Making the UK a science superpower
How enhanced R&D tax credits can support growth, jobs and levelling up
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Foreword

Britain has led the world in developing and approving vaccines to beat the pandemic. A great achievement has resulted from the determination to harness innovation to tackle the most pressing of challenges. Crisis was the great motivator. Yet it is that same drive to unleash innovation that we now need more than ever, if we are truly to build back better.

The Prime Minister has committed his government to making this happen: he wants the UK to be a “global leader” in technology and a “science superpower” where home-grown innovation drives growth, jobs and levelling up.

The top priority is research and development: conceiving new discoveries and inventions and turning these into commercially viable businesses, creating high value jobs in critical areas like manufacturing. Yet the UK economy still invests too little in R&D, at only 1.7% of national income, well below the OECD average of 2.4%. A key reason is that there is too little incentive for businesses and investors to make the UK their R&D base.

That is why we are backing the policy set out in this research. It calls for a simple change of policy to allow the capital expenditure needed for research sites, factories, laboratories and machinery to qualify for R&D tax credits. Tax credits are already used to help businesses claim tax relief for R&D costs, but the cost of these vital facilities is excluded. This contrasts with the approach of France, Spain and Japan among others – a simple reason not to do R&D in the UK.

If allowed, this relief would more than pay for itself because of the substantial economic benefits it would produce. Independent economic modelling of the impacts, conducted for this report by a former Bank of England economist, shows the policy would create over 12,000 additional new jobs, mainly in high-skilled manufacturing. It would expand the economy by £4bn annually within 10 years, becoming a net revenue raiser for the Exchequer in just 7 years.

The real boon for the Prime Minister is that these economic benefits would cluster in the UK’s industrial heartlands in the North of England and West Midlands. By removing a policy distortion that currently discriminates against manufacturing, it puts these areas on a level playing field. Over 60 per cent of the jobs created would be in manufacturing, giving a concrete boost to his levelling up agenda.

We simply cannot be a global innovation leader if our R&D investment incentives lag behind those of our competitors. Bringing capital expenditure into R&D tax credits is a simple, rapidly self-financing way to kick-start growth, that will help to level up those parts of the country that desperately need it. Britain then really could be the global innovation leader the Prime Minister envisions.

Executive summary

The Government has set out a bold ambition for the UK to become a “science superpower”. It says this means being “the best place in the world for scientists and entrepreneurs” to conduct world-leading research into new medicines, tackling climate change and other major challenges, but also activity that will drive much-needed economic growth as we recover from the pandemic.

This is a very welcome commitment and ministers have identified correctly that Research and Development (R&D) is the critical factor in meeting it.

There is, however, one fundamental flaw in the UK’s approach to encouraging R&D. Unlike countries such as France, Spain and Japan, the UK does not fully recognise capital expenditure – such as on labs and buildings – within its R&D tax credits system. In other words, there are far stronger incentives to physically locate a new research facility in other countries.

The UK cannot be “the best place in the world” for scientific research if incentives for investing in it are suboptimal compared to elsewhere. Enhancing R&D tax credits to better recognise capital is a policy that would not only help the ‘science superpower’ ambition to be achieved, it would have a raft of much-needed economic benefits.

First off, the policy would support directly all efforts to encourage industrial innovation and growth for the UK’s recovery. It would make the UK comparatively more competitive for investment and spur commercial activity that would create thousands more high-value jobs.

The policy would also be fantastic for the Prime Minister’s priority ‘levelling up’ agenda. This is because some of the economically poorest communities in the UK are home to firms that undertake millions of pounds of R&D every year. It will boost manufacturing particularly in the industrial heartlands in the UK that developed cutting-edge clusters of advanced manufacturing firms.

Moreover, the benefits would result in higher tax revenues that pay for the policy. So, while tax incentives typically create a revenue loss for the Treasury, this one would be 100% self-financing.

This report uses a combination of existing data and new modelling analysis to explain this:

The UK must improve its R&D performance

- R&D is essential to keep the economy growing, but the UK performs relatively poorly at the amount of R&D that it undertakes. The UK spends only 1.7% of GDP on R&D, which is below both the OECD average of 2.4% and the EU average of 2.0%.

- The Government was elected on a pledge to improve the country’s R&D performance. The 2019 Conservative manifesto committed to increasing R&D spend to 2.4% of GDP by 2027.

