolidating some very specific risks into broader categories. While the consolidated number of risks in this report is still over double the maximum of 20 risks considered to be good practice for top-level risks reporting in an enterprise setting,[2] this reflects the wider range of risks to which governments are exposed and is comparable to the 38 risks included in the Government's most recent National Risk Register in 2020.[3] To enable a like-for-like comparison against the risks we identified in 2021, we have restated our 2021 risk register on the same basis as the consolidated 2023 register.

5.4 In surveying progress since 2021, we take account of any actions that the Government has taken to manage the risks we identified. The *Charter for Budget Responsibility* requires the Treasury to respond formally to our risk reports within a year of publication. The Treasury's responses have ranged from the substantive 140-page report *Managing fiscal risks* in 2018

[1] You can find the full risk register in the 'Supporting documents' section of our *Fiscal risks and sustainability* 2023 webpage.
[2] ACCA, *The basic principles of compiling a risk register for smaller companies,* March 2010.
[3] HM Government, *National Risk Register 2020*, December 2020.

to a brief Written Ministerial Statement in the midst of the pandemic in 2020. The Treasury responded to our first combined *Fiscal risks and sustainability* report (*FRS*), published in 2022, alongside the March 2023 Budget with a 22-page supplementary document that set out the Government's actions to address major economic and fiscal challenges such as heightened energy prices and the transition to a net zero economy. Since our first *FRR* in 2017, the Government has also made several efforts to systematically improve the management of fiscal risks. This includes launching the Contingent Liability Central Capacity (CLCC) in 2021 to improve monitoring and advice on contingent liabilities. And in 2022, the Government published the Resilience Framework, which aims to strengthen the underpinning systems that provide resilience to all risks.

5.5 Chart 5.1 summarises the changes in fiscal risks recorded on our register since our last update in 2021. Of the 53 risks on the restated 2021 register:

- **13 have crystallised**, including the increased sensitivity of debt interest spending to inflation, the revision of fiscal rules in line with the forecast, and total factor productivity weighing on potential growth in the long term. Of these, all 13 remain active risks.

- **15 have increased**, including higher cost and demand pressures on health and social care spending, increased spending on the state pension in the long term, and the risk of a delayed transition to net zero raising the associated fiscal costs.

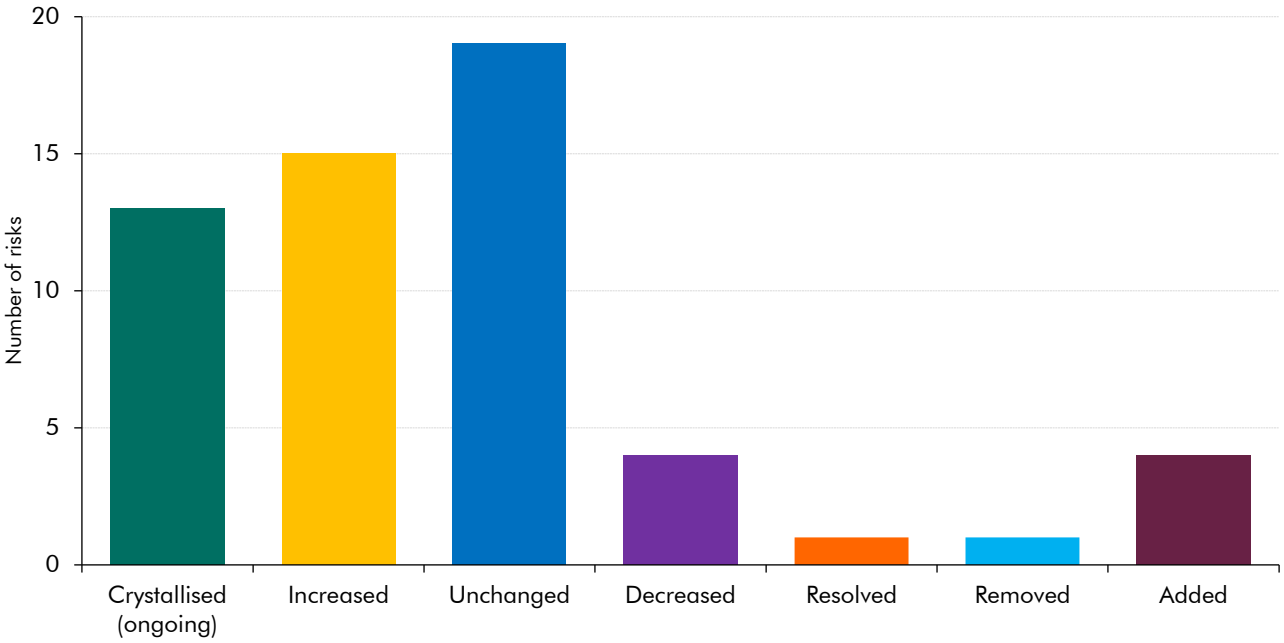
- **4 have decreased**, including the high cost of tax expenditures, lower potential growth from a reduction in labour supply, and the long-term pressure on excise duties from behavioural or technological change.

- **19 remain unchanged**, including the long-term risks of financial crises and recession, those around the implementation of planned welfare reforms, and those around non-payment of taxes.

- **2 have been resolved and removed** from the register: the post-pandemic effect on receipts and public services and a structural shift in receipts resulting from the pandemic.

- **4 risks have been added** in this report: persistent and high inflation, rising global trade tensions, global security threats, and cyber-attacks. **This takes the total number of risks in our latest register to 57**.

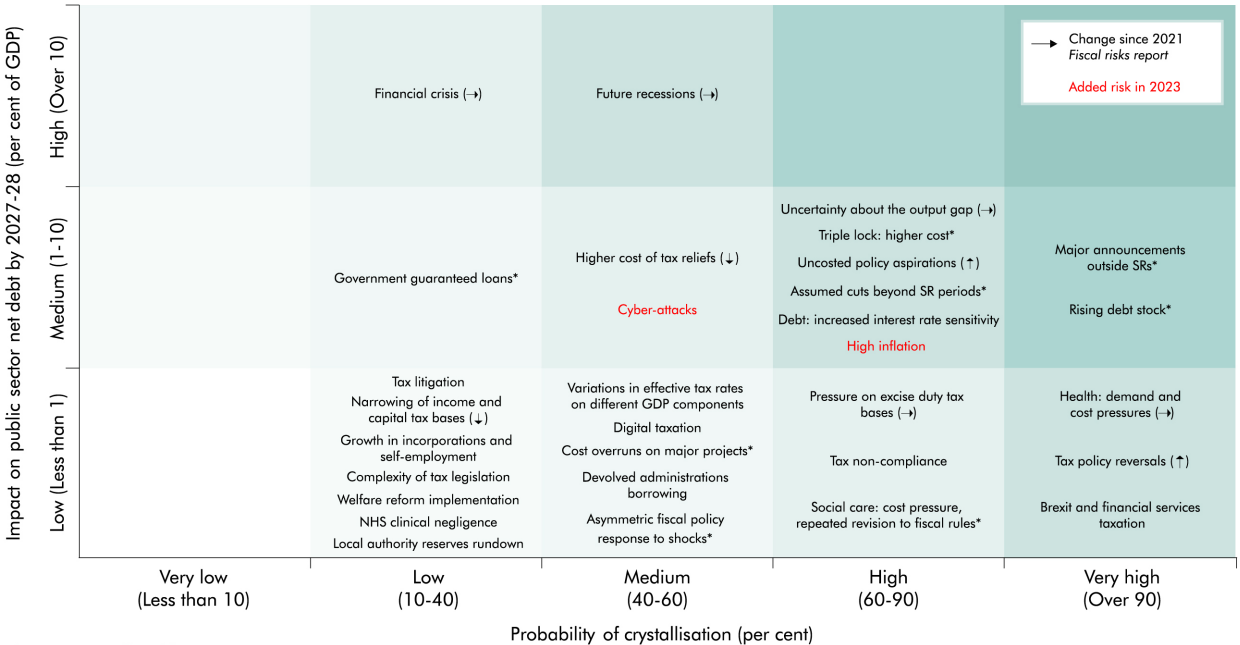
Chart 5.1: OBR fiscal risk register: changes since our 2021 *Fiscal risks report*



