Scottish Fiscal Commission

Trends in Scotland's population and effects on the economy and income tax

August 2022

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Any enquiries regarding this publication should be sent to us at: Scottish Fiscal Commission, Governor's House, Regent Road, Edinburgh EH1 3DE or info@fiscalcommission.scot

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Foreword

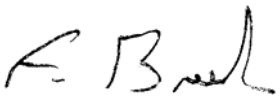
The Scottish Fiscal Commission is the independent fiscal institution for Scotland. We produce independent and official forecasts of the Scottish economy, devolved taxes and devolved social security spending. The Finance and Constitution Committee established a Legacy Expert Panel towards the end of the 2016 to 2021 parliamentary session to consider the scrutiny challenges the next committee would face. The Legacy Expert Panel recommended inviting the Scottish Fiscal Commission to publish "a long-term fiscal sustainability report at least once during each session of the Parliament."[1]

The Commission made a proposal to the Finance and Public Administration Committee in September 2021 on how we could approach producing a fiscal sustainability report for Scotland.[2] We began this work in 2022 and this report shares our first projections in this area.

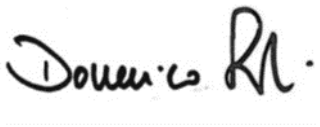
This report describes our demographic projections and our illustration of Scottish GDP over the next fifty years. Changing demographics and their effects on economic growth will have implications for the income tax net position. We show how demographics influence the net position over both the previous and the next five years. Our 2023 Fiscal Sustainability Report will continue this work and will show how we can expect population change to influence Scottish Government funding and spending. It will provide evidence to Scottish Parliament, policy makers and stakeholders on the coming pressures and challenges for Scottish Government finances.

We would like to thank the staff of the Commission as well as officials from the Scottish Government, HM Treasury, the Office for Budget Responsibility, the Northern Ireland Fiscal Council, and National Records of Scotland for their support in creating this report.

Professor Graeme Roy



Professor Francis Breedon



Dr Domenico Lombardi

Professor David Ulph

30 August 2022

[1] Finance and Constitution Committee (2021) Legacy Expert Panel Report to the Finance and Constitution Committee (link)
[2] Scottish Fiscal Commission (2021) Letter to Finance and Public Administration Committee from Dame Susan Rice about the Fiscal Sustainability Report – 6 September 2021 (link)

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Summary

Background

1. The question of whether a Government's fiscal position is sustainable in the long term is important for understanding how demand for public services will evolve in the future and how those public services can be funded. One of the most important factors affecting fiscal sustainability is demographics; the size and composition of the population affects both spending and funding.

2. Population ageing and the changing structure of the population is a common challenge for the fiscal sustainability of most high-income nations. We expect demographic change to be an influential determinant of the Scottish Government's future fiscal sustainability as it also is for the UK. The population size and structure directly affects economic growth and also Scottish Government finances through the effects on revenue and spending. For example, an ageing population is usually associated with increased spending on health and social care.

3. Next year the Commission will publish its first Fiscal Sustainability Report (FSR), looking at the Scottish Government's finances over a fifty-year horizon. In preparation for that report we set out demographic projections for Scotland for the next fifty years and consider how these differ from UK-wide projections.

4. Our report next year will focus on how demographics will affect Scottish Government spending and tax revenues. As well as directly affecting the Scottish Budget, for example because an ageing population results in increasing healthcare costs, demographics also less directly affect the Budget through the effects on economic performance and income tax revenues. In this report we provide illustrative growth projections to demonstrate the effects of demographic change on the economy and compare these to projections of UK economic growth.

5. Demographic and economic trends which are likely to continue in the long-term future have already affected the income tax funding position and we discuss influences on the income tax net position in the recent past and over the next five years. The demographic and economic trends discussed here and the influences on the income tax net position have implications for the Scottish Government's fiscal sustainability which we will explore in the report next year.

The demographic outlook

6. Our population projections use Office of National Statistics (ONS) and National Records of Scotland (NRS) data and assumptions and mirror the assumptions applied by the Office for Budget Responsibility (OBR) in their recent 'Fiscal risks and sustainability' report.[3] We have produced these projections on the same basis as the OBR so that our population and economic projections are comparable.

7. Our projections show that Scotland faces similar though more pronounced challenges to other high-income nations and to the UK in terms of ageing population. Figure 1 illustrates the changing profile of Scotland's population with population pyramids for 2022, 2042 and 2072. In 2022 the pyramid is widest for the working age population, this group is smaller by 2042 and is further

[3] OBR (2022) Fiscal risks and sustainability – July 2022 (link)

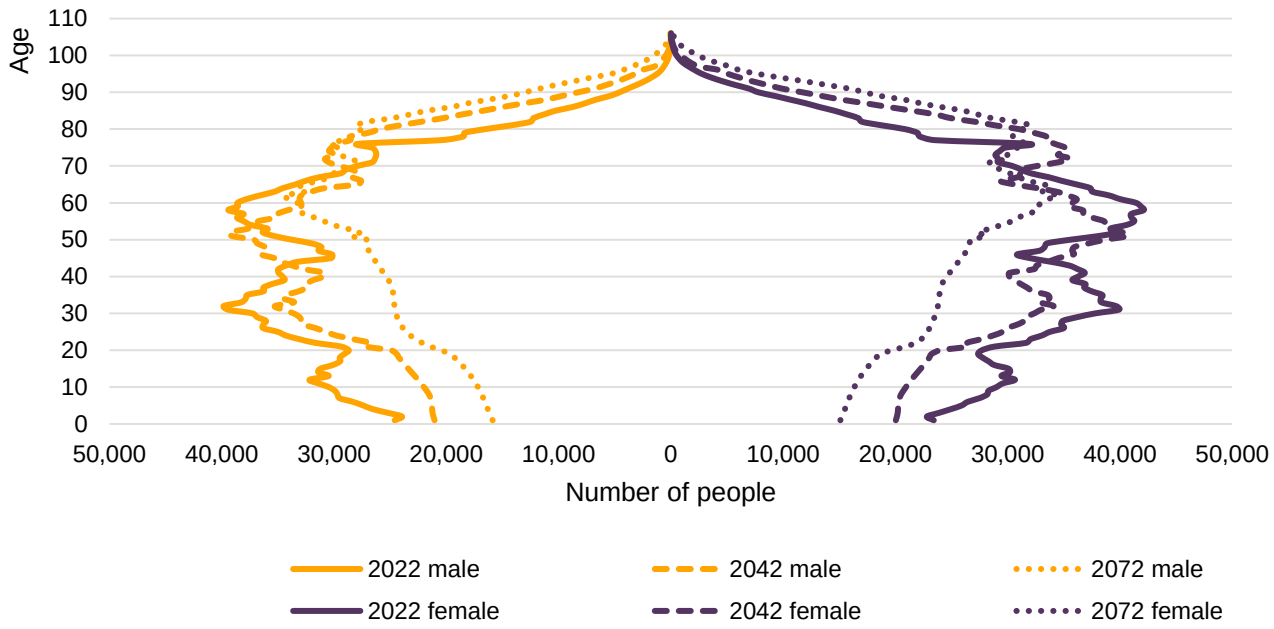
reduced by 2072. Those aged 16 to 64, who are most likely to be working, drop from 64 per cent of the population to 56 per cent between 2022 and 2072.

8. Children account for 16 per cent of the population in 2022 but their share of the population is projected to drop to 12 per cent by 2072. The only part of the population to increase in size in the 2072 projections is the older age population. Those aged 65 and older grow from being 20 per cent of the population in 2022 to 32 per cent of the population in 2072.

9. These changes mean Scotland's population is projected to be 7.6 years older on average in 2072 than in 2022, in comparison the UK population is set to be 6.1 years older over the same time period. Scotland and the UK are projected to have a similar overall dependency ratio at the end of the fifty-year horizon, 79 per cent for Scotland and 77 per cent for the UK. The dependency ratio compares the number of 'dependents' (those aged under 16 and over 64) to the age group most likely to be in work (aged 16 to 64). However, this similarity is because Scotland has a larger old age dependency ratio and a smaller young age dependency ratio compared to the UK.

10. The more acute ageing population in Scotland is primarily a result of a low number of births caused by a low fertility rate combined with an already older population. A decrease in net migration also contributes to this change but to a lesser extent.

Figure 1: Scottish population pyramids for 2022, 2042 and 2072



Source: Scottish Fiscal Commission, ONS (2022) National population projections, migration assumptions: 2020-based interim (cross-border) (link) and 2018-based user-requested (international), ONS (2022) National population projections, mortality assumptions: 2020-based interim (link), ONS (2022) National population projections, fertility assumptions 2020-based interim (link).

11. As well as showing how the population will age over our fifty-year projections, the population pyramids also show an overall decline in population. Based on our assumptions we project Scotland's population to fall by 900,000, a drop of 16 per cent, between 2022 and 2072.[4]

12. These demographic changes will have implications for the economy and income tax revenues, which are discussed in this paper. There will also be implications more broadly for Scottish

[4] We note that these projections are made using the ONS principal assumptions for fertility, mortality and within UK migration but using the '0% EU' assumption for international migration. This results in greater population decline than if using the principal assumptions for all determinants of the population. We use this assumption to reflect recent trends in migration and so our and the OBR's population and economy projections are comparable.

Government funding and spending in the future and we will explore these fiscal pressures in full in the upcoming FSR.

The effects on the economy

13. Demographics primarily affect the economy through the supply of labour. The number of people in work is determined by the size of the total population, the proportion of those who are economically active and the unemployment rate. The population aged 16 to 64 has typically been considered a proxy for the 'working-age' population, however as the State Pension Age has increased and people are staying in work longer, an increasing share of those aged 65 and over are economically active. Individuals are considered economically active if they are either in employment or actively seeking work. In 2021-22 9 per cent of those aged 65 and over in Scotland were economically active.[5] This is lower than in the UK as a whole where 11 per cent of those aged 65 and over were economically active.[6] The proportion of a population or a group who are economically active is known as the participation rate.

14. Participation rates are correlated with age. Younger age groups typically have lower participation rates as they are more likely to be in education. Older people also have lower participation rates as they are more likely to be retired. This means that in the case of an ageing population as we have projected for Scotland, we can expect the overall participation rate to decline.

15. To illustrate the effects of our demographic projections on the economy, we have combined our demographic projections with participation rates by age-group and gender to project the size of the labour force. We hold participation rates by age and gender constant across our projection period, but despite this the overall participation rate for Scotland is projected to decline in the long run as the population ageing will lower the overall participation rate. We then combine our labour force projection with assumptions on the average hours worked, the unemployment rate and productivity growth, to produce a projection of Scottish Gross Domestic Product (GDP). This broadly mirrors the approach taken by the OBR in their most recent 'Fiscal risks and sustainability' report.[7] By mirroring the OBR's UK-wide assumptions for productivity and unemployment, we can illustrate the effects of demographics on Scottish GDP and consider how this compares to the UK as a whole.

16. Overall our illustrative projections show Scottish GDP growing at an average rate of 0.9 per cent per year between 2028-29 and 2071-72. This growth is slower than the UK's by half a percentage point per year over the same period. This is largely a result of Scotland's population falling faster than the UK and the effect of population ageing on the overall labour force participation rate.

17. We have also produced illustrative projections for the GDP per person growth rate. Between 2028-29 and 2071-72 the average growth in GDP per person is 1.3 per cent for Scotland, which is similar to the OBR's projection of 1.4 per cent for the UK for the same period. The smaller difference in the GDP per person growth rates is a result of the population of Scotland falling to a greater extent and more rapidly than the UK population and the way the population change interacts with economic activity.

[5] ONS (2022) HI11 Regional labour market: Headline indicators for Scotland (link)
[6] ONS (2022) A01: Summary of labour market statistics (link)
[7] OBR (2022) Fiscal risks and sustainability – July 2022 (link)

Figure 2: GDP and GDP per person growth rates for Scotland and the UK, 2028-29 to 2071-72

Area of the UK	GDP growth rate (per cent)	GDP per person growth rate (per cent)
Scotland	0.9	1.3
UK	1.4	1.4
Difference (percentage point)	-0.5	-0.2

Source: Scottish Fiscal Commission, OBR (2022) Fiscal risks and sustainability – July 2022 (link).
Figures may not sum because of rounding.

18. We will refine our approach to projecting the long-run growth of the Scottish economy for our report published next year. The demographic and economic projections will have implications for the Scottish Government's future funding position and its spending. One way these will influence fiscal sustainability is via the income tax net position which is an important determinant of the funding position.

The income tax net position

19. Our projections of the Scottish population and economy give insight into Scotland's outlook over the next fifty years. Changes in demography and the economy through labour force participation rates, employment, productivity and hours worked all affect how much revenue is generated from income tax. It is the income tax net position rather than overall income tax revenue which is important for Scottish Government funding.

20. The income tax net position shows how much funding the Scottish Government receives from Scottish income tax revenues minus the income tax Block Grant Adjustment, which is calculated based on UK Government income tax revenues per head in England and Northern Ireland.[8] A positive net position indicates income tax positively contributes to the funding available to the Scottish Government while a negative net position indicates a reduction in available funding.

21. Relative employment, earnings and UK and Scottish Government policy influence the net position. Employment and earnings are influenced by demographic trends and economic growth. If Scotland generates less income tax revenue growth than the rest of the UK then this would negatively affect the Scottish Budget and reduce funding available to the Scottish Government.[9]

22. Looking at the income tax net position over the last five years and the latest forecasts of the net position for the next five years, we can illustrate how employment, earnings and policy have influenced the income tax net position.

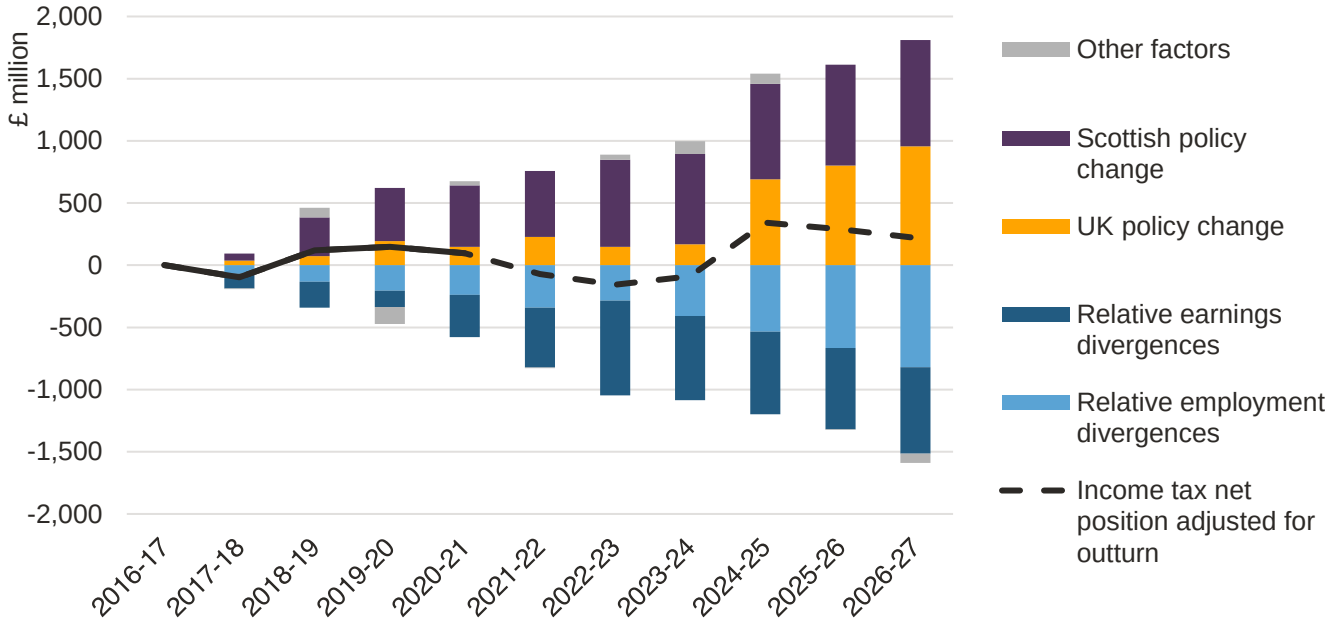
23. Scotland's relative lower growth in employment and earnings over the last five years has had a negative effect on the income tax net position. Successive changes to income tax policy in Scotland to raise additional income tax revenue from taxpayers have so far largely offset these negative economic effects. Changes in UK Government income tax policy, such as above inflation increases in the higher rate threshold, have also generally reduced UK Government revenues and therefore helped move the net position in a positive direction. Figure 3 illustrates the contributions from the

[8] A detailed explanation of how income tax affects the Scottish Budget can be found in Scottish Fiscal Commission (2021) Funding for the Scottish Budget (link).