- Increasing business investment in R&D is critical to the Government meeting its R&D target and to secure the UK’s status as a science superpower. Business is responsible for 68% of the UK’s expenditure on R&D. The rest is undertaken by higher education institutions, government bodies and private non-profits.
The UK’s business R&D story is one of growth, but also of imbalance and sensitivity to economic shocks

- **Business R&D has been growing.** The R&D expenditure of businesses in the UK has increased by more than a third (37.3%) in the last decade, rising from £19bn in 2010 to £26bn in 2019 (rising from 1% of GDP to 1.2% of GDP).

- **Business R&D expenditure is susceptible to economic downturns.** Business expenditure on R&D fell by a total of 5.0% during the financial crisis in 2008 and 2009. Employment in business R&D fell by 4.4% in the same period. But there was an even bigger impact on R&D capital expenditure, which dropped by 19% between 2007 and 2008.

- **Business R&D expenditure and business R&D employment match the economic imbalances of the UK.** The Greater South East (the regions of the South East, East of England and London) is home to 36% of the UK population but produces 47% of UK economic output. Business R&D in the Greater South East accounts for 54% of all business R&D by value and 47% of business R&D employment.

R&D tax credits and capital expenditure – the problem and the solution

- **Capital expenditure (spending on plant, machinery and buildings) has an essential and growing role in the R&D process.** Capital investment accounts for 8.3% (roughly £2.1bn) of all business R&D expenditure in 2019, up from 5.2% in 2010.

- **There are some tax benefits attached to R&D capital expenditure, but they are seriously flawed.** These tax benefits create inconsistent treatment between loss-making firms and profit-making firms, ultimately disincentivising R&D capital expenditure (and R&D projects more generally). Profit-making UK firms get back 19% on R&D capital expenditure through tax system, loss-making UK firms get nothing back on R&D capital expenditure through the tax system. This is important in the context of a pandemic related economic downturn, when many more firms are expected to make a loss.

- **Removing this inconsistency would mean including capital as eligible expenditure as part of R&D tax credits.** R&D tax credits for capital – plant, machinery and buildings - would be paid at the same rates as those for current spend. Existing capital benefits (Research and Development Allowances) would remain claimable alongside enhanced R&D tax credits – the vagaries of the tax system mean that some larger firms would lose if they are removed.

The size of the prize – what will enhancing R&D tax credits mean?

- **Including capital expenditure as eligible expenditure in R&D tax credits will mean higher growth and stronger public finances.** A conservative modelling of the tax reform suggests that private sector R&D will be raised across industries by £1.2bn per year and UK GDP will be raised by £4bn over 10 years. Moreover, while the initial cost would be around £430m a year, additional tax revenues generated through higher GDP would mean the policy is cost neutral by year seven after implementation and will have paid for itself by year 12.

- **Increased R&D spending arising from R&D tax credit reform will create an additional 12,200 R&D jobs, largely in manufacturing.** It is manufacturing firms that make up the majority of R&D spend, but also the majority of R&D capital spend. Hence, it is the manufacturing sector that will disproportionately benefit from enhanced R&D tax credits. Our modelling suggests that of these additional jobs, almost 60% would be in manufacturing.

- **Better recognition of capital in UK R&D tax credits will make the UK tax system more internationally competitive.** The OECD currently ranks the UK’s R&D tax relief scheme for SMEs as the 11th most generous of 44 countries. The UK’s R&D tax relief scheme for large companies is currently ranked as only the 23rd most generous.

R&D tax credit reform can support the Government’s levelling up agenda

- **Manufacturing R&D is more capital intensive than other sectors, and manufacturing firms are more prominent in economically poorer parts of the country.** ONS data tells us that, in 2019, manufacturing firms accounted for 58% (£1.3bn) of all R&D capital expenditure (£2.3bn). The services sector accounted for 38% and those industries classed as neither manufacturing or services – such as construction and agriculture – accounted for 4%.

- **Some of the economically weakest parts of the country still have a strong business R&D base upon which to build.** Companies with a registered head office in the five counties / unitary authorities with the lowest median incomes – Blackpool, Hull, Leicester, Torbay and Nottingham – made 800 R&D tax credit claims against £225m of qualifying expenditure in 2017/18. Outside of London, the three areas with the most R&D tax credit claims in 2017/18 were West Yorkshire, the West Midlands and Greater Manchester. Median incomes in these places are in the bottom half of median incomes when comparing all UK counties or unitary authorities. Indeed, companies with a head office in Blackpool – the place with the lowest median income in the UK – made more R&D tax claim credits in 2017/18 than a quarter of all other counties or unitary authorities.

