
Productivity and Fiscal Sustainability

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Foreword

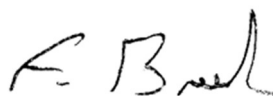
The Scottish Fiscal Commission is the independent fiscal institution for Scotland. Our statutory duty is to provide independent and official forecasts of the economy, tax revenues and social security spending to inform the Scottish Budget.

Following the recommendations by the OECD in its evaluation of the Commission and by the Scottish Parliament's Finance and Public Administration Committee, we published the first Fiscal Sustainability Report for Scotland in March 2023. That report set out long-term projections of the Scottish economy, devolved funding and public spending. Following a request from the Finance and Public Administration Committee this report presents that analysis with a change to our productivity assumption.

We plan to continue our work on fiscal sustainability and intend to publish papers looking at fiscal sustainability in specific areas such as climate change and health in the future. We welcome feedback on the approaches used in this report, and suggestions for future topics.



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29 August 2023

Contents

| | |
|--|----|
| Foreword | 1 |
| Summary | 3 |
| Chapter 1 How we approach productivity | 5 |
| Chapter 2 How productivity growth affects the Scottish Budget in our FSR | 9 |
| Chapter 3 Limitations and future analysis | 18 |
| Additional information | 20 |

Summary

- 1 Productivity measures how much output of goods and services is created for a given amount of input such as labour, capital or land. Labour productivity underpins all of the Scottish Fiscal Commission's long-term economic, income, and spending projections.
- 2 This paper explores the potential effects of a change in productivity growth on the long-term outlook for the devolved Scottish public finances. We conclude that even though higher productivity growth leads to a faster economic growth, higher wage growth, and likely better public services for the people of Scotland, on its own it does not necessarily translate into a more sustainable fiscal position. While higher productivity growth has a clear positive effect on the economy, the net effects on the public finances are complicated and to improve fiscal sustainability will require changes in public spending or tax policy.
- 3 We model higher and lower productivity growth than in our Fiscal Sustainability Report (FSR) published in March 2023. Historically productivity growth in Scotland and the rest of the UK has been broadly similar and therefore we focus on changes in productivity growth across the UK. We have also modelled the effects of higher and lower productivity growth being seen only in Scotland, and those results are discussed in the report to illustrate the potential ways in which productivity affects the projections.
- 4 We assume wages rise in line with productivity, and that this happens consistently across both the private and public sectors. Higher wages provide a boost to devolved Scottish funding through larger devolved income tax revenues. But there are also implications for public spending. Where productivity increases across the UK, we expect UK Government spending to increase, which results in additional funding for the Scottish Government through the Block Grant.
- 5 Our analysis mirrors the approach taken by the OBR for the UK, so our analysis is consistent with its assessments of fiscal sustainability. We make a number of simplifying assumptions: that higher productivity growth results in higher wage growth with no other effects such as a change in working hours or participation rates, and that it also results in higher public spending mainly because public sector wages grow at the same rate as those in the private sector.
- 6 Another key assumption is that as productivity grows more or less rapidly, no further policy interventions occur. In reality, as the resources available to the Scottish and UK Governments change, we can expect changes to public spending and taxation policy both here and in the rest of the UK.
- 7 Under these assumptions higher productivity growth means Scotland would become wealthier, more prosperous and it is likely public services would improve. However the annual budget gap could be worse than a scenario with lower productivity growth. Although our no policy change standpoint is unlikely to hold true in practice, the broad trends it outlines show potential future challenges for the devolved public finances.
- 8 If yearly productivity growth in the UK was 0.2 percentage points higher than we projected in March 2023, the 50-year average projected Annual Budget Gap (ABG) would grow from 1.7 per cent to 2.0 per cent of devolved public spending.¹ In this scenario higher productivity growth is resulting in public spending in Scotland rising by more than the associated increase in funding. In contrast, if

¹ The Annual Budget Gap (ABG) is the amount that devolved spending exceeds funding, expressed as a share of total devolved spending.

yearly productivity growth was 0.2 percentage points lower than in our central case, then the average ABG would shrink slightly to 1.5 per cent of devolved public spending.

- 9 We have based the analysis on the current devolution arrangements.² Under our modelling assumptions, all devolved spending in Scotland is affected by productivity growth in Scotland. Since tax devolution, changes in Scottish productivity influence around half of devolved funding. The rest of funding is through the Block Grant, determined by changes in UK Government spending because of productivity in the rest of the UK. But the mechanisms of the Barnett formula, when combined with a projected decline in population in Scotland relative to the rest of the UK, mean that overall funding benefits less from faster productivity growth than the pressure it adds to public spending.
- 10 Our analysis suggests that, under the current devolution arrangements, an increase in productivity is on its own not necessarily a guarantee for the sustainability of the Scottish public finances. Decisions would have to be taken by governments so that the public finances benefit more from those increases in productivity by changing either public spending or tax policy.

² The dynamics described in this report are unaffected by the recent changes to the Scottish Government's fiscal framework following its first review. Scottish Government (2023) Agreement reached on Fiscal Framework ([link](#))

Chapter 1

How we approach productivity

Introduction

- 1.1 Our first Fiscal Sustainability Report (FSR) was published in March 2023.³ That report focused on how demographic change would affect the devolved public finances. We showed the risks to the devolved public finances, if current tax and spending arrangements continue, in the context of a falling and ageing population.
- 1.2 We assumed Scotland's productivity growth would match the OBR's assumption for the UK as a whole. In this paper, we consider how higher and lower productivity growth in the UK as a whole or only in Scotland would affect the central scenario of the March 2023 FSR. We also explain what these results mean for policy makers and other stakeholders.
- 1.3 The main area of interest in the March 2023 FSR was demographic change. Taking the same approach as other FSRs, we made some simplifying assumptions on other parts of the projection to explain the effects of demographic change. In this paper we do not change those assumptions, for example, that productivity increases equally across the economy. Instead we focus on the effects of a change in the growth rate of productivity.

