

PRODUCTIVITY

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This briefing has been prepared for the Economy, Energy and Tourism Committee, but should be of wider interest to Members and their staff.

At its meeting on Wednesday 24 October 2007, the Economy, Energy and Tourism Committee agreed to commission SPICe to look at “the facts and figures behind the reported productivity gap in Scotland relative to other economies and seek to provide explanations as to why this exists”.

This briefing provides background on productivity and its measurement, facts and figures on productivity in Scotland and elsewhere, summarises some of the reasons suggested for Scotland’s “productivity gap” and presents some of the international “best practice” on improving productivity.

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KEY POINTS

- productivity is a measure of the ability to produce useful outputs with available inputs. Productivity increases as the ratio of outputs to inputs increases. High productivity implies a high level of output relative to inputs
- there are a number of ways of measuring productivity, all with advantages and disadvantages
- the most common measure, and the only measure where comparative Scottish data exists, is labour output per hour worked
- Scotland currently ranks close to the median of OECD countries in terms of Gross Domestic Product (GDP) per hour worked
- the Scottish Government's recently published Economic Strategy sets the target for Scotland "to rank in the top quartile for productivity amongst our key trading partners in the OECD by 2017"
- there is variation in productivity per employee within different sectors of the Scottish economy, with Gross Value Added (GVA) per employee in manufacturing (£53,000) 80% higher than GVA per employee in the service sector (£28,800)
- Scottish productivity expressed as GVA per hour worked equates to around 97.5% of UK productivity
- UK and Scottish productivity has increased in the last decade, but there remains a "productivity gap" between the UK/Scotland and the most productive economies
- some of the reasons cited for the Scottish productivity gap are:
 - past underinvestment in infrastructure
 - less effective use of information and communication technology compared with competitors
 - low levels of research and development (R&D) compared with competitors
 - high levels of young people not in education, employment or training (NEETs)
 - relatively low levels of business start-ups
- the Scottish Government's recently published Economic Strategy attempts to diagnose and present policies for closing Scotland's "productivity gap"
- global movement of labour, finance, goods and services has increased productivity levels throughout the world and allowed the so-called "emerging economies" to become richer and "move up the value chain"
- globalisation and increased economic competition from the "emerging economies" like China and India presents a challenge to more "mature economies" such as Scotland to retain a comparative advantage in the higher value added sectors
- the literature on productivity suggests policy best practice in improving productivity involves governments in:
 - incentivising innovation and risk taking
 - developing skills
 - improving regulation
 - investing in and maintaining infrastructure
 - promoting competition and incentives
- gains in public sector productivity appear to be difficult to achieve and to measure, but examples of good practice exist and are transferable
- the Scottish Government is committed to reporting annually on progress against the range of indicators and targets presented in its Budget and Economic Strategy in November 2007. The first progress report is likely in autumn 2009
- the briefing concludes with a number of options for Committee members in terms of how they may wish to continue scrutiny of Scotland's productivity performance

WHAT IS PRODUCTIVITY?

Productivity isn't everything, but in the long term it is almost everything. A country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker.

Paul Krugman (1994)

Productivity is a measure of the ability to produce useful outputs (goods and services) with available inputs (labour, capital and raw materials). Productivity increases as the ratio of outputs to inputs increases. High productivity implies a high level of output relative to the level of inputs.

The most common measure of productivity relates to labour which may be expressed as output per hour worked, output per worker or output per person of working age. Other input divisors may be used. Examples are output per unit of capital (capital productivity), output per unit of energy (energy productivity) and output relative to the input of all factors of production (total factor productivity or multi-factor productivity). These terms are defined and their merits discussed later in this paper.

WHY DOES PRODUCTIVITY MATTER?

Sustainable economic growth is the top priority of the Scottish government and improving productivity is one of the ways in which economic growth can be delivered. Increasing the economic output of an economy can be done in two ways (Treasury 2006):

- increasing the total number of hours worked or
- increasing productivity i.e. output per hour worked

Increasing the total number of hours worked is desirable where there is involuntary unemployment or underemployment. But there is a limit to the number of hours people can work and as societies become richer there is usually a demand for some of the increase in wealth to be taken in the form of greater leisure rather than higher earnings. Increasing productivity per hour worked is, therefore, the more attractive means of achieving sustained economic growth.

All other things being equal higher labour productivity allows higher wages to be paid without loss of competitiveness; higher capital productivity allows higher output for a given level of investment; and higher energy and raw material productivity means that natural resources are used more efficiently.

MEASURES OF PRODUCTIVITY

Measures of productivity should show how efficiently inputs (such as labour) produce outputs. In other words, productivity indicates how much is being produced relative to how much is being used in production. There are several main ways of measuring productivity, each with their own advantages and disadvantages.

Output per worker and output per hour worked

Output per worker and output per hour worked are the two most commonly used measures of labour productivity and are the central productivity definitions used by the Scottish and UK Governments. They are commonly used measures because they are measures of the amount produced for a certain amount of labour input and are closely related to living standards. They can also be measured fairly reliably. The main flaw with output per worker and output per hour worked is that they take no account of the quantity of capital or raw materials used in producing a given level of output.

Output per worker

Output per worker is the simplest measure of labour productivity and is the average level of output produced divided by the number of people in employment – in short, it is the average amount produced by each worker. The main benefit of using this measure is that it is easily and widely collected and allows for international comparisons.

The disadvantage of using this measure of productivity is that it takes no account of the number of hours worked. Consequently, countries with long working hours, like the United States, have higher output per worker under this measure than countries with shorter working hours.

