Scotland's National Strategy for Economic Transformation

Evidence Paper

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Scottish Government
Riaghaltas na h-Alba
gov.scot

Executive Summary – What the Evidence Tells Us

This report provides analytical evidence underpinning the National Strategy for Economic Transformation (NSET). It is among various sources of evidence that have informed the strategy, including a public consultation exercise, views from members of the Council for Economic Transformation and their subgroups, and engagement with other economy stakeholders.

It presents evidence on the structure and performance of Scotland's economy, and the linkages between key indicators of economic performance. It identifies where the new National Strategy must take action to deliver transformational improvements to Scotland's economic performance.

The focus is on the five new policy programmes of action:

- **Productive Businesses and Regions:** make Scotland's businesses, industries, regions, communities and public services more productive and innovative;
- **A Fairer and More Equal Society:** reorient our economy towards wellbeing and fair work, to deliver higher rates of employment and wage growth, to significantly reduce structural poverty, particularly child poverty, and improve health, cultural and social outcomes for disadvantaged families and communities.
- **New Market Opportunities:** strengthen Scotland's position in new markets and industries, generating new, well-paid jobs from a just transition to net zero;
- **Entrepreneurial People and Culture:** establish Scotland as a world-class entrepreneurial nation founded on a culture that encourages, promotes and celebrates entrepreneurial activity in every sector of our economy; and,
- **Skilled Workforce:** ensure that people have the skills they need at every stage of life to have rewarding careers and meet the demands of an ever changing economy and society, and that employers invest in the skilled employees they need to grow their businesses.

This summary of 'what the evidence tells us' sets out the challenges identified in this evidence paper.

Scotland's Overall Economic Performance

Scotland is a small open economy with a population of 5.4 million and on-shore GDP of circa £160 billion (excluding oil), which accounts for around 8.0% of UK economy. It accounts for about a third of UK landmass, and possesses key natural resources across its land and seas. As part of the UK economy, Scotland's economy has faced a number of challenges in recent years. These include the impacts of the 2008-09 financial crisis; UK government austerity measures; the oil price shock from 2014 and early adjustment in anticipation of the UK leaving the European Union (EU) and the European single market.

These developments have impacted on Scotland's economic performance. While Scotland's economic growth performance has improved over the medium term, it has declined in comparison with Organisation for Economic Co-operation and Development (OECD) countries, with Scotland currently ranked in the 4th quartile for GDP growth. However, Scotland still compares strongly internationally. In 2019, Scotland's GDP per head (including offshore) was $48,373 at Purchasing Power Parity, ranking in the 2nd quartile of country rankings.

More recently, the COVID-19 pandemic and necessary restrictions on the economy to protect public health have impacted significantly on GDP since 2020. This was in addition to the impact of eventually leaving the EU and the European single market. Following the first COVID-19 lockdown in March 2020, Scotland's economy contracted by 23% relative to the period before the measures were introduced. While the economy has now returned to pre-COVID levels of output[1], business resilience has been damaged across a number of sectors.

Further analyses identified the key challenges holding back Scotland's economic prosperity and opportunities for transformation. These are summarised below, along with evidence of potential of some of the projects in NSET and lessons from other small advanced economies

Productive businesses and regions

On Scotland's productivity performance and its drivers, the evidence shows that:

Overall Productivity Performance

- Scotland's productivity performance varies significantly across and within sectors, and across business size bands, with productivity growth largely occurring in higher productivity sectors (manufacturing and internationally tradable services). To shift the dial on productivity across the whole economy we need to maintain rates of productivity growth in currently high performing sectors and increase performance in the traditionally lower productivity services sectors.

Research & Development and Broader Technology Adoption

- Scotland still suffers from very low levels of business research and development (R&D) spend, although there have been recent improvements - Business Enterprise Research & Development jobs in Scotland increased by 9.0% between 2019 and 2020. Scotland also shows strong performance on higher education R&D spend.

- There is scope to improve business management practices and to build their capacity for productivity enhancing business models. This includes policies to encourage a

[1] GDP Monthly Estimate: November 2021 - gov.scot (www.gov.scot)

culture of entrepreneurship within the existing business base by building experimental and innovative capacity, and facilitating peer to peer learning between businesses.

- There is need to tackle a wide range of barriers to businesses adopting and making the most effective use of existing technologies. This will go a long way in improving the productivity performance of many businesses.

Investment

- Recently, Scotland has performed well at attracting foreign direct investment projects, and has a strong angel investment market due to 'the Scottish model' of business angel syndicates investing alongside the public sector.

- Scotland's capital investment, measured by Gross Fixed Capital Formation (GFCF) as a share of GDP is low by OECD standards. However, Scotland's public sector investment as share of GDP is higher than the UK's, and compares favourably to other OECD countries, although there remains a gap to close on the better performing countries like Norway.

- Scotland's business capital investment rates are lower than comparable countries. The pandemic may have exacerbated this problem due to impact on business balance sheets and ongoing economic uncertainty.

Digital Infrastructure and Technology

- While there has been progress to support digital transformation through enhanced broadband and mobile coverage via programmes like Reaching 100 (R100) and the Scottish 4G Infill (S4GI) Programme, Scotland's levels of connectivity still lag behind many other European countries, particularly when considering full fibre

- The adoption of most key digital technologies, such as mobile technologies and cloud computing, has increased in recent years. However, the digitisation of Scottish businesses is relatively low on average and there is scope to increase further the adoption of many digital technologies to improve economic performance.

- Barriers to digital adoption and readiness exist, particularly in digital skills development, meaning many businesses are not fully embracing digital technologies to enhance their productivity. This is important as digital adoption is a continuous process where deployment of modern technology and development of skills should be a constant of business evolution.

Transport

- Overall, Scotland's transport system performs well in enabling economic activity. However, there remains opportunities to improve transport connections within and between certain areas. The main challenge is with respect to public passenger

transport, largely improving satisfaction with services and encouraging switch from the car to public and active travel.

Fairer and More Equal Society

Scotland's economy needs to do more to deliver on wider prosperity. Scotland also faces challenges with respect to:

- low growth of earning from employment and low pay, with a significant although reducing proportion of the workforce earning below the 'real living wage'. While this is partly explained by productivity levels, the evidence from other countries suggest that labour market structure, business models and policy could be important determinants of wages.

- deep seated regional inequalities in economic activity with many communities in Scotland facing significant social challenges linked to poor economic performance, as evidenced by high-levels of deprivation or child poverty in regions with low economic performance.

- significant economic inequalities exist for disadvantaged groups (gender, ethnicity and disability). Tackling these is not only important for maximising the benefits from Scotland's economic prosperity, but it improves overall economic performance.

New Market Opportunities

- Scotland has demonstrable strengths in many of the industries of the future, with high potential for economic transformation if it can make progress in establishing industries to serve new markets linked to net zero transitions and wider technological developments.

- Evidence from offshore wind energy developments suggests that Scotland has not always maximised on opportunities. Supply chain development has not matched the opportunities available in Scotland, the rest of the UK and internationally. It is important therefore that Scotland's approach to other emerging or new markets draws lessons from offshore wind developments where there are now efforts to bolster Scotland's supply chains capacity. This will require investment in skills, private capital, infrastructure and innovation to grow capacity and competitiveness.

- While Scotland has grown its international exports over the past 20 years, their value as a share of GDP has remained broadly static and remains low relative to comparable small advanced economies.

- Scotland's exports are heavily concentrated. Our top five sectors account for 69% of export value. Scotland outperforms its peers in a few sectors. Scottish export performance differs across regions due to the geographic distribution of exporting businesses.

Entrepreneurial people and culture

The evidence shows that Scotland's entrepreneurship is improving from a low base, but there needs to be a step-change in order to be truly transformative. There remains significant scope for improvement in a number of areas, as follows:

- Scotland has a relatively small but growing business base. Growth has largely been among micro and small businesses, and Scotland still lags behind comparable economies on indicators of entrepreneurial dynamism – start-ups, business survival rate and high growth businesses.

- Scotland has a deficit of high-growth firms when compared with other countries, and there is evidence of constraints to business growth in the wider enterprise ecosystem.

- There is recent evidence of significant improvement in business start-ups in the younger age groups that Scotland can build on. The business start-up rate amongst ethnic minorities is also significantly higher than in the rest of the population, demonstrating the value of immigration to Scotland's economy. There is, however, a distinct gender gap in Scottish entrepreneurship; there is need to increase female entrepreneurs.

- Growth of registered businesses has been strongest in 'internationally tradable services' and 'infrastructure and support' sectors,[2] although the domestic services industry still accounts for the largest share of registered businesses.

Skilled Workforce

Scotland has performed well in post school education and has one of the highest shares of the workforce with at least tertiary education in Europe. However, the economy still faces a wide range of challenges with respect to skills, including:

- general skills shortages as measured by prevalence of 'skills shortage vacancies'. The skills challenge has grown as economic activity has recovered following the pandemic and with impacts of EU exit on migration;

- an aging population, which is also translating to an aging workforce. There is evidence the working life is getting longer with increasingly more people working beyond the retirement age. Latest projections suggest that these trends are long term and will continue. This highlights the importance of investing in lifelong learning.

- While Scotland has depended on migration to meet skills and workforce requirements – especially in some sectors; its share of foreign-born population is much lower when compared to other OECD countries. Brexit will have reduced this further.

[2] See Annex 1.1 to 1.3 for definition of these sectors

- Despite having challenges with respect to skills and general labour shortages, around one in five of Scotland's working age population is inactive. The most common reason cited for labour market inactivity in Scotland is temporary or long-term health problems in the workforce. The share of inactive workers reporting that they are discouraged or not interested in work is extremely small (1 per cent).

- To mitigate against growing skills mismatch in the economy, there is need to ensure skills provision adapts to changing skills requirements as the economy transforms with modern technologies and new markets. This requires ensuring that a more coherent lifelong learning offer is complemented by increased employer and industry investment in skills and training.

Potential Impact of the Strategy

Economic modelling suggests that the economy could be 4.9% (£8 billion) larger in 2032 than it would otherwise have been if NSET projects to increase openness and productivity were implemented successfully. An increase in exports through improved access to existing and new international markets benefits trade. Productivity improvements provide a further boost to the economy by increasing economic capacity and through improved competitiveness at home and abroad.

Lessons from Comparable Advanced Economies

The evidence suggests that successful small advanced economies that Scotland could emulate have strengthened their economic competitiveness through investing in human capital and supporting innovation. They have chosen their areas of outward activity through careful development of existing strengths and targeting of potential international markets.

Prioritising Innovation and Human Capital: they demonstrate strong, sustained investment in knowledge, innovation and human capital. High performing economies, such as Switzerland and several Scandinavian countries, perform particularly well on the Global Competitiveness Index's innovation and business sophistication measures.

Strategic Coherence: they demonstrate a high degree of policy coherence in their approaches; demonstrate flexibility when responding to shocks and structural changes. For example, the Scandinavian nations and Switzerland all have flexible labour market policies, but also strong social insurance systems to protect their workforce and mitigate the risks that come with labour flexibility. Following the 2008 crisis, the countries that recovered quicker tended to have an increased focus on:

- building economic resilience and an increased awareness of economic risk;
- deliberate efforts to boost productivity, either through structural reform or other policy levers, increased business investment and encouraging innovation; and,

- strategies to diversify international footprints, either through trade agreements or through supporting firms to expand internationally.

Active International Engagement: they also tend to have active international engagement, which lets them access larger markets. Their business base has more large companies per capita, which helps with access to global markets. External relations policies—whether that takes the form of trade agreements or a skills focus on enterprise and international expansion—support this international engagement.

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1. Introduction

This report is a compilation of some of the evidence that informed the National Strategy for Economic Transformation (NSET). It is among various sources of evidence that have informed the strategy, including a public consultation exercise, views from members of the Council for Economic Transformation and their subgroups, and engagement with other economy stakeholders.

It presents evidence on the structure and performance of Scotland's economy, the linkages between key indicators of economic performance and opportunities available to transform Scotland's economy. It identifies where the NSET must take action to deliver transformational improvements to Scotland's economic performance.

The focus is on the five new NSET policy programmes of action:

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This paper broadly mirrors the main NSET report by presenting evidence on the following:

Section 2 - general overview of Scotland's economic performance, including on economic growth, employment, pay, broad sectoral differences, key regional perspectives and business base.
Section 3 - Scotland's performance on key drivers of economic progress, along with benchmarking against comparable advanced economies to identify where Scotland has opportunities for improvement.
Section 4 - potential future scenarios for Scotland's economy if the Scottish Government and its partners deliver some of the NSET projects successfully.
Section 5 - policy lessons from other countries that have delivered strong outcomes across a range of wellbeing economy indicators.

2. Scotland Economic Performance

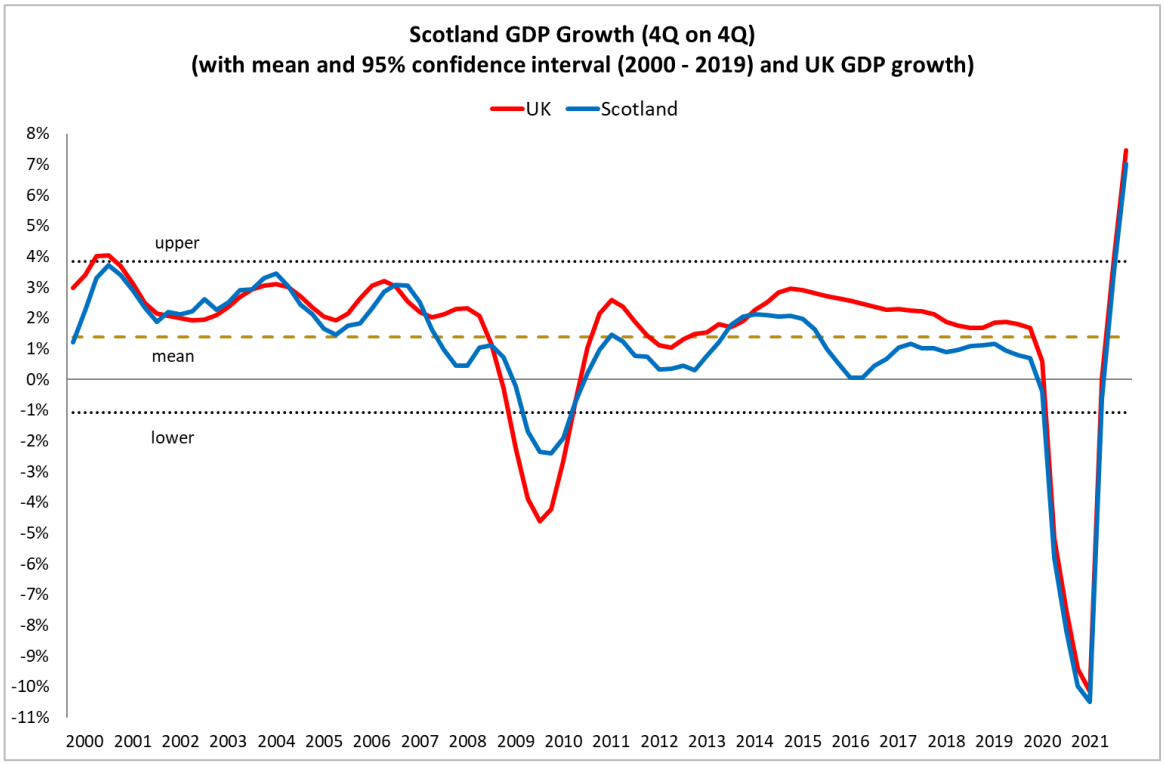
2.1 Macroeconomic performance

Scotland is a small open economy with a population of 5.4 million and on-shore GDP of circa £160 billion (excluding oil), which accounts for around 8.0% of UK economy. It accounts for about a third of UK landmass, and possesses key natural resources across its land and seas. As part of the UK economy, Scotland's economy has faced a number of challenges in recent years. These include the impacts of the 2008-09 financial crisis; UK government austerity measures; the oil price shock from 2014 and early adjustment in anticipation of the UK leaving the European single market.

Currently, the most common indicator for measuring economic activity is Gross Domestic Product (GDP), which is the total monetary value of all the goods and services produced in a country over a period. Economic growth in Scotland, measured in terms of the change in GDP over time, has been relatively subdued since the 2008-09 financial crisis. The average GDP growth rate over the period 2000 to 2019 was 1.4%. Over the period 2000–2007 it was 2.4% and fell to 0.7% over the period 2008-2019.

However, GDP does not capture broader wellbeing, environmental factors or the level of equality in a society. It also does not capture the value of all activity in the economy, such as volunteering or unpaid caring and household work. It does not take account of the impact current activity has on future generations, for example on our environment and nature. For these reasons, this report also looks at a wider range of indicators for economic performance and prosperity. There is a commitment in the NSET to develop a broader set of Wellbeing Economy indicators for Scotland.

Figure 2.1.1 - Scotland GDP Growth (4Q on 4Q), 2000 to 2021



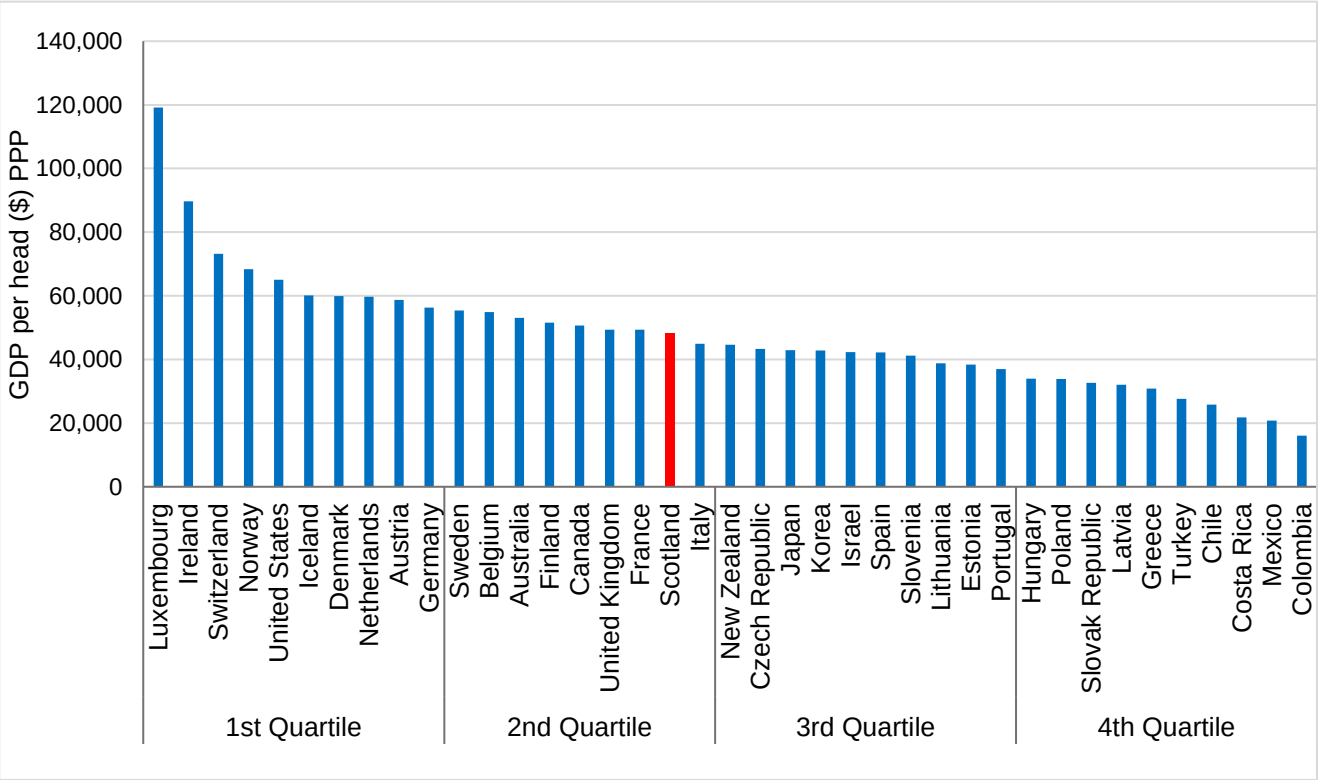
Source: Scottish Government
Note: includes mean and 95% confidence interval (2000-2019) and UK GDP growth

The COVID-19 pandemic and necessary restrictions on the economy to protect public health have had a significant impact on GDP since 2020. Following the first COVID-19 lockdown in March 2020, Scotland's economy contracted by 23% relative to the period before the measures were introduced. The economy has been recovering from the impacts of the lockdown on a monthly basis, and returned to pre-pandemic levels of output for the first time in November 2021.

The Scottish Fiscal Commission forecast (December 2021) that Scotland's economy will grow by 3.8% in 2022. They also suggest that longer term scarring to the economy from Covid will mean that trend GDP at the start of 2025 is forecast to remain 2% lower than their pre-pandemic forecast. However, this is less than previously expected at the start of 2021.

Despite the challenges presented above and evidence of subdued performance, Scotland's economy still compares strongly internationally. In 2019, Scotland's GDP per head (including offshore) was $48,373 at Purchasing Power Parity and ranks in the 2nd quartile of Organisation for Economic Co-operation and Development (OECD) country rankings.

Figure 2.1.2 - GDP per Head in OECD Countries, 2019

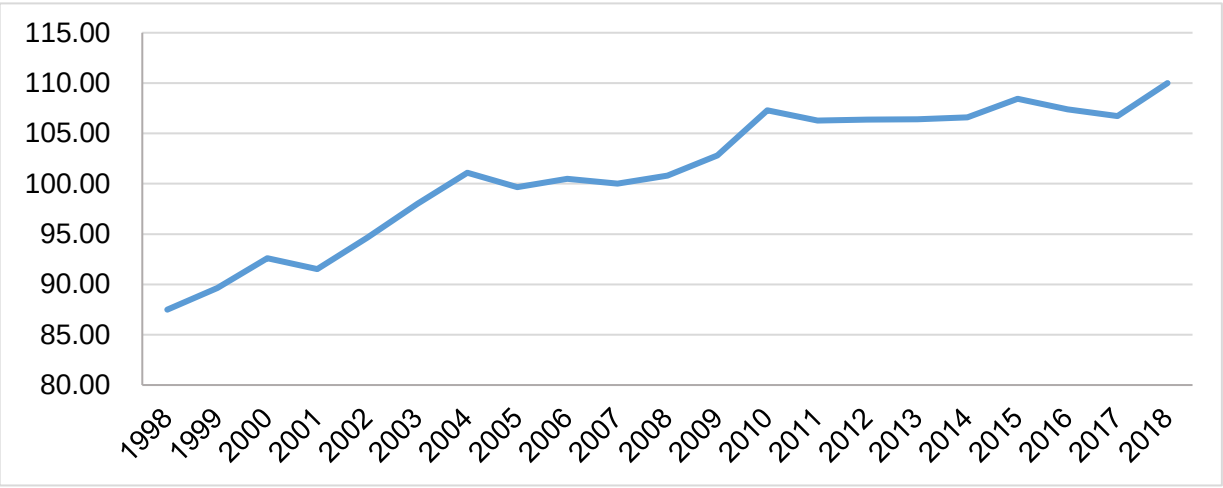


Source: OECD, Scottish Government

2.2 Productivity

Productivity, generally measured as output per unit of labour, is probably the most important measure of economic performance and competitiveness. Productivity growth has slowed across most developed nations, and has particularly struggled to recover since the global financial crisis. Along with other developed nations, Scotland's real terms productivity has been almost stagnant since 2008-09, in common with trends in the rest of the UK and other advanced economies. Productivity levels in 2018 could have been 30-percentage points higher if pre-financial crisis growth rates had continued.

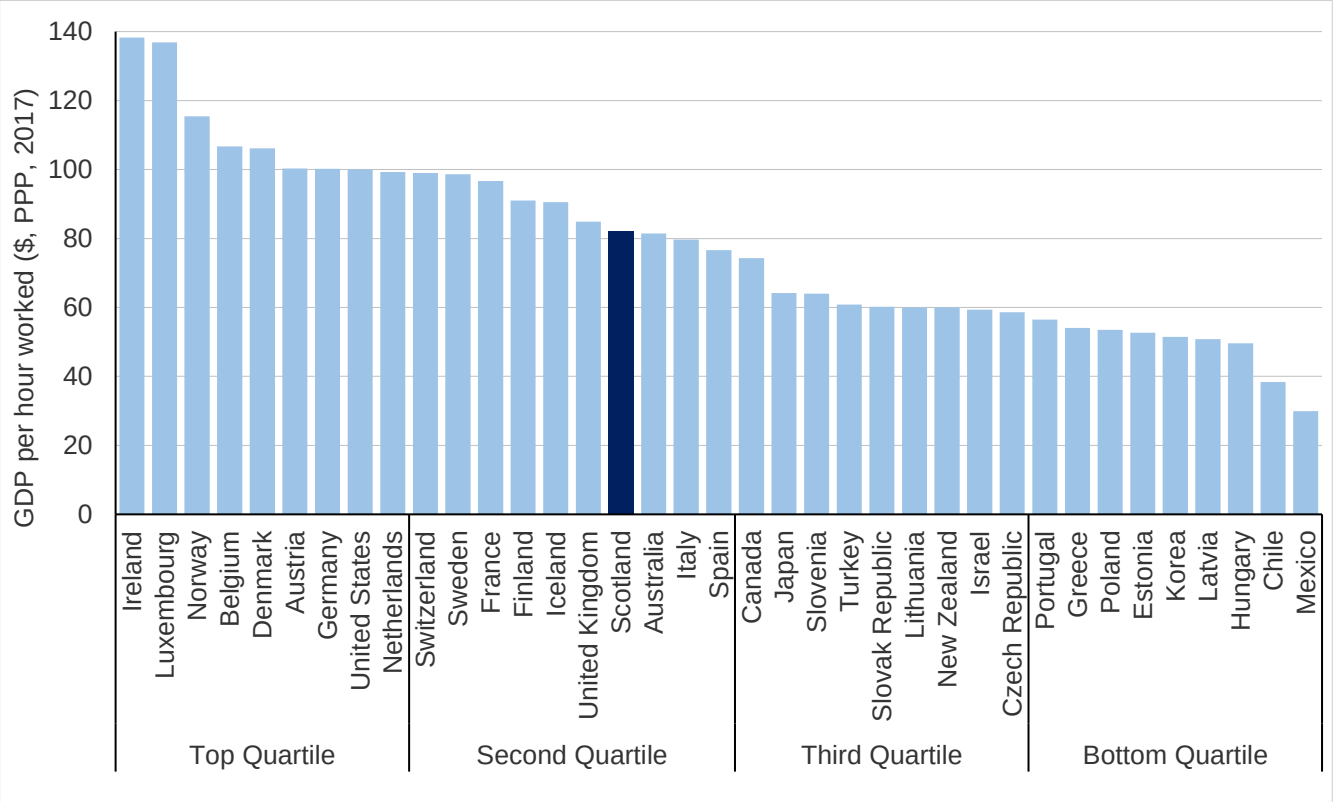
Figure 2.2.1 – Scotland Productivity (Output per Hour) Trends, 1998 to 2018



Source: Scottish Government

The National Performance Framework tracks Scotland's productivity performance against OECD countries, with the target to reach the top quartile. Scotland's productivity ranking has remained 16 out 37 in the last six years to 2018, and it has not shifted significantly in the last couple of decades.

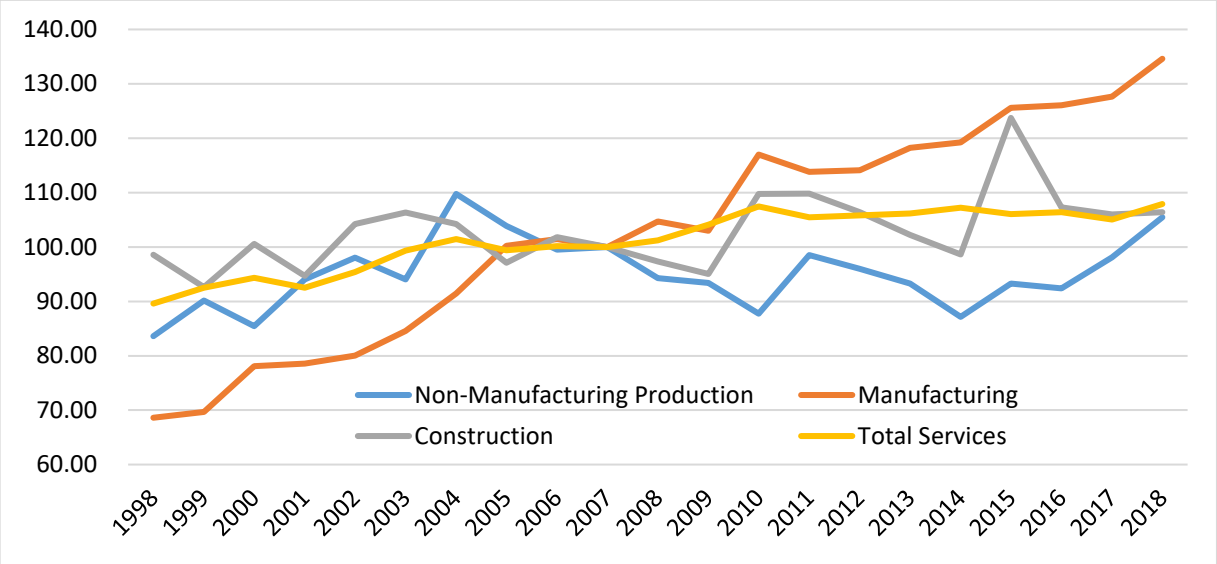
Figure 2.2.2 - OECD Countries GDP per hour worked (US$, PPP, 2017)



Source: Scottish Government

Scotland's productivity performance varies significantly across sectors and businesses of different sizes, in terms of both levels and trends. While productivity growth has been subdued across the whole economy since 2008-09, the manufacturing sector has performed relatively well when compared to non-manufacturing production (agriculture, forestry, fishing and mining), construction and services.

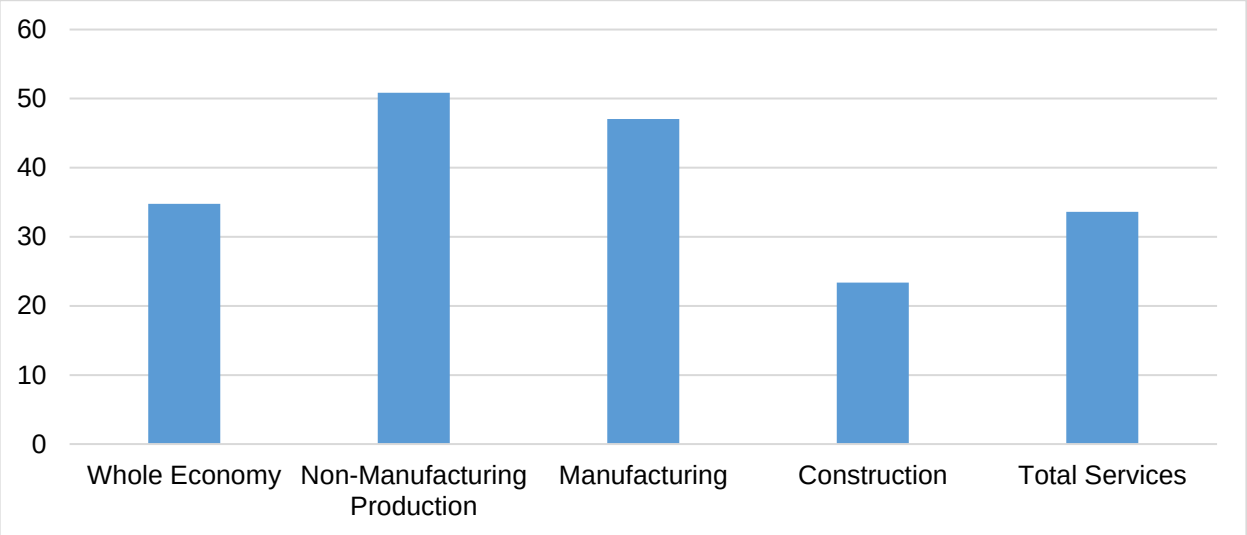
Figure 2.2.3 – Scotland Productivity (Output per Hour) Trends by Broad Industry Group (Real Terms)



Source: Scottish Government

On productivity levels, non-manufacturing production and manufacturing lead the broad industry groups, while construction lags behind. However, there will be significant differences in productivity performance within individual sectors and sub-sectors making up the broad industry groups (See Section 3.1 for detailed sectoral breakdowns in productivity).

Figure 2.2.4 – Scotland Productivity Levels (GVA (£) per Hour) by Broad Industry Group (Current Prices), 2018



Source: Scottish Annual Business Statistics

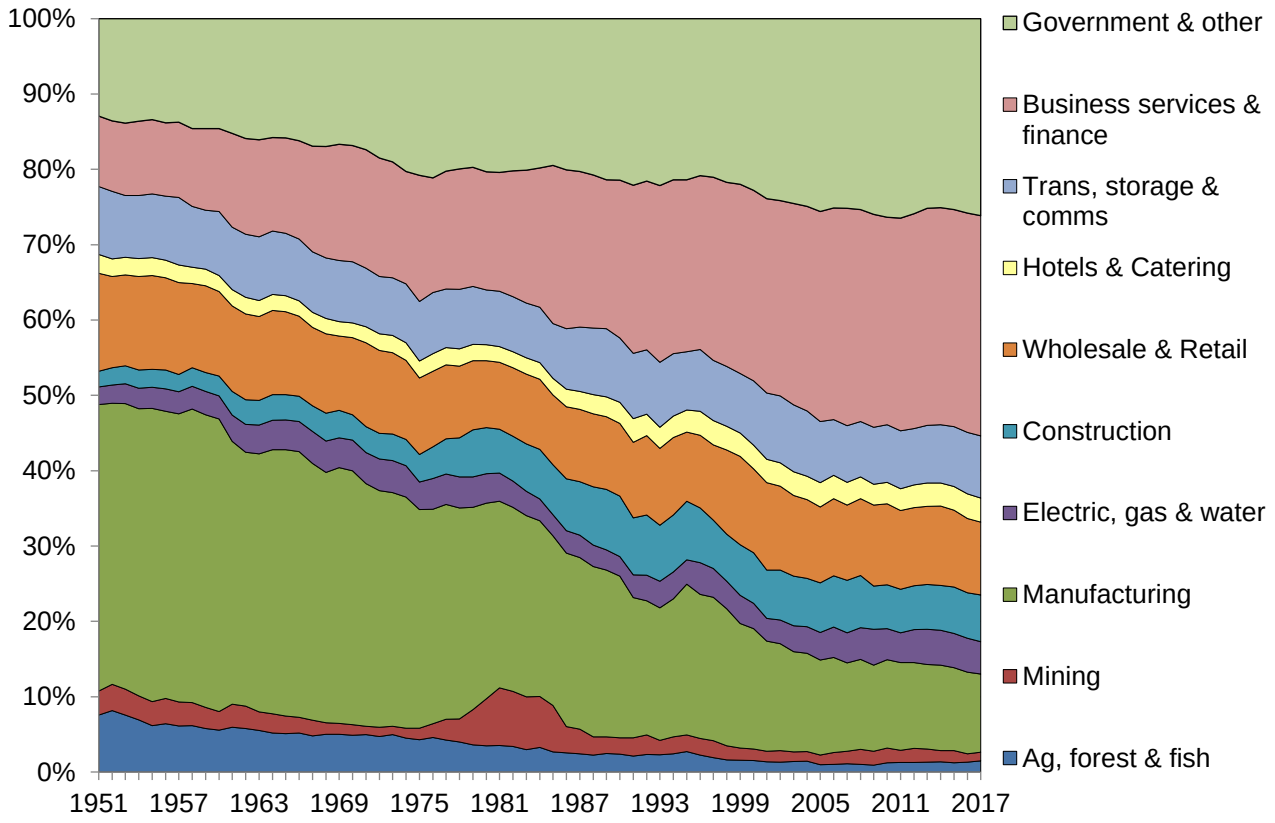
2.3 Structure of Scotland's Economy

The structure of Scotland's economy has changed gradually over the last seven decades. The contribution of the 'Government and Other' and the 'Business Services and Finance'

industry sectors to the economy have grown in relative importance, while the relative contribution of ‘Manufacturing’ and ‘Non-Manufacturing Production’ has declined.

The changing structure of the economy, especially the shift away from the high productivity manufacturing and non-manufacturing production would have affected Scotland’s overall economic growth performance. However, such structural changes in the economy are characteristics of the development path of many economies over time.

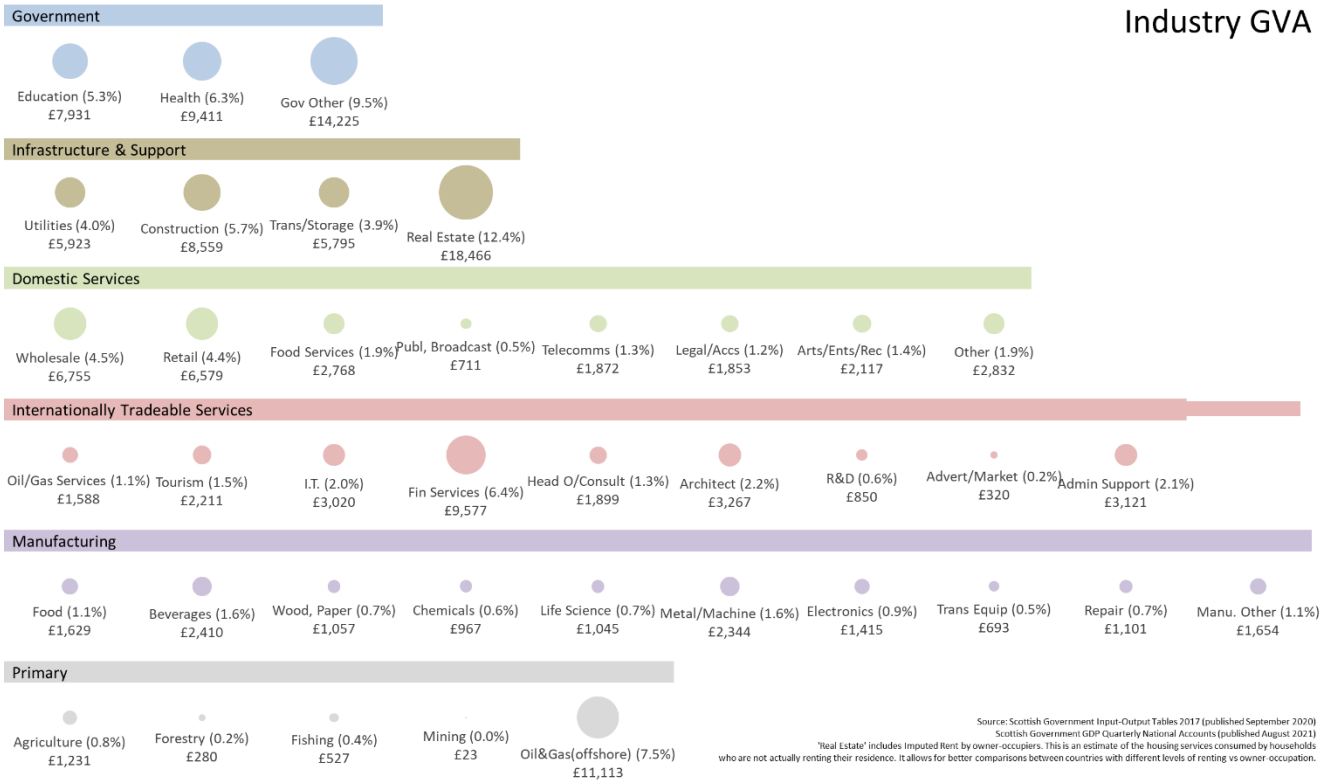
Figure 2.3.1 – Changing Structure of Scotland’s Economy, Share of GVA by Broad Sector, 1951 to 2017



Source: Experimental Scottish National Accounts and Scottish Government Input-Output tables.
Note: these data are not fully consistent over time because of changes in accounting systems and industrial classifications.

Overall, Scotland’s economy remains diverse with a wide range of sectors contributing to output, employment and exports. Figure 2.3.2 shows the contributions of different economic sub-sectors to Scotland’s GVA.

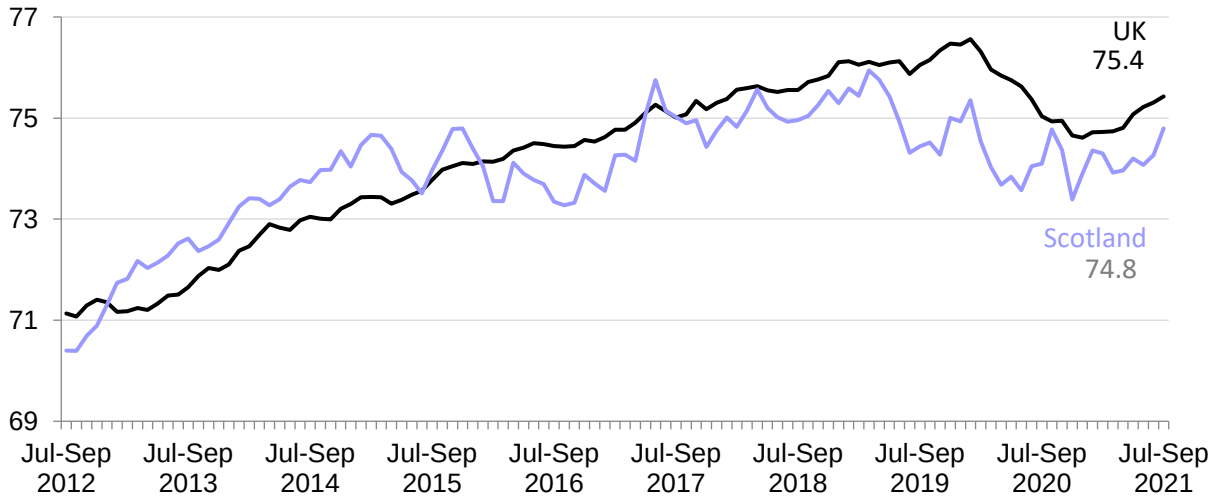
Figure 2.3.2 Structure of Scotland's Economy: GVA by Sector, 2017



2.4 Employment

Scotland's labour market participation has performed well since the 2008-09 financial crisis, with headline labour market indicators – employment and unemployment – close to their record levels. Scotland's employment rate recovered gradually from 69.8% in February to April 2010 to 75.4% just before the COVID-19 pandemic (December to February 2020). The growth in the employment rate has reduced the unemployment rate, while the economic inactivity rate has remained broadly unchanged over this period

Figure 2.4.1 – Scotland Employment Rate (16-64 years old), 2012 to 2021



Source: Labour Force Survey, Seasonally adjusted, ONS

Despite the COVID-19 pandemic being an acute negative shock on the economy, Scotland's employment rate has been resilient because of employment support offered to businesses through the furlough schemes (the Coronavirus Job Retention Scheme and the Self Employment Support Scheme). In fact, at the time of writing, a number of Scotland's economic sectors were facing significant labour and skills shortages (see Section 3 for detailed discussion).

While managing economic recovery from COVID-19 will be critical in the short and medium-term, particularly mitigating 'scarring' effects that could have long term damaging impacts on the workforce affected; another key challenge is how to improve employment outcomes for equalities groups: young people (16-24 years); minority ethnic populations; women and disabled people. There remain significant employment gaps for these groups, and in some instances, the employment gaps have worsened.

Box 2.1. Scotland's Labour Market and Equalities Groups

Substantial gaps remain in the employment rate for equalities groups. For example, the employment rate for young people (16-24 years) was 51.8 per cent,[3] significantly lower than for the population (16-64 years) - 72.2 per cent. However, around 46.3 per cent of young people are in full-time education.

While the employment rate for men was 74.4 per cent**,** the employment rate for women was lower at 70.1 per cent, an employment rate gap of 4.3 percentage points.

The disability employment gap in Scotland[4] has reduced in recent years but remains high at 32.0 percentage points.

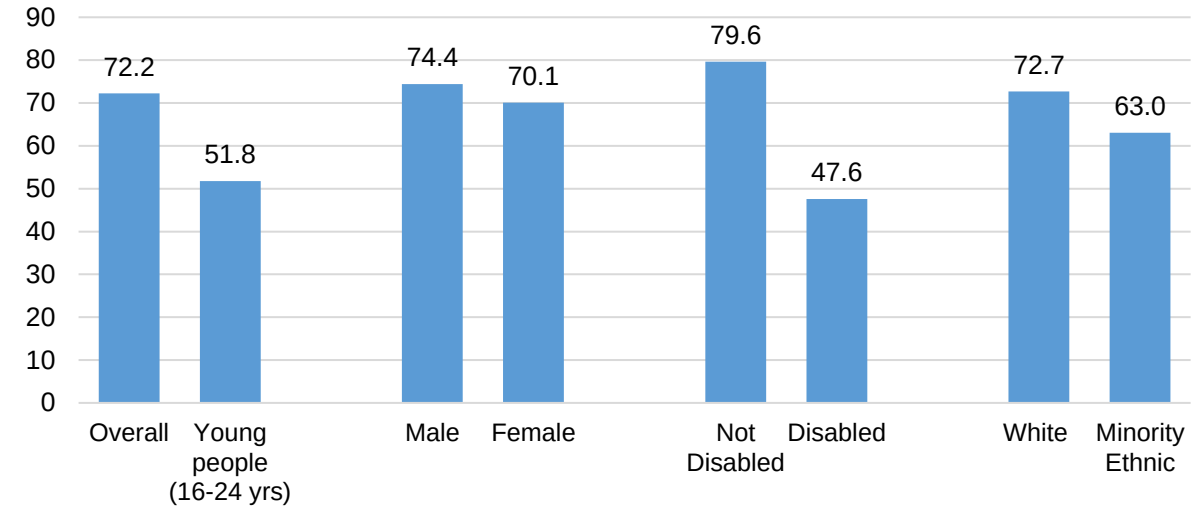
The employment rate gap for the minority ethnic[5] population compared with the white population was 9.7 percentage points, and the gap was substantially higher for women (16.6 percentage points) compared with men (1.2 percentage points).

[3] Labour Market Statistics for young people (16-24 years): Scotland and UK – July 2020 to June 2021 - gov.scot (www.gov.scot)

[4] The difference between the employment rates of Equality Act disabled and not Equality Act disabled people.

[5] 'Minority ethnic' includes all categories outside the white population and 'White includes 'White Polish' and 'White Gypsy' who also suffer disadvantage.

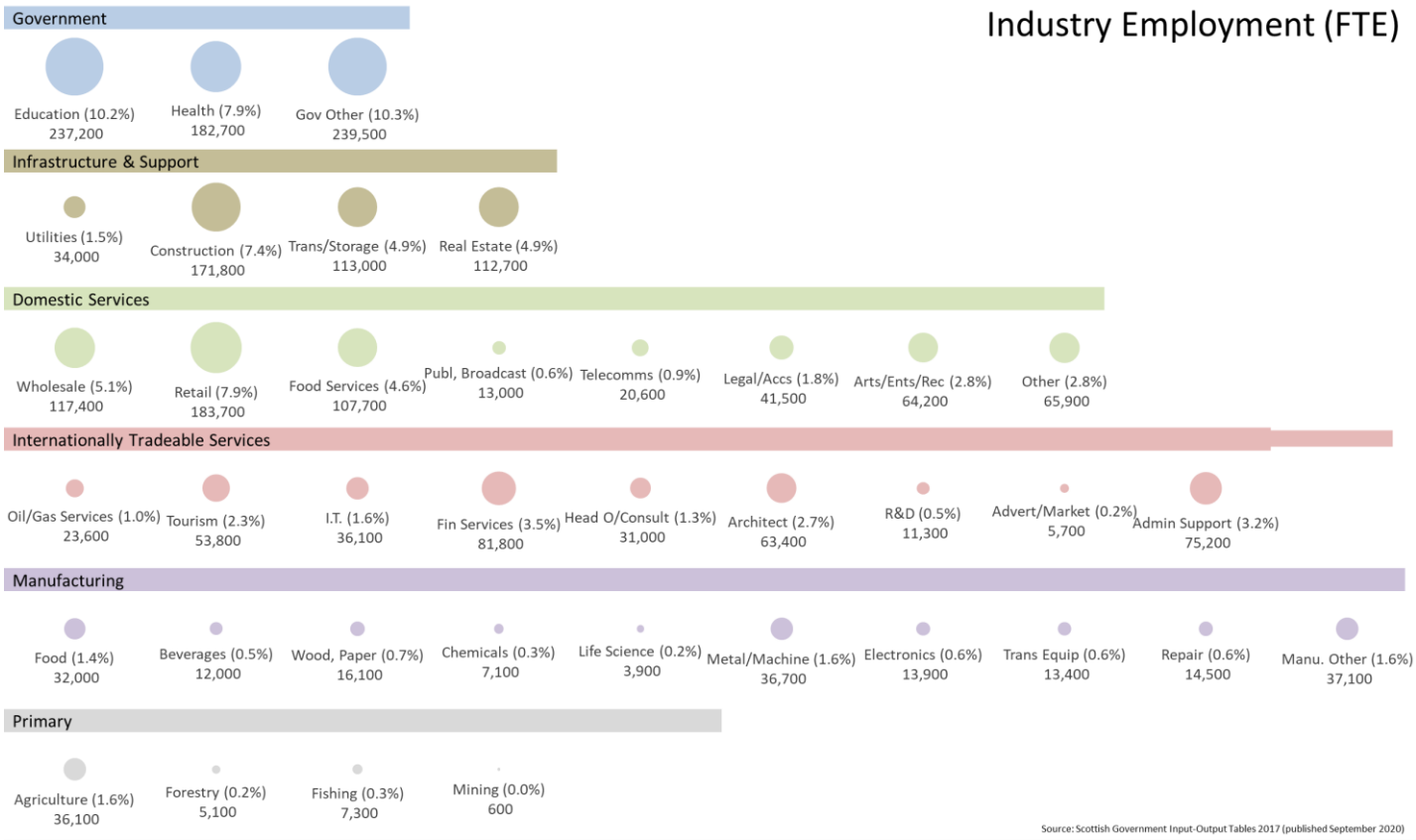
Figure 2.4.2 - Employment rate (Per cent) Scotland by equality characteristic



Source: Annual Population Survey July 2020 to June 2021, ONS
Note: All employment rates refer to the population 16-64 years, unless otherwise stated

Figure 2.4.3 shows the distribution of employment across different sub-sectors of Scotland's economy. It shows differences across sectors, which is mostly due to variations in labour intensities in production.

