

Incentivising Innovation >

Why R&D tax credits matter, and how to improve them

RESEARCH NOTE

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Summary

“Productivity isn’t everything” says the economist Paul Krugman, “but in the long run, it is almost everything”. And when it comes to increasing productivity, innovation isn’t everything – but in the long run, it is almost everything.

The UK’s growth problem is, to a significant degree, a business investment problem. High productivity countries like the US and South Korea generate business R&D investment of around 2.6% and 3.8% of GDP respectively. The UK’s business investment in R&D is under 2%, and even when Government and non-profit spending is included only rises to around 2.4%. So incentivising investment in innovation is an urgent challenge for a Government that wants to increase the long-term growth trend in a tight fiscal context.

Left to their own devices, businesses will underinvest in R&D. That’s because innovation generates large spillover benefits for workers, firms, and local areas that aren’t captured by the companies actually undertaking R&D activity. The social returns outweigh the private returns – justifying government intervention to boost levels of R&D spending by businesses.

Today, R&D tax reliefs are one of the most popular ways for Governments to increase private investment in innovation. 34 out of 38 OECD countries offer some kind of R&D tax relief. In the UK, R&D tax credits were introduced in 2000 to encourage SMEs to invest in innovation, and the scheme of reliefs has been steadily expanded since to cover large firms, capital investment, and patents.

The UK scheme is delivering benefits. A recent data revision by the ONS suggests that in the last six years, overall business investment in R&D has increased by 26%. Among small businesses, the amount of activity supported by the R&D tax credit is five times larger over the same period. Academic studies find that productivity benefits of business R&D investment lag by around ten years, so this uplift should be seen in the broader economic statistics soon.

But the UK R&D tax credit scheme has become extremely expensive. Costs of the SME scheme have risen from £705 million in 2013-14 to £4.2 billion in 2020-21. The R&D tax credits scheme for larger firms has risen from £930 million to £2.4 billion over the same period. Together, the full range of R&D tax reliefs cost the Treasury over £9 billion each year – more than the R&D budget of the Ministry of Defence or Department of Health and Social Care, and more than is invested through UKRI or higher education funding. The cost of the UK's R&D tax incentives are the largest of comparable countries at 0.33% of GDP, with France in second place with 0.28% and the OECD average sitting at 0.12%.

Some of this increase in cost is legitimate and intended – as business R&D investment increases, so does the corresponding cost of the reliefs. But leakage is a challenge. The SME scheme has become complex and unpredictable for firms, and the definitions used to determine legitimate R&D activity have become unmoored from international standards. This has opened the door for a high degree of fraud, with unregulated and unmonitored tax consultants operating on a “no win no fee” basis and inflating claims or encouraging claims for non-R&D activity. Boosting the efficiency and additionality of the programme means addressing these implementation issues.

Although the ONS statistical revision has led to us hitting our 2.4% target for R&D investment, we're still only in the middle of the pack. In fact, the OECD average has moved since the target was set, to 2.7%. If we want to become a science superpower, we need to aim higher. R&D leaders such as Germany and Japan spend over 3% of GDP, and trailblazers like South Korea and Israel spend over 4% and 5% respectively. The £22 billion committed by the Government during this Parliament is an important down payment on the UK's science and technology ambitions, but should be a floor not a ceiling.

There is a central role to play for a streamlined set of tax credits in boosting R&D, alongside improvements in capital allowances for R&D intensive firms. But the UK is an outlier in its reliance on tax credits, investing 4.1 times more in R&D tax reliefs compared to direct investment in R&D. Across the OECD, the average is 1.5 times more. In the US it's 0.9 times more due to high levels of direct investment in areas of strategic opportunity like defence and aerospace. For the UK to boost our scientific standing, we also need to boost direct investment in business R&D, through Innovate UK and innovation deals with Metro-Mayors.

This research note sets out the shape of the UK's R&D tax reliefs, exploring both their impact and rising costs. It concludes that there are important reforms to be made to streamline the system, tackling fraud and boosting additionality. R&D tax credits can work better, but overall: they work. And a Government going for growth needs them in their policy arsenal.