- **Increased R&D – even if it were distributed along the same lines as its current geography – would have greater benefit in the economically poorer parts of the country.** The reason for this is that the high-value jobs created by increased business R&D are likely to be relatively rarer – and therefore worth relatively more – in those places that have weaker economies. For instance, the average salary of somebody working in the East Midlands in the occupation of ‘scientific research and development’ is 32% higher than the average salary across all jobs in the East Midlands. Yet the average salary of somebody working in London in the occupation of ‘scientific research and development’ is 2% below than the average salary across all jobs in London.

In conclusion, the move to include capital expenditure allowances in R&D tax credits would be very simple to implement, would make the UK a better place to invest in, would drive jobs and growth across the regions that need levelling up, and would help government deliver on their pledges and ambitions. All for a policy that is self-financing. It should be adopted as an immediate priority.
Why the Government should care about enhancing R&D tax credits

The economic importance of R&D is indisputable. It is an essential ingredient for healthy year-on-year economic growth. It is of paramount importance if the greatest economic challenges of our time are to be overcome – R&D is behind the CO2-reducing technology that will help us to combat climate change, as well as the vaccines that will ultimately end the Covid-19 pandemic and the systems and services that will make the UK a global space power.

Despite its undoubted economic importance, the UK has become established as an international R&D laggard. As a nation we spend 1.7% of GDP on R&D, below the OECD average of 2.4% and below the EU average of 2.0%. Israel, South Korea, Switzerland, Sweden and Japan are just some of the many advanced economies that outperform the UK on this measure of R&D performance.

Both the Prime Minister and the Chancellor recognise that a drastic improvement to this performance is necessary if the UK is to maintain – or even increase – its global economic relevance in the 21st century.

Helping to meet the R&D target with tax reform

The Government has set itself a laudably ambitious target for R&D spending to reach 2.4% of GDP by 2027. Though this would only move the UK in line with the OECD average, getting there at this pace would be a significant achievement.

To help meet the target, the March 2020 Budget announced a slew of significant policy interventions. These measures included more generous R&D tax credits and a new institution to fund high-risk, high-reward research.

The publication of an R&D roadmap followed in July 2020. It contained a strategy to make careers in R&D more attractive and moves to entice the best science expertise in the world to come and live and work in the UK.

The Spending Review in November 2020 was peppered with references to R&D funding for a wide variety of projects.

But the Government will need more policy interventions if it is to meet its R&D targets.

This report makes the case for one such intervention – reforming the tax system to better recognise the fundamentally important role of capital expenditure in the R&D process.

This tax reform would enhance R&D tax reliefs to include capital – that comes in the form of plant, machinery and buildings – as eligible expenditure. The term ‘plant’ means the apparatus that is necessary for R&D to be carried out, ranging from air conditioning systems to moving walkways. The term ‘machinery’ includes the use of things like cars, lathes and computers in the R&D process. The term ‘buildings’ is the physical structures in which R&D takes place.

The objective of this tax reform would be to reduce the cost of businesses to undertake R&D, thus encouraging more R&D to take place in the UK.

R&D tax reform supporting wider political priorities (including levelling up)

Enhancing R&D tax reliefs to better recognise capital would not only help the Government to meet its R&D target, but there are also plenty of other benefits for both national and local policymakers.

First and foremost, the levelling up agenda will be supported. Companies with a registered head office in West Yorkshire make more R&D tax credit claims than companies with a registered head office in Surrey. Companies with a registered head office in the West Midlands claim R&D tax credits against more R&D expenditure than companies with a registered head office in Cambridgeshire. Indeed, some of the most economically disadvantaged parts of the country have relatively strong R&D activity.

Most importantly, manufacturers will disproportionately benefit, as manufacturing R&D is more capital intensive. The economic strategies of the Tees Valley, Liverpool, Manchester and West Midlands Combined Authority areas – among many other Local Enterprise Partnerships and Local Authorities – have a heavy focus on their industrial heritage and established bases of cutting-edge advanced manufacturing companies. These areas will get a boost from the tax change that this report proposes.

Then there is a stronger economic recovery and jobs growth. We know that R&D drives growth. We know that the R&D process supports high-value jobs. Both of these things mean additional tax revenues to rebuild public finances. Just like the companies undertaking R&D, the government investing in this R&D reform today will reap the rewards in the future.

Finally, the UK would have a more internationally competitive tax system. The UK’s R&D tax system is not a generous one – those of many other rich nations are more so. When the UK is trying to redefine its place in the world after Brexit, a redesigned tax system can provide an advantage.