[9] Growth in revenues in England and Northern Ireland are used to calculate the income tax Block Grant Adjustment as the Welsh rates of income tax have been devolved to the Welsh Government. For ease we refer to the rest of the UK throughout this publication.

different factors. This analysis is illustrative as the exact contribution of each factor to the net position cannot be known with certainty and there may be overlaps in the contribution of different factors.

Figure 3: Illustrative contributions to the income tax net position



Source: Scottish Fiscal Commission

24. The divergence in employment is related to labour force participation rates, our fifty-year projections show these declining as a result of an ageing population which will have implications for the future income tax net position. Our FSR next year will consider in further detail how demographic change is likely to contribute to the income tax net position over the next fifty years.

Chapter 1
Introduction

1.1 This report shows how Scotland's population is projected to change over the next fifty years. We discuss how the changing population size and structure is likely to affect the economy and discuss some of the implications for the Scottish Government's Budget ahead of our first Fiscal Sustainability Report (FSR) in 2023. These projections will inform next year's report where we will provide an in-depth analysis of how changing and relative demographics and economic performance will influence the Scottish Government's finances through its funding and spending.

1.2 Although Scotland shares similar demographic challenges to other high-income nations, the fiscal framework gives a unique importance to Scotland's share of the UK population and its relative economic performance within the UK for the fiscal sustainability of the Scottish Government. The fiscal framework does provide some but not complete protection for the Scottish Government against UK-wide factors although it opens up risks from the effects of relative demographic change. We provide comparisons with the UK when showing the projected population size and structure in **Chapter 2** and have produced an illustrative GDP projections in **Chapter 3**.

1.3 Our approach to the long-term fifty-year projections is different to our five-year medium-term forecasts, published in our reports 'Scotland's Economic and Fiscal Forecasts'. In the medium-term forecasts, we take great care to account for detailed trends in the medium term and to forecast as precisely as possible. Long-term projections are illustrative, there is large uncertainty regarding policy change as well as how the population and economy may evolve. Instead the key aim is to highlight how broad trends will affect the public finances over time. We use the description 'projection' rather than 'forecast' in relation to the long-term analysis to reflect this. The projections shown here indicate what would happen given our assumptions about the population and economy.

1.4 We outline how our approach to fiscal sustainability needs to consider UK Government funding and spending projections as well as UK economic performance, not only the Scottish Government's Budget and the Scottish economy in our 'Approach to fiscal sustainability: consultation' paper'.[10] For example, the income tax net position matters rather than the level of Scottish income tax revenue. The net position is the difference between Scottish income tax revenue and the Block Grant Adjustment (the amount removed from the Scottish Budget to reflect what would have been raised or spent in Scotland, had Scottish revenues grown in line with the rest of the UK since its devolution). The income tax net position is an important determinant of the Scottish Budget funding position and is important for the future sustainability of Scottish Government finances.

1.5 In **Chapter 4** of this paper, we provide an analysis of what has affected the income tax net position over the last five years, and what we expect to affect the net position over the next five years. We have not yet produced long-term projections of the income tax net position, we will provide this in next year's FSR. However, our discussion of the income tax net position shows how the economy, demographics and policy affect for the net position and we can already appreciate the implications of the projected demographic change and relative economy performance for the net position over the long term.

[10] Scottish Fiscal Commission (2022) Approach to fiscal sustainability: consultation – August 2022 (link)

Chapter 2
Demographics outlook

Overview

2.1 Changing demographic structures and population ageing are common challenges for the fiscal sustainability of high-income nations. We expect demographic change to be an important determinant of Scotland's future fiscal sustainability as it is for the UK. The population size and structure affects economic growth and Scottish Government finances through funding and spending. For example, an ageing population is usually associated with increased spending on health and social care.

2.2 Unlike other economies, for the Scottish Government the fiscal framework means it is not just population ageing or changing structure which is important but also how Scotland's population changes relative to rest of the UK. Scotland's share of the UK population is a component of Barnett-determined Block Grant funding (the biggest part of Scottish Government funding) and the associated Block Grant Adjustments. The relative sizes of the working population in Scotland and the UK will influence relative economic performance and incomes which are important for the income tax net position (discussed in **Chapter 4**).

2.3 The population is determined by births, deaths and migration. We discuss each of these in this Chapter as well as the overall size and age structure of the population and how these compare to the UK. Births, life expectancy and migration over the preceding decades shape the current population structure and influence future population dynamics. Population structures tend to change slowly and do not react quickly to economic or to policy change. This means that challenges like population decline and ageing tend to be long-term and change slowly, even though flows into and out of the total population (births, deaths and migration) can change quickly.

2.4 Migration is a factor which is more changeable than births and deaths in the short term but it would need to happen on a large scale to substantially change the size and structure of the population. Compared to births and deaths, migration is more volatile, more responsive to economic and policy factors and is the most difficult to predict. In a Scottish context there are also particular challenges in the quality of the data.

2.5 Our fifty-year projections of the Scottish population are based on assumptions about births, deaths and migration. We explain these in more detail in the companion paper where we discuss our rationale for the assumptions that we use.[11] In short we use the ONS principal projection for fertility and mortality and internal (within UK) migration. We use the '0% European Union (EU)' assumption as an input for our migration projection that both we and the Office for Budget Responsibility (OBR) have been using for some time in our medium-term forecasts.[12] More generally, we have used the same assumptions as the OBR for their projections of the UK population for their 2022 'Fiscal risks

[11] Scottish Fiscal Commission (2022) Approach to Fiscal Sustainability Consultation Paper (link)

[12] The '0% EU' assumption is a migration assumption provided by the ONS. Outflows by EU (excluding British) and non-EU citizens were calculated using international migration estimates for year-ending mid-2016 to year-ending mid-2018. Depending on the variant, the average EU migration flows were removed (0% future EU migration variant) or reduced by half (50% future EU migration variant) and the percentage changes from the original total migration estimates were calculated. This was done for both inflows and outflows: for example, the 50% future EU migration variant reduced both EU inflow and outflows by half. The assumed remaining flows (British and non-EU citizens) were unchanged. More information is available at ONS (2019) 0% future EU migration variant – October 2019 (link).

and sustainability' report.[13] This is important for our analysis so that we make sure differences are because of different demographic structures, fertility, mortality and migration rather than methodological differences. Long-term projections are subject to uncertainty, current projections for migration are subject to more uncertainty than usual given the effects of the COVID-19 pandemic and Brexit.

Births

2.6 Our analysis of births each year is based on how many children women have over the course of their lives, and when in their lives those births occur. We use the total fertility rate to describe fertility trends.[14] The total fertility rate in Scotland has been lower than in England and Wales since the mid-1970s.[15] The highest the total fertility rate has been since the 1990s was 1.77 births per woman in 2008 in Scotland but it has fallen since then. Comparatively, in the UK the total fertility rate reached 1.92 births per woman in 2012 and then began to decrease.

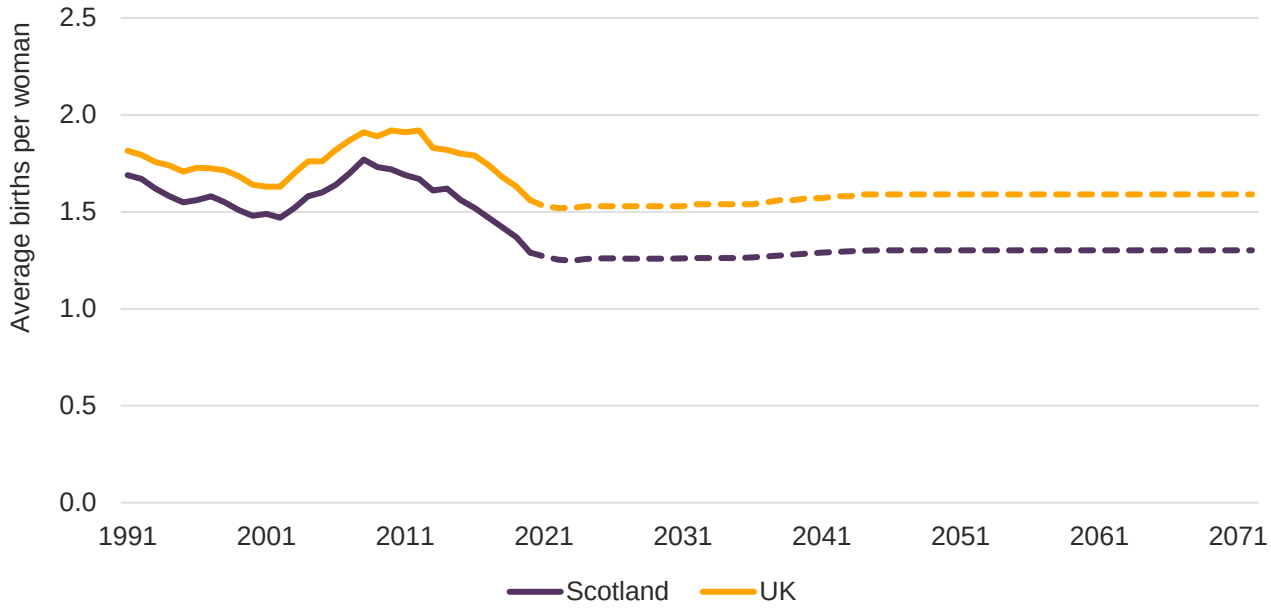
2.7 Births in Scotland are projected to reach a low of 1.25 births per woman in 2023 and then slowly increase to 1.30 births per woman by 2043. The overall rate for the UK is projected to reach a low of 1.52 births in 2022 and then stabilise at 1.59 births per woman from 2044 onwards. This is shown in Figure 2.1.

2.8 To make assumptions about fertility up to 2044, the Office of National Statistics (ONS), as well as the National Records of Scotland (NRS) and Northern Ireland Statistics and Research Agency, use an expert panel and recent trends to give the most likely fertility rate and to predict how this changes up to 2044. The long-term rate is then applied from 2044 onwards. The trend up to 2044 is influenced by people having children later in their lives than previous generations. The long-term projections of the total fertility rate converge with the average completed family size. In the long term, the ongoing decrease in births for women aged under 30 is expected to continue but with increases for those aged 40 and over.[16] Therefore the birth rate (and completed family size) are projected to stabilise, though at a lower level than in the past.

2.9 Even though we assume the fertility rate is steady in the long term, the total number of births in Scotland is projected to decrease by 36 per cent over the next fifty years, with 17,100 fewer births projected in 2072 than in 2022. This is a result the population shrinking in combination with the low long-term fertility rate.

[13] OBR (2022) Fiscal risks and sustainability –July 2022 (link)
[14] The total fertility rate represents the hypothetical average number of children born per woman, if women experienced the age-specific fertility rates of the particular year. The total fertility rate gives a useful summary measure but the projections are based on age-specific birth rates.
[15] National Records of Scotland (2019) Scotland's population (link)
[16] ONS (2022) National population projections, fertility assumptions: 2020-based interim – January 2022 (link)

Figure 2.1: Birth rates for Scotland and UK, 1991 to 2072



Source: Scottish Fiscal Commission, ONS (2021) Fertility assumptions 2020-based interim (link).
Projection from 2020 onwards, we reflect short term trends in 2021 and apply our long term assumptions from 2022.

Migration

2.10 Our migration assumptions will influence the overall size of the projected Scottish population. The assumptions have implications for the number of births, as compared to the current Scottish age-structure migrants tend to be at ages where people have children. Our migration assumption is important for our economic modelling too as migrants are in the age groups most likely to be working and therefore influence our GDP, earnings, participation rate and income tax projections.

2.11 Migration can be volatile and subject to fluctuations which we do not see to the same extent in deaths and births, this makes it harder to predict. Brexit and the COVID 19 pandemic mean that recent migration trends are uncertain and there is uncertainty about how these will change in the future.

2.12 Migration to Scotland comes from the rest of the UK and internationally. In line with our and the OBR's forecasts since March 2020, we have used a '0% EU' migration assumption and projected low international migration to Scotland.[17] Our assumption on cross-border migration within the UK is the ONS principal assumption.

