

Sectoral influences on Scotland's productivity performance

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Abstract

Productivity is an important driver of economic growth and a key determinant of wages and living standards. Scotland's productivity performance is below a number of other economies, and the Scottish Government's ambition is to match the performance of the top quartile of OECD countries. This paper considers the role that Scotland's sectoral employment structure has played in recent productivity performance. The findings show that a majority of Scotland's employment is in sectors that have below overall average productivity levels, and the employment levels in these sectors has increased in recent years. Conversely, employment has declined in a number of sectors that have above overall average productivity. Also, productivity levels in a number of large employing sectors have increased, but this has been offset to an extent by falling productivity in others. Sectoral employment and productivity trends have slowed the overall growth of productivity in Scotland. The paper then considers the implications for future forecast employment growth on productivity performance.

1. Introduction

Productivity is an economic measure of the efficiency of production and is expressed as the ratio of output to inputs used in the production process. It is critical to economic growth and international competitiveness; and is the single most important determinant of living standards, earnings and wealth. Scotland has the ambition to match the OECD's best performing countries for productivity¹, and productivity performance is a key indicator in Scotland's National Performance Framework².

Although GDP growth has been relatively strong in the UK and Scotland since 2008, productivity growth has been weak. GDP growth has been driven recently by increasing (to a record high) employment and more hours being worked rather than by higher productivity. However, it is

¹ [Enterprise and Skills Board: strategic plan](#)

² [National Performance Framework](#)

recognised that, "unless we improve productivity while holding on to high employment, we cannot raise living standards and quality of life for our citizens"³. Additionally, as Scotland's population ages and the number of people in traditional working age groups decline, productivity will need to increase for businesses to sustainably grow.

Across the UK, poor productivity performance has been mostly attributed to a 'long tail' of underperforming businesses⁴. Also, new research by the Office for National Statistics (ONS) suggests that changes in the mix of industry sectors have held back productivity growth as more people are working in unproductive sectors⁵ and that although productivity could increase in every individual sector, overall productivity could fall if a sufficient number of workers continue to move from higher to lower productivity sectors.

This paper analyses Scotland's productivity to identify the sectors that have been driving overall performance and to assess the effect of recent sectoral employment changes. The paper also examines the possible impact of future employment changes on Scotland's productivity performance.

2. Scotland's recent productivity performance

In 2007, relative to other OECD countries, Scotland was ranked in 16th place for productivity performance (measured as GDP per hour worked) and in the second quartile of OECD countries - and has remained in 16th place in every year to 2017⁶ (refer Figure 1). However, the gap between Scotland's productivity level and the bottom of the top quartile of OECD countries has increased from 15.6% in 2007 to 17.3% in 2017, meaning that Scotland has become less competitive.

Compared to other UK regions, Scotland's recent productivity performance has been relatively strong. For productivity measured by GVA per worker, Scotland ranked 4th of 12 UK regions in 2017 (refer Figure 2). With average GVA per worker of more than £53,000, only London, the

³ [Industrial Strategy: building a Britain fit for the future, BIS](#)

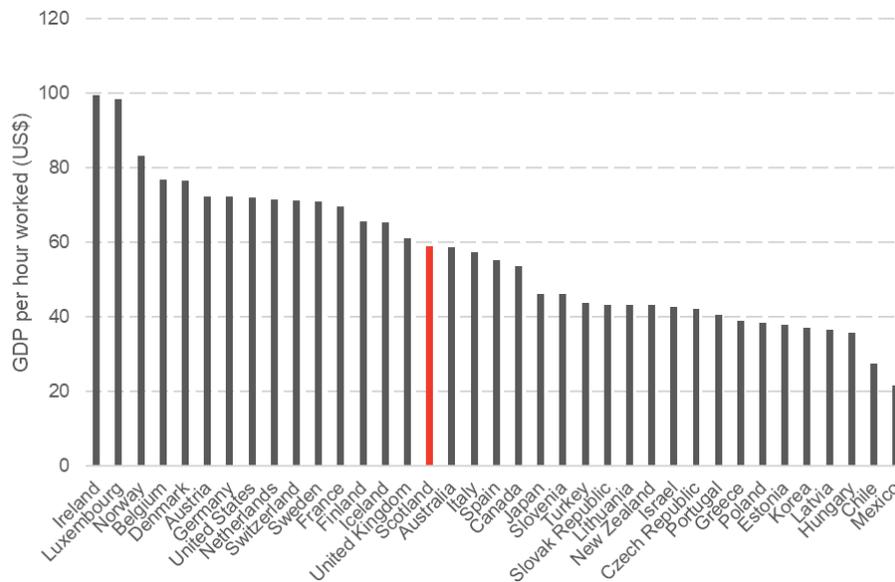
⁴ [Productivity puzzles - speech by Andy Haldane, Bank of England, 2017](#)