Source: OBR

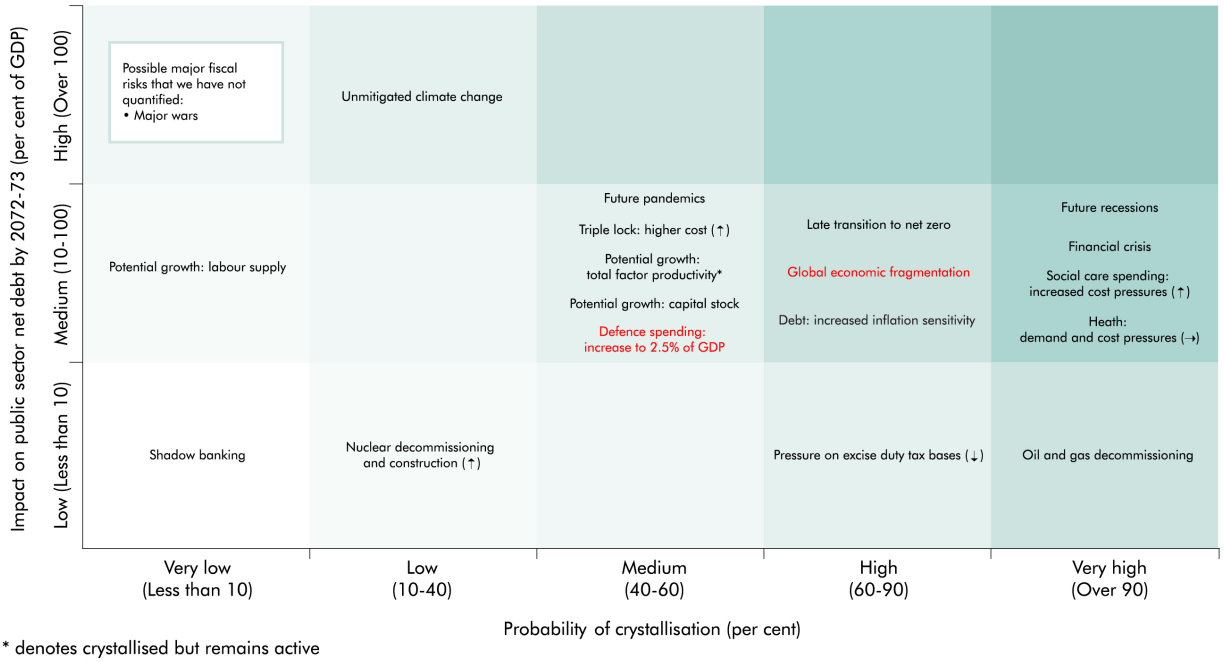
5.6 Alongside this report we have also published an updated and comprehensive risk register on our website. It lists all the fiscal risks discussed in this report, our assessment of their size and likelihood, and any changes to the risks identified in our 2021 report. Figures 5.1 and 5.2 summarise the main risks to our medium-term fiscal forecasts and to long-run fiscal sustainability respectively, categorised by size and likelihood.

Figure 5.1: Sources of fiscal risk over the medium term



* denotes crystallised but remains active
Source: OBR

Figure 5.2: Sources of risk to fiscal sustainability



* denotes crystallised but remains active
Source: OBR

Key developments in fiscal risks since 2021

5.7 The remainder of this chapter discusses the key developments in the other fiscal risks not covered in the preceding three chapters of this report. In previous reports we have organised the array of fiscal risks by their primary channel of impact on our forecast: the economy, revenue, spending, balance sheet, and risks that cut across these channels. In this year's report we have regrouped risks based on their underlying source. This is intended to make our analysis more operationally relevant for those in government charged with managing the risks rather than those, like ourselves, charged with analysing their fiscal implications. With this in mind, we have organised the universe of fiscal risks into three broad categories according to the nature of the risk:

- **shocks** that generate large and acute fiscal costs either directly (in the form of government support for those affected) or indirectly (via their impact on the wider economic activity on which the public finances depend);
- **policy risks** that are generated by the Government itself in the form of policy ambitions which are not yet costed, policy settings which are unlikely to prove sustainable, and asymmetries in the way the Government reacts to improvements or deteriorations in the fiscal outlook; and
- **long-run trends** which threaten to progressively erode fiscal sustainability either directly (by eroding various tax bases or putting upward pressure on various spending items) or indirectly (via their impact on the overall performance of the economy).[4]

[4] This categorisation echoes one of the key conclusions from our first *FRR* in 2017, which stated that *"From the perspective of policymakers, three perennial conclusions emerge. Governments need to manage the risks to which they actively choose to expose themselves, to prepare for shocks and to deal with many sources of slow-building pressure."*

Fiscal risks arising from shocks

5.8 As discussed in our 2021 *FRR,* shocks to the economy and public finances have become more frequent and more costly in the first part of the 21st century. In less than two decades, the UK has experienced two 'once-in-a-century' shocks – the 2008 financial crisis and the 2020 coronavirus pandemic. And last year's energy price shock was a 'once-in-a-generation' event not seen since the late 1970s.

5.9 As advanced economies' exposure to potentially catastrophic risks increases, so do the associated risks to the public finances. This is not only because of the disruptive effects of the associated economic shocks on government revenues and non-discretionary spending. Governments are also more directly exposed because catastrophic risks are, by their nature, difficult or impossible to price or insure against. This means that the private sector cannot manage them without active government intervention. Government is therefore in effect obliged to step in to act as an 'insurer of last resort'. And the more often it does so, the greater the expectation that it will again when the next shock hits – as has been apparent in calls for support as mortgage rates have risen in recent months.

5.10 Since our 2021 *FRR,* public services including the NHS, schools, and public transport have continued to deal with the aftershocks of the Covid pandemic. The UK and global economies have been hit by a further major shock emanating from the Russian invasion of Ukraine and resulting increase in global energy prices. And other major risks that have yet to crystallise – such as cyber-attacks and instability in the financial sector – appear to have heightened. We have seen a rise in cyber-attacks, including on national institutions such as the NHS and Royal Mail, which have interrupted vital public services. And more recently, we have seen the strain that rising interest rates can put on banks and other financial institutions in the US, UK, and elsewhere in Europe (discussed in Box 5.1).

The pandemic's legacy for public services

5.11 In our 2021 *FRR* we discussed the pandemic's legacy risks to the public finances over the medium term, particularly in relation to the unwinding of the pandemic response package. One source of direct pressure on the public finances was the pandemic's impact on public services. We estimated these could leave the Government facing spending pressures of around £10 billion a year on average between 2022-23 and 2024-25 and impact three major spending areas – health, education and transport. In Spending Review 2021, the Government announced a public service recovery package to support these spending areas in responding to and recovering from the pressures caused by the pandemic and to reduce the resulting backlogs. Developments since *FRR* 2021 also include:

- **Health** budgets have been exposed to post-pandemic pressures which have materialised through a growth in the backlog of treatments and rising waiting list. In 2022 the NHS published its *Delivery plan for tackling the COVID-19 backlog of elective care* which aimed to reduce waiting times so that by April 2023 nobody will be waiting for more than 18 months. By April 2023, this had been reduced by 90 per

cent.[5] Our 2021 *FRR* estimated that health budgets might require around £7 billion *a year* to pay for continued pandemic costs such as revaccinations and the backlog of treatments. The Government also plans to spend over £8 billion as announced in the *Build Back Better* plan in September 2021, to tackle the elective backlog between 2022 and 2025.[6] And at Spending Review 2021, the Government also announced £5.9 billion of additional capital investment for NHS backlogs.

- The catch-up to **education** disruption has been supported by a range of interventions. Our 2021 *FRR* estimated that schools might require around £1.25 billion *a year* to enable students to 'catch-up'. Spending Review 2021 allocated the Department for Education £1.8 billion of funding *over the three years* to 2024-25 available to schools to support education recovery through schemes such as the National Tutoring Programme (NTP), the catch-up premium and the recovery premium.[7]

- **Transport**. Public transport usage has recovered to a steady-state level of usage that is below pre-pandemic levels, particular for mid-week travel following increased levels of working from home.[8] Revenues have recovered less than usage, partly due to the 70 per cent reduction in season ticket revenue in 2022-23 relative to 2019-20.[9] Our 2021 *FRR* estimated that Great British Railways and Transport for London might need £2 billion *a year* to fill the gap in fare revenue. Since our 2021 *FRR*, the Government has continued to provide additional funding to public transport including £6.1 billion in 2021-22 and £5.7 billion over the 2021 Spending Review period for rail services, and £3 billion of additional funding for Transport for London.