Making the case in the rest of this report

The following chapters develop the arguments for enhancing R&D tax credits to better recognise capital:

• Chapter Two tells the story of R&D in the UK with relevant statistics.
• Chapter Three explains the detail of the tax reform for which this report is advocating.
• Chapter Four sets out the potential prize for enhancing R&D tax credits.
• Chapter Five describes why R&D can help with the levelling up agenda.
The story of business R&D in the UK – growth and imbalance

ONS and HMRC data tell a story about local and regional business expenditure on R&D. The summary of this story is:

• Growth in business R&D is likely to be affected by a pandemic-related economic downturn, with R&D capital investment likely to be hit particularly hard.

• Business R&D takes place in a wide variety of industry contexts, but it is heavily concentrated in relatively few of them.

• The data suggest that business R&D in the UK is geographically imbalanced (in a similar way to UK economic activity as a whole).

This story is supported by the available data in the below sections, setting the scene for the arguments made in the following chapters about implementing enhanced R&D tax credits and the importance of R&D to the Government’s levelling up agenda.

The big picture – an economic downturn threatens growth in business R&D

• Business R&D has been growing. The R&D expenditure of businesses in the UK has increased by more than a third (37.3%) in the last decade, rising from £19bn in 2010 to £26bn in 2019 (rising from 1% of GDP to 1.2% of GDP). Before 2018, business expenditure on R&D had not been as high as 1.2% of GDP since 1990.x

• Business R&D supports high-value employment. In 2019, 263,000 people were employed in business R&D (having grown by 112,000 over ten years). This employment consists of scientists, engineers, technicians, laboratory assistants and administrative and clerical staff. The average wage of an employee working in business R&D in the UK is £48,400, 58% higher than the average wage across all industries.11

• Business R&D expenditure is susceptible to economic downturns. Business expenditure on R&D fell by a total of 5.0% during the financial crisis in 2008 and 2009. Employment in business R&D fell by 4.4% in the same period. But there was an even bigger impact on R&D capital expenditure, which dropped by 19% between 2007 and 2008. None of these indicators of R&D activity recovered to 2007 levels until 2011. Chart One below shows the year-on-year growth of these indicators between 2008 and 2011.12

Chart One: Year-on-year growth of selected indicators of R&D activity, 2008-2011.

R&D happens in a wide variety of industry contexts

• Business undertakes over two-thirds of R&D expenditure that takes place in the UK. The breakdown of R&D expenditure in the UK is: business (68%), higher education (24%), Government bodies (7%) and private non-profits (2%).13

• Business R&D takes place within many different parts of the economy, but much of it is concentrated within relatively few products and industries. Just five of 33 different product groups accounted for almost three (31.5%) of business R&D expenditure in 2019. These product groups are categorised as ‘pharmaceuticals’ ('aerospace' (including space), ‘motor vehicles and parts’, ‘telecommunications’, and ‘computer programming and information services activities’. Equally, 70% of the R&D expenditure against which R&D tax credits were claimed can be attributed to just three of 19 industry categories – ‘manufacturing’ (32%), ‘professional, scientific & technical’ (22%) and ‘information & communication’ (16%).14

• Services sector R&D spend is catching up with manufacturing R&D spend. In 2019, 64% of all UK business R&D expenditure was in the manufacturing sector, down from 72% in 2010. Manufacturing R&D grew in value by in value by 21% between 2010 and 2019, whereas business R&D in the services sector grew by 76% over the same period.15 This is represented in Chart Two, below.

The geography of R&D – a regional and sectoral imbalance

• Business R&D expenditure and business R&D employment reflect the economic imbalances of the UK. The Greater South East (the regions of the South East, East of England and London) is home to 36% of the UK population but produces 47% of UK economic output.16 Business R&D in the Greater South East is proportional to these headline economic indicators, with 54% of all business R&D by value and 47% of business R&D employment being attributed to the area (see table in Annex I).17

• Business R&D and tax credits show an even more pronounced regional R&D imbalance. 45% of R&D tax credit claims are made by businesses with a registered head office in the Greater South East. But these claims account for 60% of the value of all R&D claims made in the UK and are claimed against 61% of the value of R&D expenditure (see a full breakdown in the table in Annex I).
The manufacturing sector makes up the majority of R&D spend in most regions of the country. In every region except Scotland and London, the manufacturing sector spends more on R&D than the service sector. Over three quarters of business R&D spend in the East Midlands, West Midlands, North West and Wales is undertaken in the manufacturing sector. This has resulted in employment in business manufacturing R&D being roughly spread across the country along the lines of the national population spread – 37% of employment in manufacturing R&D can be found in the Greater South East, alongside 36% of the population.

Chart Three: Proportion of employment in business R&D, split by region and sector

R&D tax credits reduce the cost of R&D investment. More R&D projects go ahead because of them.