2.13 Scotland has experienced periods of negative net migration. More people emigrated from or left Scotland than immigrated to or moved to Scotland until the early 1990s.[18] Migration can be important for net population change and has been the main driver of Scottish population growth in the last 20 years.[19]

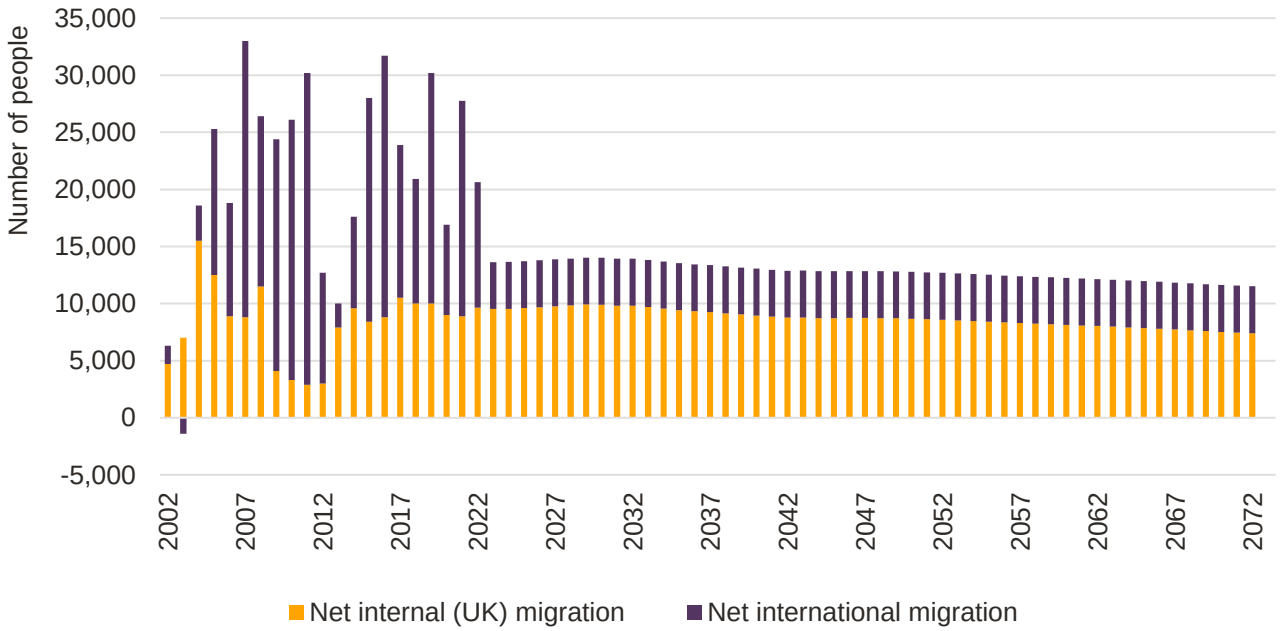
[17] '0% EU' assumption is a user-requested migration assumption provided by the ONS. It scales down by reducing net migration in line with net migration by (non-UK) EU citizens over the three years running up to 2018. In contrast, the principal migration assumption is based on the twenty five-year average of international migration. OBR adopted 0% EU in March 2020 (link). We adopted it in January 2021 (our next set of forecasts after the OBR's March 2020 forecasts) (link).
[18] National Records of Scotland (2019) Scotland's population (link)
[19] National Records of Scotland (2021) Mid-2020 Population Estimates (link)

2.14 Figure 2.2 shows net UK and international migration to Scotland between 2002 and 2021. We use our short-term forecast for migration for 2022.[20] The long-term projection is shown from 2023 onwards. Net migration varies year-on-year and over the year to mid-2020 it was lower than in any of the previous six years.[21] This was affected by travel restrictions put in place during the pandemic; figures over the year to mid-2021 were higher. Note that because of changes in the methods for producing international migration statistics in the years ending mid-2020 and mid-2021, direct comparisons of migration with previous years should be treated with caution.[22]

2.15 Net migration from the rest of the UK is assumed to continue to make a significant positive contribution to the Scottish population. It is projected to fall slightly over this period reflecting the projections being made on a per capita basis and the population declining over the projection period. Net migration from other parts of the UK is projected to fall over the next fifty years, based on migration trends from 2015 to 2020. [23]

2.16 Net international migration is assumed to remain flat at 4,100 people per year over the fifty-year projection period. This reflects our use of the '0% EU' assumption given trends in recent years, the UK policy context and also for consistency with the OBR's UK projections published in July 2022. However, mid-year estimates from ONS released in May 2022 suggested higher migration to the UK than expected in 2021 and 2022 than in 2020.[24] Changing this assumption for Scotland and the UK would affect the projected Scottish and UK populations, but the effect on Scotland's share of the UK population and differences in relative economic growth would be minor.

Figure 2.2: Components of net migration to Scotland, 2002 to 2072



Source: Scottish Fiscal Commission, ONS migration assumptions: 2020-based interim (cross-border) (link) and 2018-based user-requested (international), NRS migration statistics (2022) (link).
Projection from 2020 onwards, we reflect short term trends in 2021 and apply our long term assumptions from 2022.

[20] Scottish Fiscal Commission (2022) Scotland's Economic and Fiscal Forecast – May 2022 (link)
[21] NRS (2021) Mid-2020 Population Estimates (link)
[22] ONS (2022) Methods to produce provisional long-term international migration estimates – May 2022 (link)
[23] This average is projected forward based on average per person migration rates, by age, and by country of origin, from the preceding five years (2015-2020)
[24] Office for National Statistics (2022) Long-term international migration (link)

Mortality

2.17 Life expectancy is a measure of the average amount of time someone can expect to live given their age, year of birth and sex. The ONS base life expectancy on mortality rates, when mortality rates are low life expectancy is greater. Projected life expectancy is based on projected mortality rates by age, sex and year.[25] Assumptions for future improvements are based on past trends and expert advisory panels. The ONS make assumptions for the short term between 2020 and 2024, up to 2044 and for the long term after that. Mortality rates differ by age and sex. In the short term, mortality rates reflect recent trends by constituent country of the UK. Improvements in mortality are assumed to recover to pre-COVID-19 trends. In the long term, these rates of improvements converge to a long run estimate of improvement for the UK by age and sex.

2.18 Life expectancy has in general risen consistently over the last two centuries. Historically this was mainly driven by reduced mortality for infants and among young age groups. In the latter half of the twentieth century improvements in mortality have been among older age groups.[26] More recently, although improvements in life expectancy are still expected, life expectancy has stalled since 2012-14, and the long term projected improvement has consistently been lower with each biennial projection since 2012.

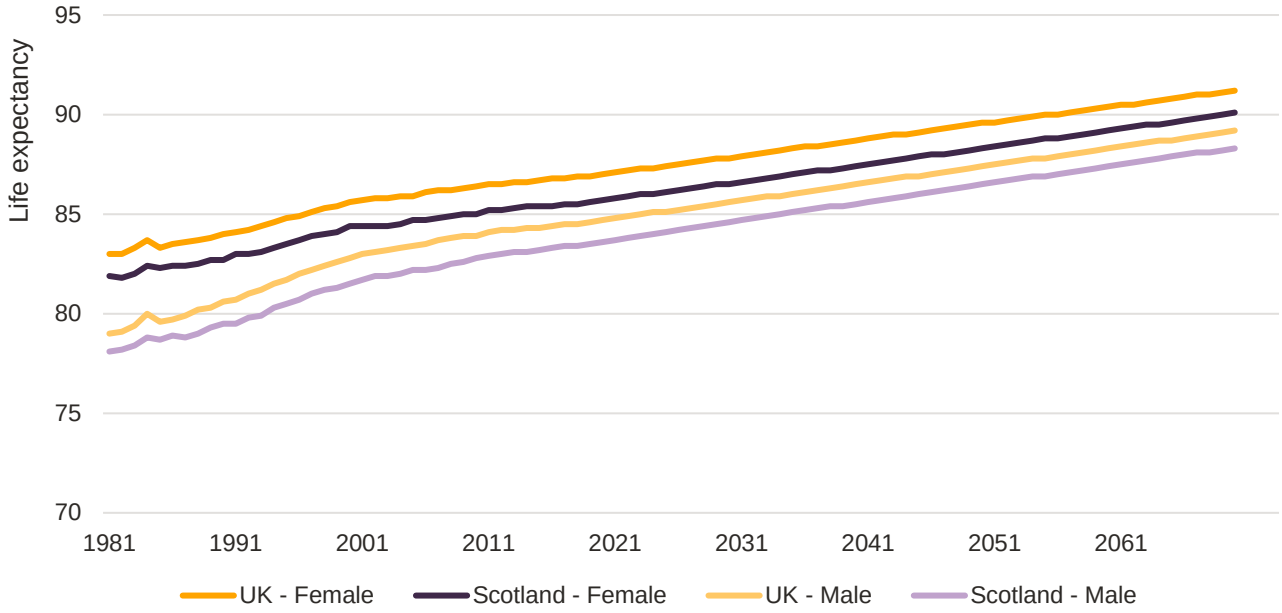
2.19 As of the 2020-based interim projections, the ONS projected that in 2022 life expectancy at age 65 was 83.8 for men and 85.9 for women in Scotland. This compares to a UK average of 84.9 for men and 87.2 for women, a difference of 1.1 years for men and 1.3 years for women.[27]

2.20 Scotland generally has higher mortality rates than in the rest of the UK. This leads to a lower life expectancy and fewer older people compared with a scenario where mortality rates were similar to the UK. The ONS assumes a different improvement rate for Scotland than for the rest of the UK. As the rates of improvement in mortality converge across the UK nations, we see the average life expectancy gap narrow slightly between Scotland and the UK over time.

2.21 Figure 2.3 shows the projected cohort life expectancy for men and women aged 65 in Scotland and the UK up to 2070 based on ONS principal projections.[28] We look at life expectancies at age 65 for the fifty-year horizon as these reflect people living now and who will be born in the near future. Life expectancy at age 65 improves by 4.5 years for men in Scotland and 4.2 years for women between 2022 and 2070. These improvements are slightly larger than the projected improvements for men and women in the UK where life expectancy is anticipated to grow by 4.3 years for men and 4.0 years for women. This slightly narrows the gap in life expectancy between Scotland and the UK and may reflect the improvements in mortality rates converging between Scotland and the UK average.

[25] ONS (2022) National population projections, mortality assumptions: 2020-based interim – January 2022 (link)
[26] ONS (2015) How has life expectancy changed over time? (link)
[27] ONS (2022) Past and projected period and cohort life tables (link)
[28] Projections only go to 2070 for mortality because of unavailability of data.

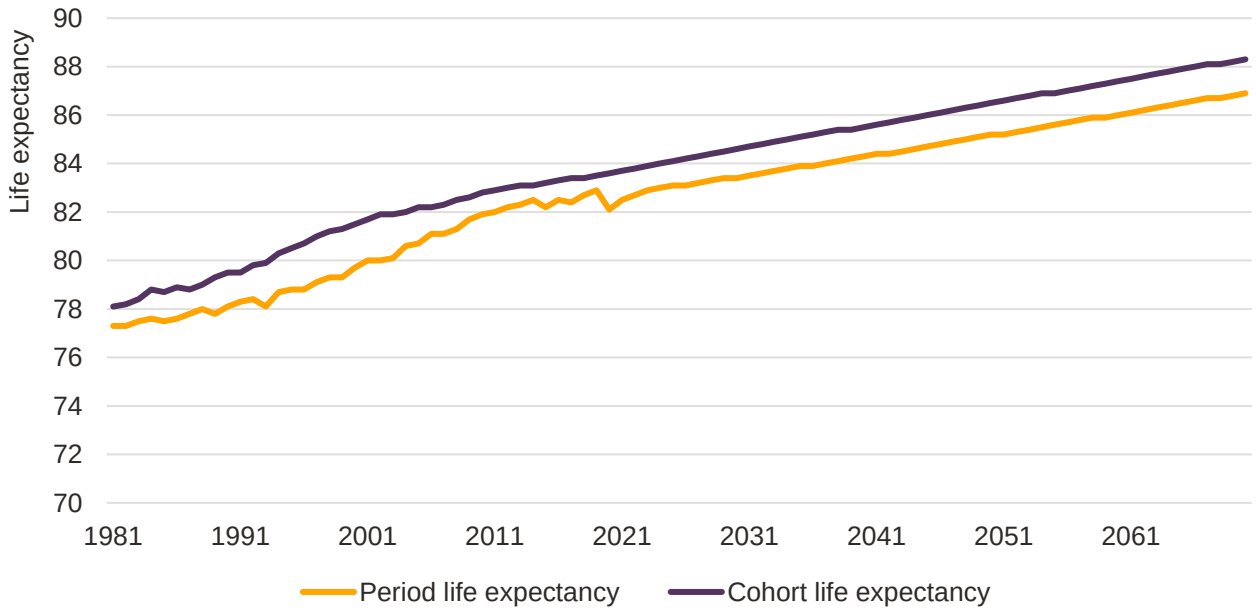
Figure 2.3: Life expectancy at age 65 in Scotland and UK, 1981 to 2070



Source: Scottish Fiscal Commission, ONS (2022) Past and projected period and cohort life tables (link)
These projections are based on ONS life tables calculated using observed and projected deaths, and population estimates and projections. The projections end in 2070 because of unavailability of data.

2.22 Population projections are based on cohort life expectancy which takes account of future improvements in mortality rates over the course of an individual's life. As a result, short term effects such as higher numbers of deaths among certain age groups during the COVID-19 pandemic only have a marginal effect on life expectancy for each cohort. In contrast, period life expectancy is based on fixed mortality rates for a hypothetical individual, and thus reflects the cumulative short-term effects on life expectancy in a particular year. We illustrate this difference in Figure 2.4.[29]

Figure 2.4: Life expectancy for males at age 65 by Period and Cohort in Scotland, 1981 to 2070



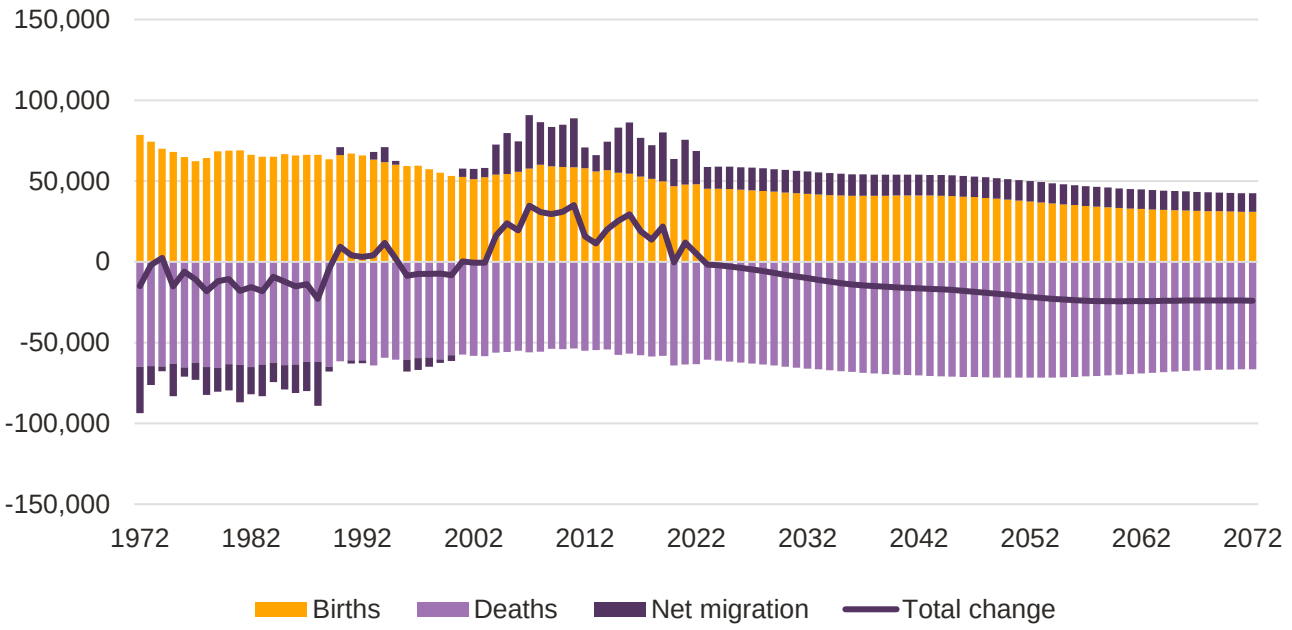
Source: Scottish Fiscal Commission, ONS (2022) Past and projected period and cohort life tables (link).
Projection from 2022 onwards. The projections end in 2070 because of unavailability of data.