Output per hour worked

Output per hour worked is a measure of the average amount produced in each hour worked. The main benefit of this measure is that it takes account of how effectively hours worked are being used, and takes account of variations in the number of hours worked, for example, through having more holiday entitlements or working part-time.

The disadvantage of this measure of productivity is that hours worked are not always measured consistently across countries making international comparisons problematic. The OECD does attempt to improve the consistency of the data it compiles but differences remain.

Output per person of working age

Output per person of working age is more of a measure of prosperity than productivity and measures the average amount of income generated by each member of a country's working age population. The disadvantage of this measure is that some countries may appear to have very high labour productivity, but this might be masking high levels of unemployment.

Total factor productivity

Increases in labour productivity can arise as a result of increased use of capital, energy and raw materials and therefore gives only a partial indication of how total productivity is changing. While the labour based measures of productivity attempt to measure output per unit of labour, "total-factor productivity" (TFP) or "multi-factor productivity" (MFP) attempts to measure the increase in output after allowing for any change in the inputs of labour, capital and natural resources.

The disadvantage of TFP is that it is difficult to measure due to problems in assigning relative weights to labour, capital and natural resources.

Other Measures of Productivity

Capital productivity is a measure of output per unit of capital input, with capital input measured as either the stock of capital employed or the services that the capital stock provides.

Energy productivity is output per unit of energy used. It can be seen as a measure of the efficiency of use of energy or as a measure of conservation.

Materials productivity is output per unit of materials used and is a measure of efficiency in the use of materials.

These three measures are of greater interest at the level of the individual enterprise as firms seek to reduce costs relative to output. They are likely to become more significant at the macroeconomic level as economies seek to become more sustainable and reduce their reliance on raw materials and fossil fuels.

SCOTTISH PRODUCTIVITY COMPARED

The only indicator through which Scottish productivity can be measured against competitors is GDP per hour worked. The Scottish Government's (2007a) recently published *Economic Strategy* (which is covered in more detail below) sets the target for Scotland to "rank in the top quartile for productivity amongst our key trading partners in the OECD by 2017." According to the latest OECD productivity stats, Scotland ranks in the 2nd quartile for GDP per hour worked¹.

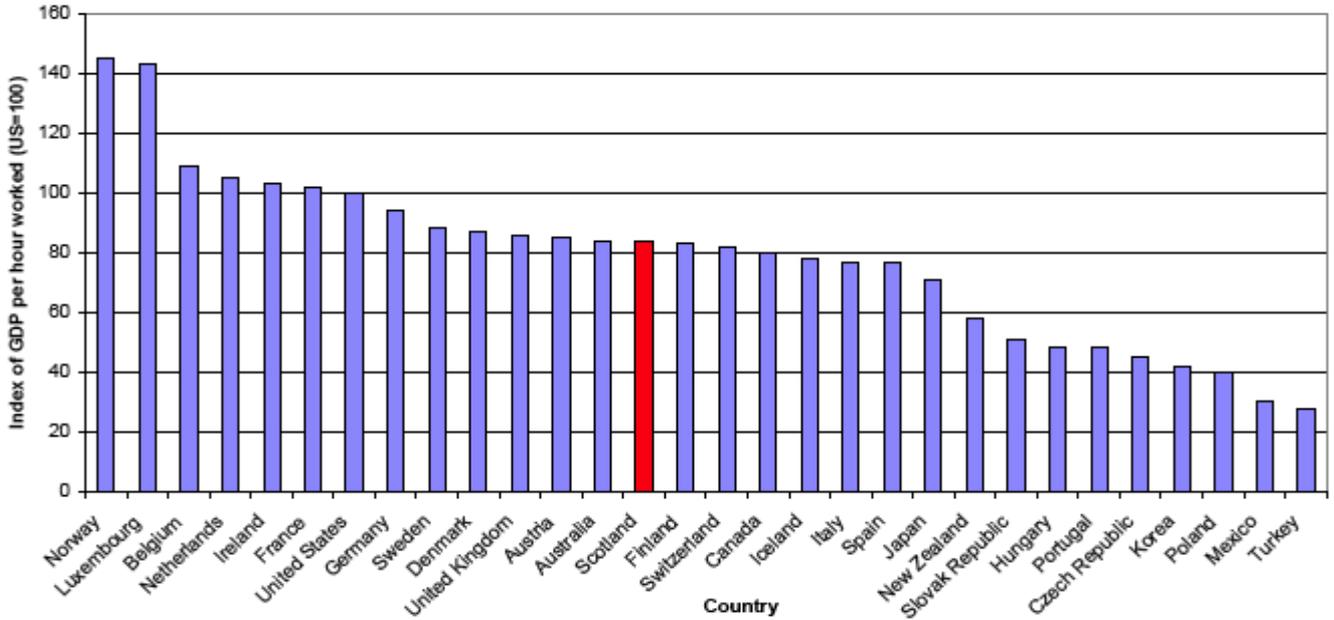
The recently published technical notes for the 2007 Scottish Spending Review (Scottish Government 2007b) provides some comparative Scottish data on productivity. These are presented in figures 1 and 2 below.

Figure 1 shows that Scotland ranks 14th out of 30 countries in terms of GDP per hour worked, which puts Scotland at the bottom of the 2nd quartile of OECD countries. Figure 2 presents Scotland's ranking in 1999 and 2005, and shows that Scotland has slipped from a ranking of 12th in 1999 to 13th in 2005.²

¹ The OECD only provide a figure for UK productivity. In order to estimate labour market productivity in Scotland, regional accounts data from the Office for National Statistics (ONS) are used to identify Scotland's productivity performance relative to the UK. In 2005, the most recent data, Scotland's labour productivity was 97.5% of the UK level (Scottish Government 2007b).