The R&D tax credits system in the UK is based around two tax advantages:

- The SME scheme. Applying to companies with less than 500 staff and a turnover of under €100m (or a balance sheet total of under €86m). This applies to companies that are larger than the thresholds in the SME scheme. However, RDEC can also be claimed by SMEs who have been subcontracted to do R&D work by a large company.

These are high-level descriptions. There is a large amount of technical detail behind the design and accessibility of the above schemes (which are covered in many other sources). The key point is that both small firms and large firms get tax relief on some R&D expenditure.

The Government commits significant financial resource to R&D tax reliefs, with £4.3bn claimed through them in the financial year 2017-18.

But financial commitment on its own will not maximise the benefit of R&D tax reliefs. The rules around them need to be consistently updated so as to keep pace with evolutions in how R&D takes place.

A good example is the growing prominence of big data analysis within R&D – the costs of purchasing, storing, using and analysing data are not currently treated as qualifying expenditure for the R&D tax credit. These activities are therefore relatively more costly to undertake than those that are classed as qualifying expenditure. The Government has acknowledged this, formally consulting on how data and cloud computing can be recognised through R&D tax credits system (the consultation closed in October 2020).

The problem – patchy recognition of capital in the R&D tax system

The recognition of capital within the R&D tax system should also be a focus of policymakers’ attention.

The reason for this is that capital expenditure is critical to the R&D process and is growing in importance. Capital investment accounts for 8.3% (roughly £2.1bn) of all business R&D expenditure in 2019, up from 5.5% in 2010.

The use of capital in the R&D process is recognised to an extent in the current tax system. Research and Development Allowances (RDAs) provide a full tax deduction on capital assets that are used for the purpose of R&D.

But RDAs are severely flawed.

One reason they are flawed is that when R&D investment decisions are made, RDAs can be difficult to identify and include within the decision-making process. But the key flaw is that non-R&D tax allowances and RDAs interact to create inconsistent treatment between loss-making firms and profit-making firms, ultimately disincentivising R&D capital expenditure (and R&D projects more generally).

This is a convoluted area of tax policy, but there are two broad conclusions from an analysis of capital allowances and R&D in the UK. Profit-making UK firms get back 19% on R&D capital expenditure through the tax system. Loss-making UK firms get nothing back on R&D capital expenditure through the tax system.
There are three negative implications arising from this inconsistency:

- It adds to the threat of reduced R&D activity as a result of the unfolding economic crisis. Many more firms may be expected to make a loss in the coming months and years – for instance, manufacturing output was over 10% down on the year in August 2020. Many more firms may be expected to make a loss in the coming months and years – for instance, manufacturing output was over 10% down on the year in August 2020.

- It is more difficult for younger, smaller or troubled firms to grow to a position of profitability.

- Large, globally profitable, firms may be disincentivised from R&D investment. These firms will sometimes have a structure that results in lower UK operating profits – a large scale R&D capital investment may therefore not go ahead. This may mean that R&D is pushed to occur wherever there are existing R&D facilities (which potentially means overseas, especially if existing facilities are in countries have better incentives for capital expenditure more generally).

Capital expenditure is a prominent feature of R&D expenditure in several sectors (see Box on the next page as an example). The solution – enhanced R&D tax credits

The solution to this problem is relatively straightforward. The R&D tax system should be reformed so that:

- R&D tax credits for capital are paid at the same rates as those for current spend (this could even be amended to be even more generous for capital expenditure given its importance).

- Plant, machinery and buildings (but not land) are defined as allowable R&D expenditure for this purpose, which is in line with RDA policy.

- RDAs remain claimable alongside improved tax credits – the vagaries of the tax system mean that some larger firms may lose out if RDAs are removed entirely.

Box: The Sectors using R&D Capital – Pharmaceuticals Case Study

Five of 33 product groups account for just under two-thirds (64%) of R&D capital expenditure undertaken by UK businesses, amounting to around £1.5bn. These product groups are:

- Computer programming and information service activities.
- Pharmaceuticals.
- Motor vehicles and parts.
- Miscellaneous business activities; technical testing and analysis.
- Chemicals and chemical products.

Just two of these product groups account for around a third of all R&D capital expenditure – the computer programming firms that are part of the UK’s rapidly growing digital sector and the well-established and high-value pharmaceuticals industry.

An example of how enhanced capital terms would encourage R&D in the UK comes from the pharmaceuticals firm Pfizer, which was recently considering the placement of a new R&D investment in the UK or in Ireland. This investment centred on continuous flow chemistry technology, expected to be a unique asset in a truly novel area of Pfizer’s manufacturing processes.

