



Productivity, Innovation and the Corporate Tax Environment

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Summary

- The UK has had a persistent productivity gap with the US and other major European countries: with a given level of labour input, we produce fewer outputs. The gap has narrowed since the mid-1990s but increased again in the most recent period.
- The UK also consistently lags behind in terms of the proportion of national resources that are devoted to research and development (R&D). There has been a decline in business expenditure on R&D as a proportion of GDP (BERD) since the mid-1980s, which has resulted in a deterioration of the UK position vis-à-vis other developed economies.
- The UK has performed historically well on measures that capture the outputs of basic science and universities. For example, with only 1% of the world's population, the UK produces 9% of all scientific papers and receives 12% of citations.
- Labour governments since 1997 have stated that productivity and innovation are a priority and have enacted a number of related policies. Notably, there have been significant increases in spending on science and the introduction of R&D tax credits.
- Whoever wins the upcoming general election will need to make significant cuts to public spending. The three main UK political parties seem to agree on the importance of science and innovation. However, none has set out specific details on the extent to which cuts in public spending will need to be made in the areas of science, research and skills. While cutting spending in these areas may arouse little protest from the electorate, they are areas that will feed into the UK's long-run success. Cuts should therefore be considered with caution.
- In 2009, the UK had the second-lowest statutory corporate tax among the G7 and the tenth-lowest among the EU15. A new Labour government would leave the main rate unchanged at 28% in 2011–12 and increase the small companies' rate to 22% in 2011–12, while an incoming Conservative government would reduce the main rate to 25% and the small companies' rate to 20%, paid for by broadening the base of the tax.
- Increasing internationalisation and mobility of capital have put pressure on national tax systems. Most recently, the main issue in relation to the UK corporate tax system has been the taxation of foreign income. In 2009, the UK moved to an exemption system under which much of the foreign income of UK firms is exempt from UK corporation tax.

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- At the end of 2009, the Labour government announced its intention to introduce a ‘Patent Box’ – a new policy that would tax the income from patents at a reduced 10% rate of corporation tax. This is a poorly targeted and expensive innovation policy. The Conservative Party has highlighted plans to create an ‘attractive tax environment for intellectual property’.

1. Introduction

Productivity and innovation may not form the centrepiece of election campaigns but they are key drivers of economic growth and have the potential to address many of the world’s major problems. The efficiency with which resources are used and the extent to which new products and processes are introduced are major determinants of the wealth of the UK and will form the backdrop to economic recovery going forward.

Governments around the world operate a range of policies that intervene in innovation markets, including subsidies for research and direct spending on science. The rationale for such policies is the failure of markets to provide sufficient incentives for private investment in innovative activities because they generate benefits not only for the individuals and firms carrying them out but also for third parties; see Box 1.1.

Private businesses play a key role in driving productivity and innovation, and governments’ actions affect the economic environment in which they operate. This environment includes a range of factors such as the stability of the macroeconomy, the regulatory framework, the nature of competition law, the protection of intellectual property, public infrastructure and the burden of corporate taxes. While each of these is important for ensuring a competitive business sector, in what follows we focus on changes to the corporate tax environment alongside direct policies that aim to correct market failures. To begin, we highlight the main policies that have been introduced by Labour governments since 1997 and the main policies being proposed by the three main UK parties in the run-up to the 2010 election.

Box 1.1. The rationale for government support of innovation

Research and innovation involve the creation of new ideas. These are intangible, and thus it is often difficult for the inventors to appropriate all the returns from their efforts. Some of the benefits from the inventions will ‘spill over’ to third parties (this is what economists call a positive externality). As a result, market incentives alone may provide too little incentive for research and innovation from society’s point of view. This is one of the strongest justifications for government support of research and innovation: by lowering the private cost (or increasing the private gain), government can encourage the activities that generate positive spillovers.

In addition, firms and individuals may be restricted in the extent to which they can respond to market incentives, due to failures in financial markets which make it difficult to secure external sources of finance for risky and intangible projects. This can also lead research and innovative activities to be underprovided.

Other rationales for government intervention include coordination failures – where individuals and firms may face difficulty in acting collectively towards a common goal – and information failures, where firms are unaware of the existence of potential research partners or of a particular technology.

1.1 Policy under Labour to date

Labour has instituted a number of policy measures in the areas covered by this Briefing Note. The main ones have been:

- significant increases in spending on science;
- the introduction of research and development (R&D) tax credits;
- a large number of small discretionary innovation policy measures;
- a reduction in the UK statutory corporate tax rate from 33% in 1997 to 28% today;
- a series of changes to the small companies' rate, which now stands at 21% compared to 24% in 1997;
- exemption from UK corporation tax for foreign income since 2009.

1.2 Proposed policies

Despite the central role that productivity and innovation play in our economic wealth, elections' battle lines are rarely drawn with innovation policy. Parties tend not to preannounce detailed policies in this area, preferring instead to stick to broader statements regarding the benefits of living in an innovative society. Any preannounced policies are more likely to refer to corporate taxes.

There are some policies for which there is agreement among the main parties:

- In 2009, the Labour government introduced an exemption system for the taxation of foreign profits and has since undertaken ongoing consultation on how to adapt the related Controlled Foreign Companies (CFC) rules. The Conservative Party set out an aim to simplify the CFC rules in its manifesto.
- At the end of 2009, the Labour government set out plans to introduce a Patent Box giving a reduced rate of corporation tax to the income derived from patents granted after 2013. The Conservative Party manifesto indicates a desire to create an 'attractive tax environment for intellectual property'; this does not rule out the introduction of a Patent Box.
- All three parties have issued proposals aimed at supporting small businesses.

The main point of difference between the Labour and Conservative parties is the short-term trajectory of corporate tax rates: a new Labour government would leave the main rate unchanged at 28% in 2010–11 and increase the small companies' rate to 22% in 2011–12, while an incoming Conservative government would reduce the main rate to 25% and the small companies' rate to 20%, paid for by broadening the base of the tax. The Liberal Democrats, while stating a desire to reduce business regulation and clamp down on corporation tax avoidance, have not mentioned corporate taxes in their manifesto.

All the main parties have made positive statements about the role of science, research and higher education. However, none has given details on the level of funding and all have been silent on the extent and composition of inevitable cuts to science-related budgets, including higher education. Labour has 'committed to a ring-fenced science budget in the next spending review'; the Conservatives have proposed a multi-year science and research budget; the Liberal Democrats have pledged to ensure that the allocated science budget is not used for other purposes. None of these measures rules out cuts.

The following lists outline the main policies that have been announced by the parties and highlight where the parties differ. In some cases, the points are little more than stated ambitions and they

carry few, if any, details. The policies come from the pre-election outputs, including manifestos, and, for Labour, the 2010 Budget.

Labour²

- Keep the main rate of corporate tax unchanged at 28% for financial year 2011–12.
- Increase the small companies' rate from 21% to 22% in April 2011.
- Protect and increase the size of capital allowances.
- Double the Annual Investment Allowance – which allows the first £50,000 of annual capital expenditure to be fully offset against taxable profits – to £100,000 (from April 2010).
- Extend Entrepreneurs' Relief – which provides a reduced, 10% rate of capital gains tax – from the first £1 million to the first £2 million of lifetime gains (from April 2010).
- Ring-fence the science budget in the next spending review.
- Introduce the University Enterprise Capital Fund to 'exploit the commercial potential of the UK's world-class research base'.

