Scotland's Productivity Performance: Latest data and insights

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Abstract

This paper reviews the latest data and evidence on Scotland's recent productivity performance, including comparisons with the UK and internationally. It analyses trends in a number of the drivers of productivity, and considers how these have influenced productivity performance. This analysis develops our evidence base further, helping to inform discussions on where policy should focus across the drivers of innovation, internationalisation, investment and inclusive growth. The evidence suggests that Scotland's weak productivity growth and level is due to a mix of several factors, including: 'labour hoarding'; low interest rates and 'forbearance' by banks; reduced business investment; slowing innovation; and a declining number of exporters. The analysis highlights the need to continue a policy focus on innovation, internationalisation and investment as ways to improve Scotland's productivity performance and contribute to inclusive growth.

1. Introduction

Productivity is a measure of how well an economy uses resources to produce outputs, and is a fundamental determinant of any economy's international competitiveness and living standards. Scotland's Economic Strategy highlights that productivity is the principal long-term driver of economic growth, and that raising productivity typically leads to higher incomes, living standards and wealth[1]. The Scottish Government has set a target that Scotland's productivity level should match the performance of the top quartile of OECD countries[2].

2. Why is productivity important?

Productivity measures the efficiency of production and is expressed as the ratio of output (GDP) to inputs used in the production process. GDP per hour worked and per worker are the two most commonly used measures.

Productivity is critical to economic growth. Over the long-term, improvements in productivity performance will increase the competitiveness of an economy and make the largest contribution to increases in overall economic growth rates. As employment rates in Scotland reach historic highs and the working age population is forecast to decline from the early 2020s, increases in productivity will be needed to sustain economic growth rates.

[1] *Scotland's Economic Strategy, Scottish Government, 2015*
[2] *Scotland Performs, Scottish Government, 2007*

Productivity is also the single most important determinant of average living standards and wealth, and is tightly linked to incomes[3]. Figure 1 shows that in nearly every OECD country where productivity is above the Scottish level, annual average wages are also higher[4]. Across the OECD, on average for every 1% increase in productivity, annual wages are around 0.8% higher.

If Scotland's productivity matched that of the UK, this could result in annual average wages being almost £440 higher, and if Scotland matched the OEDC top quartile, annual wages could be almost £3,850 or 10% higher.

Figure 1: International Productivity and Living Standards

Source: OECD, ONS

3. Recent productivity performance

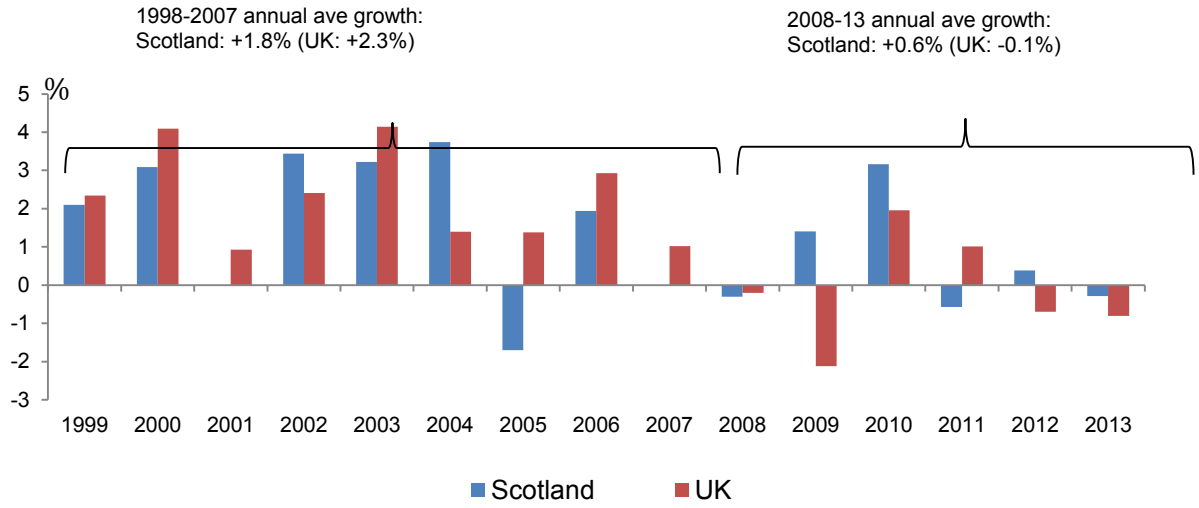
Historically, the UK's labour productivity trend growth rate has been, on average, just over 2% per annum. However, growth has stagnated since the Great Recession, and UK productivity is now 15% below where it would have been had pre-recession growth trends continued[5].

Since 2008, figure 2 shows that Scotland's productivity growth has performed slightly better than that of the UK, growing at around 0.6% per annum, although this is only a third of its pre-recession annual average of 1.8%. Scotland's overall level of productivity is now around 7% lower in real terms than it would have been if pre-recession productivity growth trends had continued. Scotland's recent productivity growth has also been lower than most other OECD countries.