⁵ [UK productivity research summary: February 2018, ONS](#)

⁶ [National Performance Indicators, Scottish Government](#)

South East and East of England outperformed Scotland. Using productivity measured by GVA per hour, Scotland ranked 3rd out of 12 UK regions (refer Figure 3).

Figure 1: GDP per hour worked, OECD countries 2017



Sources: OECD, Scottish Government

Figure 2: UK regions GVA per worker, 2017

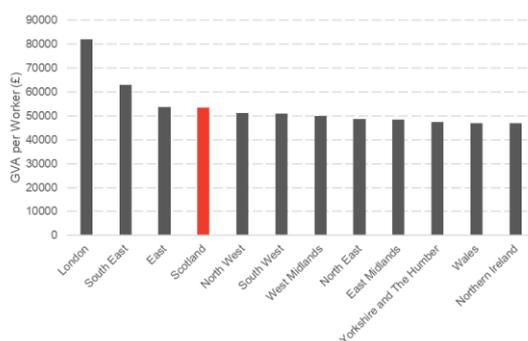
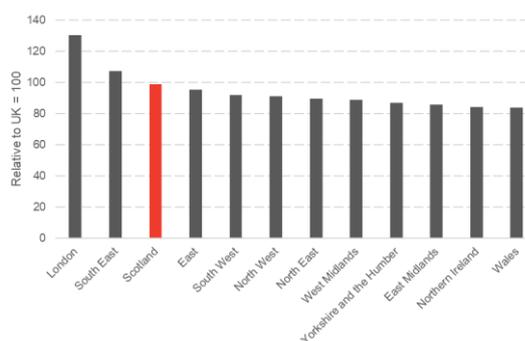


Figure 3: UK regions GVA per hour, 2017

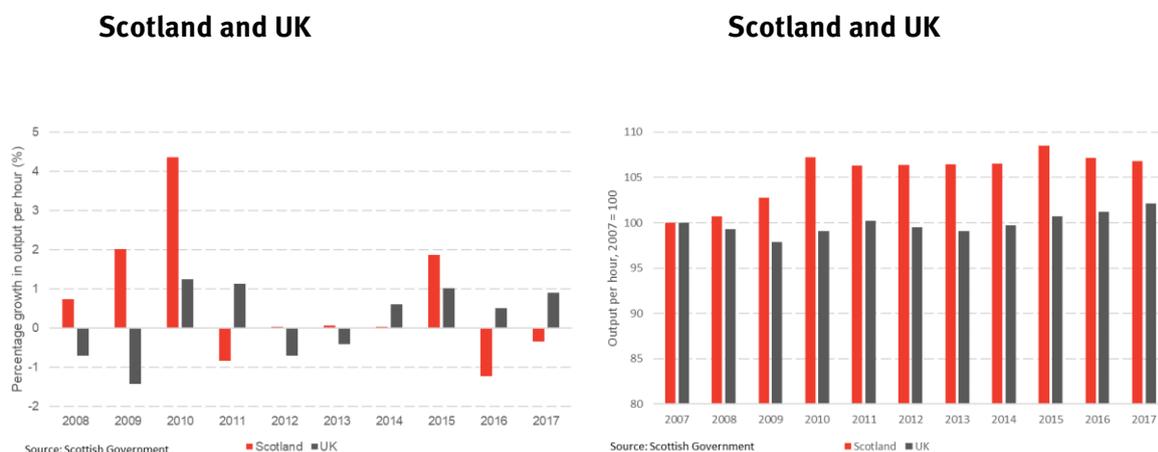


Source: ONS Nominal and real regional gross value added (balanced) by industry

Scotland's overall productivity growth has been slightly higher than the UK since 2007, increasing at an annual average rate of 0.7% compared to 0.2% for the UK up to 2017, although productivity declined in three out of ten of these years (refer Figure 4). This meant that by 2017,

the level of productivity in Scotland was 6.8% higher (in real terms) than in 2007, however it was still a full 3.0 percentage points lower than the UK level⁷ (refer Figure 5).