Measures aimed at small businesses:

- Remove business rates for one year from October 2010 for eligible small businesses occupying properties with rateable values up to £6,000.
- Increase the online support for small businesses by the end of 2011, including making it easier for businesses to register for multiple taxes online.
- Create a Small Business Credit Adjudicator to assist small and medium-sized enterprises (SMEs) to access finance and 'UK Finance for Growth' to oversee government funds for SME finance.

Conservatives³

- Reduce the main rate of corporate tax from 28% to 25%.⁴
- Reduce the small companies' rate from 21% to 20%.
- Reduce the generosity of capital allowances and reliefs.
- Make changes to R&D tax credits to focus them on high-tech companies, small businesses and new start-ups.
- Initiate a multi-year science and research budget with the aim of providing a stable investment climate for Research Councils.

² See Budget 2010, http://www.hm-treasury.gov.uk/d/budget2010_complete.pdf; in particular, see 'Business and Financial Services' in Financial Statement and Budget Report. Also see Labour Manifesto, <http://www2.labour.org.uk/uploads/TheLabourPartyManifesto-2010.pdf>.

³ See the Conservative Manifesto, <http://www.conservatives.com/Policy/Manifesto.aspx>; Conservatives, *A New Economic Model: Eight Benchmarks for Britain*, http://www.conservatives.com/News/News_stories/2010/02/~/_media/Files/Downloadable%20Files/new-economic-model.ashx; and the Conservative Technology Manifesto, http://www.conservatives.com/News/News_stories/2010/03/Conservative_Technology_Manifesto_launched.aspx. Alongside tax changes, the Conservative Party has proposed the creation of an Office of Tax Simplification.

⁴ In addition, the Conservatives have said they will 'reverse the effects of the abolition of the dividend tax credit for pension funds' when finances allow. See box 1 of C. Emmerson, G. Tetlow and M. Wakefield, *Pension and Saving Policy*, IFS 2005 Election Briefing Note 12, Institute for Fiscal Studies, London, 2005 (<http://www.ifs.org.uk/bns/05ebn12.pdf>) for discussion of the abolition of the dividend tax credit for pension funds. This could be an expensive policy, and the financial situation means it is unlikely that reforms of this nature will happen for some time.

Measures aimed at small businesses:

- Remove employer National Insurance on the first 10 employees hired during the first year of any new business started in the first two years of a Conservative government.
- Reduce the number of forms needed to register a new business in order to move towards a 'one-click' registration model.

Liberal Democrats⁵

- Consult with businesses with a view to removing, reducing or simplifying business regulations.
- Create Local Enterprise Funds and Regional Stock Exchanges.
- Reform business rates so that they are based on site values rather than rental values and make small company relief automatic.
- Reform Regional Development Agencies (RDAs) to focus solely on economic development and, in some cases, scrap RDAs and let local authorities take over their functions.

In the rest of this Briefing Note, we describe the UK's productivity and innovation performance, further discuss the main policy changes under Labour governments between 1997 and 2010 and, where relevant, elaborate on the proposed policies of the main parties. Section 2 compares the UK's performance with that of other countries, including how it has evolved over time and how it has fared more recently in the recession. Section 3 considers the key policies relating both to direct government interventions and to corporate taxes. Section 4 concludes.

2. UK productivity & innovation performance

2.1 Productivity

Measures of productivity tell us how efficiently we turn a set of inputs into final goods and services. Higher productivity, which means that we are producing more with the same resources, drives increasing economic wealth and is therefore of central importance.

The long picture

A basic measure of the economic wealth of a country is gross domestic product (GDP) per capita, which represents the amount that a country produces per person. Looking over the past 50 years, we see that GDP per capita in each of the UK, France, Germany, Japan and the US has grown. This can be seen in Table 2.1, which shows the evolution of GDP per capita in US\$ across the G5 countries. The US has consistently ranked first for GDP per capita, while the UK has seen an improving position relative to France and Germany.⁶

There are a number of factors that contribute to the level of GDP per capita, mainly the hours worked (which depend on the number of people employed and the average hours each person works) and how efficient workers are at producing output (labour productivity). Labour productivity in turn is affected by the skills of the workers, the capital they have to work with and a number of other factors commonly called total factor productivity.

⁵ The Liberal Democrats have announced very few specific policies or aims that relate to innovation, science or the corporate tax environment. See 'Business', Liberal Democrat Policy Briefing, <http://www.libdems.org.uk/siteFiles/resources/PDF/Election%20Policy/06%20-%20Business.pdf>.

⁶ Making precise international comparisons is difficult for several reasons. There are a number of methodological issues involved, most notably how series are deflated and how they are converted into a common currency. For more information, see *The ONS Productivity Handbook: A Statistical Overview and Guide*, <http://www.statistics.gov.uk/StatBase/Product.asp?vlnk=14900&Pos=&ColRank=1&Rank=272> and work by the Groningen Growth and Development Centre at <http://www.ggdc.net/>.

Table 2.1. GDP per capita across the G5 (2009 US\$)

	1960	1970	1980	1990	2000	2009
UK	14,212	17,701	21,258	27,009	33,505	37,391
France	11,590	17,876	23,134	27,648	31,995	33,791
Germany	-	-	-	29,856	34,646	36,163
Japan	6,290	15,326	21,186	29,645	32,719	34,167
US	17,058	22,631	27,973	34,934	43,324	46,008

Notes: These numbers are derived from the Conference Board Total Economy Database. GDP has been converted to 2009 US\$ using updated 2005 EKS PPPs. German figures are excluded for the pre-unification period.

Source: The Conference Board Total Economy Database, January 2010, <http://www.conference-board.org/economics/database.cfm>.

Here is how the UK fares on the total number of hours worked:⁷

- The UK population has grown from 52.4 million in 1960 to 61.1 million in 2009 (17% growth). In comparison, the populations in other G5 countries have grown more quickly, by 70% in the US, 38% in France and 35% in Japan.⁸
- The proportion of the total population that is employed has remained fairly stable in the UK: 46.2% of the population was employed in 1960 while 47.0% was employed in 2009. In France the rate is lower and has declined from 42.9% in 1960 to 39.4% in 2009, while in Japan it has remained fairly constant at around 49%. In contrast, the proportion of the US population employed has increased from 37.9% to 46.2%.⁹
- Average annual hours worked per worker in the UK have fallen from 2,421 in 1960 to 1,639 in 2009; there have been similar declines in all G5 countries.

The overall effect of changes in population, proportion of the population employed and hours worked has been that since 1960 total hours worked have fallen by 19.5% in the UK and by 12.3% in France, remained fairly stable in Japan, and, in stark contrast, risen by 84.3% in the US. A fall in total hours worked can be expected to have a negative effect on GDP. The effect on productivity is less clear. If reductions in participation mean that the lowest-productivity workers are no longer working, then productivity will rise. Likewise, if a worker's productivity falls the more hours they work, then reducing hours per worker will lead to an increase in productivity. However, it is possible to have increasing productivity and increasing hours worked.¹⁰

Labour productivity – the amount of output produced per hour worked – is shown in Figure 2.1. We see that for each of the UK, France, Japan and the US, labour productivity has grown steadily. Despite this, the UK has had a persistent productivity gap with the US – the UK consistently produces less per hour worked. Over the 1980s and early 1990s, UK growth was stronger than US growth, which led to a narrowing of the gap. However, the gap has persisted since the mid-1990s, and widened in the most recent period. France experienced rapid growth over the 1970s and 1980s, and by the start of 1990 it was at the same level as the US, where it has remained.¹¹

⁷ All the figures in this paragraph are from the Conference Board Total Economy Database, January 2010.