Summary of recommendations

Problem	Recommended Solution
1. The SME R&D tax credits scheme lacks predictability and visibility in the rate of relief.	The SME scheme should be updated to match the more modern RDEC scheme, with a fixed relief rate regardless of a company's tax position. This would increase the predictability and visibility of the relief, increasing its impact on company spending decisions.
2. R&D capital allowances only benefit profit-making firms.	Research and Development Capital Allowances (RDAs) should provide a cash credit for loss-making firms. This would support growing firms to make long-term commitments to R&D in the UK at a time when the cost of funding capital expenditure is increasing.
3. The definition of eligible R&D expenditure is unclear.	HMRC should update guidance with industry-specific examples of what activities are eligible, and ineligible, for R&D tax credits. This would reduce the need for R&D tax consultants and help HMRC enforce compliance.
4. Small firms are receiving bad advice from unregulated tax agents.	Tax agents must be members of one of the seven existing regulatory bodies, and adhere to a code of practice, to reduce abuse of the schemes.
5. HMRC only provides high-level summary statistics on the R&D tax incentives.	HMRC should provide more detailed data on the types of R&D businesses are doing, and which R&D costs make up the claims, to give a more detailed picture of the UK's R&D landscape.

Chapter 1: What are R&D tax incentives, and why do we have them?

Investment in research and development (R&D) drives innovation and economic growth. But there are significant positive externalities from R&D spending, which means private returns from R&D are lower than the public returns. Put another way, private investors in R&D are unable to fully capture the spillover benefits of their investment, which means they tend to invest less than is optimal for society.¹ This means the government should subsidise private R&D to encourage the optimal level of innovation for the economy.²

Governments provide support through direct subsidy, intellectual property protections which help companies capture more of the benefits from R&D, and increasingly, through tax incentives. These incentives take several different forms, but most commonly a tax credit, which allows companies to offset some of their corporation tax bill when they invest in R&D. Not only are these incentives intended to increase the amount domestic firms invest in R&D, they aim to attract internationally mobile R&D activity – pitting countries against each other to offer the most attractive environment to invest in innovation.

Tax incentives are an important factor that businesses consider when planning where, and how much, they should invest in R&D. But they are not the only factor. Policy certainty, workforce skills, infrastructure, direct government support, regulation, market size, geographical considerations and operation costs are also important in shaping investment decisions.³ Countries with high investment in R&D have built a strong foundational offer in most of these areas.

What R&D tax incentives does the UK offer?

The UK introduced the current R&D tax credit system in 2000, and has increased the generosity of the schemes and broadened the eligibility of which firms can benefit in the years since. HMRC offers two R&D tax credit programmes: the Small and Medium Enterprise (SME) scheme set up in 2000 and the R&D expenditure credit (RDEC) scheme covering large businesses introduced in 2016 (replacing the former 'large company scheme' set up in 2002).

R&D relief for small firms

HMRC's SME scheme offers a tax deduction on 130% of R&D costs from yearly profit, in addition to the normal 100% deduction. This equates to a 230% combined deduction against profits subject to corporation tax. Loss-making firms can claim a cash credit, as they would not be able to benefit from a reduction in corporation tax. This credit is worth 14.5% of claimable R&D (which is up to 230% of the cost of R&D activity) resulting in an effective return of 33%.

Working out the credit rate is complicated for companies that have some taxable profits, which they can get a tax deduction on, and some surrenderable R&D losses.

In 2008 the Government changed the definition of an SME for the scheme. The definition of an SME used elsewhere by the Government is fewer than 250 staff, €50m sales and €43m assets. But for tax credit purposes, businesses with fewer than 500 staff, and either sales under €100m, or assets under €86m qualify for the more generous SME credit.

Box 1: Example of a small firm claiming R&D tax reliefs

A small firm has a pre-tax profit of £30,000 and invested £25,000 in R&D activities over the past year.

The £25,000 of R&D spending is multiplied by the enhanced deduction rate of 130%, resulting in an additional deduction of £32,500.

The company's profits are liable to the 19% corporation tax rate, which would result in a tax bill of £5,700. The R&D relief can offset this tax bill, meaning that the additional deduction, £32,500, can be applied to the profit of £30,000, resulting in no taxable profit and no corporation tax liability. Furthermore, the remaining £2,500 of additional deduction can be surrendered for a payable cash credit at a rate of 14.5% - a payout of £362.50.

So in this example, the profit-making firm would be able to use R&D tax relief to offset its entire corporation tax liability (£5,700) and surrender its additional loss to claim a small cash credit (£362.50).