[29] ONS (2019) Period and cohort life expectancy explained (link)

Why the population is changing

2.23 Figure 2.5 shows the total change in Scotland's population since 1972 and over our fifty-year projection and how net migration, births and deaths contribute to this. Scotland's low number of births is the main reason the population is projected to decline, the number of births projected in 2072 is 17,100 less than in 2022. Net migration is projected to make a small and consistent positive contribution to the overall size of the population. Deaths make a negative contribution though we see the number of deaths fall as the population declines. In order to maintain a steady population, births and migration would need to increase.

Figure 2.5: Births, deaths and net migration in Scotland, 1972 to 2072



Source: Source: Scottish Fiscal Commission, ONS (2022) National population projections, migration assumptions: 2020-based interim (cross-border) (link) and 2018-based user-requested (international), ONS (2022) National population projections, mortality assumptions: 2020-based interim (link), ONS (2022) National population projections, fertility assumptions 2020-based interim (link).
Projection from 2020 onwards, we reflect short term trends in 2021 and apply our long term assumptions from 2022.

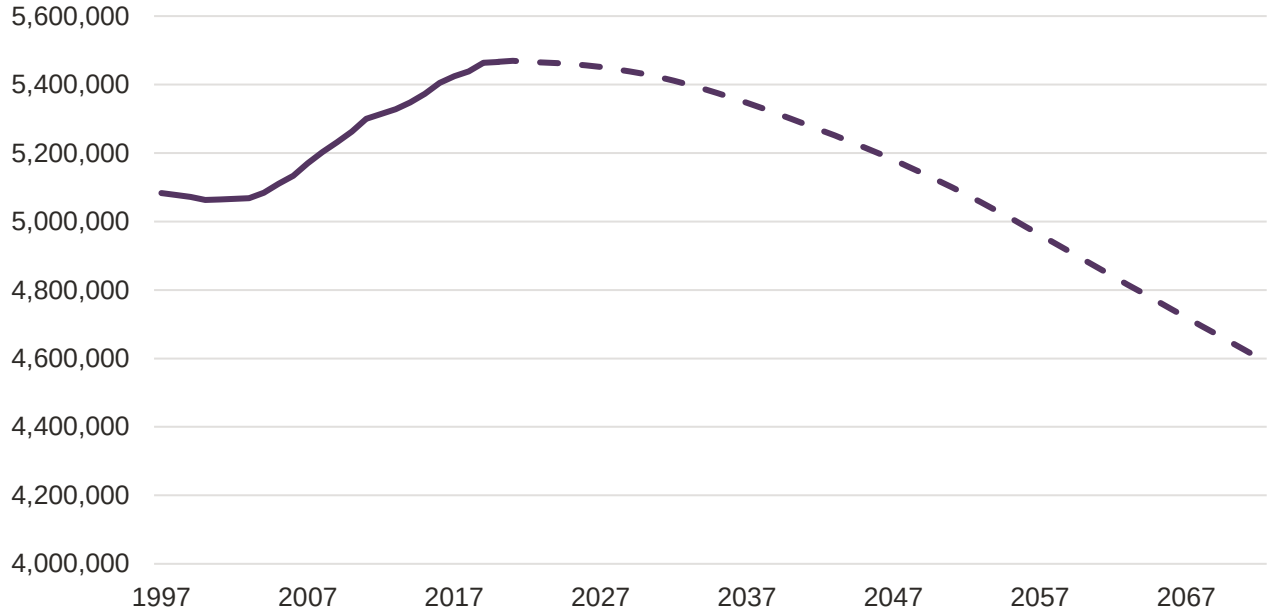
Scotland's population over the next fifty years

2.24 Given our projections for fertility, mortality and migration under the assumptions and described above, we project the Scottish population to decline from 5.5 million in 2022 to 4.6 million in 2072, a fall of 16 per cent. Previously the Scottish population had grown by 400,000 since the late nineties, as is shown in Figure 2.6. The 2021 population of 5.5 million is the largest population to date. Given our assumptions on deaths, births and migration as well as the existing age structure of the population, the population is projected to decline from 2021 onwards. The rate at which the population decreases accelerates over the fifty-year projection, starting at an annual average of -0.1 per cent in the first 10 years of our projection but reaching -0.5 per cent per year in 2060.

2.25 We use a narrower measure of the population, those aged 16 and over, in our projections of GDP growth. The population aged 16 and over is expected to decrease by 11 per cent from 4.6 million in 2022 to 4.1 million in 2072.

2.26 Children born now, in 2022, will form part of the 16 and older population that contributes to our projections of GDP from 2038 onwards. Births have fallen in recent years which will affect future births and future working age population. With births projected to decrease over our projection period the 16-64 population will to continue to fall, and this is only partially mitigated by net migration over the next fifty years.

Figure 2.6: Scotland's population, 1997 to 2072



Source: Scottish Fiscal Commission, ONS (2022) National population projections, migration assumptions: 2020-based interim (cross-border) (link) and 2018-based user-requested (international), ONS (2022) National population projections, mortality assumptions: 2020-based interim (link), ONS (2022) National population projections, fertility assumptions 2020-based interim (link).
Projection from 2020 onwards, we reflect short term trends in 2021 and apply our long term assumptions from 2022.

2.27 In comparison to the decline we see for Scotland, in the OBR's projections the UK population falls by only 2 per cent over the same period, from 67.1 million to 65.9 million. In the OBR's projections, the UK population keeps growing until the 2040s. By 2072 Scotland will have only 7.0 per cent of the UK's population, compared with 8.1 per cent in 2022 and 8.7 per cent in 1997. We will discuss the implications of this for the Scottish Government's future funding position in next year's report.

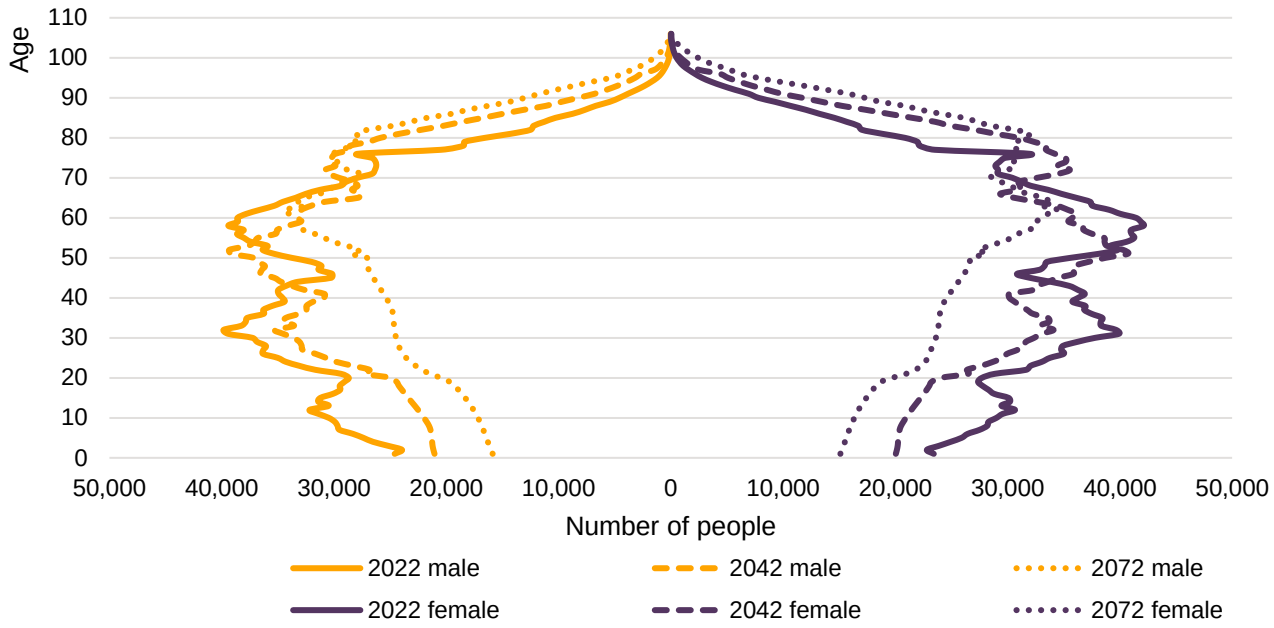
Age structure

2.28 The population's age structure affects the size of the economy and has implications for public finances. Figure 2.7 illustrates the projected change in the size and age structure of Scotland's population using population pyramids for 2022, 2042 and 2072.

2.29 The shrinking size of Scotland's population is evident in at almost for all ages in 2042 and 2072 and is starkest in for younger ages and children. The older age population does grow in 2042 and 2072 but as discussed above, the overall size of the population still declines.

2.30 In 2022, there is a bulge in the under 20 age group which is not repeated in the 2042 and 2072 projections. We can see those who were children in 2022 become the 20 to 40 age cohort in the 2042 projection, a larger cohort moves into the age 40 to 60 cohort. The cohort who join the working age population in the 2072 projection are smaller again. By 2072, Scotland's population pyramid is top heavy with the population being largest among those in their sixties.

Figure 2.7: Scottish population pyramids for 2022, 2042 and 2072



Source: Scottish Fiscal Commission, ONS (2022) National population projections, migration assumptions: 2020-based interim (cross-border) (link) and 2018-based user-requested (international), ONS (2022) National population projections, mortality assumptions: 2020-based interim (link), ONS (2022) National population projections, fertility assumptions 2020-based interim (link).

2.31 This continues trends which have already been influencing Scotland's population structure. Between 1997 and 2022 the share of the population aged 65 and over has increased from 16 per cent to 20 per cent. Our population projections show this rising to 32 per cent of the population by 2072. The population aged under 16 has fallen from 20 per cent of the population in 1997 to 16 per cent in 2022 and is projected to decline to 12 per cent of the population by 2072.

2.32 The population aged 16 to 64 is projected to shrink to 56 per cent per cent of the population by 2072 from 64 per cent in 2022. This age group is most likely to be working and its declining share of the population influences the economy through the size of the labour force and influences public finances through taxation. At the same time the growing share of the older population has implications for spending on health and social protection.

Comparison with the UK

2.33 The UK as a whole shows similar trends to those we see for Scotland. The dependency ratio compares young people (aged under 16) and older people (aged 65 and over) to people aged 16 to 64. People aged 16 to 64 are most likely to be working. The dependency ratio can be calculated for young people, older people or both.

2.34 Both Scotland and the UK have a growing overall dependency ratio over our fifty-year projections. As shown in Figure 2.8, the dependency ratios are quite similar but Scotland's total dependency ratio is slightly lower than the UK's in 2022 and 2042, and it is slightly larger in 2072. This change reflects Scotland having a lower young age dependency ratio than the UK in 2022 which then falls similarly in both countries. Scotland starts with the same old-age dependency ratio as UK, while it grows sharply in both countries, it grows faster in Scotland than in the UK.

2.35 As a result of these trends, Scotland's population will be, on average, 7.6 years older in 2072 compared with 2022. The UK's population will age by 6.1 years over the same period, widening an existing gap of 1.2 years to 2.7 by the end of our projection period.

Figure 2.8: Dependency ratio by age group and year, Scotland and UK

Country	Age bracket	2022 (per cent)	2042 (per cent)	2072 (per cent)
Scotland	Young age [1]	26	21	21
Scotland	Old age [2]	31	43	58
Scotland	Overall [3]	57	64	79
UK	Young age	30	26	26
UK	Old age	31	42	52
UK	Overall	61	67	77

Source: Scottish Fiscal Commission, ONS (2022) National population projections, migration assumptions: 2020-based interim (cross-border) (link) and 2018-based user-requested (international), ONS (2022) National population projections, mortality assumptions: 2020-based interim (link), ONS (2022) National population projections, fertility assumptions 2020-based interim (link).
[1] Young age refers to the population aged less than 16 years.
[2] Old age refers to the population aged 65 years and older.
[3] Overall combined the young age and old age populations.

Chapter 3
Effects on the economy

Overview

3.1 In this chapter we illustrate the effects of demographic change on the Scottish economy, this is primarily through the supply of labour. To produce illustrative projections of economic growth we consider how demographic change will affect the size of the population and the proportion of people economically active. We then combine our labour force projection with the average hours worked, an assumed unemployment rate and productivity growth assumption, to produce a projection of Scottish Gross Domestic Product (GDP). We have broadly mirrored the approach taken by the Office for Budget Responsibility (OBR) in their most recent 'Fiscal risks and sustainability' report.[30] By mirroring the OBR's UK-wide assumptions for productivity and unemployment, we can illustrate the effects of differential demographics on projections of GDP and consider how this compares to the UK as a whole.

3.2 We explain our assumptions and rationale for these in more detail in our 'Approach to fiscal sustainability: consultation' paper.[31]

Understanding our economic projections

3.3 To illustrate how demographics affect the economy, we have developed an economic projections model broadly in line with the OBR's approach in their most recent 'Fiscal risks and sustainability' report.[32]

3.4 Our approach is based on the main drivers of economic growth, essentially how many people are working and their level of productivity. This is a simpler approach than our five-year economic forecasts, they are based on more factors which are modelled in detail. The projections show how the economy might evolve given a specific set of assumptions. The projections account for differences in demographics between Scotland and the UK.

3.5 To project GDP we decompose GDP into five determinants as shown in Figure 3.1. The determinants are:

- The population aged 16 and over. This part of the population is important for GDP as they are most likely to be working. It can also be referred to as the adult population.
- The labour force participation rate, or economic activity rate. This means the proportion of people aged 16 and over who are working or looking for work. We use different participation rates for different groups split by age and gender, but hold those participation rates fixed over the projection period.
- The equilibrium rate of employment. In the long term, we use an assumed steady state of unemployment which gives us the projected equilibrium rate of employment. Scotland's rate of unemployment has broadly tracked that of the UK since 1992, and closely matched it since

[30] OBR (2022) Fiscal risks and sustainability – July 2022 (link)
[31] Scottish Fiscal Commission (2022) Approach to fiscal sustainability: consultation (link)
[32] OBR (2022) Fiscal risks and sustainability – July 2022 (link)

2010. For the purposes of these projections we have mirrored the OBR's assumption on the UK unemployment rate and held the unemployment rate for Scotland constant for the projection period.

- Average hours worked. Mirroring the OBR's assumption for the UK as a whole, we have assumed that the average number of hours worked per week by those in employment remains constant over the next fifty years.

- Labour productivity. This is the output produced for each hour of work. Productivity is a measure of the labour force's efficiency. We mirror the OBR's assumption for the UK that productivity will grow at 1.4 per cent until 2035-36, and 1.5 per cent thereafter.

3.6 As Figure 3.1 shows, by mirroring the OBR's assumptions, we can illustrate the effect of demographics on economic growth compared with the UK. Further information on how we have produced these projections can be found in 'Approach to Fiscal Sustainability Consultation Paper' Methodology Chapter.[33]

Figure 3.1: Schematic representation of long-term GDP projection

Source: Scottish Fiscal Commission

Participation rates

3.7 How many people participate in the labour force by working or by looking for work is an important determinant of economic growth. Younger age groups typically have lower participation rates as they are more likely to be in education. Older people also have lower participation rates as they are more likely to be retired. This means that in the case of an ageing population as we have projected for Scotland, we can expect the overall participation rate to decline.