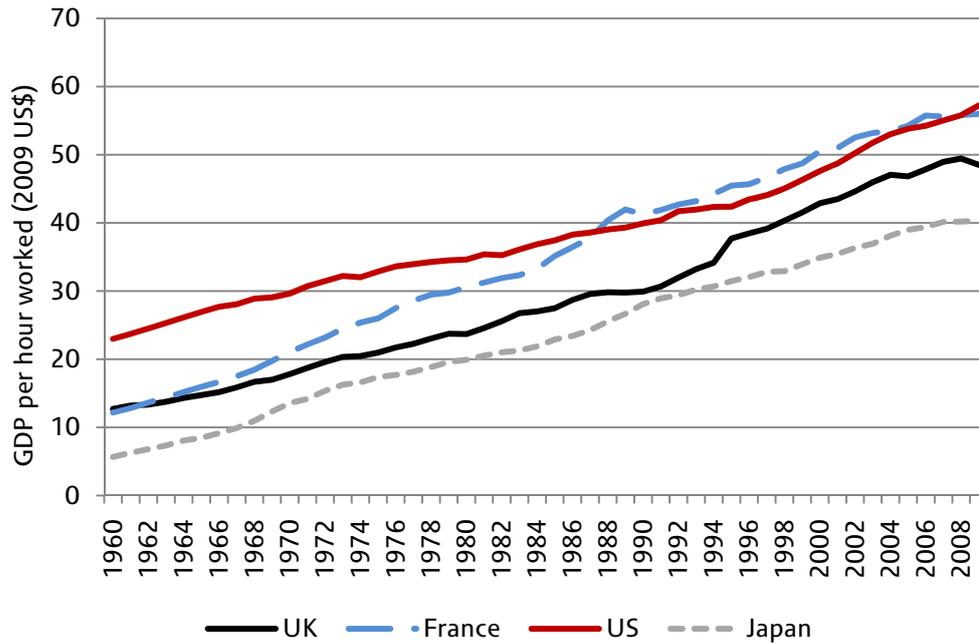
⁸ The German figures across the period 1960–2009 are distorted by unification; therefore we exclude Germany from the analysis from this point on.

⁹ This figure is total persons employed divided by total population; it will therefore be affected by the labour market participation rate of working-age individuals as well as by the age structure of the population.

¹⁰ For example, see paragraph 1.14 of HM Treasury, *Productivity in the UK 5: Benchmarking UK Productivity Performance*, http://www.hm-treasury.gov.uk/consult_productivity_indicators_index.htm.

¹¹ Whether France has been above or below the US since 1990 depends on which exchange rates are used.

Figure 2.1. Labour productivity (2009 US\$)



Note: This graph plots labour productivity per hour worked in 2009 US\$ (converted to 2009 price level with updated 2005 EKS PPPs).
 Source: The Conference Board Total Economy Database, January 2010.

The result from Table 2.1 that the UK has a lower level of GDP per capita than the US can therefore be attributed to both the lower number of hours worked and the lower level of productivity. In the case of France, although productivity is higher, total hours worked are lower, which results in lower GDP per capita than in the UK.¹²

The last few years

What has happened to UK productivity during the recent recession and how does this compare with the US experience? One might expect productivity to fall as output falls. However, productivity is also affected by changes in the number of hours worked, which typically also falls in a recession. In fact, if layoffs (usually of below-average-productivity employees) keep pace with falls in output, productivity may increase.

At the start of 2007, UK labour productivity was continuing to grow and was a little more than 2% higher than in 2006. Productivity continued to increase, but at a slower and declining rate, until the middle of 2008 when productivity started to fall. UK labour productivity fell consistently until the middle of 2009, when it was 4% lower than at the same time the previous year.¹³ The most recent data show that UK labour productivity continued to decline throughout 2009 but at a slowing rate.¹⁴

The UK's performance stands in stark contrast to that of the US, which saw no decline in productivity alongside a much slower decline in the rate of growth: US productivity growth was

¹² For further analysis of international productivity comparisons, see the Groningen Growth and Development Centre website, <http://www.ggd.net/>.

¹³ Source: Table 1 of 'Productivity Q4 2009', ONS Statistical Bulletin, <http://www.statistics.gov.uk/pdfdir/pro0310.pdf>.

¹⁴ See <http://www.statistics.gov.uk/CCI/nugget.asp?ID=133&Pos=1&ColRank=1&Rank=278>.

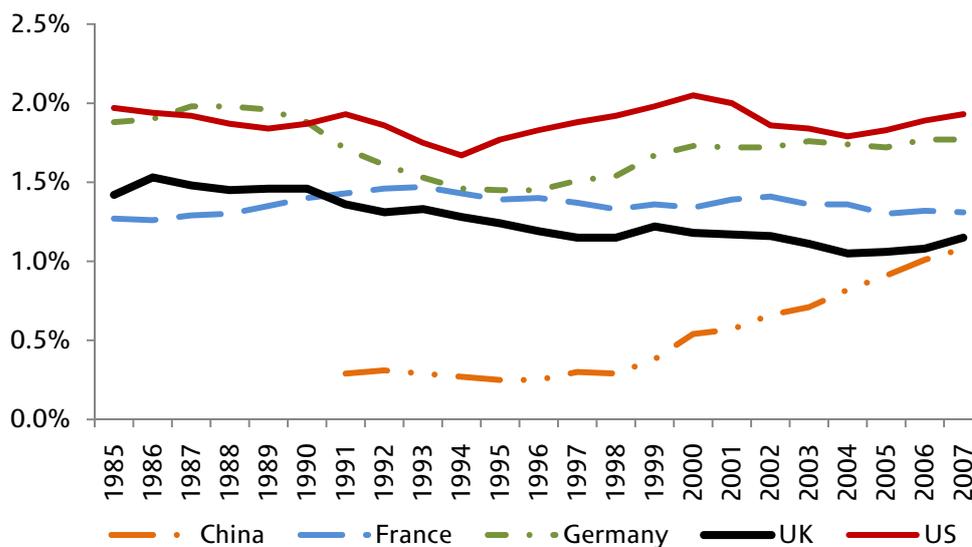
close to zero at the start of 2007, rose to 3% by the end of 2007 and then fell back to 1% at the start of 2009.¹⁵

Why has the UK had such a different experience? In short, the answer is that the US saw a larger fall in employment (and hours) relative to output, which acted to keep output per hour worked high. Employment has not fallen so sharply in the UK and, as a result, lower output has been translated into lower productivity. Further details on UK productivity during the recent recession are available in a separate Election Briefing Note.¹⁶

2.2 Innovation

Historically, the UK has performed well on measures that capture the outputs of basic science and universities. For example, with only 1% of the world's population, the UK produces 9% of all scientific papers and receives 12% of citations. In addition, the UK ranks third in the G8 for the number of doctoral awards and second for the share of doctoral awards relative to the population.¹⁷ In the 2009 European Innovation Scoreboard (which provides a comparative assessment of the innovation performance of EU member states in 2007), the UK retained its position in the 'innovation leader' group.¹⁸ Measures of outputs show that, while there has been consistent dominance by the US, the UK has held a historically strong position. More recently, however, other nations, including those in Europe as well as quickly developing nations such as China, have caught up with the UK and begun to erode its international position.

Figure 2.2. Business expenditure on R&D as a percentage of GDP (BERD)



Source: OECD's 2009 Main Science and Technology Indicators (MSTI) data set. Data can be accessed at http://www.oecd.org/document/52/0,3343,en_2649_34451_34537140_1_1_1_1,00.html.

¹⁵ Source: Bureau of Labor Statistics, 'Productivity and Costs: Second Quarter 2009, Revised', BLS News Release, 2 September 2009, http://www.bls.gov/news.release/archives/prod2_09022009.pdf.