Figure 4: Annual growth in labour productivity, **Figure 5:** Index of labour productivity,



Sources: ONS, Scottish Government

3. Scotland's productivity by industry sector

Analysis of productivity performance by sector provides an indication of the drivers of overall performance. Data on hours worked by sector covering the whole economy are not available for Scotland, however, new GVA statistics⁸ and Business Register and Employment Survey data⁹ allow us to calculate productivity levels and growth rates by sector in real terms (with the effect of inflation removed) based on GVA per worker. Consistent GVA and employment data are available for the years 2010 to 2015¹⁰.

The data show that GVA per worker in Scotland increased by 4.7% across all industry sectors between 2010 and 2015 (compared to growth of 3.6% in the UK). At an industry level, comparable productivity data for Scotland and the UK are available for 14 industry sectors (out

⁷ [Scottish Government Labour Productivity Statistics, Q3 2018](#)

⁸ [Regional gross value added \(balanced\), UK - Office for National Statistics,](#)

⁹ [Extracted from Nomis - Official Labour Market Statistics](#)

¹⁰ GVA data are available for the years 1998 to 2016: consistent employment data are available for the years 2010 to 2015.

of 19¹¹). Overall, the average Scottish productivity level for these 14 sectors was below the UK average in 2015: and of the 14 comparable sectors only 5 had productivity levels above the UK's (refer Table 1)¹².

Table 1: Productivity (GVA per worker) and contribution to productivity growth by sector, Scotland and UK, 2010-2015

Sector	Productivity Level (£) 2015			Percentage Point (PP) Contribution to Total 14 Sector Productivity Growth 2010-15		
	Scotland	UK	Difference (£)	Scotland	UK	PP Difference
Real Estate	476,726	445,325	31,401	1.7	1.6	0.1
Finance & Insurance	104,200	119,010	-14,811	-0.2	-0.4	0.2
Manufacturing	77,899	71,246	6,653	0.0	0.2	-0.2
Information & Communication	73,539	85,586	-12,048	0.8	0.4	0.4
Construction	56,526	71,182	-14,656	0.2	0.4	-0.2
Public Administration	55,900	63,636	-7,736	-0.1	0.2	-0.3
Transport & Storage	55,196	54,852	344	0.0	0.1	-0.1
Professional, Scientific & Technical	49,545	50,473	-929	0.6	0.2	0.4
Education	41,162	38,936	2,226	0.3	0.2	0.1
Wholesale, Retail, Repair	34,786	36,761	-1,975	1.1	1.3	-0.1
Health	30,882	32,648	-1,766	0.1	0.0	0.1
Business Admin & Support	28,597	31,363	-2,766	0.5	0.0	0.5
Agriculture, Forestry & Fishing	26,107	23,049	3,058	0.6	0.2	0.4
Accommodation & Food Services	21,870	23,846	-1,975	-0.8	-0.7	-0.1
All 19 Industries	52,332	56,800	-4,469	4.4	3.5	1.0

Source: Scottish Enterprise calculations based on ONS Nominal and real regional gross value added (balanced) by industry and BRES employment statistics

Some sectors, for example Information & Communication and Professional, Scientific & Technical, contributed more to overall Scottish productivity growth than they did in the UK as a whole, although their productivity levels in Scotland were lower. Relatively stronger

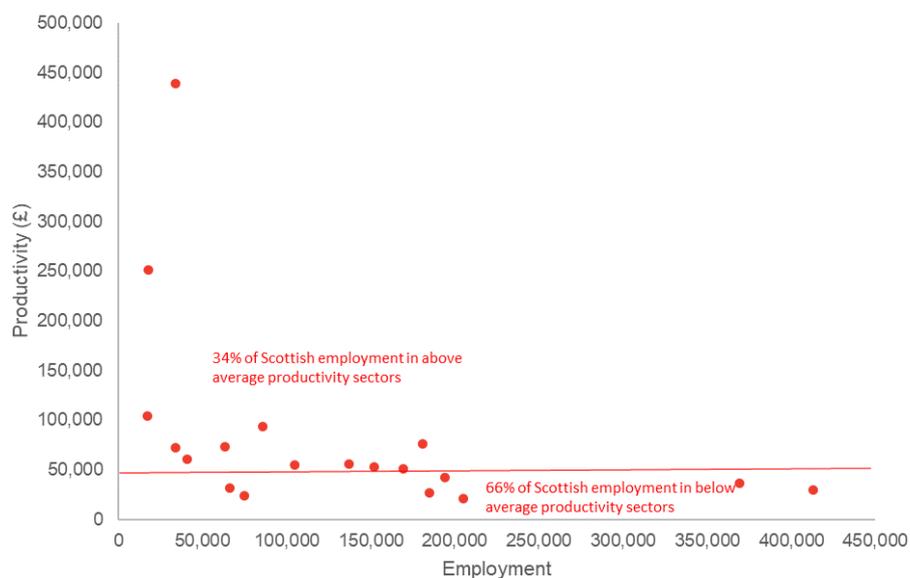
¹¹ Excludes Mining, Quarrying, Utilities, Arts, entertainment & recreation and Other service activities as employment data are not disaggregated to these sectors individually.