3.8 UK participation rates by age and gender have changed a lot in the past thirty years. For example, labour force participation for females aged 35 to 49 has increased from 77 per cent in 1992 to 83 per cent in 2021. Older people have also continued in work for longer in response to changes in the State Pension Age. The participation rate for those aged 65 and over has increased from 6 per cent in 1992 to 11 per cent in 2021. In contrast enrolment in tertiary education for younger people has increased, and the participation rate for people aged 18 to 24 has fallen from 78 per cent in 1992 to 69 per cent in 2021.[34]

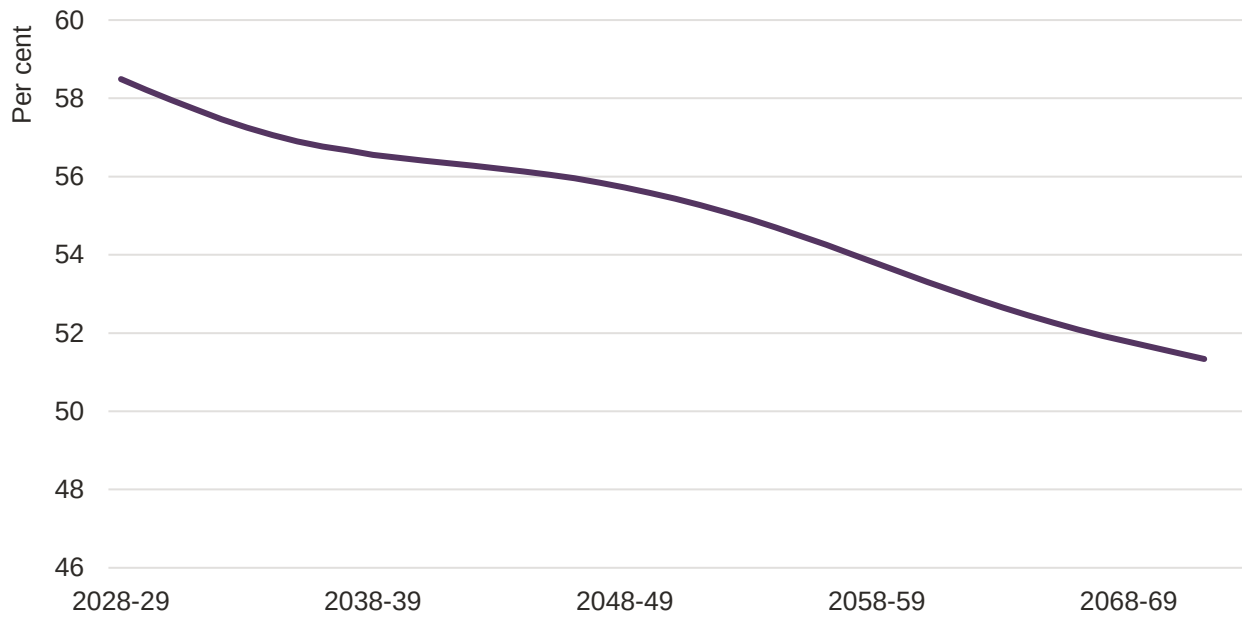
3.9 How future trends in labour force participation may change by age and gender is uncertain. For the purposes of projecting how demographics affect the economy, we have assumed participation rates by age and gender stay at the same level as we forecast for 2027-28.

3.10 The participation rate for those aged 16 and over is projected to decline over time as Scotland's population ages, as shown in Figure 3.2, because although individual age cohort participation rates remain constant the relative size of the cohorts change. The share of Scotland's population

[33] Scottish Fiscal Commission (2022) Approach to Fiscal Sustainability Consultation Paper (link)
[34] ONS (2022) Labour Force Survey statistics (link)

projected to be economically active falls from 60 per cent in 2021-22 to 51 per cent fifty years later. This compares with a high of 64 per cent in 2007-2008.

Figure 3.2: 16+ participation rate in Scotland based on fixed age and gender specific participation rates, 2028-29 to 2071-72



Source: Scottish Fiscal Commission, ONS (2022) Labour Force Survey: Economic activity rate (by age and gender), July 2022 (link)

3.11 This approach is broadly consistent with the OBR's approach used in their UK projections. The participation rates by age and gender start from different levels in Scotland and the UK which continue throughout the projections. We will continue to review our methodology as we prepare our first Fiscal Sustainability Report, but the broad results are driven by demographic trends and we do not expect they will change with more refined modelling.

Labour productivity

3.12 Labour productivity is the amount of goods and services that can be produced for an hour of labour input. It grows with advances in technology and physical and human capital.

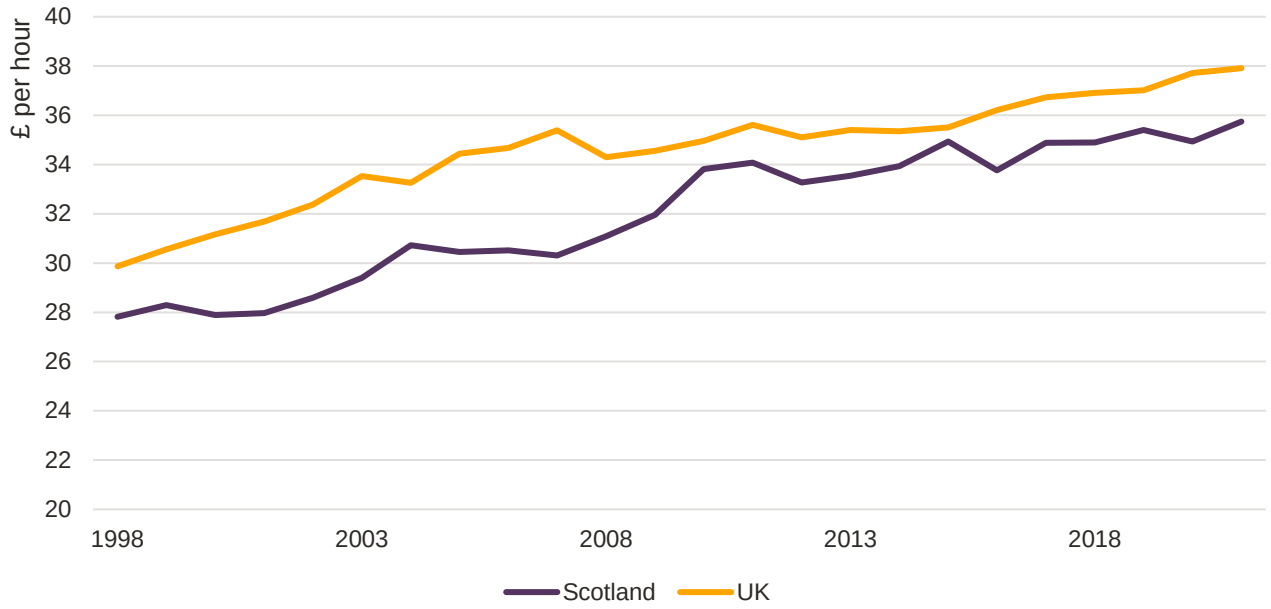
3.13 From 1998 to 2021, Scotland's output per hour worked grew by around 1 per cent per annum on average, in line with the UK.[35,36] Despite variation between specific years, the overall trend has seen similar productivity growth in Scotland and UK. This is shown in Figure 3.3. Although we can see the trend in productivity growth is the same between Scotland and the UK, productivity is consistently at a higher level for the UK than for Scotland.

3.14 To focus on the effects of demographics on our projections of economic growth, we assume productivity growth in Scotland will be the same as that assumed by the OBR for the UK. The OBR assume productivity will grow at 1.4 per cent until 2035-36, and 1.5 per cent thereafter. The initial slower rate of growth is because the OBR assume Brexit will reduce productivity levels by 4 per cent in the long-run, and it takes 15 years to see the full effect. In projecting productivity levels given the

[35] Scottish Fiscal Commission, Scottish Government (2022) Labour productivity statistics: 2021 Quarter 4 (link), ONS (2022), Output per hour worked, UK (link).
[36] ONS (2022) Output per hour worked released 7 July 2022 (link) and Scottish Government (2022) Labour productivity statistics: 2021 Quarter 4 (link).

gap observed in historical data shown in Figure 3.3, we take the existing lower level of productivity in Scotland and project forward from this lower level. Therefore Scottish productivity remains at a lower level than UK productivity throughout our long-term projections.

Figure 3.3: Scotland and UK labour productivity, Gross Value Added in constant prices (2019 base year) per hour worked



Source: Scottish Fiscal Commission, Scottish Government (2022) Labour productivity statistics: 2021 Quarter 4 (link), ONS (2022) Output per hour worked, UK released 7 July 2022 (link).

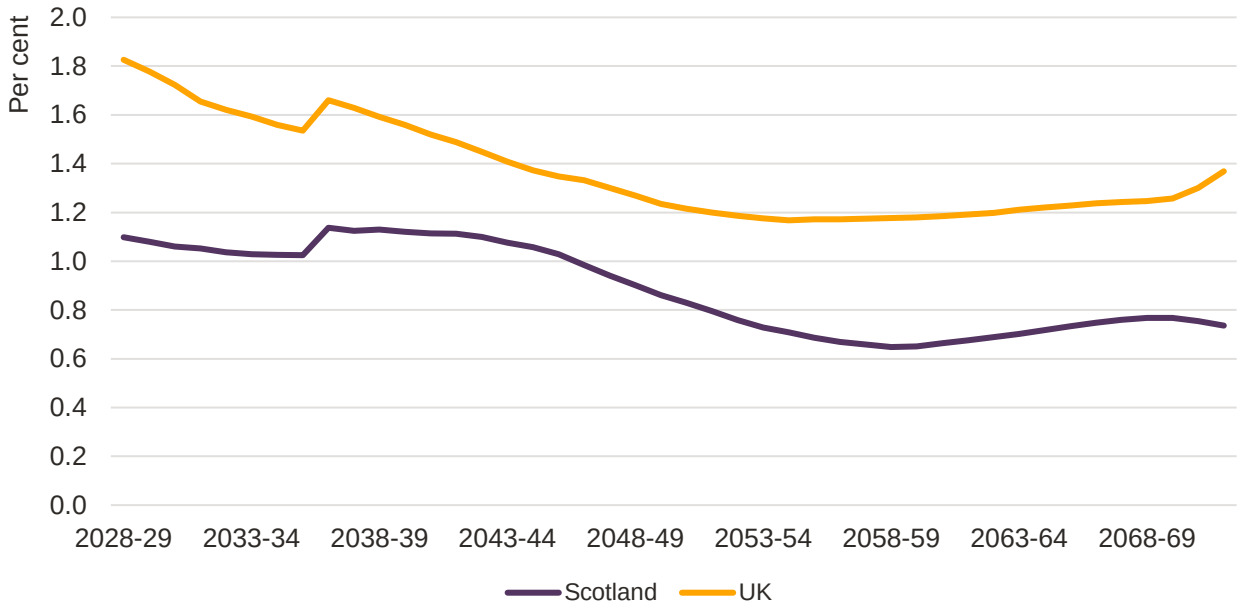
Illustrative Scottish GDP projections

3.15 To show how demographics affect economic growth we have produced illustrative projections of Scottish GDP to 2071-72. Between 2027-28 and 2071-72 these illustrative projections show Scottish GDP growing by 0.9 per cent a year on average.

3.16 Holding most determinants of economic growth fixed and mirroring the approaches taken by the OBR demonstrates how a shrinking and ageing population affects economic growth. Our projections show Scottish GDP growing by an average of 0.9 per cent a year over the next fifty years, 0.5 percentage points lower on average than the OBR's most recent projections show for UK GDP growth.[37] Figure 3.4 shows projected GDP growth per year for Scotland and the UK, the primary difference is projected demographic change. Scotland's declining population and the influence of the ageing population on the overall participation rate drives the difference in GDP growth. A large part of the difference between Scotland and the UK is because Scotland's population is projected to fall by 16 percent over the next fifty years, compared with 2 per cent for the UK.

[37] OBR (2022) Fiscal risks and sustainability – July 2022 (link)

Figure 3.4: GDP growth rate for Scotland and the UK, 2028-29 to 2071-72



Source: Scottish Fiscal Commission, OBR (2022) Fiscal risks and sustainability – July 2022 (link).

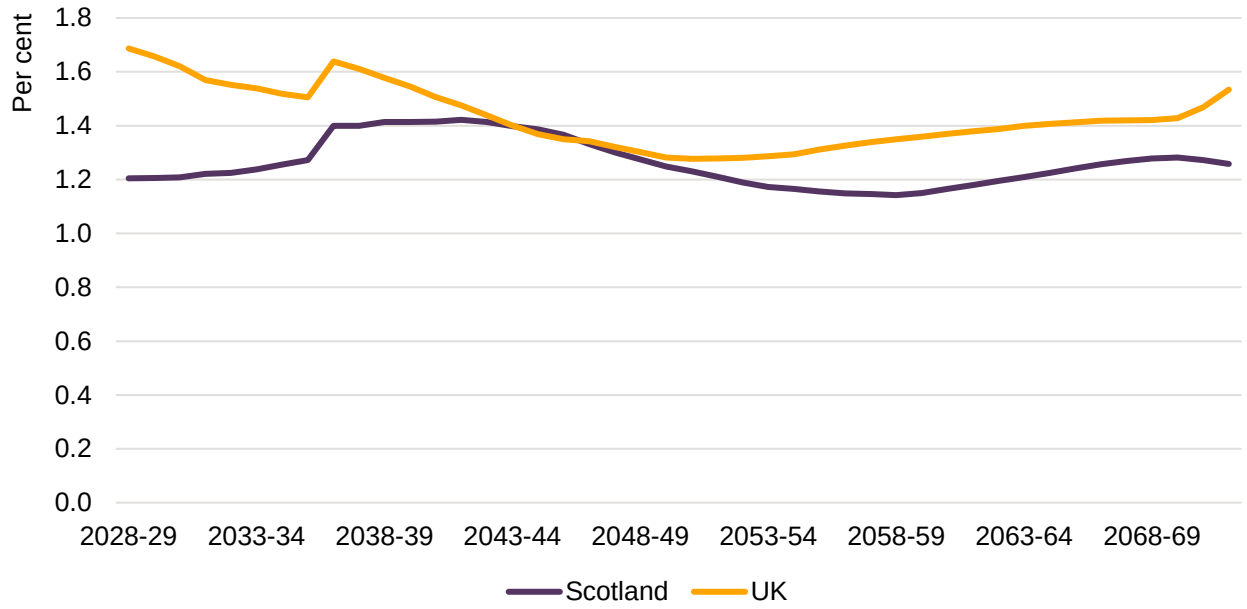
3.17 We have also produced illustrative projections of the GDP per person growth rate. Over the fifty-year horizon in our projections the average growth in GDP per person is 1.3 per cent for Scotland. This is similar to the OBR's projection of 1.4 per cent for the UK. Figure 3.5 presents the trends over the next fifty years. Average growth in GDP per person is 0.2 per cent faster in the UK than Scotland.[38]

3.18 The difference between the Scotland and UK projections for GDP per person growth is lower than for the overall GDP growth rate as a result of the population of Scotland falling more rapidly than the UK population. While the falling population has a negative effect on GDP growth through reducing the labour supply, from the mid-2030s to mid-2040s this effect is balanced out in the estimate of GDP per person growth by reductions in the overall population in Scotland.