5.12 Wider pressures – particularly those in health – make it difficult to disentangle pandemic effects on public services from non-pandemic effects. As a result, we have decided to cover these risks under broader spending categories within our restructured risk register, and to remove the specific pandemic-related risks that appeared in the previous register.

Energy prices and inflation

5.13 In the wake of the pandemic, Russia's invasion of Ukraine sparked a global increase in energy prices – felt particularly acutely in Europe – that produced an almost thirteen-fold increase in wholesale gas prices in the UK relative to the historical average. The UK is particularly vulnerable to gas price movements because gas makes up a significant proportion of our energy mix (around 40 per cent) and now almost always sets the wholesale price of electricity.

5.14 The Government sought to shield households and businesses from the rise in wholesale prices passing through to energy bills through the introduction of several policy measures (including the energy price guarantee for households, and the energy bill relief scheme and its successor the energy bills discount scheme for businesses). We estimate the combined

[5] Department of Health and Social Care, *How we're tackling the NHS backlog,* May 2023.
[6] Department of Health and Social Care, *Build Back Better: Our Plan for Health and Social Care,* September 2021.
[7] National Audit Office, *Education recovery in schools in England,* February 2023.
[8] Department for Transport, *Daily domestic transport use by mode,* June 2023.
[9] Reflecting franchised rail passenger revenue. See Office of Rail and Road, *Passenger rail usage January to March 2023,* June 2023.

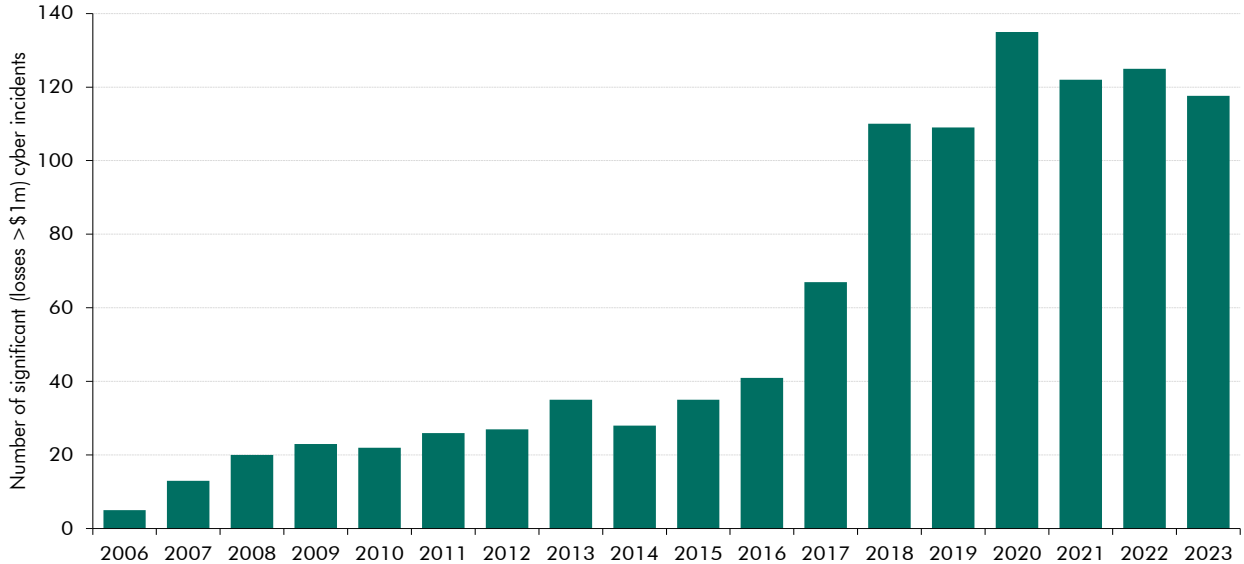
cost of these schemes to be £35 billion across 2022-23 and 2023-24. If prices remain elevated for longer than expected and continue to squeeze households and businesses, history suggests that the Government may judge further intervention to be necessary.

5.15 High energy prices have also imposed indirect costs on the public finances by contributing to a rapid rise in CPI inflation which hit a 41-year peak of 11.1 per cent in October 2022. High inflation has led to large increases in both our debt interest and welfare spending forecasts, due to the cost of servicing index-linked gilts and the uprating of most welfare payments and public service pensions in line with CPI inflation. But the source of inflation is important for the revenue impact – imported inflation that reduces real wages is typically fiscally costly (although with income tax thresholds frozen in cash terms, as they are currently, any upside in nominal wage growth is fiscally beneficial, even if real wages are falling); domestically generated inflation driven by rising real wages is fiscally beneficial, at least in the near term.[10]

Cyber-attacks

5.16 In recent years, cyber-attacks have become increasingly common and a growing threat globally. We added the fiscal risk from cyber-attacks to our risk register in our 2021 *FRR*, and first illustrated their potential fiscal impact in our 'geopolitical stress test' in our 2022 *FRS*. The UK continues to be a major target for this type of attack and their ability to disrupt key public services is a risk that requires sophisticated mitigation tools. A recent report found that the UK was the most attacked country in Europe over the past twelve months, accounting for 43 per cent of cases.[11] The UK Government's National Risk Register places cyber-attacks in its second-highest 'likelihood' category, but in its second-lowest 'economic impact' category, with attacks typically costing millions rather than billions of pounds.

Chart 5.2: Significant global cyber-attacks from 2006 to 2022



Note: Data for 2023 reflect outturn up to May 2023 that has been scaled up to the full year.
Source: Centre for Strategic and International Studies

[10] See Box 3.2 of October 2021 *Economic and fiscal outlook*.
[11] See *IBM Security X-Force Threat Intelligence Index 2023*.

5.17 While most incidents to date have been relatively modest in scale, some recent attacks have underscored the potential economic risks posed by large-scale cyber-attacks. Royal Mail was the subject of a cyber-attack in January 2023 from LockBit, a ransomware group linked to Russia. The group disrupted 11,500 branches across the UK and demanded a £66 million ransom, which Royal Mail refused to pay.[12] Previous experience suggests that, while the private sector may continue to bear the risk and associated costs of cyber-attacks without the input of government, a failure of the insurance sector to keep pace with levels of risk could put pressure on the public purse. To combat the rise in attacks, the Government has pledged over £2.6 billion over the 2021 Spending Review period for cyber and legacy IT, in addition to funding for the UK's National Cyber Force.