¹² Note that the GVA per worker data has not been adjusted to reflect different patterns of full and part time working across sectors. However, initial analysis suggests that adjusting for part-time working does not significantly impact on either the growth rates or the findings.

performance in some sectors such as Finance & Insurance and Business Administration & Support helps to explain Scotland’s relatively better overall productivity growth over the period; however, there are some sectors such as Accommodation & Food and Public Administration which have had, a negative effect on overall productivity in Scotland (refer Table 1).

The distribution of employment and productivity levels across 19 sectors in Scotland in 2015 shows a ‘long tail’ (8 sectors) with below average Scottish productivity (£52k) and 66% of Scottish employment.

Figure 6: Distribution of Scottish employment and productivity levels, 2015



Sources: ONS Nominal and real regional gross value added (balanced) by industry, BRES

Productivity declined between 2010 and 2015 in seven out of the 11 sectors with above overall Scottish average productivity levels, while six out of eight sectors with below average productivity improved their performance, indicating that the spread of productivity performance across sectors is narrowing.

Two sectors with the highest productivity levels, Utilities and Real Estate, contributed 1.7 percentage points to Scotland’s overall 19 sector productivity growth of 4.7% between 2010 and 2015 although they accounted for only 2% of total employment (52,000 workers) in 2015. If the

contribution to productivity growth of these two sectors is excluded, overall Scottish productivity (GVA per worker) would only have increased by 3% (rather than 4.7%) between 2010 and 2015. The two largest sectors in terms of employment, Health & Social Work and Wholesale & Retail, accounting for 30.8% of employment (782,000 workers), contributed 1.2 percentage points (25%) to overall 19 sector productivity growth between 2010 and 2015, as their productivity increased.

Table 2: Productivity (GVA per worker), productivity growth and contribution to productivity growth by industry sector, Scotland, 2010-2015

Broad Sector	GVA per worker 2015 £	Productivity Growth 2010-2015 (%)	Percentage Point Contribution to Productivity Growth 2010-2015
Real estate ¹³	471,118	-6.6	1.7
Wholesale, Retail, Repair	34,767	13.1	1.1
Information & communication	73,889	26.6	0.8
Professional, scientific & technical	49,574	12.0	0.6
Agriculture, forestry & fishing	26,107	27.6	0.6
Administrative & support	28,535	19.4	0.5
Other service activities	64,171	24.4	0.4
Education	41,098	4.7	0.3
Construction	56,650	2.7	0.2
Human health & social work	30,860	5.5	0.1
Mining & quarrying	81,265	-1.9	0.1
Transportation & storage	55,038	-1.0	0.0
Manufacturing	78,028	-1.4	0.0
Utilities	237,222	3.7	0.0
Public administration & defence	55,789	-1.4	-0.1
Financial and insurance	104,442	-2.7	-0.2
Water & waste management	100,882	-19.2	-0.2
Arts, entertainment & recreation	30,803	-19.9	-0.4
Accommodation & food	21,902	-2.4	-0.8
All industries	52,340	4.7	4.5

Source: Scottish Enterprise calculations based on ONS Nominal and real regional gross value added (balanced) by industry and BRES employment statistics

¹³ Real Estate GVA includes imputed rental and represents around 10% of GDP. Rental estimates are also imputed for rent-free dwellings and second homes; therefore, this inflates the level of GVA per worker as there is no employment for these dwellings.