¹⁶ See R. Griffith and H. Miller, *UK Productivity in the Recession*, IFS Election Briefing Note 10, 2010.

¹⁷ See Department for Business, Innovation and Skills, *International Comparative Performance of the UK Research Base: September 2009*, 2009, http://www.bis.gov.uk/assets/biscore/corporate/migratedD/publications/I/ICPRUK09v1_4.

¹⁸ See Department for Business, Innovation and Skills, *Annual Innovation Report: 2009*, <http://www.bis.gov.uk/assets/biscore/innovation/docs/2009-innovation-report.pdf>.

In 2007, the latest year for which figures are available, gross domestic expenditure on R&D (GERD), which includes spending by both the public and the private sector, was 1.8% of GDP.¹⁹ For both the public sector, which conducts around a third of UK R&D, and the private sector, there has been a decline since the mid-1980s in the proportion of national resources – captured by GDP – that are devoted to R&D. As a result, the UK has increasingly lagged behind many other developed nations.

Figure 2.2 shows the decline in business expenditure on R&D as a proportion of GDP (BERD) since the mid-1980s and highlights the deterioration of the UK's position vis-à-vis other developed economies. In 2007, UK business expenditure on R&D stood at just 1.15% of GDP, lower than the 1.9% invested by US business and the 1.8% by German business. Notably, China has experienced rapid growth over the last decade and Chinese BERD is now at a level very similar to the UK's.

3. Policy

The Labour government has made productivity and innovation a policy priority and, in November 2000, published 'Productivity in the UK: the evidence and the Government's approach', which concluded that 'the UK's productivity gap can be accounted for by its deficit in physical and human capital and its lower rate of innovation compared to other major economies'.²⁰ In this document, the government established the five drivers of productivity growth – investment, innovation, skills, enterprise and competition – as a framework for analysing and improving the UK's position.²¹

This was followed by a large number of reviews that considered aspects of UK innovation and led to a series of policy changes.²² These included many small discretionary policy measures by what, after a series of name changes, is now called the Department for Business, Innovation and Skills (BIS).²³ Investments in innovation and improvements to productivity result from long-term investment decisions, and it is therefore particularly important that policy remains consistent and stable over time to allow firms to plan. Frequent policy changes are at odds with this.

In this section, we review some of the main policy areas that affect productivity and innovation. The Labour government has made a number of policy changes and there are obviously likely to be further changes under future governments. An important question, then, is how do governments know which policies work best and which ones to invest in? Should the government put its next £1 of innovation spending towards R&D tax credits, spend it directly on science or introduce a new policy? For example, at the end of 2009, the government announced a new innovation policy, the Patent Box, that will benefit a few large firms at an estimated cost of £1.3 billion a year; is this the best use of funds, or would these funds be put to better use in schools or universities?

¹⁹ R&D expenditure figures are from the OECD's 2009 Main Science and Technology Indicators (MSTI) data set. Data can be accessed at http://www.oecd.org/document/52/0,3343,en_2649_34451_34537140_1_1_1_1,00.html.

²⁰ See paragraph 2.21 of HM Treasury, *Productivity in the UK: The Evidence and the Government's Approach*, 2000, <http://www.hm-treasury.gov.uk/d/81.pdf>.

²¹ See paragraph 4.20.

²² In relation to innovation and the relevant economic environment, there have been a huge number of reviews covering, among many other things, business support and regulations, business collaboration with universities, and the relationship between the public sector and industry. As well as those included in this section, notable examples include the 2003 Lambert Review of Business–University Collaboration, the 2003 DTI Innovation Review of Competing in the Global Economy, the 2006 Gowers Review of Intellectual Property and, most recently, the Hauser Review of the Current and Future Role of Technology and Innovation Centres in the UK.

²³ In 2005, the Department of Trade and Industry (DTI) was rebranded as the Department of Productivity, Energy and Industry (DPEI); within the week, it had changed back to the DTI. It became the Department for Business, Enterprise and Regulatory Reform (BERR) in 2007 and then, following a merger with the Department for Innovation, Universities and Skills (DIUS), the department was named the Department for Business, Innovation and Skills (BIS).

These are difficult questions to answer (and ones that we will not be able to answer here), not least because the effects of policies are hard to predict and measure. In the textbook case, investment in a policy would take place until the point where the marginal benefits produced by the policy are equal to its marginal costs. However, it is difficult to measure precisely the costs and benefits of a specific policy, although it is often the case that we can say with a high degree of certainty that the benefits are higher than the costs. But choosing between policies requires identification of where the difference between the marginal benefit and marginal cost is highest. This requires some knowledge of the relative magnitudes across different policies, which can be much more demanding.

3.1 Science & infrastructure

Direct spending

Direct spending on science, including funding Research Councils, and investments in infrastructure, such as laboratories and universities, can have a direct impact on how innovative a country is. Spending can result directly in innovative outcomes as well as provide investment in infrastructure, the provision of world-class research facilities, good transport networks, high-speed internet services and a host of other facilities that can contribute to an environment conducive to corporate innovative activities. The government's science budget, which includes spending on Research Councils, has more than doubled since 1997, reaching £3.4 billion in 2007–08.²⁴

Government directly contributes less to total R&D spending than the private sector. However, innovation that is conducted in the public sector (in universities and research labs) and directly funded by government is important, since these activities are precisely those that produce the largest positive externalities, and the ones that would be underprovided by the private market, making intervention well justified. Basic science creates fundamental discoveries and general technologies which have wide applications and a broad impact. This type of research is hard to secure private financing for, because the returns are both highly uncertain and difficult to appropriate. Of the UK's government-funded R&D, which includes R&D conducted by Research Councils, around half is applied (has practical aims or specific uses) while around 40% is basic (carried out for the advancement of knowledge). The proportion of basic science, which has the highest externalities, represents an increase from 20% in the mid-1980s and 30% in 1997.²⁵

Despite the government's strong record here, the prospects for the UK science base are more uncertain going forward. In the 2009 Pre-Budget Report (PBR), the government announced proposals for £600 million of cuts to come from higher education and science and research budgets before 2013. In addition, at the end of 2009, it was announced that the Higher Education Funding Council for England (HEFCE) will also face a cut of £135 million in its 2010–11 settlement.²⁶ This is in stark contrast to many other major economies, which, as part of measures aimed at combating the recession, have introduced large budget increases for science and education.²⁷

²⁴ See Department for Innovation, Universities and Skills, *The Allocations of the Science Budget 2008/09 to 2010/11*, 2007, <http://www.bis.gov.uk/assets/biscore/corporate/migrated/publications/u/urn07114.pdf>.

²⁵ See part 1 of The Royal Society, *The Scientific Century: Securing Our Future Prosperity*, London, 2010.

²⁶ This was revealed in a grant letter from Lord Mandelson to HEFCE. See <http://www.hefce.ac.uk/news/HEFCE/2009/grant1011/letter.htm>.

²⁷ President Barack Obama's American Recovery and Reinvestment Act included large increases in spending on science in the US. For information on other countries, see table 4 of OECD, *Policy Responses to the Economic Crisis: Investing in Innovation for Long-Term Growth*, 2009, <http://www.oecd.org/dataoecd/59/45/42983414.pdf>; also part 2 of The Royal Society, *The Scientific Century: Securing Our Future Prosperity*, London, 2010.