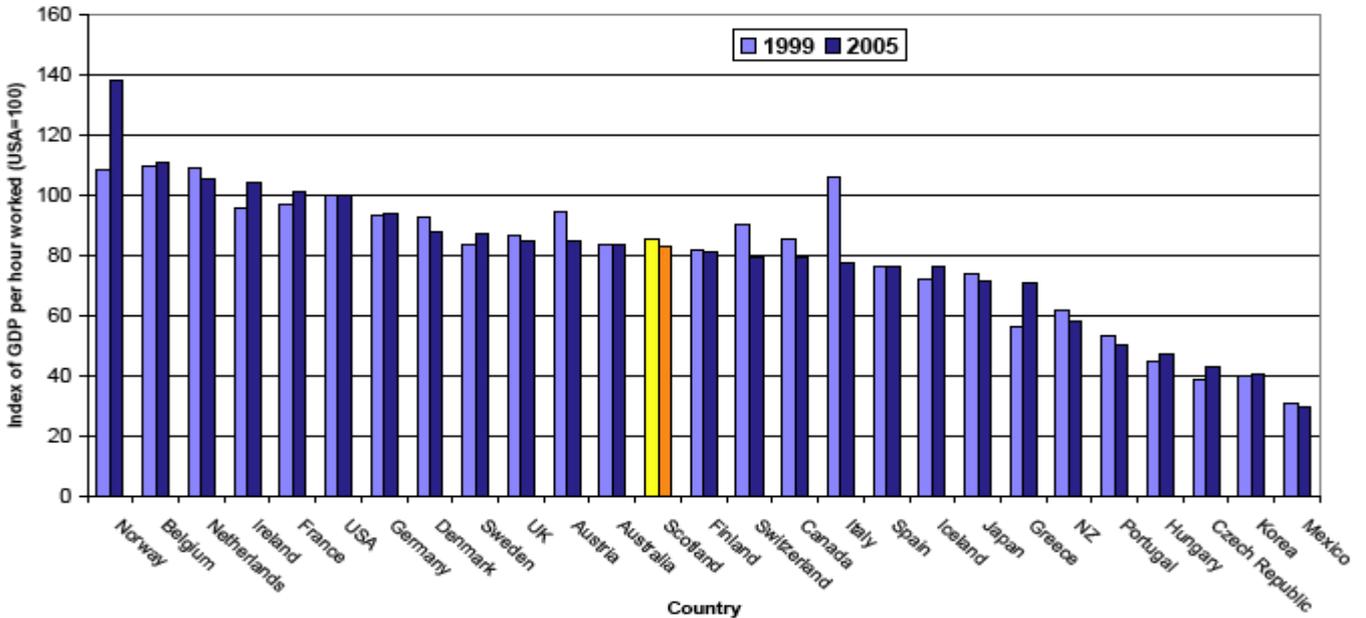
² Luxembourg is not included in figure 2. Their inclusion would reduce Scotland's ranking to 14th in 2005.

Figure 1: GDP per hour worked, 2006 (Index: US = 100)



Note: Data for Scotland is for 2005. Data for all other countries is 2006.
 Source: Organisation for Economic Co-operation and Development; Office for National Statistics. Taken from Scottish Government 2007b.

Figure 2: GDP per hour worked, 1999 and 2005 (Index: US = 100)



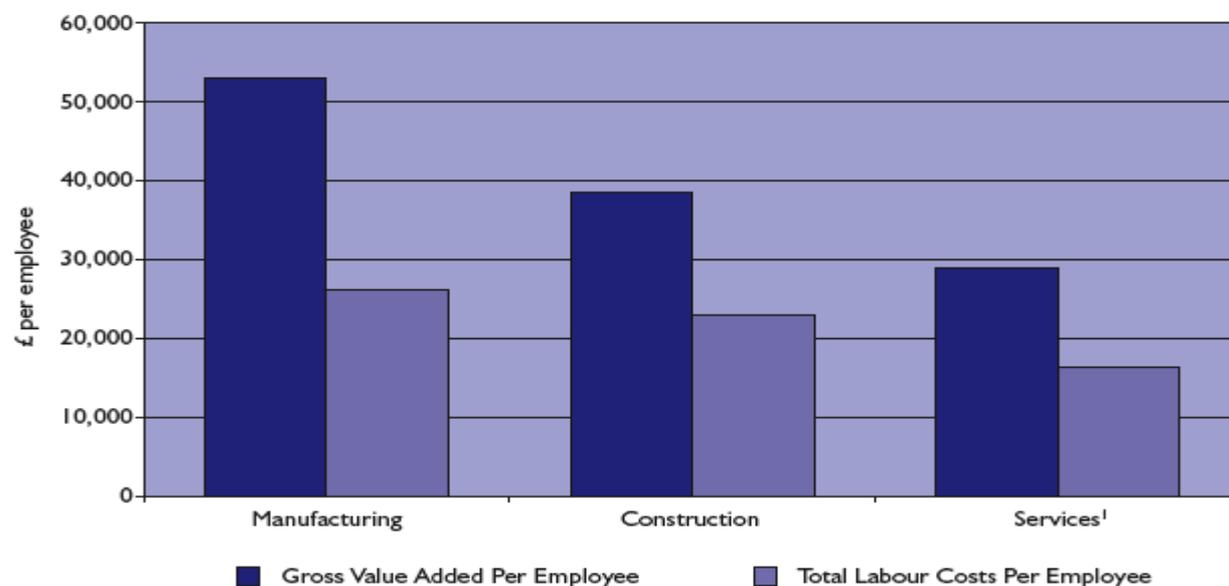
Source: Organisation for Economic Co-operation and Development; Office for National Statistics. Taken from Scottish Government 2007b.