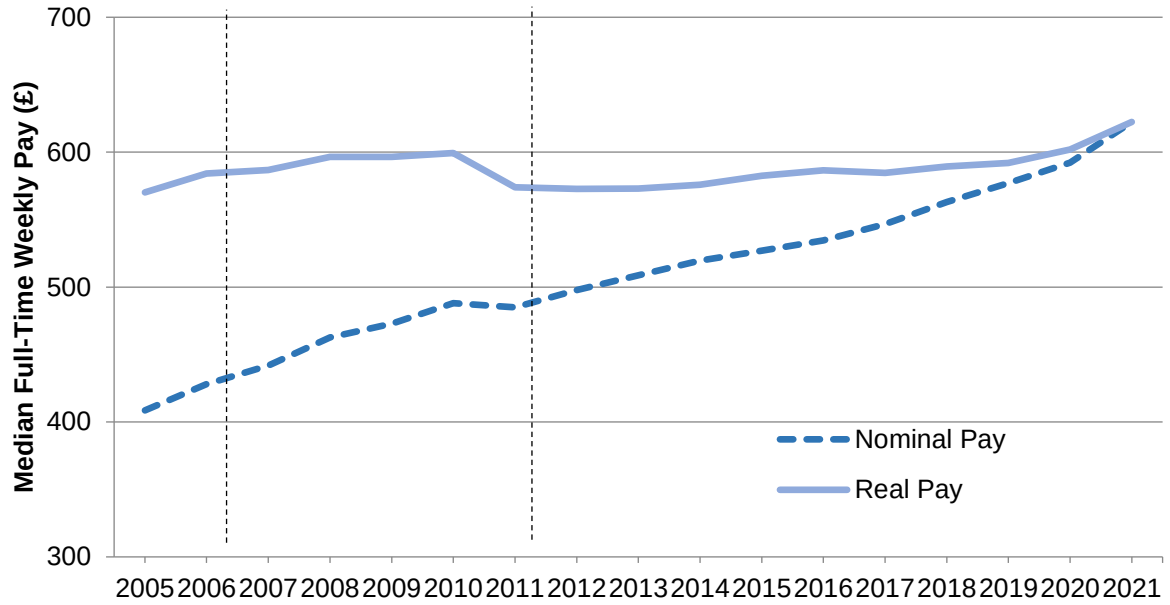
Figure 2.4.3 Scotland's Employment by Industry, 2017



2.5 Earnings from Employment

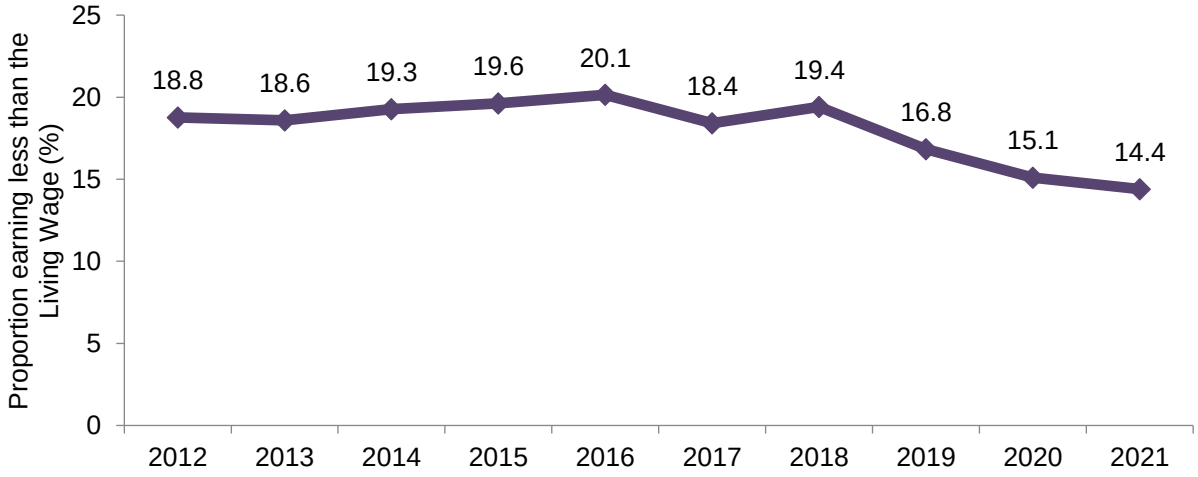
Scotland's real gross median weekly pay for full-time employees has barely increased since the 2008-09 financial crisis. Scotland's real gross median weekly pay for full-time employees has only exceed its historic peak (2010) for the first time in 2020. The slow growth in productivity over the last decade, along with economic shocks from the financial crisis and more recently the pandemic, partly explains the trend in real pay.

Figure 2.5.1 - Gross Median Weekly Full-time Pay; Scotland 2005-2021



Source: Annual Survey of Hours and Earnings 2021, ONS
Note: Real Pay Adjusted for inflation (using the Consumer Price Index including owner-occupier housing costs (CPIH)

Figure 2.5.2 - Proportion of employees aged 18 and over earning below the real living wage, 2012-2021



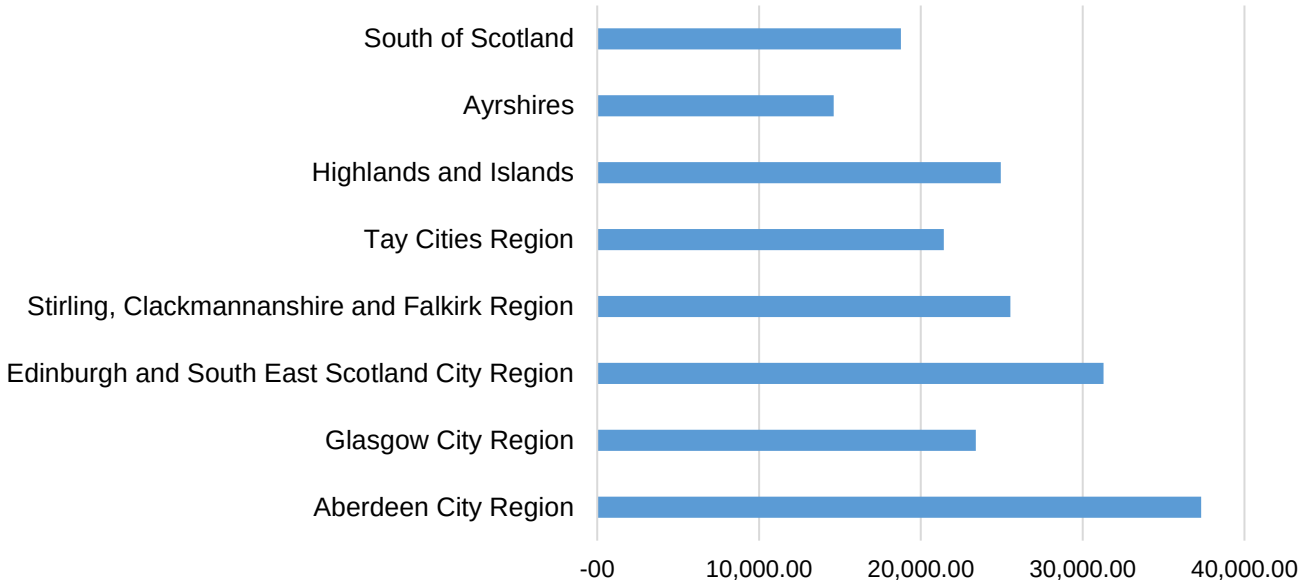
Source: Annual Survey of Hours and Earnings 2021, ONS

The Scottish Government's aspires for every working adult (18 years and above) in Scotland to earn at least the Real Living Wage[6] (£9.50 in Scotland in 2021). In 2021, 14.4% of all employees aged 18 years and over (about 333,000 employees) earned below the 'Real Living Wage'. The proportion of employees earning less than the Real Living Wage remained relatively constant between 2012 and 2016, ranging between 18.6% and 20.1%. Since 2018, it has decreased consistently (see Section 3.2 for detailed evidence on sectoral performance against the Real Living Wage).

2.6 Regional economic performance

When comparing the value of economic activity across Scotland's regions as measured by gross value added (GVA) per capita, there are significant differences in economic performance. At the Regional Economic Partnership area level, the 'Aberdeen City Region' and 'Edinburgh and South East Scotland City Region' perform relatively well, while the 'Ayrshires' and 'South of Scotland' regions lag behind. In 2018, the Ayrshires GVA per capita was less than half that of the 'Edinburgh and South East Scotland City Region' and the 'Aberdeen City region'.

Figure 2.6.1 – Scotland GVA Per Capita by Regional Economic Partnership Area, 2018



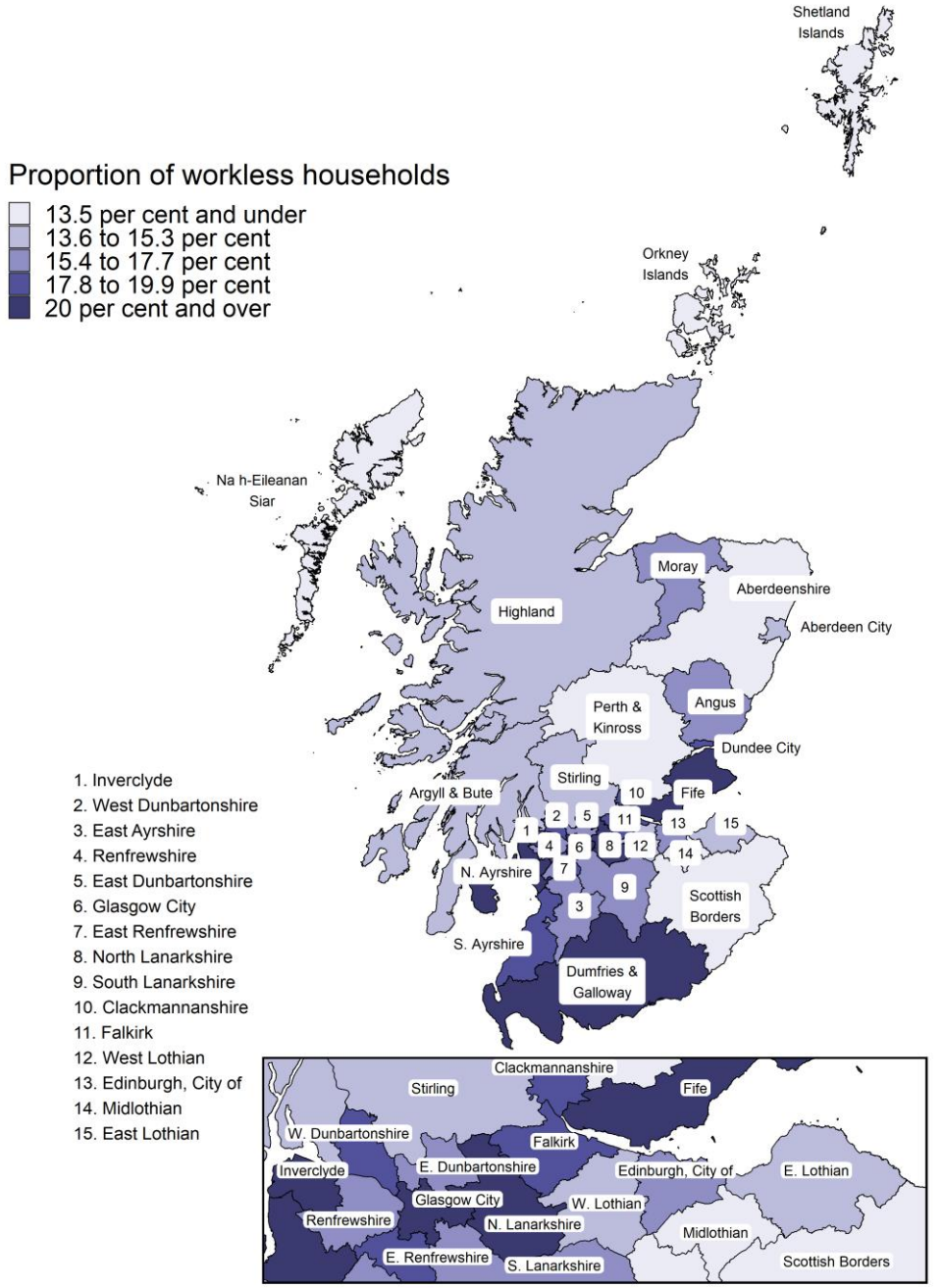
Source: Scottish Annual Business Statistics

The proportion of workless households (where no adult is working) across Scottish local authorities follows a similar pattern to economic performance and other inclusion/socio-economic indicators, with post-industrial areas generally lagging behind. A range of other wellbeing economy indicators including quality of jobs or public services, the health of citizens, index of multiple deprivation and child poverty reveal similar regional differentials

[6] The Calculation | Living Wage Foundation

(see Box A in the NSET Report). Despite efforts to tackle these differentials, significant regional inequalities remain.

Figure 2.6.2 - Proportion of Workless Households by Scottish Local Authority Areas, 2020



Source: Annual Population Survey Household Datasets (Jan - Dec 2020), ONS

Source: Annual Population Survey (Household Data set) 2020
Note: Workless households Number of households where no adults are in employment and containing at least one person aged 16-64 years

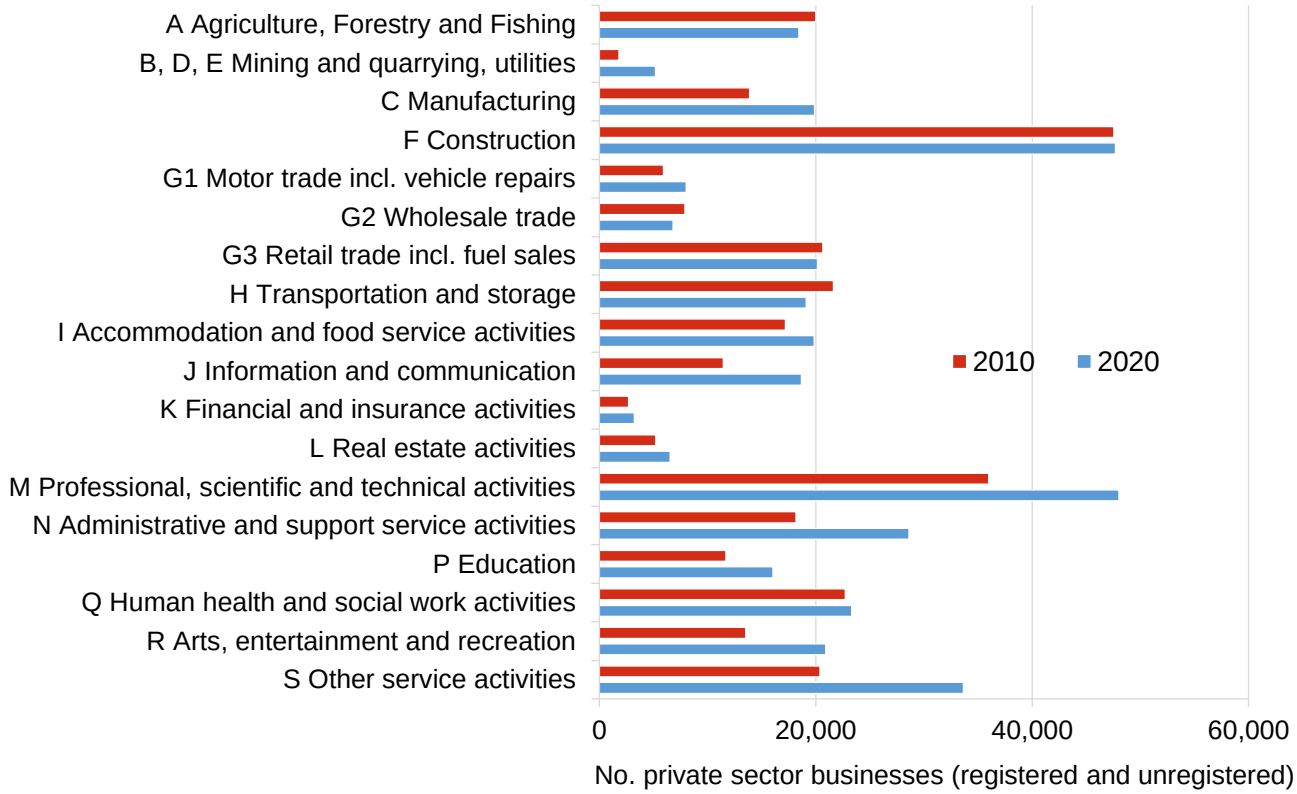
2.7 Scotland's business base

There were 364,310 registered and unregistered businesses operating in Scotland in 2020. This is an increase of 22% from 2010. Between March 2020 and March 2021, however, the estimated number of businesses decreased by 5.4% (-19,805 businesses), in line with trends across the whole UK and reflecting the impact of the COVID-19 pandemic on the economy.

Scotland's business base is diverse. However, construction and professional, scientific and technical services account for the largest shares, mainly reflecting the prevalence of micro and small enterprises in these sectors.

Other sectors like mining and quarrying (including oil and gas businesses) have much fewer businesses, although they tend to have a very high concentration of Scotland's jobs in large businesses.

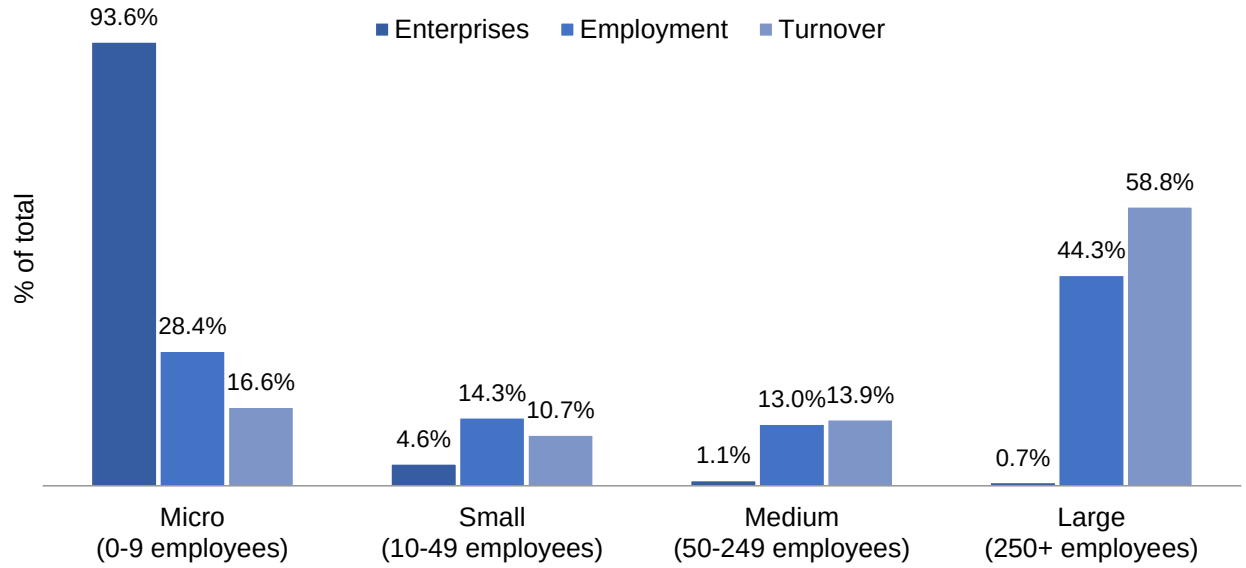
Figure 2.7.1 - Total number of private sector businesses (registered and unregistered) in Scotland by sector



Source: Scottish Government

The vast majority (93.6% - equivalent to 341,030) of businesses in Scotland are micro businesses (employing fewer than 10 people), averaging around 2.5 employees per business. Micro businesses accounted for 28.4% of private sector employment and 16.6% of private sector turnover in Scotland in 2020. At the other end, Scotland's 2,435 large businesses (with 250 or more employees) accounted for 44.3% of all jobs in Scotland and 58.8% of turnover.

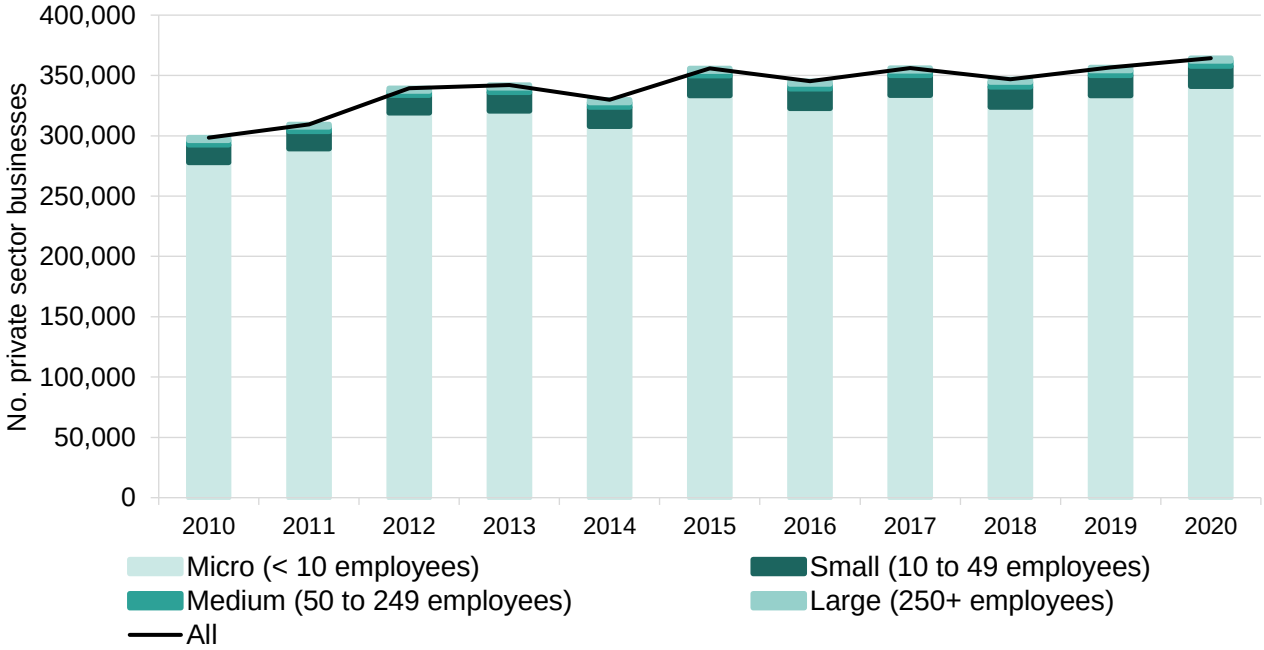
Figure 2.7.2 - Share of businesses, employment and turnover by size, Scotland, 2020



Source: Scottish Government

The growth in the business base over the last decade has largely been driven by an increase in the number of micro businesses, which have seen a 22.7% increase (63,105 businesses between 2010 and 2020) compared to a 7.7% increase in the number of large businesses (175 businesses). Over the same period, the share of total jobs in micro businesses increased from 26.3% to 28.4%, whereas the share of jobs in large businesses fell from 47.1% in 2010 to 44.3% in 2020. When compared to the UK as a whole, Scotland still has a relatively high share of jobs in large businesses (44% in Scotland compared to 39% in the UK).

Figure 2.7.3 - Total number of private sector businesses in Scotland by size

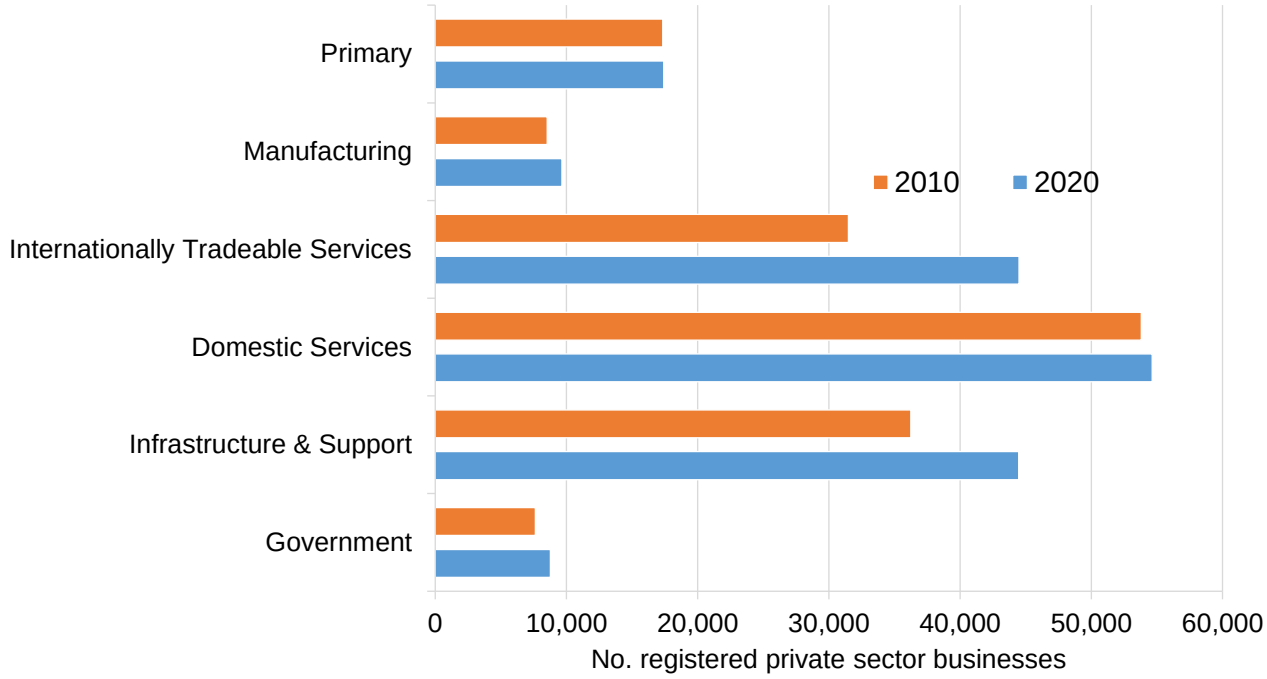


Source: Scottish Government

In 2020, there were 179,460 VAT/PAYE registered private businesses in Scotland, about half of the total businesses (registered and unregistered). By broad economy grouping the largest share of Scotland's registered businesses is in the 'domestic services' sectors, followed by 'internationally traded' and then 'infrastructure and support' sectors (see Figure 2.4.3 for definition).

The 'internationally traded services' and 'infrastructure and support' industries have largely driven growth in Scotland's registered businesses over the period 2010 to 2020. The numbers have not changed significantly for the other broad sector groupings.

Figure 2.7.4 - Number of registered private sector businesses in Scotland by broad industry group[7]



Source: Scottish Government

2.8 What the evidence tells us we need to address

The evidence presented in this Section shows that Scotland's economy has faced a number of challenges in recent years that the NSET needs to address. These include:

- subdued economic growth since the 2008-09 financial crisis and the application of UK wide austerity. The impacts of the COVID-19 pandemic could exacerbate this. While Scotland's economic growth performance has improved over the medium term, it has worsened when compared with other OECD countries;
- low to almost stagnant productivity growth in the last decade, with GDP growth mostly driven by increased employment. Productivity growth was concentrated in higher productivity sectors (manufacturing and internationally tradable services);

[7] See Figure 2.4.3 for sectors making up these broad industry groups

- restructuring of the economy towards low productivity sectors, which has impacted on Scotland's overall economic performance. To shift the dial on productivity across the whole economy we also need to increase performance in the traditionally lower productivity services sectors.
- low growth of earning from employment, with a significant although reducing proportion of the workforce earning below the real living wage;
- deep seated regional inequalities in economic performance and their wider implications on the distribution of socioeconomic outcomes and wellbeing across communities;
- Scotland's business base has been growing, but largely from an increase in the number of micro enterprises, including many self-employed workers.
- of the registered businesses in Scotland (~50% of the total), growth has been strongest in 'internationally tradable services' and 'infrastructure and support' sectors, although the domestic services industry still accounts for the largest share of registered businesses.

Section 3 analyses these challenges further to identify their root causes and to shape projects for transformation in the NSET, which are summarised at the end of each sub-section.

3. Challenges Facing Scotland's Economy across National Strategy Objectives

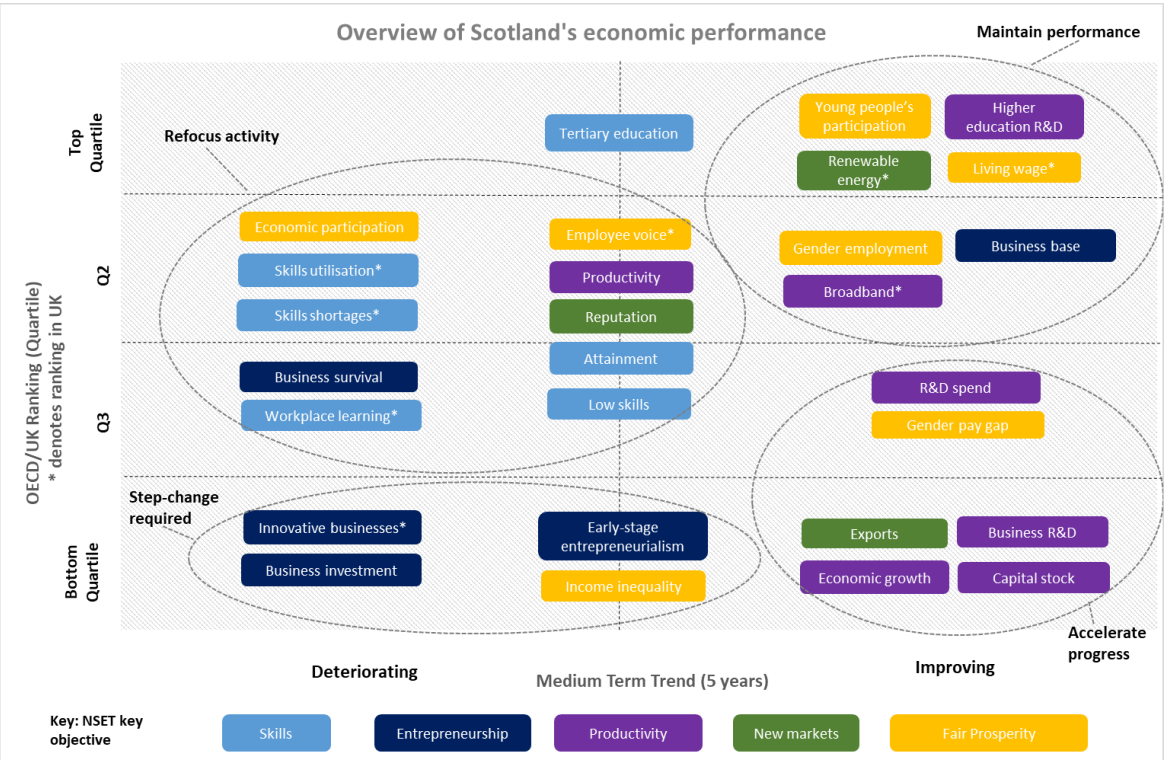
This section provides further evidence of Scotland's economic challenges across the five objectives set out in Section 1. It sets out:

- how Scotland has performed based on a range of measures of success – including benchmarking performance against comparable economies; and,
- specific challenges to improving performance and delivering transformational economic change;

Figure 3 gives an overview of Scotland's performance across key drivers of economic performance. On the vertical axis it considers these drivers in relation to how Scotland performs against international competitors (or the rest of the UK where international data is not available), and on the horizontal axis whether Scotland's performance is improving or worsening. It highlights the economic drivers where Scotland has maintained strong performance, where there is need to refocus policy to stop further deterioration, and where it needs to accelerate progress to drive a step change in performance.

Broadly, the main areas where Scotland needs to drive a step change for the economy to prosper are linked to our business base – business innovation, investment and early-stage entrepreneurship, and inequality. These are the areas where Scotland ranks low when compared to other OECD countries and the UK, and where performance has been deteriorating.

Figure 3 – Overview of Scotland's Economic Performance



3.1 Productive businesses and regions

Performance at a glance:

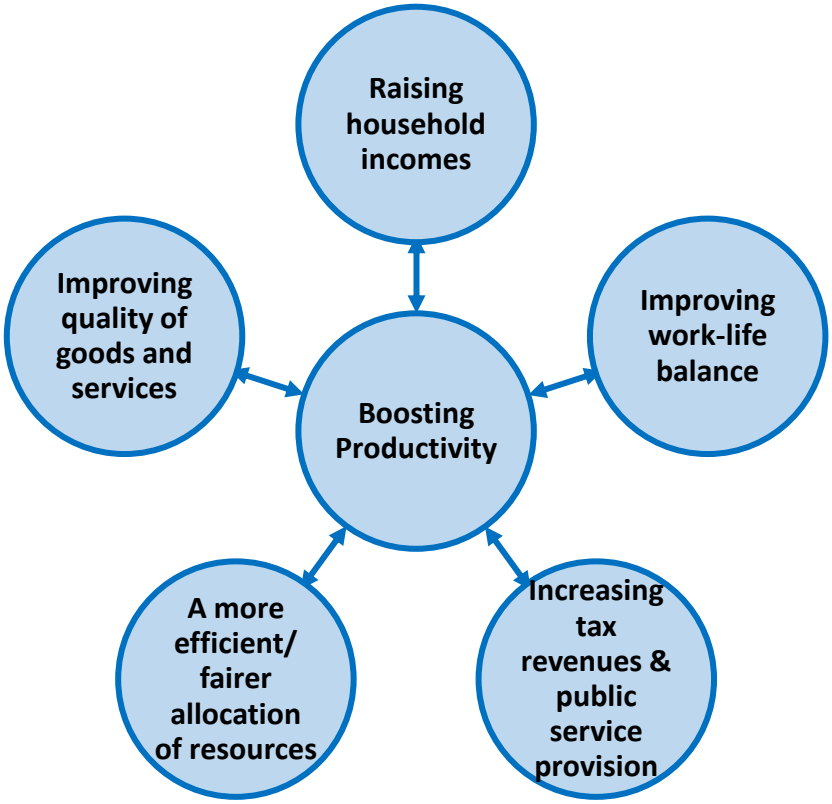
Measure	Current Performance
Productivity: Scotland's position on OECD productivity country rankings	16th out of 37 countries
Innovation: Position on OECD gross expenditure on research and development rankings	20th out of 37 countries
Business Innovation: Share of 'innovation active' businesses	32.2%
Investment: Gross fixed capital formation as share of GDP	15.8%

Evidence presented in Section 2.2 showed Scotland's productivity in the last decade to 2018 has been subdued, and this is a pattern seen across most advanced economies.

Productivity growth is not an end in itself. When delivered within a policy framework prioritising a broader set of economic, social and environmental wellbeing, productivity growth is an important enabler for the Scottish Government vision set out in the main NSET document.

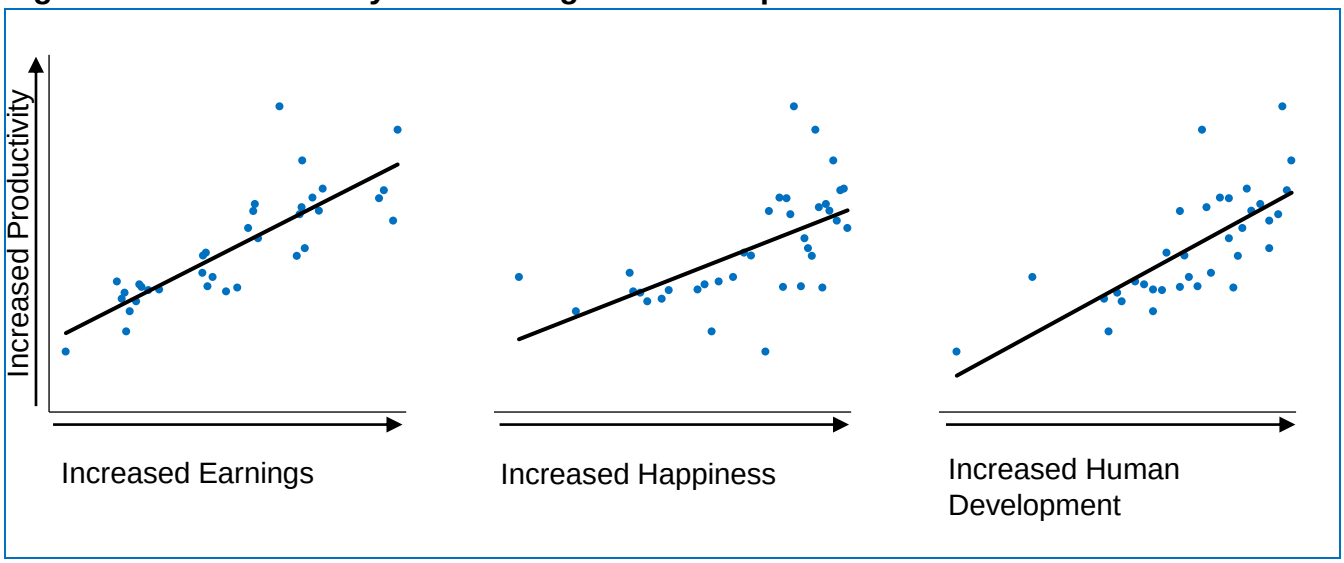
The mechanisms through which rising productivity can contribute to delivering a wellbeing economy can be distilled into five main channels: raising household incomes; improving work-life balance; increasing tax revenues and public service provision; a more efficient and fairer allocation and use of resources; and, improving the quality of goods and services in the economy. This framework demonstrates that boosting productivity and delivering a wellbeing economy are important, interdependent and mutually reinforcing ambitions.

Figure 3.1.1 - Productivity and wellbeing economy framework



Source: Scottish Government

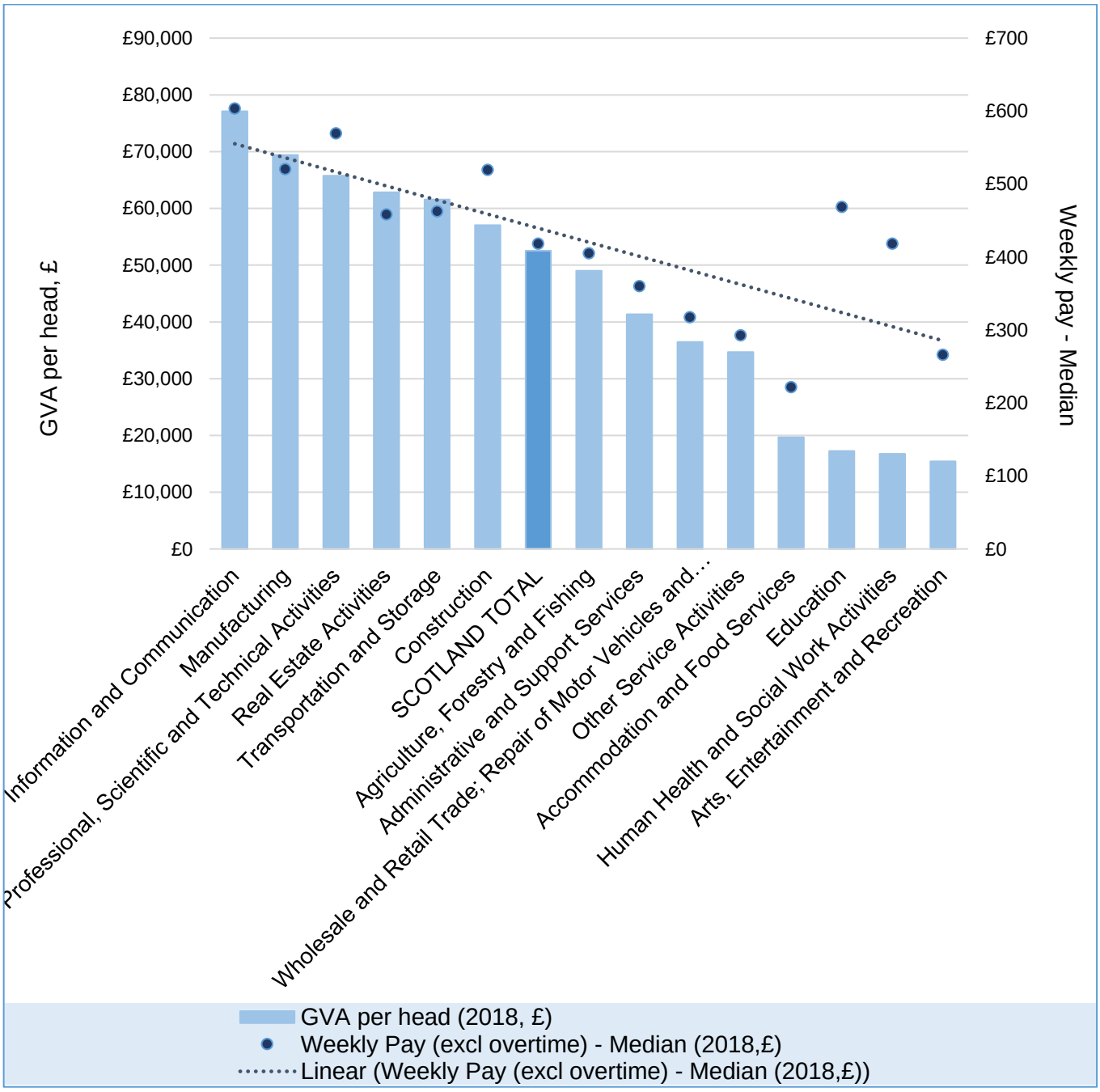
Figure 3.1.2: Productivity & Wellbeing Relationship



Notes:
(1) Productivity – as measured by output per hour USD PPP. Source: OECD, 2019
(2) Earnings – as measured by average median annual earnings USD PPP. Source: OECD, 2019
(3) Happiness – UN World Happiness Index Ranking. Source: UNSDN, 2020
(4) Development – UN Human Development Index, based on measures including life expectancy and education. Source: UNDP, 2018
(5) Each chart plots the 37 OECD member countries

There is a positive relationship between productivity performance and weekly median pay (excluding overtime). Higher productivity sectors such as 'Information and Communication' and 'Manufacturing' have higher median weekly pay. This contrasts with lower productivity service sectors where median weekly pay is lower than average (not including non-market services – 'education' and 'health & social care'). It demonstrates the important positive impact that productivity performance has on incomes.

Figure 3.1.3 - Relationship between productivity and weekly pay by sector (SIC Section)

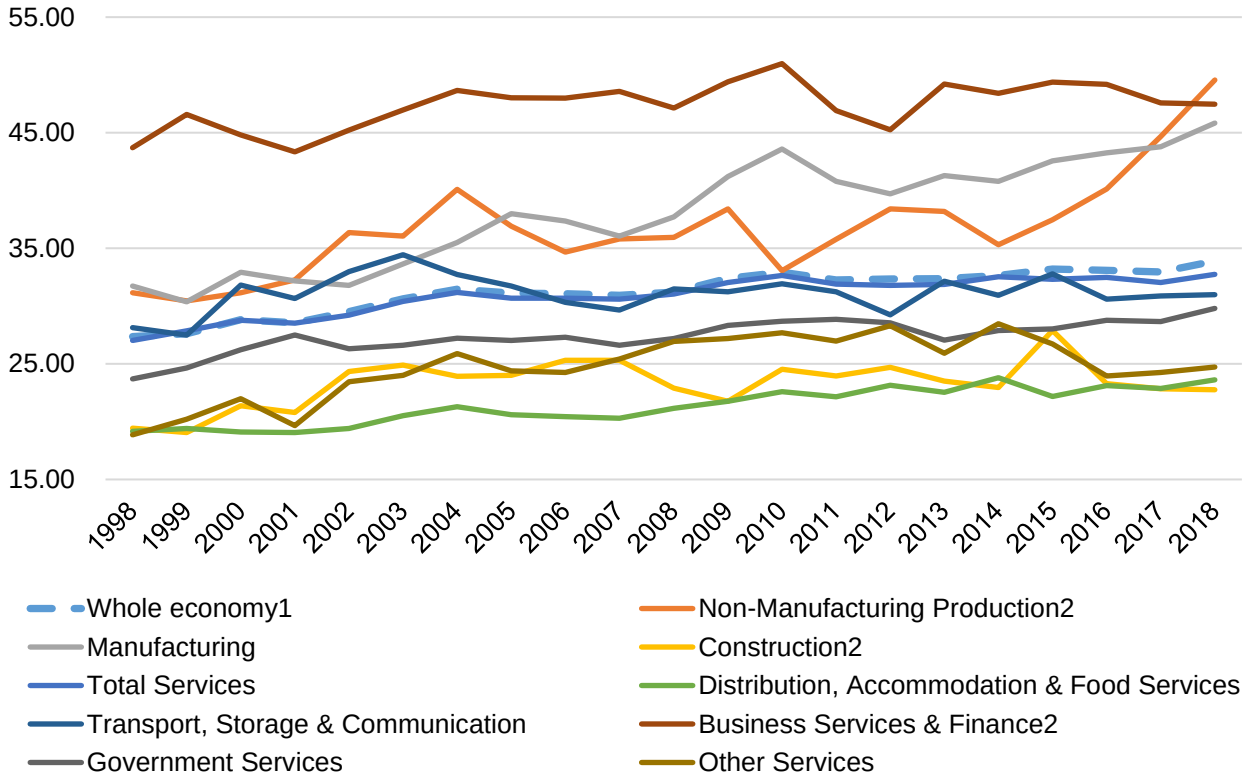


Source: Scottish Annual Business Statistics 2018, Annual Survey of Hours and Earnings 2018.

This relationship between productivity performance and pay is also evident across countries. In nearly every OECD country where productivity is above the Scottish level, annual average wages are also higher. On average, for every 1% increase in productivity, annual wages are around 0.8% higher. If Scotland's productivity matched that of the OECD top quartile, annual wages could be almost £3,850 or 10% higher. [8]

Figure 3.1.4 provides a more disaggregated picture of Scotland's productivity by industry. Business services, manufacturing and non-manufacturing production perform the strongest in terms of both productivity levels (above the Scotland average) and productivity growth over the last 20 years. As noted in Section 2, this is an important consideration for thinking about the structure of the economy and where to target effort to improve productivity.

Figure 3.1.4 - Real GVA per hour by Broad Industry Grouping, £ per hour



Source: Scottish Annual Business Statistics 2018

The Scottish Annual Business Statistics shows that there is significant variations in productivity within sectors of the economy when split by sub-sectors and business size groupings. This is important for policy when deciding how to target interventions to raise productivity and in ways that will have the most beneficial impacts on wellbeing.

Figure 3.1.5 shows selected sectors of the Scottish economy and highlights their performance in terms of GVA and employment. The majority of the high productivity (with top 25% on productivity) tradeable sub-sectors are largely manufacturing industries.

[8] Richmond & Turnbull (2015), Scotland's Productivity Performance: latest data and insights. Fraser of Allander Economic Commentary 39(2) pp. 77-90

However, none of the high productivity tradeable sub-sectors are among Scotland's high employment sectors (with top 25% on employment). This would appear to indicate that the high productivity industries in Scotland are more 'niche'. Scotland's more tradeable services sectors such as 'Information Service Activities' and 'Telecommunications' also exhibit higher productivity than the mostly non-tradeable and localised services like 'Accommodation' and 'Food and Beverage Services.' These sectors tend to be both capital and knowledge intensive.

Figure 3.1.5 – Productivity and Employment Rankings of Select Economic Sectors (Green for top performing 25%, red for lowest performing 25%)

Sector	Sub-Sector	High Employment	Low Employment	High Productivity	Low Productivity
Agriculture, Forestry and Fishing	Crop and animal production, hunting and related service activities				✓
Mining and Quarrying	Mining of Coal and Lignite		✓		✓
	Extraction of Crude Petroleum and Natural Gas	✓		✓	
	Mining Support Service Activities		✓		
Manufacturing	Manufacture of Beverages		✓	✓	
	Printing and Reproduction of Recorded Media				✓
	Manufacture of Coke and Refined Petroleum		✓		
	Manufacture of Chemicals and Chemical Products (3)			✓	
	Manufacture of Basic Pharmaceutical Products and Pharmaceutical Preparations			✓	
	Manufacture of Basic Metals		✓		✓
	Manufacture of Computer, Electronic and Optical Products	✓		✓	
	Manufacture of Machinery and Equipment (not	✓		✓	

	elsewhere classified)				
	Manufacture of Other Transport Equipment	✓			
	Manufacture of Furniture		✓		✓
	Repair and Installation of Machinery and Equipment	✓		✓	
Water Supply, Sewerage, Wate Management and Remediation Activities*	Sewerage		✓		
	Waste Collection, Treatment and Disposal Activities; Materials Recovery	✓		✓	
	Remediation Activities and Other Waste Management Services		✓		✓
Construction	Construction of Buildings			✓	
Transport and storage	Water Transport		✓		✓
	Warehousing and Support Activities for Transportation			✓	
	Postal and Courier Activities				✓
Accommodation and food service activities	Accommodation	✓			
Information and communication	Programming and Broadcasting Activities		✓		✓
	Telecommunications		✓		
	Computer Programming, Consultancy and Related Activities			✓	
	Information Service Activities		✓		
Professional, Scientific and Technical Activities	Legal and Accounting Activities	✓		✓	
	Activities of Head Offices; Management Consultancy Activities			✓	
	Scientific Research and Development	✓		✓	

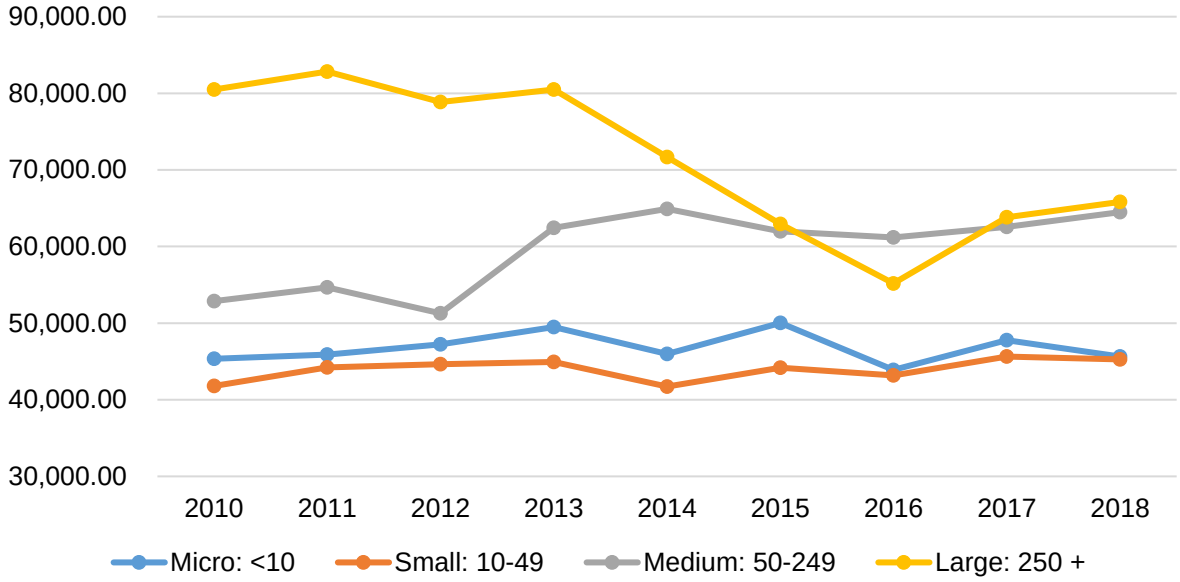
	Other Professional, Scientific and Technical Activities	✓		✓	
Administrative and support service activities	Employment Activities	✓			
	Travel Agency, Tour Operator and Other Reservation Service and Related Activities	✓		✓	
	Security and Investigation Activities		✓		✓
	Services to Building and Landscape Activities	✓			
Education, human health and social work activities	Human Health Activities		✓		✓
	Residential Care Activities	✓			
	Social Work Activities Without Accommodation	✓			✓
Education, human health and social work activities	Human Health Activities		✓		✓
	Residential Care Activities	✓			
	Social Work Activities Without Accommodation	✓			✓
Arts, entertainment and recreation	Libraries, Archives, Museums and Other Cultural Activities	✓			✓
	Gambling and Betting Activities				✓
	Sports Activities and Amusement and Recreation Activities				✓
Other service activities	Activities of Membership Organisations		✓		✓
	Repair of Computers and Personal Household Goods		✓		

Note: 'Water Supply, Sewerage, Water Management and Remediation Activities*' marked as the sector is incomplete due to disclosive information in SIC 36
Source: Scottish Annual Business Statistics (2018)

Scotland's productivity also varies by business size (Figure 3.1.6). While the estimated productivity levels for large businesses have overall declined since 2013 – partly driven by developments in the oil and gas industry, there remains a significant gap between smaller businesses (micro and small) and the medium and large businesses, with the former

showing significantly lower levels of productivity. Thus, the dominance of micro and small enterprises in Scotland's business base shown in Section 2.7 will have a bearing on the economy's overall productivity performance.[9] Ensuring that micro and small businesses are maximising on their productivity potential could have transformational impact on the economy and wider wellbeing.