Productivity in our March 2023 FSR

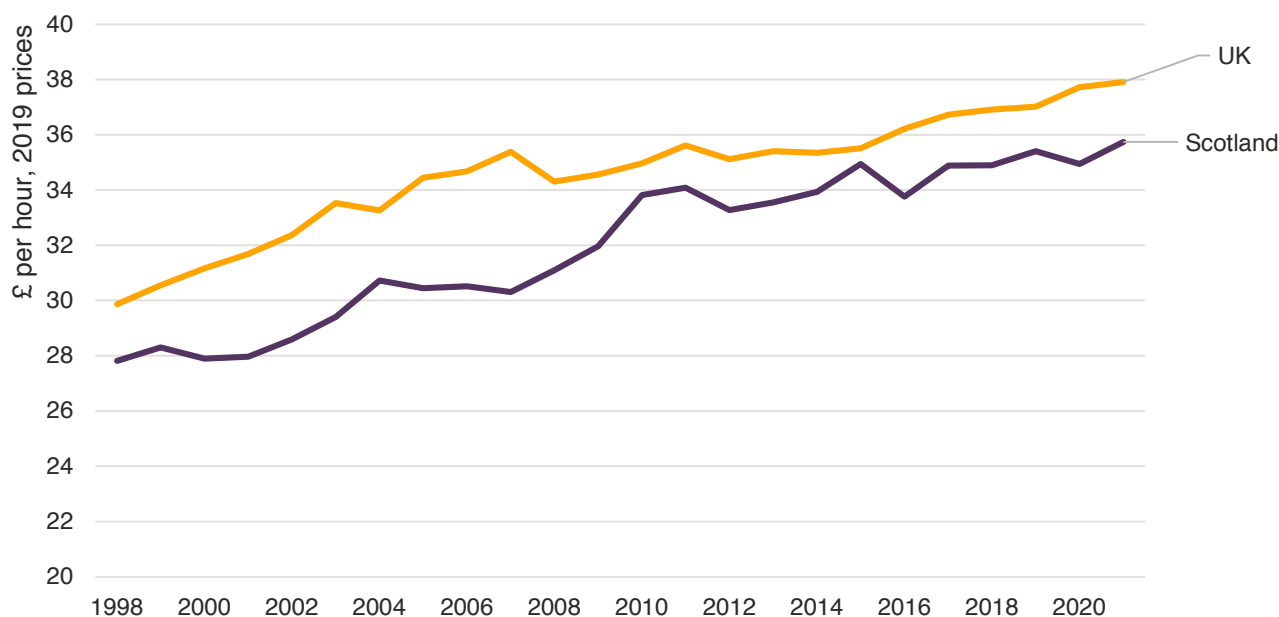
- 1.4 Labour productivity is the value of goods and services produced for an hour of labour input. It is driven by improvements in technology and working practices. When combined with the number of hours worked by employed people it determines the size of the economy. If productivity increases, so does the amount of goods and services produced by the workforce, all else held equal.
- 1.5 Average labour productivity in Scotland is below that of the UK as a whole, so the monetary value for each hour worked is lower. In 2021 the gap was 6 per cent. However, as shown in Figure 1.1, labour productivity has typically grown at the same rate in Scotland as across the UK. Gross Value Added (GVA) per hour in Scotland grew at 1.1 per cent per year on average from 1998 to 2021, and the UK's grew on average at 1.0 per cent a year in the same period.⁴

³ Scottish Fiscal Commission (2023) Fiscal Sustainability Report – March 2023 ([link](#))

⁴ The difference between Scottish and UK productivity growth from 1998 to 2021 was 0.03 percentage points. The analysis in this paper is an extension of our March 2023 analysis and is based on productivity data up to 2021. We therefore have not included the recently released productivity data for 2022. This data shows productivity in Scotland grew by 2.0 per cent in 2022 while UK productivity grew at 0.4 per cent. Scottish Government (2023) Labour productivity statistics: 2022 ([link](#)) and ONS (2022) Output per hour worked, UK released 7 July 2023 ([link](#))

Figure 1.1: Scotland and UK labour productivity, GVA in constant prices per hour worked

Productivity in Scotland was 6 per cent lower than in the UK in 2021, but historically has grown at a similar rate to the UK.



Description of Figure 1.1: line chart showing the productivity in £ per hour (2019 prices) both in Scotland and the UK since 1998. Scotland's productivity has always been below that of the UK by around £2 to £3 an hour, a gap of around 6 per cent. However, productivity in both geographies has grown at similar rates over time, maintaining the historic gap. Source: Scottish Fiscal Commission, Scottish Government (2022) Labour productivity statistics: 2021 Quarter 4 ([link](#)), ONS (2023) Output per hour worked, UK released 7 July 2023 ([link](#)).

- 1.6 In our long-term projections, we assume labour productivity growth is the same in Scotland as in the UK, based on the overall trend over the last 20 years. We also assume that the productivity growth rate is the same across the public and private sectors. Our March 2023 report followed the OBR's assumption that productivity growth would be 1.4 per cent a year until 2035-36, and 1.5 per cent from then on.⁵
- 1.7 The slower initial growth rate of 1.4 per cent is because of the effect of Brexit on economic growth, which the OBR assumes will reduce UK productivity by 4 per cent in the long run.⁶ The assumption of 1.5 per cent is based on long-term trends. Labour productivity growth across the UK since 2010 has been significantly slower at around 0.7 per cent per year. We and the OBR assume in our projections that productivity growth will be higher in the future based on the long run historical average.
- 1.8 As we applied the same rate of growth in labour productivity to Scotland and the rest of the UK, the gap in productivity levels of 6 per cent persists throughout the projection.⁷
- 1.9 Figure 1.2 shows average Scottish productivity growth between 1998 and 2021 compared to the UK, the EU and the OECD. Scottish productivity growth is close to the average in the two international country groups.

⁵ OBR (2022) Fiscal Risks and Sustainability – July 2022 ([link](#)) and Scottish Fiscal Commission (2023) Fiscal Sustainability Report – March 2023 ([link](#))

⁶ OBR (2020) Economic and fiscal outlook – March 2020 Box 2.1 ([link](#))

⁷ Drawn from forecasts from the OBR (2023) Economic and fiscal outlook – March 2023 ([link](#)) and the SFC (2023) Scotland's Economic and Fiscal Forecasts – May 2023 ([link](#)).

Figure 1.2: Scotland and UK productivity growth compared to relevant country groups

| Average change (per cent) | 1998 to 2021 |
|---------------------------|--------------|
| Scotland | 1.1 |
| UK | 1.0 |
| International Groupings | |
| EU | 1.2 |
| OECD [1] | 1.2 |

Source: Scottish Fiscal Commission, Scottish Government (2022) Labour Productivity Statistics: 2021 Quarter 4 ([link](#)); ONS (2023) Output per hour worked, UK released 7 July 2023 ([link](#)); OECD (2023) Compendium of Productivity Indicators ([link](#))
 [1] The OECD growth rate is calculated between 2000 and 2021, as data is not available for 1998 and 1999.

Changes to our productivity assumption

- 1.10 We have modelled four new scenarios. These apply high and low productivity assumptions either to Scotland alone or to the whole of the UK. The high scenarios add 0.2 percentage points to the productivity growth rate we assumed in our March 2023 central case. The low scenarios subtract 0.2 percentage points instead. The changes in productivity we model are changes in the long-term trends, rather than one-off shocks. Figure 1.3 shows the growth rate assumptions in each scenario.