R&D relief for large companies

HMRC's Research and Development Expenditure Credit (RDEC) scheme replaced the Large Company (LC) scheme which was phased out between 2013 and 2016. The RDEC scheme offers a 13% credit on qualifying spending, which can either be used to discount corporation tax liabilities or, for a loss-making firm, can be claimed in cash. In the SME scheme, the R&D costs can include up to 65% of subcontractor costs – including subcontractors based outside the UK. RDEC allows for only certain limited subcontractor costs.

Box 2 : Example of a large firm using the RDEC scheme

A large firm has a pre-tax profit of £500,000 and invested £250,000 in R&D activities over the past year.

At present rates, the firm is liable to pay 19% corporation tax on its profits, which would mean a liability of £95,000. The firm has £250,000 in spending eligible for the R&D tax credit, which they can apply to the corporation tax bill at a rate of 13%, worth £32,500. This benefit is subject to corporation tax, so after the tax is accounted for the tax credit is worth £26,325, or 10.53% of its R&D investment (£250,000).

Patent Box and Capital Allowances

The Government also offers the Patent Box, introduced in 2013, which allows companies to pay a rate of 10% corporation tax on earnings from patents (as opposed to the standard rate, which is currently 19%). Companies that have a UK or European patent on an invention that they have created, or have significantly contributed to the creation of, can claim qualifying income from the patent at the lower rate. This is subject to a number of qualifications including the Nexus regime, which gives tax relief proportional to the amount of R&D that was undertaken in-house, or by a subcontractor, against intellectual property that has been acquired from other companies.

Research and Development Allowances (RDAs) provide full first year relief on R&D-related capital expenditures. The time-limited 'Super Deduction', set to run between 2021 and 2023, provides an enhanced rate of 130% on capital expenditure on plant and machinery (which includes R&D capital expenditure). Both the RDAs and Super Deduction offer enhanced tax reliefs above the usual capital allowances rates.

The Patent Box, RDAs and Super Deduction benefit profit-making firms with corporation tax liabilities. None of these schemes offer a cash alternative for firms without a corporation tax liability.

The planned increase in the main corporation tax rate from 19% to 25% in April 2023, for firms with over £250,000 profits, will effectively make these tax incentives more generous. For these more profitable firms, the Patent Box will deliver a 15p benefit rather than the current 9p benefit. The tax relief from RDAs and the enhanced expenditure rate in the SME scheme will offset taxes at a higher rate – assuming the enhancement rates and relief rates remain the same. Firms with profits under £50,000 will pay tax at the lower 19% rate while firms in between the tax rate thresholds will pay a tapered rate between 19 and 25%.⁴ This will likely complicate the calculation of the effective rate of relief for firms operating around the thresholds. However, because the RDEC credit is applied pre-tax, when the corporation tax rate increases to 25% the effective rate of relief will be reduced from 10.6% to 9.8% unless the headline RDEC rate is increased to compensate

Overall cost of the UK schemes

The utilisation of the R&D tax incentive schemes has risen significantly since 2013. Each of the schemes has seen both a higher number and higher cost of claims, but the SME scheme has seen the most growth, increasing from a cost of £705 million in 2013-14 to £4.2 billion in 2020-21 (see Figure 2). RDAs do not incur additional costs to the government, as they bring the capital relief forward.

Figure 1: Public R&D expenditures and the cost of R&D tax credits, 2015-20

Source: HMRC Annual Report and Accounts; UK Government Net Expenditures on Research and Development (R&D) by department, 2009 to 2020 current prices (ONS).