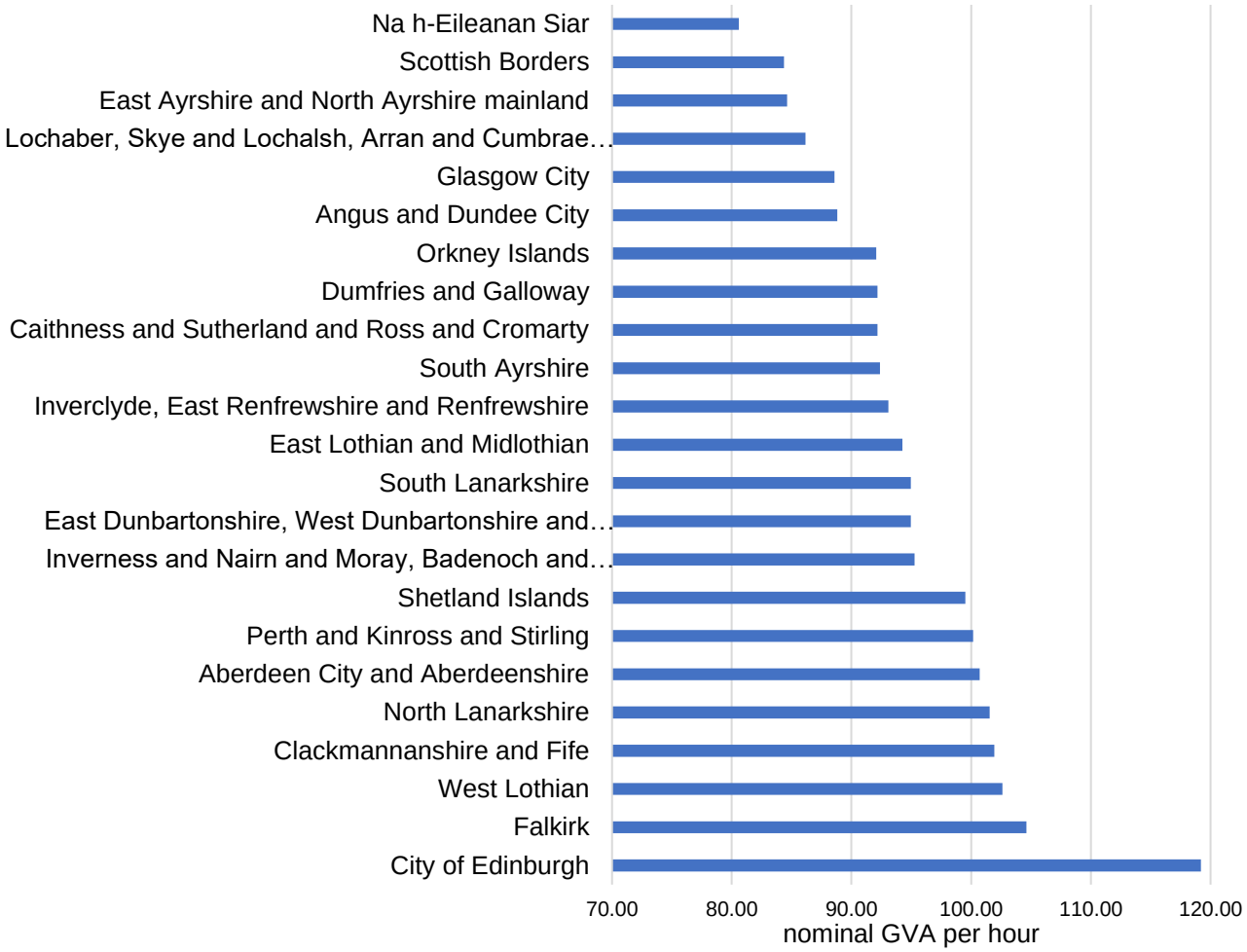
Figure 3.1.6 - Real GVA per Worker by business size, 2010-2018



Source: Scottish Annual Business Statistics (2018)

[9] Micro and small business account for 98% of Scotland's private sector business base) and 43% of employment

Figure 3.1.7 - Nominal GVA per hour, by ITL3 area, 2019 (smoothed; index, UK = 100)



There are also differences in productivity across Scotland's regions (see Figure 3.1.7). City of Edinburgh is a notable outlier in terms of high hourly productivity. It is followed by Falkirk; West Lothian; Clackmannanshire and Fife; North Lanarkshire; Aberdeen City and Aberdeenshire; and, Perth and Kinross and Stirling in achieving rates above the UK as a whole. Glasgow City achieved just 88.6% of the UK's overall productivity despite being a large urban area. A recent report by the Centre for Cities suggested that Glasgow was facing a gap of £7 billion between its productive potential and actual GDP.[10]

The key drivers for productivity – innovation and technology; investment; and, digital and transport connectivity are looked at in the reminder of this section.

3.1.1 Innovation and technology

There are various measures for tracking innovation in the economy – from looking at expenditure on research and development, to prevalence of innovation activity in the business base.

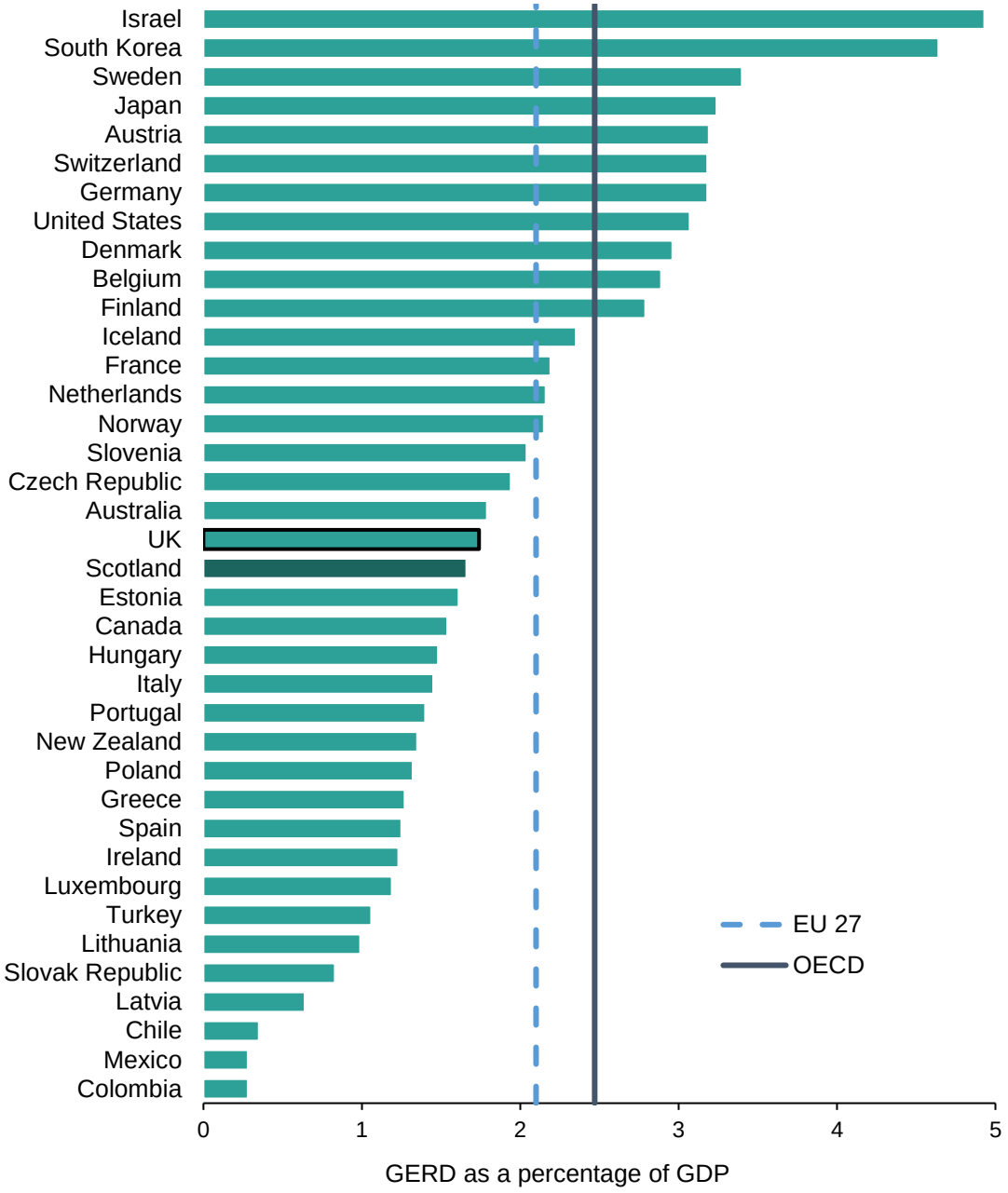
[10] So you want to level up?, Paul Swinney, June 2021

Scotland's Gross Expenditure on Research and Development (GERD) was £2,789 million in 2019 – an increase of 0.4% in real terms from 2018. In 2019, Scotland's GERD represented 7.2% of the UK total and 1.66% of Scotland's Gross Domestic Product (GDP). As a percentage of GDP, it ranked in the third quartile of the OECD countries (see Figure 3.1.8), below the UK (1.74%), the EU (2.10%) and the OECD (2.47%).

There are two components of GERD: Business Enterprise Research and Development (BERD) spend and Higher Education Research and Development (HERD) spend. Compared to most other OECD countries, Scotland's HERD spend makes up a relatively large proportion of total GERD.

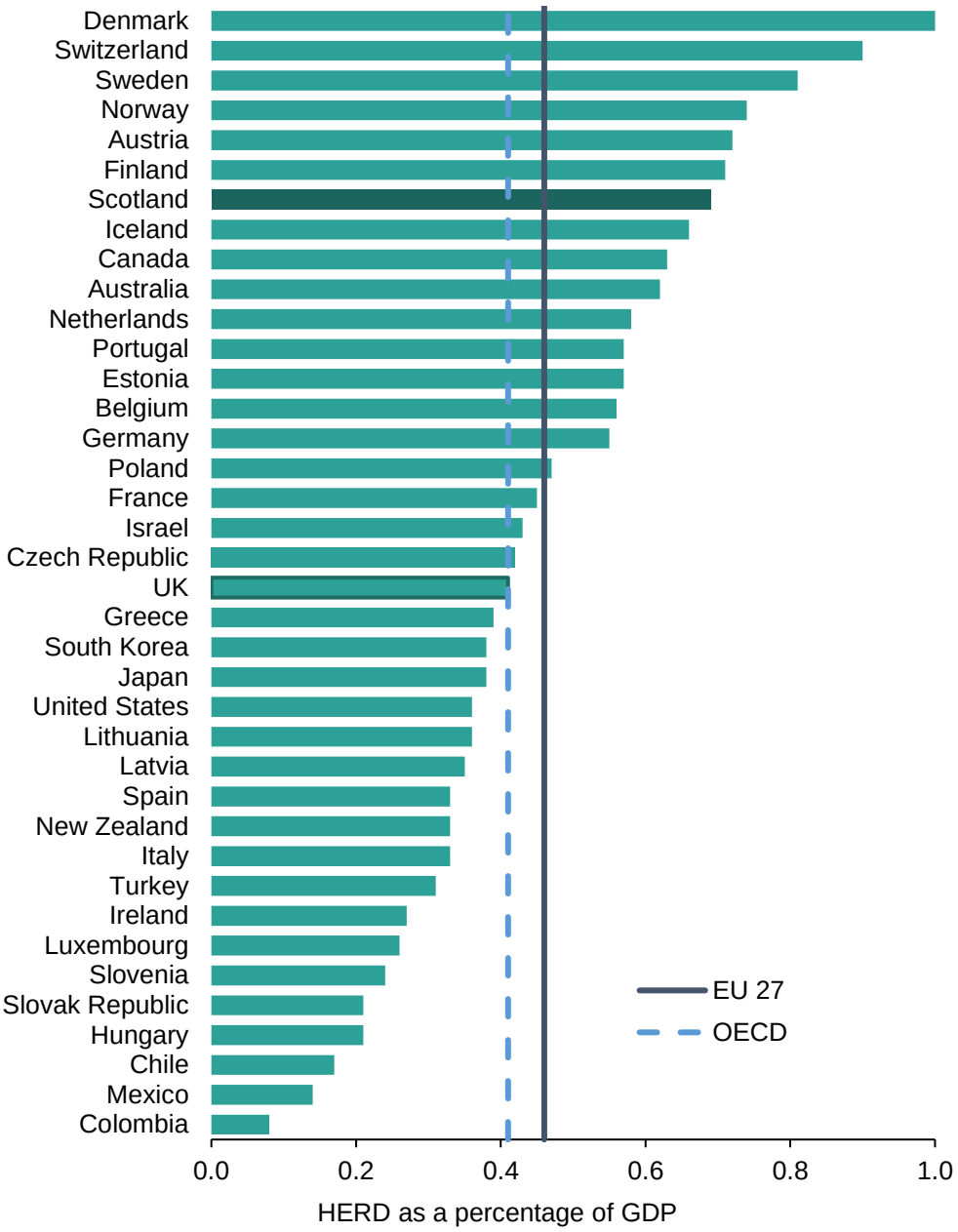
Scotland's HERD spend was £1,150 million in 2019 – down 0.3% in real terms from 2018. In contrast the UK's HERD increased by 1.3% over this period. As a percentage of GDP it was 0.69%, compared to an OECD average of 0.41% (see Figure 3.1.9). Scotland ranked seventh among the OECD countries for HERD spend as a percentage of GDP, putting it in the first quartile, in contrast to the UK's position in the third quartile.

Figure 3.1.8 - Gross Expenditure on Research and Development across the OECD



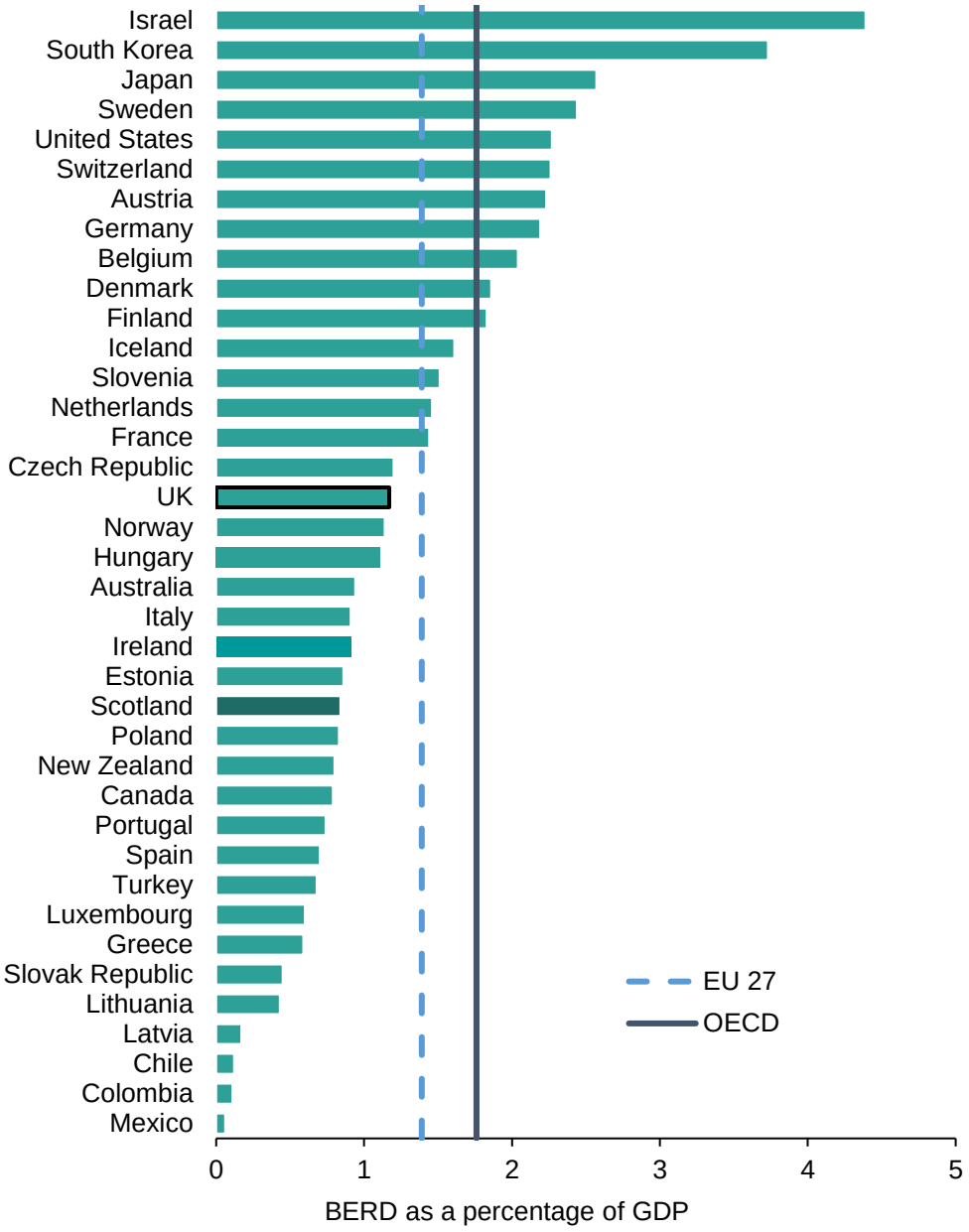
The latest data shows that BERD spend in Scotland decreased by 6.1% in real terms between 2019 and 2020. However, the timing of major research projects undertaken by a few large firms can cause fluctuations in the overall levels of business R&D. This is particularly important for 2020 given that some companies may have paused research projects because of the pandemic. BERD employment is a more stable measure of business R&D performance, and latest data shows that BERD jobs in Scotland increased by 9.0% between 2019 and 2020 – taking BERD jobs in Scotland to the highest level in the series back to 2001.

Figure 3.1.9 - Higher Education Expenditure on Research and Development across the OECD



Looking over the longer term, Scotland has experienced relatively strong growth in BERD spend and is on course to meet its target of doubling BERD spend between 2015 and 2025. However, Scotland's BERD spend is still relatively low compared with other countries (see Figure 3.1.10). At 0.84% of GDP, Scotland's BERD spend as a percentage of GDP ranked in the third quartile of the OECD countries in 2019, well below the EU and OECD averages, which are 1.39% and 1.76% respectively.

Figure 3.1.10 - Business Enterprise Expenditure on Research and Development across the OECD



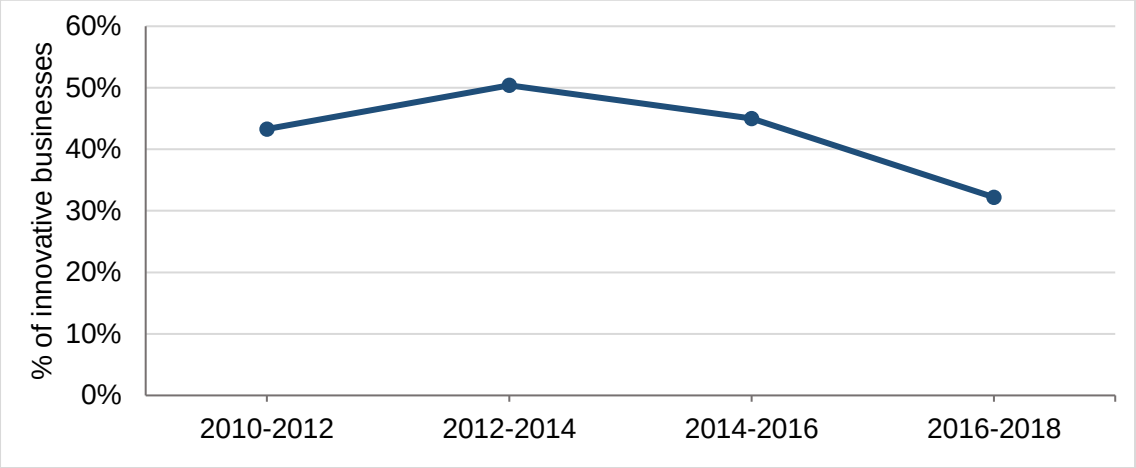
The above evidence suggest Scotland potentially faces some challenges with aligning its higher education and business and enterprise research and development activities. There is scope for HERD to help leverage additional BERD if Scotland is to improve on its overall ranking within the OECD on GERD.

The National Performance Framework tracks the level of innovation activity within Scotland's business base. The share of 'innovation active'[11] businesses in Scotland in

[11] The innovation active definition includes any of the following activities, if they occurred during the survey period:
1.

2016-2018 was 32.2%, a decrease from 50% in 2015 (see Figure 3.1.11).

Figure 3.1.11 - Share of Innovation active businesses in Scotland, 2010-12 to 2016-18



Source: UK Innovation Survey (UKIS)

Recent ONS research[12] using firm-level survey data found that firms with a higher management practice score were significantly more likely to undertake R&D. When controlling for other factors, moving a firm from median management practice to the upper quartile had roughly the same effect on the probability of being R&D active as moving a firm from domestic to foreign ownership. Additionally, it showed that the relationship between productivity and R&D is significantly stronger for firms with a higher management practice score.

The ONS research suggests Scotland's businesses perform favourably on management practices, with Scotland ranked joint-highest among all UK regions, along with the South East of England. It suggests Scotland has improved significantly since 2016, where it was the joint least performing region with the North East of England.

While innovation policy tends to focus on how best to encourage businesses to undertake research and innovate themselves, it is important to consider how best to empower businesses to adopt existing innovative technologies and practices. The Finnish innovation agency (Business Finland) uses a similar approach, which may prove effective in aiding the 'long tail' of low productivity firms.[13] This is important, because general-purpose technologies such as electricity in the 19th-20th Century and digital technologies in the 21st Century have tended to diffuse slowly despite obvious benefits. If technological diffusion takes a long time, it can slow-down productivity growth because of the impact of 'laggard firms' on the performance of the overall economy.

Researchers at Aston Business School have looked at the drivers and barriers to technology adoption for SME firms. Some of the key drivers for technology adoption that have been identified in this work are: agile and lean decision making, work optimisation planning, business competitiveness, employee training activities, and pro-active decision-

[12] Management practices and innovation, Great Britain - Office for National Statistics (ons.gov.uk)
[13] Business Finland: World Class Ecosystems and the Competitive Business Environment

making. Some important barriers to technology adoption they identify include: a lack of talent and knowledge management, poor skills development, limited finances, technology friction, a lack of systematic strategy, a lack of dissemination of successful business practices, and a lack of adequate technical infrastructure.

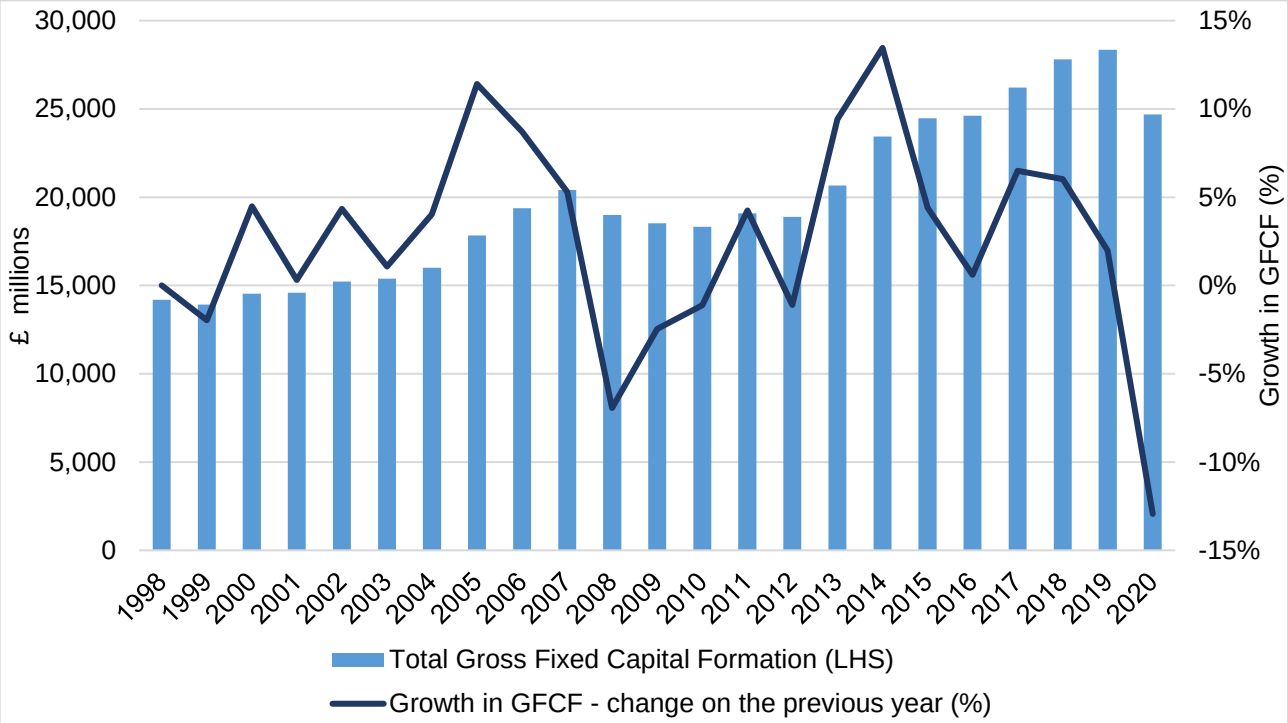
3.1.2 Investment

Private capital investment promotes the creation of new businesses and helps existing businesses to grow and improve competitiveness. At the same time, public led investment in infrastructure helps businesses to operate more efficiently, in turn increasing productivity. Investment can create high quality jobs and improve wellbeing.

3.1.2.1 Gross fixed capital formation

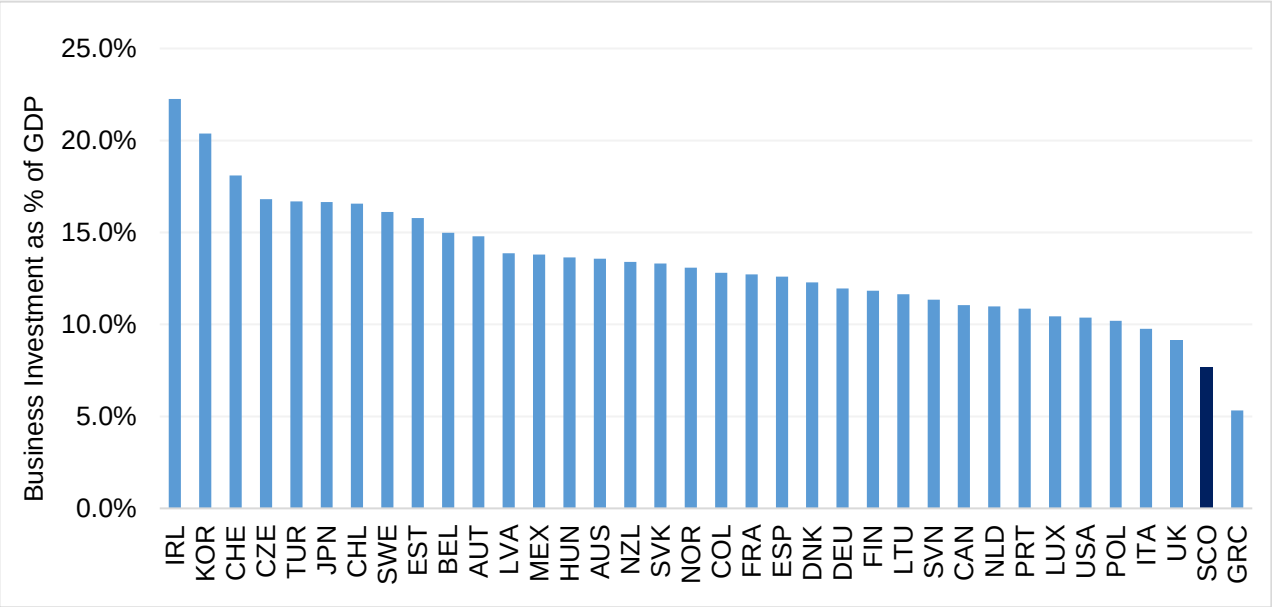
Figure 3.1.12 shows recent trends in Scotland's gross fixed capital formation (GFCF), and Figure 3.1.13 Scotland's ranking among OECD countries. The average annual growth in GFCF over the most recent ten years for which data are available is 2.6%. However, it fluctuates from year-to-year reflecting the lumpy nature of some investments.

Figure 3.1.12 - Trends in Scotland's Gross Fixed Capital Formation



Source: Quarterly National Accounts Scotland

Figure 3.1.13 - Comparing Scotland's GFCF as % of GDP against OECD Countries

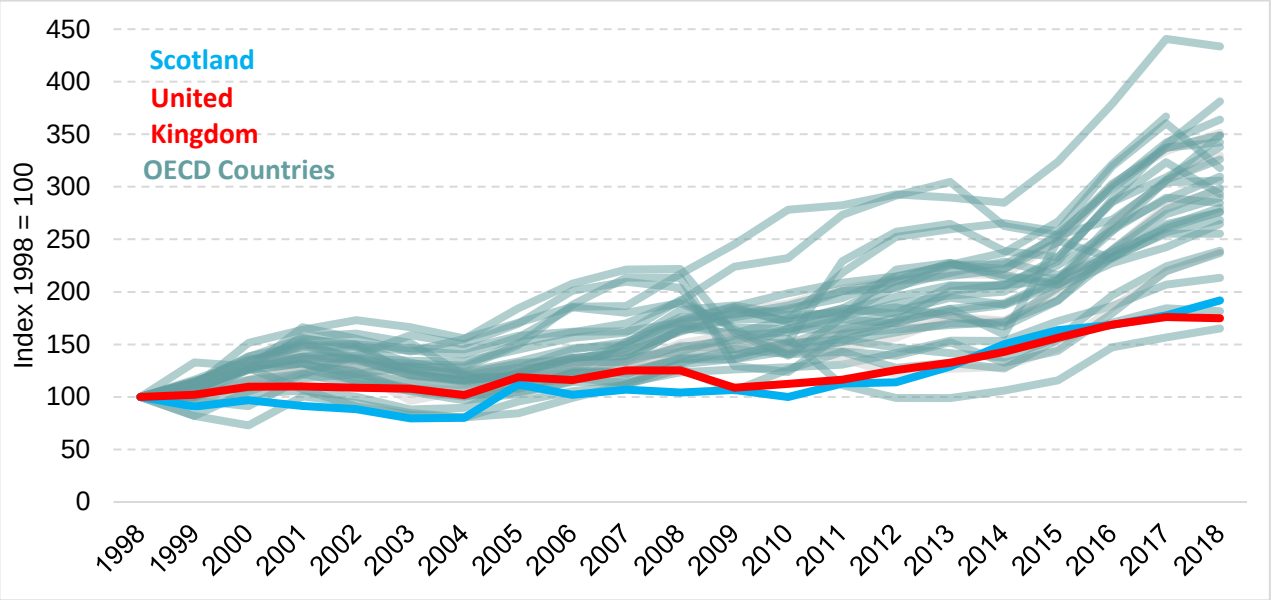


Scotland's GFCF as a share of GDP is low when compared to other OECD countries. Latest figures put Scotland's GFCF as a share of GDP at 15.8% in 2020, compared to an OECD average of 23%. Relative to the UK, Scotland has seen the gap in investment close in recent years, although the UK as a whole suffers from relatively low levels of investment.

3.1.2.2 Business Investment

While Scotland's business investment as a share of GDP has increased over the past decade, from 6.7% in 2011 and peaking at 9% in 2018, this figure remains low by OECD standards. Since 2018, it has however fallen for the past two consecutive years and is currently around 7.5%. Figure 3.1.14 shows how Scotland compares with other small advanced economies on business investment growth (where data is available).

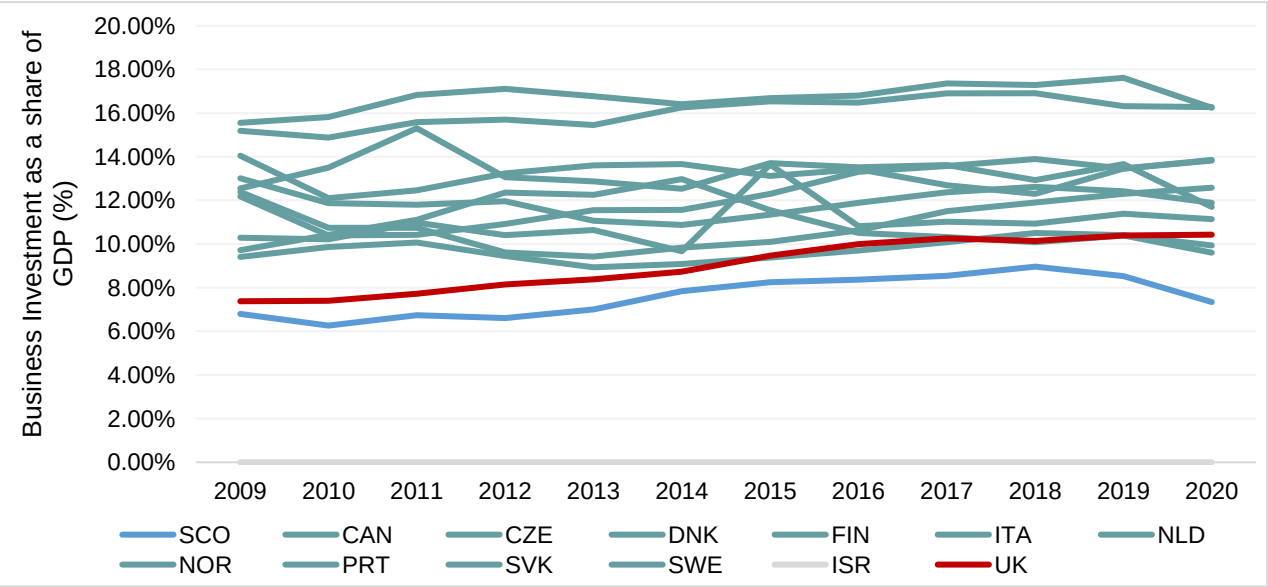
Figure 3.1.14 - Business Investment as a share of GDP (%) – select OECD countries



Source: Quarterly National Accounts Scotland, ONS, OECD

In recent years, Scotland's business investment growth has been broad-based, driven by growth across most sectors of the economy – with increases in primary industries, manufacturing, business services, accommodation and distribution. Production sectors (manufacturing and primary industries) accounted for a disproportionately large share of business investment in 2019 (45%) compared to their share of Scotland's overall gross value added (19%), reflecting the capital-intensive nature of these sectors. The services sectors accounted for 53% of business investment in 2019, compared to 75% of Scotland's overall gross value added.

Figure 3.1.15 - Business Investment as a share of GDP (%) – select OECD countries



Source: Quarterly National Accounts Scotland, ONS, OECD

Scotland outperforms most other regions of the UK on foreign direct investment (FDI). For the last six years, Scotland has secured the most inward investment projects of any UK

nation or region outside of London. However, compared to other OECD countries, there is scope to attract more global capital into business growth, infrastructure and commercial property. Scotland needs to close the gap in FDI flows as a share of GDP.

Scotland's FDI deals are mostly concentrated in a few sectors – 'business services', 'digital and IT' and 'technology and engineering'. In addition, Edinburgh, Glasgow and Aberdeen have accounted for the larger share of inward investment over the period 2015-2020. Together, these cities account for more than 50% of Scotland's inward investment projects, reflecting largely their share of Scotland's business base.[14] More detailed analysis of Scotland's FDI performance is available in methodology paper accompanying Scotland's Inward Investment Plan.[15]

Table 3.1.1 - Number of FDI Deals in Scotland by Sector, 2016 to 2020

	2016	2017	2018	2019	2020
Aerospace and Satellites	3	6	1	2	7
Business Services	101	159	137	174	160
Digital & IT	147	200	201	223	230
Energy – Other	19	20	20	20	21
FinTech	11	16	13	19	24
Food & Drink	40	50	64	50	56
Life Sciences	34	58	47	61	59
Oil & Gas	9	20	15	24	25
Renewables	16	21	15	22	16
Technology & Engineering	82	141	109	156	144
Other	24	32	26	29	36

The broad measures of business investment used above are a good barometer of overall investment activity in Scotland across business growth, new assets and changes of business ownership. Investments into high growth businesses in Scotland provides a more specific measure of performance in 'risk capital'.

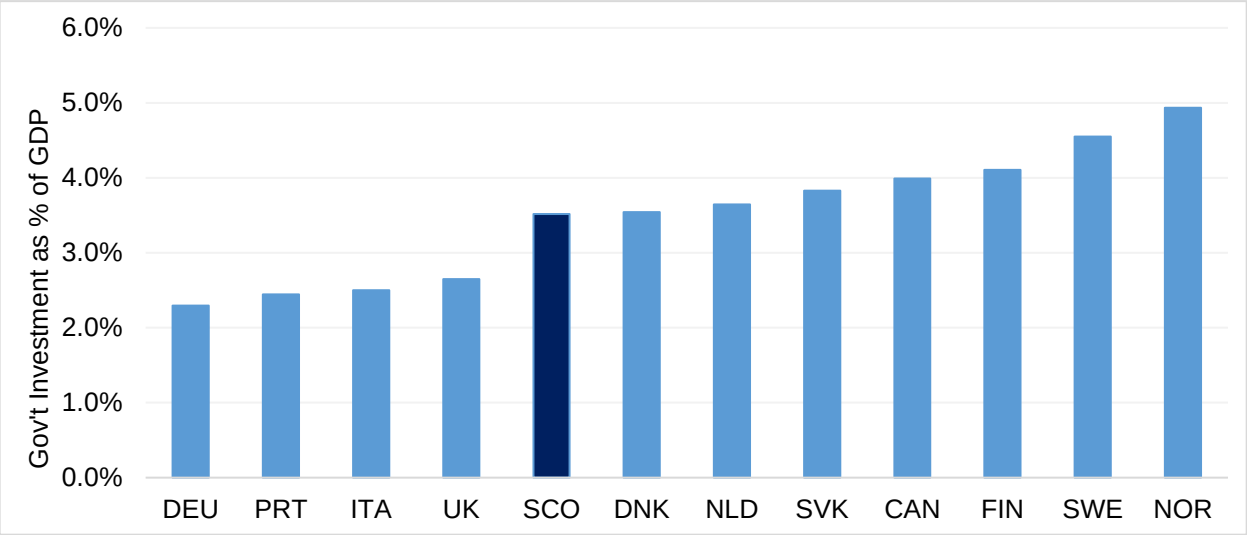
Scotland performs relatively well in the risk capital market. In 2019, Scotland recorded the highest number of deals on record (285 deals), an increase of 13% on the previous year. These deals were worth a combined £542 million. However, the value of equity investment deals varies significantly year-on-year as risk capital flows are dependent on a few large investments. Digital, IT and life sciences dominate Scottish investment, together accounting for half of Scottish deals in 2019. Scotland has a strong angel investment due to 'the Scottish model' of business angel syndicates investing alongside public sector.

Further analysis of Scotland's performance in attracting risk capital and implications for business growth, infrastructure investment and real estate is contained in the Global Capital Investment Plan (GCIP).[16]

[14] EY UK Attractiveness Survey, 2021
[15] Scotland's Inward Investment Plan: Analytical Methodology Note (www.gov.scot)
[16] Health & Life Sciences, High Value (advanced) Manufacturing, Digital, Low Carbon Transition

3.1.2.3 Public Sector Investment

Figure 3.1.16 - Public Sector (Government) Investment as a share of GDP (%) – 10 year average



Source: Scotland - Quarterly National Accounts Scotland, OECD

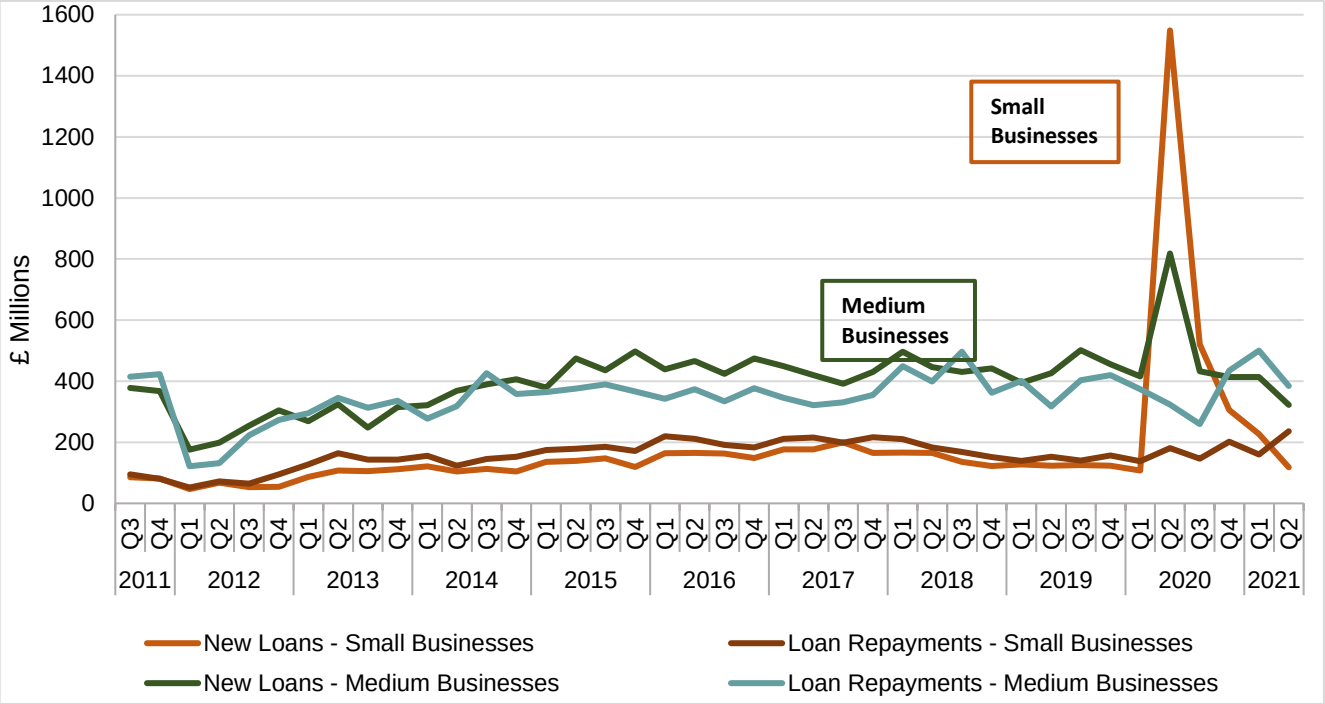
Public sector investment has increased by an average of 4.6% each year over the past decade. As a share of GFCF, it has also increased from around 18% in 2000 to 27% in 2020. Scotland performs relatively well in terms of public sector investment as a share of GDP when compared to other countries.

Latest comparable data shows that Scotland's public sector investment, as a share of GDP remained broadly stable over the past 10 years. Data for 2020 shows that while business investment and total gross capital formation fell, public sector investment increased, both in value terms and as a share of GFCF and GDP.

3.1.2.4 Scotland Business Investment Prospects Post-COVID-19 Pandemic

In response to the COVID-19 pandemic and its significant impact on the economy, the UK Government introduced a package of support in 2020 designed to improve access to- and reduce the cost of finance for UK businesses. This included a range of government-backed loans and finance agreements for businesses. A third (34%) of Scottish businesses used these. Data shows SME lending spiked from Q2 of 2020, driven mainly by increased COVID-19 related lending to small businesses.

Figure 3.1.17 - Small and Medium Sized Business Lending – 2011 Q3-2021 Q2



Source: UK Finance

While the debt taken on by businesses during the pandemic may have been crucial in helping them survive, the relaxed affordability checks presents future risk, there are concerns about businesses' ability to repay and the impact it will have on business investment and future growth.

In Q2 of 2021, 22% of SMEs in the UK using finance were concerned about their ability to repay, increasing to 30% of those borrowing for the first time. Concern about ability to pay decline by size of SME, and businesses in Hospitality, Manufacturing and Transport were the most concerned about meeting the repayments on current borrowing.

3.1.3 Infrastructure: Digital Connectivity

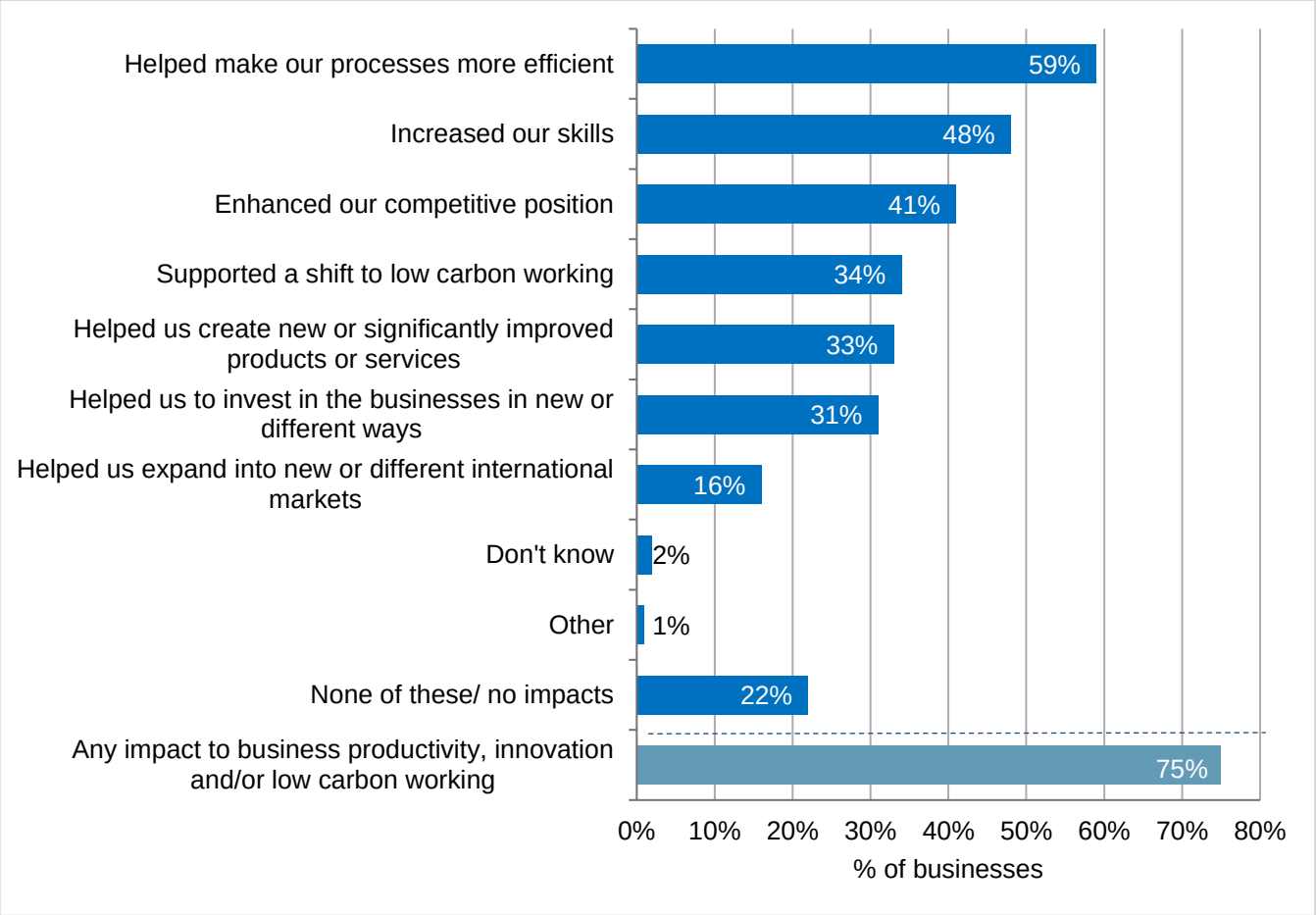
Digital technology is a source of opportunity and potential for businesses to open new markets. It enhances productivity, allows for timesaving and frees up resources, which in turn drives business growth across every sector of the economy. It is also widely recognised as drivers of innovation and international trade.

Evidence supports the link between digital technologies and enhanced business performance. The Digital Economy Business Survey (DEBS)[17] 2021 evidence shows that 31% of businesses report that digital technology had a significant impact on their productivity over the last 12 months. About a quarter (23%) saw a moderate impact on their business productivity, while 17% reported a slight impact and 26% reported no impact at all.

[17] Digital Economy Business Survey 2021: findings - gov.scot (www.gov.scot)

The influence of digital technologies on productivity is particularly noticeable in larger businesses and in particular sectors. Larger businesses were more likely to report a productivity impact from digital technologies than smaller businesses. The sectors most likely to report a significant productivity impact included Business Activities (43%), Health/Social Work (42%) and Other Services (41%). Those likely to report no impact included Transport and Communication (41%), Construction (38%) and Agriculture (33%).

Figure 3.1.18 - Ways in which digital technologies impacted on business productivity, innovation and low carbon working (percentage)



Source: Digital Economy Business Survey, 2021

Figure 3.1.18 shows that digital technologies impact productivity in different ways. A third of businesses reported that digital technology helped them to create new or significantly improved products or services. It also made business processes more efficient (59% of businesses), increased skills (48%) and enhanced competitiveness (41%).

3.1.3.1 Digital Infrastructure

Digital infrastructure is a fundamental requirement for a modern advanced economy alongside the effective use of digital technologies. A key pillar of digital infrastructure is fast and reliable broadband access. Future economic transformation will depend on improvements in this infrastructure, particularly with the emergence of new technologies such as artificial intelligence, the internet of things and 5G.

In 2020, 81% of commercial premises in Scotland had access to superfast broadband (minimum download speed of at least 30 Mbit/s).[18] Residential premises have also seen significant growth in superfast broadband coverage in recent years, with access reaching 94% of Scottish homes in 2020, up from 92% the previous year.

Table 3.1.2 - Fixed Broadband Connectivity at Different Speeds

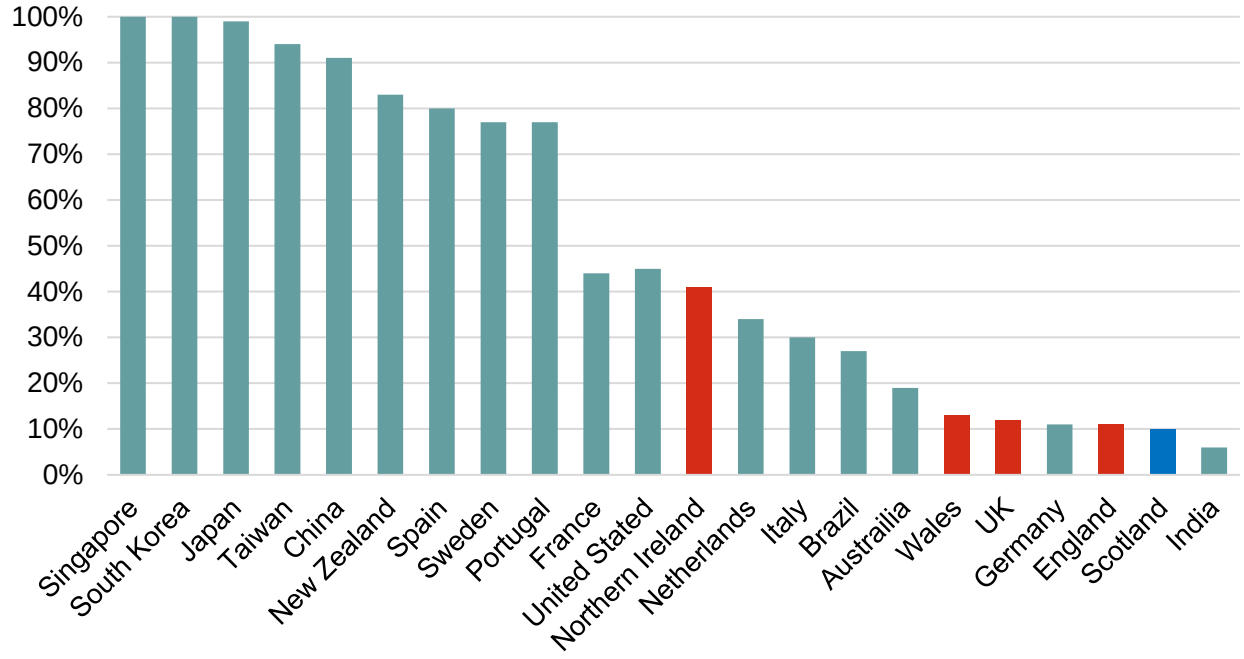
	% of Residential Premises			% of Commercial Premises		
	Superfast Coverage	Full Fibre Coverage	Gigabit Capable	Superfast Coverage	Full Fibre Coverage	Gigabit Capable
Scotland	94%	20%	44%	81%	9%	23%
England	96%	19%	36%	84%	17%	26%
Northern Ireland	90%	63%	69%	83%	35%	43%
Wales	94%	21%	28%	82%	13%	17%
UK	98%	21%	37%	84%	16%	26%
Source: Ofcom Connected Nations Interactive Dashboard Spring 2021 (all data as of Jan 2021)						

Full fibre infrastructure offers a degree of future proofing in digital connectivity, and can offer download speeds of up to 1,000 Mbit/s. Over 14,900 commercial premises (9% of total) in Scotland now have access to full-fibre broadband, an increase of 6,300 premises (77%) on the previous year. Over 517,000 residential premises (20% of total) in Scotland also now have access to full-fibre broadband, with coverage growing 90% on the previous year (See Table 3.1.2). Despite significant developments in Scotland's full fibre network, data suggests that rollout in Scotland (and the UK as a whole) lags behind a number of other nations (Figure 3.3.22)[19].