3.19 More specifically, the falling proportion of the population under 16 has a positive effect on the estimate of GDP per person growth initially, but does not have an immediate effect on the labour supply as those aged under 16 are predominantly economically inactive. In the longer term the fall in the proportion of the population under 16 translates into a fall in total economic activity as a result of fewer people ageing from the under 16 age group into the workforce.

[38] Scottish GDP per person is projected to grow by an average of 1.26 per cent while UK GDP per person is projected to grow by an average of 1.43 per cent over the period 2028-29 to 2071-72. The difference rounds to 0.2 percentage points.

Figure 3.5: GDP per person growth rate for Scotland and the UK, 2028-29 to 2071-72

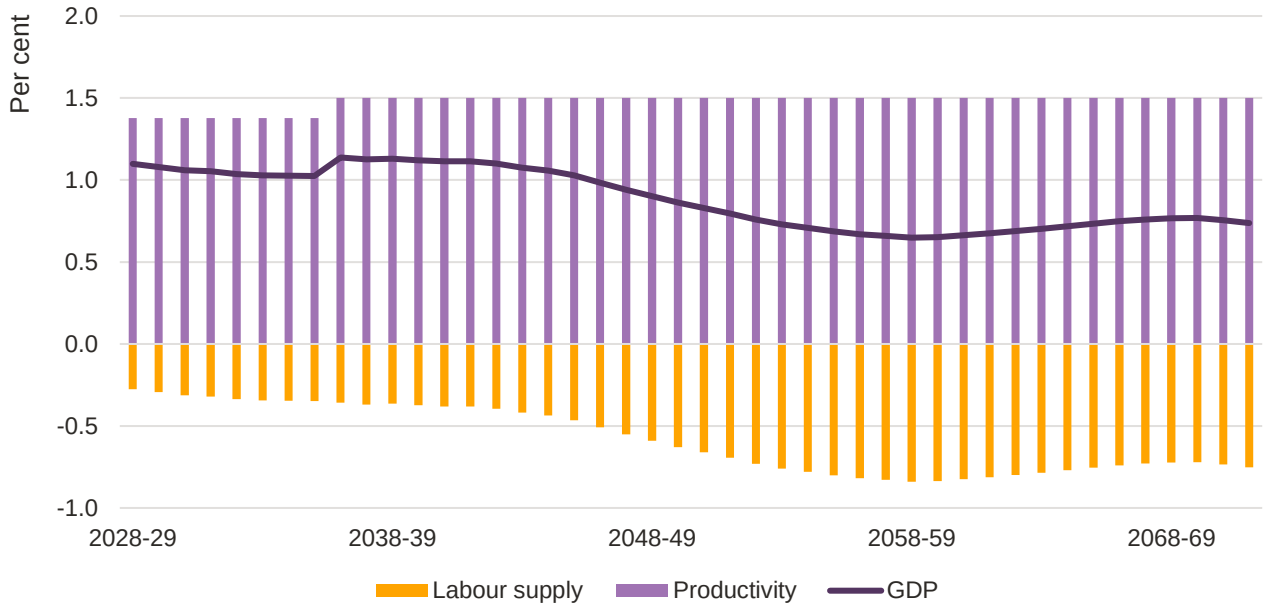


Source: Scottish Fiscal Commission, OBR (2022) Fiscal risks and sustainability – July 2022 (link).

Components of GDP growth

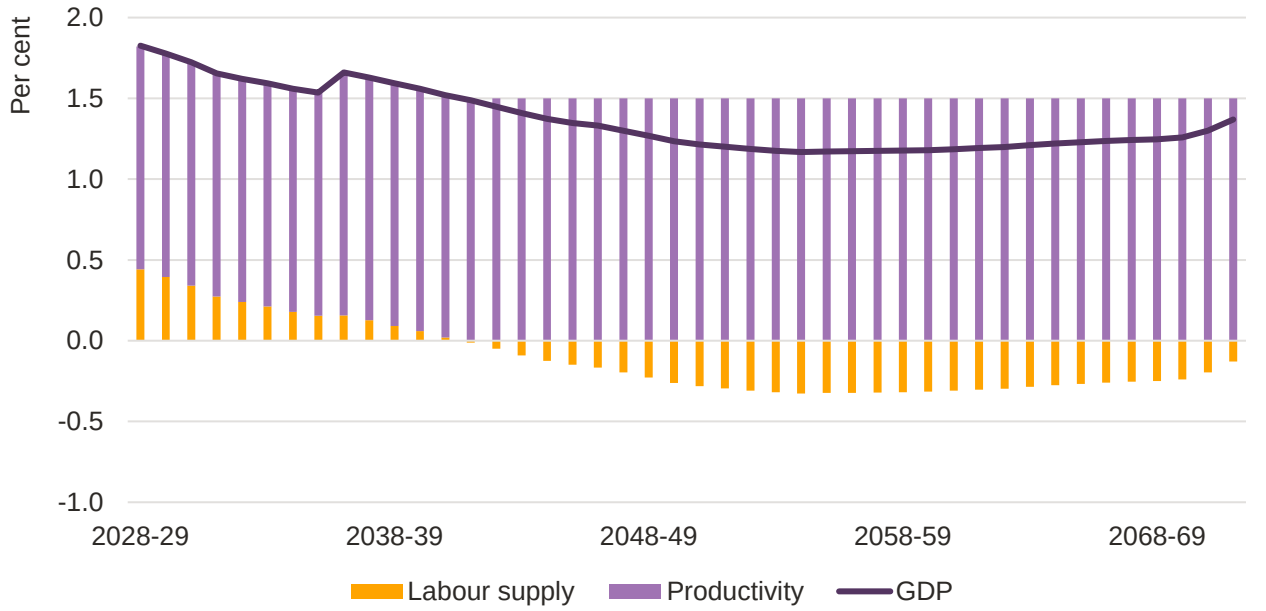
3.20 We can demonstrate the effects of demographics on economic growth by decomposing projected GDP growth into productivity growth and labour supply. Labour supply is affected by the size of the population aged over 16 and the participation rate. The primary driver of long-term economic growth in Scotland is productivity, and for the purposes of these projections we have assumed productivity growth in Scotland mirrors growth in the UK. As shown in Figure 3.6, this is offset by reductions in the labour supply. The labour supply has a negative effect on Scottish GDP growth throughout our forecast horizon, while contributing positively to UK GDP growth until the start of the 2040s as shown in Figure 3.7.

Figure 3.6: Components of projected Scottish GDP growth, 2028-29 to 2071-72



Source: Scottish Fiscal Commission, ONS (2022) National population projections, migration assumptions: 2020-based interim (cross-border) (link) & 2018-based user-requested (international), ONS (2022) National population projections, mortality assumptions: 2020-based interim (link), ONS (2022) National population projections, fertility assumptions 2020-based interim (link), ONS (2022) Labour Force Survey: Unemployment rate, July 2022 (link),ONS (2022) Labour Force Survey: Average actual weekly hours of work (link), ONS (2022) Labour Force Survey: Economic activity rate (by age and gender), July 2022 (link), Scottish Government (2022) Labour productivity statistics: 2021 Quarter 4 (link), ONS (2022) Output per hour worked, UK released 7 July 2022 (link).

Figure 3.7: Components of projected UK GDP growth, 2028-29 to 2071-72



Source: Scottish Fiscal Commission, OBR (2022) Fiscal risks and sustainability – July 2022 (link)

Chapter 4
Income tax net position

4.1 Our projections of the Scottish population and economy give insight into the outlook for the next fifty years. Changes in demographics and the economy through labour force participation rates, employment, productivity and average hours worked all affect how much revenue is generated from income tax. Other factors such as the income distribution, earnings growth and income tax policy also affect income tax revenues. If there is lower income tax growth in Scotland than the rest of the UK then the Scottish Government has less money to spend because of the income tax net position.[39]

4.2 Our long-term projections show the Scottish population aged 16 to 64 by eight percentage points between 2022 and 2072, while the fall in the UK as a whole is projected to be six percentage points. Looking at recent data for Scotland since income tax devolution, the total Scottish population is forecast to increase by 0.9 per cent between 2016 and 2027, however the labour force, that is people who are economically active is forecast to fall by 1.4 per cent over the same time period as a result of an ageing population.[40] This has implications for income tax revenues and the income tax net position.

4.3 Next year our Fiscal Sustainability Report (FSR) will explore in detail how these projections affect the Scottish Government's funding and spending. The effects of some trends we discuss such as failing participation rates and ageing population are already beginning to affect income tax revenues. We can look at the effects on income tax over the last five years, and in our medium-term five-year forecasts to provide an indication of how the position may evolve in the future. Annex A explains the methodology we have used.

4.4 The income tax net position shows how much funding the Scottish Government receives from Scottish income tax revenues minus the income tax Block Grant Adjustment (BGA).[41] A positive net position indicates income tax positively contributes to the funding available to the Scottish Government while a negative net position indicates a reduction in available funding. The Block Grant Adjustment is calculated based on growth in UK Government tax revenues per head in England and Northern Ireland. The net position is affected by economic and policy divergences between Scotland and England and Northern Ireland. We focus on recent Office for Budget Responsibility (OBR) analysis for the UK as a whole, noting that UK-wide trends are usually driven by England. Our discussion in **Chapter 3** provides an indication of the economic divergence which could arise as a result of differences in demographic trends over the next fifty years.

4.5 Over the last five years, Scotland's relative lower growth in employment and earnings have had a negative effect on the income tax net position. Successive changes to income tax policy in Scotland to raise additional income tax revenue from taxpayers have so far largely offset these negative economic effects. Changes in UK Government income tax policy, such as above inflation increases in the higher rate threshold, have also generally reduced UK Government revenues and therefore helped move the net position in a positive direction.

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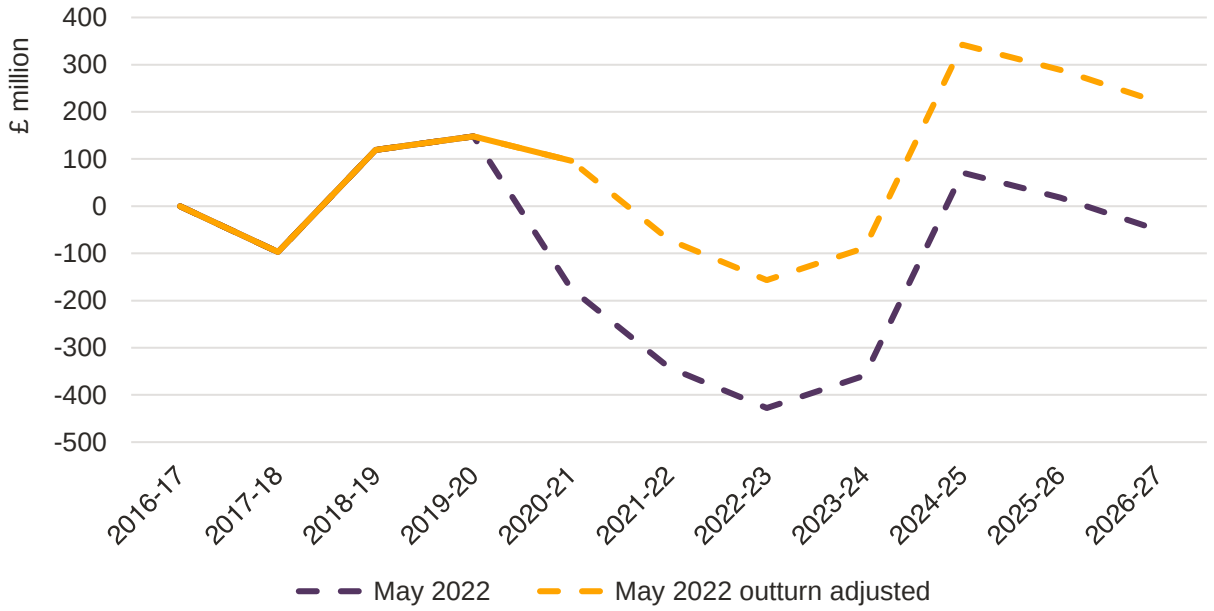
[39] Growth in revenues in England and Northern Ireland are used to calculate the income tax Block Grant Adjustment as income tax has been devolved to the Welsh Government. For ease we refer to the rest of the UK throughout this publication.
[40] Scottish Fiscal Commission (2022) Scotland's Economic and Fiscal Forecasts – May 2022 (link)
[41] A detailed explanation of how income tax affects the Scottish Budget can be found in Scottish Fiscal Commission (2021) Funding for the Scottish Budget (link)

The income tax net position

4.6 Figure 4.1 shows outturn data and forecasts of the income tax net position, which compare our forecasts of Scottish income tax revenue to the income tax BGA based on forecasts by the OBR.[42,43] Our latest forecasts published in May 2022 were based on four years of outturn data from 2016-17 to 2019-20.[44] Since then, an additional year of income tax outturn data has been published.[45] The income tax net position in 2020-21 was £271 million more positive than we had estimated in May 2022.[46] We have therefore adjusted the forecast net position in future years with a £271 million upward shift. This illustrative adjusted forecast of the income tax net position is used in the following analysis. An updated forecast net position will be available once we and the OBR have produced revised forecasts later this year.

Figure 4.1: Income tax net position



Source: Scottish Fiscal Commission, Scottish Fiscal Commission (2022) Scotland's Economic and Fiscal Forecasts – May 2022 (link), Office for Budget Responsibility (2022) Economic and fiscal outlook – March 2022 (link).

4.7 The income tax net position is influenced by the relative growth of per person income tax revenues in Scotland and the rest of the UK. If Scottish income tax revenues per head grow faster than in the rest of the UK, the net position moves in a positive direction, and there is more funding available for the Scottish Budget. Conversely, if Scottish income tax revenues per head grow more slowly than in the rest of the UK, the income tax net position moves in a negative direction, and there is less funding available for the Scottish Budget.