A third-party analysis was conducted to support decision-making. One factor in determining against investment in the UK was the key difference it highlighted between the respective tax credit systems, including:

- Ireland’s R&D tax credit relief rate being 25%, versus 13% in the UK.
- Ireland’s R&D tax credit system including capital expenditure, which is in addition to any capital allowances claimed.

Pfizer emphasised that the inclusion of capital expenditure in tax credits would send a very strong signal to global Boards about the intentions of the UK looking ahead, helping the UK to attract new investment in life sciences.
The prize for enhanced R&D tax credits

There are multiple benefits to enhancing R&D tax credits, which can be grouped into three headline categories:

I. Increased R&D supporting higher economic growth and greater tax revenue. The Association of British Pharmaceutical Industry (ABPI) has modelled the impact of enhanced R&D tax credits as set out in the previous chapter. Under a central case modelling scenario, this tax reform would:

• Raise private sector R&D across industry by £1.2bn per annum by year 5 after implementation.
• Raise GDP by £4bn by year 10 after implementation.
• The initial fiscal cost would be around £430m per annum, but by year seven after implementation additional tax revenues generated through higher GDP would exceed costs. By year 12 after implementation, the policy will have paid for itself.

All of this adds up to a benefit cost ratio of £9.06bn over a 20-year period.

II. The creation of thousands additional high-value jobs every year. Our additional analysis finds that enhanced R&D tax credits would mean:

• An additional 12,200 R&D jobs created. 31
• For context, these additional jobs would amount to more than the entire population of scientific research and development jobs currently in the East Midlands. 32
• A projected sectoral breakdown of these jobs as in the below table. 33

Table One: Additional jobs created by enhanced R&D tax credits, split by sector

<table>
<thead>
<tr>
<th>Sector</th>
<th>Additional jobs created from R&amp;D tax credits</th>
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<tbody>
<tr>
<td>Manufacturing</td>
<td>7,100</td>
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<tr>
<td>Including the sub-sectors of transport and aerospace.</td>
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<tr>
<td>Services</td>
<td>4,600</td>
</tr>
<tr>
<td>Including the sub-sectors of computer programming and software development.</td>
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</tr>
<tr>
<td>‘Other’</td>
<td>500</td>
</tr>
<tr>
<td>Including construction and agriculture.</td>
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III. A more internationally competitive tax system. Business R&D in the UK is a globalised endeavour. More than a fifth of business R&D undertaken in the UK is by US owned firms. Almost half of business R&D performed in the UK is by foreign-owned companies. 34 Yet the UK’s current R&D tax credits system is less generous than those of many other countries. The OECD ranks the UK’s R&D tax regime for SMEs as the joint 11th most generous of 44 countries. The UK’s R&D tax regime for large companies is ranked as the 23rd most generous. Table Two below, shows how the UK’s international standing on the recognition of capital in the R&D process compares in an international context, and in particular for those firms without a taxable profit. 35

Table Two: Present Value of tax system savings on firms’ investment in R&D capital 36

<table>
<thead>
<tr>
<th>Selected Nations</th>
<th>Firms with taxable profit</th>
<th>Firms without taxable profit</th>
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<tbody>
<tr>
<td>France</td>
<td>59%</td>
<td>25%</td>
</tr>
<tr>
<td>Spain</td>
<td>54%</td>
<td>0%</td>
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<tr>
<td>Australia</td>
<td>36%</td>
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<td>0%</td>
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<td>0%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>19%</td>
<td>0%</td>
</tr>
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</table>
How R&D tax reform can support levelling up

The Government recognises that geographic considerations are important if it is to meet its R&D target. It is examining how publicly funded R&D should be distributed across the country to support the levelling up agenda. A ministerial advisory group has been established to look at options for maximising the local economic impact of R&D.

The previous chapter set out the growth and employment benefits that could arise from enhanced R&D tax credits. There are three reasons why this growth and employment would contribute to the Government’s levelling up agenda:

1. Manufacturing R&D is more capital intensive than other sectors, and manufacturing firms are more prominent in economically poorer parts of the country. ONS data tells us that, in 2019, manufacturing firms accounted for 58% (£1.3bn) of all R&D capital expenditure (£2.3bn). The services sector accounted for 38% and those industries classed as neither manufacturing or services – such as construction and agriculture – accounted for 4%.

R&D tax credit data – which defines manufacturing differently to the aforementioned ONS data – tells us that manufacturing R&D is a more prominent feature of R&D activity outside the Greater South East. For instance, manufacturing companies with a head office in the West Midlands account for 78% of all R&D expenditure against which tax credits are claimed in the region. The equivalent figure for manufacturing companies with a head office in the South East is 25%. See Chart One, below for all regions.