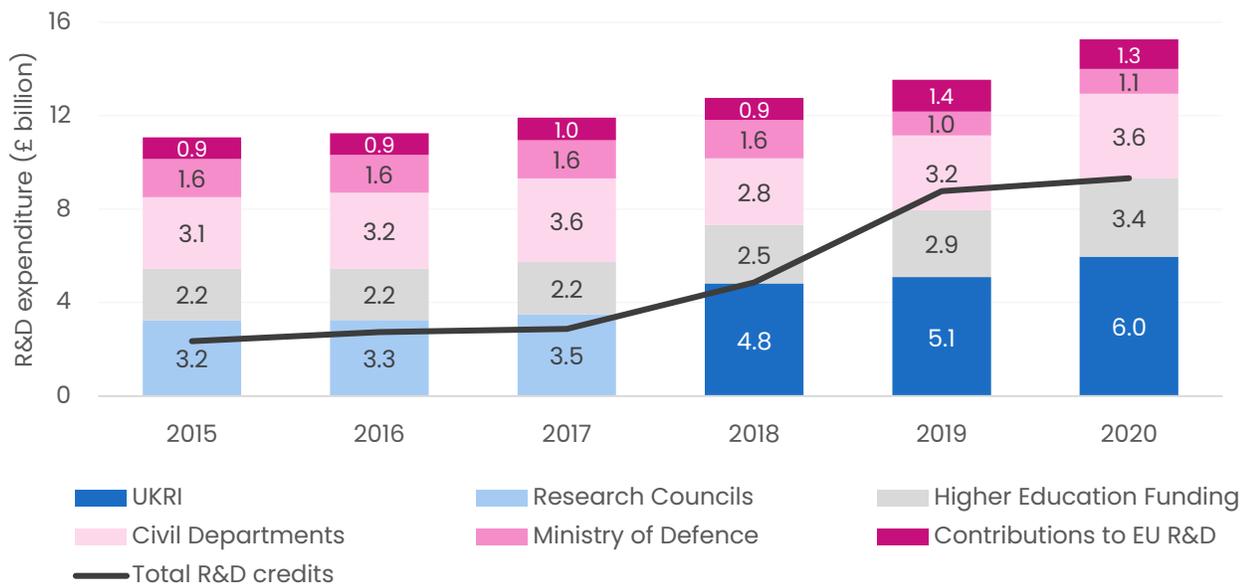


Figure 2: Value of R&D tax reliefs, 2013-14 to 2020-21

Source: HMRC Research and Development Tax Credits Statistics 2022 RD2; HMRC Patent Box relief statistics September 2022. (2020-21 figures are provisional)



How does the UK's regime compare to other countries?

R&D tax credits are well-established internationally. As of 2021, 34 out of the 38 OECD countries and 22 out of 27 EU countries have an R&D tax incentive regime. And countries are shifting their support for R&D towards tax incentives over time. In 2006, 36% of OECD government support for R&D came through tax relief. By 2019, this had increased to 57%. Over the same time period across EU countries, the proportion of R&D support through tax reliefs increased from 27% to 52%. The average rate of R&D tax subsidy has also risen steadily over the last 20 years.⁵

Not all R&D tax incentives are created equal. Tax incentive schemes can differ across five key design features:

1. Type of tax instrument
2. Provision for loss-making firms
3. Limits on benefits
4. Eligible expenditure
5. Preferential treatment for certain firms

1. Type of tax instrument

Different tax relief regimes allow expenses to be redeemed against different tax liabilities. In a few countries, such as France and the Netherlands, R&D spending is redeemable against payroll taxes or social security, but it's most commonly redeemable against corporation tax. In the UK, R&D tax reliefs are only redeemable against corporation tax liabilities.

Some countries, such as the USA and Japan, base R&D tax reliefs on R&D expenditures above a defined baseline amount. These regimes are known as *incremental*. Some countries, for example the Czech Republic, base relief on an *allowance* basis, but the most popular structure is a *volume-based* tax credit, which gives relief based on the net amount of R&D spending. Some countries such as Korea adopt a *hybrid* approach, combining elements of both volume and incremental tax credits.

There is a tendency for countries to replace the more complex incremental and hybrid schemes with the simpler (and usually more generous) volume schemes. For example, France switched to a volume-based tax credit in 2008 and Ireland switched in 2015.

The UK's R&D tax credit schemes have always been volume based, which is one of the reasons that the gross value of the UK's tax credits is higher than countries using incremental schemes. This approach removes any disincentives to invest that might arise through tax planning to maximise benefits in an incremental scheme.

2. Provision for loss-making firms

Most OECD countries allow firms with no corporation tax liability to carry over tax incentives to future years. But the length of carry-forward provisions differs significantly. For example, the limit in Poland is 6 years, 20 years in the USA and unlimited in Denmark.

The UK allows firms with no corporation tax liability to claim the credit in cash. This approach is becoming increasingly popular, with countries such as New Zealand adopting this approach in recent years.

The benefit of providing tax credits for loss-making firms is that it provides reliable support for start-ups and rapidly scaling companies that are pre-revenue. It also aids companies in R&D investment planning, inclusive of tax support, even when there is uncertainty over whether the company will make enough revenue that year to generate a corporation tax liability large enough to benefit from the tax credit. Carrying over tax credits to future years delays the benefit of the credit, reducing the incentive to invest in R&D and the ability to re-invest the tax credit into innovation. This effect is even more pronounced when inflation is high, as the benefits carried-forward lose even more value as time goes on.