Figure 1.3: Assumed levels of productivity growth (per cent)

| Scenario | 2028-29 to 2035-36 | 2036-37 to 2072-73 |
|--------------------|--------------------|--------------------|
| Central projection | 1.4 | 1.5 |
| High productivity | 1.6 | 1.7 |
| Low productivity | 1.2 | 1.3 |

Source: Scottish Fiscal Commission

- 1.11 Although levels of productivity are different in Scotland and in the UK as a whole, as shown in Figure 1.1, over the long term growth in productivity has been similar. The modelled scenarios in which productivity growth in Scotland is different to that of the UK for an extended period are therefore unlikely, but it is helpful to show how differential productivity growth could affect the Scottish Budget. The integration of the Scottish economy and labour market with the rest of the UK means that productivity will likely continue to grow at a similar pace across the UK. We have therefore also modelled the high and low productivity variants applied to the whole of the UK, not just Scotland.
- 1.12 Factors which could result in higher productivity growth include increases in on-the-job training for employees, higher levels of business investment, and improvements in educational outcomes for school leavers. Similarly, lower levels of training or investment could result in lower productivity growth.
- 1.13 Though the change in the growth rate is small, the overall cumulative effect over fifty years is large. By 2072-73, the low scenario represents 8 per cent lower productivity, and the high scenario 9 per cent higher productivity, compared with our central projection.

- 1.14 In the scenarios applied across the UK as a whole, the percentage gap in productivity levels between Scotland and the UK remains constant throughout the projection period, with both productivity levels growing at the same rate.
- 1.15 In the scenario where higher productivity growth occurs in Scotland but not in the rest of the UK, Scottish productivity would eventually overtake that of the UK before the end of the projection period. In contrast, in the scenario where Scotland's productivity growth is lower than the UK, the gap between the two would grow, with Scotland falling further behind the UK.

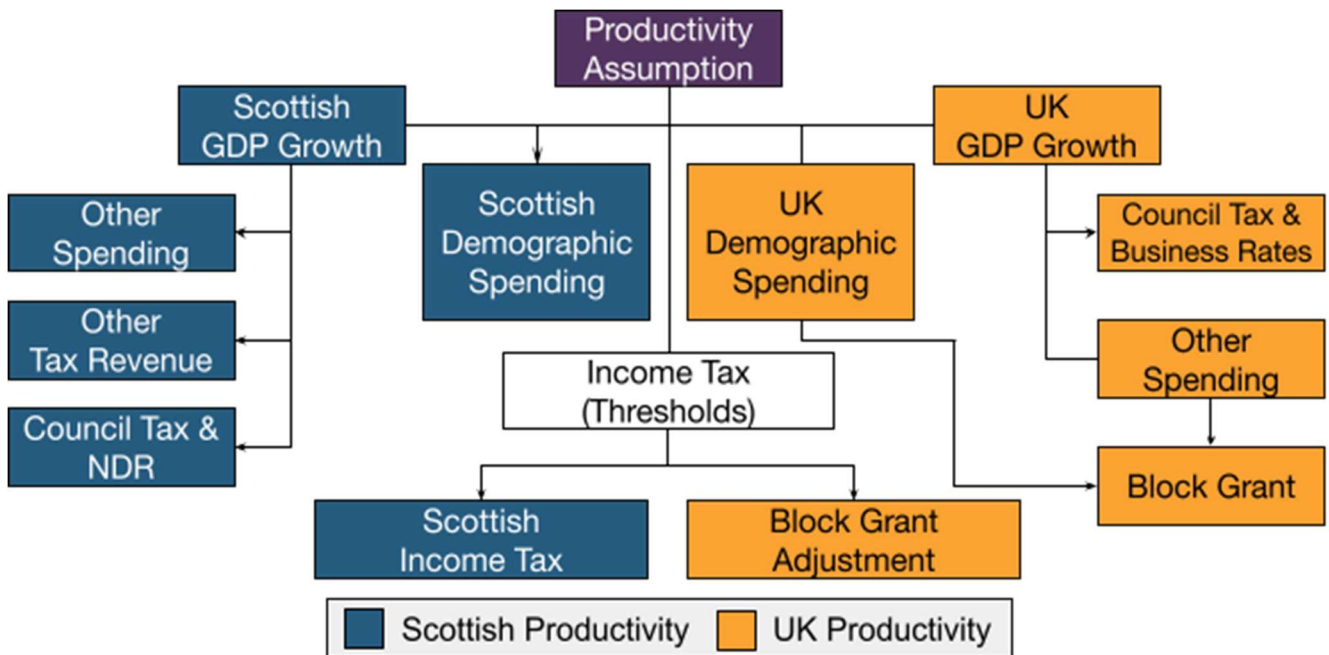
Chapter 2

How productivity growth affects the Scottish Budget in our FSR

- 2.1 Labour productivity is an important driver of economic growth. It determines how many goods and services can be provided for every hour of work. As workers become more efficient, we assume their real wages increase in line with the increase in their productivity. We assume that real wages across the economy grow at the same rate throughout our projection.
- 2.2 We assume that there are no additional effects from productivity increases, such as changes on the level of employment or average hours worked. We assume that the employment rate is constant for each year of age, and so is only affected by demographic changes. We assume that average hours worked per worker is constant throughout the projection period.
- 2.3 Figure 2.1 sets out how productivity feeds into our models. Any change in productivity is assumed to affect GDP, tax revenues, and government spending.

Figure 2.1: Illustrative diagram of labour productivity assumption in FSR modelling

Productivity affects all projections of GDP, Scottish and UK-wide, and in turn all projections of spending and funding for both the UK and the Scottish Governments.



Description of Figure 2.1: flowchart depicting how productivity affects each of the models for the FSR. It affects the Scottish and UK GDP projections. Each, in turn, affect the projection of funding and spending of areas not deemed to be demographically sensitive, with UK Government spending projections leading to Block Grant funding for Scottish Government. Productivity also affects Scottish income tax revenues and the equivalent revenues in the rest of the UK, which result in projected income tax Block Grant Adjustments.