[3] *Fixing the Foundations: Creating a more prosperous nation, , HM Treasury, 2015*
[4] *18 OECD countries have higher productivity levels than Scotland, and all except Spain and Italy have higher annual average wages.*
[5] *Pay and productivity: the next phase, speech by Sir Jon Cunliffe, Bank of England June 2015*

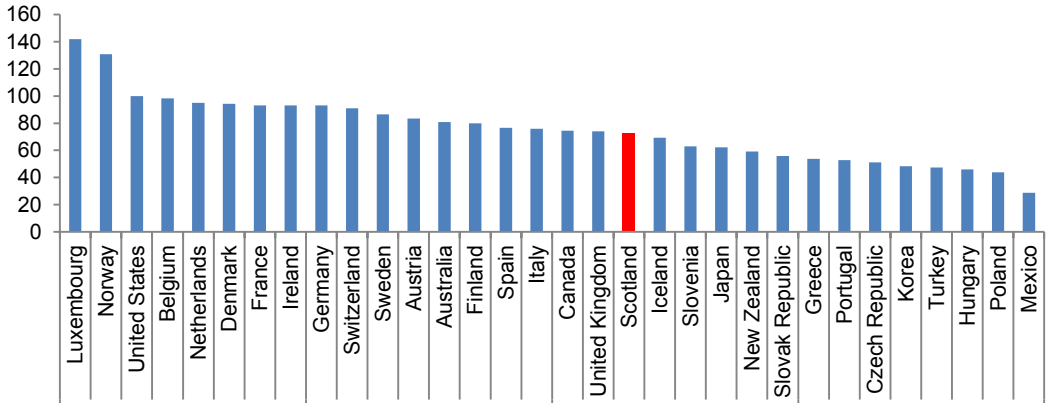
Although Scotland's productivity has grown faster than the UK's, its *level* is still below the UK average (at 97.7% of the UK in 2013, although the gap has narrowed from 94.1% in 2008). Internationally, Scotland's productivity level is in the third quartile of OECD countries (see figure 3), and is lower than many other smaller EU countries. Figure 4 shows that slower productivity growth in Scotland has resulted in the performance gap with the OECD top quartile widening over recent years – in other words, compared to many other countries, Scotland has become less competitive in terms of its overall productivity.

Figure 2: Annual growth in productivity, Scotland & UK (%)



Source: Scottish Government, ONS

Figure 3: International productivity levels, 2013 (Index: USA=100)

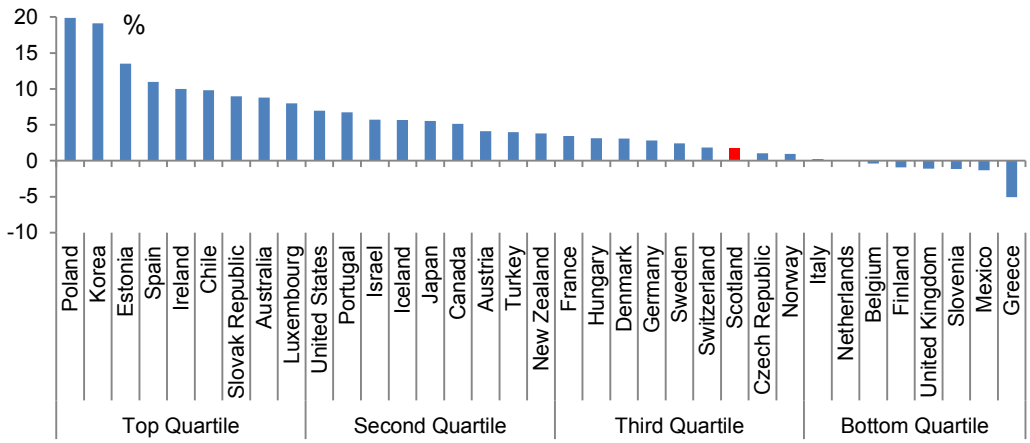


Sources: Scottish Government, OECD

The UK's low productivity growth compared to other countries does not appear to be due to a sectoral mix that is biased towards low productivity sectors, but rather due to low productivity *within* sectors (i.e.

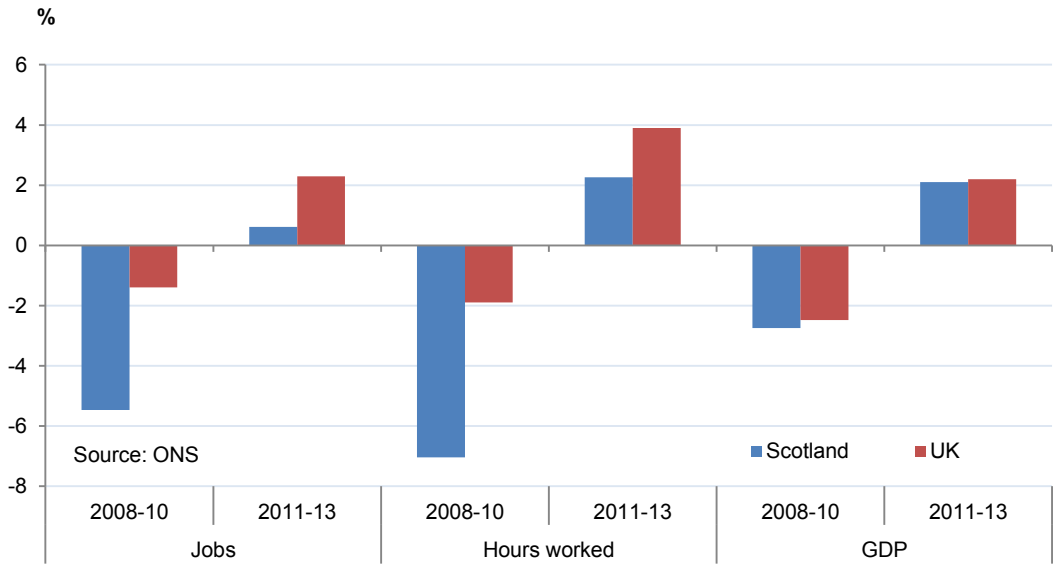
individual sectoral productivity tends to be lower than in other countries)[6]. Data does not allow a comparison of Scotland's sectoral performance with other international countries[7], but as its sector mix is very similar to that of the UK, it is likely that Scotland's low in-sector productivity also largely explains its poorer overall productivity performance relative to other countries.