Comparative data on Scottish productivity in the other measures of productivity mentioned above (like output per worker, output per person of working age, and total factor productivity) are not available.

However, there is information on productivity per employee within the various sectors of the Scottish economy suggesting that some industrial sectors are more “productive” than others. For example, in 2004 GVA per employee in manufacturing (£53,000) was around 80% higher than in the services sector (£28,800) (Scottish Economic Statistics 2007, chart 3.1). However,

labour costs per employee in manufacturing (£26,200) were around 60% higher than in services (£16,300). The lower levels found in services is in part a reflection of the higher level of part time working in this sector. Manufacturing also tends to have higher capital investment per employee which increases labour productivity.

Figure 3: Gross Value Added and Labour costs per employee by sector in Scotland, 2004



Source: Scottish Executive 2007

Some Caveats

Labour productivity can be increased by increasing capital investment. However if the cost of servicing additional capital (interest charges and depreciation) exceeds the value of the gains in productivity then neither the investor nor the employee will see any increase in their net income despite the fact that labour productivity expressed as GDP per hour worked has increased. In other words, massive capital investment can lead to higher labour productivity but does not necessarily lead to higher disposable income.

In most developed economies the productivity of capital has been declining as investment has increased (OECD 2006). UK capital productivity declined from 116.1 in 1990 to 96.9 in 2003 (2000 = 100) a pattern repeated in most OECD countries, although Finland, France and Ireland were exceptions. The desired outcome is therefore to optimise the level of investment ensuring that workers have neither too little nor too much capital to support them in their activities. Given that gross fixed capital formation comprises nearly 20% of UK GDP and that returns to capital, whether natural capital, such as land, or man made capital such as machines, comprise about 40% of GDP then it is important that capital is invested and managed wisely.

Labour productivity can also be increased by using more natural resources, such as land and fossil fuels, per unit of labour. But the effect on the productivity figures differs depending on whether the natural resources are imported or produced within the country. If the former then the natural resource input does not appear in the importing country's GDP. If the latter then it does and labour productivity is enhanced, not just by the increase in output arising from the use of the natural resource, but also by the value of the natural resources produced in the country adjusted for the associated labour input.

Most published figures for Scottish GDP excludes the output from the Scottish portion of the UK continental shelf. Including the output of North Sea oil and gas would have a major impact on Scottish GDP and, because oil and gas production is not labour intensive, labour productivity. However, because output of oil and gas is declining, including this output in figures for Scottish labour productivity would make it more difficult to increase the rate of growth in productivity.

REASONS FOR SCOTTISH PRODUCTIVITY GAP

According to the most recent Economic Survey by the OECD (2007), the United Kingdom has enjoyed strong productivity growth in the past decade. At 97.5% of the UK level, Scottish labour productivity trails the UK but not to any dramatic degree. The OECD puts the recent growth in UK productivity down to the UK's relatively free product and labour markets, (exports and imports of goods and services in the UK in 2006 represented 58% of GDP) which has allowed the economy to benefit from globalisation. The OECD argues that globalisation provides an opportunity to promote productivity growth through the economies of scale provided by greater competition and also allows companies to specialise in areas where they have a competitive advantage.

However, despite the growth in Scottish and UK productivity in the last decade, there is still room for improvement. Scotland continues to trail its competitors (as shown in figures 1 and 2 above) and sits at the bottom of the 2nd quartile of OECD countries. The remainder of this briefing will look at why Scotland (and the UK as a whole) has a productivity "gap" and what kind of policies might help fill it.

One of the main explanations for the productivity gap between Scotland (and the UK as a whole) and its competitors, is the trend of under-investment in capital in the 1970s, 1980s and 1990s (see Scottish Executive Economist Group 2005). This issue has been addressed somewhat in recent years with increasing levels of capital investment. However, the UK and Scotland face a period of "catch-up" with competitors in terms of infrastructure levels. The OECD (2005) has cited the UK's clogged transport system as a key factor which has harmed productivity. The OECD report said that Britain has the most congested roads in the European Union³ adding to business costs, and making it difficult to reap the benefit of "[just in time](#)" production methods. In addition, unreliable trains in the UK take their toll on commuters and impact on individual productivity levels. However, it could be argued that past underinvestment in infrastructure in the UK has led to a high level of use of that infrastructure with beneficial effects on return on capital and capital productivity.

The previous Scottish administration published its Infrastructure Investment Plan in 2005 (Scottish Executive 2005), with the aim of delivering a 5% annual real terms increase in net investment over the spending review period of 2005-06 to 2007-08. Capital investment is also recognised as an issue of importance to the new Scottish Government. The recently published *Economic Strategy* states:

"Whilst evidence is limited as to the effects of investment in physical capital on Scotland's labour productivity performance, research⁴ exploring why UK productivity lags behind that of the United States, France and Germany, identified that different levels of investment in physical capital stock accounted for the largest proportion of the

³ This is less of a problem in Scotland overall, but rush-hour congestion on the M8 corridor between Glasgow and Edinburgh is often noted by the Scottish business community as a drag on productivity.

⁴ O'Mahoney, M. and de Boer, W. (2002)

productivity gap. It accounted for 51 per cent of the gap with the United States, 80 per cent of the gap with France and 81 per cent of the gap with Germany.”