Financial sector

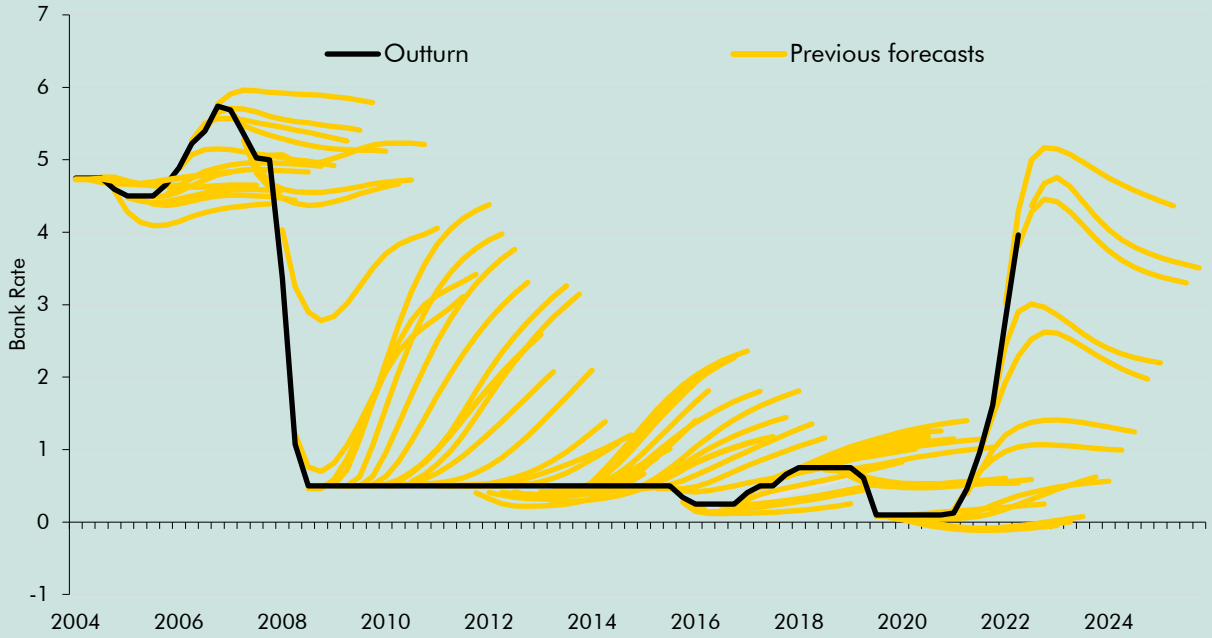
5.18 The relative size of the UK's financial sector makes it one of the major and recurrent sources of fiscal risk for the UK. It is notable that this risk did not crystallise despite the strains of the pandemic, reflecting the strengthening of capital requirements and other banking regulation since the 2008 financial crisis. But more recent – so far isolated – episodes of financial sector stresses, precipitated by, among other things, the unexpectedly sharp and large rise in global interest rates, have underlined the importance of a sufficiently capitalised financial sector. Over the past twelve months we have seen the takeover of Credit Suisse in Europe and collapse of Silicon Valley Bank (and others) in the United States. And in the UK, the Bank of England intervened during the pension funds' liability-driven investment crisis that was prompted by the adverse gilt market reaction to last September's 'mini-budget.' These episodes highlight the need for robust regulation and supervision of all parts of the financial sector (Box 5.1).[13]

Box 5.1: Recent interest rates rises and financial stability

The UK has experienced a notable shift in its interest rate environment over the past 18 months, marked by the re-emergence of higher interest rates after a prolonged period of historically low rates. Bank Rate has now reverted to around its pre-financial crisis levels, but has done so more rapidly than most expected. The unexpected speed at which interest rates have jumped (both in the UK and globally) may pose risks to the financial sector. To demonstrate the extent of the surprise, Chart A shows market expectations for Bank Rate at the time of successive Bank of England *Inflation Reports* and *Monetary Policy Reports*, alongside its actual path. Financial markets continuously expected rates to rise between 2008 and 2020, when in fact they remained at 0.5 per cent for much of the period. But in 2022 this trend reversed, and Bank Rate is now around 4 percentage points above the level expected just 18 months ago.

[12] Financial Times, *Royal Mail hackers demanded £65mn ransom,* 14 February 2023.
[13] Bank of England, *Financial Stability Report,* December 2022.

Chart A: Financial market-implied and actual Bank Rate path



Source: Bank of England, OBR

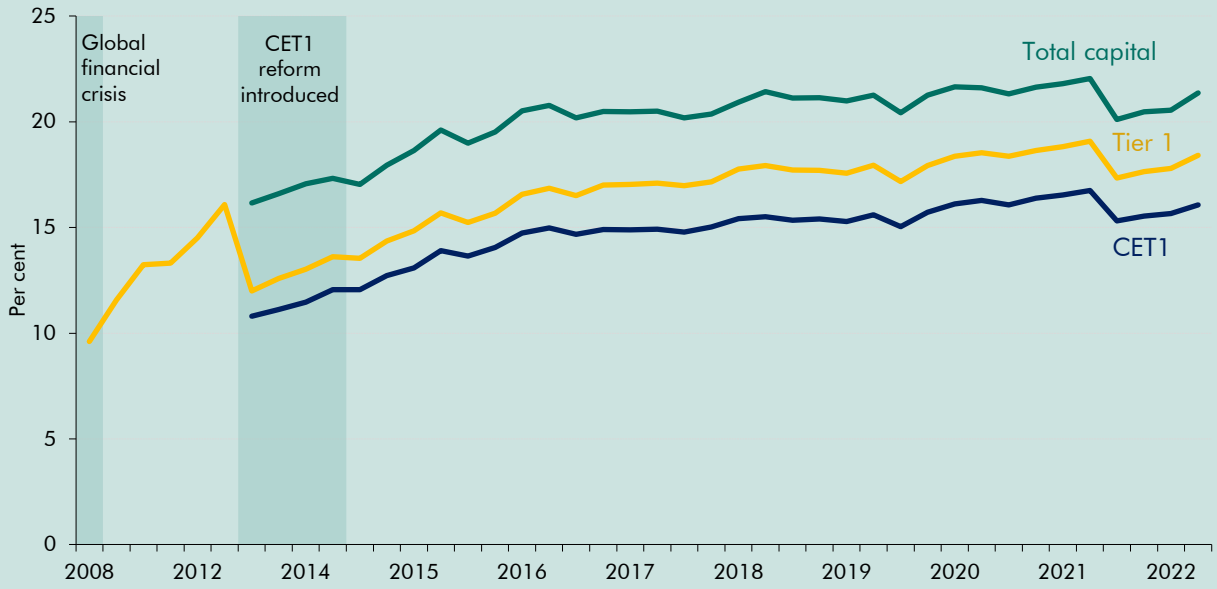
The financial sector is inherently exposed to large and unexpected changes in interest rates, and global interest rate hiking cycles have often coincided with episodes of distress in the financial sector.[a] And financial instability is one of the largest sources of risk to the public finances. The direct fiscal costs are potentially substantial, as they can involve injecting liquidity or capital in the form of public funds into the banking system to stabilise it and protect depositors and creditors. And the indirect costs from wider economic disruption can be even larger and long-lasting, as evidenced by the UK's persistently weak growth performance since 2008.

To mitigate these risks in the banking sector, governments and regulators introduced more stringent capital adequacy requirements following the financial crisis. The Basel III framework played a central role in these reforms. One of the key changes was the emphasis on Tier 1 capital, which represents the core capital of a bank and includes common equity and other qualifying instruments. The Tier 1 capital ratio became a crucial metric to assess a bank's financial strength and ability to absorb losses. Regulators also introduced the CET1 ratio, consisting primarily of common equity, as an additional measure of a bank's capital adequacy that is deemed the highest quality capital due to its loss-absorbing capacity. The CET1 ratio became a key benchmark to assess a bank's financial soundness and its ability to withstand adverse economic conditions and absorb losses during shocks. These measures of capital adequacy have risen since 2008 (Chart B).

UK banks are subject to capital rules that mean their exposure to interest rate risk is specifically capitalised against. They also have substantial buffers of liquid assets, and access to Bank of England liquidity facilities that should help to protect them against liquidity risks that could arise (in relation to interest rate risk or otherwise). They are therefore now better capitalised and positioned to handle challenges posed by sharply rising interest rates. And the Bank of England's Financial Policy Committee's latest assessment is that "*the UK banking system remains resilient*".[b]

Nevertheless, given the relative size and opacity of some parts of the shadow banking sector (as we discussed in our 2019 *FRR*), significant direct and indirect fiscal risks remain.

Chart B: Capital adequacy ratios of UK banks



Source: Bank of England, IMF

[a] Jiménez, G., et al., *Monetary Policy, Inflation, and Crises: New Evidence from History and Administrative Data*, Working Paper No.1378, Barcelona School of Economics, 2022.
[b] Bank of England, *Financial Policy Summary and Record of the Financial Policy Committee meeting on 23 March 2023*, March 2023.

5.19 Other major shocks that we continue to monitor include the risks from unmitigated climate change, future pandemics, and major wars, all of which we have considered in previous editions of this report. These shocks have the potential to crystalise over the longer term and pose a substantial threat to economic and fiscal conditions.

Fiscal risks arising from government policy

5.20 Fiscal risks can also arise out of the fiscal policymaking process itself. This section looks at three such sources of risk.

- First, Parliament requires our forecasts to fully reflect currently announced government policy, but it has also said that this should only be done where the effects can be quantified with reasonable accuracy. Where that is not the case, they must be noted as specific fiscal risks.[14] As such, when the governments set out **'ambitions' or 'intentions' or partially specified polices** whose effects cannot be quantified in each year of our forecast, we note them as a risk.