All three parties fail to address the most important question over the level of funding. It seems likely that budgets that relate to science and education spending will be cut going forward as whoever forms the next government attempts to rein in public spending. This risks placing the UK in a weakened position and would have long-run consequences; therefore, cuts should be considered carefully.²⁸

Discretionary policies

In addition to direct funding for science, a large number of smaller initiatives, aimed at supporting innovation, have been introduced since 1997. These have been smaller in terms of both scope and revenue cost. They have largely been run by what is now called the Department for Business Innovation and Skills (BIS) and have often been the result of one of the many reviews that have been undertaken. Policies ranged from those that aim to increase the finance available for small and high-tech companies, including the 'Enterprise Capital Funds' and more recently the 'UK Innovation Investment Fund', to those that provide information to businesses, such as the 'Business Links' service and the 'National Measurement Service', to those that encourage collaborations such as the Faraday partnerships and the more recent UK-US science bridges.²⁹

The Sainsbury Review of Science and Innovation, published in October 2007,³⁰ produced a number of recommendations, including a lead role for the Technology Strategy Board (TSB). This business-focused organisation had been established in July 2007 as part of the 'Science and Innovation Investment Framework 2004–2014'.³¹ It plays a lead role in providing greater coordination of Regional Development Agencies, Research Councils and government department activity with a view to stimulating business R&D and innovation. The TSB has received increasing funding and has a budget of £711 million for the period 2008–11, with additional aligned funding from both the Regional Development Agencies and the Research Councils.³²

Government procurement

Over the last parliament, there has been an increasing emphasis on the role of government procurement in driving innovation. This is set out in *Innovation Nation*, a White Paper published in March 2008, which sets out the government's aim to 'make the UK the best place in the world to be an innovative business'.³³ The document continues the theme of the Sainsbury Review and additionally highlights the role of service sector innovation and advocates a greater focus on innovation in government procurement. In particular, the White Paper highlights a key role for government procurement in increasing the demand for innovation, allowing the government to act as a leader in new markets and producing signals of the strength of potential markets. Each government department will now have an Innovation Procurement Plan, which will be particularly relevant in the areas of health and defence and where there is scope for green technologies.

²⁸ For the benefits of public R&D spending, see, for example, D. A. King, 'The scientific impact of nations: what different countries get for their research spending', *Nature*, 2004, **430**, 311–16, <http://www.berr.gov.uk/files/file11959.pdf>.

²⁹ The current policies operated by BIS, in a number of areas, can be found at <http://www.bis.gov.uk/Policies/by/themes/innovation>.

³⁰ *The Race to the Top: A Review of Government's Science and Innovation Policies*, 2007, http://www.hm-treasury.gov.uk/sainsbury_index.htm.

³¹ http://www.hm-treasury.gov.uk/spending_sr04_science.htm.

³² See Department for Business, Innovation and Skills, *Annual Innovation Report: 2009*, <http://www.bis.gov.uk/assets/biscore/innovation/docs/2009-innovation-report.pdf>.

³³ Department for Business, Innovation and Skills, *Innovation Nation*, 2008, <http://www.dius.gov.uk/Policies/innovation/white-paper>.

The Conservatives' manifesto also outlines plans for government procurement to be used to 'stimulate enterprise and innovation'.³⁴ Their proposals include publishing government tender documents for contracts worth more than £10,000 online and breaking ICT projects into smaller projects, both with an aim to make government procurement more accessible to small businesses.

3.2 Corporate tax environment

The private sector accounts for around two-thirds of innovative activity and one of the important influences on corporate activity is the corporate tax environment. For large firms, the statutory corporate tax rate and the tax base to which this applies are relevant. Small firms and new entrants

Box 3.1. Taxes and the location of activity

Where firms choose to locate their headquarters, production facilities, research labs and intellectual property will all be affected by the nature of the corporate tax system. This is especially true for large internationally mobile multinationals. As a result, it has long been acknowledged that countries may attempt to compete for activity by offering firms low-tax environments. This often raises concerns of a race to the bottom as countries continue to reduce rates in a bid to offer lower taxes than their neighbours.

In general, firms will make optimal location decisions based on a number of factors, including the opportunities and inputs available in local markets. This may lead to firms locating offshore where they can access the latest technologies, tap into local skills or sell their services to new markets and in doing so remit some of the benefits back to the UK. As a result, it is not necessarily desirable to distort firms' decisions with taxes.

However, there are benefits from having activity conducted in the UK. At the very least, it is beneficial to have firms locate in the UK to provide jobs, particularly those at the high-skill end. There are likely to be additional benefits from having innovative activities located in the UK since the largest externalities result from the creators of new technologies; inventors hold tacit knowledge which is shared when they interact with others. Firms' headquarters may also be particularly attractive since they provide high-skilled jobs, both directly and as a result of demanding high-skilled services such as legal, creative and business services. There are other benefits to having large companies locate their headquarters in the UK, including corporate control and tax revenues.

Recently, concern has been raised over firms moving (or threatening to move) their headquarters offshore. This was evidenced in 2002 by the US government's attempts, including four Congressional Acts, to prevent US companies relocating headquarters offshore.^a The concern is probably overstated: despite threats to do so, very few firms have actually relocated their headquarters.

The UK has an interest in ensuring that it offers an internationally competitive corporate tax environment. However, it should, of course, be remembered that taxes are not the only reason that firms choose a location, especially not when locating real activity as opposed to income. In fact, firms may elect to pay high corporation taxes in return for the public services that are provided from tax revenue. In the long term, therefore, it would be undesirable to reduce taxes at the expense of policies such as spending on science and education that help make the UK a better place to do business.

a. The four Congressional Acts in 2002 were the Corporate Patriot Enforcement Act, the Save America's Jobs Act, the Uncle Sam Wants You Act and the Tax Breaks for Corporations Renouncing America Act. There was also an American Jobs Creation Act of 2004.

³⁴ See page 20 of the Conservative Manifesto, <http://www.conservatives.com/Policy/Manifesto.aspx>.

may make long-term decisions based on expectations of the main statutory rate but are likely to be more affected by the cost of starting a business and the tax rate they will initially face – the small companies’ rate.

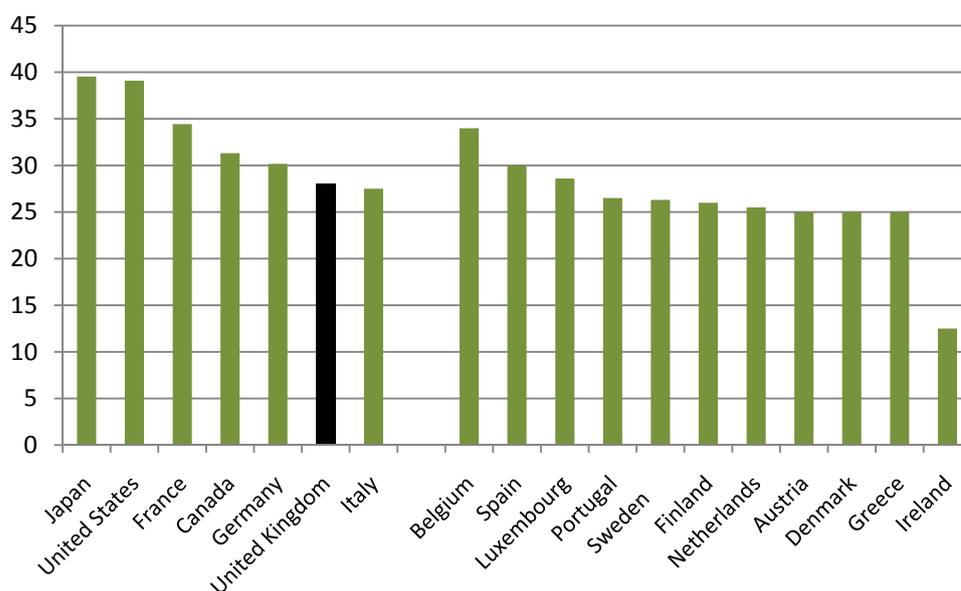
Other aspects of the corporate tax environment – in particular, the tax treatment of foreign source income and, especially in relation to innovation, the tax treatment of intellectual property – are important. Corporate taxes affect not only the amount of activity but also, since large firms are internationally mobile, where firms locate activity. This is particularly relevant for highly mobile intangible assets, such as intellectual property, which result from innovation. (See Box 3.1.)