Figure 4: International productivity growth (%), 2008-2013



Sources: Scottish Government, OECD

Figure 5: Percentage change in jobs, hours worked and GDP, Scotland & UK



Source: ONS

[6] *The Missing Pieces: Solving Britain's Productivity Puzzle, Dolphin, T and Hatfield, I. Institute for Public Policy Research, 2015*

[7] *Data for GDP per hour worked by sector is not available for Scotland. Data for GDP per worker can be estimated, but this is not the ONS preferred measure for international comparisons.*

4. The productivity 'puzzle'

It is not unusual for productivity to fall during an economic downturn. However, what has been unusual is the slower rebound in the UK's productivity since the Great Recession, compared to past recessions. In addition, the UK's productivity performance since 2008 has been far weaker than in many other advanced economies. At the same time, UK GDP growth has been relatively strong (GDP rebounded after an initial steep fall), though this has been driven by more hours being worked rather than higher productivity. These trends have been described as the UK's 'productivity puzzle'[8].

Scottish trends have been slightly different. Figure 5 highlights that, over both the 2008–2010 and 2011-13 periods, GDP performance in Scotland and the UK was very similar, but Scotland experienced a far greater percentage decline in jobs and hours worked over 2008-10, and a lower percentage increase over 2011-13. This resulted in Scotland's better productivity performance over the 2008-13 period. However, the reasons for Scotland's greater labour market adjustment compared to that of the UK are not entirely clear[9].

So, although Scotland's productivity performance has not been as weak as in the UK, growth still lags pre-recession rates and that of many other OECD countries. So, Scotland also has a 'productivity puzzle', just not as pronounced as that of the UK[10].

5. Factors affecting productivity performance

There are several potential factors that can explain the weak productivity growth since 2008 in both Scotland and the UK. These include:

Labour hoarding

Some businesses were unwilling to lay off workers during the recession due the costs of losing staff and skills (and the costs of rehiring when demand picked up) or the need for minimum staffing levels. Many businesses therefore responded by reducing hours worked and wages (real and sometimes nominal) rather than reducing numbers of staff. Evidence suggests this was a factor in the UK, particularly in the period up to 2012, although as noted above, perhaps less so in Scotland. Also, weak demand conditions may have meant that some firms needed to work harder or put more staff resources into winning contracts and retaining existing customers, thereby reducing their productivity.

Impaired capital allocation

Low interest rates could have allowed less profitable (and lower productivity) businesses to remain operational as they were able to service low debt interest repayments. Linked to this, lenders may have been reluctant to foreclose on some poorer performing businesses because of the potential damage to

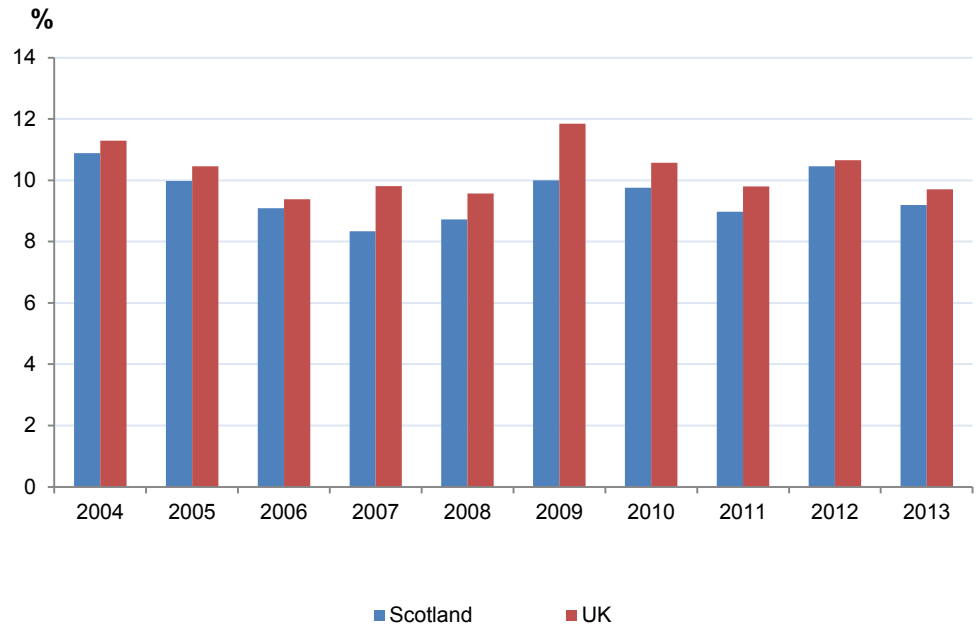
[8] *What is the productivity puzzle? ONS digital, 2015*
[9] *Fraser of Allander Economic Commentary, Vol. 36 No. 2, Fraser of Allander Institute, Strathclyde Business School, 2012*
[10] *Productivity Puzzle, 'State of the Economy', Scottish Government, November 2012,*

their balance sheets, and so provided 'forbearance' through leniency or support to those firms struggling to meet their obligations.