[18] Interactive report - Ofcom

[19] Note that this data is accurate to the end of 2019. Since then, Full Fibre coverage in residential premises in Scotland has improved from 10% to 20% (as of Spring 2021)

Figure 3.1.19 - Percentage of households in areas served by Full Fibre (end of 2019)



Source: Eurostat

Mobile connectivity is also an integral part of Scotland's digital infrastructure. Mobile coverage has increased significantly in Scotland in recent years, with 2.2 million indoor premises (81%) now covered by all mobile 4G operators (Table 3.1.3). This represents an increase of 1% compared the previous year, and 20% compared to three years ago. Scotland also shows strong performance when compared with other UK regions.

Table 3.1.3 - Indoor premise 4G coverage by UK nation (all operators)

Scotland	81%
England	81%
Northern Ireland	65%
Wales	73%
UK	80%
Source: Ofcom Connected Nations Spring Update 2021	

However, a much greater proportion (19%) of Scotland's landmass is currently without 4G coverage compared to 3% in England and Northern Ireland, and 10% in Wales (Table 3.1.4). This reflects the difficulties of connecting hard-to-reach locations across Scotland, particularly given Scotland's disproportionate share of the UK's total landmass.

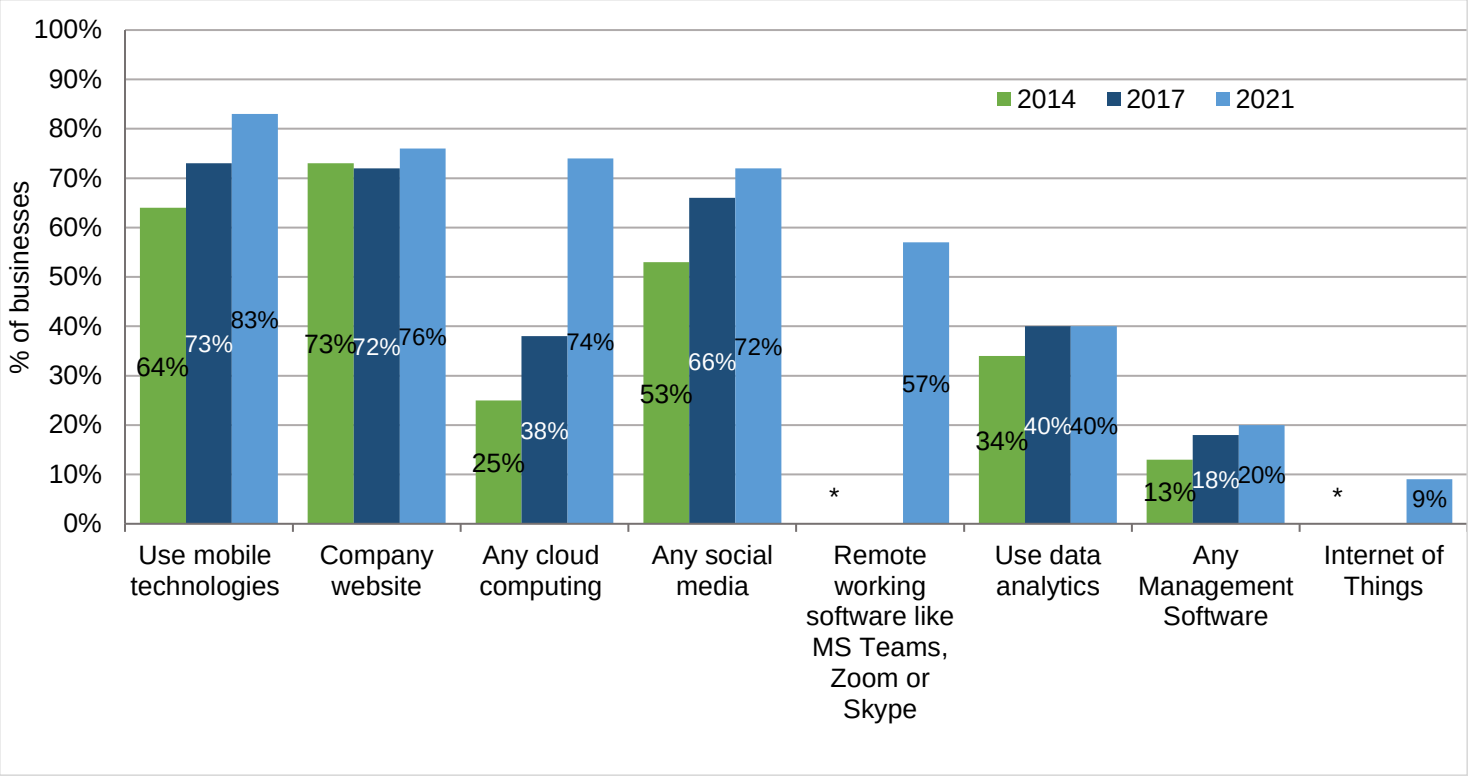
Table 3.1.4 - Distribution of 4G Not Spots - UK

	Proportion of Landmass without 4G Coverage
Scotland	19%
England	3%
Northern Ireland	3%
Wales	10%
Source: Ofcom Connected Nations Annual Report 2020	

3.1.3.2 Digital Adoption

The benefits of digital technologies are realised only if businesses are taking up available technologies. Evidence shows that the discovery of new technologies is not sufficient to boost productivity, without their adoption by businesses and diffusion across the economy.[20] Section 3.1.1 has already highlighted the importance of digital adoption in driving productivity growth, particularly among the long tail of low productivity businesses in the Scottish economy.

Figure 3.1.20 - Adoption of key digital technologies (%) by Scottish businesses



Source: Digital Economy Business Survey, 2021

Evidence suggests that businesses in Scotland have increasingly been deploying a number of digital technologies to improve business performance. As of Quarter 1 of 2021, the most widely adopted digital technologies were mobile technologies (83%), company websites (76%) and cloud computing (74%). The use of most digital technologies has increased over time. (Figure 3.1.20).

A relatively small proportion of businesses (2%) did not use any of the technologies listed in Figure 3.1.20, with most (65%) reporting the technologies were not relevant to the business (65%). Other reasons include preference for current business models like face-to-face interaction (11%), lack of understanding of IT (10%) and lack of skills in the organisation (5%).

[20] Do patent rights matter? 40 years of innovation, complexity and productivity - ScienceDirect

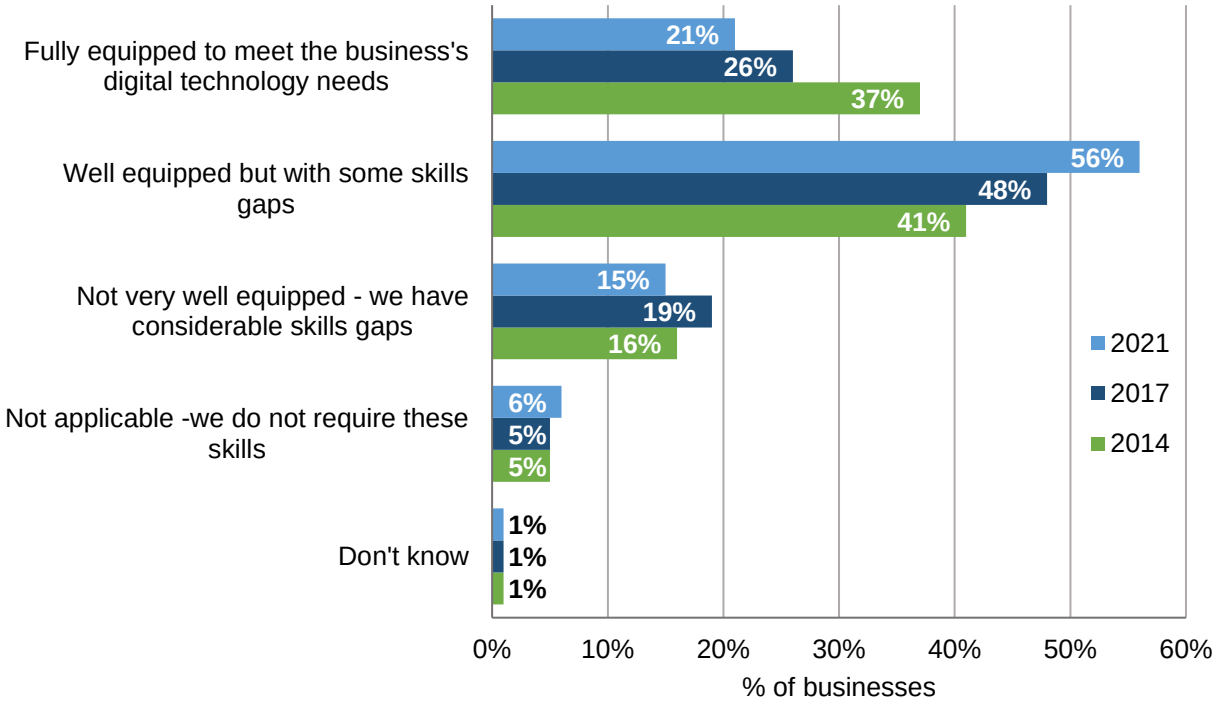
The Digital Economy Maturity Index (DEMI),[21] a more holistic measure of digital adoption show that overall digital capability remains very low among Scotland's businesses. The DEMI shows that in 2021 72% of businesses in Scotland fell into the bottom half of the index scale. These businesses have minimal, basic or intermediate level of digitisation.

Lower levels of digitisation based on the DEMI are particularly prominent in smaller businesses and in sectors like agriculture, construction, transport and communication. There are also regional variations in the index – for example, businesses in the South of Scotland were more likely to fall within the least mature segment.

3.1.3.3 Barriers to Digital Adoption

Despite the potential for digital technology to improve business performance, it is clear that there are barriers to businesses adopting these technologies. Foremost among these barriers is skills. Digital skills are essential if businesses are to benefit from digital adoption. However, only 1 in 5 Scottish businesses felt fully equipped with digital skills in 2021 and 15% reported that they were not very well equipped and had considerable skills gaps (Figure 3.1.21).

Figure 3.1.21 - How equipped staff as a whole are in terms of skills to meet the business' digital technology needs (%)



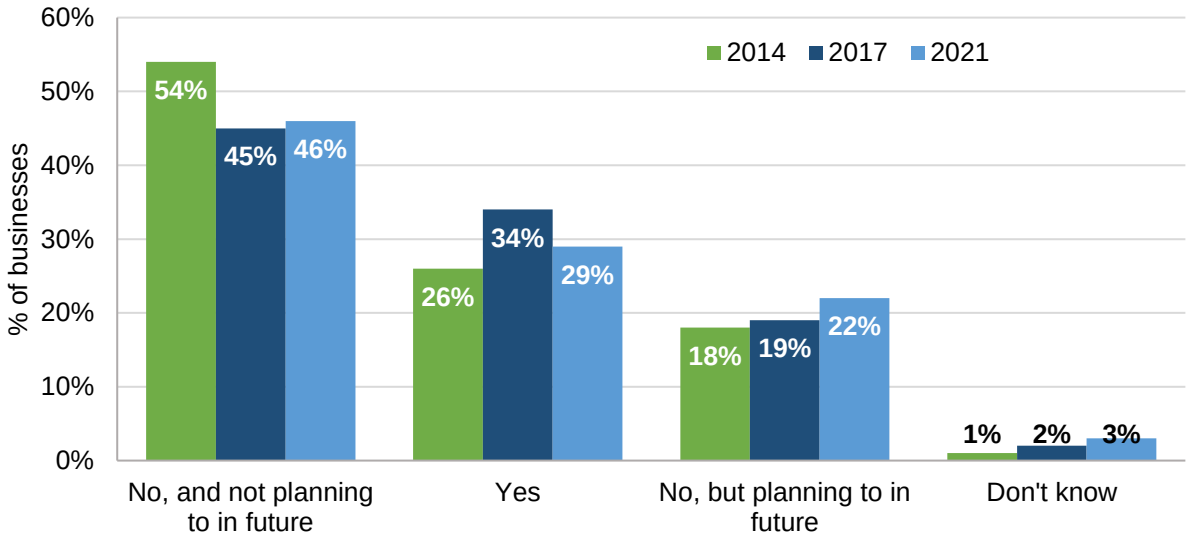
Source: Digital Economy Business Survey, 2021

The proportion of businesses that feel their staff are 'fully equipped' to meet their digital technology needs has decreased since 2014, though the proportion that feel staff are 'well

[21] Scotland's Digital Maturity Index 2021 (www.gov.scot)

equipped' is increasing. Businesses in particular sectors, such as Agriculture and Hotels/Restaurants, were particularly likely to report considerable skills gaps in 2021.

Figure 3.1.22 - Is your business taking any action to develop your current employees' digital technology skills, for example providing or investing in training?



Source: Digital Economy Business Survey, 2021

The commonly cited areas of skills gap include basic technology skills, like email, internet navigation, Microsoft Office applications (26%), cyber security skills (11%), software skills (10%), web development skills (5%) digital marketing (6%), general business and commercial skills (5%) and coding skills (4%). About 14% of businesses reported that they are 'poorly' or 'not at all' equipped with the relevant skills to protect against and deal with cyber security threats.

While many businesses reported skills gaps, 46% of those surveyed were 'not taking' or 'planning to take' any action to address digital skills gaps. Amongst businesses with relevant skills gaps who were not taking action to address them, the most commonly cited barriers include 'resource or time constraints', and costs. Of the businesses that reported skills gaps, 23% were not able to identify specific skills for improvement, highlighting some knowledge barriers.

3.1.4 Infrastructure: Transport Connectivity and the Economy

The transport system in Scotland is an important enabler of economic activity. Evidence shows that the efficiency, reliability and quality of transport system is an important driver for business productivity.[22,23] It reduces barriers to employment,[24] connects people (workers

[22] Scotland's Big Mo: Industrial Strategy, Inclusive Growth and the Future of Mobility, SCDI's Connectivity Commission, June 2018
[23] Transport's role in sustaining UK's Productivity and Competitiveness: The Case for Action, Sir Rod Eddington 2008
[24] The Poverty Alliance Poverty and Transport Event, February 2019

and customers) to areas of economic activity and allows businesses to access their markets – domestic and abroad, in turn supporting international trade, including tourism.[25]

An efficient transport system contributes to creating agglomeration benefits,[26] which is another driver for performance of our local economies. Transport also affects other aspects of people's wellbeing – social outcomes and the environment, including climate. The National Transport Strategy (NTS2) has four priorities to capture the various impacts of transport on wellbeing:

This section focuses on the performance of Scotland's transport system with respect to the economy. Section 3.1.4 presents transport policy challenges with respect to the climate emergency.

3.1.4.1 Passenger Transport

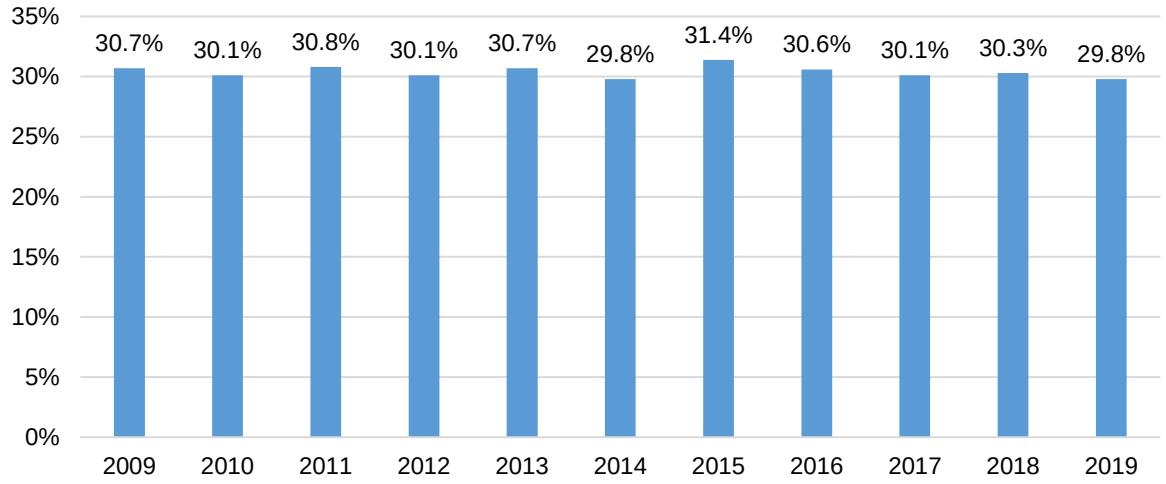
Road

Cars or vans account for the majority of passenger journeys in Scotland, despite the longstanding need to shift to active and public transport. In addition to contributing to sustainability objectives, public or active transport contributes to stronger economic performance by reducing congestion. It offers a more efficient and sustainable means of connecting people to work and other places of economic activity.

Figure 3.1.23 shows that the proportion of people travelling to work by public transport and active travel has remained reasonably stable in the ten years to 2019. Bus passenger numbers have declined while rail passenger numbers have increased. More recently, the Covid19 pandemic has negatively affected public transport demand, and expectations are that it will take several years to return to pre-pandemic levels.

[25] Transporting Scotland's Trade, Transport Scotland, 2019
[26] Agglomeration Economies and Transport Investment, Daniel J Graham, 2007, International Transport Forum, OECD

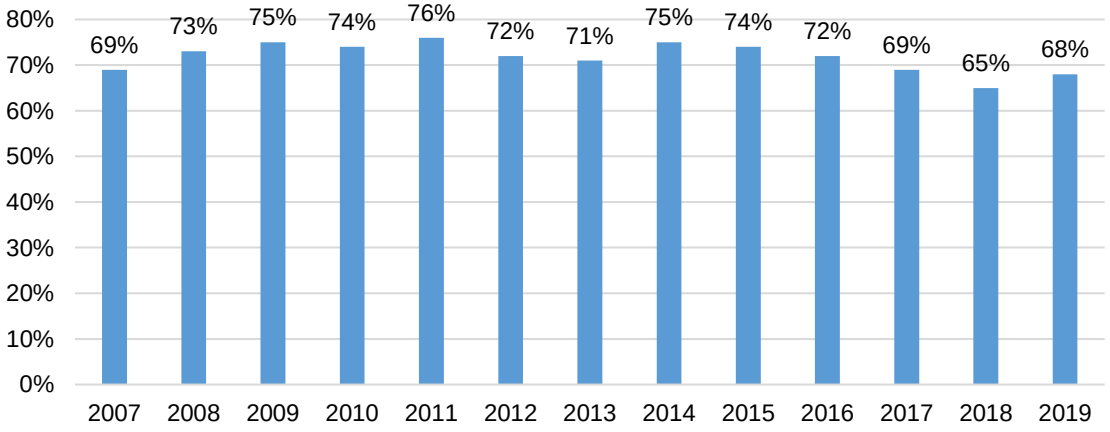
Figure 3.1.23 - Percentage of Public / Active Transport as Usual Method of Travel to Work



Source: Scottish Household Survey

The quality of services affects the use of public transport. Figure 3.1.24 shows that while the majority of adults report that they are 'very or 'fairly satisfied' with public transport, this declined from 75% in 2014 to 65% in 2018. The first year to see a reversal in this trend since 2014 is 2019.

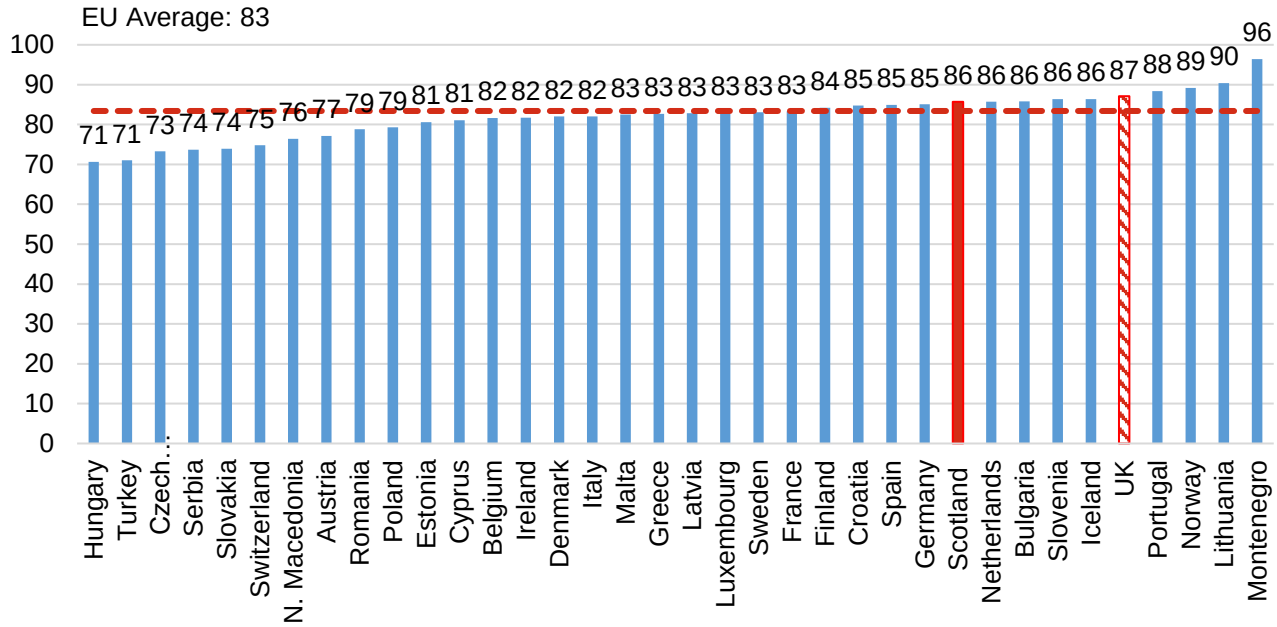
Figure 3.1.24 - Percentage of adults very or fairly satisfied with public transport



Source: Transport and Travel in Scotland

Figure 3.1.25 compares Scotland's reliance on the car for passenger transport with EU countries. Scotland has a slightly higher percentage of passenger kilometres by car when compared to the EU average, although lower levels of car use in some countries could reflect lower incomes limiting car ownership. In some instances, physical and human geography will also be a factor. However, the data still shows that it is possible to have a relatively low level of reliance on the car while retaining higher levels of productivity and wellbeing, like in Belgium, Denmark and Ireland.

Figure 3.1.25 - Percentage of total passenger kilometres by car

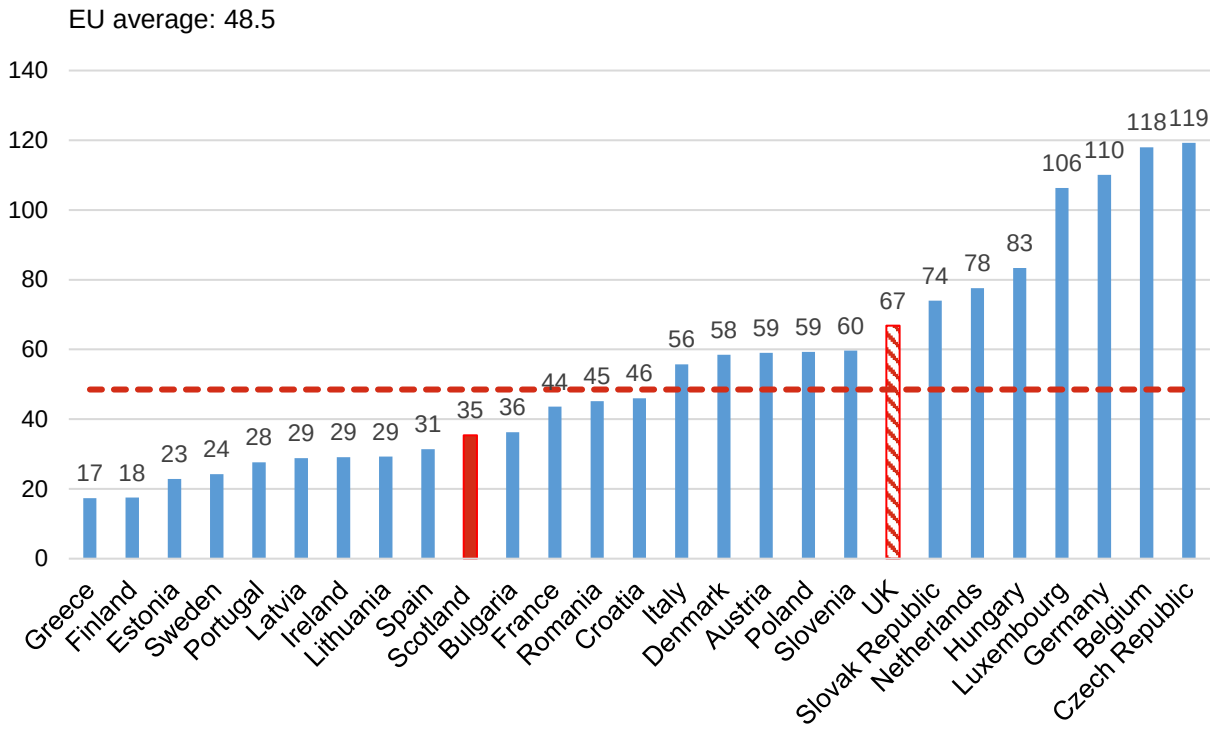


Source: Eurostat, Scottish Transport

Rail

The density of rail networks (rail network kilometres per 1000 square kilometres and rail network kilometres per 1000 of population) is used to compare Scotland's passenger rail transport with other countries. Figure 3.1.26 shows that Scotland has a low rail network density (per 1000 square kilometres) than the EU and UK average. This is partly because of large areas of Scotland with very low population density when compared to many EU countries with high rail density who overall have high population density across most of their territories.

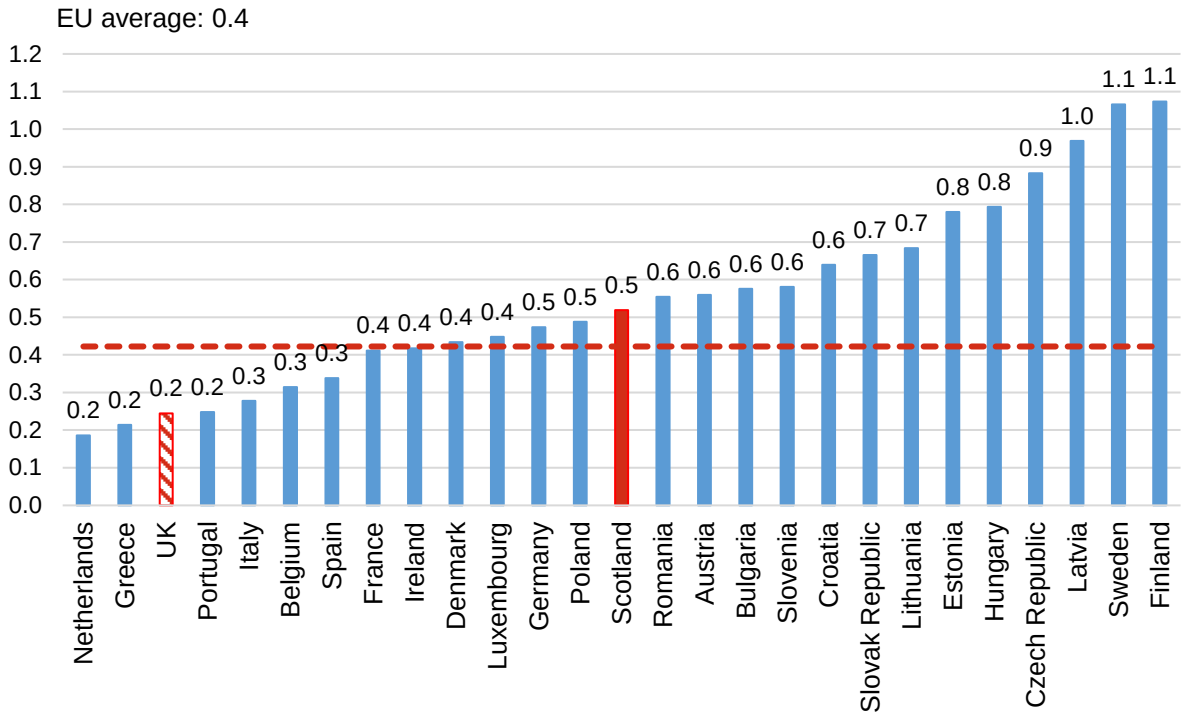
Figure 3.1.26 - Density of Rail Network, KM/1000 square kilometres



Source: Scottish Transport Statistics

On a population basis (per 1000 of population, see Figure 3.1.27) Scotland's rail network appears to be slightly denser than the EU and UK averages. This partly reflects Scotland's population distribution; and the fact that accessing more remote locations increases the required length of the rail network for a given population size.

Figure 3.1.27 - Density of rail network: KM/1000 population



Source: Analysis of Scottish Transport Statistics

Aviation

Scotland's international, national and regional air connections are important for the economy. Aviation allows people to visit Scotland – benefiting the tourism industries, and businesses to seize new opportunities in international markets. Scotland's higher education sector welcomes learners from across the globe. For many of Scotland's remote and island communities, local air services are a vital lifeline, allowing travel to and from the mainland for business, tourism, leisure, and access to health and other public services.

In 2019, 28.9 million passengers passed through Scottish airports, and the number of aircraft movements totalled 478,000.[27] In 2019, air travel to Scotland was possible from 79 unique destinations for short-haul travel and from 10 unique destinations for long-haul travel. Of the 3.5 million overseas visitors to Scotland in 2019, 1.9 million arrived using Scottish airports.[28]

3.1.4.2 Freight Transport

Scotland has trade links with 105 countries across nearly 100 different industries and sectors. Scotland's key exports include petroleum, petroleum products and related materials, food and drink and power generating machinery and equipment. For a detailed analysis, see Transporting Scotland's Trade.[29] Within Scotland, the trunk road network

[27] Scottish Transport Statistics 2020. Chapter 8: Air Transport
[28] ONS Travel Trends 2019
[29] Transporting Scotland's Trade - 2020 edition

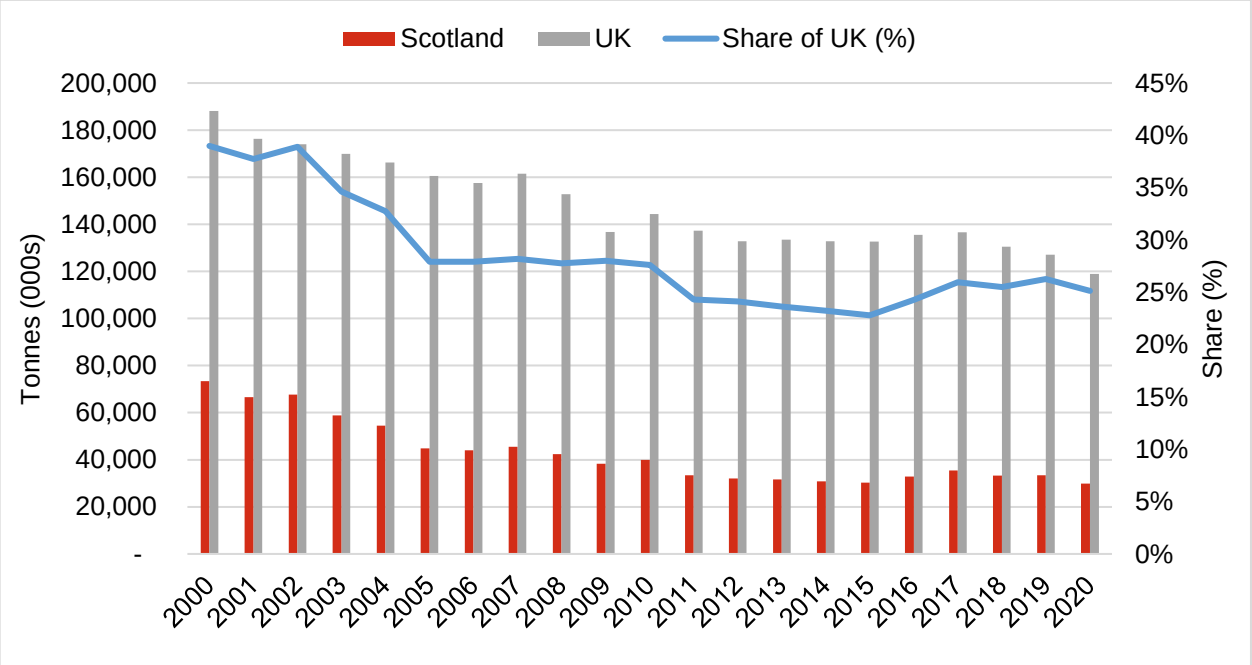
operated by Transport Scotland is crucial for national and local delivery of goods, with 70% of heavy goods vehicles (HGV) vehicle kilometres being on trunk roads.

There are eight “major” port areas in Scotland that handle over a million tonnes of cargo per year and for which official statistics are collected. However, the Forth is by far the largest port in Scotland and handles the majority of Scotland’s international exports (by weight).

Port	Major Activity
Aberdeen	Oil products and some domestic general freight
Cairnryan	Ferries to Northern Ireland
Clyde	Oil imported from Russia, Norway, USA, Nigeria etc. Oil product exports and other cargo to mostly Europe & north Africa
Forth	Handles more liquid bulk cargo than any other UK port except Milford Haven, largely exporting oil products to Netherlands & China
Glensanda	Ships quarried granite and aggregates mostly to Germany, Netherlands & UK
Loch Ryan	Ferries to Northern Ireland
Orkney	Dominated by oil exports to Germany, Netherlands, China, Plus some ferry traffic
Sullom Voe	Dominated by oil exports to Netherlands and other UK ports

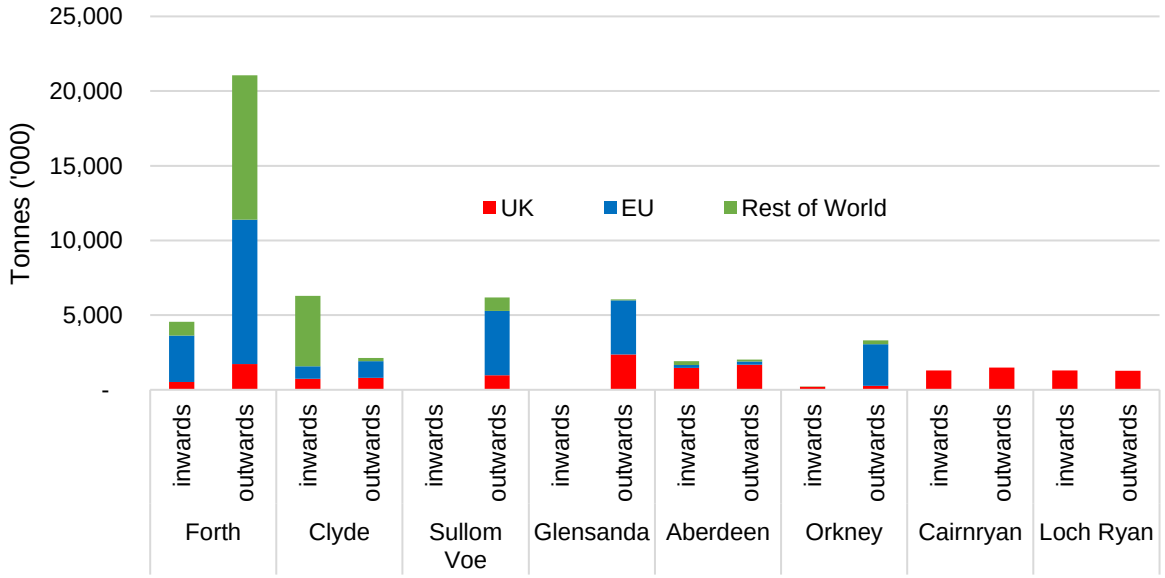
In 2020, Scottish ports accounted for 25.1% of all UK major port outbound traffic by volume and 4.4% of all UK major port inbound traffic by volume. Crude oil exports – with crude oil making up 80.3% of all exports, skews the outbound figure. There are other heavy but low value items such as granite bulk particulates from Glensanda.

Figure 3.1.28 - Outbound international freight (by weight) from UK port 2000 – 2020



Source: Department for Transport

Figure 3.1.29 - Cargo handled by Major Scottish Ports by direction and partner region (2017-20, average tonnage '000)



Source: Department for Transport port freight statistics

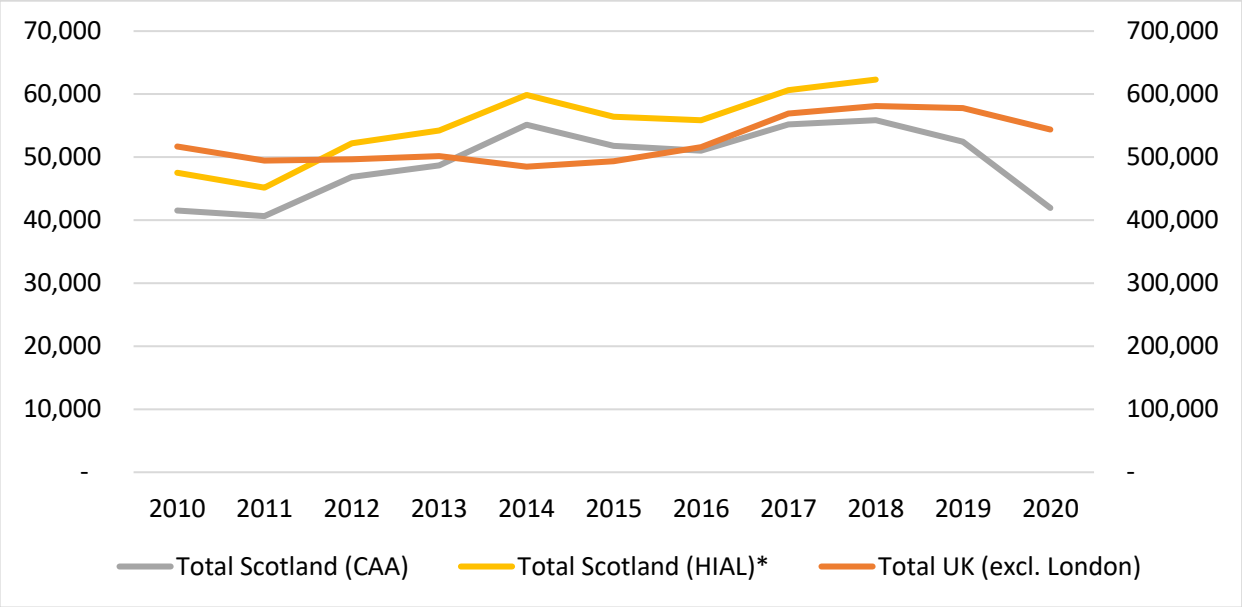
Overall, Scotland is heavily reliant on ports in England, especially the Channel ports/tunnel, as it represents the most effective route to/from continental Europe for a wide range of industries. Whilst air transport is faster for some routes to/from Scotland, it is also expensive - typically priced 4–5 times per kg more than road transport and 12–16 times per kg on sea transport. As a result, most cargo to the EU travels by sea or sea/road.

Ports also serve other functions beyond handling cargo. They also host offshore industries such as energy and fishing. They also offer key infrastructure nodes for passengers to reach certain parts of the country. Ferries to Scottish islands carry 40% of the UK's domestic sea passenger traffic,[30] and the sea connections to Northern Ireland carry 8% of domestic passenger traffic and 85% of sea passengers between Northern Ireland and the island of Great Britain.

Airfreight accounts for a very small amount of total freight lifted from Scotland, almost 60,000 tonnes in 2019. However, goods tend to be of a higher value and are more time-sensitive than those transported by sea. The last available figures for 2020 show that freight carried by air totalled 41,938 tonnes.

[30] Excluding river ferries

Figure 3.1.30 - Air freight lifted at UK airports (tonnes)



3.1.5 What the evidence tells us we need to address:

This section has provided evidence on Scotland's productivity performance and its drivers. It has shown that:

Overall Productivity Performance

- Scotland's productivity performance, while overall subdued over the last two decades, varies significantly across and within sectors, and across business size bands, with productivity growth largely occurring in higher productivity sectors (manufacturing and internationally tradable services. To shift the dial on productivity across the whole economy we need to maintain rates of productivity growth in currently high performing sectors and also increase performance in the traditionally low productivity services sectors.

NSET responds to this evidence through the following Projects:

- Project 9: Upskill Business and Public Sector Leaders, Pioneering New Approaches to Driving Productivity Improvements
- Project 10: Realise the Potential of the Different Economic and Community Assets and Strengths of Scotland's Regions
- A National Mission with Local Impact: Infrastructure Investment Plan for Scotland 2021-22 to 2025-26

Research & Development and Broader Technology Adoption

- Scotland still suffers from very low levels of business R&D spend, although there has been recent improvements. This is in contrasts with Scotland's strong performance on higher education R&D spend.

- There is scope to improve business management practices and to build their capacity for productivity enhancing business models. This includes policies to encourage a culture of entrepreneurship within the existing business base by building experimental and innovative capacity, and facilitating peer to peer learning between businesses.

- There is need to tackle a wide range of barriers to businesses adopting and making the most effective use of existing technologies. This will go a long way in improving the productivity performance of many businesses.

NSET responds to this evidence through the following Projects:

- Project 9: Upskill Business and Public Sector Leaders, Pioneering New Approaches to Driving Productivity Improvements
- Project 8: Improve Connectivity Infrastructure and Digital Adoption Across the Economy

Investment

- Recently, Scotland has performed well at attracting foreign direct investment projects, and has a strong angel investment market due to 'the Scottish model' of business angel syndicates investing alongside the public sector.

- Scotland's capital investment, measured by Gross Fixed Capital Formation (GFCF) as a share of GDP is low by OECD standards. Scotland's public sector investment as share of GDP is higher than the UK's, and compares favourably to other OECD countries, although there remains a gap to close on the better performing countries like Norway.

- Scotland's business capital investment rates are significantly lower than comparable countries. The pandemic may have exacerbated this challenge due to impact on business balance sheets and ongoing economic uncertainty.

NSET responds to this evidence through the following Projects:

- Project 7: Attract and Deploy Significant Domestic and International Private Investment in Scotland
- Shaping Scotland's Economy: Inward Investment Plan
- Investing with Purpose: Global Capital Investment Plan
- A National Mission with Local Impact: Infrastructure Investment Plan for Scotland 2021-22 to 2025-26

Digital Infrastructure and Technology

- While there has been progress to support digital transformation through enhanced broadband and mobile coverage via programmes including Reaching 100 (R100) and the Scottish 4G Infill (S4GI) Programme, Scotland's levels of connectivity still lag behind many other European countries, particularly when considering full fibre

- The adoption of most key digital technologies, such as mobile technologies and cloud computing, has increased in recent years. However, the digitisation of Scottish businesses is relatively low on average and there is scope to increase further the adoption of many digital technologies to improve economic performance.

- Barriers to digital adoption and readiness exist, particularly in digital skills development, meaning many businesses are not fully embracing digital technologies to enhance their productivity. This is important as digital adoption is a continuous process where deployment of modern technology and development of skills should be a constant of business evolution.

NSET responds to this evidence through the following Projects:

- Project 8: Improve Connectivity Infrastructure and Digital Adoption Across the Economy
- Project 11: Adapt the Education and Skills System to Make it more Agile and Responsive to our Economic Needs and Ambitions

Transport

- Overall, Scotland's transport system performs well in enabling economic activity. However, there remains opportunities to improve transport connections within and between certain areas. The main challenge is with respect to public passenger transport, largely improving satisfaction with services and encouraging switch from the car to public and active travel.

NSET responds to this evidence through the following Projects:

- Project 8: Improve Connectivity Infrastructure and Digital Adoption Across the Economy

3.2 A Fairer and more equal society

Performance at a glance

Measure	Current Performance
% of workforce earning above the Real Living Wage	85.6% (2021)
No of Living Hours Accredited Employers	0% (scheme launched 1 Aug 2021)
Disability employment gap	32.0 p.p. (Jul 2020 – Jun 2021)
Gender employment gap	4.3 p.p. (Jul 2020 to June 2021)
Ethnicity employment gap	9.7 p.p. (Jul 2020 to June 2021)

Scotland continues to face challenges of low pay, unacceptably high levels of child and in-work poverty and wide ranging inequalities. A number of policies are already in place to ensure that Scotland's economy contributes to raising living standards for all. While some of these measures have demonstrated progress in improving outcomes, this has not always translated to improvements in other indicators for prosperity and standard of living like child poverty. The NSET seeks to build a stronger and fairer economy that offers people better opportunities to earn incomes and that grows resources for supporting public services.

3.2.1 Employment Earnings and Inequality

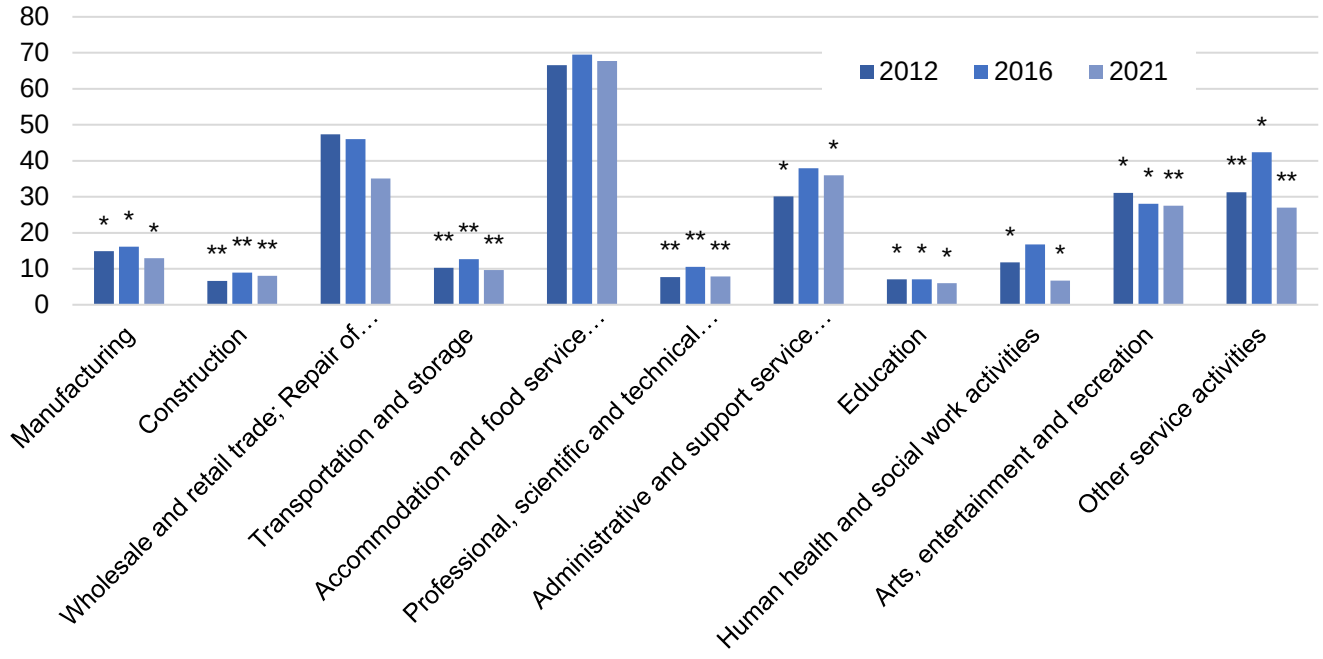
Real Living wage and low-wage earners

Scotland faces a significant challenge with respect to the share of the workforce with low earnings from employment. As shown in Section 2, growth in real incomes has been modest since the 2008-09 financial crisis. In 2021, about 14.4% of the workforce earned less than the real living wage, which is currently £9.50.

There are significant variations in sectoral performance against the real living wage. In 2021, as much as two-thirds (67.7%) of the workforce in accommodation and food service activities, earned less than the real living wage. The high prevalence of workers earning below the real living wage are also observed in other sectors – wholesale and retail trade; administration and support services; arts, entertainment and recreation; and other service activities.

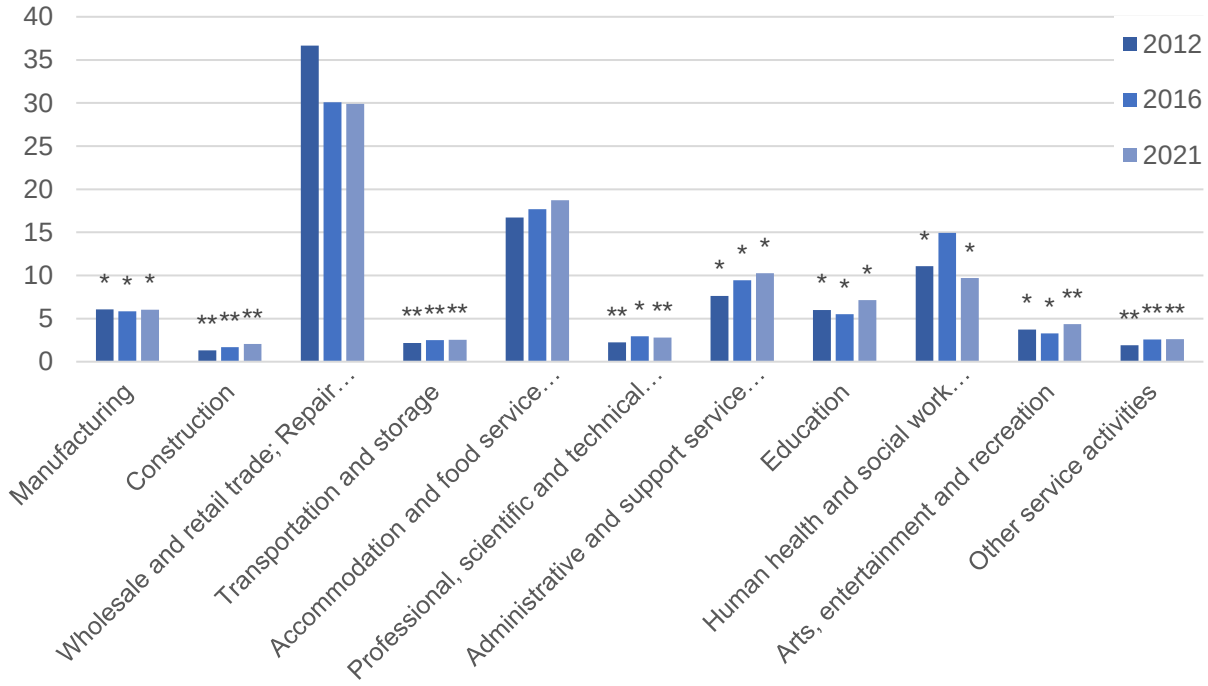
When taking account of the size of the workforce, however, the 'retail and wholesale trade' industry accounted for the largest share of the all workers earning below the real living wage in 2021, followed by 'accommodation and food service activities'. In 2021, nearly half (48.6%) of all employees earning less than the real living wage were employed in the 'wholesale and retail trade' or 'accommodation and food service activities' sectors.