Statutory corporate tax rates

Across Europe, there has been a trend towards falling corporate tax rates; this has been equally true for the UK. In his first Budget as Chancellor in July 1997, Gordon Brown reduced the main statutory rate of corporation tax from 33% to 31%. There was a further cut to 30% in 1999 and then to 28% in 2008. There have also been reductions in capital allowances which have broadened the tax base. For example, the allowance for most plant and machinery was reduced from 25% to 20% in 2008. In revenue terms, reductions in corporate taxes are orders of magnitude larger than any of the more direct innovation policies.

In 1997, the UK’s corporate tax was the lowest in the G7 and fourth-lowest in the EU. As shown in Figure 3.1, the UK continues to have a corporate tax rate that is low relative to those in other G7 countries, having the second-lowest rate among these countries in 2009. However, on average, UK cuts have been more modest than those in other EU member states, so that the UK tax rate is now above the average of the pre-enlargement EU. The UK had the tenth-lowest rate among the EU15 in 2009.³⁵ In addition, the new EU member states typically have lower corporate tax rates than those elsewhere in Europe, including the UK.

Figure 3.1. Corporate income tax rates, 2009



Notes: This figure shows the statutory corporate tax rate including, where relevant, local corporate income tax rates. Where a progressive (as opposed to flat) rate structure applies, the top marginal rate is shown. Source: OECD Tax Database, ‘Taxation of Corporate and Capital Income’, table II.1.

³⁵ The 15 pre-enlargement EU countries are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and UK. In 1997 the average corporate rate was 36% compared with the UK rate of 31%, while in 2009 the average was 27% compared with the UK rate of 28%.

Labour has announced the intention to keep the main rate of corporate tax unchanged at 28% for financial year 2011–12. In 2010, the Labour government doubled the Annual Investment Allowance to £100,000 and now pledges to maintain it in line with inflation. In its manifesto, Labour set out a desire to ‘protect and increase the size of capital allowances that help to grow key sectors such as manufacturing’. There have been no details on what this would mean in practice. Increasing the size of capital allowances – which would operate to reduce the tax burden of capital-intensive firms – would go against the recent trend towards base broadening.

The Conservatives have announced plans to reduce the main corporate tax rate to 25% to be funded by ‘reductions in capital allowances and scrapping complex reliefs’. A Conservative document from 2008 suggests that this would involve reducing plant and machinery allowances from 20% to 12.5%, reducing both long-life plant and machinery and integral fixtures allowances from 10% to 6% and removing the Annual Investment Allowance. Their stated aim is for the package of reforms to be revenue-neutral.³⁶

Cutting the headline rate would reduce the tax burden, while restricting allowances, which operates to reduce the proportion of previous years’ capital expenditure that can be deducted from revenue to calculate taxable profits, would lead to an increase. If the package is revenue-neutral, then this means that, on average, there will be no change in firms’ overall tax burden. However, it is likely that there will be some firms that benefit and others that lose. The losers are likely to be those firms with capital-intensive operations – with long-lasting equipment and machinery – that currently benefit most from the capital allowances. While this is likely to apply more to firms in the manufacturing and transport sectors, it may also be true for some capital-intensive service sector firms. The removal of the Annual Investment Allowance will disproportionately affect small firms.³⁷

R&D tax credits

The single largest innovation policy aiming to incentivise private sector innovation activity was the introduction, in 2000, of R&D tax credits. Originally available only for small and medium-sized firms, they have been available to all firms since 2002. The R&D tax credits offer tax relief for eligible R&D costs by allowing firms to deduct an amount greater than actual R&D expenditure from taxable profits, and thereby reduce their corporation tax bill.

Tax credits are market-based policies which aim to increase the private rate of return to R&D, to bring it closer to the social rate of return. Since the tax credits subsidise research activity directly, they are reasonably well targeted at externality-generating activities.

There are two tax credits – one aimed at large firms and the other at SMEs.³⁸ For large companies, tax relief is given at 130%; that is, for each £100 of qualifying costs, a company can reduce the income on which corporation tax is paid by £130. For SMEs, the tax relief is 175%.³⁹ In addition, for SMEs, part of the credit is ‘repayable’: firms with insufficient taxable profits can claim a cash payment equal to 24% of eligible R&D expenditure. This makes the SME tax credit particularly effective for small R&D-intensive start-ups that have not yet generated any taxable profits.

³⁶ For the Conservative Party’s proposed changes, see pages 8 and 9 of *A 21st Century Employment Strategy*, <http://conservativehome.blogs.com/torydiary/files/2008.07.14%20Employment%20plan%20-%20press.pdf>.

³⁷ For more information and analysis of the Conservatives’ corporate tax policies, see the forthcoming IFS Election Briefing Note, *Taxes and Benefits: The Parties’ Plans*.

³⁸ SMEs are defined as those with fewer than 500 employees and either an annual turnover not exceeding €100 million or a balance sheet not exceeding €86 million.

³⁹ In both cases, the relief is only available for companies spending at least £10,000 a year on qualifying R&D costs; for SMEs, there is also an upper limit of €7.5 million on the total amount of aid that can be received for any one R&D project. There are strict guidelines regarding what qualifies as an R&D project. Broadly, it must be a project that ‘seeks to achieve an advance in overall knowledge or capability in a field of science or technology through the resolution of scientific or technological uncertainty’. For more details, see <http://www.hmrc.gov.uk/ct/forms-rates/claims/randd.htm>.

In PBR 2009, the Labour government restated its commitment to the R&D tax credit as a mechanism for promoting innovation. Despite earlier plans to scrap the R&D tax credits, and following their ‘Dyson Review’, the Conservatives have announced that they will keep the policy. However, they have stated their intention that they will be ‘improved and refocused on hi-tech companies, small businesses and new start-ups’.⁴⁰ The Liberal Democrats have also indicated their intention to ‘Reform Research and Development tax credits to ensure that resources are targeted to encourage innovation’.⁴¹ It is unclear what the Conservative and Liberal Democrat plans would mean in practice, but both are likely to involve a cut in the generosity of the R&D tax credits.

Small firms

Historically, the UK has had relatively low costs and few procedures in relation to starting and running a business relative to other countries. The World Bank’s *Doing Business 2010* report, which compiles quantitative indicators on business-related regulations and procedures across 183 countries, showed that the UK ranked fifth in the world in terms of the ease of doing business in 2009, a one-place improvement from 2008.⁴² On the measures that relate to starting a business – the number of procedures required, the number of days it takes and the cost – there has been no

Table 3.1. The ease of starting a business, international rank 2009

	International rank (out of 183) (1)	<i>To start a business:</i>		
		Number of procedures (2)	Number of days (3)	Cost (% of income per capita) (4)
United States	8	6	6	0.7
Ireland	9	4	13	0.3
UK	16	6	13	0.7
France	22	5	7	0.9
Denmark	28	4	6	0.0
Finland	30	3	14	0.9
Belgium	31	3	4	5.3
Sweden	43	3	15	0.6
Portugal	60	6	6	6.4
Netherlands	70	6	10	5.6
Luxembourg	72	6	24	1.8
Italy	75	6	10	17.9
Germany	84	9	18	4.7
Austria	122	8	28	5.1
Greece	140	15	19	10.9
Spain	146	10	47	15.0

Notes: Column 1 shows the international ranking, out of 183 countries, of the ease of starting a business in 2009. The rankings are the average of the countries’ rankings on the number of procedures, time, cost and paid-in minimum capital for starting a business. The countries are ordered according to the rank in column 1. Column 2 shows the number of procedures, column 3 the number of days and column 4 the cost of starting a new business. See source for more information.