It is not simply the level of investment that impacts on productivity rates, but also the way in which capital resources are used. Management practices, production processes and complementary innovations and investments also play a role in productivity performance. This is recognised by the Scottish Government in its *Economic Strategy*, who cite a study by Basu, Fernland, Oulton and Srinivasan (2003) which argues that the productivity gap between the UK and US is not due to differences in levels of investment in information and communication technology (ICT), but in how the ICT investment has been utilised.

Another explanation given for Scotland’s productivity gap is the low level of business sector investment in Research and Development (R&D) in Scotland. Whilst the rate of R&D spend by Higher Education is in the top quartile of OECD economies and public sector R&D spend is above the average EU25 and OECD rates, business expenditure on R&D in Scotland is low. Figures for 2005 reveal that expenditure on R&D undertaken by Scottish business totalled 0.59% of GDP, compared with 1.08% in the UK, 1.12% across the EU 25, 2.46% in Finland and 2.92% of GDP in Sweden (Scottish Economic Statistics 2007). The challenge for Scotland is to convert its world class university sector R&D base into levels of investment in business R&D that are as high as some of our competitors.

Other factors cited by the Scottish Government (2007a) in diagnosing Scotland’s productivity gap are:

- the high level of young people not in education, employment or training (NEETs), which according to the Scottish Government (2007a) is the third highest proportion among OECD economies
- despite rising skill levels over the past twenty years, there has not been an accompanying increase in the level of influence which employees report they can exercise over their jobs (Scottish Government 2007a, p14)
- our low rates of VAT registration (an indicator of business start-ups) which is well below the UK average and far behind the rates found in “arc of prosperity” countries like Norway and Iceland (Scottish Government 2007a, p14)

Factors cited by the OECD (2007) in its recent Economic Survey of the UK as potentially acting as a barrier to further productivity growth were:

- restrictive planning and land usage regulations which may be holding back new firms, thus hindering productivity growth
- a growing regulatory burden on businesses from increasing tax complexities and red tape costs of conducting business
- concerns of a deficiency in management skills which may be hampering faster improvements in productivity.

The above mentioned under-investment was also cited by the OECD, who argued that there was:

- evidence of underinvestment by both government and business in a number of areas including research & development (preventing a move up the value chain), transport infrastructure (slowing productivity growth by raising transportation costs) and the skills of the labour force (hampering relocation of labour from declining and expanding

sectors, and preventing the workforce from fully taking advantage of new technologies and knowledge)

HOW CAN PRODUCTIVITY GAPS BE CLOSED IN A GLOBAL ECONOMY?

Productivity in a Global Economy

The last two decades have witnessed an increasingly globalised economy, with the removal or lowering of barriers to the movement of goods and services, knowledge and information, finance and labour across international borders. One example has been the increasing outsourcing of labour-intensive manufacturing from high wage to low wage economies leading to the more developed economies concentrating on high value, knowledge-based activities such as financial and professional services, research and development (R&D), creative industries and aerospace. This process leads to a more efficient use of resources as it allows countries to focus on what they do best, exploit their comparative advantages, enjoy the benefits of economies of scale and develop specialist expertise. As a result global productivity has never been higher.

Increased global productivity, however, also creates competitive challenges for all economies. Emerging economies as they develop further will increasingly move up the “value chain” by investing in labour force skills and R&D so that they can compete effectively in areas where the developed world has traditionally enjoyed an advantage. The challenge for developed economies like Scotland is in maintaining its competitive advantage in the higher value added sectors that will allow it to continue to grow.

Policy Options for Improving Productivity in a Global Economy

The productivity literature suggests some key levers as being crucial to improving productivity, and this section looks at some of this policy “best practice”. It is important to note that these levers should not be seen as independent of each other but rather as inter-linked.

Innovation

Innovation, which can be defined as the creation of new ideas, technologies and process, can have a significant effect on productivity performance. Innovations often have “spillover” effects that can create wider benefits to the overall economy than simply to the person or firm who created the innovation. These spillovers can be contagious and increase the productivity of all firms as new processes and ideas are copied. An example of such an innovation was the creation of assembly lines which allowed for larger-scale productivity improvements in manufacturing (Treasury 2006). Recent new technologies in IT developments have had similar impacts, creating new products and markets. Innovations can occur with individual firms, or have their roots in research undertaken in the university environment. The increasing speed of globalisation makes the encouragement of innovation an ever more important dynamic of a successful economy. As more countries move up the value chain, the comparative advantage will increasingly be won by successfully generating and exploiting innovation.

Some of the policy best practice to promote innovation is as follows:

- encourage R&D through funding of universities

providing research and information services to the Scottish Parliament

- strengthen links between business and universities' research base
- invest in science
- incentivise private sector R&D through the tax system
- ensure an attractive regulatory regime and business environment

Skills

The education and skill level of a workforce is of crucial importance to productivity growth, particularly in a developed economy. Improving skill levels contributes directly to productivity performance as it can generate new innovations, technologies and ideas that benefit the economy as a whole.

William Nordhaus, an economist at Yale University, has calculated that under 30% of the goods and services consumed at the end of the 20th century were variants of the goods and services produced 100 years earlier.