Figure 3.2.1 - Percentage of employees earning below the real living wage (18 years and above) across sectors, 2012, 2016 and 2021, Scotland



Source: Annual Survey of Hours and Earnings, ONS
Note: Estimates for some SIC sections are not included due to the reliability of the estimates.
* estimates are considered reasonably precise.
** estimates are considered acceptable.

Figure 3.2.2 – Percentage Distribution of employees earning below the real living wage (18 years and above) across sectors, 2012, 2016 and 2021, Scotland

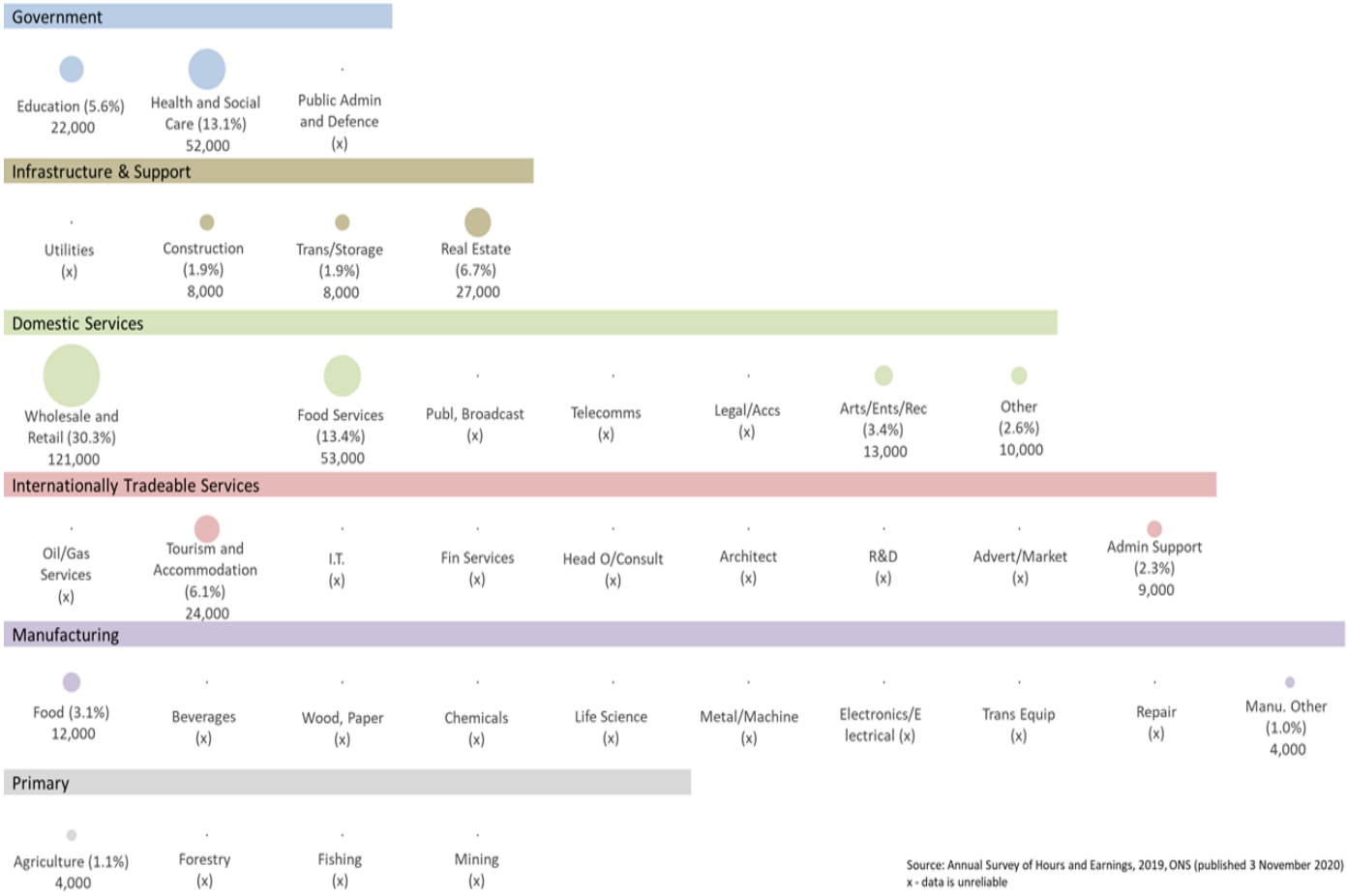


Source: Annual Survey of Hours and Earnings, ONS

Note: Estimates for some SIC sections are not included due to the reliability of the estimates.
* estimates are considered reasonably precise.
** estimates are considered acceptable.

Figure 3.2.3 provides a more detailed picture of the distribution across Scotland's industries of workers earning below the real living wage across Scotland's industries.[31]

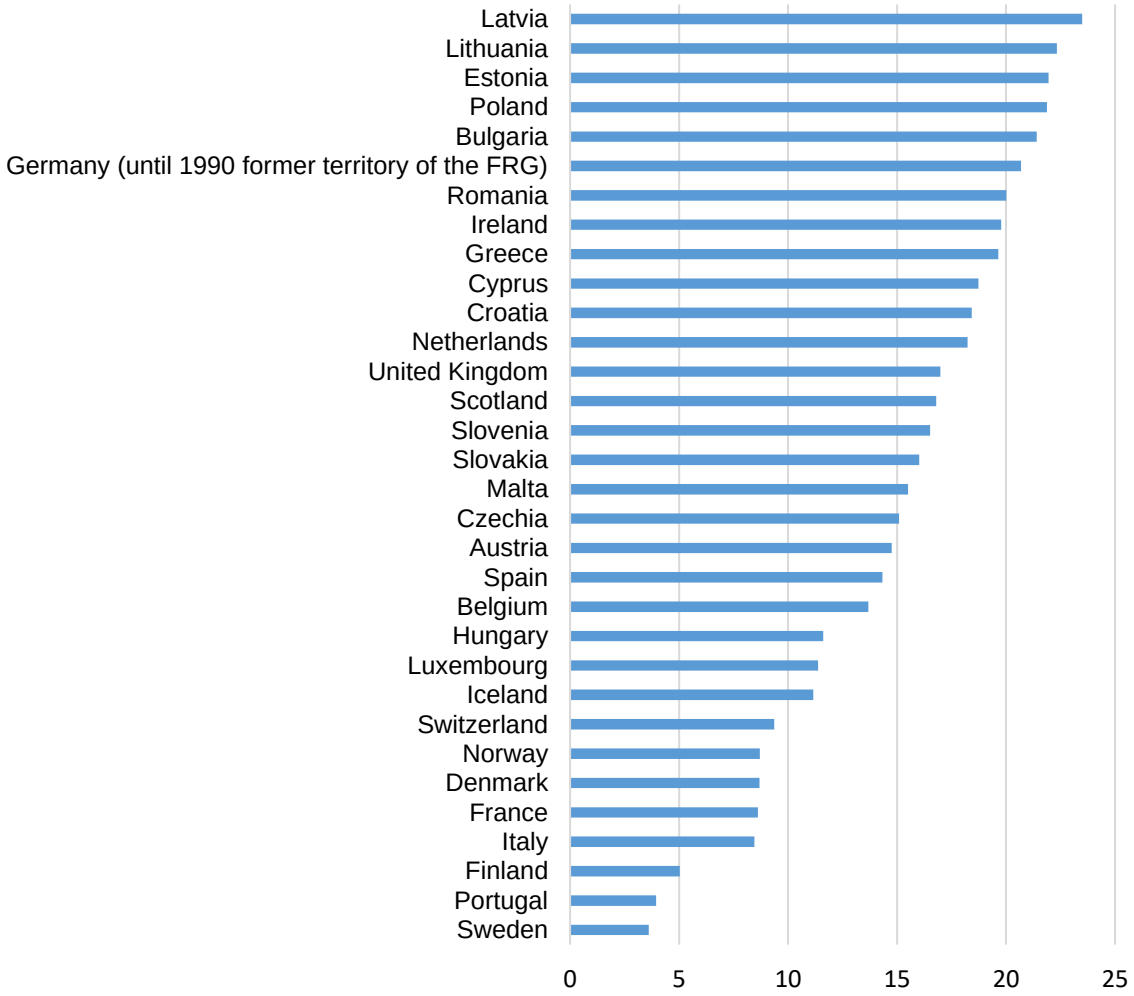
Figure 3.2.3 – Employees Earning Less than the Real Living Wage by Sector – 2019[32]



The share of low-wage earners as a proportion on all employees allows for comparison with other countries. The share for Scotland was 16.8%, placing it in the bottom half of countries (EU plus Norway and Switzerland) ranked according to the least share of low-wage earners. Most countries performing better than Scotland on this measure tend to rank higher on productivity performance. However, some rank significantly below Scotland on productivity (Slovenia, Czech Republic, Spain, Hungary, Italy, and Portugal). This suggests labour market structure and policy environment can play an important role in delivering better relative pay outcomes.

[31] For a number of industries the data is suppressed because of low levels of data reliability due to very small sample sizes. Across most of these industries the numbers will generally be very low)
[32] For a number of industries data are suppressed because of small sample sizes).

Figure 3.2.4 - Low-wage earners as a proportion of all employees (excluding apprentices) 2018

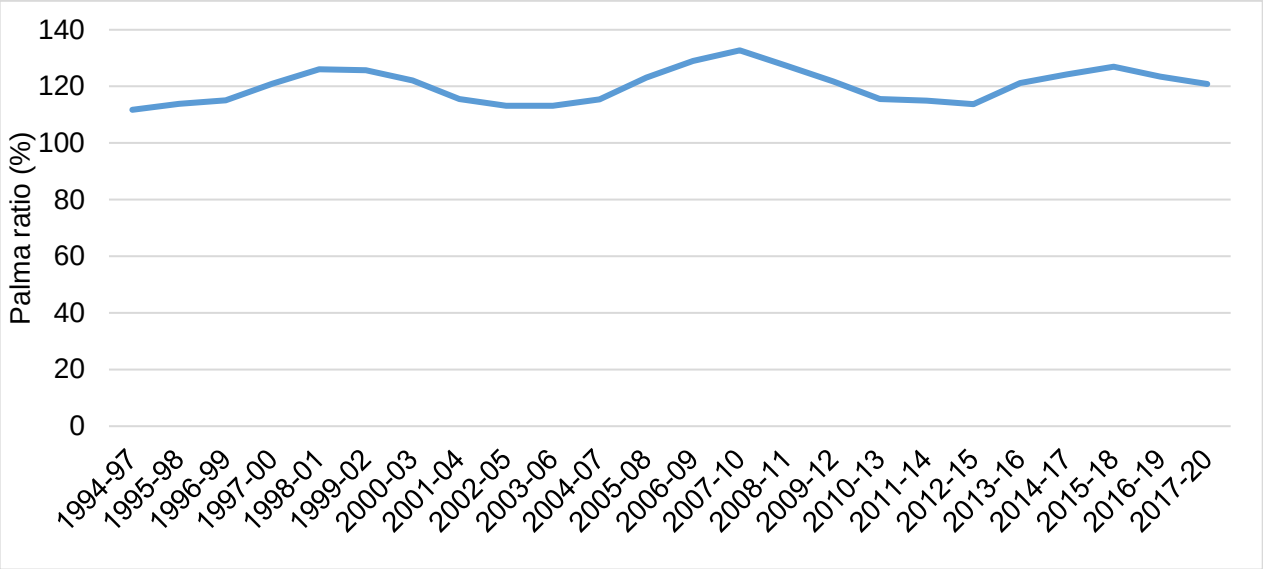


Source: Eurostat

Income inequalities

Scotland's income inequality, measured by the Palma ratio, has consistently fluctuated over time with no clear trend. In 2017-20, the total household income of the top ten percent of the population was 21% higher compared to that of the bottom forty percent. This is a gradual improvement from the three previous periods. However, on this measure Scotland ranks in the bottom quartile of OECD countries.

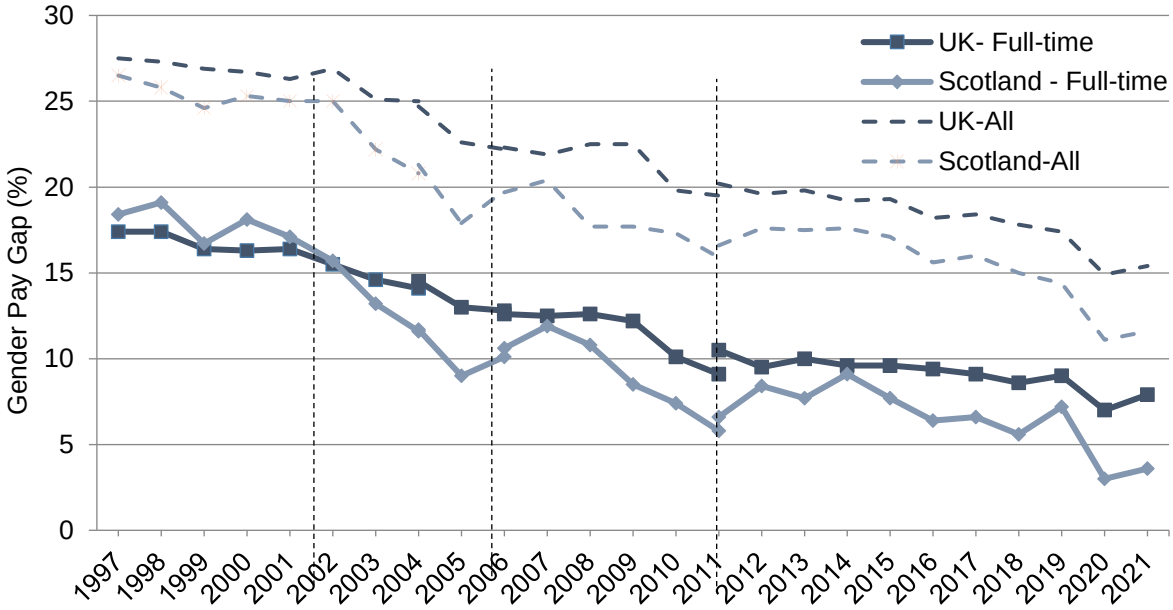
Figure 3.2.5 - Palma ratio of income inequality 1992-97 to 2017-20, Scotland



Source: Scottish Government Analysis of the Family Resource Survey, Households Below Average Income dataset

Scotland's earnings from employment also vary across equalities groups. For instance, median gross weekly earnings for full-time women in 2021 was £582.20 while the equivalent for full-time men was £650.50. However, the Gender Pay Gap for full-time employees (based on hourly earnings excluding overtime) in Scotland has decreased from 18.1% in 2000 to 3.6% in 2021. The gender Pay gap in Scotland is ranked 26th lowest out of 37 OECD countries (2019), based on full-time gross weekly employee earnings.[33]

Figure 3.2.6 - Gender Pay gap for Median Full-time and All Hourly Earnings (excluding overtime) Scotland and UK April 1997 to 2021

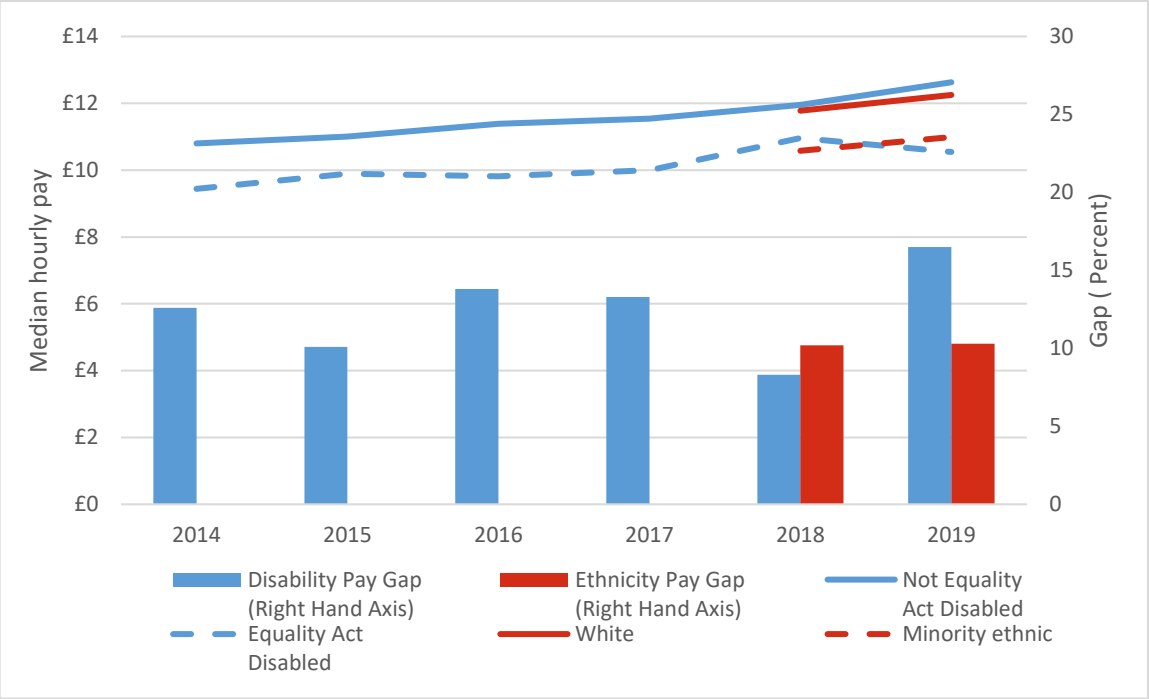


Source: Annual Survey of Hours and Earnings

[33] Gender Pay Gap Action Plan - Measurement Framework (www.gov.scot)

In 2019, estimates for Scotland's disability pay gap[34] was 16.5% and for the ethnicity pay gap[35] it was 10.3%.

Figure 3.2.7 –Median hourly pay (£) and Ethnicity and disability Pay Gap (%) Scotland



Source: Annual Population Survey January to December dataset [36] [37]
Note: Data for earnings by ethnicity are not available for earlier years at time of publication
Disability pay gap - Pay gap calculated as Not Equality Act Disabled median hourly earnings minus Equality Act Disabled median hourly earnings then divided by Not Equality Act Disabled median hourly earnings.
Minority ethnic pay gap Pay gap calculated as Minority ethnic median hourly earnings minus Minority ethnic median hourly earnings then divided by Minority ethnic median hourly earnings.

3.2.2 Wider socioeconomic performance

Scotland's less favourable performance on pay has direct impact on the living standards of many families and communities. This is evident in the wide range of poor social outcomes, especially in local communities that are lagging behind on economic performance.

On latest 2017-20 data, around one in four (24%) children in Scotland currently live in relative poverty, significantly above the 2030 targets. Absolute poverty rate was 22% and combined low income and material deprivation rate was 13%. The relative poverty rate has

[34] The disability pay gap represents the difference between average hourly pay of disabled and non-disabled people, as a percentage of non-disabled people's pay.
[35] The ethnicity pay gap represents the difference between average hourly pay of minority ethnic workers and white workers, as a percentage of white workers' pay.
[36] Disabled people in the labour market in Scotland - gov.scot (www.gov.scot)
[37] "Minority Ethnic" includes all categories outside of the white population. "White" includes "Polish" and "Gypsy Traveller" who also suffer disadvantage.

slowly increased while the absolute child poverty rate, persistent poverty rate and the combined low income and material deprivation rate have remained relatively stable.

Children in the six priority family groups identified in the Scottish Government Tackling Child Poverty Delivery Plan remain at higher than average risk of poverty. Particularly notable is the proportion in relative poverty amongst lone parents and minority ethnic households:

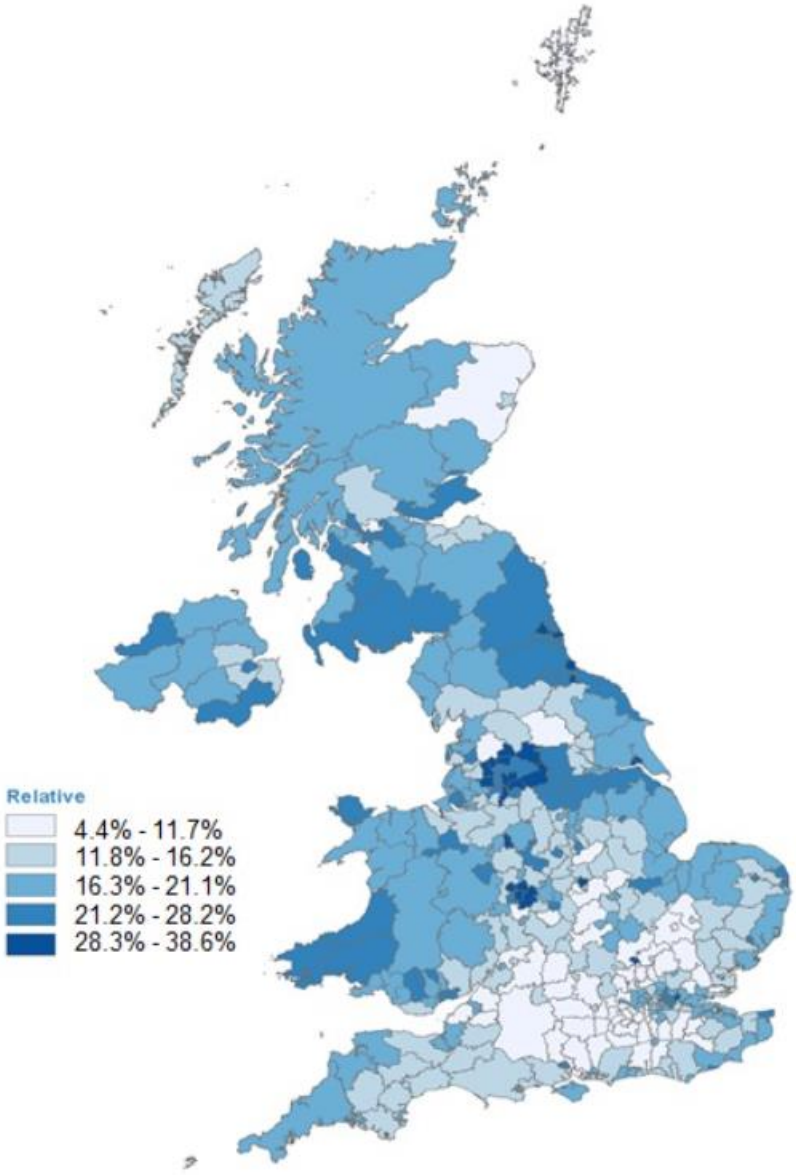
- Lone parent households: 38% in relative poverty (2017-20)
- Minority ethnic household: 38%
- Baby aged under 1 in household: 34%
- 3+ children in household: 32%
- Disabled person in household: 29%

Scotland's local authorities are however consistently underrepresented in the 10% of UK local authorities with highest child poverty rates. Relative poverty rate after housing costs was 19% in Scotland and 22% in the UK in 2017-20. Poverty is lower in Scotland than in the UK for almost all after-housing-costs (AHC) measures, except for persistent poverty, where levels are similar. Only Northern Ireland's AHC poverty rates are slightly lower than Scotland's.

Poverty statistics – Scotland and UK comparison

- The statistics covering the period 2017-20 indicate that child poverty has been gradually rising since the early 2010s.
- Relative poverty AHC overall was 19% in Scotland and 22% in the UK in 2017-20.
- Poverty is lower in Scotland than in the UK across almost all AHC measures except for persistent poverty, where levels are similar. Northern Ireland's AHC poverty rates are slightly lower than Scotland's.
- Almost one in four children in Scotland (24%, 240,000) were still living in relative poverty (AHC). In the UK, 30% of children were in relative poverty (AHC).
- More than one million people (19%, 1.03 million) in Scotland were in relative poverty AHC. This compares to 22% across the UK.
- 68% of children in poverty AHC in Scotland lived in working households (160,000 children). This compares to 74% of children across the UK.
- 61% of working-age adults in poverty AHC in Scotland lived in working households (400,000). This compares to 68% of working-age adults across the UK.
- 14% of pensioners were in relative poverty AHC (150,000). In the UK, 17% of pensioners were in relative poverty.
- 17% of people in Scotland (910,000) were in relative poverty before housing costs, the same level as in the UK overall.

Figure 3.2.8 - Proportion of Children (0 - 15 years) living in low-income families by Local Authority Areas: 2019-20



Source: DWP/HMRC children in low-income families local measure 2019-20

The 2017-20 data shows that the majority of people living in poverty are in working households. 68% of children in poverty AHC in Scotland lived in working households (160,000 children), compared to 74% across the UK. 61% of working-age adults in poverty in Scotland lived in working households (400,000), compared to 68% of working-age adults across the UK. It shows that having a job is not always enough, for example when it does not pay well, when someone is unable to work enough hours, or when one parent is unable to do paid work.

The increase in working poverty over the last decade points to changes in the labour market and the wider economy since the financial crisis, with reductions in unemployment

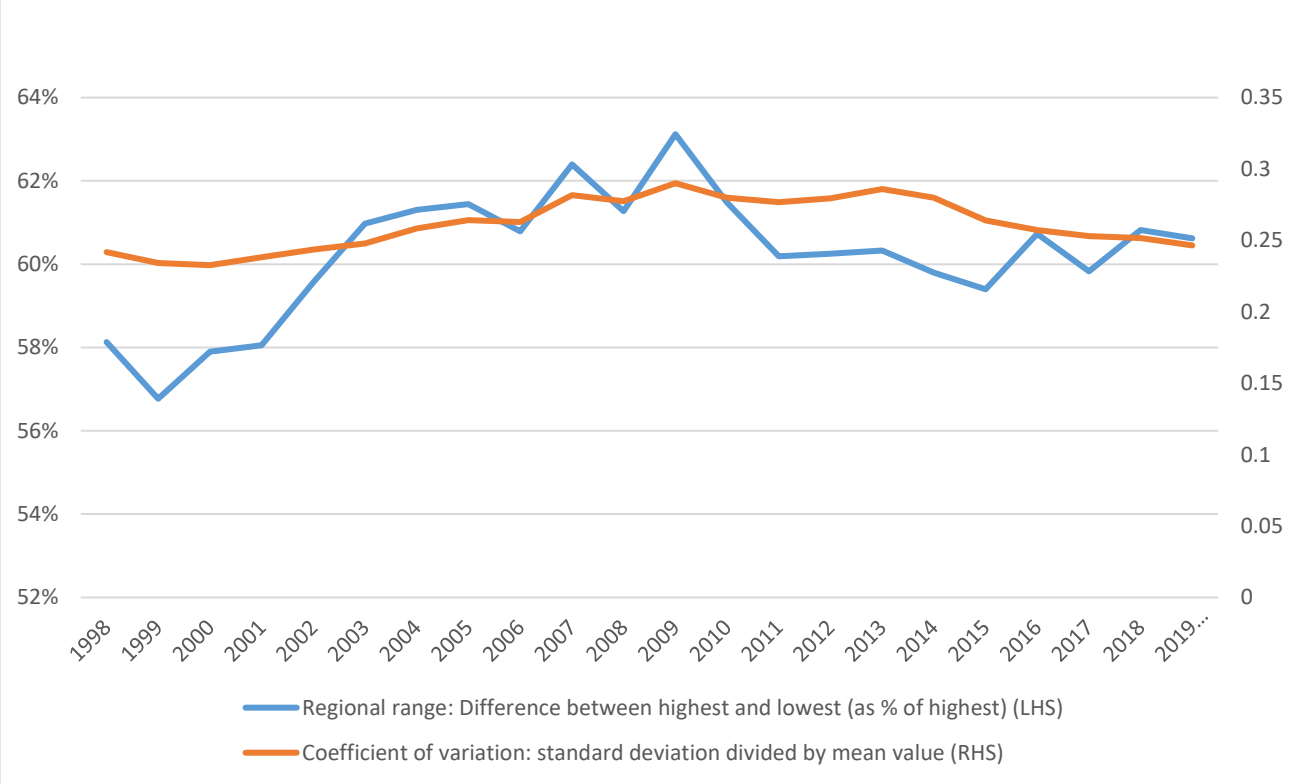
matched by stagnant wages and the rise of part-time work and insecure contracts.[38] At the same time poverty can act as a drag on economic performance, particularly child poverty, which tends to reduce an individual's lifetime earnings. This also tends to absorb fiscal resources that could be invested in other ways to support public services and the economy.[39]

Although Scotland has the lowest child poverty rates in UK, tackling child poverty remains an urgent national priority. Recent projections suggest child poverty targets will be challenging to achieve, as the COVID-19 is likely to disproportionately affect workers in in low pay sectors.

3.2.3 Regional Economic Inequality

The distribution of economic activity and its benefits across regions is important for fair prosperity. While regional inequality is partly a result of different regions having different opportunities as determined by the natural assets and historical contexts, there can be scope to reduce it.

Figure 3.2.9 Regional Inequality in GDP per head: 1998-2019[40]



38 http://eprints.lse.ac.uk/65615/1/Coulter_The%20UK%20labour%20market%20and%20the%20great%20recession.pdf

39 https://www.lboro.ac.uk/media/media/research/crsp/downloads/the-cost-of-child-poverty-in-2021--crsp-paper.pdf

40 Based on Regional range and coefficient of variation between International Territorial Level (ITL) 3 regions

Over the period 1998 to 2019, the difference between the highest and lowest regional GDP per capita peaked in 2009. In that year, GDP per capita was highest in City of Edinburgh (£38,807) and lowest in East Lothian & Midlothian (£14,312). The coefficient variation, used by the OECD to measure regional inequalities, also shows that regional inequalities have gradually declined, although they remain above levels recorded in 1999 to 2000.[41]

3.2.4 What the evidence tells us we need to address

The evidence in this section has highlighted the need to do more for the economy to do more to deliver on wider prosperity and to raise living standards across all of Scotland:

- low growth of earning from employment and low pay, with a significant although reducing proportion of the workforce earning below the real living wage. While this is partly explained by productivity levels, the evidence from other countries suggest that labour market structure, business models and policy could be important determinants of wages.

- deep seated regional inequalities in economic activity with many communities in Scotland facing significant social challenges linked to poor economic performance, as evidenced by high-levels of deprivation or child poverty in regions with low economic performance.

- significant economic inequalities exist for disadvantaged groups (gender, ethnicity, and disability). Tackling this is not only important for maximising the benefits from Scotland's economic prosperity, but it improves overall economic performance.

NSET responds to this evidence through the following Projects:

- Project 14: Tackle Poverty Through Fairer Pay and Conditions
- Project 15: Eradicate Structural Barriers to Participating in the Labour Market
- Project 10: Realise the Potential of the Different Economic and Community Assets and Strengths of Scotland's Regions
- A National Mission with Local Impact: Infrastructure Investment Plan for Scotland 2021-22 to 2025-26

[41] Note, GDP per capita measure is distorted to some extent by commuters. For example, city regions like Edinburgh benefit from a large number of workers commuting to work in the city and contributing to its GDP, however wages and income go where workers reside.

3.3 New market opportunities

Performance at a glance:

Measure	Current Performance
Renewable Energy Target: for the equivalent of 50% of the energy for Scotland's heat, transport and electricity use to come from renewable sources.	23.8% (2019)
Circular Economy: waste prevention	Latest figure (2018) is a 4% reduction. Has been achieved twice since 2011 but highly dependent on construction waste.
International exports as a share of GDP	20.8% (2019)

The global and domestic market place is constantly in transition with global policy changes, new technologies, product innovations and changing tastes and habits. This continuously presents new market opportunities for Scotland. The global push to tackle the climate emergency; improve environmental sustainability; and, the need to rebuild Scotland's natural capital offers Scotland opportunities to establish new and transformational industries for the future.

Together the NSET identifies the following opportunity areas:

- **Renewable energy**, with Scotland's enjoying 25% of Europe's wind potential and home to globally leading businesses in tidal energy;
- The **hydrogen economy**, with vast generation potential of renewable hydrogen for export markets;
- The **decarbonisation of transport**, particularly the development of a high value manufacturing base for low volume high value zero emission vehicles;
- **Space,** leading Europe in end-to-end capability for small satellites, including earth observation data solutions;
- The "**blue economy**", utilising the potential, and sustainable management of our ocean, sea and coastal resources;
- **Sustainable farming & forestry**, nature restoration, eco-tourism, and nature-based solutions to climate change mitigation and adaptation;
- Our **financial services and fintech** sectors including Scotland's leading positions in responsible and ethical finance;
- **Industrial biotechnology**, where Scotland has developed innovative technology that can transform traditional industries and offer greener alternatives to fossil fuels;
- **Emerging technologies** such as photonics and quantum technologies which will underpin the industries of the future and where Scotland enjoys a world leading position;

- **Digital technology** including artificial intelligence and cyber security, building on Edinburgh as the Data Capital of Europe and Dundee's global leadership in gaming;
- One of the biggest **life sciences** clusters in Europe with world leading expertise in drug discovery and precision medicine, medical technologies and pharmaceutical services, advanced therapies, digital health and care, animal health and agritech;
- **Food and drink innovation** including Scotland's long-standing strengths in premium food and drink products, a key export market, and the transition to technologies of the future, including our world leading position in vertical farming; and
- **Creative industries and tourism**, which draw on Scotland's long-standing cultural assets and reputation for innovation, and growing strengths in digital skills and technologies.

Early evidence suggests the Inward Investment Plan is making progress to increase the number of investment deals into sectors linked to some of these opportunity areas. Industry and sector led plans to drive growth also support these areas. However, it is too early to establish evidence for wider economic impacts (e.g. impacts on GDP, jobs and local economies).

The Scottish Government is also working on delivering on the 2020 Programme for Government commitment to create Supply Chain Development Programmes (SCDP) across key sectors of the economy. The aim is to leverage £13 billion of public sector procurement spend aligned with strategic enterprise and innovation to build resilient and strategic supply chains to support growth of industries in these opportunity areas.

This section will focus on presenting evidence on the opportunities available to Scotland in net zero transitions and environmental sustainability.

3.3.1 Renewable Electricity Generation

The Scottish Government has set a target to reduce GHG emissions by 75% reduction by 2030, and for net zero GHG emissions by 2045. While Scotland has a range of sector-specific targets and ambitions including in heat, transport, electricity, land use and industry, achieving the net zero target will require emissions reductions across all sectors of the economy. This is a challenge shared across the world. Key drivers for progress will be the pace at which society can improve energy efficiency and reduce fossil fuel usage. This requires significant investments in renewable energy in Scotland and globally, which creates vast economic opportunities for economic growth and transformation.

To date, the decarbonisation of electricity generation has been one of the main drivers for Scotland's progress towards net zero. Scotland is already a world leader in renewable energy, with the equivalent of 95.9% of gross electricity consumption generated from renewable sources in 2020. However, operating a zero-carbon electricity system requires further investment to replace thermal power stations. To illustrate the potential scale of the economic opportunity in renewable technologies, National Grid analysis estimated that 50,000 jobs in Scotland will be required in the net zero energy workforce.

Scotland currently has approximately 12 Giga Watts (GW) capacity of renewables, and this has increased by 50% in the last 5 years. Offshore and onshore wind generation have huge potential for growth to 2030 and beyond, as outlined in the Scottish Government's Offshore Wind Policy Statement, which aims for an additional 10GW offshore wind and 16GW of onshore wind by 2030. The Scottish Government's Sectoral Marine Plan for Offshore Wind Energy will partly support delivery of these ambitions, providing the framework for consenting offshore wind projects that have been awarded options for seabed leases by Crown Estate Scotland via the ScotWind leasing round.

ScotWind lease option holders have made commitments to invest around £1bn per GW in Scottish supply chain content, through the Supply Chain Development Statements required by the ScotWind leasing round. It is expected that this should result in billions worth of investment linked to ScotWind.

The UK Offshore Wind Sector Deal has a UK wide target to achieve 60% lifetime local content for offshore wind projects installed by 2030. A recent Scottish Offshore Wind Energy Council (SOWEC) study provides baseline estimates of the Scottish supply chains' performance against this target.[42] Scottish supply chains' content in Scottish projects is 44%, which is very close to the overall UK supply chains' content in UK projects of 48%. However, Scottish supply chains have only so far been able to capture less than 1% of all of the non-Scottish UK offshore wind projects – reflecting opportunities to grow beyond the Scottish market.

Table 3.3.1 - Summary of UK and Scottish content for all projects considered in the analysis

	Scottish Projects		Non-Scottish UK Projects		All UK Projects		Adjusted	
	Scottish content	UK content	Scottish content	UK content	Scottish content	UK content	Scottish content	UK content
DEVEX	66%	73%	0%	90%	38%	80%	27%	83%
CAPEX	9%	13%	1%	11%	5%	12%	4%	12%
OPEX	76%	81%	0%	80%	43%	81%	31%	81%
DECEX	30%	30%	0%	30%	17%	30%	12%	30%
Total	44%	48%	<1%	47%	25%	48%	18%	48%

Source: BVG Associates (2021). UK and Scottish content baseline and roadmap: A report for the Scottish Offshore Wind Energy Council

When adjusting for the anticipated installed UK capacity in 2030 and how it may balance between Scottish and non-Scottish UK projects, the SOWEC study estimates current share of Scottish supply chains to be around 18%.[43] While these estimates are driven by modelling assumptions, they still indicate the challenge to maximising economic benefits

[42] BVG (2021). UK and Scottish content baseline and roadmap: A report for the Scottish Offshore Wind Energy Council https://www.offshorewindscotland.org.uk/media/1580/bvga-local-content-roadmap.pdf
[43] This assumes that an annual UK market size in 2030 of 4GW; a Scottish market share in 2030 of 40%; percentage floating in Scottish projects of 25%; and, percentage floating in non-Scottish UK projects of 5%.

from growing offshore wind energy market. Scottish supply chains need to build capability and competitiveness in exportable segments of the offshore wind projects.

A BVG Associates study estimates all turbines components, foundations, substations and cables must be sourced from the UK to achieve the 60% lifetime local content target for projects installed by 2030. This would require 15 new manufacturing facilities in the UK, of which six could be located in Scotland.

3.3.2 Hydrogen Economy

The world needs to move at pace to develop other alternative fuels to displace hydrocarbons, in addition to decarbonising electricity. Currently, attention is focused on hydrogen as a future GHG emissions free alternative. Hydrogen has wide-ranging applications in:

Transport: it offers significant advantages over battery electric vehicles (BEV) in heavy vehicles such as buses, heavy goods vehicles (HGVs), non-electrified trains and ferries/ships.

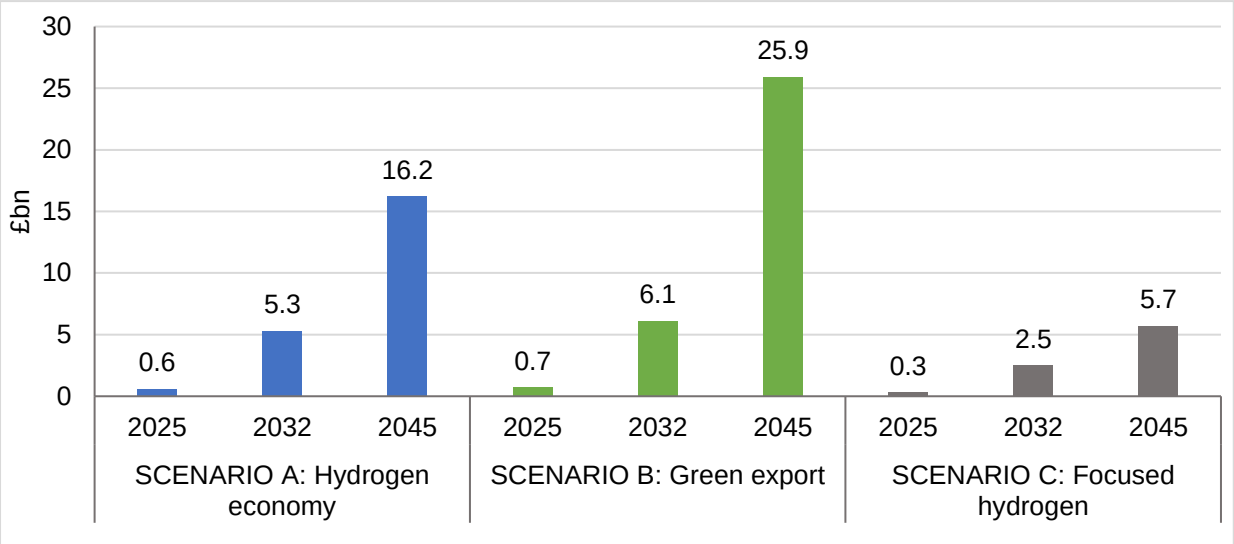
Buildings and heating: use of hydrogen in domestic, commercial and industrial space heating could play an important role alongside the use of other zero emissions heat technologies, such as heat pumps and heat networks, with existing gas distribution network repurposed for hydrogen distribution. However, this is dependent on UK Government decisions on the future of the UK gas network.

Industry and Power Generation: hydrogen use could be significantly expanded to displace fossil fuel use for high temperature heat and for the production of synthetic fuels. Industrial use could generate sufficient scale required to create blue hydrogen hubs.

A comprehensive Hydrogen Assessment[44] was undertaken in 2020, along with an Economic Impact Assessment (EIA) of three scenarios; Focused Hydrogen, Green Export and Hydrogen Economy and across the timeframes of 2025, 2032 and 2045 (see Figure 3.3.1 and Figure 3.3.2).

[44] Scottish hydrogen: assessment report - gov.scot (www.gov.scot)

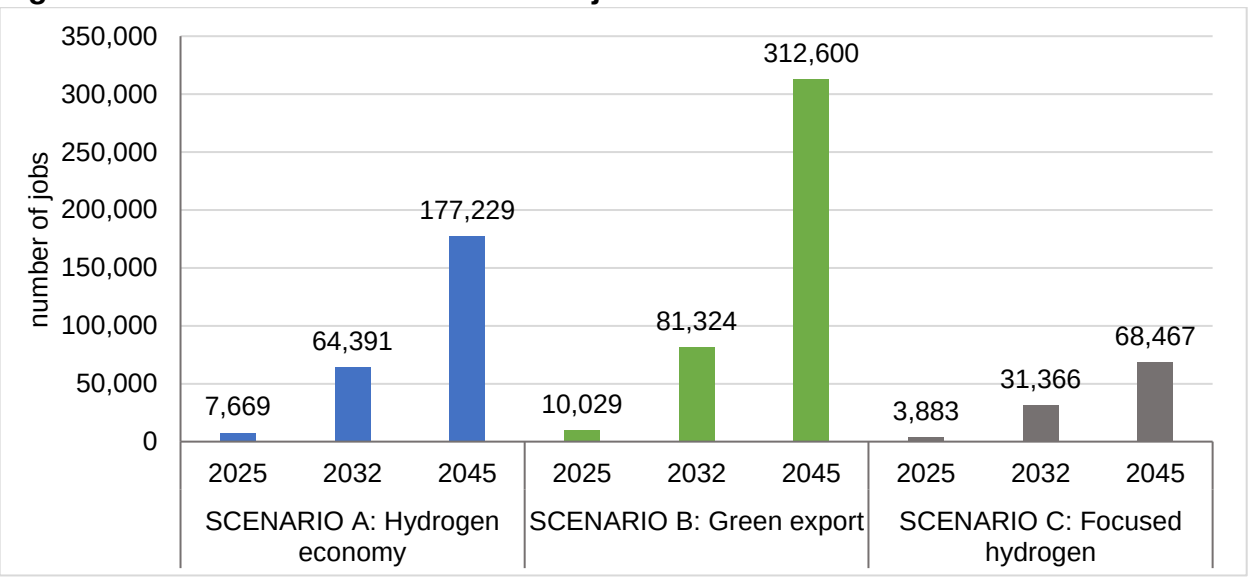
Figure 3.3.1 - Total Scottish GVA in each scenario (£billion)



Source: Scottish Hydrogen Assessment Report

The ‘Green Export scenario’ (assumes Scotland as a key exporter of hydrogen) provides the highest GVA contribution in which roughly £26 billion of value is generated by 2045. The ‘Hydrogen Economy scenario’ (less export more widespread use of hydrogen in Scotland) also makes a significant contribution in terms of GVA – generating £16 billion. The Focussed Hydrogen scenario assumes lower overall amounts of hydrogen produced and generates GVA of £5 billion.

Figure 3.3.2 - Total number of Scottish jobs in each scenario



Source: Scottish Hydrogen Assessment Report

The Green Export scenario could delivers most employment; over 300,000 jobs are either retained or created. This is followed by the Hydrogen Economy scenario, which creates a significant 177,000 jobs spread across Scotland, and the Focused Hydrogen, which supports 69,000 jobs delivering localised value in regions.

Informed by the economic assessment the Scottish Government published its Hydrogen Policy Statement in December 2020, committing to a strategic approach to the development of the hydrogen economy in Scotland, with an ambition to install 5GW hydrogen production capacity by 2030 and 25GW by 2045.

Supply Chain - the supply chains in Scotland that currently services heavy industry and the energy sector should be well positioned to support progress in the hydrogen industry. These supply chains have shown a prior ability to reshape themselves to support new industries (e.g. offshore wind). It is also clear, however, that government support for this transition will be a critical success factor and a focus on encouraging local content will be key.

There is already strong appetite from industry to develop and commercialise a hydrogen industry in Scotland. Large-scale hydrogen production features as an integral part of the recent £1 billion investment by Ineos to help decarbonise the Grangemouth industrial complex. Significant investment in comprehensive demonstration and early commercial hydrogen projects is also coming forward from key energy players in Scotland such as Scottish Gas Networks,Scottish Power Renewables and oil and gas majors such as Repsol/Sinopec and the Green Investment Group (McQuarries).

3.3.3 Heat in Buildings

Currently, heat in buildings accounts for 20% of Scotland's greenhouse gas emissions. This is in a context where 25% of households are fuel poor, and 12% are in extreme fuel poverty. As well as reaching net zero emissions by 2045, by 2040 statutory fuel poverty targets require that no more than 5% of households are fuel poor; that no more than 1% of households are in extreme fuel poverty; and that the fuel poverty gap is reduced to £250.

Scotland has made good progress in improving energy efficiency for heat in buildings, with 45% of homes now achieving Energy Performance Certificate Band C or better. Only around 11% of households have a low carbon heating system and just over half of non-domestic building stock has heating from low or zero carbon sources. To reach net zero the heating systems of over 2 million homes and almost 100,000 non-domestic buildings in Scotland will need to change by 2045. To meet the 2030 target, heating system conversions must accelerate, requiring at least 124,000 conversations annually between 2021 and 2026, and over 200,000 conversions per year in the late-2020s.

The same challenge of reducing emissions from heat in buildings is shared across the world, especially in the Northern hemisphere. This presents a large market opportunity if Scotland can make progress in developing cost-effective low or zero emissions technologies to commercialisation, and build industries to serve export markets. Such opportunities are in alternative fuels like hydrogen, heating appliances, supporting infrastructure and related supply chains.

3.3.4 Transport decarbonisation

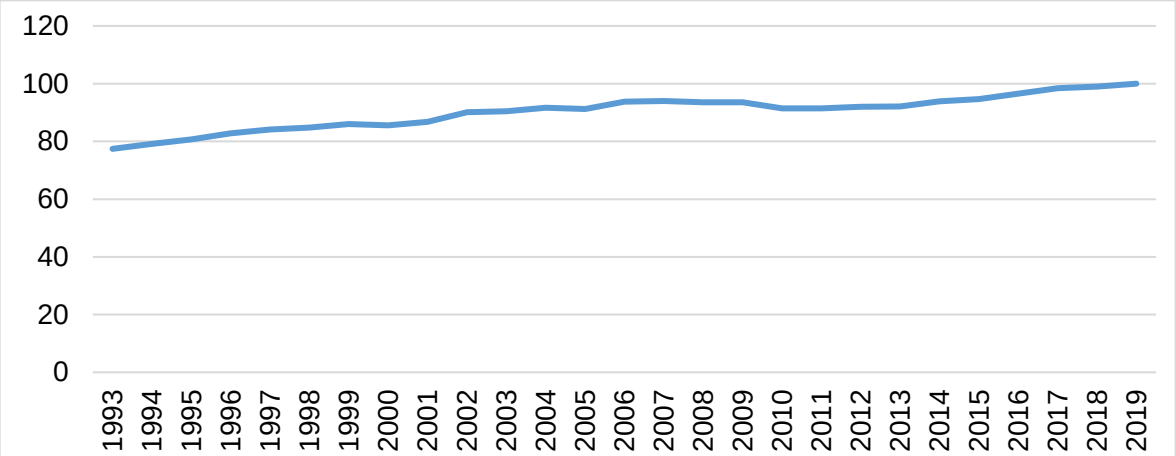
Transport continues to be Scotland's biggest emitting sector, accounting for around 29% of emissions. The derived nature of transport demand mean that where people live, work, learn and access goods and services all play a part in their need to travel. Moreover, many transport choices people make are particularly ingrained and have become habitual over time.

The climate action for transport aims to increase the share of public transport operators in the passenger market and to support active travel. The Climate Change Plan update (CCPu) includes measures that will further reduce emissions while stimulating the economy. Further, the National Transport Strategy (NTS2), which sets the direction for Scotland's transport over the next two decades, has climate action as a core priority along with reducing inequalities, helping to deliver inclusive economic growth and improving health and wellbeing.

While the decarbonisation of small passenger vehicles is progressing with electric car technologies, achieving net zero emissions in aviation, maritime and heavy goods still requires substantial investment in innovation. Extensive carbon-reduction modelling has concluded that technological solutions alone will not be enough to reach net-zero emissions. Thus, CCPu in 2020 set out a world-leading commitment to reducing car kilometres by 20 per cent by 2030. This presents economic opportunities in alternative modes of transport. Scotland is in a good position to start looking at technology and industry growth opportunities in these areas, given its comparative advantage in natural assets for establishing a hydrogen economy. The presence of a thriving aerospace engineering industry in Scotland also provides foundations for building innovation clusters for relevant technologies.

Figure 3.3.3 reflects the scale of the challenge to reverse a long-term trend of rising car use, and to reduce the economic, social, health and environmental harms of growing car use. Measures to achieve this outcome can also create transformational economic benefits – living more locally can support community wealth and improve equality of opportunity across Scotland.

Figure 3.3.3 - Index of car KM driven in Scotland, 1993-2019 (2019=100)



Source: DfT Road Traffic Statistics

3.3.5 Waste and the circular economy:

Scotland has made significant progress in the waste sector in the last 20 years by recycling over 60% of its waste and reducing the amount of waste that goes to land fill to its lowest since records began. In 2018, the waste and resources sector emissions were over 70% lower than in 1998. However, achieving full circular economy milestones will require further effort to reduce and recycle waste, including:

- ending landfilling of biodegradable municipal waste and significantly reducing food waste;
- accelerating efforts to address legacy emissions from closed landfill sites; and
- ensuring a more rapid transition to a fully circular economy in Scotland.

There is an opportunity to build a fully circular economy in Scotland that can stimulate job creation. Research has shown that 10,000 tonnes of waste can create one job in incineration, 6 jobs in landfill, 36 jobs in recycling or up to 296 jobs in repair and reuse. Building a circular economy at a scale needed to tackle climate change and global resource scarcity requires change from all sectors of the economy. Designers, manufacturers and consumers all have a role to play in ensuring that move to circular economy delivers economic opportunities for Scotland. Transformational circular economy opportunities are varied, and they include in the following areas:

- domestic reprocessing of materials;
- circular energy infrastructure; and,
- construction supply chains.

3.3.6 Land use, land use change and forestry:

Scotland's land has capacity to deliver nature-based solutions to climate change, including through increased tree cover, restoration of degraded peatland and infrastructure to help with adaptation. With significant increases in tree cover and widespread peatland

restoration, Scotland can reduce emissions, increase carbon sequestration, enhance and protect our biodiversity, improve flood mitigation and climate adaptation, and support new jobs as part of a green recovery.