Source: *Doing Business 2010: Reforming through Difficult Times*, <http://www.doingbusiness.org>.

⁴⁰ See page 11 of the Conservative Manifesto, <http://www.conservatives.com/Policy/Manifesto.aspx>.

⁴¹ ‘Business’, Liberal Democrats Policy, <http://www.libdems.org.uk/siteFiles/resources/PDF/Policy%20Briefing%20-%20Business%20Oct%2009.pdf>.

⁴² All figures in this paragraph are from *Doing Business 2010: Reforming through Difficult Times*. Page 160 has a UK summary. In 2009, the rankings for ease of doing business were 1 Singapore, 2 New Zealand, 3 Hong Kong and 4 US.

change since the index began in 2004 and the UK compares well to other major economies. On a measure that captures the overall ease of starting a business, the UK ranked sixteenth in 2009. A comparison of this measure for the G7 and EU countries is shown in Table 3.1.

Since 1997, there have been a number of measures to assist new and small business. These have covered the regulation of small companies, access to government procurement and, in many cases, access to finance. Policies aimed at helping businesses to secure finance include the Enterprise Capital Funds, Community Investment Tax Relief, Early Growth Funds and Enterprise Finance Guarantee.⁴³ Most recently, in the 2010 Budget, 'UK Finance for Growth Limited' was established to oversee finance schemes for SMEs. In addition, the 2010 Budget extended the relief available under Entrepreneurs' Relief, which supports business owners, or those investing in businesses with growth potential, by providing a reduced, 10% rate of capital gains tax. The relief was increased from the first £1 million to the first £2 million of lifetime gains.⁴⁴

Small companies' rate

Since 1997, there have been six changes to the small companies' rate of corporation tax, which applies to companies with profits below £300,000 per year. The small companies' rate was 24% in 1997 and was reduced to 21% in the Budget of that year. It was then cut to 20% in 1999 and at the same time a starting rate of 10% was introduced. The small companies' rate was cut to 19% in 2002 alongside the introduction of the now infamous 0% starting rate, which was removed in 2006.⁴⁵ The rate then increased to 21% in 2008. At the same time, the first £50,000 of investment in plant and machinery was made tax deductible. This figure was increased to £100,000 in Budget 2010.

In the 2009 PBR, the government announced that the previously planned increase in the small companies' rate to 22% in April 2010 would be deferred again until April 2011. The small companies' rate is therefore planned to increase under a new Labour government. The Conservatives have announced plans to cut the small companies' rate to 20%, to be funded, as with the main rate, by reductions in allowances.

Taxation of foreign source income

In 2009, the UK moved to an exemption system for the taxation of foreign source income, under which most of the foreign income of UK firms is exempt from UK taxation. Before the change, UK-resident companies were taxed on income earned overseas, with a credit given for any taxes paid to foreign governments. The change brings the UK in line with many other European countries and should help UK multinationals to make more productive use of their assets.⁴⁶

The move to a dividend exemption introduces an incentive for firms to move income abroad to countries with a lower corporation tax rate and then repatriate the returns as tax-exempt dividends.⁴⁷ To prevent this type of income-shifting, the UK modified the Controlled Foreign

⁴³ For more information on each of these policies, see <http://www.bis.gov.uk/Policies/enterprise-and-business-support/access-to-finance>.

⁴⁴ For more information about small-business-related policies introduced in the 2010 Budget, see <http://www.bis.gov.uk/news/features/2010/3/small-firms-given-major-boost>.

⁴⁵ For more detail on the 0% starting rate, see section 9.4 of S. Bond, 'Company taxation', in R. Chote, C. Emmerson, R. Harrison and D. Miles (eds), *The IFS Green Budget: January 2006*, <http://www.ifs.org.uk/budgets/gb2006/06chap9.pdf>.

⁴⁶ For more details, see R. Griffith, H. Miller and M. O'Connell, 'Business taxation', in R. Chote, C. Emmerson, D. Miles and J. Shaw (eds), *The IFS Green Budget: January 2009*, <http://www.ifs.org.uk/budgets/gb2009/09chap12.pdf> and M. Gammie, R. Griffith and H. Miller, 'Taxation of companies' foreign profits', in R. Chote, C. Emmerson, D. Miles and J. Shaw (eds), *The IFS Green Budget: January 2008*, <http://www.ifs.org.uk/budgets/gb2008/08chap12.pdf>.

⁴⁷ There are a number of mechanisms through which a multinational may artificially shift income offshore, including manipulating the price of intra-firm transactions, allocating shared expenses and using debt, all with the aim of overcharging the part of the company located in the high-tax area. See references in above footnote for further details.

Companies (CFC) rules, which define that part of foreign income that remains taxable in the UK.⁴⁸ Broadly, a company is treated as a CFC if it is resident outside the UK, is subject to a tax regime with a significantly lower rate of tax than the UK's and is controlled by UK residents.

Consultation on how the CFC regime will operate going forward is ongoing. A discussion document was published in January 2010 outlining the proposals for reform to the CFC regime.⁴⁹ The consultation is due to culminate in legislation in the 2011 Finance Bill. In particular, how to treat the income from intellectual property when it is in the form of foreign dividends remains unresolved and is an active part of the debate over CFC reform.

This consultation process and resulting modifications to the CFC rules are likely to continue, regardless of who forms the next government.

Taxation of intellectual property

Intellectual property encompasses a number of intangible assets and associated rights, including patents, trademarks and copyrights.⁵⁰ The income derived from intellectual property is highly mobile. As a result, it is deemed to be able to move offshore easily in order to avoid taxation and is targeted under the current CFC rules.

The current system is undesirable; firms may hold their intellectual property (IP) offshore for commercially valid reasons and, in these cases, it is not clear that income from intellectual property should be treated differently from other income. The discussion document does recognise that 'many offshore IP companies undertake genuine and effective management activity'⁵¹ and it sets out potential reforms to CFC rules that would not tax income in these cases. However, the government has expressed its desire to continue to tax this income in cases where the intellectual property has been actively managed in the UK. A remaining problem is how to identify when intellectual property income is being diverted from the UK for tax purposes.⁵²

The discussion document explicitly recognises the interaction between the CFC rules as they relate to intellectual property and other aspects of the corporate tax regime, in particular the newly announced Patent Box.

Patent Box

In the 2009 PBR, the government announced its intention to introduce a 'Patent Box' – a new policy which would tax the income from patents granted after April 2013 at a reduced 10% rate of corporation tax. The explicitly stated aim of this policy is 'to strengthen the incentives to invest in innovative industries and ensure the UK remains an attractive location for innovation'.⁵³ However, the Patent Box is poorly targeted at the market failures that typically justify government

⁴⁸ The CFC rules were originally due to be reformed at the same time that an exemption system was introduced. Instead, reform of the CFC rules was delayed and is now the topic of a further consultation process; at present, the old CFC regime continues to operate with the introduction of a worldwide debt cap on tax deductions for interest claimed by UK members of a multinational group.

⁴⁹ HMT and HMRC, 'Proposals for controlled foreign companies (CFC) reform: discussion document', 2010, http://www.hm-treasury.gov.uk/d/cfc_discussiondoc_260110.pdf.