Research shows that UK SMEs in receipt of forbearance have productivity levels 40% below that of other SMEs, although at the UK level only a small proportion (around 6%) were in receipt of forbearance in 2013[11]. Low interest rates and forbearance are likely to have allowed some poorer performing businesses to survive that, in normal times, would have failed (so-called 'zombie businesses'), resulting in business failure rates being lower than would perhaps have been expected.

Data suggests that the level of business 'deaths' did not rise significantly over the period of the recession, and were lower in Scotland than in the UK. Figure 6 shows that although the business death rate increased in Scotland and the UK after 2008, particularly in 2009, the increase was possibly less than might have been expected given the depth of the recession. This in turn may have impaired the reallocation of capital to fund new or more dynamic businesses with the potential to achieve higher productivity.

Figure 6: Business 'deaths' as % of total active businesses, Scotland & UK



Source: ONS

Weak Business Investment

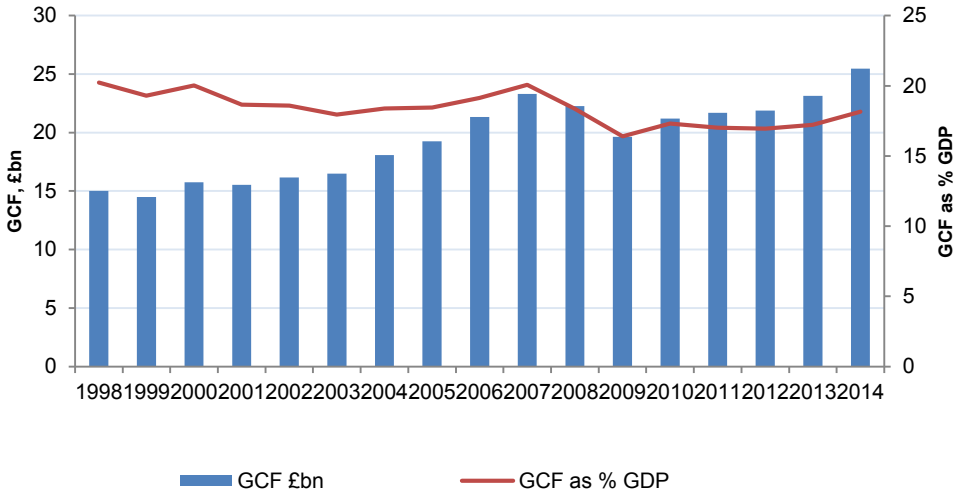
Industries with a larger stock of capital per worker tend to have higher levels of productivity[12], and some estimates suggest that most of the fall in UK labour productivity could be accounted for by declines in

[11] *SME forbearance and its implications for monetary and financial stability, Bank of England, Quarterly Bulletin Q3 2013, pages 296-303*
[12] *Economic Review, Banks, A, Taylor, C. and Wales, P. ONS, July 2014*

effective capital per worker[13]. The level of UK capital stock per worker has generally grown since 2008, but at below pre-recession rates (and indeed it declined in 2011)[14]. Capital stock figures for Scotland are not available, but trends are assumed to be broadly similar.

Capital stock growth is driven by business investment. Annual levels of business investment in the UK declined in the early years of the financial crisis, and did not return to pre-recession levels until 2012. This is likely to have been due to a combination of reduced business confidence as demand slowed, and a tougher (and more expensive) funding environment, especially bank funding for smaller businesses. Also, as real wages declined during the recession (and have only recently returned to growth), the relatively low cost of labour may have led some businesses to use more labour intensive forms of production rather than investing in capital. The Bank of England estimates that if business investment had grown at pre-2007 averages, capital per worker would have been 8% higher than it was by the end of 2013[15].

Figure 7: Investment (gross capital formation) in Scotland



Source: Scottish Government

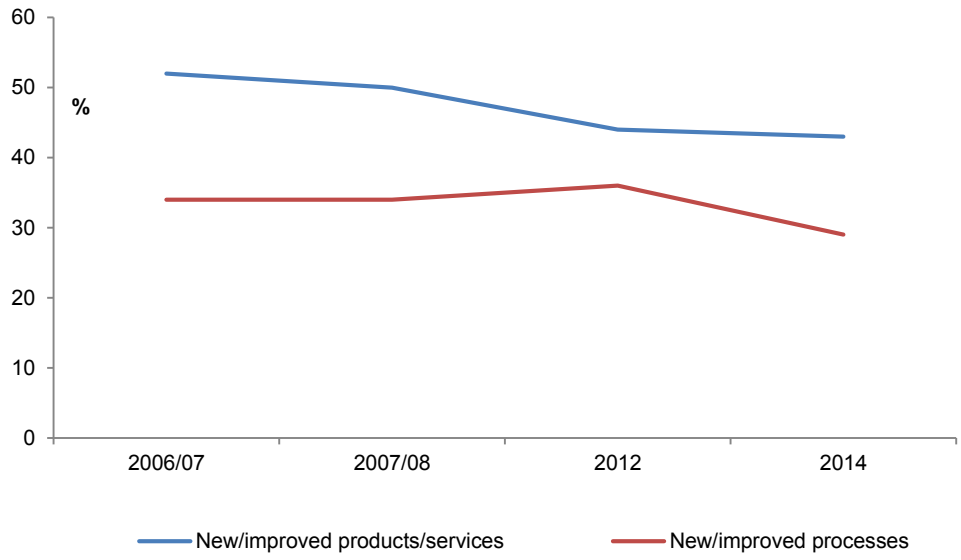
Up-to-date business investment data for Scotland is not available. However, data up to 2010 does suggest that business investment declined in the years immediately following the Great Recession (2008) in both Scotland and the UK[16].