Chart Four: Proportion of R&D expenditure against which R&D tax credits are claimed accounted for by manufacturing firms, split by region, 2017-18

![Chart showing the proportion of R&D expenditure against which R&D tax credits are claimed accounted for by manufacturing firms, split by region, 2017-18](image)

This means that the current bias against capital in the R&D tax credit system discriminates against manufacturing – and in doing so against economically poorer regions. It is precisely the sort of regressive distortion of historic policy that this government has pledged to counter, as it has in the case of HM Treasury’s Green Book.

Improved incentives for R&D capital expenditure would help redress the recent slow pace in manufacturing sector R&D growth versus that of the services sector. In doing so, enhancing R&D tax credits would help level-up the manufacturing sector relative to services.

2. Some of the economically weakest parts of the country have a relatively strong business R&D base upon which to build. Our analysis looked at the location of the head office of those companies making R&D tax credit claims in comparison to the average incomes in those locations. The income distribution was used as a proxy measure for understanding where the economically weaker parts of the country are. The geographic level that the analysis used was county / unitary authority level (the geographic level at which R&D tax credit data is collected). Findings from the analysis are:

- Companies with a head office in the five counties / unitary authorities with the lowest median incomes – Blackpool, Hull, Leicester, Torbay and Nottingham – made 800 R&D tax credit claims in 2017/18 against £235m of qualifying expenditure. Indeed, companies with a head office in Blackpool – the place with the lowest median income in the UK – made more R&D tax credit claims in 2017/18 than a quarter of all other counties or unitary authorities.
- Outside of London, the three areas with the most R&D tax credit claims in 2017/18 were West Yorkshire, the West Midlands and Greater Manchester. Median incomes in these places are in the bottom half of median incomes when comparing all UK counties or unitary authorities.
- Nottingham is fifth from bottom in the rankings of median incomes in counties / unitary authorities. 295 R&D tax credit claims were made there in 2017/18. This is a higher number of R&D tax credits than were recorded in each of Wokingham, Windsor and Maidenhead and Aberdeen, which come in the top five of the rankings for median incomes in counties / unitary authorities.

3. Increased R&D – even if it were distributed along the same lines as its current geography – would have greater benefit in the economically poorer parts of the country. The reason for this is that the high-value jobs created by increased business R&D are likely to be relatively rarer – and therefore worth relatively more – in those places that have weaker economies. For instance, the average salary of somebody working in the East Midlands in the occupation of ‘scientific research and development’ is 32% higher than the average salary across all jobs in the East Midlands. Yet the average salary of somebody working in London in the occupation of ‘scientific research and development’ is 2% below the average salary across all jobs in London.
## Annex I – Supplementary Tables

### Table – Employment in business R&D by region, 2019**

<table>
<thead>
<tr>
<th>Region</th>
<th>R&amp;D Employment (‘000)</th>
<th>% of the total</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>6</td>
<td>2.3%</td>
</tr>
<tr>
<td>North West</td>
<td>20</td>
<td>7.6%</td>
</tr>
<tr>
<td>Yorkshire and the Humber</td>
<td>14</td>
<td>5.3%</td>
</tr>
<tr>
<td>East Midlands</td>
<td>20</td>
<td>7.6%</td>
</tr>
<tr>
<td>West Midlands</td>
<td>26</td>
<td>9.9%</td>
</tr>
<tr>
<td>East of England</td>
<td>42</td>
<td>16.0%</td>
</tr>
<tr>
<td>London</td>
<td>31</td>
<td>11.8%</td>
</tr>
<tr>
<td>South East</td>
<td>50</td>
<td>19.0%</td>
</tr>
<tr>
<td>South West</td>
<td>22</td>
<td>8.4%</td>
</tr>
<tr>
<td>Wales</td>
<td>7</td>
<td>2.7%</td>
</tr>
<tr>
<td>Scotland</td>
<td>15</td>
<td>5.7%</td>
</tr>
<tr>
<td>Northern Ireland</td>
<td>9</td>
<td>3.4%</td>
</tr>
</tbody>
</table>