⁵⁰ The full list also includes industrial, commercial or scientific information, knowledge or expertise; brands, invention or design rights; and licences or other rights in respect of intellectual property. See paragraph 4.2 of the HMT/HMRC discussion document.

⁵¹ See paragraph 4.4 of the discussion document.

⁵² The discussion document sets out an option to identify companies with 'sufficient IP management activity offshore' and to exempt them from the CFC rules. Box 4.A of the document considers some of the factors that would need to be considered for determining where intellectual property is 'actively managed'.

⁵³ See paragraph 4.40 of HM Treasury, *Pre-Budget Report 2009*, December 2009, http://www.hm-treasury.gov.uk/prebud_pbr09_repindex.htm.

Box 3.2. The Patent Box

The Patent Box is unlikely to be a particularly well-targeted or successful innovation policy, for four reasons.

First, a Patent Box, by granting a lower rate of corporation tax for successfully patented technologies, is targeting the income received from an innovation. However, the largest source of externalities is not the income, but the research activity itself – exploring new ideas allows others to learn from the experience – which may or may not result in large revenue streams. The largest benefits of the policy will accrue to the largest income streams; while commercial application of an idea can produce external benefits, the majority of benefits are likely to be captured by the innovator. In fact, the grant of a patent, by issuing monopoly rights over that technology, is designed to ensure that the owner can capture the returns to the invention. Much of this activity would have likely taken place without the tax incentive and, in these cases, the tax cut represents a large deadweight cost of the policy.

Second, the Patent Box does little to incentivise firms to undertake more innovative projects. Under the Patent Box, the returns to successful, patentable innovations are increased. However, there is a long and uncertain lag between conceiving a new idea, creating a patentable technology, having the patent granted and then finally generating a stream of income on which a reduced rate of corporation tax can be levied. As a result, this is unlikely to have a significant impact on a firm deciding today whether to invest in additional innovative activities.

Third, while firms may conduct increased development activities to create more income from a patented technology, this is not an area where markets fail and, as a result, there is weak justification for government intervention.

Fourth, eligible patents are likely to include those that are held by UK firms but for which the underlying research was conducted elsewhere in the EU and perhaps elsewhere in the world; a policy specifying that research be conducted in the UK would likely meet resistance from the European Commission as being incompatible with the free movement of services in the EU. Therefore, while the Patent Box provides firms with an incentive to locate income from patents in the UK, it does little to change the UK's desirability as a location for innovation.

In addition, the policy will be difficult to implement, not least because it requires identification of the income that is attributable to eligible patents. In those cases where a firm licenses out a patented technology, the income received can be clearly identified. However, the income is much harder to identify when the patented technology is used within the firm, usually alongside other non-eligible patents and in conjunction with marketing, personnel and many other factors, since there is no observed market price.

intervention in innovation markets and is unlikely to lead to significant increases in innovation or to make the UK a more attractive location for innovation, as discussed in Box 3.2.⁵⁴

What the Patent Box will do is make the UK more attractive as a location for firms to hold the income from patents and provide large tax breaks for firms, such as those operating in the pharmaceuticals industry, for which patents are an important source of income. GlaxoSmithKline announced UK investments amounting to approximately £500 million in direct response to the Patent Box.⁵⁵ In fact, it is large firms like this that are most likely to respond to tax incentives such

⁵⁴ For more details, see R. Griffith and H. Miller, 'Support for research and innovation', in R. Chote, C. Emmerson and J. Shaw (eds), *The IFS Green Budget: February 2010*, <http://www.ifs.org.uk/budgets/gb2010/10chap10.pdf>.

⁵⁵ See http://www.gsk.com/media/pressreleases/2009/2009_pressrelease_10142.htm.

as the Patent Box, not only because they undertake large, long-run projects but also because they are the most mobile and able to locate activity in response to taxes. However, taxes are not the only reason that firms choose a location, especially when locating real activity as opposed to income. This is illustrated by AstraZeneca's recent closure of UK facilities despite the tax incentives of the Patent Box.

Despite being poorly targeted at encouraging innovation, the Patent Box does have the effect of reducing the incentives that UK firms face to shift the income from patents offshore. The operation of patent boxes by other EU countries as well as their favourable treatments of foreign source income currently works to exacerbate the concern over patent income (and potentially innovative activity) being shifted out of the UK.⁵⁶ Under the Patent Box, the UK will be one of the lowest-tax locations for patent income and this will therefore reduce one of the challenges faced by the CFC rules.

However, while the problem may be lessened in the case of patents, the new CFC regime will still have to deal with other forms of intellectual property; patents are a significant part but not everything. Although some EU countries include other forms of intellectual property, particularly copyrights, in their patent boxes, there is no indication that the UK will be doing this.

Although proposed by Labour, the Conservatives have announced their intention to create an 'attractive tax environment for intellectual property',⁵⁷ which may include the implementation of a Patent Box.

4. Conclusions

The UK has had a persistent productivity gap with the US and other major European countries although, throughout the 1990s, this gap narrowed. The UK has also lagged consistently behind other developed economies in spending on R&D; there has been a decline in business expenditure on R&D as a proportion of GDP (BERD) since the mid-1980s, which has resulted in the deterioration of the UK position. The decline ended in 2004. On other measures, which capture the outputs of basic science and universities internationally, the UK performs much better.

Since 1997, successive Labour governments have enacted a number of policies aimed at productivity and innovation, including large increases in spending on science, the introduction of R&D tax credits and a number of discretionary policies. Government policies can affect productivity and innovation outcomes but do so with large lags and over long periods of time, making it difficult to attribute any improvement in productivity performance to a particular intervention or even government.

We highlighted at the start that the issues covered in this Election Briefing Note are not the issues on which elections are fought. All parties espouse the benefits of living in a more productive and innovative society with a higher-skilled workforce and a competitive tax system, but they set out very few specific policies to achieve these stated aims.

Since 1997, the Labour government has instituted a series of reductions in the statutory corporate tax rate – which is 28% in 2010 – and the small companies' rate – which is 21% in 2010. The two main parties differ in the short-term trajectory of the corporate rates: a new Labour government would leave the main rate unchanged and increase the small companies' rate to 22% in 2011–12,

⁵⁶ A number of European countries have also implemented some form of patent box, including Belgium, Ireland, Luxembourg, the Netherlands and Spain.

⁵⁷ See page 19 of the Conservative Manifesto, <http://www.conservatives.com/Policy/Manifesto.aspx>.

while an incoming Conservative government would reduce the main rate to 25% and the small companies' rate to 20%. The Conservatives would finance the lower rate by reducing the generosity of capital allowances in a way that would be intended to be revenue-neutral. The two main parties therefore agree on how much revenue we should be trying to raise from corporation tax while differing in how that should be achieved. On other aspects of the corporate tax environment, there is much more agreement between the two main parties: both would continue to reform the Controlled Foreign Companies rules and provide a more attractive environment for intellectual property.

A notable gap in the policies of all parties is the question over government funding for science, research and higher education. We know that the majority of departments will face deep cuts, especially if large budgets such as those for the NHS and schools are protected from cuts. While each party has explicitly recognised the benefits of an innovative society, all have been silent on the extent and composition of cuts to the levels of science-related budgets.

While cutting spending in these areas may arouse little protest from the electorate, they are areas that form the backdrop not only to the UK's recovery from the recession but also to long-run success and economic wealth. Large cuts in spending on science and universities have long-term consequences; they risk both direct falls in innovative outputs and indirect falls to the extent that the UK would become a less desirable place for firms to conduct research. Cuts should therefore be considered with caution.