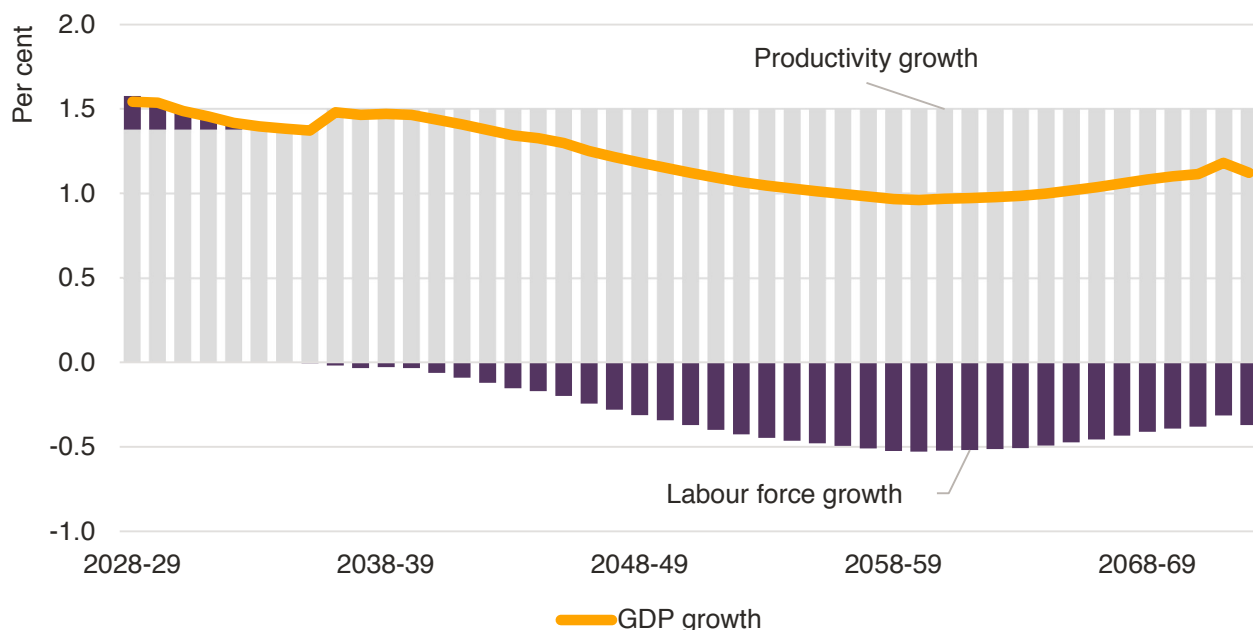
Source: Scottish Fiscal Commission

Economy

2.4 Labour productivity, along with the total number of hours worked, forms our long-term projection of GDP growth. As shown in Figure 2.2, in our central scenario in the March 2023 FSR, GDP growth is mostly driven by assumed rises in productivity, and partly offset by reduction in the working population (the labour force) as the size and shape of Scotland's population changes.

Figure 2.2: Components of projected Scottish GDP growth, 2028-29 to 2072-73

Projected GDP growth is mostly driven by assumed productivity increases, with demographic factors becoming a drag on the economy from the late 2030s.



Description of Figure 2.2: stacked column chart showing the components of projected Scottish GDP growth from 2028-29 to 2072-73. Assumed productivity growth is a constant throughout the projection, with a slight increase from 2036-37 onwards. The labour force contributes to economic growth in the early years, but from 2036-37 it becomes a drag that gets progressively worse, peaking in the late 2050s before softening slightly.

Source: Scottish Fiscal Commission (2023) Fiscal Sustainability Report – March 2023 ([link](#))

2.5 For all other determinants, we match the assumptions set out in our March 2023 FSR. We assume that changes in productivity have no interactions with participation rates and average hours worked, which might slow or enhance economic growth. All of our projections are in real-terms and given in 2022-23 prices.

Funding

2.6 Scottish Government funding is determined by the revenue it receives from devolved taxes, the Block Grant based on UK Government spending, and Block Grant Adjustments (BGAs) based on UK Government devolved social security spending and tax revenues.

2.7 Throughout the fifty-year horizon our models assume that growth in productivity leads to the same growth in real-terms wages. In our March report this meant earnings were projected to grow at the same rate across Scotland and the rest of the UK.

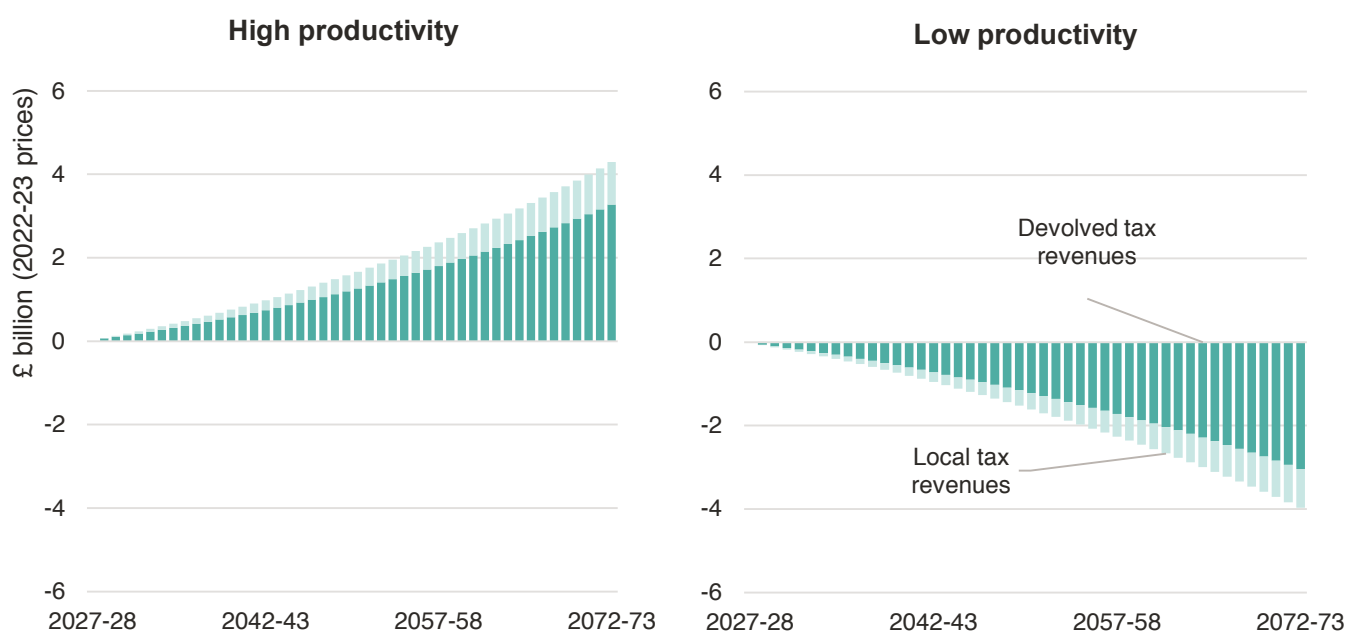
2.8 We take the same unchanged policy approach as the OBR with regards to income tax. To isolate the effects of demographic change on the devolved tax system, we uprate income tax bands each

year in line with earnings. In this way the number of taxpayers in each band only changes depending on demographics. Earnings growth still influences tax revenues, as earnings growth within each tax band leads to growth in tax revenues.