Recent years have seen some progress in these areas. Around 22,000 hectares of new woodlands were planted in the last two years, and over 25,000 hectares of peatland have been put on the road to restoration. However, around 80% of Scotland's peatlands are still degraded and Scotland remains heavily deforested compared to many other European countries. Net zero land use transformation in Scotland is estimated to require £12 billion of investment (UKCCC). This is attracting interest from private investors.

The forestry industry has already identified opportunities to increase the quantity of renewable natural wood and wood products used in Scotland, especially in construction where it can displace other non-renewable energy intensive building materials. The use of more wood and wood products will help to store carbon in some products for 100 or more years and so help to meet Scotland's climate change target of net zero emissions by 2045.

3.3.7 Blue Economy

Many of the opportunities identified above, including in renewable energy generation and the hydrogen economy, will contribute to Scotland's Blue Economy. The Blue Economy approach will help ensure our that our seas are clean, healthy, safe, productive and biologically diverse and managed to meet long term needs of nature and people. It will also offer further opportunities to grow Scotland marine related industries, notably in aquaculture, oil and gas decommissioning and the maritime industries.

Aquaculture

Scotland exported £868 million of seafood in 2020, of which Scottish salmon accounted for £450 million. The extensive use of technology in aquaculture means it is producing highly skilled jobs in some of Scotland's remote coastal and island communities. GVA per worker in the Scottish aquaculture sector was £107,000 in 2018 , with the average wage in salmon production at £38,000. The trend towards high skilled jobs in the sector will continue with further technological progress.

Oil and Gas Decommissioning

The UK Continental Shelf (UKCS) is the largest decommissioning market in the North Sea. The Oil and Gas Authority estimates that UK annual decommissioning expenditure in 2018 amounted to £1.45 billion, having risen year-on-year from 2015.[45] This represents around 9 per cent of total expenditure in the basin in 2018, compared to 2 per cent in 2010. The Oil and Gas Authority reports that the total cost of decommissioning remaining UK offshore oil and gas production, transportation and processing infrastructure to be around £49 billion.[46] This presents huge economic opportunity for Scotland's oil and gas service industry.

[45] https://www.ogauthority.co.uk/media/5382/oga_projections-of-uk-oil-and-gas-production-and-expenditure.pdf
[46] https://www.ogauthority.co.uk/media/5906/decommissioning-estimate-cost-report-2019.pdf

However, a competitive oil and gas decommissioning industry in Scotland will demand infrastructure and world class Scottish supply chains. This demands upgrade of economic infrastructure in many areas, including ports and skills.

Maritime Industries

Scotland has a legacy in maritime industries and there are areas of opportunity emerging for countries like Scotland. As noted above, the need to decarbonise maritime transport presents huge opportunities for Scotland to lead in developing net zero fuels and technologies to power the global shipping industry. The maritime industry will also play an important role in growing Scotland's hydrogen economy through trade.

There are also other niche, but high-value opportunity areas, including technologies for handling ship ballast water to stop the spread of non-native invasive species, which can be a source of ecological, economic and public health harms. The Ballast Water Management Convention, which came into force in September 2017, seeks to tackle the spread of non-native invasive species from discharge of ballast water.

More than countries, representing more than 70% of world merchant shipping tonnage, have ratified the Convention.[47] The Convention will determine the waters that ships can enter and the market they can serve, if their flag country has not implemented the convention. To implement the convention ships are required to install ballast water management systems, creating a new global market worth for maritime engineering businesses.[48]

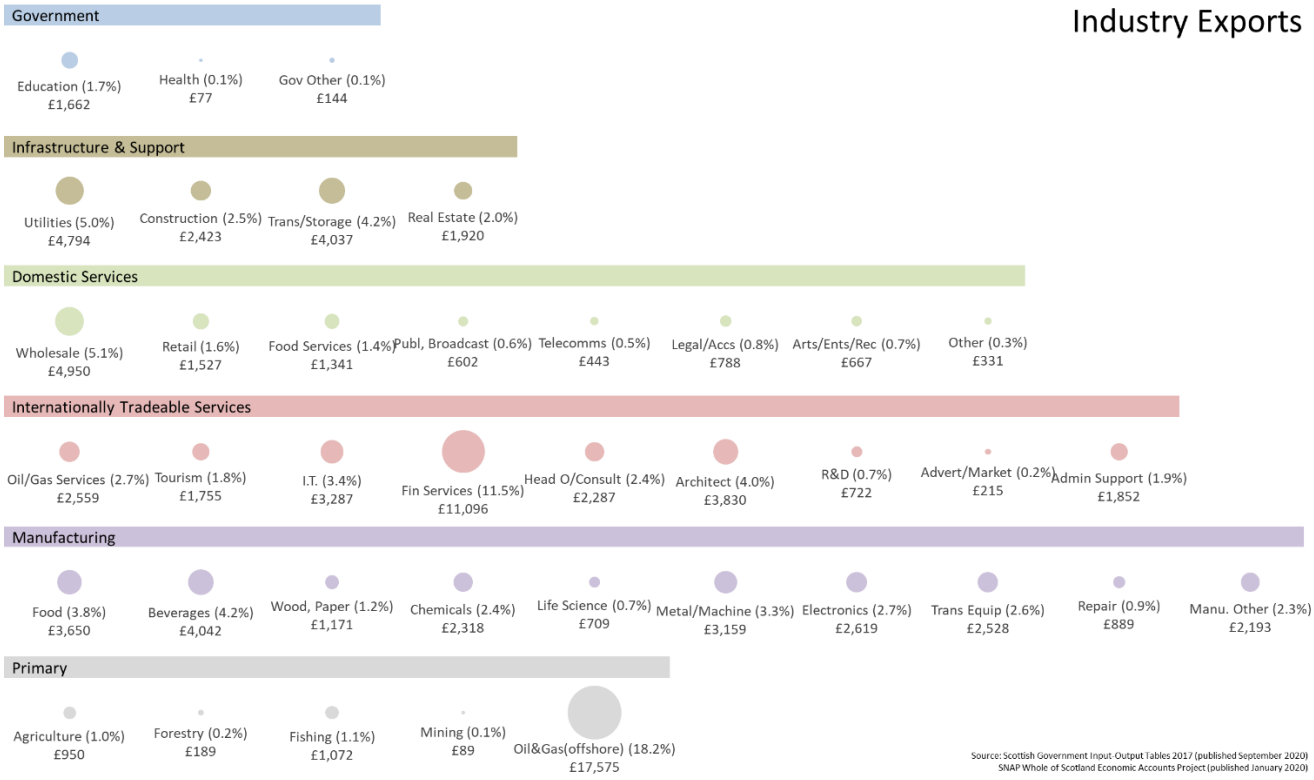
3.3.8 Export Markets

Accessing international markets provides greater opportunities for businesses to grow. Exposure to international competition can also drive productivity growth. To realise the wider economic and societal benefits from export markets, the Scottish Government and its partners are delivering the export growth plan – Scotland: A Trading Nation - A plan for growing Scotland's exports.[49] It sets direction for growing Scotland's exports and focuses resources and policies for export promotion. While progress has been made in the implementation of the Export Growth Plan, evidence of impact is still to emerge.

Figure 3.3.4 shows the level of exports vary considerably across Scotland's industries – mainly reflecting the extent to which their output is tradable and their competitiveness on international markets.

[47] International Maritime Organisation
[48] https://www.hexaresearch.com/research-report/ballast-water-treatment-systems-bwts-market
[49] https://www.gov.scot/publications/scotland-a-trading-nation/

Figure 3.3.4 Value of Scotland's Exports by Industry, 2017



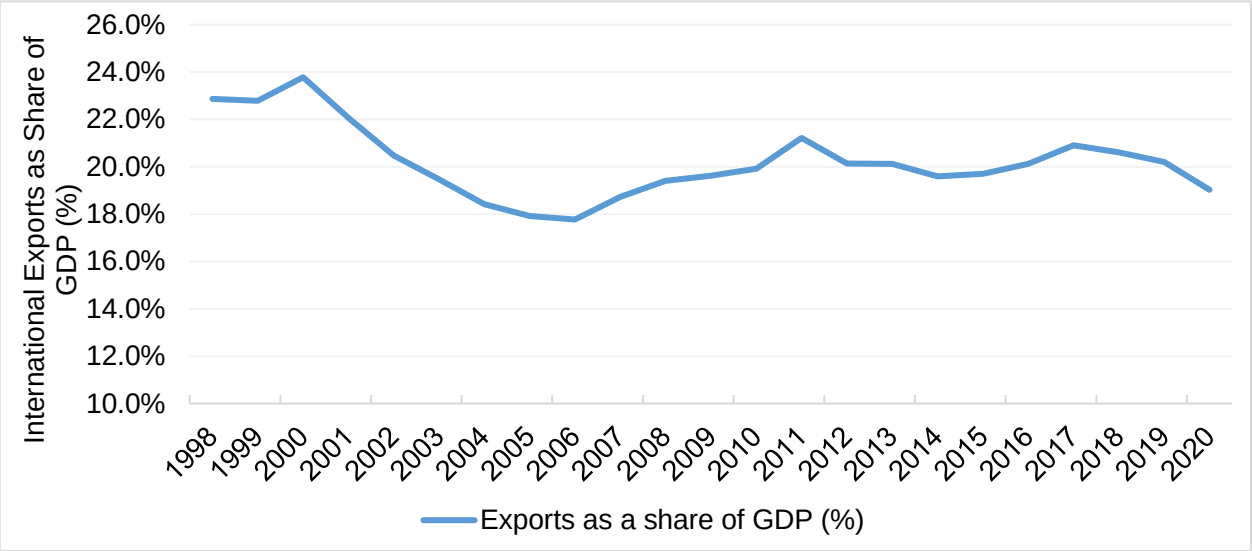
3.3.8.1 Scotland's Performance in Export Markets

HMRC Regional Trade Statistics put Scotland's international goods exports at £26.6 billion for 2020 (down from £33.8 billion in 2019) accounting for 9% of the UK's total goods exports by value. Since 2013, Scotland's international goods exports as a proportion of the UK have fallen from 11% to 9% in 2020. HMRC OTS data[50] also show a similar decline for UK non-EU exports from Scottish ports, as a share of total UK ports, from around 9% in the early 2000s to 5% in 2020.

While the value of Scotland's international exports has increased over the last 20 years, it has fallen as a proportion of GDP. Over the same period, however, many similar sized nations have increased their share of exports in GDP. This general trend suggests Scotland has not been internationalising at the same pace as its competitors with respect to trade. Latest data shows that the share of exports in GDP dropped below 20% for the first time since 2015, reflecting the impact of the COVID-19 pandemic on global markets – see Figure 3.3.5.

[50] HMRC Overseas Trade Statistics data only includes port information for UK exports to non-EU countries up until the end of the transition period on 31st December 2020, as the data is based on customs declarations. From 1st January 2021, port data will also be available for UK to EU exports.

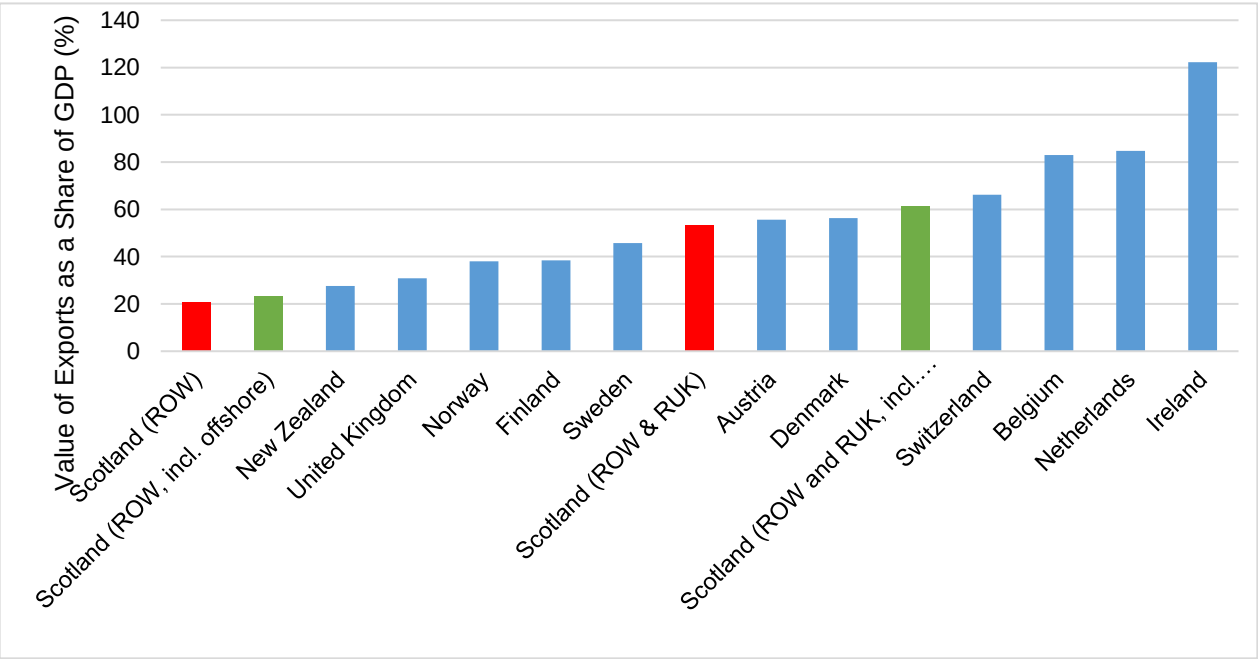
Figure 3.3.5 - Scottish International Exports as a share of GDP, 1998-2020 (%)



Source: GDP Quarterly National Accounts (Scotland), 2021 Quarter 1

Figure 3.3.6 shows Scotland's exports performance relative to other small advanced economies in 2018. It shows that Scotland underperforms on this measure, even when including exports from production onshore and in Scottish waters, and both international exports and exports to the rest of the UK. However, Scotland's export performance would have been shaped by the fact that it is part of a much bigger UK market.

Figure 3.3.6 - Exports as a percentage of GDP; selected small, advanced economies, 2018

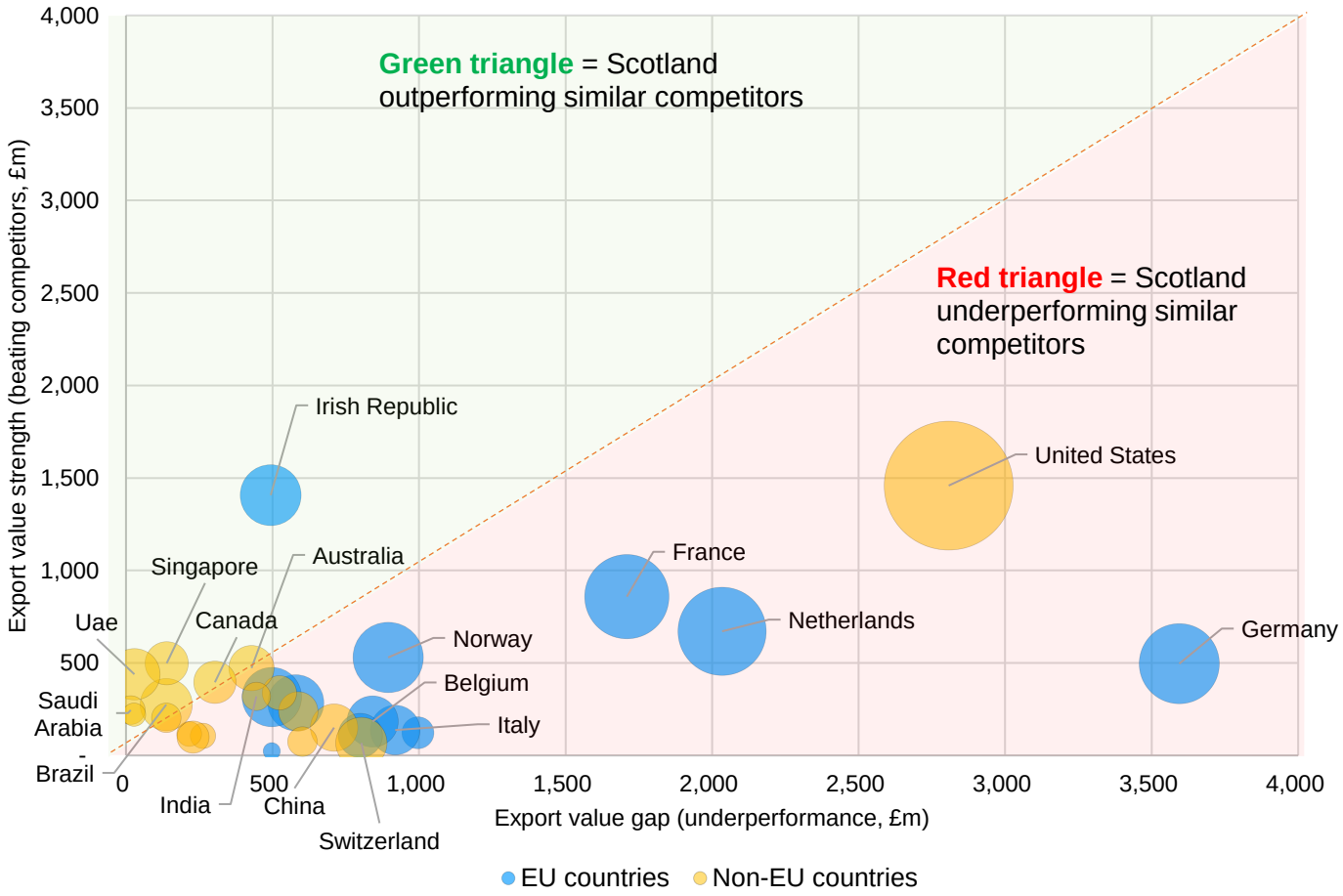


Source: Scotland's Export Growth Plan: Methodology Note, OCEA

Figure 3.3.7 shows that Scotland outperforms competitor countries in only a few product markets; only Ireland when looking at the EU market and a handful of non-EU markets – Australia, Canada, Singapore, Saudi Arabia and Brazil. Figure 3.3.8 shows that Scotland's

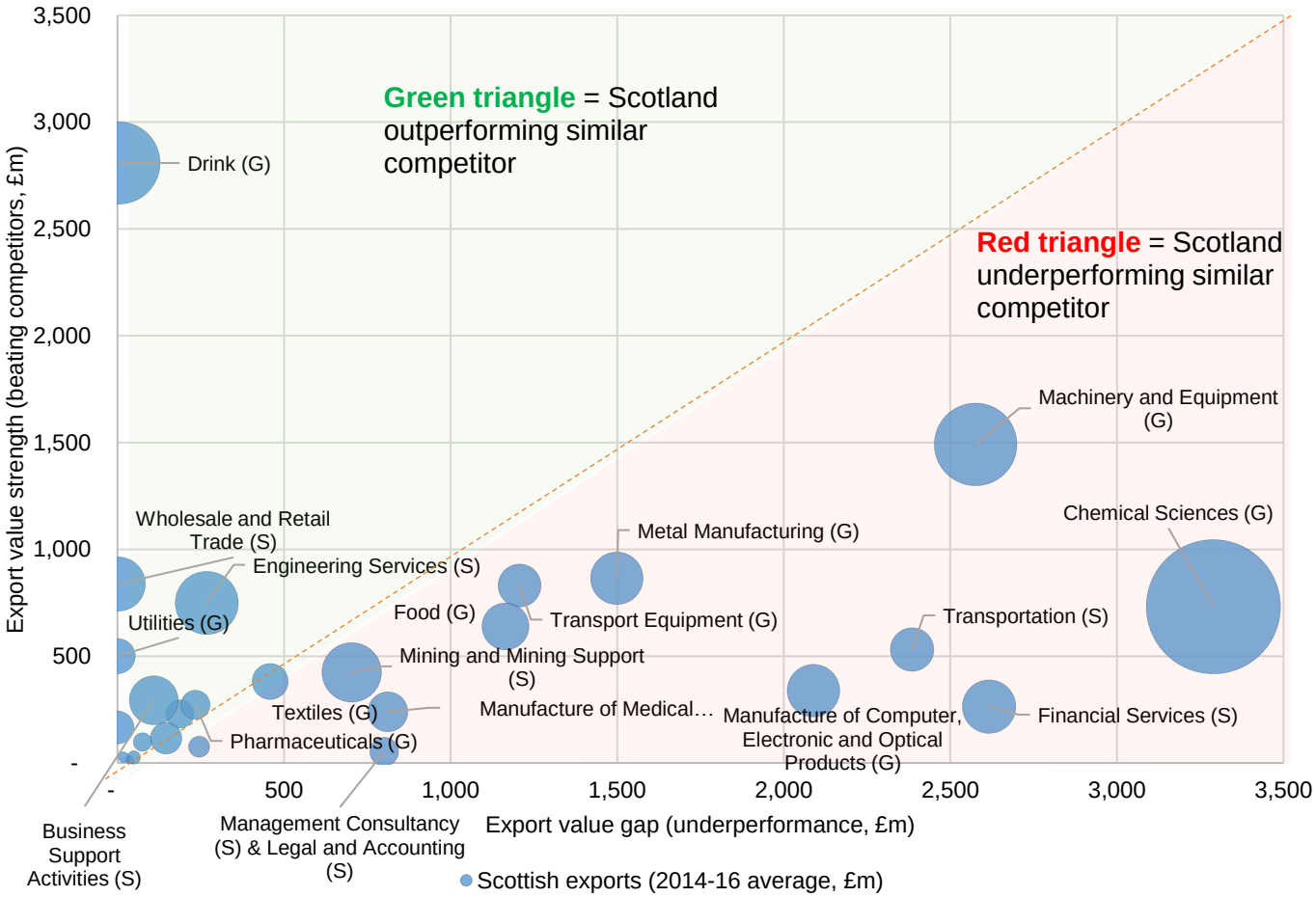
export revealed competitiveness is concentrated mainly in a handful of sectors – the drinks industry, wholesale and retail, engineering services, utilities and business support.

Figure 3.3.7 - Scotland's trade performance in key markets



Note : size of bubble = value of Scotland's exports to country, 2014-16 average

Figure 3.3.8 - Scotland's trade performance by economic sector



Source: OCEA calculations based on HMRC RTS, Export Statistics Scotland 2017 and UN COMTRADE

Scotland's goods exports are largely concentrated in the South West of Scotland and East of Scotland, although all the regions have seen growth since 2016 with the exception of North Eastern Scotland.[51] The North Eastern economy exports are predominantly in oil and gas industries and machinery industries. Scotland's trade in services is also concentrated regionally.[52] Financial and insurance activities account for the largest service industry exports in Glasgow, Edinburgh and South East city regions. [53] Professional, scientific and technical activities dominated services exports in the Aberdeen city region.

[51] A detailed illustration and definition of the UK NUTS classification for Scotland can be found here nuts-map-UK.pdf (europa.eu). The regions are defined as follows: **South Western** – East Dunbartonshire, West Dunbartonshire, Helensburgh & Lomond, Dumfries & Galloway, East Ayrshire and North Ayrshire mainland, Glasgow City, Inverclyde, East Renfrewshire and Renfrewshire, North Lanarkshire, South Ayrshire, South Lanarkshire; **North Eastern** – Aberdeen City and Aberdeenshire; **Eastern** - Angus and Dundee City, Clackmannanshire and Fife, East Lothian and Midlothian, Scottish Borders, Edinburgh City, Falkirk, Perth & Kinross and Stirling, West Lothian; **Highlands and Islands** - Caithness & Sutherland and Ross & Cromarty, Inverness & Nairn and Moray, Badenoch & Strathspey, Lochaber, Skye & Lochalsh, Arran & Cumbrae and Argyll & Bute, Eilean Siar (Western Isles), Orkney Islands, Shetland Islands.

[52] ONS International trade in services by subnational areas of the UK: 2018

[53] Scottish City Deals regions include Aberdeen, Edinburgh and South East Scotland, and Glasgow

Figure 3.3.9 - HMRC Regional trade in goods statistics disaggregated by smaller geographical areas: 2016- 2019 (1)

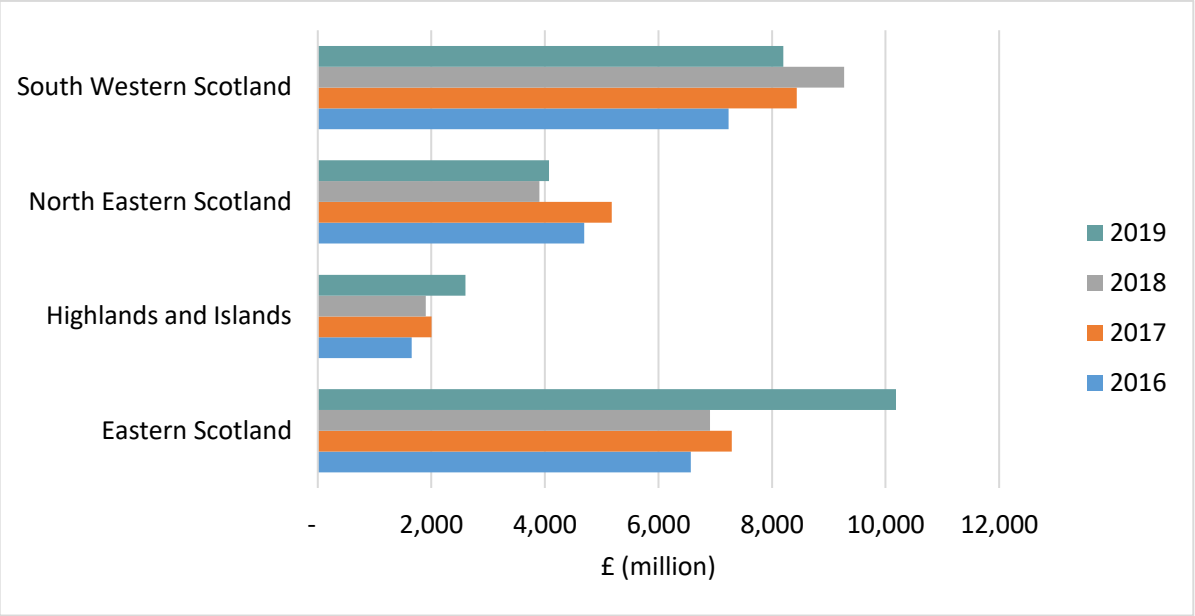
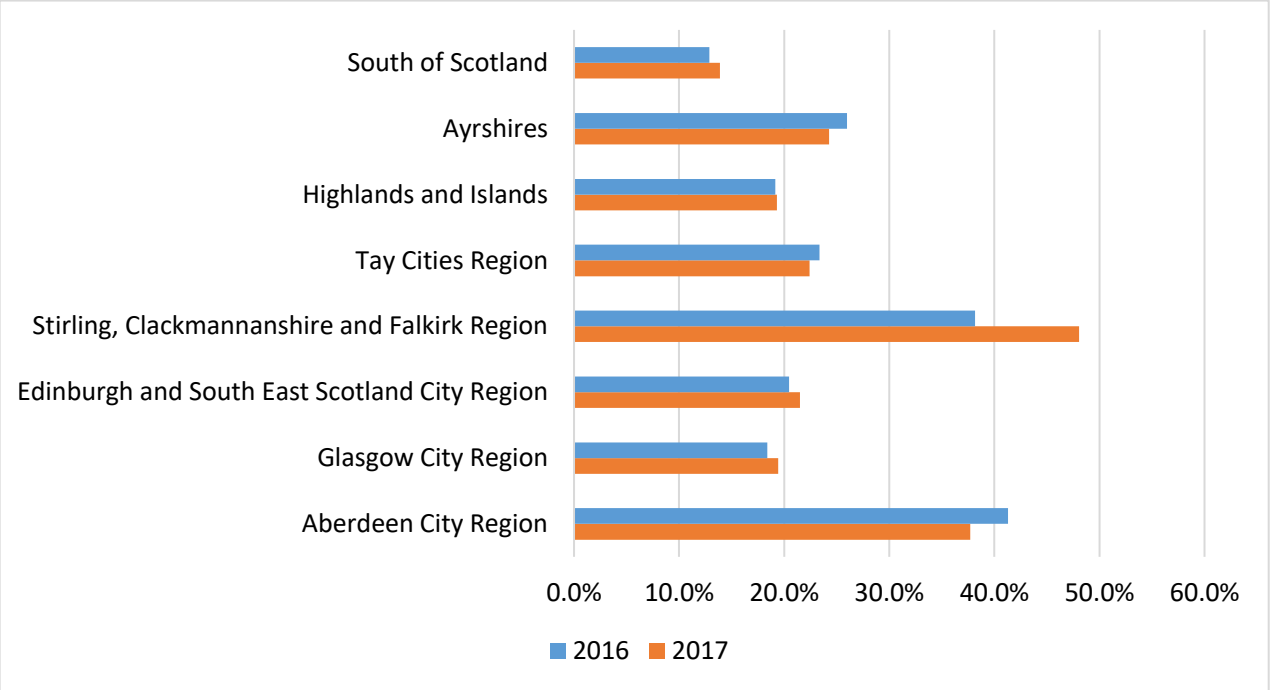


Figure 3.3.10 - HMRC Regional trade in goods statistics disaggregated by smaller geographical areas: 2016- 2019 (2)



3.3.9 What the evidence tells us we need to address

Scotland has demonstrable strengths in many of the industries of the future with high potential for economic transformation if it can make progress in establishing industries to serve new markets linked to net zero transitions and wider technological developments.

Evidence from offshore wind energy industry suggests that Scotland has not always maximised on its economic opportunities. Supply chain development has not matched the opportunities available in Scotland, the rest of the UK and internationally. It is important therefore that approach to other emerging or new markets draws lessons from the offshore wind development where there are now efforts to bolster Scotland's supply chains capacity. This will require investment in skills, private capital, infrastructure and innovation to grow capacity and competitiveness.

While Scotland has grown its international exports over the past 20 years, their value as a share of GDP has remained broadly static and remains low relative to comparable small advanced economies. Scotland's exports are heavily concentrated. Our top five sectors account for 69% of export value. Scotland outperforms its peers in only a few key markets and sectors.

NSET responds to this evidence through the following Projects:

- Project 11: Adapt the Education and Skills System to Make it more Agile and Responsive to our Economic Needs and Ambitions
- Project 5: Build on Scotland's Strengths to Win an Ever Greater Share of Domestic and International Market Opportunities
- Project 6: Support the Development of Scottish Supply Chains, Laying the Foundations of a Net Zero Industrial Strategy
- Project 7: Attract and Deploy Significant Domestic and International Private Investment in Scotland (Shaping Scotland's Economy: Inward Investment Plan &
- Investing with Purpose: Global Capital Investment Plan)
- A Trading Nation - A Plan to Grow Scotland's Exports

3.4 Entrepreneurial people and culture

Performance at a glance

Entrepreneurship	
Business creation: Total Early-stage entrepreneurial activity rate (TEA)	7.3% (2020)
Business survival: Start-up business 3-year and 5-year survival rate	57% (3 Year) (2016) 42% (5 Year) (2014)
Business growth: Proportion of high growth businesses in total registered businesses with 10 or more employees	3.9% (2020)
Total Early-stage entrepreneurial activity rate (TEA) Gender Gap	4 percentage point (2020)

Businesses are the engine of any economy. Thriving and growing economies need a dynamic and innovating business base. Scotland has a smaller business base when

compared to the rest of the UK and internationally. For example, to be in the UK regions' top quartile for the number of registered businesses per 10,000 population, Scotland would need to create 60,000 more businesses (grow the current base by 35%). However, it is not only the size of the business base that matters, the quality and diversity of businesses is important.

A central driver for a growing, innovating and dynamic business base is entrepreneurship; the ability to identify business opportunities and to translate them into viable business propositions that deliver economic impact and desirable social and environmental change. Entrepreneurship is diverse, spanning lifestyle businesses, social entrepreneurship, high growth, scale-ups, intrapreneurship within established companies and possibly other forms. However, an entrepreneurial mind-set of aspiration and ambition drives all of them.

Entrepreneurship is also important for driving productivity growth. The general view is that new entrants into industries can drive productivity growth through the creation of new technology and processes that diffuse across the economy. Furthermore, entrepreneurship can drive 'creative destruction' whereby incumbent firms are displaced and resources are reallocated to improve overall economic efficiency and leading to long-term productivity growth.

A number of policy initiatives are already in place to ensure Scotland realises it full entrepreneurship potential. These include Unlocking Ambition and Scottish EDGE. The Women in Enterprise Framework and Action Plan or the Women's Business Centre support women to start their own businesses. These interventions are delivering in many cases, but are still at early stages of delivery to assess their full impact. For example, there is evidence to suggest that Youth Enterprise Scotland is having some impact; the business start-up rate for the 18-29 age group has been rising over time and is now the highest (9.7%) within the UK home nations.[54] However, Scotland still has a significant gap to close if it is to match the overall performance of other small advanced economies.

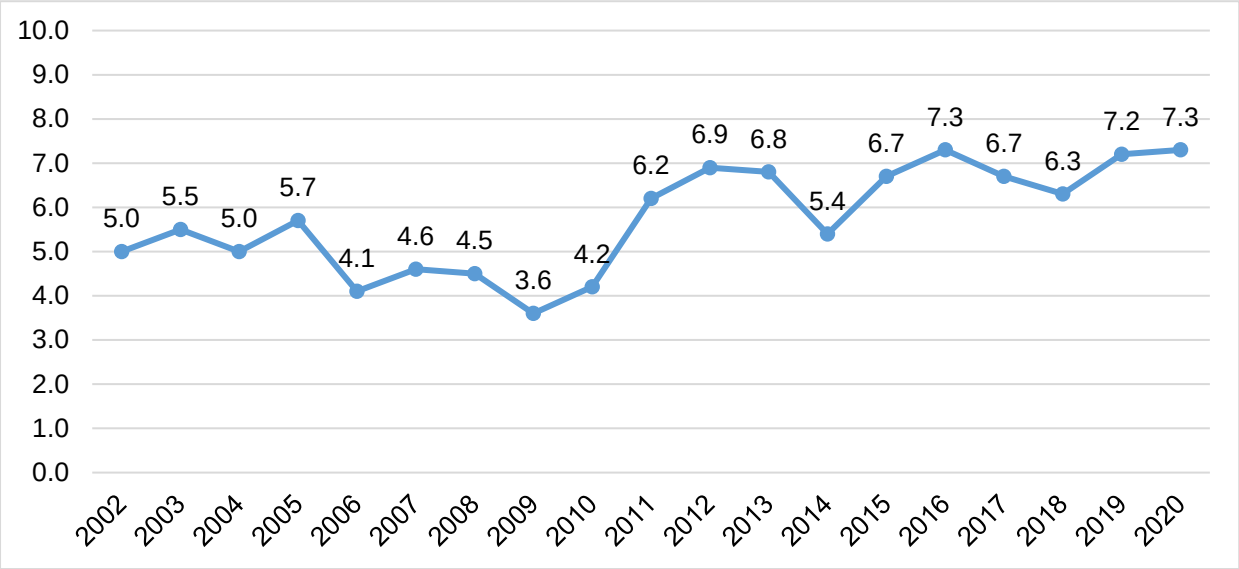
This section provides evidence on Scotland's performance on three phases of the business life cycle – business creation, business survival and business growth.

3.4.1 Business Creation

The National Performance Framework (NPF) tracks Scotland's business creation using the indicator: Total Early-stage Entrepreneurial Activity (TEA) rate. TEA measures the proportion of the working age population that is actively trying to start a business or that own or manage a business, which is less than 3.5 years old. On this measure, Scotland's entrepreneurial activity has gradually improved over time. However, Scotland's TEA rate remains significantly below that of other advanced economies, including the rest of the UK (see Figure 3.4.1).

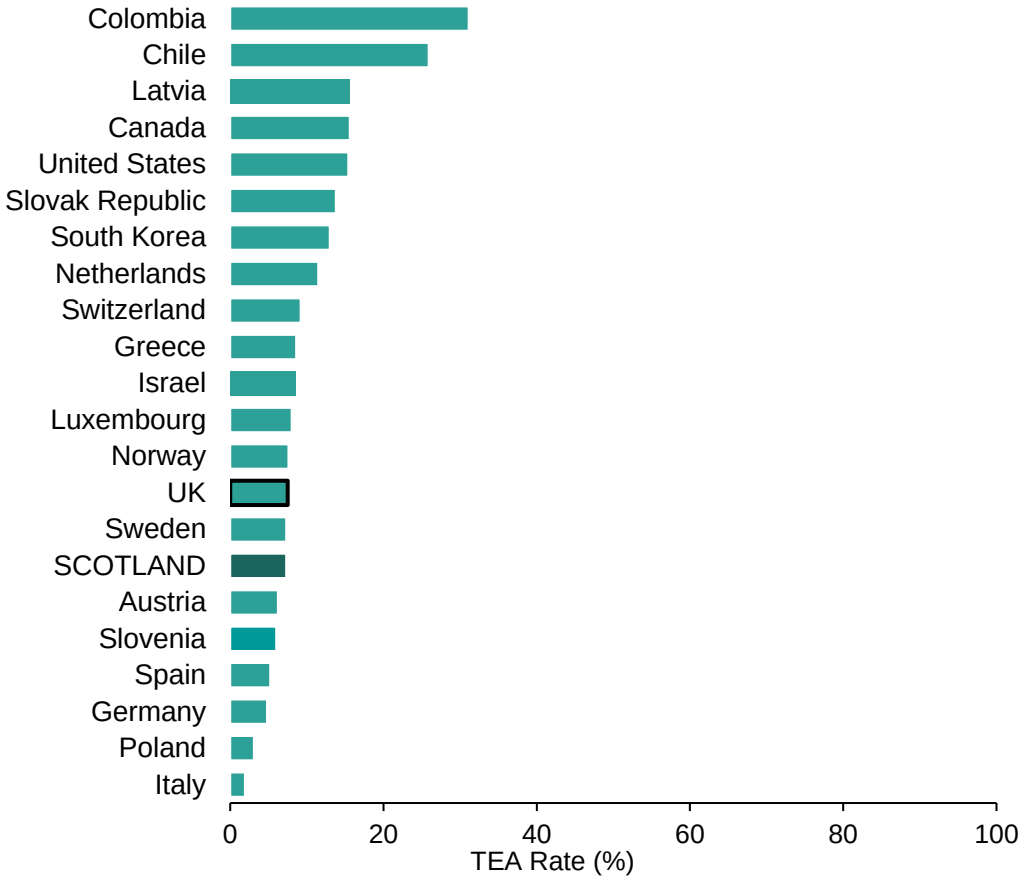
[54] Due to volatility in the annual figure this is the 2018-2020 three year rolling average.

Figure 3.4.1 - Scotland's Total Early-stage Entrepreneurial Activity (TEA) rate



Source: Global Entrepreneurship Monitor

Figure 3.4.2 - Total Early-stage Entrepreneurial Activity (TEA) rate across Selected OECD Countries, 2020[55]



Source: Global Entrepreneurship Monitor

[55] Global Entrepreneurship Monitor. Ireland is not included in chart – 2020 data not yet published.

Scotland needs to increase its TEA rate by around 70% if it is to match the performance of other small advanced economies like Ireland. To illustrate, the latest published 2019 TEA rate for Ireland was 12.4%, compared to 7.2% in Scotland in the same year.

Box 3.4.1 – Lessons from Entrepreneurship in Ireland

The Global Entrepreneurship Monitor (GEM) research for 2019 shows that Ireland stands out on the level of 'latent entrepreneurs' among its population. One in five people in Ireland aspire to start a business in the next three years, compared to one in twelve in Scotland. On this indicator, Ireland is ranked fourth in Europe (of 15) and tenth across the OECD (of 24).

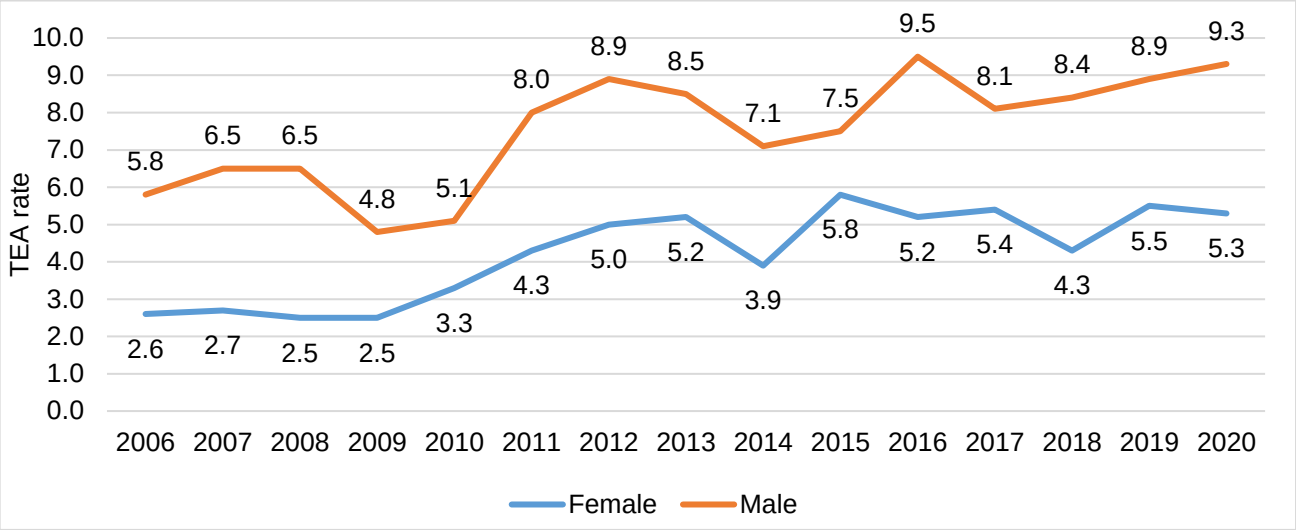
- In 2019, 18.9% of adults in Ireland deemed themselves to be aspiring entrepreneurs compared to 9.9% for the UK.
- In 2012, Ireland's TEA rate was 6.3% compared with 9.0% in the UK. Based on 2019 data, Ireland has overtaken the UK (see above).
- Ireland's strong performance on business creation however varies across equalities groups. For example, Ireland's TEA gender ratio (male TEA rate: female TEA rate) is 1.8 compared to 1.7 for the UK and Scotland and an OECD average of 1.5.
- When looking at motivation for starting businesses, early stage entrepreneurs in Ireland are more likely (69%) to report a desire to continue a family tradition compared to the UK (6%).

The relationship between start-ups and economic success is, however, much more complex. Countries with the highest TEA rates globally are low-income countries, reflecting unrealised entrepreneurship opportunities. TEA rates generally tend to be lower in advanced economies, and indeed some of the stronger advanced economies have much lower TEA rates. For example, Germany has a low TEA rate among advanced economies yet it has a strong performing economy. Some start-ups can also be precarious and associated with low wages and low productivity.

Men dominate Scotland's businesses creation despite the fact that half of people approaching Business Gateway (Scotland's publicly funded business advisory service) are female. While Scotland's TEA rate for women has risen over time, it remains lower than that for men (Figure 3.4.3). The business base also reflects this. In 2020, only 17% of SMEs in Scotland with employees and 20% of sole traders were women-led. This is broadly in line with the UK as a whole (16% and 21%).[56]

[56] Small Business Survey Scotland. Defined as being controlled by a single woman or having a management team of which a majority were women. Difference with UK is not statistically significant.

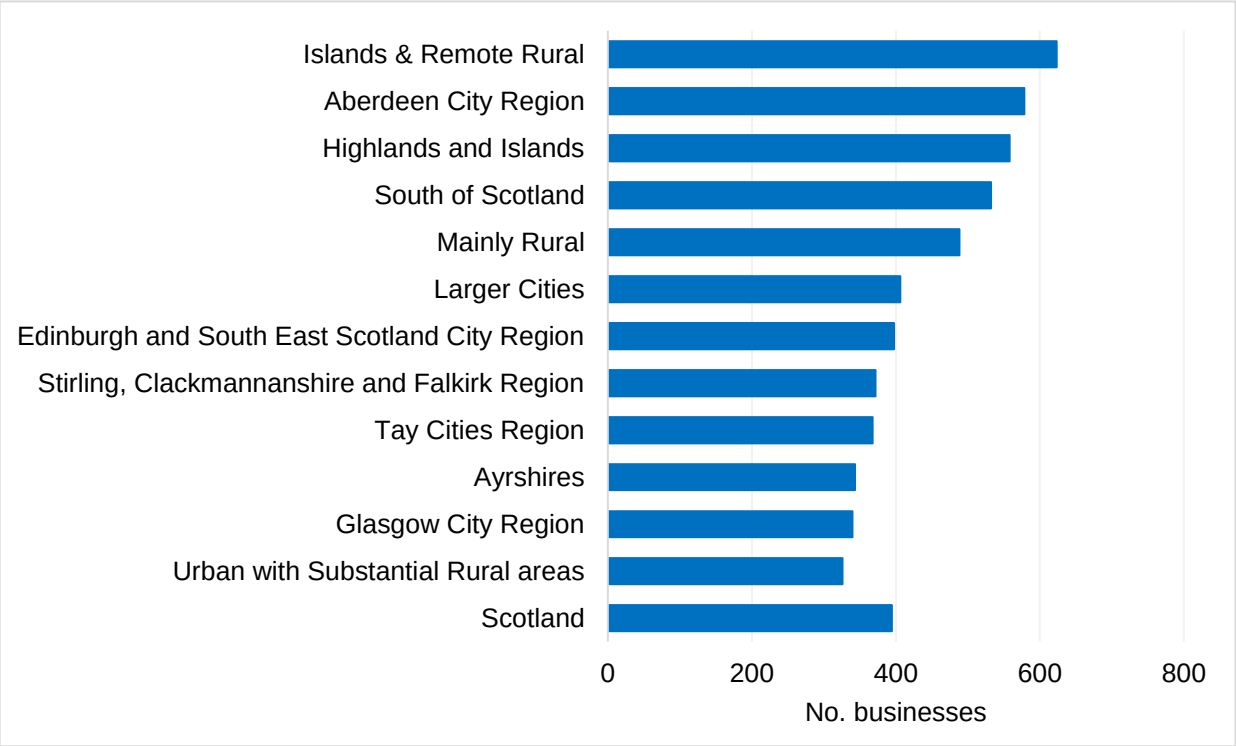
Figure 3.4.3 - Scotland Total Early-stage Entrepreneurial Activity (TEA) by Gender, 2006 to 2020



Source: Global Entrepreneurship Monitor

Analysis by ethnicity shows a TEA rate of 12.95% amongst Scotland's non-white population. Given the overlap between ethnicity and migration, this chimes with recent evidence from the Federation of Small Business on the importance of immigrant led businesses to Scotland's economy. However, this may be partly necessity entrepreneurship due to less favourable labour market outcomes for minority ethnic populations.

Figure 3.4.4 - Number of Business in Scotland per 10,000 adults by region, 2020

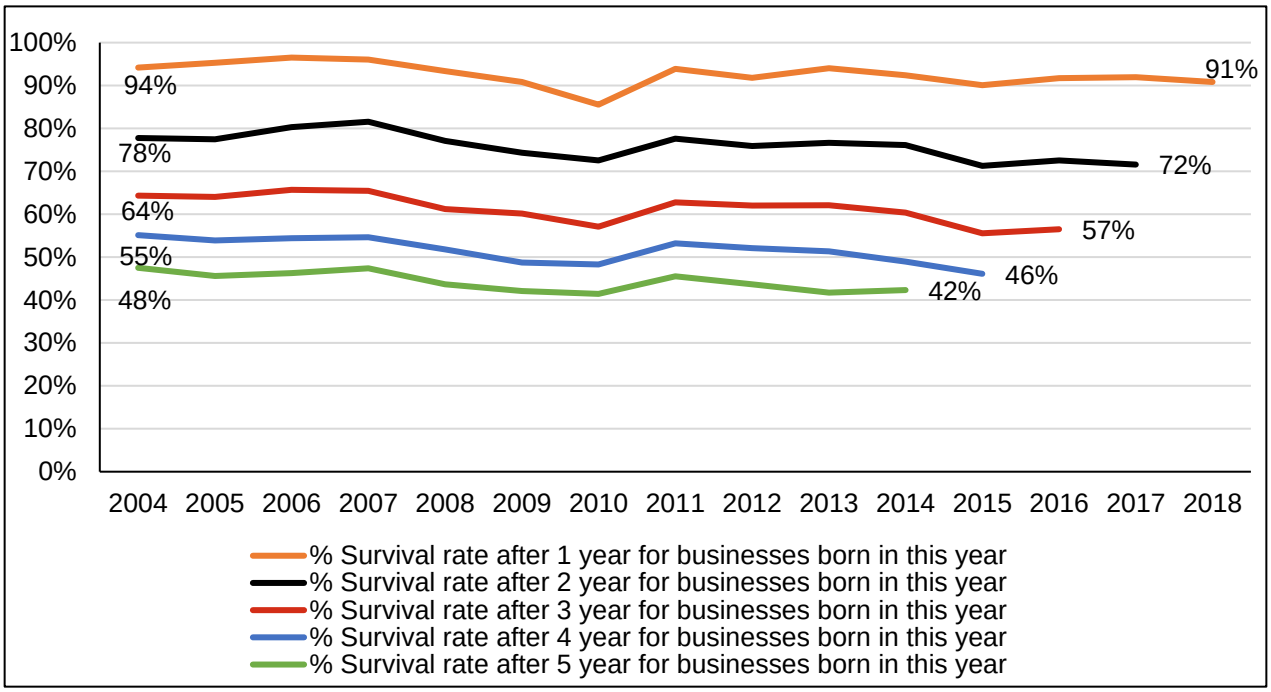


Source: Scottish Government

3.4.2 Business Survival

Survival rates for business start-ups in Scotland have generally declined over time (see Figure 3.4.5). While more businesses have been starting in recent years, more have stopped trading at an earlier stage. Based on 2004 to 2018 data, 57% of Scotland's start-ups survived to 3 years and 42% survived to 5 years.

Figure 3.4.5 - Start-up Survival Rate in Scotland by year of birth, 2004 to 2018

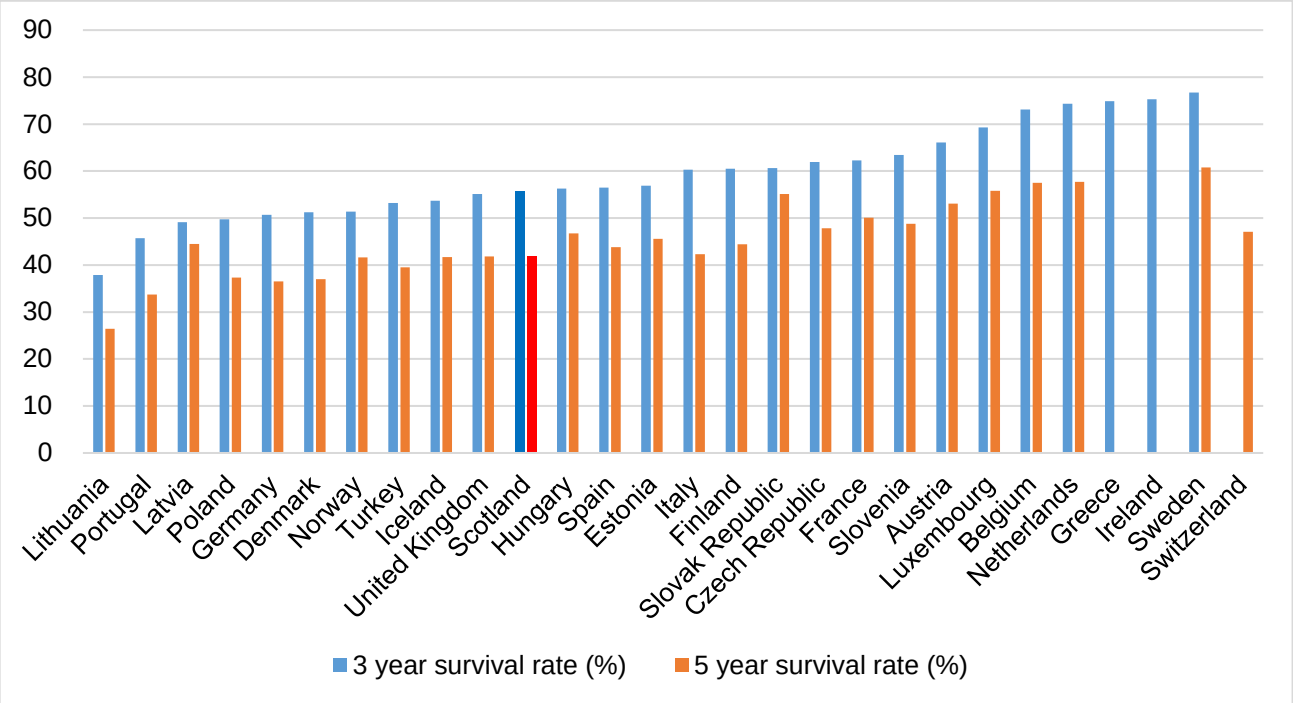


Source: ONS Business Demography

Compared to other advanced OECD economies, the start-up survival rate in Scotland appear to be much lower. Across the OECD in 2018, the best performing countries on 3 years start-up survival rates included Sweden (76.7%), Netherlands (74.3%), Ireland (75.3%) and Belgium (73.1%). The 5 year start-up survival rate is highest in Sweden (60.8%); Netherlands (57.7%) and Belgium (57.5%), compared to the UK rate of 42%.