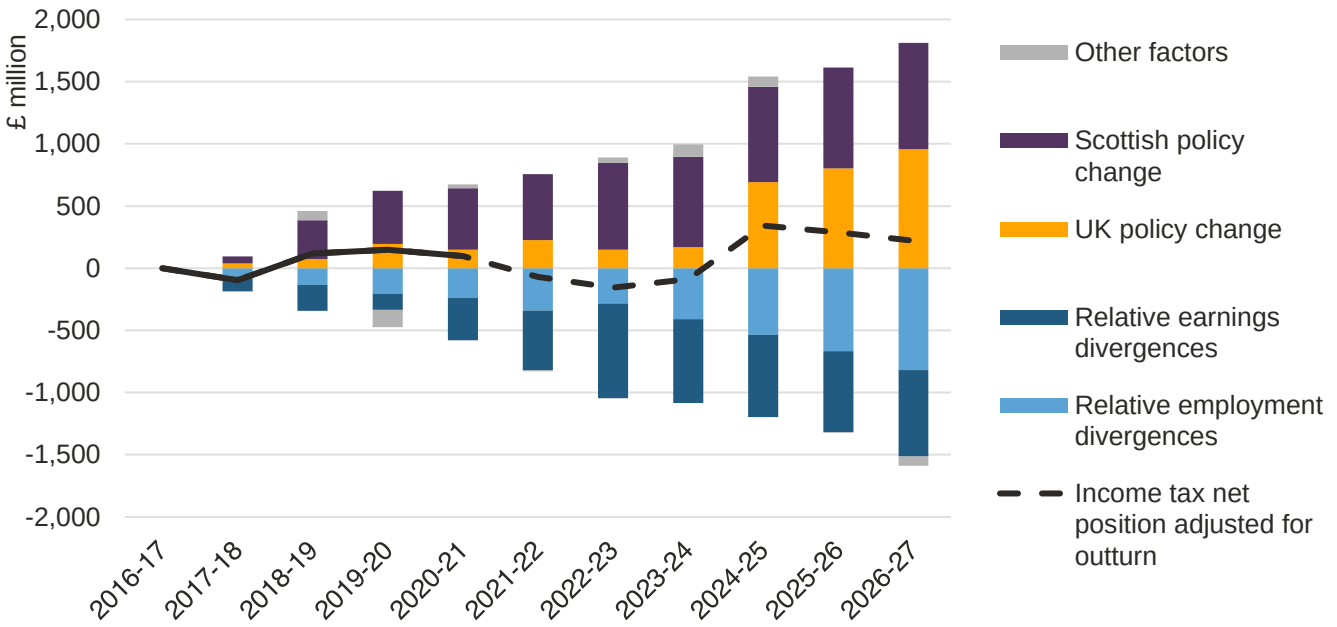
4.8 Growth in income tax revenues is driven by the underlying performance of the economy, in particular earnings and employment growth, and also by divergences in Scottish and UK income tax policy. The demographics projections we show in **Chapter 2** imply the size of the population most likely to

[42] Scottish Fiscal Commission (2022) Scotland's Economic and Fiscal Forecasts – May 2022 (link)
[43] OBR (2022) Economic and Fiscal Outlook – March 2022 (link)
[44] Scottish Fiscal Commission (2022) Scotland's Economic and Fiscal Forecasts – May 2022 (link)
[45] HMRC (2022) Scottish Income Tax Outturn Statistics: 2020 to 2021 (link)
[46] The income tax outturn data and subsequent updated BGA showed the net position for 2020-21 increase from the forecast negative £175 million to a positive £96 million, which is a £271 million increase. Analysis of the outturn data is provided in Scottish Fiscal Commission (2022) Forecast Evaluation Report – August 2022 (link).

be in employment in Scotland is set to decrease and to decrease more than for the UK. This implies revenues per head are likely to grow more slowly than in the rest of the UK.

4.9 In this section, we present illustrative analysis to demonstrate how changes in each of these factors relative to the UK are estimated to have contributed to the net position, both in the outturn data and the forecast. This analysis is illustrative as the exact contribution of each factor to the net position cannot be known with certainty and there may be overlaps in the contribution of different factors. We summarise our analysis in Figure 4.2.

Figure 4.2: Illustrative contributions to the income tax net position



Source: Scottish Fiscal Commission

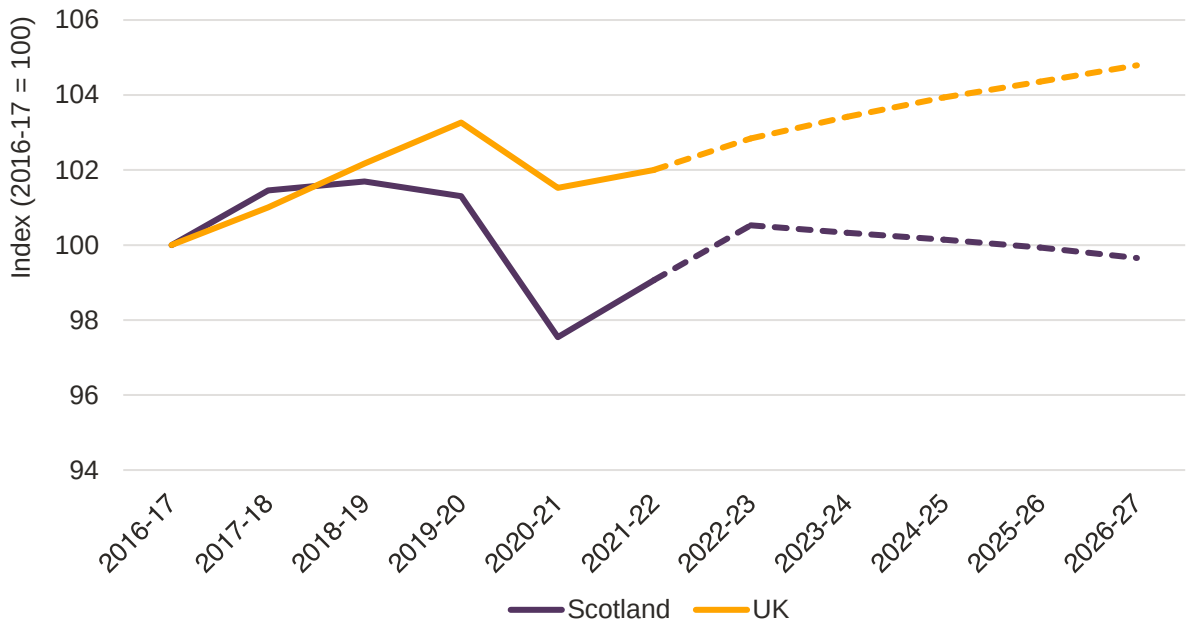
4.10 Figure 4.2 shows slower Scottish earnings and employment growth have contributed negatively to the net position. This is offset by divergence in Scottish and UK income tax policy which has helped keep the net position positive in most years. We estimate that, in the absence of Scottish and UK income tax policy differences, the net position would have been -£1,004 million in 2022-23. By having relatively higher tax rates in Scotland and lower thresholds for higher rate taxpayers, the income tax net position shifts to an expected -£157 million in 2022-23.

Economic Divergence: Employment

4.11 Since 2016-17, growth in the number of adults in employment in the UK has been higher than in Scotland. This is partly driven by faster population growth, but there are other factors at play. Figure 4.3 shows growth in Scottish and UK employment since 2016-17 and forecast growth for the next five years.

4.12 Relatively slower employment growth in Scotland is estimated to reduce the net position by £284 million in 2022-23. We expect this effect to continue to grow over our five-year forecast horizon, reaching £820 million by 2026-27, this is more than the effect of divergences in earnings.

Figure 4.3: Scottish and UK employment (2016-17 = 100)



Source: Scottish Fiscal Commission, Scottish Fiscal Commission (2022) Scotland's Economic and Fiscal Forecasts – May 2022 (link), OBR (2022) Economic and fiscal outlook – March 2022 (link).

4.13 The employment divergence is driven by lower population growth as well as different labour force participation trends. The participation rate for those aged 16 and over has been falling in Scotland while being broadly flat for the UK since 2014-15. Although an ageing population has contributed to a reduced overall participation rate in Scotland, it is changing participation rates within age groups that has driven divergence between Scotland and the UK.

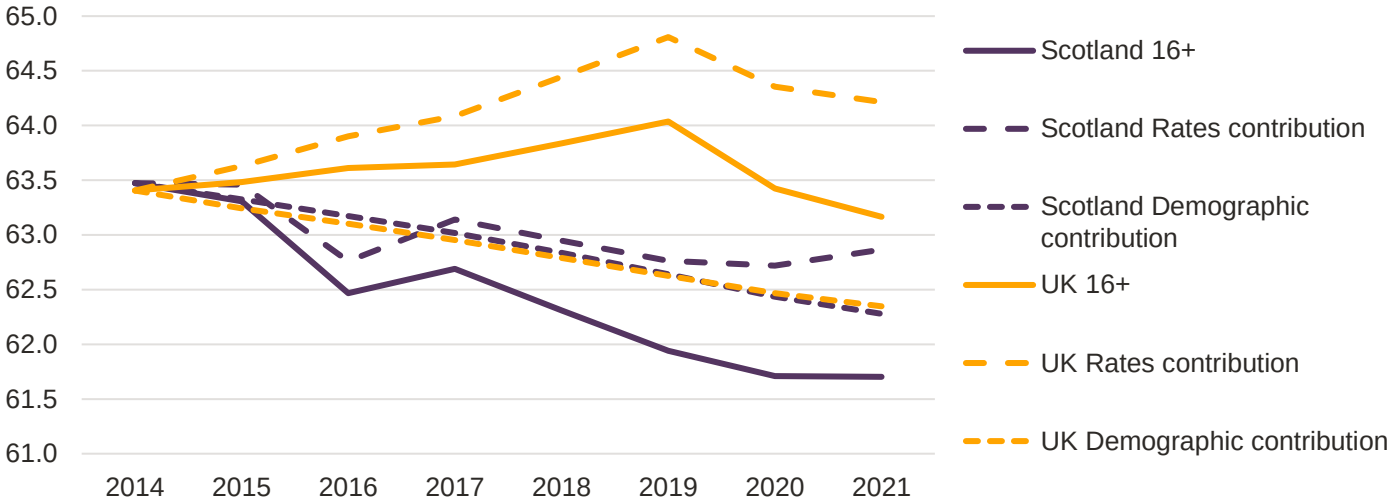
4.14 Demographic trends in the UK and Scotland are resulting in the average age of the population increasing. We can isolate the effect of an ageing population on participation by holding participation rates by age constant. This is shown as the demographic contribution in Figure 4.4. At the UK level, increasing participation rates within age groups, shown as the rates contribution in Figure 4.4, have offset this demographic effect but Scottish participation rates have fallen at the same time as demographic effects.

4.15 Scottish and UK participation rates have been diverging for all age groups since 2014-15. In May 2022 we highlighted how an ageing population and growing enrolment in tertiary education for those aged 16 to 25 had contributed to this divergence.[47] In addition there are also differences for those aged 25 to 34 and 35 to 49, as shown in Figure 4.5. These age groups are the largest segments of the working population, have the highest participation and employment rates, earn the most money, and pay the most tax. Therefore if the employment rates for these age groups fall relative to the UK, this puts downward pressure on income tax revenues and the income tax net position via average earnings as well as employment.

4.16 ONS survey data on economic inactivity, those who are not in employment or actively seeking work, shows similar reasons for inactivity across the UK and Scotland, making it difficult to identify an explanation for the divergence in participation of those aged 25 to 49. This is partly because data on inactivity by reason is not broken down into age groups.

[47] Scottish Fiscal Commission (2022) Scotland's Economic and Fiscal Forecasts – May 2022 (link)

Figure 4.4: Contributions to participation rate gap



Source: Scottish Fiscal Commission, ONS (2022) HI11 Regional labour market: Headline indicators for Scotland (link), ONS (2022) A01: Summary of labour market statistics (link).
The participation rate for those aged 16 and over for Scotland shown here is from the July 2022 Labour Force Survey. The data are slightly different to that in Figure 4.5 which are from Annual Population Survey data published in April 2022.

4.17 One possible reason for diverging labour market activity of those aged 25 to 49 is the downturn of the oil and gas sector. Employment linked to activity in the North Sea has fallen by around 250,000 since 2014, of which Scotland represents around a third.[48] Some of these workers will have stayed in the Scottish labour force and moved into other sectors while others may have gone overseas to find work, lowering the average participation rate in Scotland. These jobs that have been lost were also generally high paying, which is likely to have contributed to the divergence in average earnings between Scotland and the UK.

Figure 4.5: Participation rates by age in Scotland and UK

Percentage points	Scotland		UK		Difference (Scotland - UK)		
	2014-15	2021-22	2014-15	2021-22	2014-15	2021-22	Change
16-17	36.9	22.5	32.9	28.0	4.0	-5.5	-9.5
18-24	71.6	68.9	70.6	68.9	1.0	0.0	-1.0
25-34	85.8	84.8	85.2	87.7	0.6	-2.9	-3.5
35-49	86.8	84.5	86.9	88.0	-0.1	-3.5	-3.4
50-64	70.1	70.8	71.6	73.3	-1.5	-2.5	-1.0
65+	8.8	9.0	10.5	11.0	-1.7	-2.0	-0.3
16-64	77.5	76.1	77.8	78.7	-0.3	-2.7	-2.4
16+	62.6	60.3	63.4	63.2	-0.8	-2.9	-2.1

Source: Scottish Fiscal Commission, ONS (2022) HI11 Regional labour market: Headline indicators for Scotland (link), ONS (2022) A01: Summary of labour market statistics (link).
The participation rate data for Scotland shown here is from the April 2022 Annual Population Survey which includes age breakdowns. The data are slightly different to that in Figure 4.4 which is from Labour Force Survey data published in July 2022.

4.18 By 2026-27 the participation rate divergence is forecast to be 4 per cent between Scotland and the UK, primarily caused by the ageing population as our forecasts assume participation rates

[48] Oil and Gas UK (2019) Workforce Report 2019 (link) and Oil and Gas UK (2021) Workforce Insight Report 2021 (link)

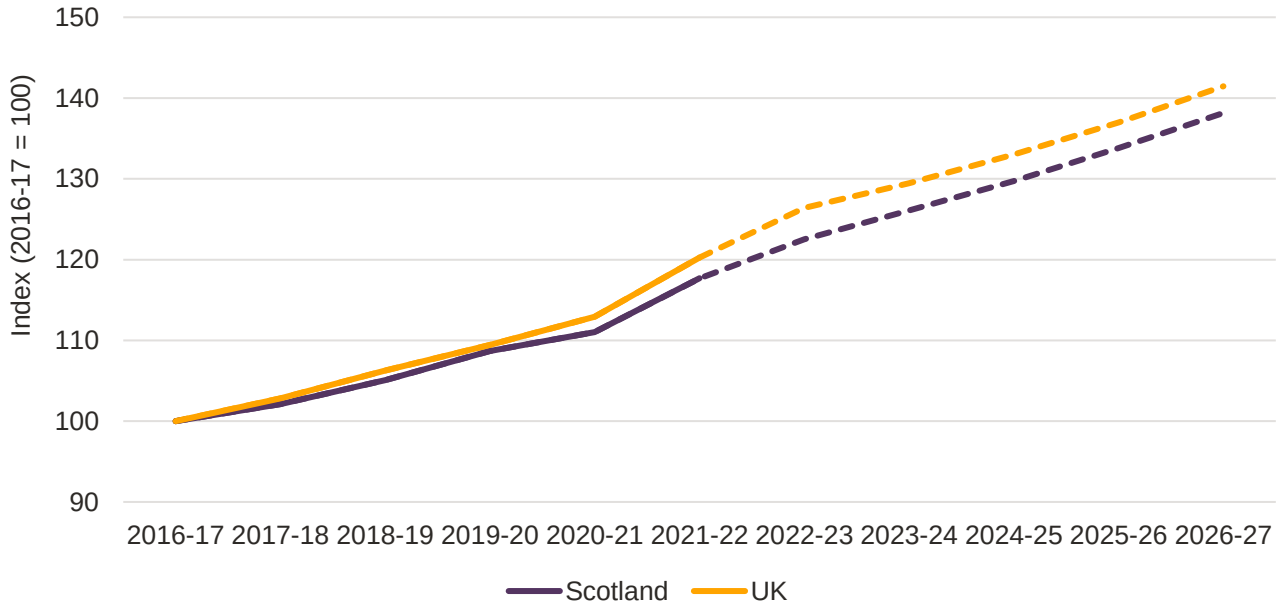
for each age group remain broadly constant at the 2021-22 levels.[49] Our long-term projections are for the participation rate in Scotland to drop by around 8 per cent over the next fifty years as a result of the ageing population. This illustrative decomposition of the net position shows how important relative employment growth is to the net position. A more rapidly ageing population compared to the UK may have increasing negative effects on the income tax net position over the long term, although the overall effect will depend on interactions with total population growth which affects the BGA calculation. Our FSR next year will explore this further.