- 2.9 Figure 2.3 shows the changes in local and devolved taxes when changing only the Scottish productivity growth assumption. Because the Block Grant and BGAs are based on UK Government devolved spending and revenues they are unaffected by this change. We also assume that changes to Scottish productivity growth does not lead to any interactions with the rest of the UK.

Figure 2.3: Change in funding projections with Scotland-only productivity scenarios

Faster productivity growth in Scotland increases tax revenues while slower productivity growth reduces them.



Description of Figure 2.3: two stacked column charts showing how local and devolved tax revenues change within the 50-year projection in the event of higher or lower productivity growth. Tax revenues increase with faster productivity growth and decrease with slower productivity growth. Devolved taxes contribute to most of the change in both cases, and both the decrease and increase are gradual and broadly symmetrical.

Source: Scottish Fiscal Commission.

- 2.10 Relative to the central scenario, a 0.2 percentage point change in assumed Scottish productivity growth is projected to increase non-reserved tax revenues in 2072-73 by £4.3 billion in the high productivity scenario, and reduce them by £4.0 billion in the low productivity scenario.
- 2.11 These changes are roughly equivalent to the whole portfolio allocation for education in the 2023-24 Budget.⁸ However, they are relatively small as a share of the overall Scottish Budget. The shift in tax revenues from differing productivity growth in Scotland only would amount to 4 per cent of the total devolved spending by the end of the projection, when the changes are largest.
- 2.12 By 2072-73, in our central projection, 60 per cent of devolved public funding is the net Block Grant – the Block Grant after BGAs – which is only affected by changes of productivity growth in the UK as a whole.
- 2.13 In line with the OBR, we assume that UK-wide productivity growth leads to increased UK Government spending to maintain current levels of service provision relative to the wider economy.

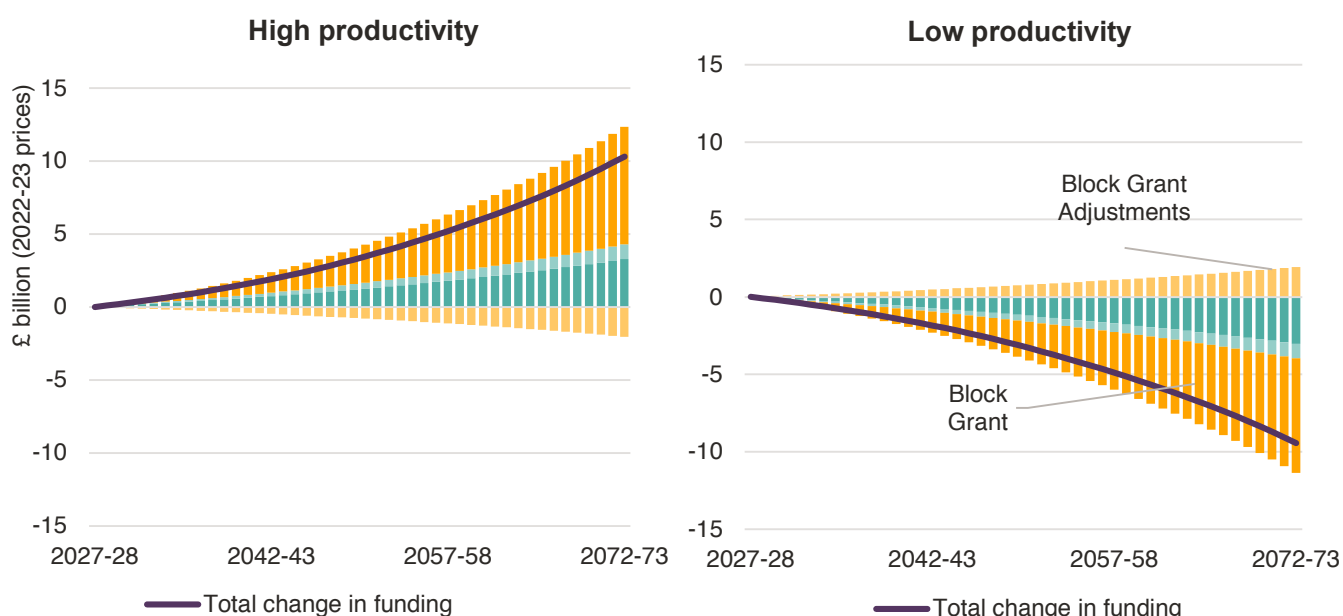
⁸ Scottish Government (2022) Scottish Budget 2023-24 ([link](#))

To the extent that these services are devolved, this will lead to a larger Block Grant funding for the Scottish Government through the Barnett Formula.

- 2.14 The tax BGAs partly depend on UK Government devolved tax revenues in England and Northern Ireland (E&NI). We project the tax BGAs on the same basis as the Scottish tax revenues. Therefore, UK-wide productivity growth leads to greater income tax revenues in E&NI. For any given population projections, greater income tax revenues in E&NI increase the income tax BGA, which reduces Scottish Government funding. All other tax BGAs are projected to grow in line with UK GDP.
- 2.15 We assume social security payments that the UK Government is responsible for in England and Wales (E&W) also grow in line with real wages and so with productivity. This is to ensure that throughout the projection social security payments are worth the same as currently when compared to what could be earned from employment. As a result the social security BGAs increase.
- 2.16 Figure 2.4 shows how changes to the productivity growth assumption for all of the UK affect our projections of devolved funding. As well as the changes in local and devolved tax revenues coming from Scottish-specific changes in productivity growth shown in Figure 2.3, Figure 2.4 shows how UK-wide changes also affect the Block Grant and the BGAs.

Figure 2.4: Change in funding projections with UK-wide productivity scenarios

Faster or slower productivity growth in all of the UK leads, respectively, to more or less funding for Scotland, with the Block Grant driving the changes.



Description of Figure 2.4: two stacked column charts showing how Scottish devolved funding changes within the 50-year projection in the event of higher or lower productivity growth in all the UK. Funding rises with higher productivity growth and falls with slower productivity growth. The Block Grant drives the bulk of the change in both cases, and both the decrease and increase are gradual and broadly symmetrical.

Source: Scottish Fiscal Commission.