While there is no Scottish target for start-up survival rate, there is a significant gap to close if Scotland is to match the best performing advanced economies. For instance, to match the best performing OECD countries, Scotland would need to raise its 3-year and 5-year business survival rate by around 20 percentage points. It must be borne in mind, however, that in a thriving economy a degree of churn in the businesses base reflects dynamism, and it is important to drive innovation and to reinvigorate the economy.

Figure 3.4.6 - 3-Year and 5-Year Survival Rate: Scotland compared with OECD Countries, 2018



Source: OECD Business Demography Indicators

3.4.3 Business Growth

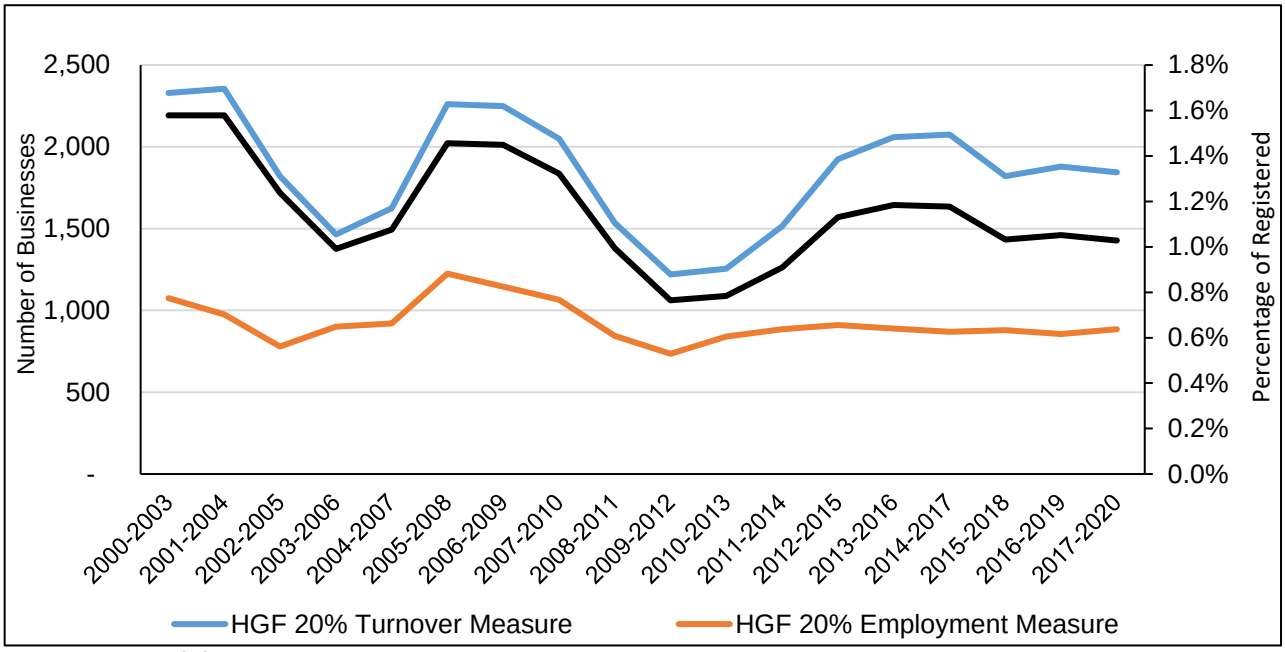
Not all start-ups that survive will grow or scale up. Others may find their growth is constrained, for example, by the market, by limited access to talent, constraints on investment and leadership capacity.

The ScaleUp Institute has estimated that while high-growth firms represent less than 1% of UK companies, they generate £1.1 trillion in turnover, equivalent to 50% of the total turnover among SMEs.[57] Other research finds that high-growth firms generate over 80% of net employment growth, and they are 24% more productive than other small firms.[58] These findings have encouraged a particular policy focus, including in Scotland, on start-ups that have the potential to scale-up.

The growth trajectories for firms can however be "episodic" which makes it difficult to define high-growth firms.[59] Additionally, it is not always apparent how best to treat micro-enterprises. Using the OECD high-growth (scale-up) definition,[60] there were 2,190 such firms in Scotland in 2020 that employed 220,562 people and with a turnover of £21.5 billion. The number of high-growth businesses in Scotland has declined since 2014.

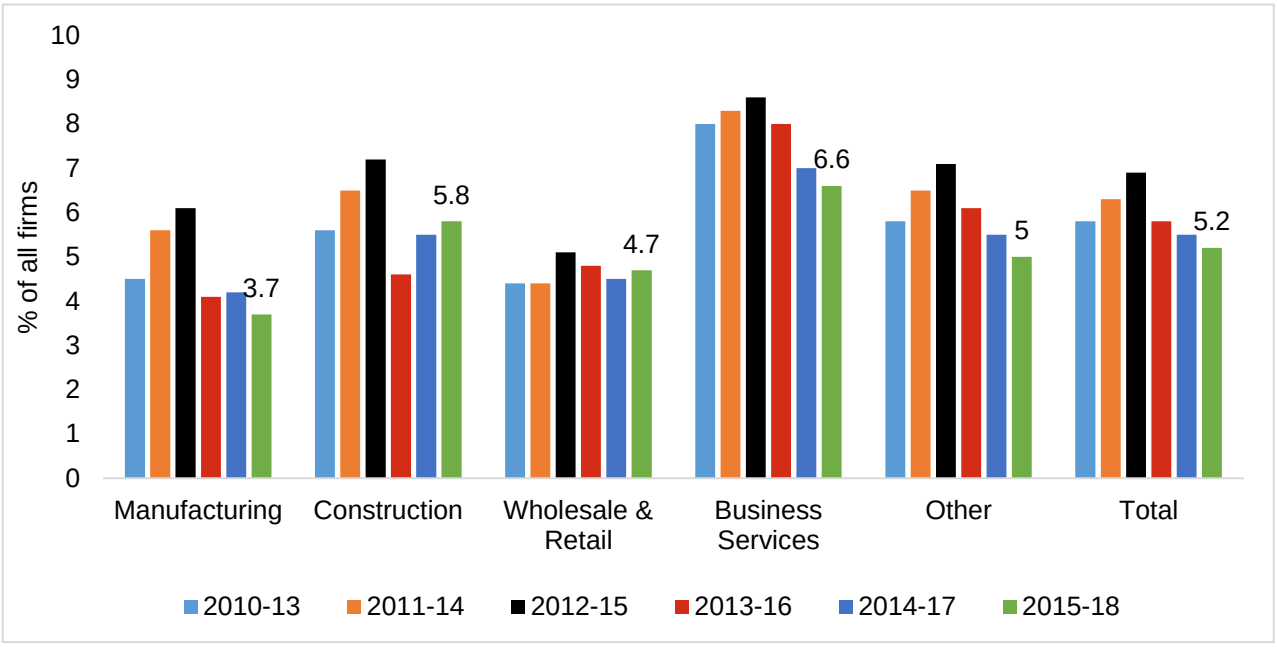
[57] The ScaleUp Annual Review 2021, the ScaleUp Institute, 2021
[58] High Growth Small Businesses, the Octopus Group, 2019
[59] From the Cabinet of Curiosities: The misdirection of research and policy debates on small firm growth (aston.ac.uk)
[60] Firms growing their employment numbers and/or turnover by more than 20% a year over a period of three years, with at least 10 employees at the start of the period

Figure 3.4.7 - Trends in High Growth Firms in Scotland



Source: Scottish Government

Figure 3.4.8 - High growth firms across time by sector (% of total firms with 10+ employees)



Source: ONS Business Structure Database (BSD)

As a share of the overall business base, high growth enterprises (as a share of all registered enterprises) accounted for 1.1% in 2020, down from 1.5% in 2008. When looking at businesses with 10 or more employees, the share in Scotland is 3.9% – below the UK average of 4.5% and the London region rate of 5.4%. Thus, when benchmarking against other parts of the UK, Scotland consistently underperforms on the share of high-growth enterprises in the business base.

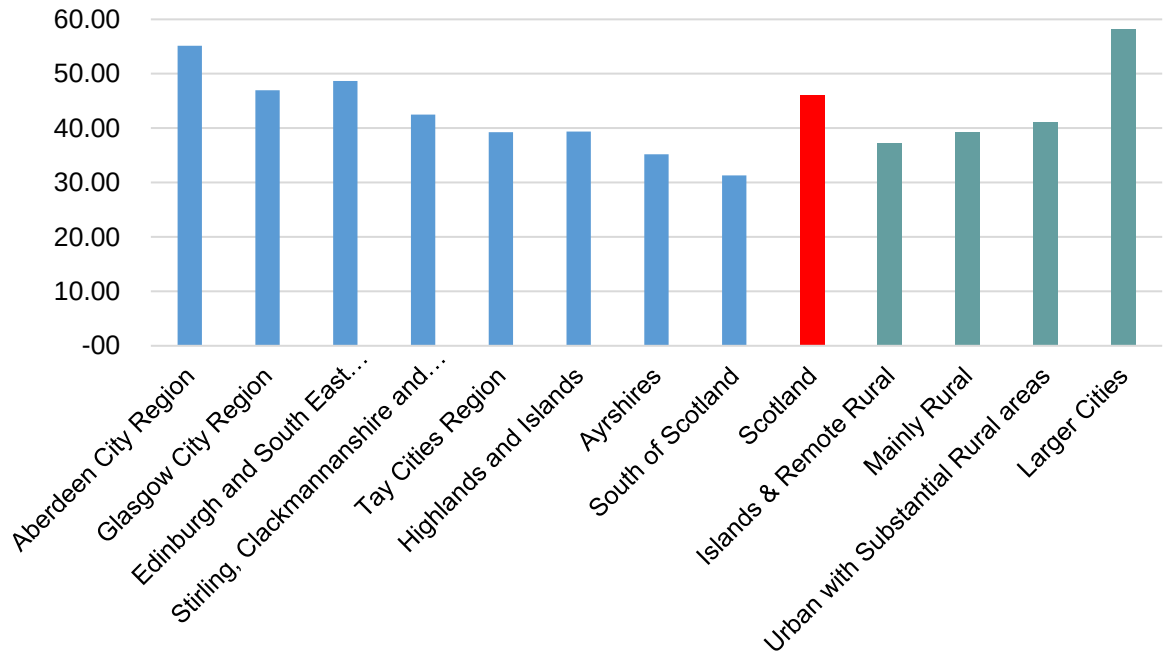
A key driver for business growth is ongoing 'intrapreneurism' – constant focus on identifying enterprise opportunities in existing businesses and creating a competitive edge in the market. Research using panel data comprising 73 countries over 13 years finds that an increase in the experimental capacity score of a firm of one standard deviation is associated with an increase in productivity growth by an almost equal amount. [61] It finds that experimental capacity is more important for entrepreneurs who entered the market in the previous year when compared to those who entered in the current year. This suggests that growth-enhancing policies need to be different from entry-centred policies.

3.4.4 Regional patterns in entrepreneurship

In Scotland, there is a close correlation between entrepreneurship (as measured by VAT business registrations per 10,000 adults) and regional economic prosperity and performance. The stronger city regions appear to have higher levels of entrepreneurship. However, when it comes to survival rate of newly registered businesses, there does not appear to be huge variations across regions (although survival rate has overall declined over the period 2013 to 2015).

The distribution of high growth enterprises in Scotland is also unequal, although a number of regional economies with weaker overall economic performance (Ayrshire and Stirling & Clackmannanshire) seem to perform much better on this measure. Overall, however, high growth firms seem to be more concentrated in larger cities.

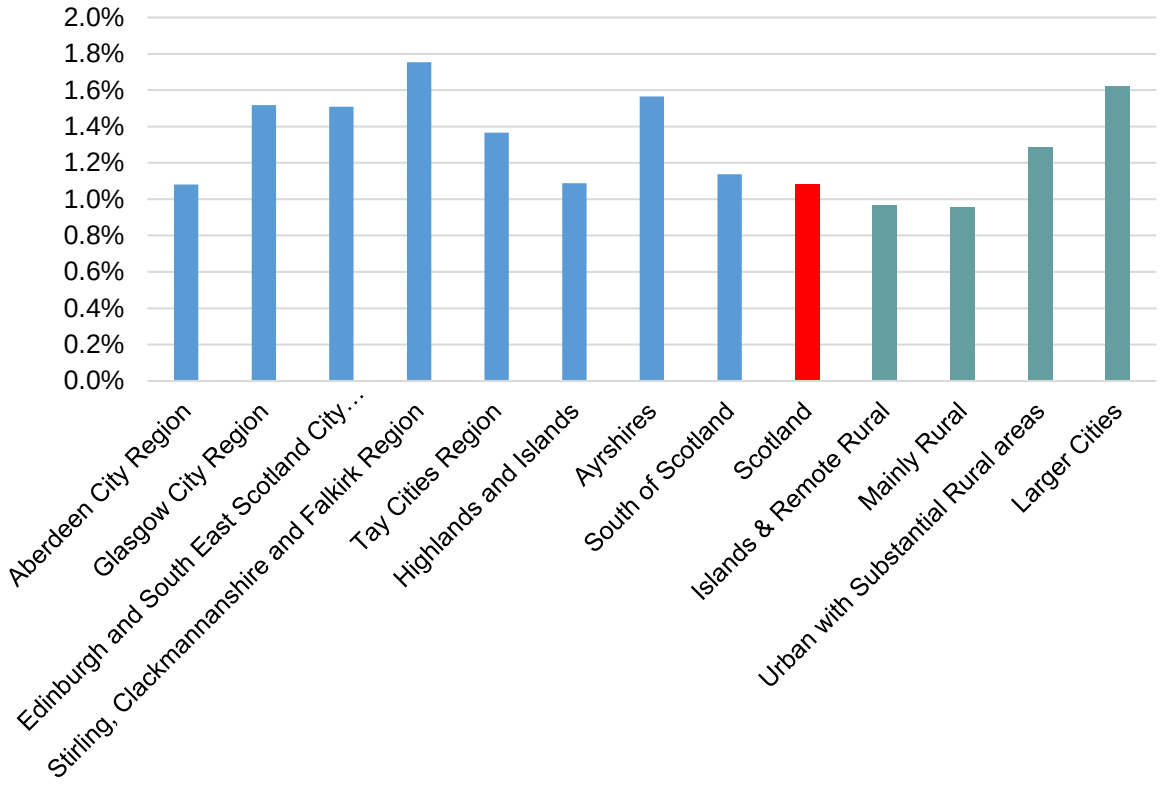
Figure 3.4.9 - VAT/PAYE business registrations (business births per 10,000) adults 2018



Source: Business Demography - Office for National Statistics

[61] Druid21: When Does Entrepreneurship Contribute to Productivity Growth? Experiment Capacity and the Entrepreneurship–Productivity Relationship

Figure 3.4.10 - High Growth Registered Private Sector Enterprises as a share of all VAT/PAYE registered Private Sector Enterprises



Source: Businesses in Scotland 2020 - Scottish Government

While both urban and rural areas have high growth firms, urban areas have a higher incidence of them. They are also across all sectors, including some low-productivity and domestic market facing sectors, with disproportionately more in business services and construction.

3.4.5 Entrepreneurial eco-system

Research carried out for Scottish Enterprise[62] finds that Scotland's low performance on high-growth firms is partially explained by the nature of the business base (size, age, sector, prior growth), together with background variables such as education, ethnicity and other macro variables such as economic growth. This suggests that, as well as providing direct support to help individual businesses to scale up, greater focus should be placed on the wider "entrepreneurial eco-system".

The most successful entrepreneurial economies feature thriving eco-systems, often operating through a "triple helix" of private sector, public sector and universities and linked to sectoral clusters. In terms of local economies in Scotland, Edinburgh is a good example of this, but more needs to be done in other areas.[63]

[62] Document details | Reading Room for Scottish Enterprise (evaluationsonline.org.uk)
[63] https://labs.uk.barclays/support/news/a-key-to-unlocking-growth-edinburgh-manchester-top

Nurturing entrepreneurial ecosystems requires building cultural, social and material attributes,[64] including education, role models, access to peers, celebration of success, learning from 'failure', social ties, entrepreneurial networks, skilled workers and access to talent and appropriate and diverse investment capital. Entrepreneurship can flourish when these attributes are supported by key institutions including universities (which are often anchor institutions), favourable government policies and appropriate infrastructure including transport, super-fast broadband and access to cultural activities including, for example, attractive places for entrepreneurs to come together in a "market-square" type environment.[65]

3.4.6 Challenges for Entrepreneurship in Scotland

Overall, evidence presented above shows that there is significant scope for Scotland to improve its entrepreneurship performance, especially when looking at what other advanced economies achieve. This report has reviewed evidence on challenges faced by Scotland's micro and SME business base (as a proxy for entrepreneurship) to understand where they may be opportunities to improve Scotland's entrepreneurship performance.

Table 3.4.1 Constraints to Entrepreneurship in Scotland: Summary of Evidence

The following have been identified as constraints to entrepreneurship in Scotland:

- Fewer entrepreneurial companies with which to collaborate and build an eco-system;
- Access to talent (depending on sector, e.g. tech: software engineers and coders);
- Low levels of entrepreneurial ambition;
- Public perceptions about entrepreneurship;
- Lack of diversity among entrepreneurs;
- Lack of joined up entrepreneurial education from primary through to further and higher education;
- Business infrastructure, e.g. incubators and other premises;
- Fewer existing businesses of scale: fewer role models and opportunities for collaboration and sales;
- Finance for growth;
- Skills in how to lead and grow businesses of scale;
- Access to talent;
- Lack of experience and capacity in growing an entrepreneurial venture;
- Increasing sales domestically and internationally;

Table 3.4.2 provides evidence on the distribution of obstacles to business growth by business size drawing on Small Business Survey Scotland data.

[64] Spigel (2017) The Relational Organization of Entrepreneurial Ecosystems. 41(1): 49-72 DOI: 10.1111/etap.12167

[65] Scottish technology ecosystem: review - gov.scot (www.gov.scot)

Table 3.4.2 - Obstacles to business success by business size, SME Employers, 2019

	Scotland	Business size		
		Micro (1 - 9)	Small (10 - 49)	Medium (50 - 249)
Obtaining finance	**22%**	21%	27%	17%
Taxation, VAT, PAYE, National Insurance, business rates	**39%**	36%	53%	42%
Staff recruitment and skills	**29%**	23%	55%	62%
Regulations/red tape	**38%**	37%	46%	34%
Availability/cost of suitable premises	**15%**	15%	15%	10%
Competition in the market	**45%**	43%	54%	69%
Workplace pensions	**17%**	15%	28%	33%
Late payment	**33%**	31%	45%	36%
UK exit from the EU	**34%**	36%	26%	32%
National Living Wage	**21%**	19%	32%	26%
Any other major issues or obstacles	**10%**	12%	2%	11%
None of these	**6%**	6%	8%	10%
Don't know/No opinion	**2%**	3%	-	-
Refused	**1%**	1%	-	-
Scotland	**100%**	**100%**	**100%**	**100%**

Source: Small Business Survey Scotland, 2019

3.4.7 What the evidence tells us we need to address

Entrepreneurship in Scotland is improving from a low base, but there needs to be a step-change in order to be truly transformative. There remains significant scope for improvement in a number of areas.

- Scotland has a relatively small but growing business base. Growth has largely been among micro and small businesses and Scotland still lag behind comparable economies on indicators of entrepreneurial dynamism – start-ups, business survival rate and high growth businesses.

- Scotland has a deficit of high-growth firms when compared with other countries, and there is evidence of constraints to business growth in the wider enterprise eco-system.

- There is recent evidence of significant improvement in business start-ups in the younger age groups that Scotland can build on. The business start-up rate amongst ethnic minorities is also significantly higher than in the rest of the population, demonstrating the value of immigration to Scotland's economy. There is, however, a distinct gender gap in Scottish entrepreneurship; we need to increase female entrepreneurs.

- Growth in registered businesses has been strongest in 'internationally tradable services' and 'infrastructure and support' sectors,[66] although the domestic services industry still accounts for the largest share of registered businesses.

NSET responds to this evidence through the following Projects:

- Project 1: Embed First Rate Entrepreneurial Learning Across the Education and Skills Systems
- Project 2: Create a World Class Entrepreneurial Infrastructure of Institutions and Programmes Providing a High Intensity Pathway for High Growth Companies
- Project 3: Attract and Retain the Very Best Entrepreneurial Talent from at Home and Abroad
- Project 4: Build an Entrepreneurial Mindset in Every Sector of our Economy

3.5 Skilled workforce

Performance at a glance:

Measure	Current Performance
Skills supply: skills shortage vacancies	21% (2020)
Scotland's performance on young people's participation in education, training and employment, compared to EU countries	3rd Quartile (2019)
Proportion of those in employment (aged 16-64) who reported receiving job related training within the last 3 months	22.3% (2020)

Skills enable people to participate and progress in the labour market. Providing people with the opportunities to develop skills – irrespective of who they are and where they live – is a key driver of improved economic performance and wellbeing, which sits at the heart of the Scottish Government's economic and labour market strategies.

People with higher skills are more likely to be in employment. For example, using qualifications as a measure of skills level, we observe that 84.2 per cent of Scotland's population (16-64 years) with a degree of professional qualification are in employment compared to only around a half of the population (16-64 years) with no qualifications (46.2 per cent).[67]

Scotland's skills levels, as measured by qualifications, have improved over time. In 2020, the percentage of the population (16-64 years) with low or no qualifications (SCQF) was 9.7 per cent, compared with 14.7 per cent 10 years earlier.[68] As well as improving the likelihood of being in employment, investing in skills helps people to progress to more fulfilling, secure, well-paid and fair work. This has wider social benefits. When improvement in skills

[66] See Annex 1.1 to 1.3 for definition of these sectors
[67] Scotland's Labour Market: People, Places and Regions – background tables and charts - gov.scot (www.gov.scot) (Table 1.24A)
[68] National Indicator Performance | National Performance Framework Skill Profiles of the population

are among groups that traditionally face disadvantage or that are under-represented on key positive labour market outcomes – women, disabled people, minority ethnic groups, it contributes to tackling social inequalities.

Overall, a highly-skilled and engaged workforce are a key requisite for a successful economy. Skills Increase an individual's ability to do advanced tasks that add more value to the economy. Indirect impacts include enabling the development and application of more productive technology and innovation.[69] Consequently, the OECD suggests that for the UK, "developing the right set of skills and making full use of them in the economy is a recipe for higher productivity growth and inclusiveness".[70]

Recently, the Scottish Centre for Employment Research (SCER)[71] has looked at business models, innovation and employees' experiences in the workplace. They provide evidence that poor productivity performance is associated with poor use of employee skills, insufficient training and poor management.

3.5.1 Skills Supply

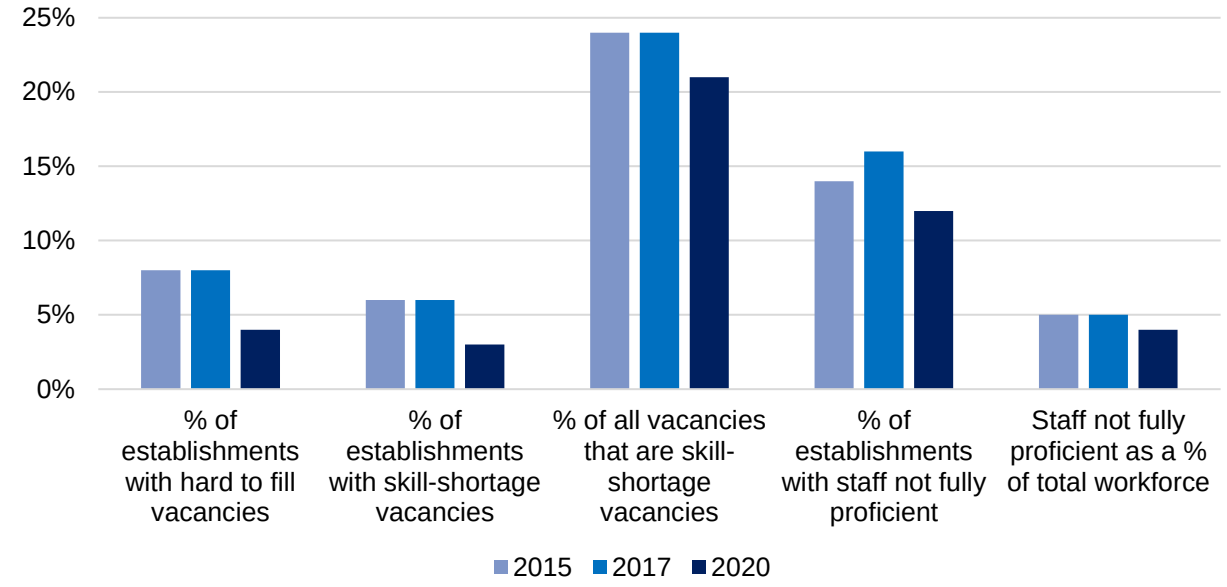
In 2020, 'skill shortage vacancies' accounted for about 21% of all vacancies in Scotland. These are vacancies that are hard to fill due to a lack of skills, knowledge or experience among applicants. In both 2015 and 2017, the rate of "skill shortage vacancies" was 24% – only falling in 2020 with the negative impact of the COVID-19 pandemic on the economy as some industries either closed or had restrictions in activity.

The proportion of all Scottish employers with at least one 'skill-shortage vacancy' fell from 6% in 2017 to 3% in 2020, partly reflecting the impact of the pandemic. Figure 3.5.1 presents the vacancies and skills picture for Scotland for years 2015, 2017 and 2020.

The incidence of 'skills shortage vacancies' vary across sectors (see Figure 3.5.2). Traditionally, the incidence has been highest in education, followed by hotels and restaurants and business services. The impact of the pandemic is evident in 2020; most sectors experienced significant falls in the incidence of skills shortage vacancies.

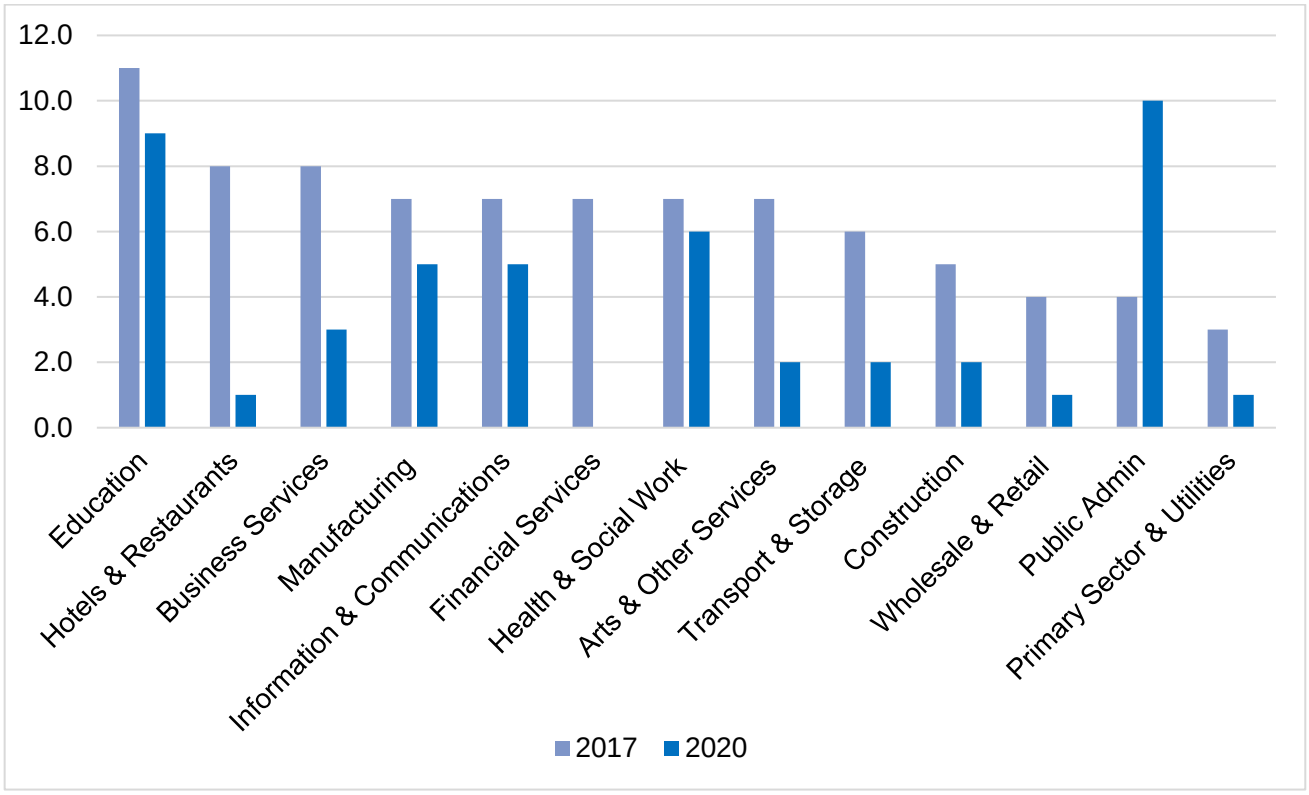
[69] BEIS (2015) 'UK Skills and Productivity in International Context'.
[70] 1 OECD (2017), 'Getting Skills Right: United Kingdom
[71] Business models, innovation and employees' experiences in the workplace: challenges for the post-Covid-19 economy Findlay, P., Lindsay, C. & Roy, G., 22 Jan 2021, Productivity and the Pandemic: Challenges and Insights from Covid- 19. McCann, P. & Vorley, T. (eds.). 1 ed. Cheltenham, p. 132-146 14 p

Figure 3.5.1 - Vacancy and Skills, Scotland, 2015, 2017 and 2020



Source: SG, Employer Skills Survey[72]

Figure 3.5.2 - Percentage (%) of employers reporting a skills shortage vacancy, by sector Scotland: 2017, 2020



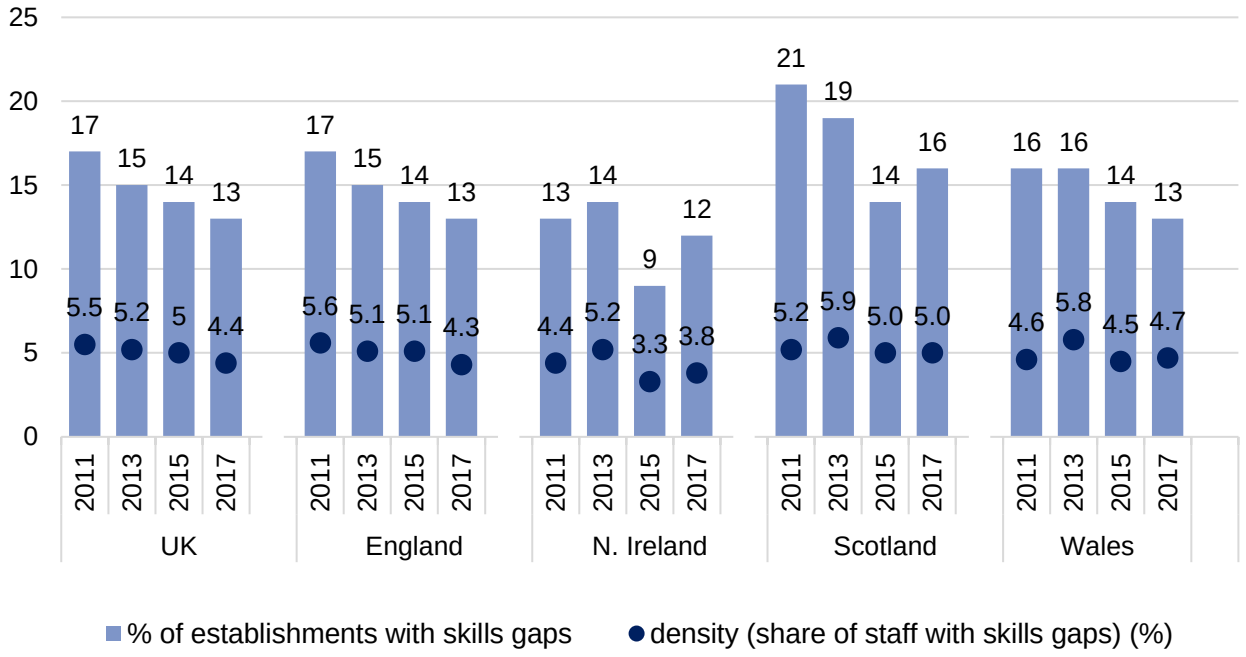
Source: Scottish Government, Employer Skills Survey

In 2017, 16% of businesses in Scotland reported 'skills gaps' (employees not sufficiently skilled for their roles) among their workforce. This is higher than the overall UK figure

[72] Scottish Employer Skills Survey 2020 - gov.scot (www.gov.scot)

(13%). Historically the shares of businesses reporting skills gaps has been higher in Scotland compared with the rest of the UK. Between 2011 and 2017, however, Scotland has seen a 5-percentage point fall in the number of businesses reporting skills gaps, and the UK as a whole saw a decline of 4 percentage points over the same period.

Figure 3.5.3 - Incidence and density of skills gaps over time by country (Per cent)



Source: UK Department for Education (2018), 'UK Employer Skills Survey 2017'; Base: All establishments (base size: UK 87,430; England 71,527; NI 3,973; Scotland 6,017; Wales 5,913)

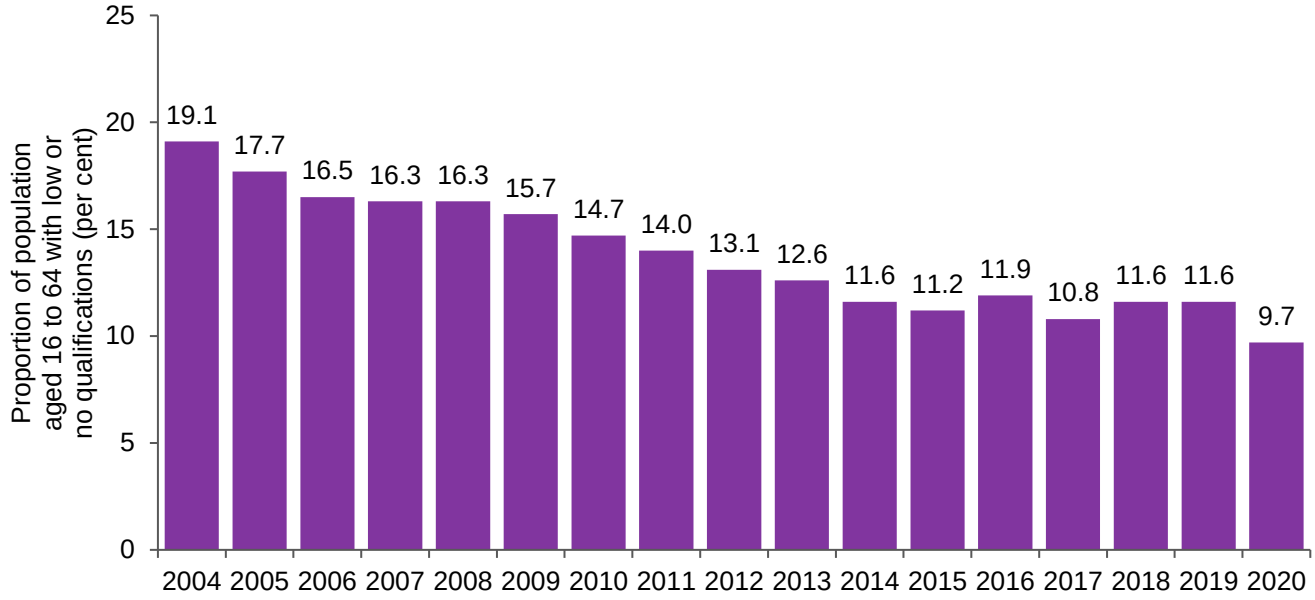
Following the pandemic, businesses have been experiencing difficulties filling posts due to the pace of re-opening, the impact of EU Exit and a frictional miss-match of candidates with jobs.[73] Survey data shows that in October 2021,[74] 44% of business reported vacancies were more difficult to fill compared with normal expectations for the same time of year. This is a bigger challenge in 'Accommodation and Food Services' and 'Transport and Storage' sectors. The most common reason cited for these difficulties is the lack of applicants and qualified candidates. Online notified vacancies are also higher than the pre-COVID period, particularly so in some sectors.

3.5.2 Skills Profile of Scotland's population

As noted above, latest (2020) data shows that around 9.7% of Scotland's population aged 16 to 64 years were classed as having low or no qualifications, reflecting progress that Scotland has made in investing in skills over the last decade.

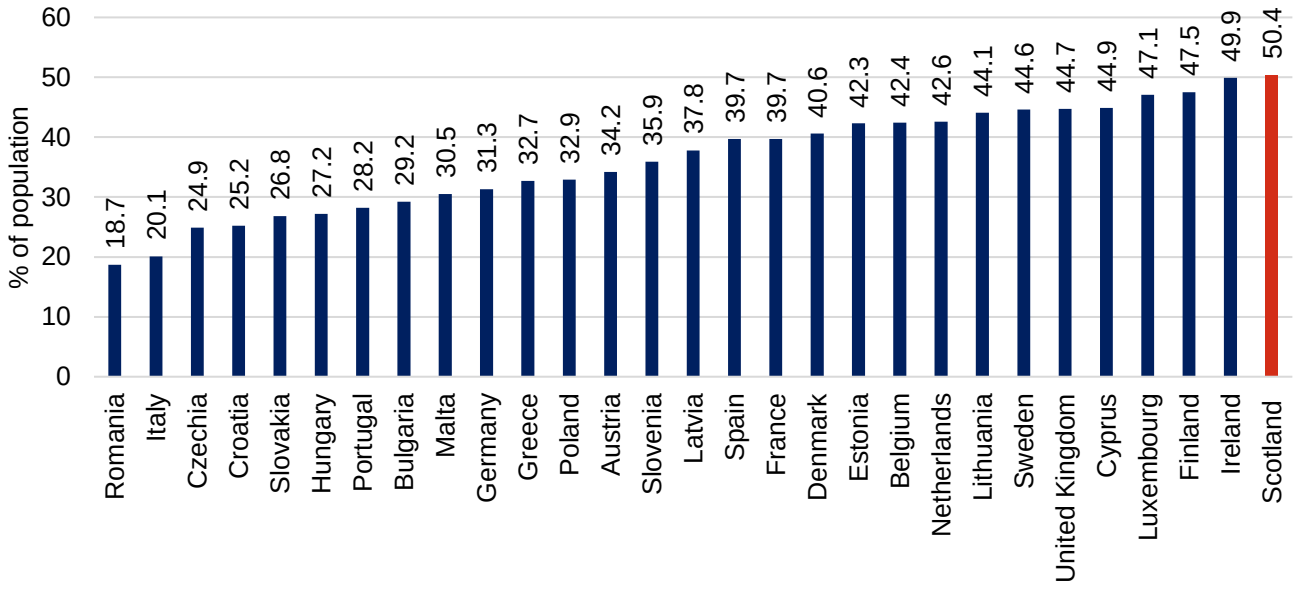
[73] Monetary Policy Report - August 2021 | Bank of England
[74] BICS weighted Scotland estimates: data to wave 40 - gov.scot (www.gov.scot)

Figure 3.5.4 - Percentage of population (16 to 64 years) with low or no qualification, 2004 to 2020



Source: Annual Population Survey, January to December each year, ONS

Figure 3.5.5 - Proportion of population (25 to 64 years) with at least tertiary education



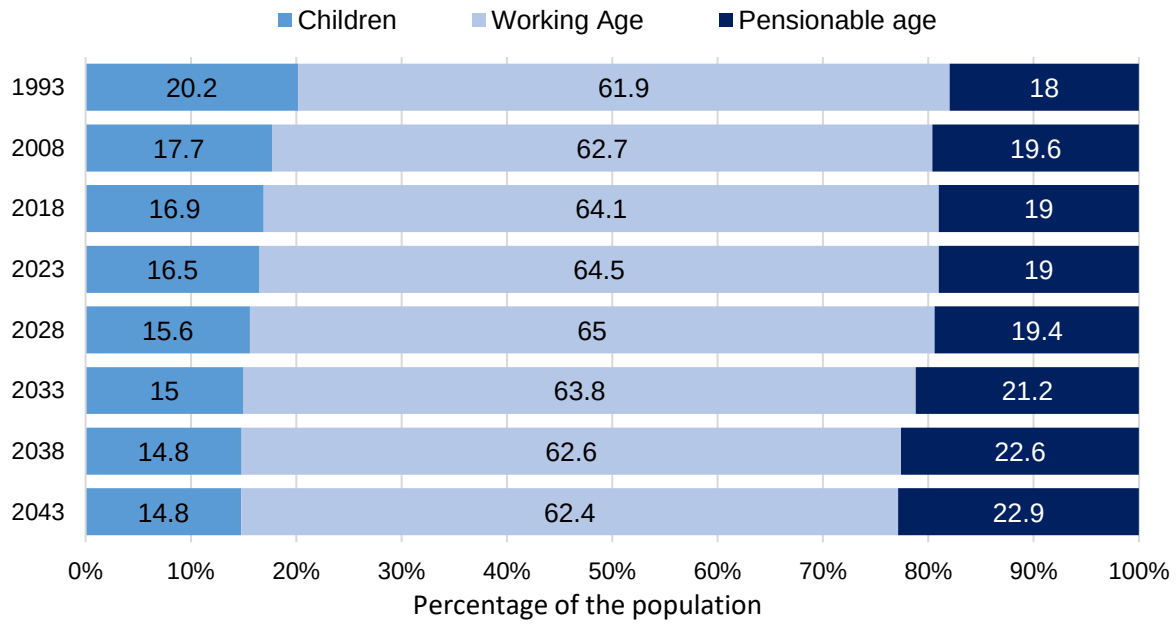
Source: Eurostat

When compared to EU countries, Scotland has the highest share of the population aged 25 to 64 years that has at least tertiary education. It shows that Scotland performs strongly when it comes to investing in skills, at least as measured by tertiary education qualifications.

3.5.3 Scotland Demographic Trends

Like most advanced economies, Scotland has an aging population. The share of children (15 years and below) in the population has declined from 20.2% in 1993 to 16.9% in 2018. Over the same period, however, the share of the pensionable age[75] group has only increased from 18% to 19%.

Figure 3.5.6 - Scotland's Demographic Trends Population by age group in Scotland, mid-1993 to mid-2043



Source: National Records Scotland[76]

The changes in the population age profile is affecting Scotland's workforce. Scotland is seeing a gradual increase employment in the older age groups. In 2020, the over 50-age group accounted for 30.9% of total employment, compared to only 24.9% in 2010. The estimated employment rates for those aged 65 years and over has increased from 5.2 per cent in 2004 to 8.7 per cent in 2020, as working lives are getting longer. The share of workers aged 50 to 64 years has increased from around a quarter of the workforce in 2010 to around one third in 2020.

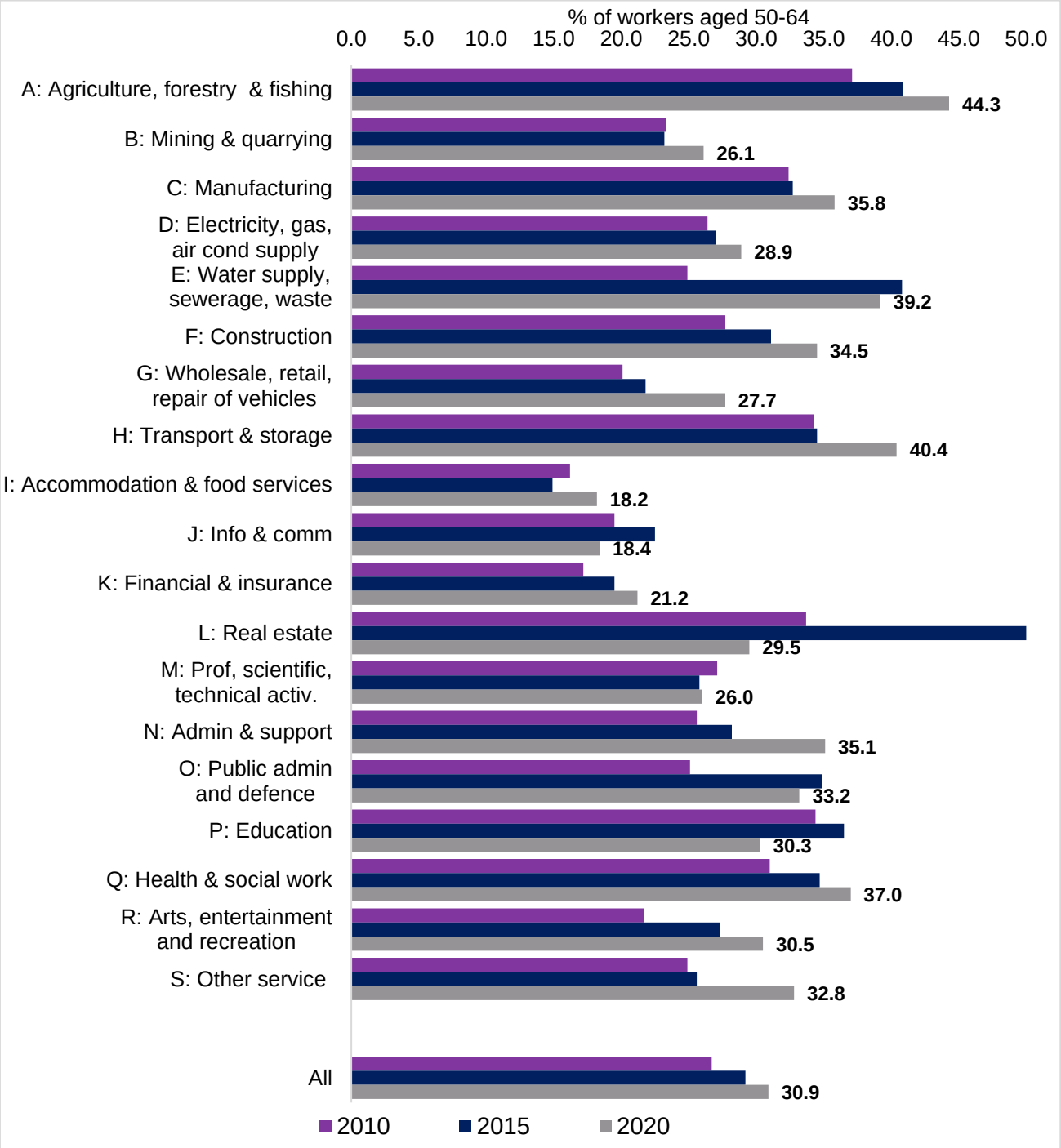
Over the same period, the share of the workforce in the younger age bands has decreased. For example, the workforce aged 25 to 49 years has fallen from 59.1 per cent in 2010 to 57.7 per cent in 2020.

The growing share of older workers in the workforce in the last 5 years is evident in most sectors. The only sectors that have not seen growth in the share of the 50-64 year olds in the workforce are 'Information and Communication Services', 'Real Estate', 'Professional,

[75] Until April 2010, state pension age (SPA) was 65 for men and 60 for women. After this point, SPA was increased gradually for women each year until it reached age 65 in 2018. SPA is scheduled to increase further for both men and women to age 67 by 2028.
[76] Projected Population of Scotland 2018-based, p.13

Scientific and Technical Services' and 'Education'.

Figure 3.5.7 - Percentage of sector workers aged 50-64 years



Source: Annual Population Survey, January to December in each year.

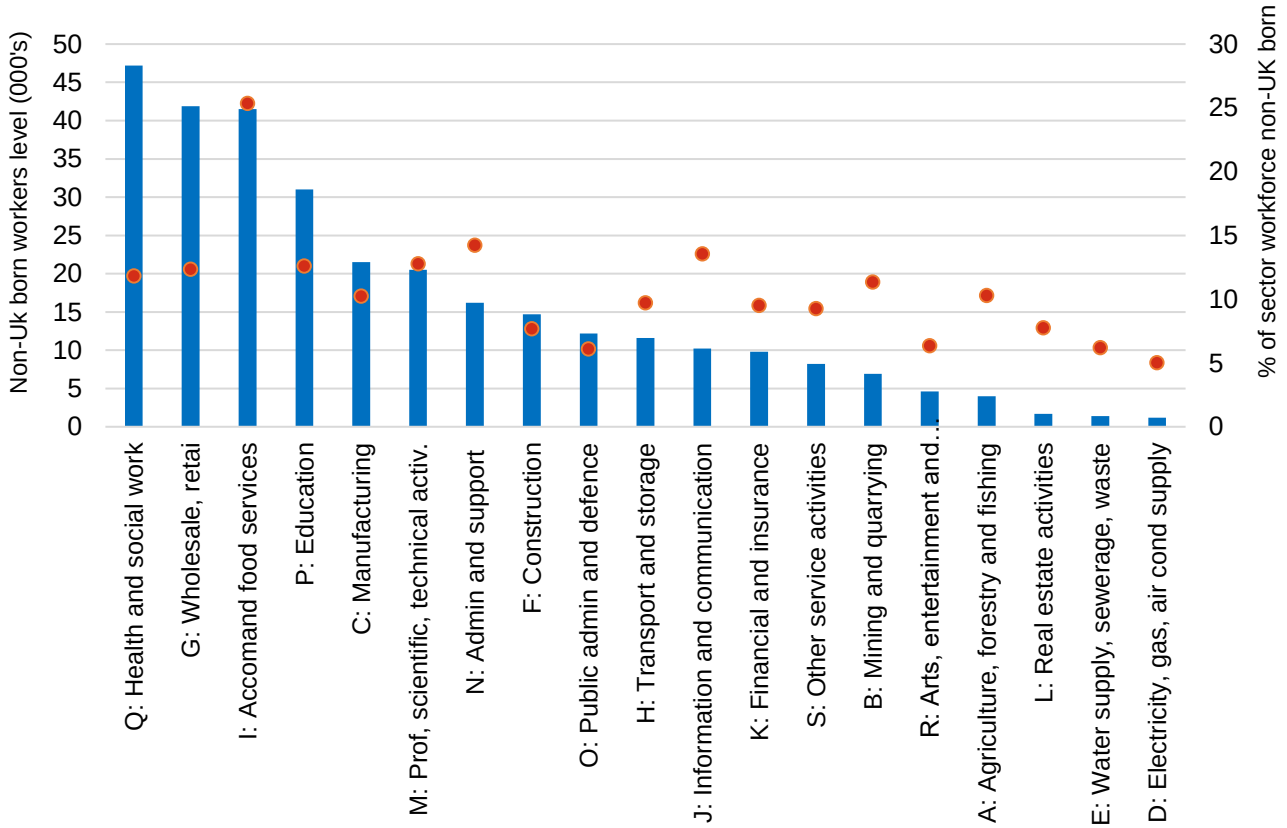
Looking to the future, the trend towards an aging population is projected to continue. According to National Records Scotland projections, Scotland's working age population could decline to 62 per cent in 2043 (from 64.1 per cent in 2018). This will affect Scotland's labour and skills supply. While these changes may present as slow or gradual, with greater challenges appearing to be in the distant future, reversing demographic changes will also be a slow and gradual process.