Economic Divergence: Earnings

4.19 We have seen Scottish average earnings grow more slowly than in the UK over the last five years. Over the longer term, we would expect Scottish average earnings to grow broadly in line with average earnings in the UK. The main driver of long-term average earnings growth is productivity growth, as discussed in **Chapter 3** Scottish productivity growth has broadly matched the UK since 1998. Similarly, between 1998-99 and 2016-17, nominal average wages have grown by around 3 per cent a year on average in both Scotland and the UK.[50] It would be unreasonable to expect average earnings in Scotland to diverge too far from the rest of the UK over time.

4.20 Since 2016-17 nominal average earnings have grown slower in Scotland than in the UK, as shown in Figure 4.6. This has a negative effect on the income tax net position. We expect the relatively slower average earnings growth in Scotland between 2016-17 and 2022-23 to reduce the income tax net position by £763 million in 2022-23. Over the next five years up to 2026-27 we expect Scottish average earnings to grow broadly in line with the UK, meaning the effect on the income tax net position stays around -£700 million each year.

Figure 4.6: Scottish and UK average earnings (2016-17 = 100)



Source: Scottish Fiscal Commission, Scottish Fiscal Commission (2022) Scotland's Economic and Fiscal Forecasts – May 2022 (link), OBR (2022) Economic and fiscal outlook – March 2022 (link).

[49] Scottish Fiscal Commission (2022) Scotland's Economic and Fiscal Forecasts – May 2022 (link) and Office for Budget Responsibility (2022) Economic and fiscal outlook – March 2022 (link).

[50] Scottish Fiscal Commission (2022) Scotland's Economic and Fiscal Forecasts – May 2022 (link), OBR (2022) Economic and Fiscal Outlook – March 2022 (link), ONS (2022) UK Economic Accounts, series DTWM and ROYK (link), ONS (2022) A01: Summary of labour market statistics, series MGRZ and MGRQ (link).

4.21 As discussed in May 2022, Scotland's slower average earnings growth since 2016-17 can be explained by the relative underperformance of the North East of Scotland, combined with significantly higher pay growth in London boosting the UK average.[51] The long-term structural decline in North Sea oil and gas activity feeds through to lower activity in the onshore oil and gas supply chain and has acted as a drag on Scotland's overall pay growth. Scotland's lagging earnings growth since 2016-17 has been exacerbated by significantly stronger earnings growth in the financial services sector in London and the South East over the last two years.

4.22 The long-term structural decline in the oil and gas industry means that, while we forecast Scotland's earnings growth in the longer run to be broadly in line with that of the UK, we expect the current gap in earnings levels to persist.

4.23 Our approach to estimating the earnings effect is based on applying UK average earnings growth to Scottish taxpayers, further details on our methodology can be found in **Annex A**. The underlying income distribution determines the effects of earnings and policy divergences on tax revenues. Therefore the effects of differences in the income distribution will be reflected in the estimated effects of earnings divergences, policy divergences and other factors.

Scottish and UK policy divergence

4.24 In 2018-19 the Scottish Government introduced a new five-band system of income tax in Scotland. This split the 20 per cent basic rate band into three separate bands with tax rates of 19 per cent, 20 per cent and 21 per cent. In the same year, it increased the higher rate of income tax in Scotland from 40 per cent to 41 per cent, and increased the top rate of income tax from 45 per cent to 46 per cent.

4.25 These changes meant that lower income taxpayers in Scotland paid slightly less than they would in the rest of the UK, while higher income taxpayers paid more. Overall, these policy changes raised additional income tax revenue from Scottish taxpayers.

4.26 Since 2017-18, the Scottish Government has increased the higher rate threshold by less than it has risen in the UK, meaning more income in Scotland is taxed at the higher rate of 41 per cent. In 2022-23 those earning over £43,663 pay the higher rate in Scotland compared to those earning over £50,271 in the rest of the UK. These policy changes have further increased tax revenues in Scotland relative to the UK.

4.27 The UK Government has announced a reduction in the basic rate of income tax in the rest of the UK to 19 per cent in 2024-25.[52] This reduces income tax revenues in the rest of the UK, thereby reducing the income tax BGA and benefiting the net position. Our income tax forecast assumes the Scottish Government follows their current income tax policy and do not make a similar reduction in tax rates in Scotland.[53] As a result, the net position is forecast to move back to a positive value in 2024-25.

4.28 We do not account for changes in the personal allowance as a policy divergence as they apply in Scotland and the rest of the UK. We do however note the recent agreement between the UK and Scottish Government that the UK Government's policy to increase the personal allowance above inflation have had a spillover effect on Scottish income tax revenues. The two governments have

[51] Scottish Fiscal Commission (2022) Scotland's Economic and Fiscal Forecasts – May 2022 (link)

[52] UK Government (2022) Spring Statement (link)

[53] We assume the higher and top rate thresholds in Scotland remain fixed, the other thresholds are assumed to increase with inflation and tax rates remain fixed at current levels.

agreed a payment of £375 million for the spillover covering 2017-18 to 2021-22, spillover amounts for future years have yet been agreed.[54] This spillover has not been included in the net position or this analysis.

4.29 We estimate that higher tax rates and the changes to the higher rate threshold in Scotland have added £847 million to the net position in Scotland in 2022-23, with most of this coming from Scottish Government policy changes. The positive effect on the net position from Scottish Government income tax policy is expected to be more than offset by the negative economic effects in 2022-23. The forecast net position in 2022-23 is £157 million, after adjusting for the most recent outturn data. By 2026-27, we expect policy divergences between Scotland and the UK will add £1,810 million to the net position. Overall the net position is forecast to be a positive £221 million in 2026-27 as the policy divergence outweighs the effects of lower employment and earnings growth in Scotland.

Other factors

4.30 We have good data on Scottish employment and earnings growth and can make reasonably accurate estimates of the effect of policy divergences to illustrate the effects on the net position. There remains a small part of the net position which cannot be explained by earnings, employment and policy divergences. These factors are difficult to measure and may include information missing from our taxpayer data; changes in the shape of the income distribution, for example large bonuses at the top of the income distribution; and changes in taxpayer behaviour for example avoidance or evasion. These factors are considered to have a small effect on the overall net position.

4.31 The behavioural responses of individuals to tax policy changes may include greater use of tax planning, tax avoidance or evasion, economic responses such as individuals changing their hours worked, or migration both into and out of Scotland. We do not expect that behavioural responses will have as big an effect on the net position as the four main factors discussed in this report.

4.32 For example, in February 2018 we forecast that there would be a behavioural effect reducing revenues by £56 million in 2018-19 in response to the policy change that introduced five tax bands in 2018-19.[55] This combines the behavioural response to both the change in Scottish policy and the tax differences between Scotland and the rest of the UK. To put this into perspective, before accounting for the behavioural effect, we estimated revenues would increase by £276 million in 2018-19. The £56 million behavioural effect reduced this by around 20 per cent to £219 million.

4.33 Since February 2020 we have published estimates of the behavioural response for each Scottish Government policy announcement because of the tax difference between Scotland and the rest of the UK. We consider these behavioural responses to be migration between Scotland and the rest of the UK, and tax residency changes for taxpayers with flexibility about where they report their location to HM Revenue and Customs (HMRC) within the UK. In February 2020 we estimated that these behavioural responses to the policies announced in 2018-19, 2019-20, 2020-21 would reduce revenues by £16 million in 2020-21, and by £46 million in 2024-25.[56] While not insignificant, this is between 5 and 12 per cent of the additional revenue that we estimated these policy measures would bring in. We discussed the effect of intra-UK migration on Scottish income tax revenues in more detail in our ‘How we forecast income tax’ paper published in May 2021.[57]

[54] Letter from the Cabinet Secretary for Finance and Economy to the Convener of the Finance and Public Administration Committee – 15 July 2022 (link)
[55] Scottish Fiscal Commission (2018) Updated income tax forecasts – February 2018 (link)
[55] Scottish Fiscal Commission (2020) Scotland's Economic and Fiscal Forecasts – February 2020 (link)
[57] Scottish Fiscal Commission (2021) How we forecast income tax (link)

4.34 The distribution of incomes will also have an effect on the net position and relative income tax revenue growth. For example if wage growth occurs because of bonuses to higher earners then this will result in higher tax revenues than if the wage growth arose because of increased wages across the income distribution. Relative changes in the income distribution between Scotland and the rest of the UK could have affected the net position. These are included in other factors shown in Figure 4.2 although these will also influence the estimated effects of earnings and policy divergences.

4.35 We will continue to monitor the income tax net position and assess how relative economic performance is affecting the Scottish Budget. Our FSR next year will consider how demographic change is likely to contribute to the income tax net position over the next fifty years.

Annex A
Income tax net position modelling

A.1 We developed a model to investigate the contribution of divergences in employment, earnings and policy to the income tax net position. The net position is calculated from Scottish income tax revenues and the income tax Block Grant Adjustment (BGA) which is based on growth in income tax revenues in England and Northern Ireland.[58] Until outturn data are available the BGAs are based on Office for Budget Responsibility (OBR) forecasts. Our income tax model is used to forecast Scottish income tax revenues and we used this model to estimate the effects of different factors on the net position.

A.2 The starting point of our analysis was the Survey of Personal Incomes (SPI) – Public Use Tape for 2016-17 aligned to the 2016-17 income tax outturn data.[59,60] This contains anonymised data of a 1 per cent to 2 per cent sample of Scottish taxpayers. We used Real Time Information (RTI) data with employment and earnings information for Scotland and the UK.[61] This data is available up to 2021-22. For the remaining years of our analysis up to 2026-27 we used our own forecasts of employment and earnings for Scotland and the OBR's corresponding forecasts for the UK.[62]

A.3 Although the focus of the analysis is on the effects of employment and earnings on the net position, we also account for policy divergences by the UK and Scottish Government. Consistent with our forecast published in May 2022 we assume the higher and top rate thresholds in Scotland remain fixed, the other thresholds are assumed to increase with inflation and tax rates remain fixed at current levels. We have accounted for UK Government increases in the higher rate threshold and the UK Government's plan to reduce the basic rate of income tax to 19 per cent in 2024-25, reflected in the OBR's latest forecasts.[63] We do not account for changes in the personal allowance as a policy effect. We do however note the recent agreement between the UK and Scottish Government that the UK Government's policy to increase the personal allowance increases above inflation have had a spillover effect on Scottish income tax revenues. The two governments have agreed a payment of £375 million for the spillover covering 2017-18 to 2021-22, spillover amounts for future years have yet been agreed.[64]

A.4 We modelled four scenarios outlined in Figure A.1. We then calculated the differences between the baseline and each scenario to estimate the effect of each change on the income tax net position. The baseline scenario includes current Scottish Government policy. The effects of Scottish Government policy on the net position have been estimated separately based on our previous policy costings and re-costings which we publish in 'Scotland's Economic and Fiscal Forecasts'.[65] Our model cannot explain all of the change in the income tax net position and the unexplained change is referred to as other factors. We expect the unexplained change to arise from behavioural changes,

[58] Further information on the Block Grant Adjustments can be found in Scottish Fiscal Commission (2021) Funding for the Scottish Budget (link)
[59] HMRC (2019) Personal incomes: tables 3.1 to 3.11, 3.16 and 3.17 for the tax year 2016 to 2017 (link), HMRC (2019) Personal incomes: tables 3.12 to 3.15a for the tax year 2016 to 2017 (link) and Survey of Personal Incomes – Public Use Tape 2016-17 (link)
[60] HMRC (2018) Scottish income tax outturn statistics (link)
[61] ONS (2022) Earnings and employment from Pay As You Earn Real Time Information, seasonally adjusted (link)
[62] Scottish Fiscal Commission (2022) Scotland's Economic and Fiscal Forecasts – May 2022 (link), OBR (2022) Economic and Fiscal Outlook – March 2022 (link)
[63] UK Government (2022) Spring Statement (link)
[64] Letter from the Cabinet Secretary for Finance and Economy to the Convener of the Finance and Public Administration Committee – 15 July 2022 (link)
[65] Scottish Fiscal Commission Scotland's Economic and Fiscal Forecasts (link) Some policy costs have been extended to 2026-27 were previous costings did not cover the complete time period.

differences in the income distribution and interactions between earnings and employment. The results are presented in Figure 4.2.

Figure A.1: Scenarios for income tax modelling

Scenario	Earnings	Employment	Policy
Baseline	RTI/SFC data for Scotland	RTI/SFC data for Scotland	Scottish policy to 2022-23, Scottish HRT frozen from 2023-24 to end of forecast
Employment	RTI/SFC data for Scotland	RTI/OBR data for United Kingdom	As above
Earnings	RTI/OBR data for United Kingdom	RTI/SFC data for Scotland	As above
UK Government policy	RTI/SFC data for Scotland	RTI/SFC data for Scotland	UK Policy including the reduction in basic rate of income tax from 2024-25 onwards

Source: Scottish Fiscal Commission

Uncertainties and further analysis

A.5 This illustrative analysis is based on four different scenarios and is subject to higher levels of uncertainty than our usual income tax modelling. Our baseline scenario looks at how tax revenues change given the circumstances we have observed in Scotland and based on our forecasts of how they will develop. Our employment scenario looks at how revenues might change if trends in UK employment applied in Scotland, and similarly for earnings. The size of UK policy effects on the net position is estimated by proxying the effects through Scottish income tax revenues. We apply the UK Government policy changes which include the level of the personal allowance, freezes in the higher rate threshold in 2020-21 and 2021-22, as well as the planned reduction in the basic rate of income tax from 2024-25 onwards. An alternative approach to estimating the size of the effect on the net position would be to consider how UK Government policy has changed the BGA, but this would need a forecast model for UK Government income tax revenues which we do not have.

Additional information

Abbreviations

BGA	Block Grant Adjustment
EU	European Union
FSR	Fiscal Sustainability Report
GDP	Gross Domestic Product
HMRC	HM Revenue and Customs
HRT	Higher Rate Threshold
NRS	National Records of Scotland
OBR	Office for Budget Responsibility
ONS	Office for National Statistics
RTI	Real Time Information
SPI	Survey of Personal Incomes

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:

Economy	Silvia Palombi	Silvia.Palombi@fiscalcommission.scot
Tax	Will Jones	Will.Jones@fiscalcommission.scot
Public funding	Caroline Carney	Caroline.Carney@fiscalcommission.scot

For general enquiries about this publication or the commission and how we work please contact info@fiscalcommission.scot

[66] OECD (2014) Recommendation on Principles for Independent Fiscal Institutions (link)
[67] Scottish Fiscal Commission (2018) Compliance with the Code of Practice for Official Statistics (link)

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