More recent gross fixed capital formation data, that measures all investment (government, dwellings and business investment - of which business investment accounts for between 50% and 60%[17]), suggests

[13] *The UK Productivity and Jobs Puzzle, Pessoa. J.P. and Reenan, J.V. Special Paper No. 31, Centre for Economic Performance, 2013*
[14] *Capital Stocks, Consumption of Fixed Capital, ONS, 2014*
[15] *The UK Productivity Puzzle, Bank of England, 2014*
[16] *State of the Economy, Scottish Government March 2013*

that investment levels declined in Scotland in 2008 and 2009, as figure 7 shows. In cash terms capital formation only returned to pre-recession levels in 2014, although, relative to the size of the economy, investment is still lower than it was in 2007. This in turn suggests that capital per worker in Scotland is also is lower than it would have been had pre-recession investment trends continued. Compared to other countries, Scotland's gross fixed capital formation rates are low, with Scotland in the fourth quartile of OECD countries, as it has been for quite a number of years.

Figure 8: Percentage of Scotland's SMEs introducing new or significantly improved products/services or processes in the past 12 months



Source: Small Business Survey

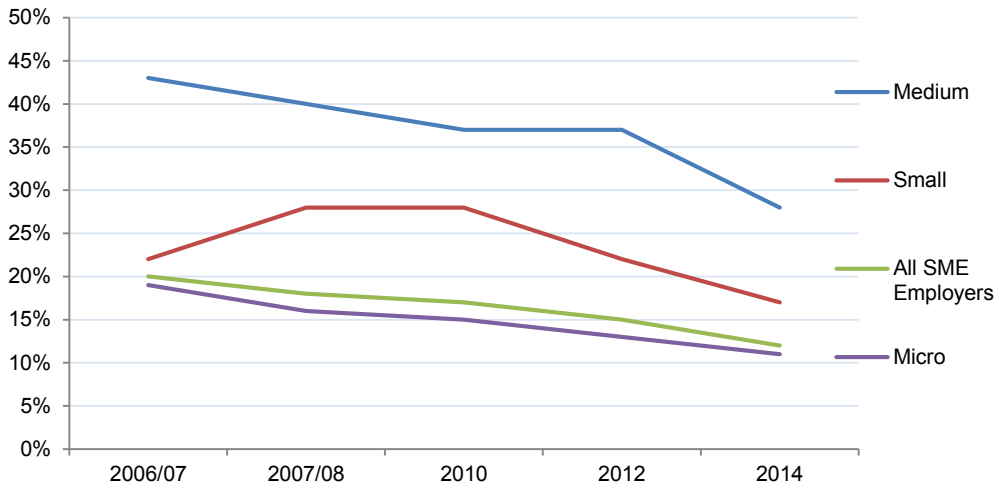
Slowing innovation rates

On some measures, innovation activity has weakened since 2008. Although business R&D spending in Scotland has been generally rising since 2006[18], this is an *input* measure to the innovation process rather than an *output*. Data on outputs from the UK Innovation Survey show that the proportion of Scottish companies that were product innovators declined between 2006-08 and 2008-10, only rising slightly in 2010-12. The proportion of businesses that were process innovators also declined. Research shows that product innovators are around 20% more productive than other companies[19].

[17] *Business investment accounts for between 50% and 60% of gross capital formation: State of the Economy, Scottish Government March 2013*
[18] *http://www.gov.scot/Resource/0046/00466415.pdf*
[19] *The UK Productivity Puzzle, Barnett et al, Bank of England, Quarterly Bulletin Q2 2014 pages 114- 128*

More recent data from the Small Business Survey show that the proportion of Scottish SMEs introducing new products or services declined between 2006/07 and 2014, down from 52% to 43%[20], as figure 8 demonstrates. Trends for the UK are broadly similar.

Figure 9: Scottish SME exporters (% of all SMEs, by size band)



Source Scottish Government

Again, compared to other countries, Scotland's business expenditure on R&D is in the fourth quartile of OECD countries; if a wider definition of business innovation is considered (e.g. introduction of new products, services, processes, business models, organisation etc.), Scotland is placed in the third quartile.

Fewer exporters

A range of evidence shows a positive link between exporting and productivity. Companies with higher productivity are more likely to be exporters, and increase their productivity further through exporting[21]. Data suggests that the proportion of SMEs in Scotland that export internationally has fallen in recent years, from 20% in 2006/07 to 12% in 2014, as shown in figure. Data also shows that a lower proportion of Scottish SMEs export overseas than those in the UK as a whole, and in many EU countries.