- Second, governments sometimes face **difficulty or delays in implementing the policies** they have previously announced or find that the implementation of those policies yields less or costs more then they originally envisaged.

[14] Charter for Budget Responsibility, paragraph 4.10.

- Third, the **frameworks and systems that governments rely upon to manage fiscal policy** can fail to meet their objectives.

Policy ambitions that are not yet included in our forecasts

5.21 It is not uncommon for the Government to announce policy intentions or ambitions that either lack the necessary parameters to be included in our forecast (for example, due to ongoing consultation on key details) or do not yet constitute the Government's current policy (for example, when they are subject to an affordability test). In these circumstances we typically note the policy ambition as a risk to our fiscal forecast, and, where possible, quantify its potential impact. This applies to the governing party's manifesto commitments, conference announcements, and leadership campaign pledges.

5.22 Since our 2021 *FRR*, several of the Government's stated policy ambitions have become firm policy, and their economic and fiscal implications are now included in our forecasts. This includes the Conservative Party's 2019 manifesto commitment to align the NICs primary threshold and lower profits limit with the income tax personal allowance. In Spring 2022, the threshold was aligned with the income tax personal allowance (currently £12,570) from July 2022 onwards. This was estimated to cost £5.4 billion a year on average.

5.23 There have also been several new announcements since our 2021 *FRR* where the Government has signalled a desired path for policy, but that is not yet included in our forecasts. These include ambitions to: (i) make permanent the, currently temporary, 'full expensing' capital allowances in the corporation tax system; (ii) increase defence spending to 2.5 per cent of GDP; (iii) build new nuclear power stations; and (iv) various policies associated with the Government's net zero strategy. The new NHS *Long Term Workforce Plan* could also put upward pressure on health spending, as discussed in paragraph 5.51.

Capital allowances

5.24 At Spring Budget 2023, the Government announced a temporary 100 per cent capital allowance regime (known as 'full expensing'), starting from April 2023 and in place for three years. At the same time, the Government signalled its intention "*to make this measure permanent as soon as it is economically responsible to do so*". The cost of making this measure permanent could approach £10 billion a year.

Defence spending

5.25 The Government has also stated a new spending aspiration to raise defence spending to 2.5 per cent of GDP at an unspecified point in the future, again as fiscal and economic circumstances allow.[15] Relative to the NATO minimum of 2 per cent of GDP which has guided defence spending plans since the mid-2000s, the cost of meeting this commitment would be around £13 billion a year in today's terms.

[15] HM Government, *Integrated Review Refresh 2023,* March 2023.

Nuclear power generation

5.26 In its *British energy security strategy* in April 2022, the Government outlined its ambition to increase nuclear power generation to up to 24 gigawatts by 2050, which could require up to eight new nuclear reactors. The medium- to long-term fiscal costs from subsidising the high upfront cost of constructing new nuclear facilities could approach £170 billion.[16] Even a modest fraction of this cost falling to the public sector would be fiscally material.

Net zero

5.27 The Government legislated its target to reach net zero emissions by 2050 and set out a Net Zero Strategy alongside sector-specific strategies to underpin decarbonisation across the economy. Our 2021 *FRR* analysis demonstrated that delaying action and then introducing it abruptly carries a greater fiscal cost than early action. The Government has announced several net zero policy intentions, but they are not yet sufficiently defined to be included in our forecast. For example, a hydrogen production levy that was intended to be introduced to bills from 2025.[17] The Secretary of State for Energy Security and Net Zero has since announced a reversal and instead proposed that funding for the hydrogen industry will have to come from "*further up the chain*".[18]

5.28 Similarly, since our March forecast, the Government has announced a lower cap on UK emissions trading scheme allowances that is consistent with net zero, the fiscal effects of which will be included in our upcoming forecast. The timing of the cap's implementation is in line with the Government's initial plans for 2024, although its full impact will not be felt until 2028 due to a transition period that makes additional allowances available to the market.[19] The Climate Change Committee (CCC) has raised significant concerns in its latest report that broader policy development "*is not happening at the required pace for future targets*".[20] Therefore we assess the fiscal risk from delayed action to have increased since our 2021 *FRR*, while noting that the Government will respond to the CCC's latest assessment in the autumn.

Risks to the implementation of current policies

5.29 Some areas of stated Government policy present a fiscal risk because they may not ultimately be implemented or their implementation may end up being more expensive than planned. The most significant risks in this area have come from the:

- Government's plans for **departmental expenditure limits** (DELs) in the medium term;
- operation of the **pensions triple lock**; and
- Government's stated, but rarely implemented, policy to index the rate of **fuel duty**.

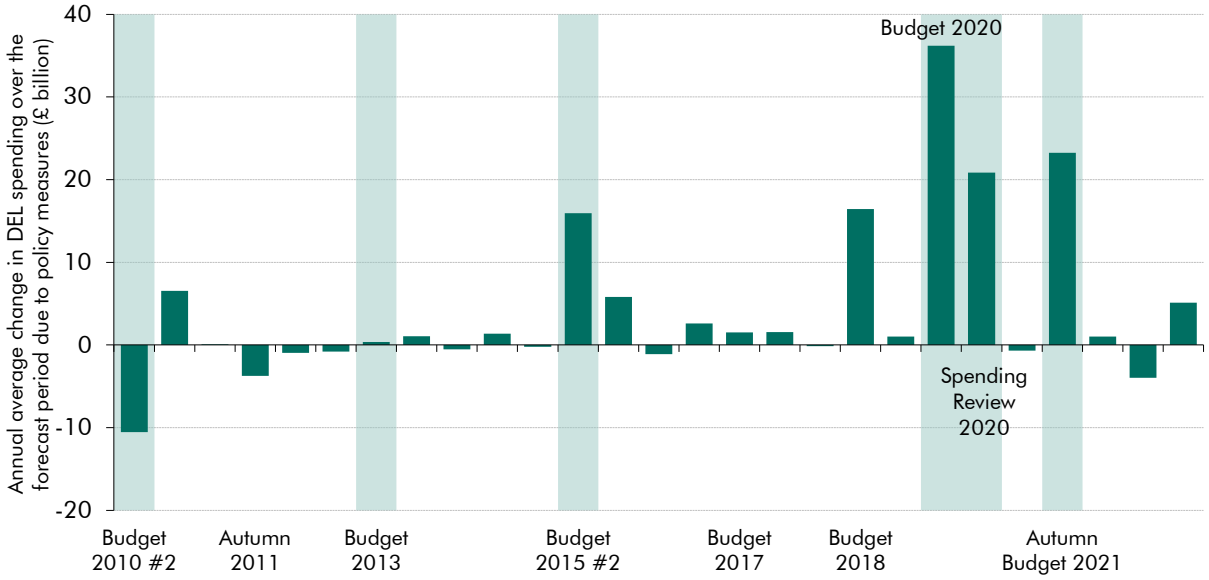
[16] Based on the costs of Hinkley Point C, as estimated in our July 2022 *FRS*.
[17] Department for Energy Security and Net Zero, *Energy Security Bill factsheet: Hydrogen and industrial carbon capture business models*, June 2023.
[18] The Telegraph, *Households will be spared £120 net zero levy, says Grant Shapps,* 23 June 2023.
[19] Department for Energy Security and Net Zero, *Tighter limit on industrial, power and aviation emissions, as UK leads the way to net zero*, July 2023.
[20] Climate Change Committee, *Progress in reducing emissions 2023 Report to Parliament,* June 2023.

Medium-term spending growth assumptions

5.30 The Treasury has exhibited a high degree of control over DEL spending once plans have been finalised, so the main medium-term risk to spending is not that limits are overspent but that policy decisions are taken to raise them. In Autumn Statement 2022, the Government announced a lower path for growth in aggregate resource and capital spending by departments (RDEL and CDEL) in the years beyond the 2021 Spending Review (SR21) which see both growing more slowly than GDP. These reduce total DEL spending by £28 billion (1.0 per cent of GDP) in 2027-28, relative to the previously implied path. In Box 3 of the November 2022 *Economic and fiscal outlook* (*EFO*) we explored the implications of these changes.