4. Employment change and productivity

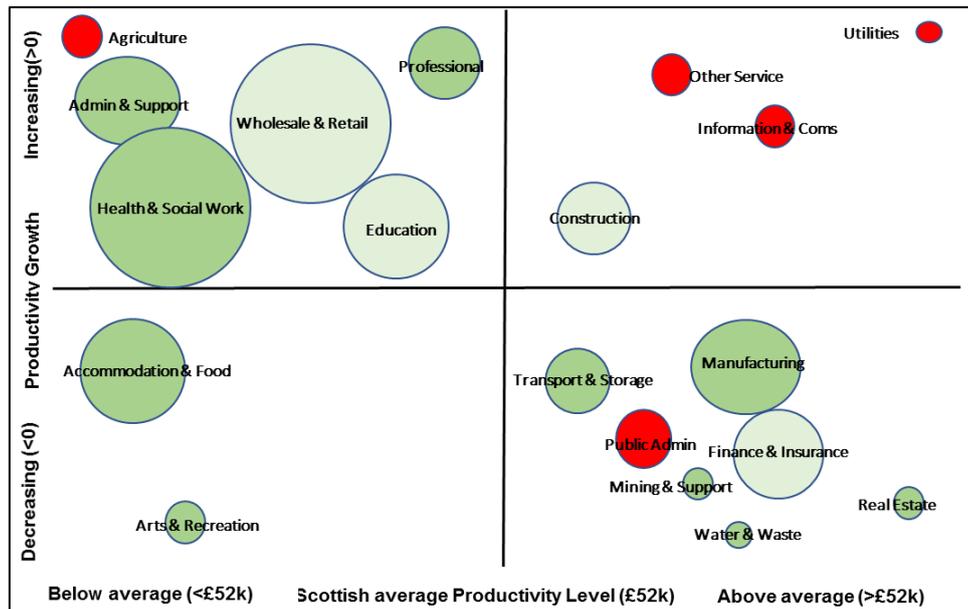
Employment in Scotland increased by 108,000 (+4.4%) between 2010 and 2015. More than 80% of this growth was in sectors with below average Scottish productivity. This means that the proportion of employment in sectors with below average productivity in Scotland rose over the period by 5.5%.

This is highlighted in Figure 7, which shows sectors in quadrants by productivity growth and productivity level (the bigger the bubble, the more people are employed in the sector):

- Top right: increasing productivity growth/above average¹⁴ productivity level - these sectors are small and represent 10% of Scottish employment and are characterised by declining employment. No sectors increased employment.
- Top left: increasing productivity growth/below average productivity level - these sectors are generally large, accounting for 55% of Scottish employment and have increasing or stable employment.
- Bottom left: declining productivity growth/below average productivity level – one sector is relatively large (Accommodation & Food), one small (Arts & Recreation), and overall the sectors account for 11% of Scottish employment and have grown employment, but are characterised by declining and below average productivity
- Bottom right: declining productivity growth/above average productivity level – five sectors of varying size, accounting for 24% of Scottish employment with declining productivity and growing employment.

¹⁴ Average across 19 sectors

Figure 7: Scottish productivity and employment¹⁵



Sources: ONS Nominal and real regional gross value added (balanced) by industry, BRES

Note: Neutral employment growth is defined as around zero employment growth.



Overall, this analysis shows that:

- Scotland does not have enough sectors or employment in the top right quadrant; indeed, employment is declining in most of the sectors in this quadrant.
- Most of Scotland’s employment is in the six sectors in the top left quadrant. Although productivity increased faster than employment in most of these sectors, there are too many in this quadrant.
- In the bottom right quadrant productivity levels are higher than the Scottish average. However, productivity is falling in these sectors and employment is mainly increasing, which has slowed down Scotland’s overall productivity growth.

¹⁵ Productivity levels are for 2015 and employment and productivity growth are for 2010-2015. Employment neutral refers no, or low, employment growth.

- There is growing employment in the bottom left quadrant where productivity levels are low and declining, which has slowed down Scotland's overall productivity growth.

5. Implications of employment changes on Scotland's productivity growth in the future

It is estimated that the number of people employed in low productivity sectors could increase by around 100,000 by 2025 (more than 80% of the increase in employment), while the number of people in higher productivity sectors is only expected to increase by around 20,000¹⁶.