6. Scotland's productivity performance, by sector

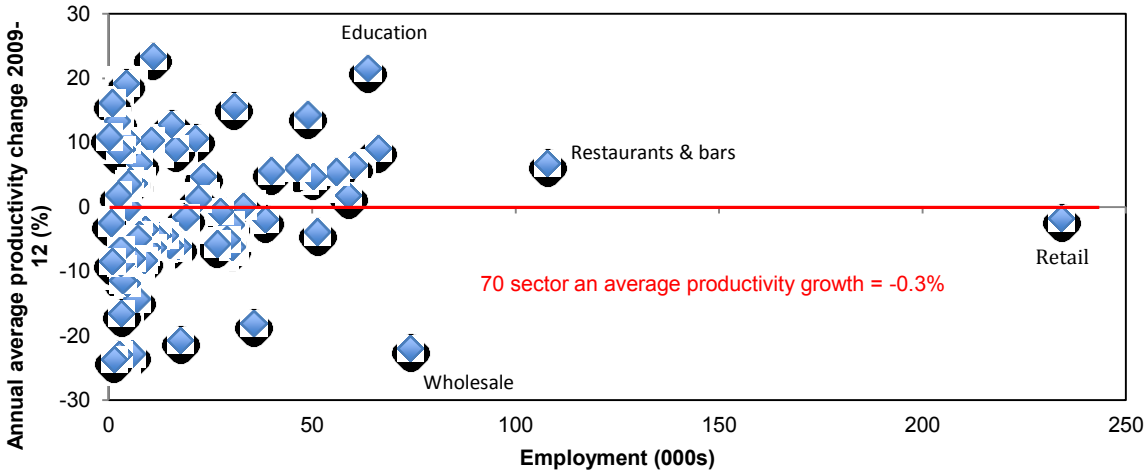
Analysis of productivity performance usually focuses on whole economy productivity levels and growth. Below this level, productivity performance varies widely by sector, and between businesses within any given sector.

[20] *Including those with 1-10 employees*
[21] *SDI Policy Evaluation, Scottish Enterprise, 2010*

Using the GVA per full-time equivalent (FTE) worker measure of productivity, it is possible to analyse Scotland's sectoral productivity performance (2012 is the latest data available at the time of writing)[22] [23]. Robust data is available for 70 private sector industries in Scotland; these employed over 1.4 million full-time equivalent (FTE) workers in 2012, equivalent to around 67% of total employment and 89% of private sector employment [24].

The data shows a wide range of productivity levels and growth rates across Scotland's sectors. Over the period 2009-12, 32 of the 70 sectors had positive productivity growth rates, and the overall productivity for the 70 sectors declined at an average annual rate of -0.3%. There is no distinct pattern in terms of productivity level and productivity growth – some sectors with high productivity levels achieved productivity growth (e.g. pharmaceuticals), whereas other sectors with high levels experienced a fall (e.g. drink). In 2012, figure 10 shows that around 820,000 people were employed in sectors that posted a decline in productivity, with 804,000 employed in sectors that posted productivity growth.

Figure 10: Scotland's sector productivity growth (2009-12) and employment levels (2012), (70 sectors)

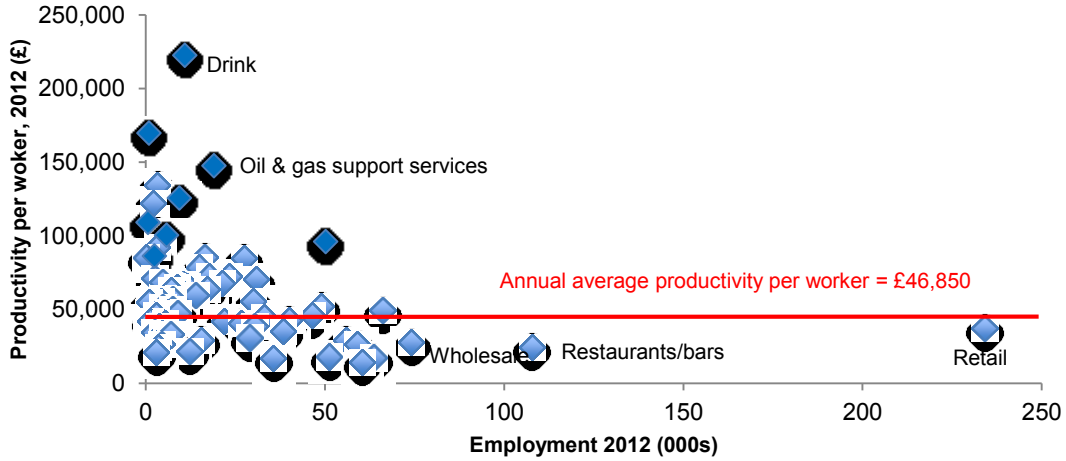


Note: Productivity as measured as output per FTE worker
Sources: SABS, BRES, HM Treasury

Figure 11 demonstrates that, of the 70 sectors, 31 had productivity levels below the overall average. These employed 1,086,000 workers in 2012, or 67% of employment across the 70 sectors.

[22] *Data on hours worked by sector covering the whole economy are not available for Scotland*
[23] *A number of sectors have a large proportion of part time workers (e.g. almost 60% of workers in the retail sector), which will reduce GDP per worker compared to sectors where PT working is less prevalent. Therefore, the analysis is based on full time equivalent workers. For this analysis 2 PT workers = 1 full time equivalent worker.*
[24] *Total employment includes employees and self-employed.*