- 2.17 In the high productivity scenario, the Scottish Government would find itself with significantly more funding. The Block Grant would increase by £8.1 billion in 2072-73. BGAs partially offset the rise in the Block Grant because of greater growth in UK Government devolved tax revenues in E&NI. The larger BGAs reduce funding by £2.0 billion in 2072-73. Together with the increased Scottish tax revenues outlined in Figure 2.3, in the event of UK-wide productivity growing faster than in our central scenario, we project there would be an extra £10.3 billion of devolved funding in 2072-73.

2.18 In the low productivity scenario, the Block Grant falls by £7.4 billion in 2072-23 relative to the central scenario. The fall is partially offset by slower growth of devolved tax revenues in E&NI. This leads to the tax BGAs growing more slowly, and therefore increases devolved funding by £1.9 billion in 2072-73 relative to our central scenario. Together with the lower Scottish tax revenues shown in Figure 2.3, a lower than assumed UK-wide productivity growth rate leads to a total fall of £9.4 billion in devolved funding by 2072-73.

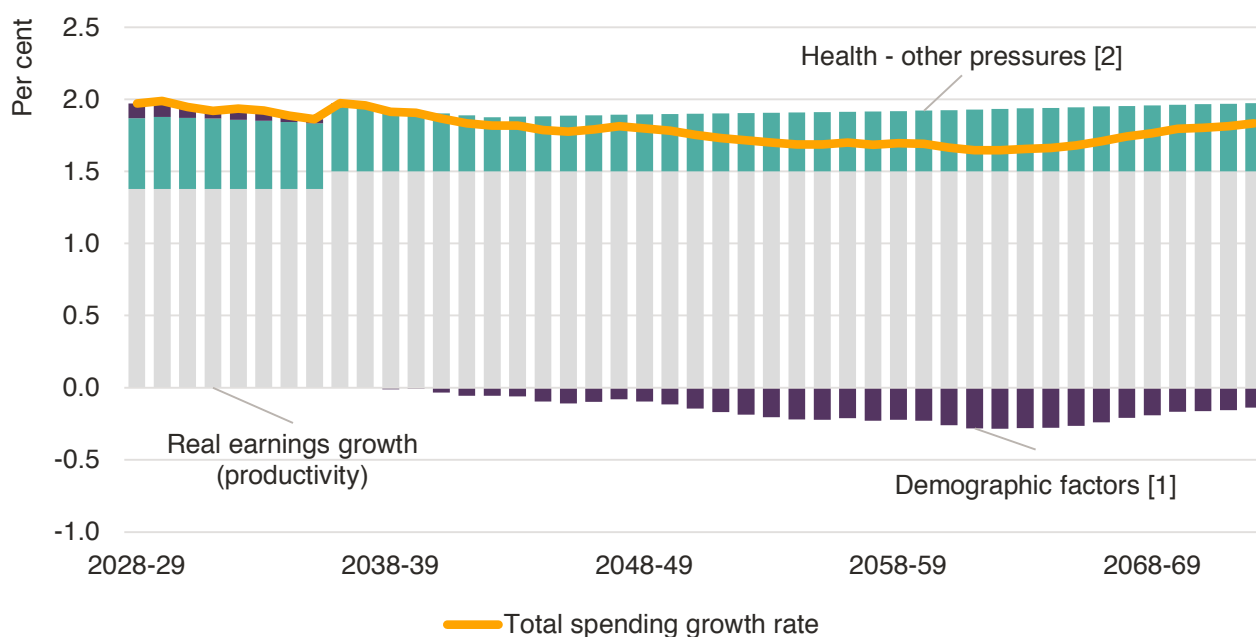
Spending

- 2.19 To fully assess how changes in productivity affect fiscal sustainability, we must also look at the implications of changes in assumed productivity growth for spending.
- 2.20 Productivity growth affects both Scottish Government and UK Government spending in our projections. For consistency with the OBR, we assume that wages in the UK and Scotland grow equally across the public and private sectors. Therefore, for education, adult social care and health we assume all spending (wage and non-wage costs) grows in line with demographics and productivity. We assume the value of social security payments also grows in line with productivity. Other areas of spending are updated in line with projected real GDP growth, which is also affected by changes in productivity as shown in Figure 2.2.
- 2.21 Our approach is based on the principle of unchanged policy, which is the standard view taken in FSRs.⁹ Effectively this assumes spending increases in response to productivity growth, both because wages increase in the public sector to attract and retain staff as wages grow elsewhere, and because governments continue to deliver the same level of public services relative to the available technology. The purpose of the FSR is to show how current policy could affect the public finances in the longer term and to highlight the scale of changes required. If future Governments make different choices, the effects on the public finances will be different. We do not speculate on different policy options in this report.
- 2.22 Figure 2.5 shows overall spending growth in our central scenario, as published in our March 2023 FSR.

⁹ This approach is discussed further in Scottish Fiscal Commission (2023) Fiscal Sustainability Report ([link](#))

Figure 2.5: Drivers of overall annual spending growth

Spending growth over the next fifty years is mostly projected to come from higher public sector wages following assumed rises in productivity



Description of Figure 2.5: stacked column chart showing the breakdown by drivers of projected spending growth from 2028-29 to 2072-73. Assumed productivity growth, which results in rises in real-terms earnings, is the most important and constant driver of spending growth. Other pressures for health spending are the second most important driver. Demographic factors are not big contributors to spending growth in the early years of the projection and actually lead to small savings from the late 2030s.

[1] Includes the effects of changing the State Pension age and, consequently, the rate of GDP growth and spending growth in other areas.

[2] In health, there are pressures which increase health spend beyond what can be explained by demographics. For example, rises in chronic health conditions or technological advances that allow more conditions to be treated.