“We travel in vehicles that were not yet invented that are powered by fuels not yet produced, communicate through devices not yet manufactured, enjoy cool air on the hottest days, are entertained by electronic wizardry that was not dreamed of and receive medical treatments that were unheard of,” writes Mr Nordhaus. “What hardy late 19th-century American pioneer would have guessed that, barely more than a century later, his country would find employment for (by the government's latest count) 139,000 psychologists, 104,000 floral designers and 51,000 manicurists and pedicurists?” (From Economist, 11 May 2004)

Predicting the skill requirements of the future is extremely difficult which makes flexibility an important element of a successful economy. Higher skill levels usually correspond to greater flexibility and a workforce better able to adapt to changing patterns of demand in a global economy.

Some of the policy best practice on promoting skills is as follows:

- invest via formal routes such as education and training, by improving basic literacy and numeracy⁵, as well as through higher level qualifications
- encourage businesses to provide informal “on the job” routes to increasing skills, which may include technical skills or “soft skills” like teamwork, problem solving, adaptability, and management⁶

Investment

The linkage between productivity and investment is well rehearsed. Empirical studies show that capital investment increases labour productivity by increasing the capital stock that a worker can use, and investment in physical infrastructure complements other forms of government investment in skills and R&D (Treasury 2006). The historic under-investment by the UK is often cited as being the explanation for the Scottish and UK's productivity gap (Clark, Elsby and Love

⁵ A recent study found that increasing the literacy score of a country by 1% leads to a 2.5% increase in labour productivity and a 1.5% increase in GDP per head (Coulombe, Tremblay and Marchand (2004)).

⁶ Studies show that firm level training can contribute to significantly higher levels of productivity. See Dearden, Reed and Reenen (2000).

2001). ICT investment, transport infrastructure and public capital investment in education and health are also deemed to be important in promoting productivity.

Productivity literature suggests that policy best practice on improving infrastructure involves:

- government directly providing investment in the areas where it is the monopoly supplier
- government leveraging in private sector investment in infrastructure
- government providing a stable and rewarding environment for companies to invest in
- increasing investment until total benefits from investment just exceeds its cost

Incentives and Competition

Innovation and the development of skills are more likely to happen if people have an incentive to make it happen. If the benefits from investing in new products, new processes, new markets or acquiring new skills are low then there will be a reluctance to take the risk associated with these activities.

Part of the way in which incentives are increased is by having competition in the market, which the literature recognises as having an important impact on improving productivity (Treasury 2006). When new high productivity firms enter the market competition is increased which causes less productive firms to exit because they are unable to compete with the new entrants. The effect of this entry and exit is to raise productivity. Global competition makes this an even more significant contributor to productivity growth as there are more firms competing with different technologies and working methods.

In addition, existing firms are also influenced by the threat of entry and exit from a market place which provides the incentive to be innovative and improve productive outputs or go out of business or lose market share.

Some of the policy best practice, cited in the productivity literature, on encouraging incentives and competition within an economy are as follows:

- don't be protectionist – remove barriers to competition and trade by keeping the economy open to outside companies
- encourage foreign direct investment
- keep taxation levels competitive
- encourage entrepreneurship by investing in human and physical capital
- encourage new business start-ups
- don't bail-out failing companies – “creative destruction” is to be encouraged
- have an effective competition regime, punishing anti-competitive practices

The next section will cover the Scottish Government policy on improving productivity.

SCOTTISH GOVERNMENT POLICY

The Scottish Government published its Economic Strategy on 13 November 2007, setting the following target for productivity:

- to rank in the top quartile for productivity amongst our key trading partners in the OECD by 2017.

The Scottish Government's Economic Strategy (2007a, see section C) outlines "Key Strategic Approaches and Policies" designed to deliver against its overall "Purpose", which is

"to focus the Government and public services on creating a more successful country, with opportunities for all of Scotland to flourish, through increasing sustainable economic growth."

Some of the policies outlined in the Economic Strategy which might be described as contributing to improving Scottish productivity are presented in the text box below. It is worth noting that many of the policies presented by the Government correspond with the policy best practice outlined above. However, it will be the job of the Economy, Energy and Tourism Committee and others to make sure that the policies mentioned in the Economy Strategy are actually carried through in practice. The final section of the paper presents some options for Committee scrutiny of the Government's plans.

On Skills, the Government's strategic approach is to

"Ensure the supply of education and skills is responsive to, and aligned with, actions to boost demand. This includes actions taken forward as part of our skills strategy, "Skills for Scotland" to:

- focus on working with employers and employees to increase the effective utilisation and demand for skills;
- ensure that our national training programmes meet the needs of individuals and employers;
- ensure flexible provision which is responsive to the needs of individuals, employers and the wider economy;
- ensure a funding system for Further and Higher Education through the Scottish Funding Council that is responsive to the needs of individuals, employers and the wider economy; and
- bring together the public agencies involved in delivering information, advice and guidance services and skills provision in the new skills body to build improvements around the needs of individuals."

The Government also seeks to

"Remove any barriers that stand in the way of all individuals participating in learning, skills development and realising their potential in the workforce. This will include actions to:

- make a clear commitment to young people about the routes to education, employment and training which are on offer and the support they can expect;
- facilitate local design and delivery of learning for those furthest away from the labour market;
- reduce financial barriers to people across Scotland accessing higher education, legislating to abolish the Graduate Endowment fee and progressing wider plans to tackle student and graduate debt; and
- promote the provision of high quality, accessible, affordable, flexible childcare, in order to enable parents to access training and employment opportunities."

On Business support, the government's strategic approach is to provide

"Responsive and focused enterprise support, working in partnership with others in the public, private and third sectors to increase the number of highly successful, competitive businesses, and their access to skills, finance and business infrastructure. This will include actions to:

- address gaps in access to capital that are constraining Scottish businesses from reaching their full potential, while helping to build capacity in the investment community to remove barriers to investment;
- provide a continued supply of the skilled people and ideas that business needs from our colleges and universities; and
- work with businesses to stimulate improvement in work practices and productivity, ensuring Scotland's

skills are fully utilised.”