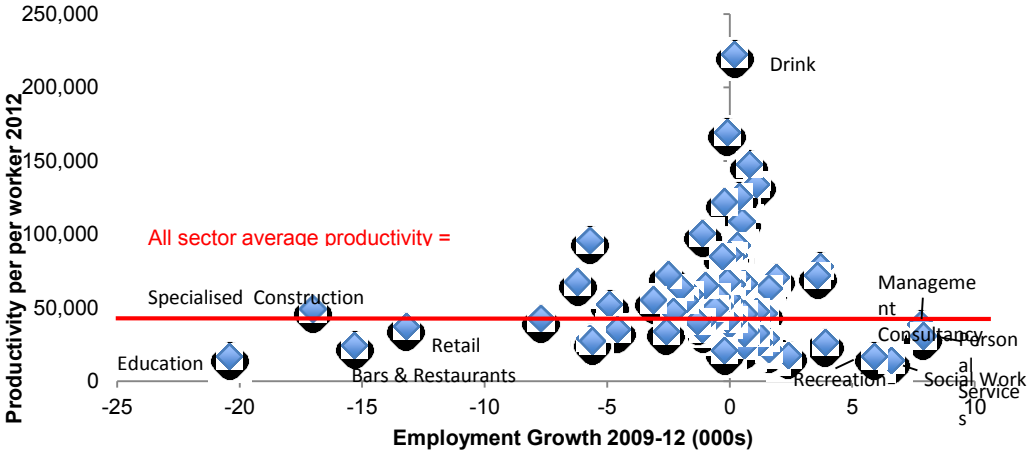
Figure 11: Scotland's sector productivity and employment, 2012 (70 sectors)



Note: Productivity as measured as output per FTE worker
Sources: SABS, BRES, HM Treasury

There does not appear to be – over the period 2009-2012 – any relationship as between jobs growth (or decline) and productivity levels. Of the 70 sectors, employment rose in 33 and declined in 34. Half of the jobs created (32,000 jobs) were in sectors with below average productivity (particularly Personal Service Activities, Head Office Activities, Social Work, Sports & Recreation and Building & Landscape Services) while job numbers declined in a number of sectors with above average productivity levels, such as Manufacturing, Construction and Computer Software. Figure 12 demonstrates the pattern of employment growth across the 70 sectors.

Figure 12: Scotland's sector productivity (2012) and employment growth (2009-12) (70 sectors)



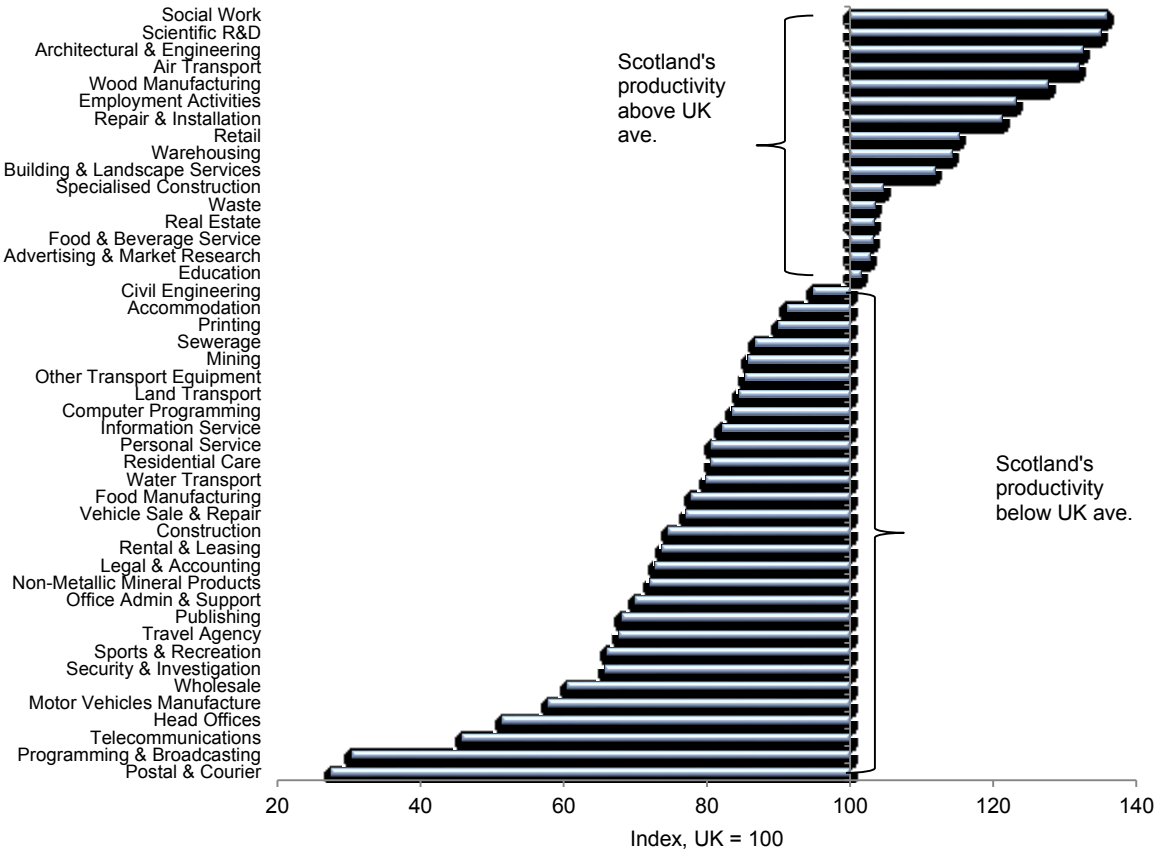
Note: Productivity as measured as output per FTE worker
Sources: SABS, BRES, HM Treasury

7. Scotland versus UK sector productivity

Scotland's productivity can be compared to the UK's for 45 sectors[25], covering 79% of Scottish private sector employment in 2012[26]. In 29 sectors, Scotland's productivity was lower than the UK and higher in 16[27]. This is illustrated in figure 13 in which Scotland's productivity performance is indexed relative to the UK = 100.

Issues around withheld data and data discontinuities mean there are little trend data available to determine the extent of volatility in productivity levels over time but, generally, three quarters of the 45 sectors maintained their position relative to the UK between 2011 and 2012. In the remaining sectors, just over half moved above the UK level and a half moved below.