5.31 Experience has shown that governments tend to set tight spending growth assumptions in the years beyond the current spending review period and then revise these totals up when the time comes for individual departmental plans to be set at the next spending review. Between December 2014 and SR day in November 2015, cash RDEL totals across the 2015 Spending Review period were raised by £37 billion (13.0 per cent) a year on average. The same happened between March 2021 and SR day in October 2021, when cash RDEL totals were raised by £32 billion (7.7 per cent) a year on average over the 2021 Spending Review period. Looking at changes to total DEL in just the year in which spending reviews take place, there have been average upward revisions of £14.3 billion a year over the five-year forecast period, compared to an average increase of £1.5 billion a year at fiscal events outside of spending reviews (Chart 5.3).[21]

Chart 5.3: DEL policy changes at fiscal events



Note: Shaded areas represent Spending Reviews.
Source: OBR

[21] Based on spending reviews since the OBR's establishment in 2010.

5.32 Beyond the SR21 period, the currently planned growth in RDEL of 1 per cent a year in real terms and the plan for CDEL to remain flat in cash terms are higher than the post-financial-crisis period of fiscal consolidation, but much weaker than the period between 2019-20 and the end of the SR21 settlements in 2024-25. And these paths still imply spending levels falling as a share of national income. This comes at a time where the aftereffects of the pandemic continue to be felt in key public services, pay disputes are ongoing, demographic pressures are building, and geopolitical risks are rising. Health is one area that has received several top-ups, and where most recently the Government agreed a revised NHS pay deal giving a 5 per cent rise to all staff and a non-consolidated one-off payment. The non-consolidated part of the pay agreement raised spending by £2.7 billion in May.[22]

Pensions triple lock

5.33 The Government's commitment to the state pension triple lock leaves the public finances exposed to higher pension costs, especially in a volatile macroeconomic environment. In the medium term, this risk has crystalised following the uprating of pensions in 2023-24 based on September 2022 CPI inflation of 10.1 per cent. With the 2.5 per cent floor in the triple lock set to bind in three of the remaining years in our latest forecast, the triple lock has the effect of ratcheting state pensions higher as a share of GDP following a shock. The Government has suspended the triple lock once, in Autumn Budget 2021, to prevent the pandemic's creation of unusual base effect distortions on annual earnings data feeding through to higher state pensions.

5.34 The ratchet effect of the triple lock means the higher starting point would raise state pensions spending in all future years, which increases the long-term risk. On our standard methodology, using data since 1992-93 and up to the end of our latest forecast, the long-term fiscal cost of the triple lock has risen again as a result of recent volatility in inflation and wage growth – raising spending in 2072-73 by an additional 0.4 per cent of GDP, with its cumulative impact by then adding 8 per cent of GDP to debt. But basing the calculation only on the more volatile and weaker period of economic activity since 2010-11, during which the triple lock has been in effect, the long-term cost of the triple lock would be considerably higher. The 'triple lock premium' would be almost twice as high at 1.04 percentage points rather than 0.58 percentage points, state pensions spending in 2072-73 would therefore be 1.9 per cent of GDP higher, and the cumulative effect of higher spending in every year would add 36 per cent of GDP to debt by 2072-73.

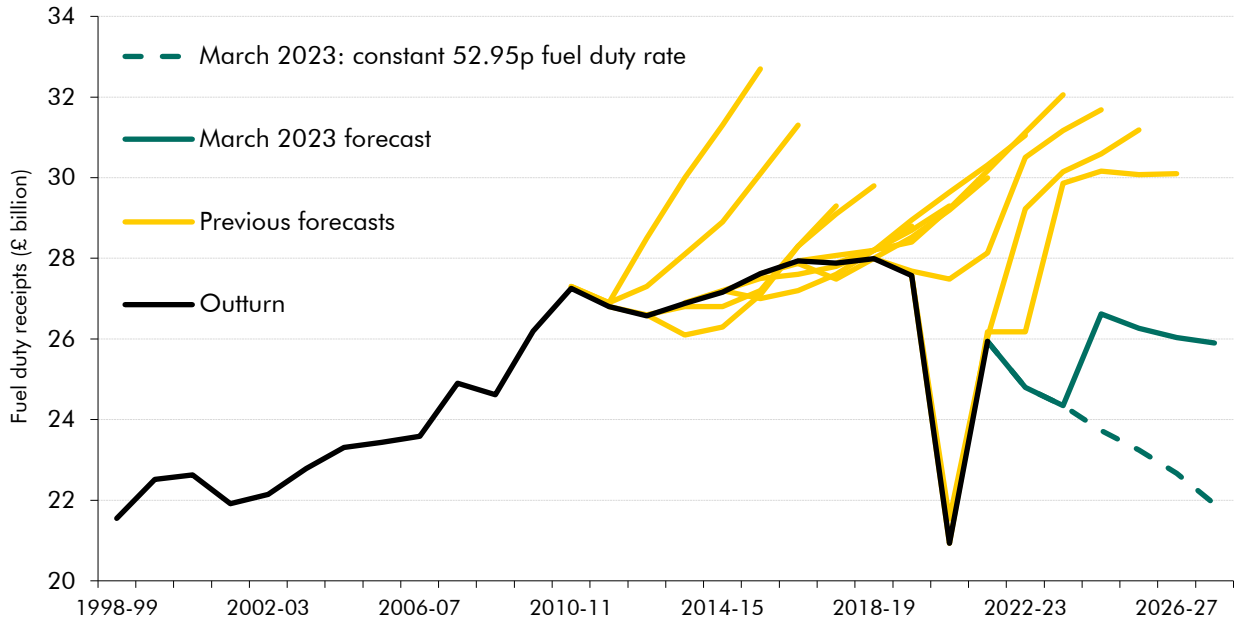
Indexation of fuel duty and other taxes

5.35 Governments also have a history of not implementing many of the planned indexations of various parameters in the tax system – with the main rate of fuel duty being the most notable and costly current example. Since 2011, successive Chancellors have not implemented every one of the planned fuel duty rate rises. In Spring Budget 2022, the Government introduced a 'temporary' 5p cut to rates, which was temporarily extended at Spring Budget 2023 for a second year. Not proceeding with the planned reversal of the extended 5p cut in 2024-25 and RPI indexations in that year and every year thereafter would reduce revenue by £4 billion in 2027-28 (Chart 5.4).

[22] OBR, *Public Sector Finances: May*, June 2023.

5.36 In our March 2023 *EFO* – following the Treasury Select Committee's concerns regarding this fiscal risk[23] – we estimated that if fuel duty remained frozen, it would more than halve the Chancellor's £6.5 billion of 'headroom' against his target of debt falling as a share of GDP by 2027-28. Although fuel duty is the most fiscally material non-implementation of policy, this is a common pattern of policymaking across the excise duties, with VED for heavy goods vehicles frozen for over two decades and aggregates levy frozen for well over a decade (costing a total of £0.1 and £0.2 billion respectively in Spring Budget 2023).

Chart 5.4: Fuel duty: forecasts versus outturns



Source: ONS, OBR

Fiscal policymaking frameworks and systems

Fiscal policy announcement outside fiscal events

5.37 Following the recent shocks to the UK economy, there has been an increased tendency for major policy announcements to be made outside of fiscal events. This was common – and clearly imperative – during the Government's response to the pandemic, and again as the Government has responded to the energy price crisis following the Russian invasion of Ukraine. But that pattern has continued and between our March 2022 and November 2022 forecasts there were four major policy statements, which included the May cost-of-living support and the September energy package, but also the wide-ranging tax cuts announced in September's Growth Plan, and the only modestly less wide-ranging reversals of those announcements in October. Taken together, these announcements sum to a net fiscal cost of £180 billion across 2022-23 and the five-year forecast period thereafter.

5.38 Where fiscally-material policy announcements are made without an accompanying forecast, the Government, Parliament, public, and financial markets in the UK, do not have a

[23] Treasury Select Committee, *Fuel Duty: fiscal forecast fiction*, January 2023.

complete view of those polices' impact on the UK economic and fiscal outlook. In its report on Autumn Budget and Spending Review 2021,[24] the Treasury Select Committee recommended that: *"The Government should wherever possible announce major changes to the rates of existing taxes and the introduction of new taxes at a Budget or other fiscal event such as a Spring Statement. This allows Parliament to consider the measures announced alongside an independent forecast by the OBR of the fiscal consequences of the measures"*.