On **Innovation and R&D**, the government aims to have

“A broader approach to business innovation in Scotland that moves beyond viewing innovation as the domain of science and technology alone and recognises the importance of working with customers, suppliers and competitors to stimulate innovation. This will include actions to:

- influence the creation of the most appropriate fiscal and taxation regime to stimulate innovation and R&D; and
- remove barriers to innovation and incentivise activity, including the promotion of best practice.

A clear focus on strengthening the link between Scotland's research base and business innovation and addressing low levels of business R&D. This will include actions to:

- recognise, reflect and promote the key role of Scotland's universities and colleges as world-class assets in further developing our science base, other key sectors and the wider economy;
- provide clear incentives through the Scottish Funding Council and other agencies to encourage colleges, universities and business to engage collaboratively in the exchange of knowledge and expertise to drive greater innovation in the economy;
- develop a new science strategy for Scotland, outlining how science will underpin Scotland's success as a nation through developing knowledge exchange between academia and business, increasing the flow of overseas investment into Scotland's R&D base and developing the science base;
- utilise the potential of mechanisms such as Intermediary Technology Institutes to increase the connections between Scotland's scientific strengths and global market opportunities, while ensuring the involvement of Scottish-based firms; and
- create an annual Saltire Prize, promoting, incentivising and providing funding to the leading areas of innovation in Scotland. The first award will focus on renewable energy.

A particular policy focus on a number of key sectors with high-growth potential and the capacity to boost productivity, through enhanced support across the Strategic Priorities, including the regulatory and fiscal environment. To expand Scotland's areas of international comparative advantage, we will give particular attention to building a critical mass of activity in the following key sectors, with government helping to create the right environment for their competitiveness and growth:

- creative Industries (including digital content and technologies);
- energy (with a particular focus on renewables);
- financial and Business Services;
- food and drink (including agriculture & fisheries);
- life sciences (including biotechnology and translational medicine); and
- tourism

along with the technologies that contribute to the development of these key sectors.

We will also seek to take advantage of the opportunities presented by Scotland's strengths and opportunities in public sector dominated industries, including:

- Education and Healthcare.”

On **Taxation** the government aims to provide

“A competitive tax regime which incentivises business growth and attracts mobile factors of production. This will include actions to:

- introduce a Small Business Bonus Scheme, removing many small businesses from the business rate burden, while reducing it for others;
- ensure that the business poundage rate in Scotland will not rise above the English rate during the lifetime of the Parliament; and
- make the case for Scotland to have fuller, and eventually full, responsibility for tax raising and public spending, utilising this to make Scotland the lowest taxed part of the UK, dropping corporation tax

significantly below the UK level.”

On **Infrastructure** the Economic Strategy focuses on Transport and “planning and place” with the following strategic approach and policies. Firstly, on **Transport**, the government aims

“To focus investment on making connections across and with Scotland better, improving reliability and journey times, seeking to maximise the opportunities for employment, business, leisure and tourism. This includes actions to:

- clearly identify projects of economic significance and enhance the alignment of decisions to Strategic Objectives; and
- complete and implement the strategic review of investment in Scotland's transport infrastructure and services, geared to delivering real benefits to businesses and communities while ensuring value for money.

To provide sustainable, integrated and cost effective public transport alternatives to the private car, connecting people, places and work, across Scotland.”

On **planning and place** the government intends to provide a

“A planning and development regime which is joined up, and combines greater certainty and speed of decision making within a framework geared towards achieving good quality sustainable places and sustainable economic growth. This will include actions to:

- publish a second National Planning Framework, focused on sustainable growth, setting out how improvements in national infrastructure will support that growth, more effectively aligning planning and development priorities across the public sector to lever greater private sector investment, including the critical importance of National Developments;
- implement a more streamlined approach to planning across urban and rural Scotland, including Strategic Development Plans to help create well-planned critical mass around and across Scotland's major city regions, and Development Plans in other areas, both of which will provide greater certainty and speed of decision-making;
- facilitate greater collaboration between Edinburgh and Glasgow and their surrounding areas to develop a city region with the scale and quality of assets (including quality of built and natural environment) that can compete with leading cities globally for mobile people, business and investment, with delivery bodies working across conventional boundaries;
- seek to deliver better value arrangements for the financing of public infrastructure investment, through the Scottish Futures Trust.”

On the issue of **regulation** the Economic Strategy talks of

“Streamlining the Scottish Government's direct dealings with business, including better regulation and more efficient procurement practices. This will include actions to:

- re-invigorate the Regulatory Review Group to address the streamlining of regulation, reducing unnecessary burdens on business, while ensuring appropriate regulations impact effectively on fairness, safety and sustainability. An early step will be to create a single environment and rural service for businesses;
- use public procurement to maximum effect so that the public sector makes better use of its purchasing power to help deliver sustainable economic growth;
- accelerate take-up of e-Procurement Scotland to make selling to the public sector easier and to increase access to government contracts for businesses of all sizes; and
- involve business more effectively across the work, and in the direction, of government activities to build consensus on our economic future.”

Public Sector Productivity

Governments have a role in creating an environment in which firms are able and encouraged to increase productivity, but they also have a more direct role in promoting productivity growth in the public sector and amongst suppliers of publicly funded services.