3. Limits on benefits

Many countries place a cap on the amount of R&D expenditure a company can use to claim R&D tax relief, and a few adopt a floor to the investment, usually those operating an incremental approach to R&D tax relief where companies have to exceed a threshold of R&D spending in order to qualify for relief. This floor is typically based on a rolling average of R&D spending the firm has undertaken over the past few years – the United States' and Japanese schemes are examples of this approach.

The UK has recently introduced a cap on the SME scheme, which limits the maximum value of the credit to £20,000 plus three times the company's PAYE and NI contributions with some specific exceptions. This cap was introduced to combat fraud – a challenge we discuss later in this paper.

4. Eligible expenditure

Most countries use definitions of R&D consistent with the Frascati Manual, an OECD document first developed in 1963 and updated regularly by science and technology experts. There are some notable deviations from the manual – for example, the UK definition excludes social science research.

Generally, countries count labour costs and current expenditures as eligible R&D expenditure. Capital expenditure is less typically supported, but some countries, including Japan (effective rate of 27%) and Spain (54%), offer tax relief for profit making companies. While other countries offer

capital spending tax support for both profitable and loss-making companies, including France (59% for profit-making firms and 25% for loss-making firms), Ireland (35% and 24%), Austria (36% and 14%) and Australia (36% for either tax position).

The UK, through the Research and Development Allowances (RDA) provision, offers relief for profit-making companies only, and at a lower effective rate (19%) than all of the examples given above.

Countries that stick more closely to the definitions and guidance given by the Frascati Manual benefit from the expertise of the OECD team that keep this global standard for R&D measurement up-to-date and relevant. But diverging from the Frascati Manual does allow countries to fulfil their own strategic goals, targeting particular activities or sectors.

The advantage of subsidising R&D capital expenditure is it supports companies investing in permanent fixtures that tie their R&D activity to an area for the long term. This is particularly important for attracting and retaining large international firms that are both R&D and capital intensive, like advanced manufacturing companies, which have significant positive spillovers.

5. Preferential treatment for certain firms

Some countries offer enhanced tax relief for firms in specific sectors, for example Italy provides a higher tax credit rate for firms investing in innovation for the net zero transition and Spain provides a high rate for improvements in the automotive industry value chain. There are also schemes that give preferential rates for collaborative research, including in Japan and France.

More commonly, countries provide preferential rates for smaller or younger companies. In the UK, the SME scheme offers an effective rate of relief up to 33% compared to the effective rate for large firms of 11%.

Preferential tax treatment for certain firms allows governments to target incentives to areas which might generate strategic benefits, or those that require greater state support due to market failures.

The generosity of R&D tax incentives

The OECD has developed a methodology for comparing the generosity of countries' R&D tax incentives, taking into account whether firms can immediately realise the entire value of the tax incentive, the relief relative to the effective corporation tax rate, and the interaction of different types of firms with the schemes. This measure is the 'implied marginal R&D tax subsidy rate' and the unit is 1 minus the B-index. The B-index specifies the pre-tax income needed for a "representative" company to break even on a marginal, monetary unit of R&D outlay, taking into account provisions in the tax system that allow for an enhanced treatment of R&D expenditures.⁶ It does not take account of thresholds or ceilings in tax credit regimes.

As of 2021, the UK offers competitive R&D tax subsidy rates for SMEs, ranking 12th out of the 38 OECD countries in the level of support for profitable SMEs, and 9th for loss-making firms. The level of support for large firms does not rank as highly, falling in the bottom half of OECD countries for both profitable and loss-making firms.

The lack of a link between business R&D and the level of subsidy is underlined by Figure 4 below. The most business R&D intensive countries in fact have some of the lowest levels of implied tax subsidy for R&D. This may suggest that countries with low business R&D turn to tax credits as a way to boost R&D intensity among firms, or that other factors weigh more heavily on firms' investment decisions. But the point remains: high tax subsidies are not a prerequisite for high rates of business R&D.