Asymmetric fiscal policy responses to shocks

5.39 The pattern of governments' responses to economic shocks has also differed depending on whether the shocks are 'good' or 'bad' news for the public finances.[25] That is, where Chancellors have been met with positive news for the fiscal outlook, they have on average spent two-fifths of the benefit. Whereas, when there is a deterioration in the pre-measures fiscal outlook, they typically offset around a quarter.[26] Three of the four forecasts since our 2021 *FRR* have seen an underlying improvement in the pre-measures outlook. The average improvement across the five years of the forecast lowered cumulative borrowing by £120.7 billion, of which around two-fifths was spent (£49.1 billion). At Autumn Statement 2022 the Government was faced with a large underlying deterioration in the public finances due to the global energy crisis. This raised cumulative borrowing by £270.2 billion over five years, to which policy measures (made up of the cost of near-term support less medium-term consolidation measures) *increased* cumulative borrowing by an eighth (£36.2 billion). So this pattern of asymmetric fiscal policy responses to shocks has continued.

'Headroom' against fiscal rules

5.40 Since the 1990s, UK governments have adopted 'fiscal rules' to guide and constrain fiscal policy. These have typically entailed a target for some measure of the budget balance and a target for some measure of debt. One notable feature over the past decade is the frequency of changes in the rules.

5.41 At the time of our 2021 *FRR*, the Government's fiscal targets were to balance the current budget and for debt to be falling by 2025-26. The outlook subsequently deteriorated such that these targets were on course to be missed by margins of £8.7 billion and £11.4 billion respectively in our November 2022 *EFO* forecasts. Alongside the accompanying 2022 Autumn Statement, the Government announced two new fiscal targets: to have underlying debt falling as a share of GDP in 2027-28 (two years later than the previous target) and to have borrowing not exceed 3 per cent of GDP in that same year (materially looser than the previous target). In the March 2023 Budget, the Chancellor's headroom against this revised debt falling target (the more binding of the rules) was £6.5 billion (0.2 per cent of GDP); the smallest margin against any fiscal rule that is still be on track to be met.

[24] Treasury Select Committee, *Autumn Budget and Spending Review 2021,* January 2022.
[25] See Box 4.2 of the March 2019 *Economic and fiscal outlook*.
[26] This reflects policy decisions as a share of the pre-measures revision in the last five years of each forecast covering November 2010 to March 2023 (excluding the data from March 2012 as an outlier).

Local authority finances

5.42 The marked rise in 'prudential' borrowing we highlighted in our 2019 *FRR* remains a fiscal risk, as local authorities have taken advantage of low interest rates offered by the Public Works Loan Board (PWLB). Local authorities' PWLB debt has risen from £77 billion in March 2019 to £96 billion in March 2023.[27] This was largely used to finance the acquisition of retail and commercial property sites as investment assets until the Government tightened the PWLB lending guidance in 2020. Nevertheless, the accumulated debt associated with these investments remains a risk as commercial property prices typically experience large falls during economic downturns, and recent interest rate rises have added further pressure to debt-servicing costs.

5.43 These pressures have started to materialise for some local authorities. Most recently, Woking council announced a suspension to all non-essential spending following an "*extremely serious financial shortfall owing to its historic investment strategy that has resulted in unaffordable borrowing, inadequate steps to repay that borrowing and high values of irrecoverable loans*".[28] Box 5.2 in our 2019 *FRR* noted that Woking was one of the seven authorities with outstanding balances exceeding £1 billion. Woking's news follows a suspension to non-essential spending announced by Slough in 2021, Thurrock in 2022 and Croydon in 2022 for the third time in two years. In Spring Budget 2023, the Government granted waivers in respect of council tax referendum limits to these three councils and has also provided exceptional financial support via capitalisation directions of almost £0.3 billion for 2023-24.[29] Additional fiscal risk might arise from the Government needing to intervene in privatised local utilities, as discussed in Chapter 7 of our 2017 *FRR*, which considered critical infrastructure such as the water industry.

Tax expenditures

5.44 The estimated cost of tax expenditures as a share of GDP has generally risen over time (outside 2008-2010).[30] Tax expenditures present a fiscal risk as they often subject to less scrutiny than spending settlements and the costs of several go unreported. Since our 2021 *FRR*, the Government has amended several structural reliefs, including a reduction to the income tax dividend allowance by three-quarters, a reduction in the capital gains tax annual exempt amount of a similar magnitude, and an extension to keep the personal allowance frozen until the end of the forecast. It has also announced several reforms to R&D tax credits that are expected to reduce the extent to which these are subject to abuse by some users. Collectively, these measures limit the cost growth of tax reliefs and therefore reduce the fiscal risk.

Clinical negligence

5.45 The cost of NHS clinical negligence claims has risen four-fold since 2006-07. The latest NHS Resolution data show that provisions in respect of future claims jumped by half

[27] Department for Levelling Up, Housing and Communities, *Borrowing and investment live table, Q4 2022 – 2023,* June 2023.
[28] Woking Borough Council, *Council issues Section 114 Notice in response to severe financial challenges,* June 2023.
[29] Department for Levelling Up, Housing and Communities, *Exceptional financial support for local authorities*, March 2023.
[30] See Chapter 4 of our July 2019 *FRR* for a fuller discussion.

between 2020-21 and 2021-22 to £128.2 billion. This increase primarily reflects a technical accounting change to the long-term discount rate affecting provisions – one that has changed frequently in the past and has changed again for 2022-23 reporting.[31] Clinical negligence payouts pose a significant fiscal burden for the healthcare system, and the public sector faces pressure to meet or manage this escalating fiscal risk. The Department for Health and Social Care has taken steps to manage this risk and has launched a consultation on proposals to cap legal fees for low-value claims. This aims to address the substantial rise in the proportion of claims made up by legal fees to the point that by 2020-21, the average legal costs recovered from the NHS by claimant lawyers was twice the average amount paid out in damages to claimants, for lower-value clinical negligence claims.[32] In parallel the Government has committed to responding to the Health and Social Care Committee report on NHS litigation reform, which outlines several suggestions that could reduce this fiscal risk.

Fiscal risks arising from longer-term trends

5.46 In addition to discrete shocks and pressures that may materialise at some point in our five-year forecast period, risks to fiscal sustainability can also come from longer-term trends that gradually erode government revenues, put upward pressures on spending, and degrade the government balance sheet over decades. As discussed in the preceding three chapters, some of these longer-term issues, such as the impacts of an ageing society, climate change, and rising interest rates are increasingly becoming near-term realities. In this section we consider risks to the public finances associated with long-term economic, demographic and technological trends.

Economic trends

Potential output

5.47 Potential output growth is defined to be the sustainable rate at which an economy can grow without under- or over-utilising available resources (and thereby putting downward or upward pressure on inflation). Weak potential output growth will, over time, lead to lower GDP growth that will in turn directly reduce growth in all the major tax bases. The outlook for potential output growth is the most important determinant of the medium- and longer-term fiscal outlook and therefore the primary source of risk to the public finances. Potential growth (and its associated fiscal risks) can be decomposed into three main determinants:

- **Labour supply**. Since our 2021 *FRR* we have revised down our pandemic scarring assumption to labour supply in the light of higher net inward migration than we had previously assumed. However, participation rates in the labour market have also been falling (as explored in Chapter 2), which acts to constrain labour supply growth.

- **Capital stock**. Business investment has stagnated since 2016. The environment of increased uncertainty and tensions in the global context of the energy crisis and

[31] NHS Resolution, *Annual report and accounts 2021/22,* July 2022.
[32] NHS resolution, *Annual Statistics (Supplementary Annual Statistics, Table 9A and 11A.1),* 2021.

subsequent high inflation, the Russia-Ukraine conflict, and the UK's still-evolving future trading relationship with the EU, has held investment back. High interest rates further weigh on investment by increasing the cost of capital, which has been compounded by the increase in the main rate of corporation tax to 25 per cent this year. However, the Government's ambition to make the capital allowances full expensing policy permanent could be a source of upside risk by providing a sustained boost to business investment (albeit at a material fiscal cost).

- **Total factor productivity (TFP)**. TFP growth declined considerably following the financial crisis and has remained low. The reasons for the fall in TFP growth, coined the 'productivity puzzle', are subject to ongoing debate. Brexit, Covid and the energy crisis are each likely to have also lowered the level of TFP (with their impact coming through over time via periods of lower growth), which has made distinguishing the underlying path even more challenging.