Baumol (1967) has argued that technological change is biased in favour of sectors like manufacturing rather than labour intensive public services and that, as a result, growth in productivity in the public sector has tended to lag behind that of the private sector. Other possible reasons for the lower rate of growth in productivity in the public sector are that governments have a range of economic, social and environmental objectives and are not as focused on maximising productivity as commercial organisations. Measuring the output of public services is also notoriously difficult (Atkinson 2005).

Crafts (2004) points out that the use of information technology is leading to rapid growth in productivity in some labour intensive service sectors such as banking and retail and that Baumol's thesis no longer applies. He argues that greater use of the right incentives, more competition or contestability in the supply of services and better performance measures would all help to increase public sector productivity. Armstrong (2007) points out that Scottish Water has demonstrated that rapid increases in public sector productivity can be achieved with the right incentives, the right regulatory environment and substantial investment and that these lessons can be applied to other public services.

COMMITTEE OPTIONS FOR MONITORING GOVERNMENT PERFORMANCE

This section presents options for the Economy, Energy and Tourism Committee in terms of how it might wish to monitor the performance of the Government against its productivity objectives.

In terms of monitoring the performance of the Government in delivering on its target of improving productivity in Scotland, the Economic Strategy (Scottish Government 2007a, p42) states:

“The Strategy must evolve as economic conditions and the responsibilities of the Scottish Government change. This evolution will be heavily influenced by the reviewing of progress from outside of government and by the development of evidence which is brought to bear. To secure this external review we:

- have established the Council of Economic Advisers, which has been highly influential in shaping this Strategy, to advise on how best to achieve increasing sustainable economic growth; and
- are in the process of establishing the National Economic Forum, which will involve key players from across Scotland in building consensus around the collective contributions to achieving increasing sustainable growth.

These bodies will hold the Government to account through assessing achievement of the measurable economic targets set out in this Strategy.....

We will formally and regularly report on the progress that we are making in relation to these targets.”

Members will also be aware of a study by the Centre for Public Policy for Regions (CPPR) (2007), looking at the Government's Economic Strategy. It made a number of points which members may wish to follow up. Specifically:

- “the Strategy clearly and unambiguously commits the Scottish government to economic growth as its principal goal and sets out bold targets for such growth
- however, these targets are currently not clearly defined
- there is a dearth of sound economic analysis and evidence to underpin policies
- greater explanation is needed over how such ambitious targets might be achieved, both in general terms and in relation to the subsequent budget allocations
- the Budget allocations do not appear to back up the Governments commitment to growth in some fundamental areas, e.g. infrastructure, post school education, the principal enterprise development bodies etc
- the Strategy fails to highlight the need for more high quality economic data”

On some of the policies related to productivity in the Economic Strategy, like stimulating demand for investment, innovation and skills to support business, innovation and R&D, the CPPR report (2007, p6) states that “there is no analysis of how to do this. Similarly, in Box C2 for innovation and R&D there are certain aspirations set-out but no analysis of specific problems and likely/possible solutions.”

Members will be aware that the Government published technical notes for the 2007 Spending Review which set out how the various indicators and targets contained in the Spending Review (and also in the Economic Strategy) will be measured (Scottish Government 2007b). Asked by the Finance Committee about the frequency and expected timing of the Government reporting against the indicators and targets presented in the Scottish Budget and Economic Strategy, the Cabinet Secretary for Finance and Sustainable Growth said:

“I am pretty sure that our assumption is to report annually to the Parliament on the indicators, but if the situation is different I will confirm that to the committee in writing shortly. In essence, we will take the working papers that are on the website and assess performance on the basis of the methodology that is set out there. A report will be published and I and ministerial colleagues will be happy to come to the Finance Committee or other committees to discuss performance in relation to targets.

.....it would be realistic to operate on the basis that we are likely to publish the first annual report in autumn 2009—we can adjust that accordingly.”

Source: Scottish Parliament Finance Committee, 10 December 2007, col 238

The Economy, Energy and Tourism Committee will no doubt have an interest in monitoring Government progress in delivering its Economic Strategy.

In terms of diagnosing Scotland's productivity lag, the Scottish Government has recognised the significance of capital investment. On 20 December 2007 the Government launched a consultation on plans for delivering infrastructure projects via the Scottish Futures Trust (Scottish Government 2007d). These plans will be of significance to Scottish productivity performance, and consequently of interest to the Economy, Energy and Tourism Committee going forward. Members will be aware that the Finance Committee intends looking at the Government's plans for a Futures Trust as part of its inquiry into the [Funding of Capital Investment Projects](#).

One component of productivity that the Committee may also be interested in monitoring further is public sector productivity. In principle, public sector productivity is the ratio of public sector outputs to total inputs. In practice, however, there have been a number of problems in measuring public sector outputs due to the difficulty in attaching an output value to a number of public services like health, education and defence. This has meant that, historically, the UK and other countries tended to measure aggregate public sector productivity by using measures of inputs (for example, the total spending on the public sector) as an approximation for public sector outputs. Such measures, by definition, imply zero productivity growth and are therefore misleading (for more, see Burnside, et al, 2005). Given the problems in measuring the outputs of the public sector, the National Statistician commissioned the Atkinson Review of the measurement of government output and productivity, which reported in 2005. The Office for National Statistics (ONS) has since established the [UK Centre for the Measurement of Government Activity](#) (UKCeMGA) to take forward the recommendations of the Atkinson Review. Members may have an interest in receiving evidence from both the UKCeMGA and the Scottish Government on progress on implementing some of the recommendations made in the Atkinson Review (2005). Further detail on the recommendation contained in the Atkinson Review can be found in Burnside, Dewar & Wakefield (2005).

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