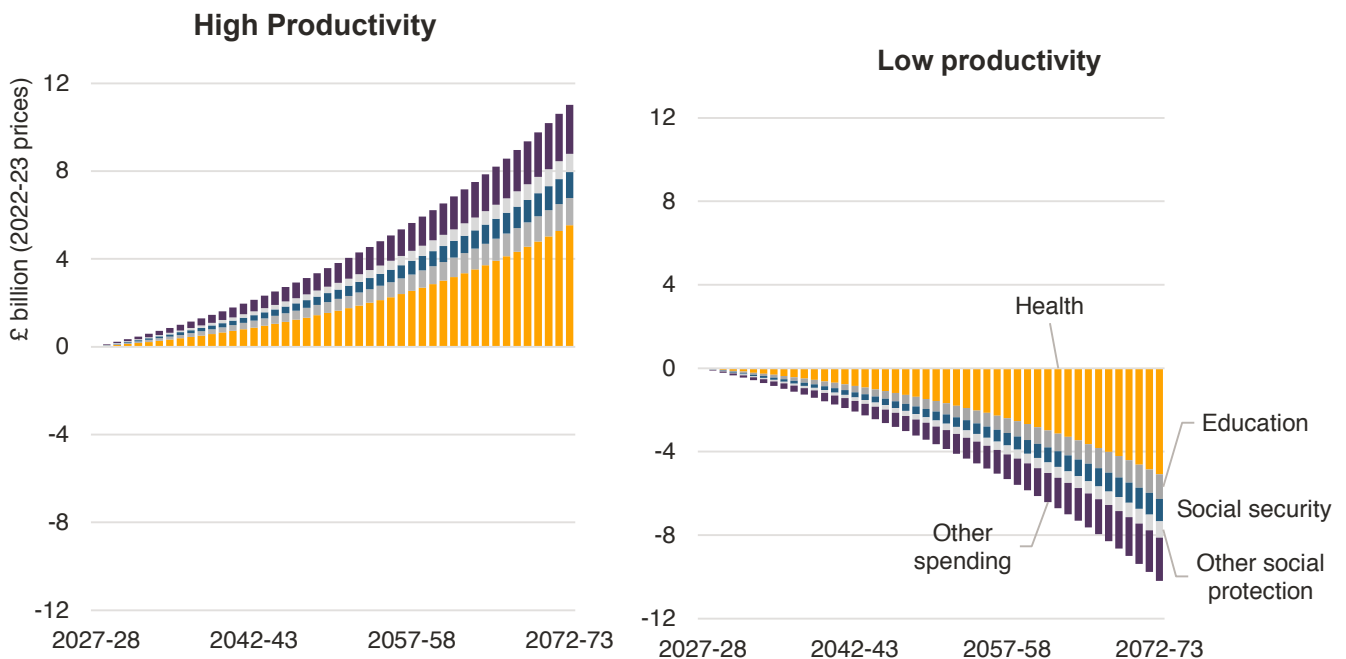
Source: Scottish Fiscal Commission (2023) Fiscal Sustainability Report – March 2023 ([link](#))

2.23 In the central projection of our March 2023 FSR, around 17 per cent of the growth in spending by 2072-73 came from other, non-demographic, pressures in health services. As we change our productivity assumption, the relative importance of those additional spending pressures changes too. Improvements in productivity are assumed to lead to growth in earnings for public sector workers, higher social security payments, and better public services in areas such as health and education. While these improvements should be expected to lead to improved living standards, this assumption means there would be significant increases in Scottish Government spending.

2.24 In projecting the Scottish Government spending, it does not matter whether the productivity change takes place in Scotland only or in the UK more broadly. This is because no devolved public spending depends on UK productivity growth in our projection models. Figure 2.6 shows the change in spending from changing our assumption about productivity growth.

Figure 2.6: Change in our projection of Scottish spending from productivity scenarios

Faster or slower productivity growth lead, respectively, to more or less public spending, with health driving the change in both cases



Description of Figure 2.6: stacked column charts showing the increase and decrease in public spending in the event of higher and lower productivity growth in Scotland. In both cases health is the main driver of the change. The shift is gradual and broadly symmetric.

Source: Scottish Fiscal Commission

2.25 In the high-productivity scenario spending is £11 billion higher than the central scenario in 2072-73. Similarly, in the low-productivity scenario spending is £10 billion lower than the central scenario in 2072-73.

Annual Budget Gap results

2.26 Under our assumptions, devolved spending is more sensitive than devolved funding to changes in productivity. This is because, as the Block Grant gets updated with the Barnett formula, Scotland's population share of the rest of the UK plays a role. The projected fall in Scotland's population implies that changes to devolved funding in either direction are smaller in absolute terms than changes to devolved spending. Figure 2.7 summarises how each Scotland-only productivity scenario affects each area of the model.

Figure 2.7: Effects of Scottish productivity scenarios on devolved funding sources

| Scenario | Block Grant | Tax net position | Spending | Total effect |
|-----------------------------------|--|---|---|----------------------------------|
| High productivity (Scotland-only) | Unaffected. Block Grant funding is determined by UK Government spending, so is unaffected by Scotland productivity. | Higher , as Scotland has increased tax revenues relative to the BGAs | Higher , as spending grows in line with wages. | Larger Annual Budget Gap |
| Low productivity (Scotland-only) | | Lower , as Scotland has lower tax revenues relative to the BGAs | Lower , as spending grows in line with wages. | Smaller Annual Budget Gap |

Source: Scottish Fiscal Commission

2.27 Although the scenario when Scottish productivity growth is higher than UK productivity growth for a sustained period is unlikely, we present the results to illustrate the effects on the public finances. The greater sensitivity of spending to productivity growth leads to counterintuitive results. Figure 2.8 shows the overall results if we apply the high and low productivity growth scenarios only to Scotland. In the high productivity scenario, the Annual Budget Gap (ABG) grows to 7.5 per cent of devolved spending in 2072-73. In contrast, the low productivity scenario leads to a surplus of 2.9 per cent.

Figure 2.8: Annual Budget Gap projections when Scotland has different productivity growth rates to the UK as a whole

| Share of devolved spending (per cent) | 2028-29 | 2050-51 | 2072-73 | Yearly average |
|---------------------------------------|---------|---------|---------|----------------|
| Central (same as UK) | 0.0 | -1.8 | -2.6 | -1.7 |
| High productivity | -0.1 | -4.2 | -7.5 | -4.1 |
| Low productivity | 0.0 | 0.7 | 2.9 | 0.9 |

Source: Scottish Fiscal Commission

2.28 In the second set of scenarios, we apply the same changes in productivity growth to all of the UK. Changes in funding through the Block Grant, determined by UK Government spending and tax revenues, partially offset the significant fluctuations in spending for Scotland. However, shifts in productivity still lead to slightly counterintuitive results because Scotland's falling population relative to the rest of the UK make the changes to the Block Grant slightly less responsive to the increased spending levels in the rest of the UK. Figure 2.9 summarises these relationships.

Figure 2.9: Effects of UK-wide productivity scenarios on devolved funding sources

| Scenario | Block Grant | Tax net position | Spending | Total effect |
|----------------------------|--|---|---|---|
| High productivity (All UK) | Higher , as UK Government spending grows in line with wages, determined by UK productivity. | Higher , as Scotland has increased tax revenues relative to the BGAs | Higher , as spending grows in line with wages. | Slightly greater Annual Budget Gap |
| Low productivity (All UK) | Lower , as UK Government spending grows in line with wages, determined by UK productivity. | Lower , as Scotland has lower tax revenues relative to the BGAs | Lower , as spending grows in line with wages. | Slightly smaller Annual Budget Gap |

Source: Scottish Fiscal Commission

2.29 Figure 2.10 shows the overall results if we apply the high and low productivity growth assumptions across the UK. In the high productivity scenario, the gap grows to 2.9 per cent of devolved spending by the same year. In the low productivity scenario, the gap shrinks slightly to 2.3 per cent of devolved public spending by 2072-73. These are both much closer to the ABG in the central scenario presented in the March 2023 FSR.