Global trade cooperation

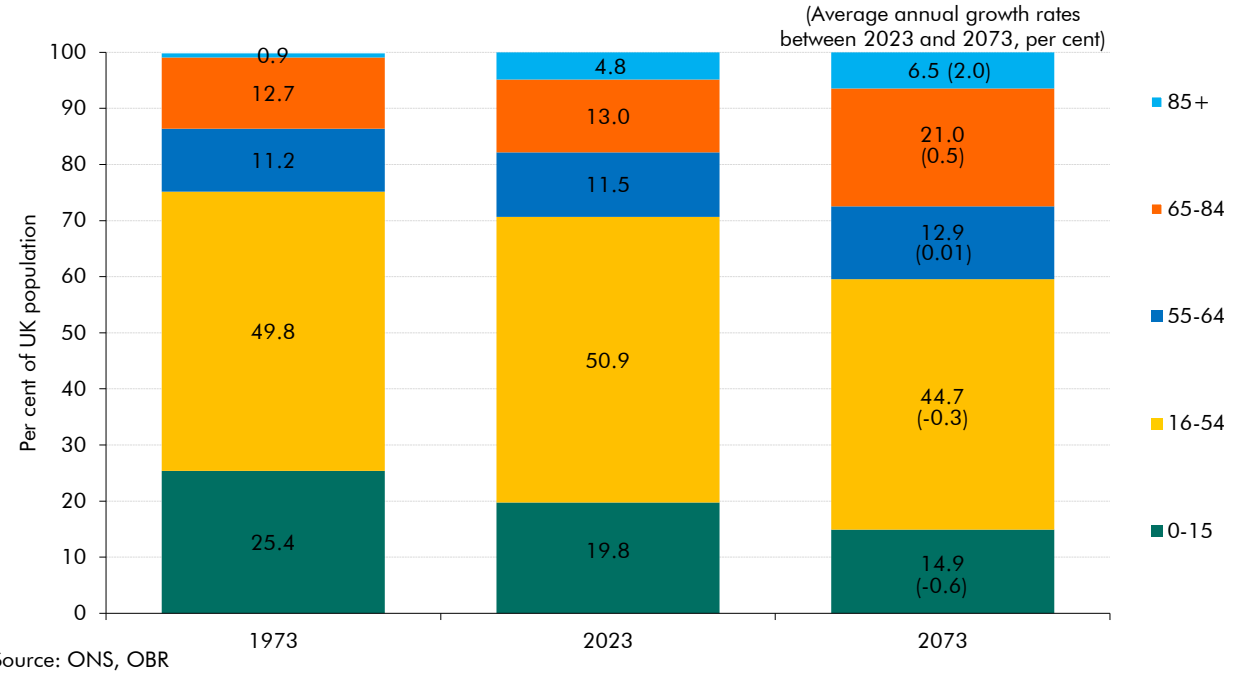
5.48 As geopolitical tensions rise, countries may become more inclined to reduce their economic openness and retreat from global economic integration.[33] The trade policy landscape has deteriorated in recent years with a sharp rise in restrictions, non-tariff measures and subsidies.[34] However, since our 2022 *FRS*, there has been some positive news. In February 2023, the Windsor Framework replaced the Northern Ireland Protocol, which should reduce the risks posed to our forecast from frictions or disputes over the original protocol. In March 2023, the UK joined the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), becoming the first new member since the trade bloc was established in 2018 and the first European member. But the risk remains present in the context of Brexit, the trade tensions between China and the US, and the ongoing Russia-Ukraine war. In our 2022 *FRS*, we estimated that rising protectionism and escalated trade tensions could add over 20 per cent of GDP to public debt by the mid-2030s.[35]

Demographic pressures

5.49 The UK's ageing population will continue to drive health and social care spending, and the cost of state pensions. Past trends of declining birth rates and increasing longevity have together created an ageing population, meaning that a higher proportion of the population will be in older age brackets (Chart 5.5). As Box 4.1 in our 2022 *FRS* set out, the UN's 2019 population projections placed the UK's old-age dependency ratio at close to average across advanced economies.

[33] See Chapter 2 of our July 2022 *FRS*.
[34] IMF, *Review of the Role of Trade in the Work of the Fund,* April 2023.
[35] This draws on the World Trade Organization scenario and was set out in Chapter 2 of our July 2022 *FRS*.

Chart 5.5: Population age structure in 1973, 2023 and 2073



Source: ONS, OBR

Health and social care

5.50 The NHS is the largest single item of public spending in the UK and has perpetually been subject to significant spending pressures. The pandemic recently worsened this as it shifted NHS priorities and created backlogs in the system. The rising waiting list and demand (discussed in Chapter 2) are significant sources of near-term pressures. It has not been uncommon for the Government to address these spending pressures through additional funding. The largest increased NHS spending by £20 billion a year, as announced by Prime Minister Theresa May in 2018. More recently in Autumn Statement 2022, the Government announced a 'one-off' addition, making available up to £6.2 billion in 2023-24 and up to £8 billion in 2024-25 to address pressures in the health and social care systems.

5.51 The long-term trend of the population ageing and the associated decline in the average health of the population also creates long-term pressures on health spending. Our long-term projections (discussed in Chapter 4) assume that health spending rises at an annual rate of 3.0 per cent in real terms over the next 15 years, 1.2 percentage points faster than our projection for the wider economy. But there are clearly risks to this assumption. Last month, NHS England published its *Long Term Workforce Plan*, which projects growth in the overall NHS workforce of between 2.6 and 2.9 per cent a year, 2.0 to 2.3 percentage points faster than our projection for whole-economy employment growth. Barring a reduction in the real rate of growth in NHS pay to below economy-wide wage growth, significant further productivity improvements or savings elsewhere in health budgets, this would present a material upside risk to this assumption about growth in NHS spending.

5.52 Costs for social care have been rising steadily on the back of higher demand and rising life expectancies for successive cohorts. The Government announced a package of reforms in 2021 to the funding of social care, including a cap on the amount that anyone in England

will spend on care in their lifetime. The cap is set at £86,000 and takes effect from October 2025. This adds around 0.2 per cent of GDP to social care spending by 2071-72.[36]

Welfare spending

5.53 As the population ages, there is an increased number of retirees relying on pension schemes and social security for their income. State pension spending is set to increase by 3.8 per cent of GDP between 2022-23 and 2072-73 – a near-doubling from 4.8 to 8.6 per cent of GDP. A higher old-age dependency ratio also means a smaller proportion of the population are contributing to tax revenues through employment. All of these trends could increase fiscal pressures on future governments.

5.54 Spending pressures are not only driven by a rising proportion of the population in older age groups. Over the past decade, the share of the working-age population reporting a disability has risen by 36 per cent, while the share in receipt of a health- or disability-related benefit has risen by 40 per cent. The growing number of new claims has been compounded by an increasing rate of claims approved for more generous incapacity benefits (as discussed in Chapter 2). Since our 2021 *FRR*, we have revised disability benefit spending up by 0.4 per cent of GDP at the forecast horizon (from 1.2 to 1.6 per cent of GDP). Taken together, spending on pensions and health-related benefits rises from two-thirds of total welfare spending prior to the pandemic in 2019-20 to just under three-quarters of it in 2027-28.

Behavioural and technological trends

5.55 Several tax bases are at risk of being eroded by behavioural or technological changes. This is particularly true for emissions-linked taxes as the UK transitions to net zero.[37] Since our 2021 *FRR*, there has been an acceleration in the uptake of electric vehicles, increasing the pace at which fuel duty revenues are eroded.[38] Although receipts will fall away faster as more people switch to electric vehicles in the near term, the fiscal risk in the long term has decreased following the Government's decision in Autumn Statement 2022 to equalise the VED treatment of previously exempt electric vehicles from April 2025. This in part protects the erosion of VED, which raised over £7 billion in 2022-23, but the almost £25 billion raised from fuel duty remains at risk.

[36] See Box A.1 in our October 2021 *Economic and fiscal outlook*.
[37] We discuss this further in *OBR Working paper No.18: Emissions and our tax forecasts*.
[38] See Box 3.3 in our March 2022 *Economic and fiscal outlook*.

Index of charts and tables

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