### Table – R&D tax Credit Claims, Number, Amount, Expenditure against which credits are claimed – split by region**

<table>
<thead>
<tr>
<th>Region and Sector</th>
<th>Number of claims</th>
<th>Amount claimed</th>
<th>Expenditure</th>
<th>Number of claims</th>
<th>Amount claimed</th>
<th>Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>1,610</td>
<td>80</td>
<td>470</td>
<td>3.4%</td>
<td>19%</td>
<td>1.5%</td>
</tr>
<tr>
<td>North West</td>
<td>4,920</td>
<td>270</td>
<td>1,770</td>
<td>10.3%</td>
<td>6.4%</td>
<td>5.8%</td>
</tr>
<tr>
<td>Yorkshire and The Humber</td>
<td>3,345</td>
<td>175</td>
<td>1,085</td>
<td>7.0%</td>
<td>4.2%</td>
<td>3.6%</td>
</tr>
<tr>
<td>East Midlands</td>
<td>3,115</td>
<td>180</td>
<td>1,200</td>
<td>6.5%</td>
<td>4.3%</td>
<td>3.9%</td>
</tr>
<tr>
<td>West Midlands</td>
<td>4,130</td>
<td>395</td>
<td>3,310</td>
<td>8.7%</td>
<td>9.4%</td>
<td>10.9%</td>
</tr>
<tr>
<td>London</td>
<td>9,650</td>
<td>1,225</td>
<td>8,905</td>
<td>20.3%</td>
<td>29.1%</td>
<td>29.3%</td>
</tr>
<tr>
<td>South East</td>
<td>7,430</td>
<td>805</td>
<td>6,055</td>
<td>15.6%</td>
<td>19.1%</td>
<td>19.9%</td>
</tr>
<tr>
<td>South West</td>
<td>3,670</td>
<td>220</td>
<td>1,530</td>
<td>7.7%</td>
<td>5.2%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Wales</td>
<td>1,525</td>
<td>90</td>
<td>500</td>
<td>3.2%</td>
<td>2.1%</td>
<td>1.6%</td>
</tr>
<tr>
<td>Scotland</td>
<td>2,195</td>
<td>155</td>
<td>1,010</td>
<td>4.6%</td>
<td>3.7%</td>
<td>3.3%</td>
</tr>
<tr>
<td>Northern Ireland</td>
<td>1,305</td>
<td>70</td>
<td>490</td>
<td>2.7%</td>
<td>1.7%</td>
<td>1.6%</td>
</tr>
<tr>
<td>East of England</td>
<td>4,705</td>
<td>550</td>
<td>4,085</td>
<td>9.9%</td>
<td>13.0%</td>
<td>13.4%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>47,600</strong></td>
<td><strong>4,215</strong></td>
<td><strong>30,410</strong></td>
<td><strong>100.0%</strong></td>
<td><strong>100.0%</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

### Endnotes

5. There are other types of capital investment, such as land acquisition, which are important to R&D, but that are outside of the scope of the tax reform for which this report is advocating.
c21010#:~:text=Common%20law%20meaning%20of%20%22plant%22%20and%20%22machinery%20includes%20machines%20and%20the%20working%20parts%20of%20machines.&text=Essentially%2C%20plant%2C%20according%20not%20stock%20in%20trade%3B%20and
11. Data taken form the Annual Survey of Hours and Earnings 2019 (for comparison with other areas), https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/regionbyindustry2digiticsashetable5
Rebalancing Research & Development: How enhanced R&D tax credits can support levelling-up


18 ONS, November 2020, Research and Development in UK Businesses 2019 Table Seven, https://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/researchanddevelopmentexpenditure/datasets/ukbusinessenterprise/researchanddevelopment


20 These figures are in euro currency because the original definition of an SME was defined by the European Commission. They are expected to change to Sterling at some point in the future.


24 It is important to note that these are calculations that exclude land as a form of capital because it is not included in the tax reform that this report is advocating for. Including land in the capital equation suggests that its use in R&D increased from 5.5% to 8.9% between 2010 to 2019.


29 Data from ONS BERD data, and QinetiQ case study provided by the ABPI.


31 The calculation is the additional R&D the tax reform has been modelled to increase after year five of the policy in relation to how many jobs are supported per £ on business R&D today (based on BERD data).

32 Analysis of ASHE 2-digit SOC regional data.

33 Sector breakdown is weighted by the split of capital expenditure performed by sector (again, taken from BERD data, through an analysis of Table 9).

34 ONS, November 2020, Research and Development in UK Businesses 2019 Table 22, https://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/researchanddevelopmentexpenditure/datasets/ukbusinessenterprise/researchanddevelopment


38 R&D Place Advisory Group, https://www.gov.uk/government/groups/rd-place-advisory-group


41 The analysis used the R&D Tax Credit Statistics supplementary tables as the basis for this analysis. 2017-18 data is the latest data available, published in April 2020: https://www.gov.uk/government/statistics/corporate-tax-research-and-development-tax-credit


43 ONS, November 2020, Research and Development in UK Businesses 2019 Table Seven, https://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/researchanddevelopmentexpenditure/bulletins/ukbusinessenterprise/researchanddevelopment