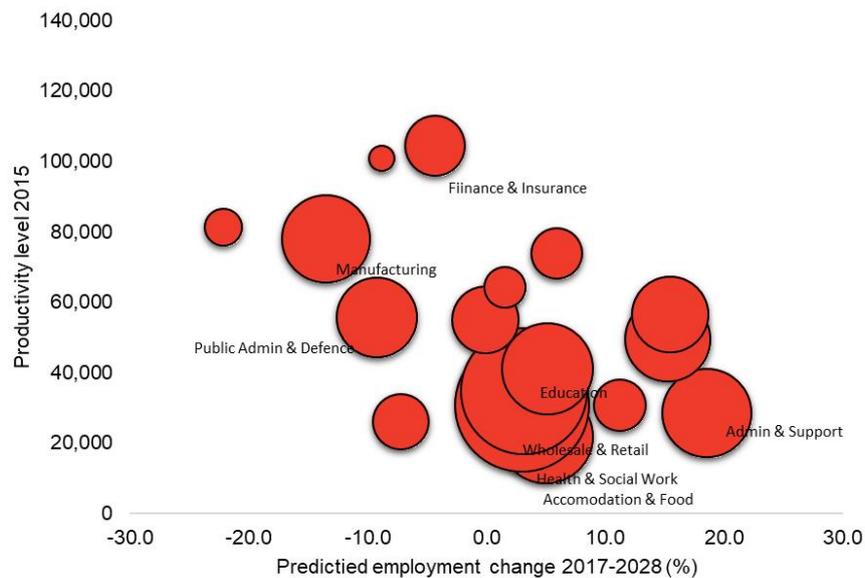
Figure 8 shows the predicted employment change by sector, where the size of the bubble shows a sector's share of overall Scottish employment. It highlights the extent of expected employment growth in large employment/low productivity level sectors, such as Wholesale & Retail, and expected employment decline in some high productivity level sectors such as Manufacturing¹⁷.

This emphasises the need to improve productivity performance in sectors with low productivity levels will be important if Scotland's overall productivity performance is to be sustained, far less enhanced. If sectoral productivity levels remain at 2015 levels (with 0% growth) then overall productivity in Scotland could fall by -1.2% between 2015 and 2025 due simply to the shift in employment to sectors with lower productivity levels.

¹⁶ [Regional Skills Assessments: People and Skills Supply 2018, Skills Development Scotland](#)

¹⁷ [Skills Development Scotland Regional Skills Assessment 2018](#)

Figure 8: Predicted Scottish employment change by productivity level, by sector 2017-2028



Employment change based on [Skills Development Scotland figures](#). Excludes utilities and real estate sectors as their high productivity levels skew the chart.

Table 3 shows the estimated impact on total Scottish output and productivity based on forecast employment levels for each sector by 2025 and for two illustrative productivity growth scenarios:

- Scenario One: if 2010-2015 productivity trends for each sector continue over 2015-2025
- Scenario Two: if declining productivity sectors improve their performance and achieve average Scottish productivity growth of 2010-15 while growing productivity sectors maintain performance.

In the first scenario, if productivity levels were to increase/decline at the same rate to 2025 as they did between 2010-15¹⁸, then total Scottish output could increase by around £16bn in real terms (+12.1%). Scotland's overall productivity level would also increase: however, growth would only be around 7% over the decade, (or at an annual average rate of 0.7% compared to annual average growth of 0.9% between 2010 and 2015) because of changes in industry structure and employment levels and continuing declines in productivity in some sectors.

¹⁸ For example, Manufacturing productivity increased by 8.6% and if it then increased by 17.2% between 2015 and 2025 total output for the sector would be £14.8bn

Table 3: Output projections for productivity growth scenarios

Sector	Productivity 2015	Employment 2025 estimate	Scenario One: Output (£m) 2025 in real terms at 2010-15 productivity growth rate	Scenario Two: Output (£m) in real terms if declining productivity sectors match Scottish average growth rate 2010-15
Agriculture, forestry & fishing	26,107	78,000	3,162	3,162
Mining & quarrying	81,265	25,000	1,953	2,221
Manufacturing	78,028	166,000	12,595	14,159
Utilities	237,222	17,000	4,328	4,328
Water & Waste	100,882	18,000	1,120	1,985
Construction	56,650	168,000	10,027	10,027
Wholesale, retail, repair	34,767	374,000	16,397	16,397
Transportation & storage	55,038	110,000	5,934	6,618
Accommodation & food	21,902	205,000	4,276	4,908
Information & communication	73,889	73,000	8,267	8,267
Financial & insurance	104,442	81,000	7,996	9,248
Real estate	471,118	36,000	14,726	18,541
Professional, scientific, technical	49,574	200,000	12,285	12,285
Administrative & support	28,535	224,000	8,869	8,869
Public administration & defence	55,789	146,000	7,909	8,904
Education	41,098	203,000	9,124	9,124
Human health & social work	30,860	413,000	14,142	14,142
Arts, entertainment & recreation	30,803	79,000	1,464	2,660
Other service activities	64,171	49,000	4,677	4,677
All industries	52,340	2,665,000	149,253	160,524