As people are working longer, it challenges skills provision to ensure that workers can continue to invest in skills throughout all life stages. This is important for ensuring all can have equal opportunities to participate and benefit from economic activity. Socio-economic trends, including the global climate emergency, demographic changes and the uncertain impact of technology, necessitate that Scotland's skills system evolves to meet the needs from this changing demography.[77]

3.5.4 Foreign born workers

Like the UK as a whole, Scotland's economy has partly depended on migration to meet it workforce and skills requirements. Some sectors are more dependent on foreign-born (those who have migrated from their country of birth to reside in Scotland) workers than others. The highest number of foreign-born workers are in the 'Health and Social Work' sector. However, the highest dependence on foreign-born workers, based on share of the workforce, is 'Accommodation and Food Services', followed by 'Administration and Support' and then 'Information and Communication Services'.

Figure 3.5.8 - Number and percentage of foreign-born workers in total sector employment, Scotland 2019

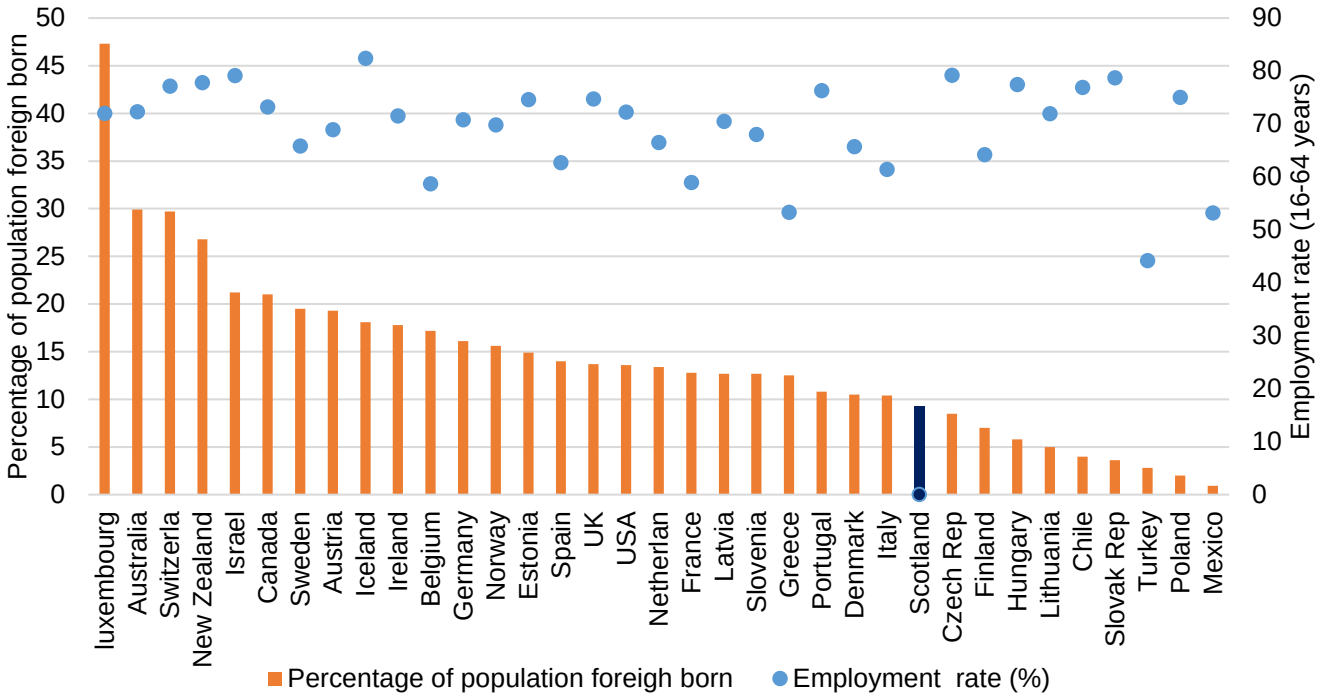


Source: Annual Population Survey 2019

[77] Skills matter for Scotland – mygov.scot

When compared to other OECD countries, Scotland has a relatively low share of foreign-born population (of all ages). However, the employment rate for Scotland's foreign-born population (16-64 years) is higher than the average across other OECD countries.

Figure 3.5.9 - Percentage of population, (all ages) which are foreign born, foreign-born employment rate (16-64 years)



Source: OECD International migration database[78], APS
Note: Scotland 2019, other countries- 2017, 2018, 2019

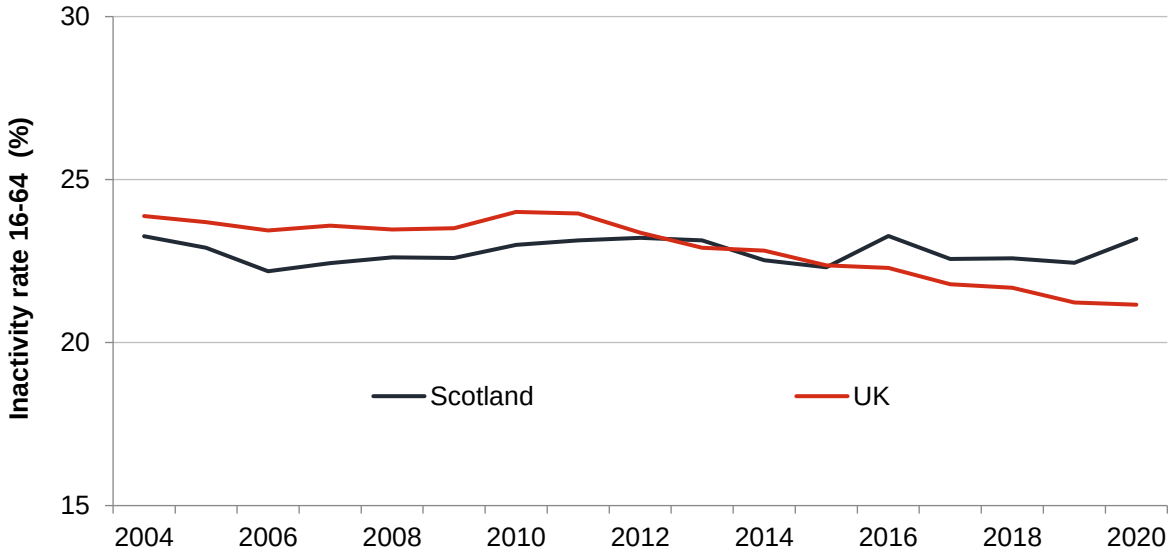
Since the COVID-19 pandemic, the National Insurance Numbers (NINo) allocated to overseas nationals have reduced.[79,80] Over the quarter October to December 2020, there were 3,700 NINo registrations to overseas nationals living in Scotland. This is a 71% decrease compared to the same quarter in 2019. While part of this may reflect disruptions to the NINo registration process because of the COVID-19 pandemic, survey data estimates that 15 per cent of businesses reported an annual declined in EU workers in 2020. This was as much as 42 per cent in Accommodation and Food services sector.

3.5.5 Inactivity in the Workforce

While Scotland faces skills and general labour shortages, 22.0 per cent (Jul to Sep 2021) of the working population (16 to 64 years) are economically inactive – not in employment and not actively seeking work. Since 2016, Scotland has had a marginally but consistently higher rate of inactivity than the UK, although since 2015 Scotland's inactivity rate has consistently been lower than Wales' and Northern Ireland'.

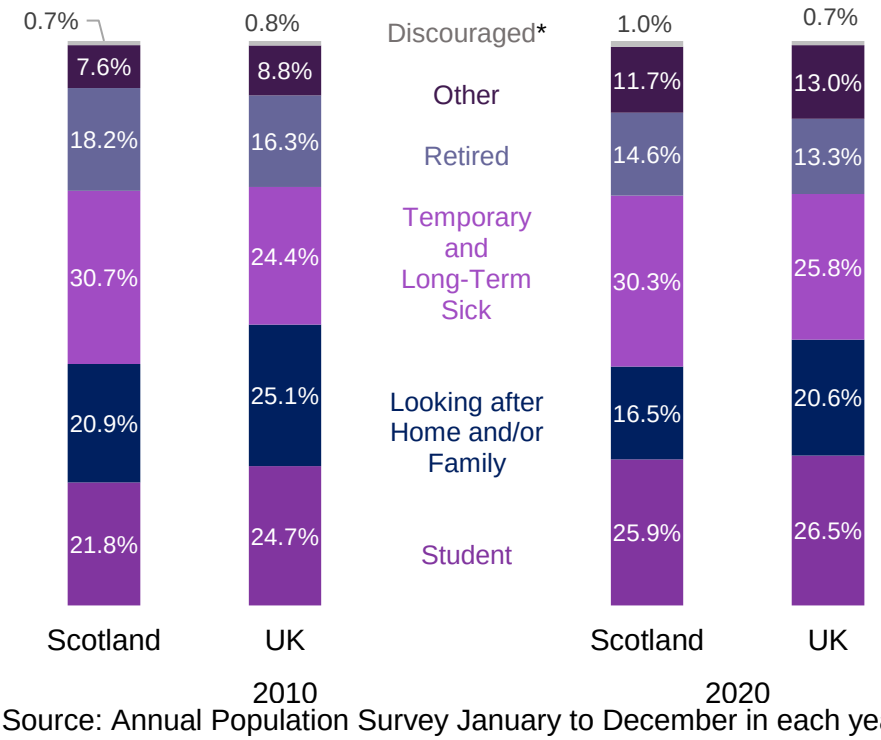
[78] Migration - Foreign-born population - OECD Data
[79] Migration Statistics Quarterly Summary for Scotland, February 2021 (nrscotland.gov.uk)
[80] A NINo is needed to work in the UK or to claim benefits, and can be used as measure of gross additions to the workforce due to in-migration.

Figure 3.5.10 - Inactivity rate (16-64), Scotland and UK, 2004 to 2020



Source: ONS, Annual Population Survey, Jan-Dec in each year

Figure 3.5.11 - Inactivity by reason Scotland and UK (percentage of all inactive 16-64 years)[81] 2010, 2021



Source: Annual Population Survey January to December in each year

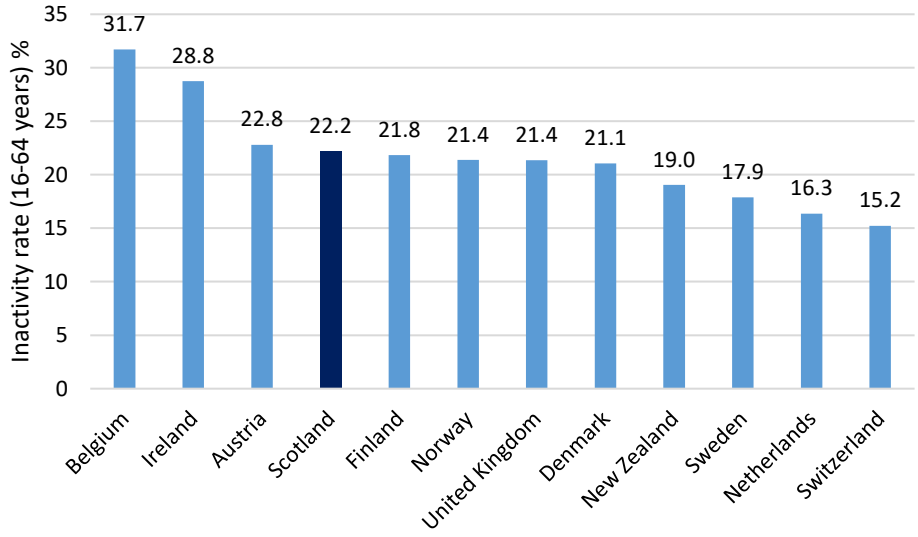
When considering reasons reported for economic inactivity, in 2010 students accounted for a larger share of the inactive population UK-wide when compared with Scotland. However,

[81] Other, includes - no reason given, not started looking – doesn't want or need to work

this gap has reduced, and currently students account for a similar share of the inactive in Scotland and UK.

The share of inactive population reporting that they are looking after family and home in UK has decreased faster when compared with Scotland. Scotland consistently report a higher proportion of inactive who are long term sick or in retirement. Women accounted for a slightly greater percentage of the inactive and most were in the 16-24 years or 50-64 years age groups.

Figure 3.5.12 Economic Inactivity rate (16-64 years) across selected advanced economies



Source: OECD, Labour Force Survey, Q1 2021

Scotland's economic inactivity rate is not too dissimilar to that of other small advanced economies like Finland, Norway and Demark. However, other countries like Switzerland, Netherlands and Sweden have much lower rates, while rates are significantly higher in Belgium and Ireland.

3.5.6 Skills Mismatch

Understanding the extent of skills mismatch within the economy is important as it can be a drag on overall performance of economy. The 2020 Scottish Employer Skills Survey (ESS)[82] suggests skills mismatch is a significant issue for employers in Scotland.

Skills mismatch is complex to measure. Often education and qualification levels are used to approximate skill levels, and to test whether or not they match what is required to do a

[82] Scottish Employer Skills Survey 2020 - gov.scot (www.gov.scot)

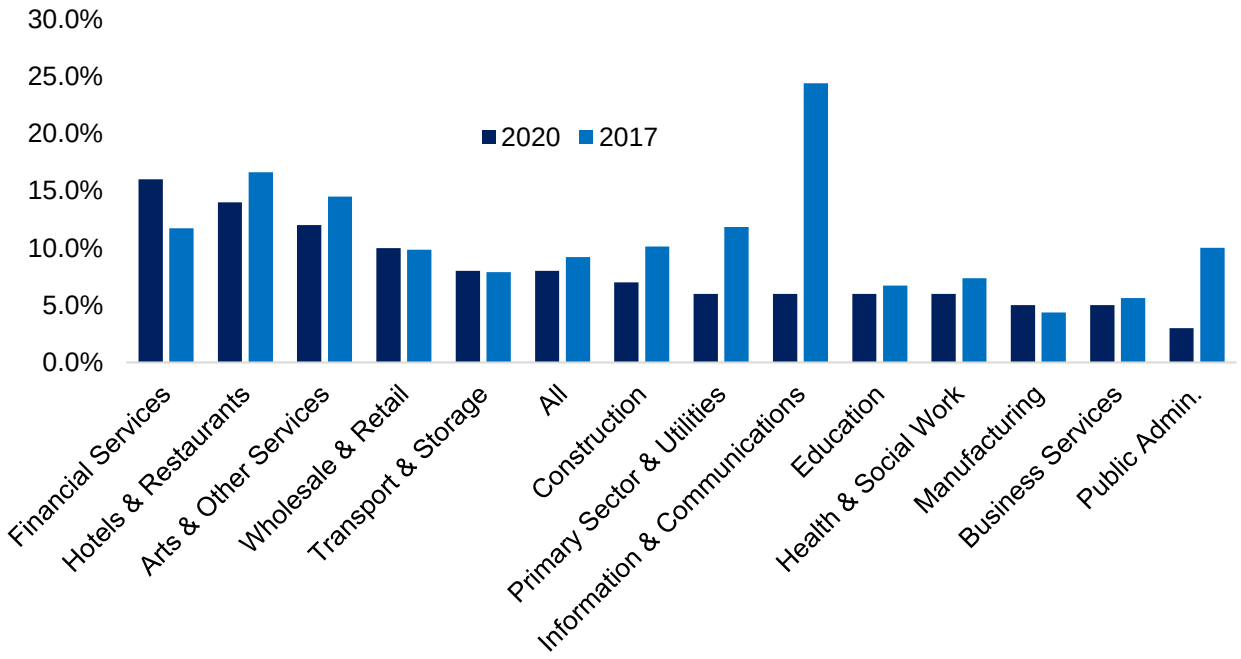
particular job. Skills mismatch can take different forms. The International Labour Organisation (ILO)[83] set out three main classification of skills mismatch:

Vertical mismatch	Horizontal mismatch	Career mismatch
When someone's level of education is higher or lower than expected for his or her occupation.	When workers educated in a particular field work in another.	When jobs and skills do not approximate over time.

In 2020, one-third (33%) of establishments in Scotland reported having under-utilised staff (i.e. those that have both qualifications and skills that are more advanced than required for their current job role). On average, under-utilised staff as a proportion of total workforces was 8%. These results varied by region, employer size and sector. This is an improvement from 2017, when 35% of establishments reported having under-utilised staff.

While we cannot conclude a trend, especially given the disruption to the labour in 2020 due to the pandemic, Employer Skills Survey results by sector show that in 2020, under-utilised staff in Scotland were most prevalent in 'Financial Services', 'Hotels & Restaurants' and 'Arts, Entertainment and Recreation' and 'Other Services'. There was also a large decline in under-utilisation in the 'Information and Communications' and 'Public Administration' sectors.

Figure 3.5.13 - Underutilised staff in Scotland as a proportion of workforce by sector, 16 to 64

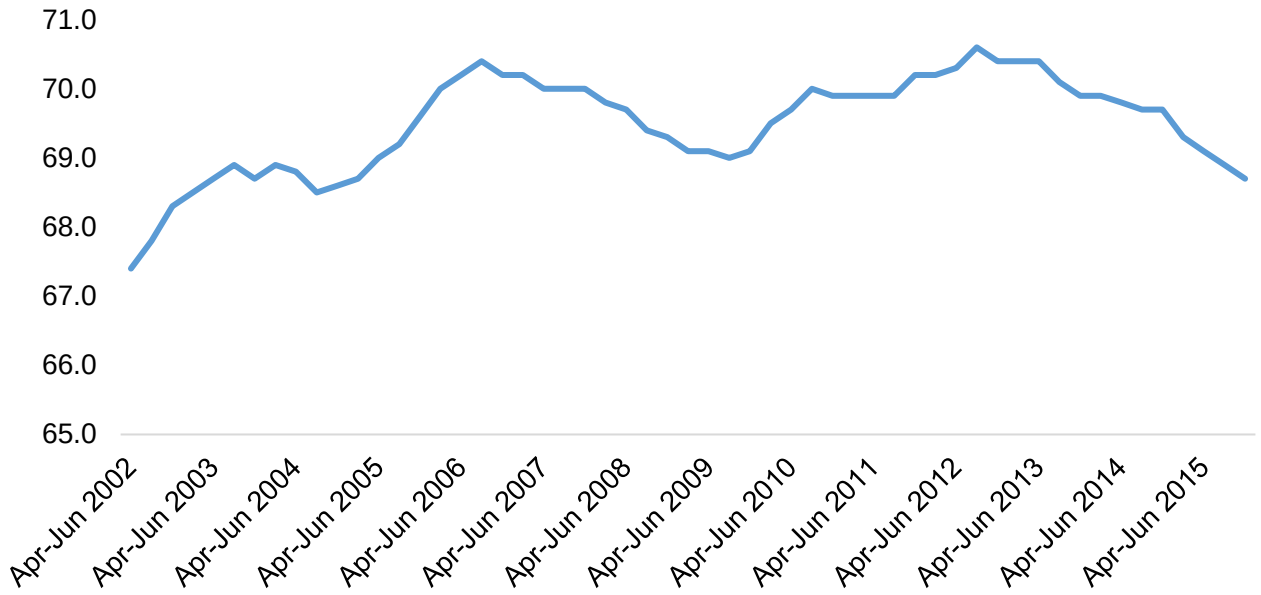


Source: Scottish Employer Skills Survey, 2020

[83] Article: What is skills mismatch and why should we care? (ilo.org)

Trend data on skills mismatch is not available for Scotland. However, the Office for National Statistics (ONS) estimated[84] in 2016 that between 2002 and 2015, the UK saw a gradual increase in the proportion of workers whose level of educational attainment matched the average for people in their occupation. The highest rate of 70.6% was in 2012 followed by a period of gradual decline to 2015.

Figure 3.5.14 - Percentage of people in employment defined as 'matched', 16 to 64, UK, 4-quarter rolling averages

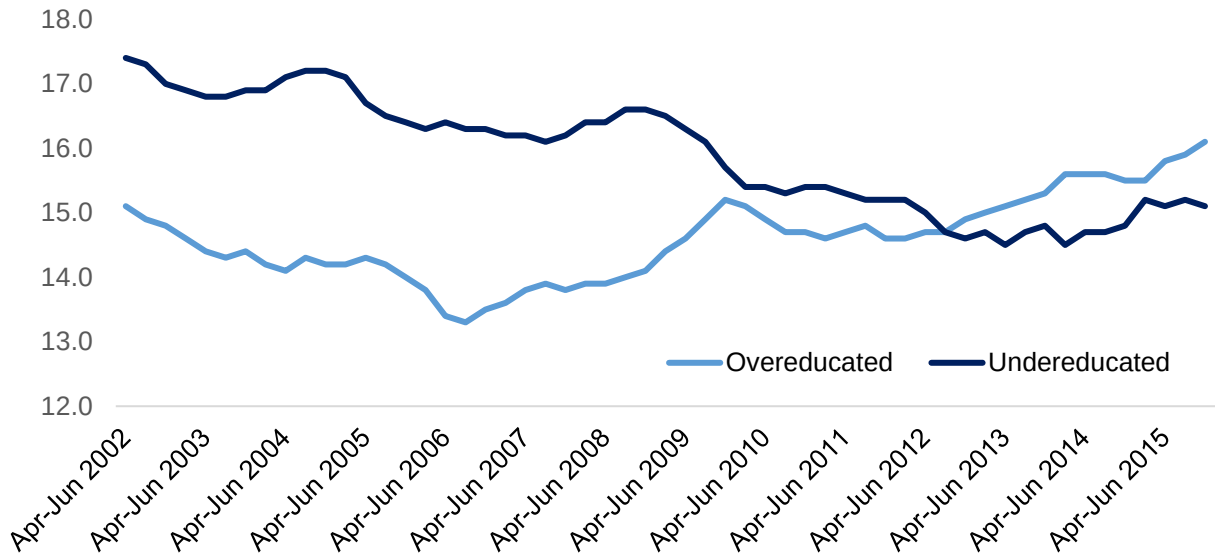


Source: ONS, Labour Force Survey

The more recent decline in matching of skills and jobs (post 2012 to 2015) is because of a rise in 'over-education', and coincides with a period of strong employment growth in the UK and in Scotland. A 2014 ILO report[85] found that total skills mismatch in the UK was 5th highest among 24 European countries in 2012, with overall 28.9% of the UK workforce in jobs not matching to their skill level (either over or under educated).

[84] Analysis of the UK labour market - estimates of skills mismatch using measures of over and under education - Office for National Statistics (ons.gov.uk)
[85] Skills mismatch in Europe (ilo.org)

Figure 3.5.15 - Percentage of people in employment defined as 'mismatched', 16 to 64, UK, 4 quarter rolling averages



Source: ONS, Labour Force Survey

3.5.6 What the evidence tells us we need to address

The evidence presented in this section shows that Scotland performs well on investment in skills, especially as measured by the share of the workforce with at least tertiary education. However, the economy still faces a wide range of challenges with respect to skills, including:

- general skills shortages as measured by prevalence of 'skills shortage vacancies'. The skills challenge has grown as economic activity has recovered following the pandemic and with impacts of EU exit on migration;

- an aging population, which is also translating to an aging workforce. There is evidence the working life is getting longer with increasingly more people working beyond the retirement age. Latest projections suggest that these trends are long term and will continue. This highlights the importance of investing in lifelong learning.

- while Scotland has depended on migration to meet skills and workforce requirements – especially in some sectors; its share of foreign-born population is much lower when compared to other OECD countries. Brexit is likely to have reduced it further.

- despite having challenges with respect to skills and general labour shortages, around one in five of Scotland's working age population is economically inactive. The most common reason cited for economic inactivity in Scotland is temporary or long-term health problems in the workforce. The share of inactive workers reporting that they are discouraged or not interested in work was only 1% in 2020.

- to mitigate against growing skills mismatch in the economy, there is need to ensure skills provision adapts to changing skills requirements as the economy transforms with modern technologies and new markets. This requires ensuring that a more coherent lifelong learning offer is complemented by increased employer and industry investment in workforce skills and training.

NSET responds to this evidence through the following Projects:

- Project 11: Adapt the Education and Skills System to Make it more Agile and Responsive to our Economic Needs and Ambitions
- Project 12: Support and Incentivise People, and their Employers, to Invest in Skills and Training Throughout their Working Lives
- Project 13: Expand Scotland's Available Talent Pool, at all Skills Levels, to Give Employers the Skills Pipeline They Need to Take Advantage of Opportunities

4. Economic Modelling of National Strategy for Economic Transformation

4.1 Introduction

This section provides a modelled illustration of how the economy may be impacted by some of the key NSET programmes of action. The NSET programmes of action are wide-ranging. They include actions to improve productivity and competitiveness of existing industries, and also actions that will help to restructure the economy if successfully delivered. The latter includes measures to establish and grow industries in new markets and to address the climate emergency.

The macroeconomic model used in this analysis has no direct link between economic activity and emissions so cannot simultaneously model the impact of transition in terms of changes in output and emissions.[86] This makes it challenging to model the impact of the full package of NSET programme of actions given the scale of the transition. However, we can simulate the impact of improved competitiveness through both trade and investment and also capture some of the wider productivity benefits. The nature of this investment will change given the opportunities and requirements to move to net zero, however, the wider macro impacts will be broadly similar.

For these reasons, the modelled impacts of NSET are based on a few key actions that can be readily captured by existing models. Specifically, this sections looks at two scenarios:

Scenario 1 - Baseline Scenario: this shows how output in the economy could evolve over the next ten years in the absence of policy changes. The outlook is informed by the official economic forecast for the Scottish economy produced by the Scottish Fiscal Commission.

Scenario 2 - NSET Scenario: Models the size of the economy if the package of policies that have recently[87] been announced and that form programmes of actions for NSET are being implemented successfully to achieve their set targets. These include:

- Increasing Exports / GDP ratio to 25% (implementation of export growth plan A Trading Nation);
- Delivering FDI 'spill over' benefits (implementation of Inward Investment Plan: Shaping Scotland's Economy) and benefits from the Global Capital Investment plan; and,
- A small increase in wages across the economy to reflect improvement in productivity and the resulting link through to higher real wages.

In simulating the economic impact, primarily through investment and export channels we recognise that much of this will relate to existing industry but also the new opportunities that emerge as we transition to net zero. Some of these opportunities are set out in Section 3.3 and will represent significant changes to the structure of key parts of the economy.

[86] The modelling of emissions uses the Scottish TIMES model, which captures the main characteristics of the energy system to understand the strategic choices that are required to decarbonise the economy.
[87] In the last three years

4.2 Channels of Transmission

The scenario modelled applied to reflect the impact of NSET on the economy operates through a range of channels, including increased trade openness and higher levels of investment, all of which provide a boost to the economy.

An increase in exports through improved access to existing and new markets benefits sectors that trade internationally as well as potential new exporters. Higher economic activity in these sectors increases demand for goods and services in associated sectors through supply chain linkages**,** thus contributing to the overall expansion in the economy. Productivity improvements provide a further boost to the economy by increasing economic capacity and through improved competitiveness at home and abroad. Changes in productivity will also depend on the ongoing policy commitment of investing in skills to keep up with evolving labour market demands in a more open economy.

Initially, the modelled effect of the increased labour productivity and increased wages is to slightly lower demand for labour and employment relative to the baseline. With higher wages it is more costly for firms to hire workers and it is assumed that firms require less additional labour due to being able to produce the same level of output with fewer (but more productive) workers. However, in the end these impacts are fully offset by increases in labour demand and the economy adjust to higher output, employment and wage levels with growth.[88]

4.3 Results from Modelling Scenarios

4.3.1 Baseline

Following the recovery, the SFC expect the economy to grow at an average rate of 1.4% per annum, reaching 1.7% in 2026. A range of assumptions could be applied to extend the baseline into the future. For this analysis we have used a simple illustration assuming that the annual growth rate of 1.7% continues beyond the official SFC forecast horizon (i.e. 2027 – 2032),[89] under this assumption the economy is expected to be 17% larger by 2032 than pre-Covid levels in real terms.

As noted in Section 2, Scotland's average GDP growth rate over the period 2000 to 2019 was 1.4% which is somewhat similar to the SFC's assumptions about the future growth rate. This also means that Scotland's international ranking on economic growth among OECD countries is unlikely to change significantly if other countries are able to maintain their historic performance.

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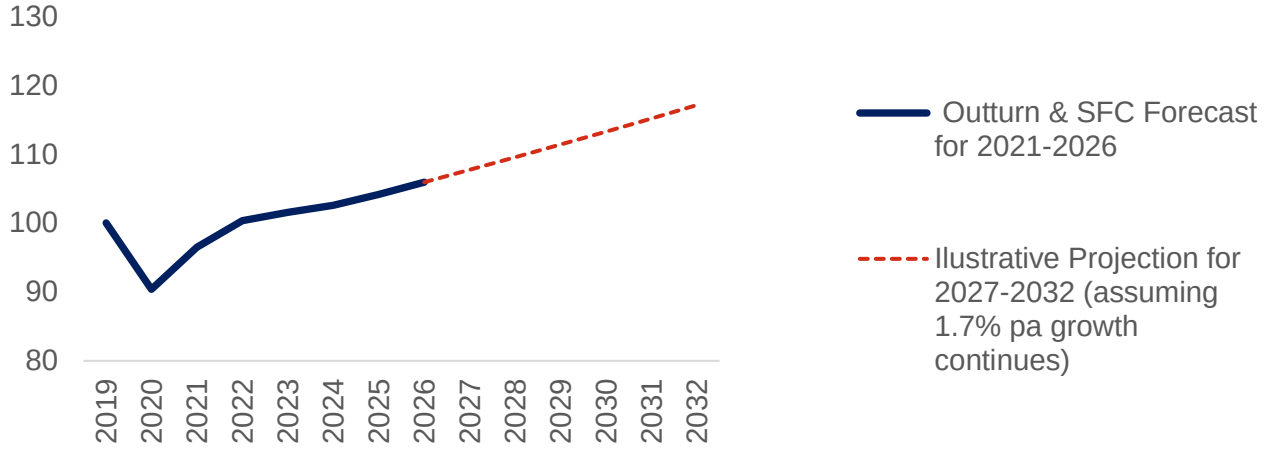
[88] More detailed modelling assumptions for each of the shocks modelled in the three scenarios are provided in Annex 2.

[89] This is broadly in line with the historical average growth rate of the Scottish economy, although it is faster than rate of growth seen between the global financial crisis and the Covid-19 pandemic.

Figure 4.1 - Scotland's GDP baseline, 2019 = 100



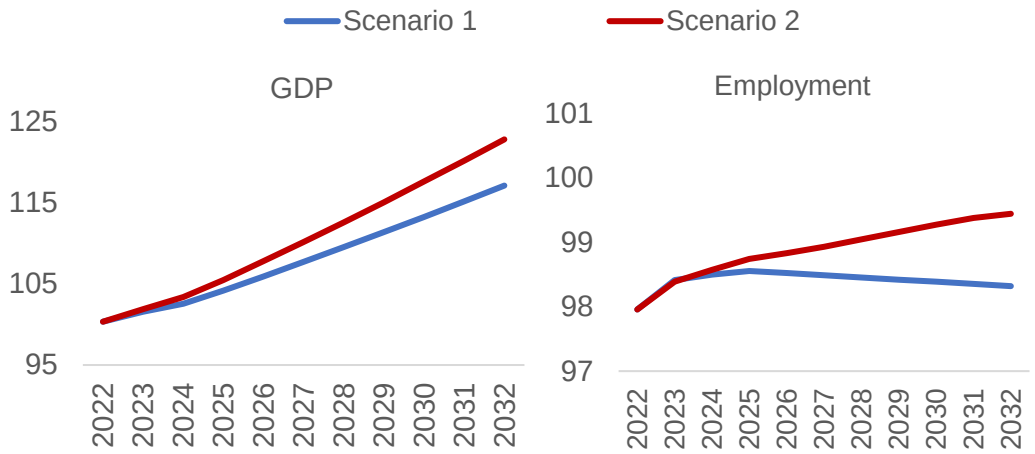
Source: Scottish Fiscal Commission, August 2021; SG calculation

4.3.2 Results of NSET scenario modelling

Overall, the economy is estimated to be 4.9% (£8 billion) larger in 2032 than it would otherwise have been the case if the benefits from the package of policies (trade, investment and higher wages) in Scenario 2 not been realised. This also translates into 1.1% increase in employment and 25.1% increase in international exports in 2032 compared to the baseline scenario.

The economy adjusts to the higher level of activity in a gradual way, reflecting gradual introduction of policy changes over the 10-year horizon and short-run constraints.

Figure 4.2 – GDP and Employment: NSET Scenario, 2019 = 100



Source: Scottish Fiscal Commission, August 2021; SG CGE analysis.
Note: the baseline path is a combination of the official forecast produced by the SFC and an illustrative projection which assumes that the 2026 growth rate for GDP and Employment in the SFC forecast applies to 2027-2032. In addition, CGE implied paths for GDP refer to nominal GDP changes as a standard GDP deflator measure is not available in the model but the magnitude of the real change should be roughly similar.

The modelled scenarios would also have implications for the structure of the Scottish economy. Over recent decades, there has been a decline in the relative importance of Manufacturing sector and an increase in importance of Services, reflecting both global and domestic trends.

The model does not provide direct outputs in terms of the structure of the economy in 2032, but if historical trends continued, the share of the Manufacturing sector could shrink further by 2032, although some of that contraction in manufacturing's share is reduced in the modelled policy scenario.

4.4 Modelling Process

All Scenarios are modelled using the Scottish Government Computable General Equilibrium (CGE) model.

The model captures the structure of the Scottish economy and the behaviour of representative agents within it based on underlying theory of economic relationships and econometric estimates of these relationships.[90]

The modelling approach is to run a policy shock through the model, and compare what would happen to the Scottish economy under the "policy scenarios" to alternative baseline scenario – the status quo. As such, this analysis should be interpreted as policy modelling and not a forecast for the economy.

[90] For more background on the Scottish Government CGE model see Computable General Equilibrium modelling: introduction - gov.scot (www.gov.scot)

The modelled scenario describes how the economy may be impacted relative to the baseline in 2032. How the economy could evolve over the next 10 years is highly uncertain. The key drivers of uncertainty are the impacts of Net Zero transition and economic recovery from Covid-19, as well as future macroeconomic development paths of major economies and the global economy as a whole.[91]

Reducing industrial emissions will also require significant investment across different sectors of the economy but can also boost productivity. Given the current uncertainties relating to different technological solutions, it is not possible for any one model to simulate the extent of change. In the NSET modelled scenario we recognise that the trade and investment shock, in practise, will reflect different technologies and opportunities.
The long-term impact of Covid-19 on the global economy is also still uncertain as we see the impact on supply changes and logistics feeding into higher energy and related costs.

4.5 Conclusions

- Overall, the modelling illustrates that the economy could be 4.9% (£8 billion) larger in 2032 than it would otherwise have been under the NSET Scenario.
- The modelled package of policies can be thought of as encouraging a more open and productive economy.
- An increase in exports through improved access to existing and new markets benefits sectors that trade internationally as well as potential new exporters.
- Productivity improvements provide a further boost to the economy by increasing economic capacity and through improved competitiveness at home and abroad. Changes in productivity will also depend on the ongoing policy commitment of investing in skills to keep up with evolving labour market demands in a more open economy.
- The ambitions set out in the strategy are broader than the modelled results but these provides an illustration of the benefits of improved competitiveness in improving economic activity relative to the baseline.

[91] These key sources of uncertainty are not explicitly captured in the model, while as with all modelling, unforeseen changes in other structural forces such as demographics and automation could also have important impacts.

5. Delivering Economic Transformation: Lessons from a Selection of Advanced Economies

This chapter considers the experiences of a number of countries that have experienced significant economic transformation or that have high levels of economic development to draw lessons for Scotland. It looks specifically at the experience of four countries that have had periods of significant economic change: Denmark, Finland, New Zealand and Ireland.

5.1 Transformation in an Advanced Economy

Traditionally, achieving and sustaining high rates of growth in GDP per capita growth, exports or other economic indicators is traditionally associated with countries undertaking transition or significant catch up in terms of economic development. Advanced economies tend to grow at slower rates given the high levels of economic activity within their economies. In the last 40 years, only one OECD country – the Republic of Korea, has doubled GDP per capita over a decade, and only two countries have doubled GDP growth in 20 years.[92] This type of economic transformation tends to be typical in earlier stages of economic development, and is then followed by the regularly observed phenomenon of 'economic convergence' where a country's GDP per capita growth slow down over time with economic development.

While more OECD countries have transformed on trade performance (roughly doubling exports over a decade), this has often been associated with radical changes to trade arrangement like the rapid global integration in the 1990s, and access to the 'European Single Market' for countries like the Czech Republic, Hungary and Poland. As noted in Section 3.5 however strong economic growth on the basis of only GDP per capita or exports is not enough to bring about wider improvement in living standards that the National Strategy for Economic Transformation is aiming for.

The World Economic Forum (WEF) Inclusive Development Index (IDI) provides a more comprehensive measure of economic transformation based on an institutional and policy framework encompassing: Growth (Labour Productivity, Healthy Life Expectancy, Employment); Inclusion (net income inequality, poverty, wealth inequality, and median income); and, intergenerational equity (adjusted net savings, carbon intensity, public debt and dependency ratio). The top six high performing countries on the WEF IDI are all relatively small European economies with populations of 10 million or fewer. All of these nations also score highly on the WEF Global Competitiveness Index (2019),[93] along with larger advanced economies (see Table 5.1.1).[94]

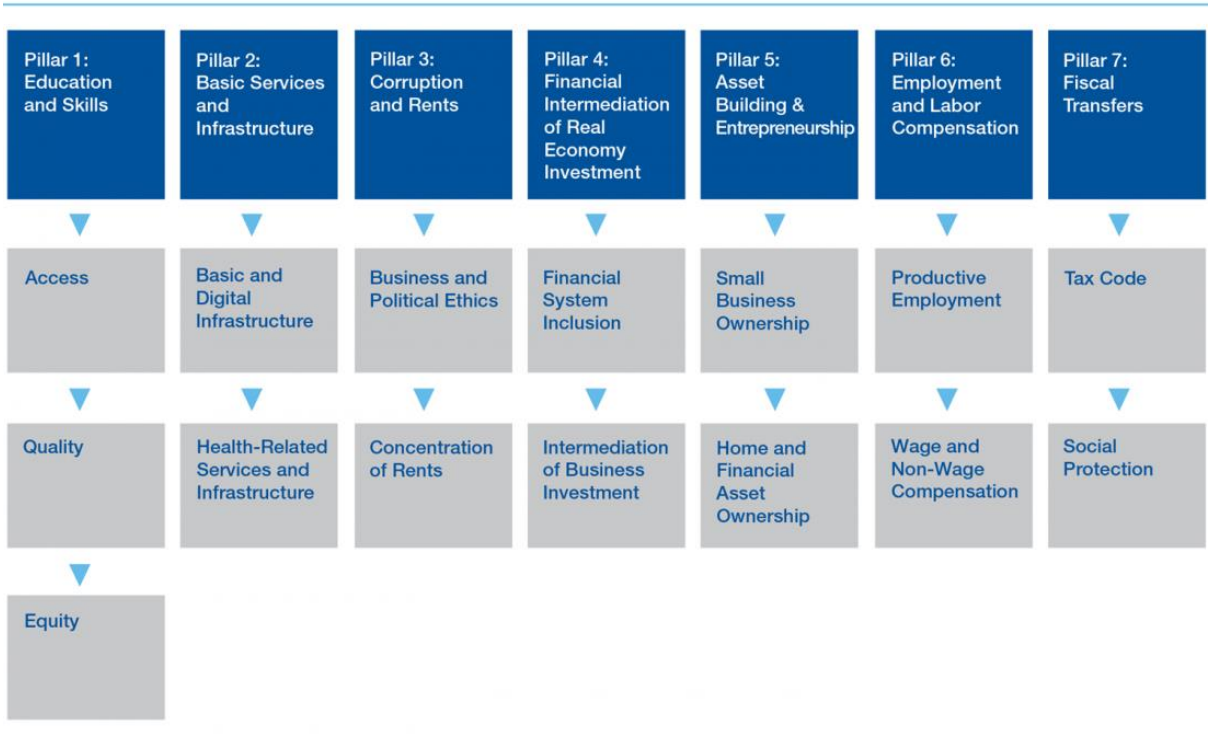
[92] World Bank Data
[93] The GCI measures the drivers of Total Factor Productivity (TPF) and is the product of an aggregation of 103 individual indicators, split into 12 pillars: Institutions; Infrastructure; ICT adoption; Macroeconomic stability; Health; Skills; Product market; Labour market; Financial system; Market size; Business dynamism; and Innovation capability.
[94] WEF_TheGlobalCompetitivenessReport2019.pdf (weforum.org), xiii.

Table 5.1.1 Top ranking countries on the WEF Inclusive Development Index (2018) and their Global Competitiveness Index ranks (2019)

	Inclusive Development Index (2018)	Global Competitiveness Index (2019)
1	Norway	17
2	Iceland	26
3	Luxembourg	18
4	Switzerland	5
5	Denmark	10
6	Sweden	8
8	Ireland	24
11	Finland	11
13	New Zealand	19
21	United Kingdom	9

These rankings on the IDI and GCI shows that it is possible for countries to achieve both socioeconomic development and economic competitiveness. The two can work together and drive a virtuous circle, which rewards investment in inclusion, equality and sustainability, with long-term gains in growth and productivity.

Figure 5.1.1 Inclusive Growth and Development Framework[95]



The WEF also ranks countries across seven structural economic policy and institutional strength pillars (see Figure 5.1.1) that cover fifteen areas judged to contribute to inclusive

[95] WEF_Forum_IncGrwth_2017.pdf (weforum.org), viii.

economic development or transformation. The top six performing countries on the Inclusive Growth and Development Framework all score highly across the seven areas. The only area where the UK performs relatively better than most of these countries is Pillar 7: Fiscal Transfers (UK ranks third), and to some extent Pillar 5: Asset Building (UK ranks fourth).

5.2 Policy Approaches for Successful Small Advanced Economies

There is no single 'best practice' to delivering economic transformation.[96] The high performing advanced economies all have significant differences in approaches and respond differently to a range of local political and economic contexts. There are, however, common features found in high performing small economies and are not in the less successful ones and all are a result of specific policy choices.

Overall, the evidence suggests that successful small advanced economies have tended to be rigorously strategic about strengthening their economic competitiveness through investing in their human capital and supporting innovation. They focus on choosing their areas of outward activity through careful development of existing strengths and targeting of potential international markets.

Prioritising Innovation and Human Capital: Most small advanced economies demonstrate strong, sustained investment in knowledge, innovation and human capital. High performing economies, such as Switzerland and several Scandinavian countries, perform particularly well on the GCI's innovation and business sophistication measures.

Strategic Coherence: High performing small economies all demonstrate a high degree of policy coherence in their approaches; demonstrate flexibility when responding to shocks and structural changes. For example, the Scandinavian nations and Switzerland all have flexible labour market policies, but also strong social insurance systems to protect their flexible workforce and to mitigate the risks that come with flexibility. Following the 2008 crisis, the countries that recovered quicker tended to have an increased focus on:

- building economic resilience and an increased awareness of economic risk;
- deliberate efforts to boost productivity, either through structural reform such as Productivity Commissions, or through other policy levers, like increased business investment and encouraging innovation; and,
- strategies to diversify international footprints, either through trade agreements or through supporting firms to expand internationally.

Active International Engagement: High performing small advanced economies also tend to have active international engagement, which lets them access larger markets. A business base that has more large companies per capita and that can readily access global markets supports this. External relations policies—whether that takes the form of trade agreements or a skills focus on enterprise and international expansion—support this international engagement.

[96] Economic-Context-and-Policy-Approaches-in-Small-Advanced-Economies.pdf, 3.

Annex 1 Modelling Assumptions

Export Plan

- The Export Growth Plan {Scotland: a trading nation - gov.scot (www.gov.scot)} set a target of increasing Scotland's international exports from 20% to 25% of GDP.
- From international trade modelling perspective, various policy levers outlined in the plan are best thought of as a reduction in trade barriers for Scottish exporters with countries across the world. In a standard trade model, lowering barriers with one trading partner is expected to increase bilateral trade and can affect trade with other trading partners.
- The overall export change of ~5% has been informed using a global trade model GTAP with the original GTAP database adjusted to include Scotland as a separate region. An illustrative reduction in Scotland's trade barriers with the Rest of the World partners has been modelled to achieve a 25% increase in International Exports in line with previous SG modelling for the Export Growth Plan. The externally calibrated shock fed into a CGE model gradually over the 10 years together with other policy changes.
- Finally, as academic evidence also suggests that higher trade openness has a positive relationship with productivity, an additional productivity shock was incorporated into a CGE modelling scenario together with export shocks. The size of the productivity shock was informed by empirical evidence on the link between trade and productivity (i.e. using an elasticity of 0.2 informed by empirical evidence[97], a 5% increase in trade is assumed to lead to a 1% increase in productivity).

Inward Investment and Global Capital Investment Plans

- The Inward Investment Plan {Shaping Scotland's economy: inward investment plan - gov.scot (www.gov.scot)} set out ambition of increasing Scotland's attractiveness as a destination for inward investment to ensure that Scotland's Foreign Direct Investment (FDI) performance is generating spillovers similar to the levels seen in the East of England (the best performing UK region as estimated in the UK Government analysis).
- In addition, the Global Capital Investment Plan {Investing with Purpose: global capital investment plan - gov.scot (www.gov.scot)} set out how the Government hopes to increase the flow of private capital to the economy.
- Literature on the link between FDI and productivity is more limited than for trade openness, and even more so for business investment.
- The FDI plan is expected to increase FDI flows as well as productivity spillovers from FDI. Empirical elasticities between FDI and productivity are small- i.e. increasing FDI stock by 50% and under higher spillover utilisation (with the elasticity of productivity of 0.07 estimated for the East of England vs 0.03 estimated for Scotland in the Department for International Trade study[98]) relative to the baseline would suggest a

[97] Modelling the long-run economic impact of leaving the European Union – ScienceDirect Distance, trade, and income — The 1967 to 1975 closing of the Suez canal as a natural experiment - ScienceDirect

[98] Estimating the economic impact of FDI to support DIT's promotion strategy: analytical report - GOV.UK (www.gov.uk)

productivity improvement of 2% in 10 years' time in Scotland. Larger increases in FDI stock relative to the baseline would generate greater improvements in productivity.
- Evidence on elasticities between investment and productivity is more limited.
- Taken together, both of these policies are modelled as a 4% increase in productivity, in line with previous Scottish Government modelling for the FDI plan but under a simplifying assumption that both plans achieve this potential improvement in productivity, reflecting productivity spillover effects from the FDI plan and higher productivity from increased innovation, infrastructure and R&D investment under the Global Capital Investment Plan.

Higher Real Wages linked to Productivity Improvements.

- The policy is modelled as a ~1% change in average gross wages, to reflect improvements in productivity.
- In a standard CGE model, an increase in wages lowers demand for labour which leads to lower employment. At the same time, numerous empirical evidence on the employment effects of minimum wages suggests low or modest impact.[99] The overall wage shock for the CGE model has been calibrated such that effective cost to firms generates changes in employment in line with the empirically observed elasticities (i.e. an elasticity of 0.3 implies that a 1% increase in wages results in 0.3% loss of employment).

Sensitivity Analysis

Productivity Shock

- The ambitions set out in this scenario are taken as given and if some targets are not met, the resulting economic boost is likely to be smaller. Expected changes to productivity and trade are relatively large in nature and exhibit a degree of overlap. Some ambitions may take longer to materialise than the assumed 10 year horizon.
- Historically, real labour productivity in Scotland grew at a rate of ~1% per annum but in the recent years it has been much lower.
- To reflect some of the uncertainty around productivity impacts, two additional illustrative scenarios have been explored for where productivity gains are lower and higher in 2032. Under both scenarios, international exports are still expected to increase by ~25%.
- The illustrative low (high) scenario shows productivity gain two standard deviations below (above) the 5% increase assumed in the main scenario. The standard deviation measure (~2%) is calculated based on the historical real labour productivity growth in Scotland.
- If the productivity gains over 10 years are higher (lower) than assumed in the scenario then the economy would be 6.3% (3.4%) larger in 2032 than the baseline.
- Both scenarios aim to provide a crude illustration of highest deviation in annual growth based on past performance around the assumed improvement of 5% in labour productivity by 2032.

[99] Impacts of minimum wages: review of the international evidence - GOV.UK (www.gov.uk)

Labour Market Parameters

- Different labour market closures (and migration) – less important when modelling a scenario (a combination of demand and supply side shocks) rather than individual policies.
- A direct shock to wages to model the Real Living Wage policy can be only be introduced under the fixed nominal wages closure (i.e. nominal wages are determined exogenously at a UK level but real wages adjust).
- For this reason, the sensitivity analysis for the labour market closure has been explored without the real living wage shock.
- Assuming a regional bargaining closure (rather than fixed nominal wages) in the labour market does not change significantly the GDP path over the 10 year horizon (GDP impact in 2032 increases by 0.1 percentage points) However, this closure results in a much higher expansion of the economy in the long run.

Production Function Parameters

- Substitution between capital and labour is one of the main parameters in the production function – it measures how easy it is substitute one input for another, and is linked to relative prices of labour and capital.
- One of the large shocks in the modelled scenario is an increase in labour productivity. Initially, it lowers demand for labour but as workers are now more productive, the effective cost of labour falls, encouraging firms to use more of labour (as it is now cheaper relative to capital). This means that employment impact in the model is likely to be sensitive to the value of elasticity.
- With higher elasticity of substitution between capital and labour, (0.8 vs 0.3), the boost to employment is higher than in the main scenario (2.3% vs 1.1%) , reflecting that firms find it easier to substitute workers for capital. GDP results are less sensitive to this parameter as the value of elasticity is expected to alter the composition of inputs used by firms when producing goods and services (GDP impact increases by 0.2 percentage points).

Limitations

- CGE models are not forecasting tools but provide an indication of how the economy may change relative to the baseline given a well-defined policy scenario.
- The targets set out in the policy scenario have been taken as given, and a range of simplifying assumptions have been used to demonstrate the potential benefits to the economy without assessing the feasibility of achieving these ambitions. If some targets are not met, the boost to the economy is expected to be lower.
- Net zero and Covid-19 – transformations already underway will have huge implications for the baseline. Also, Covid-19 part in accelerating longer term trends (more remote working, decline of large high street retail, technology/automation, demographics etc.).
- Shocks to trade and productivity are relatively large in nature and exhibit a degree of overlap – i.e. exports, inward investment and capital investment shocks all impacting on labour productivity.

- Combining all scenarios into a single mix of policy changes may introduce inconsistencies with the previous modelling of these policy changes in isolation.
- In addition to the uncertainty around the scenarios themselves, the modelling results are also influenced by parameters of the model – e.g.,. assumptions around how labour markets operate (labour market closure), how governments collect taxes and spend revenues (fiscal closure), and how migration flows between Scotland and the Rest of the UK respond to changes in economic policy (migration closure).
- In addition, the SG CGE model was not build to model economic decision making at a granular level (beyond a single representative household or firm). For example, the model does not consider how firms operating in different sectors or firms of different sizes may respond to changes in incentives; neither does it attempt to differentiate between different types of workers or different types of capital or investment. This means that the model is most useful in providing the direction of travel for the aggregate outcomes (such as GDP, employment, trade) with more limited sectoral insights.

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