Figure 2.10: Annual Budget Gap projections when the UK has different productivity growth rates

| Share of devolved spending (per cent) | 2028-29 | 2050-51 | 2072-73 | Yearly average |
|---------------------------------------|---------|---------|---------|----------------|
| Central | 0.0 | -1.8 | -2.6 | -1.7 |
| High productivity | -0.1 | -2.1 | -2.9 | -2.0 |
| Low productivity | 0.0 | -1.6 | -2.3 | -1.5 |

Source: Scottish Fiscal Commission

2.30 These changes to the ABG result from our assumptions of the effects that productivity growth will have on the economy, revenues, and government spending. The results do not mean that improvements in productivity should be regarded as bad. Higher productivity growth would lead to greater real wages and better living standards. The conclusion is that higher productivity growth is on its own not necessarily a guarantee of the sustainability of the Scottish devolved public finances.

Chapter 3

Limitations and future analysis

- 3.1 Fiscal sustainability analysis is intended to illustrate the challenges which may emerge in the future. To do this we assume current trends continue, and then project forward what the consequences of specific changes may be for the devolved public finances.
- 3.2 These projections differ from our medium-term forecasts, which are published twice a year. We take greater care to forecast as precisely as possible what will happen in the near future. There is greater uncertainty in our long-term projections about how the population and economy may evolve as well as how government policy may change. Our March report considered the mechanisms through which demographic change and health spending growth would affect the Scottish Budget. The main aim was to highlight how broad trends could affect the public finances over time.
- 3.3 In this paper we have considered how a change to productivity growth rates may affect the devolved public finances. In applying this change, we have maintained simplifying assumptions which were also made in our March 2023 FSR. These include how productivity growth affects the economy and how public sector spending and funding change with productivity. The results are complex because productivity growth affects many aspects of the funding and spending of the Scottish Government.
- 3.4 As well as the simplifications in how productivity growth affects public funding and spending, there are also limitations in the general approach to projecting productivity. These are all areas we could potentially explore further in future reports.
- 3.5 The approach to productivity is relatively simple. Mirroring the approach to long-term projections taken by other Independent Financial Institutions (IFIs), we project economic growth as being caused by changes in the working population as well as changes in labour productivity.
- 3.6 We have assumed a broadly constant growth rate in labour productivity, and that there are no linkages between different rates of productivity growth and other economic factors. In reality productivity growth may not be the same across the whole economy, and there are likely to be periods of relatively higher and lower productivity growth.
- 3.7 Changes in labour productivity may also reshape our economy and labour market. The agricultural revolution in the 1700s and 1800s saw communal farming replaced by land enclosure, mechanisation, and crop rotation. Agricultural productivity grew rapidly as crop yields increased while agricultural employment fell, with fewer workers required to work the land. The Industrial Revolution followed, with a much larger proportion of the population engaged in manufacturing and heavy industry.
- 3.8 Over the next 50 years our economy is likely to change in ways we cannot predict. The advance of artificial intelligence may have a large effect on labour productivity in the future, and thus the shape of the workforce and economy. Similarly, economic disruption could lead to labour productivity gains as sectors are incentivised to innovate during periods of demand or supply constraints.
- 3.9 Our projections are based on increases in productivity leading to increases in real-terms earnings. We assume that real wages across the whole economy, in the public and private sectors, increase at the same rate as productivity. Making this assumption ensures our projections are consistent with the OBR's UK-wide analysis. There are two aspects of this we could consider in the future; will real

wages grow with productivity in the future as further technological developments occur, and will increases in productivity and wages be seen equally across all sectors and all parts of the income distribution.

- 3.10 Our projections hold labour market participation rates by age and gender and hours worked constant across the whole period, consistent with the approach taken by the OBR in its long-run projections. In the long run, labour productivity growth may influence people's employment decisions, for example the number of hours they work each week, or deciding to enter or leave the labour force entirely. In the 20th century, UK productivity grew by 2.1 per cent per year on average, while average hours fell by 0.5 per cent.^{10,11} Demographic change may have an effect on productivity growth as our population ages.
- 3.11 As we have noted, we do not expect productivity growth to differ between Scotland and the UK. Applying the Scotland-only productivity scenarios has also required an additional assumption that a change to productivity growth in Scotland is matched by changes to Scottish wages. In practice, if Scottish wages grew at a different pace to those in the rest of the UK this may result in intra-UK migration, or the movement of employment within the UK. The projections presented in this paper do not consider these effects.

Conclusions

- 3.12 This paper illustrates how under the current devolution arrangements, improving productivity growth on its own is not necessarily a solution to the fiscal challenges the Scottish Government faces. We conclude that even though higher productivity growth leads to a larger economy and higher wages for the people of Scotland, it does not necessarily translate into a more sustainable fiscal position. While higher productivity growth has a clear positive effect on the economy, decisions would have to be taken by governments so that the public finances benefit more from those increases in productivity by changing either public spending or tax policy.
- 3.13 This analysis requires a number of simplifying assumptions: that higher productivity results in higher wages with no other effects such as a change in working hours or participation rates, and that higher productivity results in higher public spending mainly because public sector wages grow at the same rate as those in the private sector. Our assumptions mirror those made by the OBR for the UK, so our analysis is consistent with its assessments of fiscal sustainability.

¹⁰ ONS (2023) Average actual weekly hours of work for full-time workers (seasonally adjusted) ([link](#))

¹¹ OBR (2018) Productivity growth in the long-term ([link](#))

Additional information

Abbreviations

| | |
|------|---|
| ABG | Annual Budget Gap |
| BGA | Block Grant Adjustment |
| E&NI | England and Northern Ireland |
| EU | European Union |
| FSR | Fiscal Sustainability Report |
| GDP | Gross Domestic Product |
| GVA | Gross Value Added |
| OBR | Office for Budget Responsibility |
| OECD | Organisation for Economic Cooperation and Development |

A full glossary of terms is available on our website:

<https://www.fiscalcommission.scot/explainers/glossary/>

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All charts and tables in this publication have also been made available in spreadsheet form on our website. For technical enquiries about the analysis and data presented in this paper please contact the responsible analyst:

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¹² OECD (2014) Recommendation on Principles for Independent Fiscal Institutions ([link](#))

¹³ Scottish Fiscal Commission (2018) Compliance with the Code of Practice for Official Statistics ([link](#))

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