In the second scenario, total Scottish output could increase by around 21% to £161bn in real terms, and the overall productivity level could increase at an annual average rate of 1.4% compared to annual average growth of 0.9% between 2010 and 2015.

The difference in the average productivity level between these two illustrative scenarios is £4,000 per worker. If productivity levels increase/decline at the same rate between 2015-2025, the productivity level is estimated at around £56,000 per worker compared to around £60,000

per worker if declining productivity sectors achieve average Scottish productivity growth. In turn, this will support higher average wages and living standards for workers in Scotland.

Although employment is predicted to increase in some higher productivity sectors (such as Construction and Information & Communication), these sectors account for relative small proportions of Scottish employment. Key to improving living standards a quality of life in the future, therefore, is to improve productivity levels in the low productivity sectors where employment is growing.

Conclusions

This analysis shows there is a need to grow Scottish productivity by reversing declining productivity levels in high productivity sectors (e.g. Manufacturing); and increasing the productivity levels in high employment/low productivity sectors (e.g. Accommodation & Food).

In recent years, combined productivity and employment changes across sectors has tended to restrict Scotland's overall productivity growth. As increasing proportions of Scotland's employment move towards lower productivity sectors, a focus on enabling productivity growth in those sectors will have a positive impact on Scotland's overall productivity level. This is particularly important as the data imply that much of Scotland's expected future employment growth is likely to be in traditionally lower productivity sectors.

Box 1: Key trends add impacts on overall Scottish productivity growth, 2010 - 2015

Trend	Impact on overall productivity growth 2010-2015
<p>Productivity and employment growth in sectors with low productivity levels.</p> <p>The two largest sectors, Health & Social Work and Wholesale & Retail accounted for 30.8% of employment and added 1.2 percentage points to Scotland’s overall productivity growth.</p>	Positive
<p>Growing productivity in high productivity sectors</p> <p>Although employment is falling in some sectors (such as Information and communications), growing productivity is offsetting this so they are still making a positive contribution to overall productivity</p>	Positive
<p>Employment growth in sectors that have low and declining productivity levels</p> <p>This includes Accommodation & Food that is a high employment sector that deducted 0.8 percentage points from productivity growth.</p>	Negative
<p>Employment growth in sectors that have high but declining productivity level sectors</p> <p>For example, Finance & Insurance deducted 0.2 percentage points from overall productivity growth.</p>	Negative

A sustained focus on increasing productivity levels in high employment sectors will be key to raising wages of workers in these sectors, and Scotland’s overall productivity level. To support this, there are a range of approaches that include, for example:

- The Tourism Action Plan¹⁹ aims to help businesses, particularly small businesses, to improve their productivity and growth. One element is a free online tool to help businesses in the hospitality sector assess their performance, benchmark themselves and understand where there is room for improvement.
- The Scottish Manufacturing Action Plan is based on a commitment to raising productivity through increased investment and innovation, including through the launch of a new

¹⁹ [Tourism Action Plan 2016](#)

Workplace Innovation Service²⁰. The Scottish Manufacturing Advisory Service also supports businesses to increase productivity and boost competitiveness²¹.

- Construction Scotland's 'Profit through Productivity' plan sets out how the sector can become more competitive and productive by increasing productivity;²² and UK Industry Strategy Sector Deal (which covers several sectors) for Construction is expected to substantially boost the sector's productivity, through greater investment in innovation and skills, creating new and well-paid jobs and maximising its export potential²³.

Achieving a step change in the productivity performance of high employment sectors in Scotland will be key to creating more quality jobs, raising the incomes of a significant proportion of the workforce and reducing income inequalities.

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²⁰ [A Manufacturing Future for Scotland: action plan](#)

²¹ [SMAS](#)

²² [Profit Through Productivity, Construction Scotland](#)

²³ [The UK's Industrial Strategy](#)