Figure 13: Productivity per worker, Scotland relative to UK = 100, 2012



Sources: ABS, SABS, BRES

[25] Some employment and GVA data are not published for all the UK regions as they are deemed to be disclosive by the ONS.

[26] Excluding the financial sector, parts of agriculture and offshore oil & gas: turnover data are not available for parts of agriculture (SIC 01.1 to 01.5) or financial intermediation. Combined, these sectors account for only 8% of private sector employment and less than 6% of total employment, and therefore are not significant omissions.

[27] The large productivity differences for some sectors may be due to measurement issues and challenges. For example, for the postal & courier and programming & broadcasting sectors, a large proportion of GDP is likely to be produced by UK national organizations (e.g. Royal Mail, BBC), with GDP reported at the HQ location, although employment is reported regionally. Were this the case, this would artificially reduce Scotland's productivity levels.

The data suggest there is potential across a number of sectors to grow productivity levels if they were to match the UK levels. Were Scotland's productivity to match that of the UK for lagging sectors, this would have added £3.5bn (or +3.5%) to Scotland's total GVA in 2012.

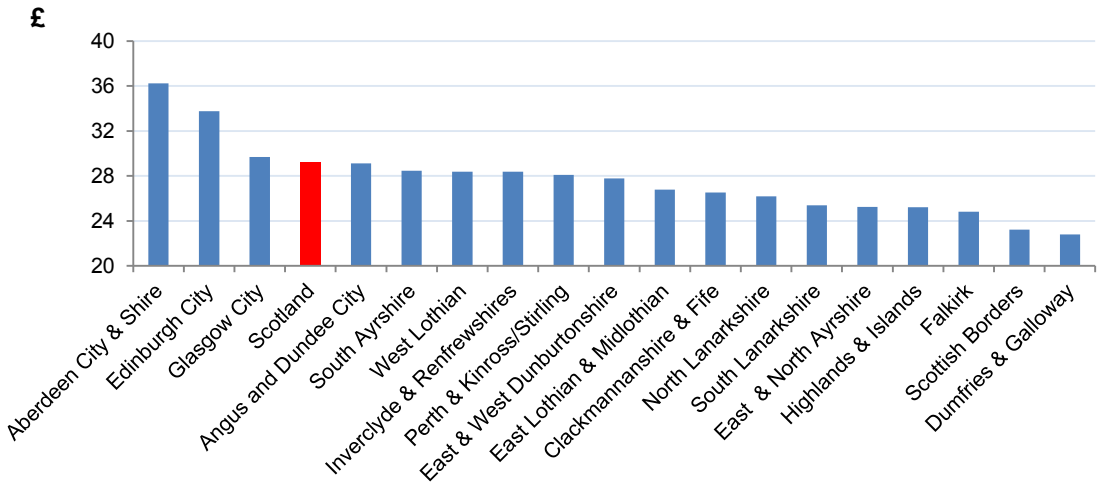
8. Productivity across Scotland

As figure 14 highlights, productivity also varies across Scotland, with the best performing area - Aberdeen City & Shire - having a productivity level almost 60% higher than the lowest performing - Dumfries & Galloway. The data highlights the role that Scotland's three largest cities play in sustaining and raising Scotland's overall productivity performance.

It is likely that the variation in productivity reflects employment / sectoral structure, with jobs in higher productivity sectors more concentrated in cities. For example, Aberdeen City & Shire has a high concentration of employment in high productivity sectors such as Architectural & Engineering Activities, Technical Testing & Analysis and Oil & Gas Service Activities, while the South of Scotland has higher concentrations of employment in lower productivity sectors such as Retail, Health and Education.

The patterns also may reflect that cities have more of the assets and characteristics likely to drive higher productivity performance, such as a higher skilled population, better connectivity (physical and digital), greater levels of competition, more knowledge spillovers and sources of innovation such as universities.

Figure 14: Productivity levels across Scotland, 2013 (GVA per hour worked)



Source: ONS

9. Conclusions

This paper considers a number of the factors and trends that explain post-recession productivity performance. Its conclusion is there is likely to be no single explanation for Scotland's 'lower productivity

growth compared to pre-recession trends, and compared to many other OECD countries. Scotland's poor productivity performance since the Great Recession, is likely to be due to a combination of:

- a degree of labour hoarding by companies;
- lower business investment rates that has reduced capital stock per worker;
- the survival of poorly performing and less profitable/productive businesses that otherwise would have failed;
- declining levels of businesses introducing new products and services;
- declining levels of exporting.

It is important to note that a number of these factors are long-standing weaknesses in the Scottish economy. For example, over recent years, Scotland's investment, innovation and exporting rates have been below that of many other countries, and this is likely to explain Scotland's persistent (at best) 'mid table' productivity performance. In addition, other factors likely to affect Scotland's productivity performance (not discussed in depth in this paper) include weaker management skills and a smaller business base and its impact on competition.

The analysis provides further evidence to confirm a policy focus on increasing the innovation, internationalisation and investment performance of Scotland's business base, and how this contributes to inclusive growth. However, it also highlights the scale of the change required for Scotland to reach the target levels of matching the top performing OECD countries. The analysis demonstrates that there is significant potential for Scotland to increase its productivity levels, for example, by Scottish sectors raising their performance to that of equivalent UK sectors and those of the better performing OECD economies. Further research and analysis of the productivity challenges faced by specific sectors will help identify the most appropriate policies and approaches to achieve this.

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