The tax subsidy rate (shown in Figure 4) is one part of the generosity of a country's R&D tax incentives. But eligible activities and limits on the claimable amount make a significant difference to the amount companies can realistically claim for and, as we will see below, the cost of the scheme to the taxpayer. The activities covered by R&D tax credits in the UK are broader than in Germany, which only covers personnel costs, and the US and Japan's relief which is based on incremental increases in R&D rather than net spending. The amount companies can claim is also greater in the UK. The US and Japan cap tax relief at 25% of the tax bill, Germany caps it at €1 million per company group, but the UK has no limit to the RDEC scheme, meaning the entire corporation tax bill can be cancelled out and cash granted if there is a remaining balance.

Figure 5 below highlights the ratio of direct government support of business R&D to tax support for business R&D. The cost of the UK's R&D tax incentives are the largest of comparable countries at 0.33% of GDP, with France in second place at 0.28%, compared to an OECD average of 0.12%. Figure 5 also shows how most other countries spend proportionally more on direct support for businesses and less on tax reliefs than the UK: the average ratio across the OECD is 1.5 times more on R&D tax support than direct business R&D funding; while the UK spends 4.1 times more.⁷

Figure 3: Implied marginal R&D tax subsidy rate 2021

Source: OECD R&D Tax incentives database: implied tax subsidy rates on R&D expenditures (These figures are provisional)

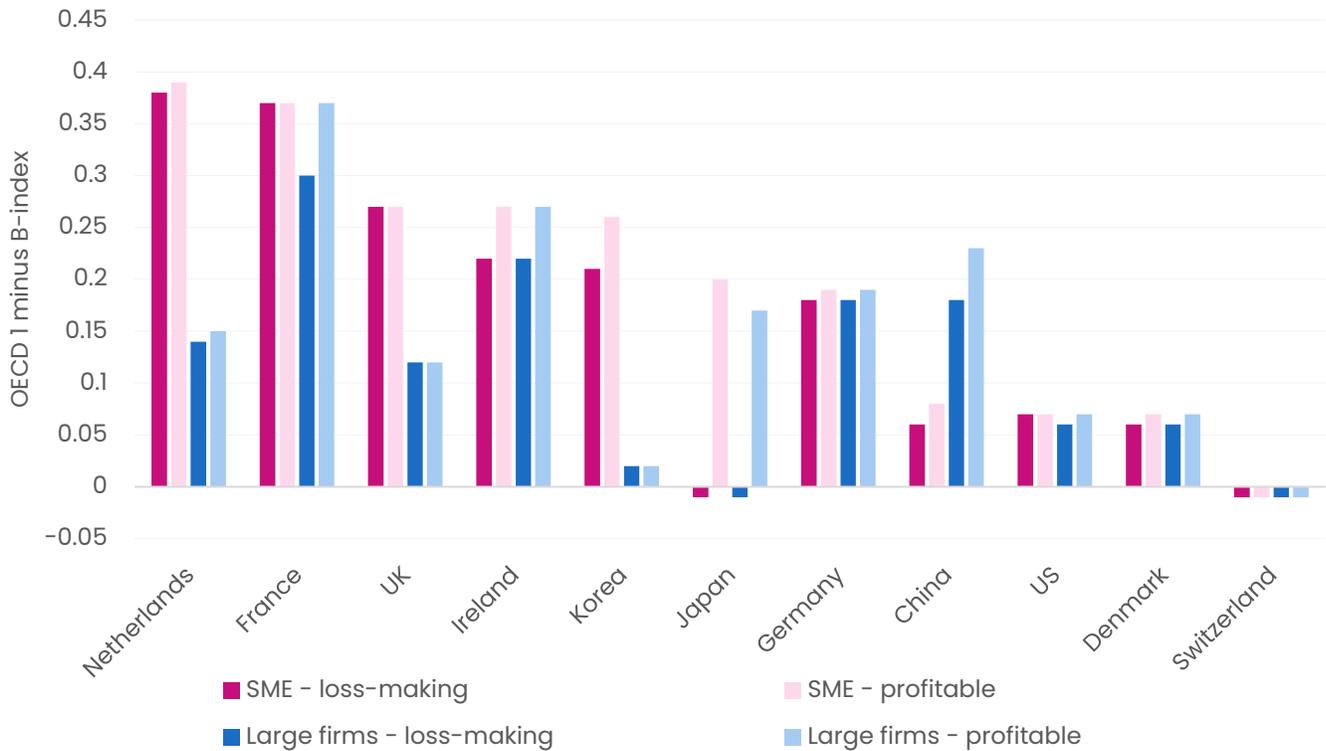


Figure 4: Average implied tax subsidy vs business expenditure on R&D 2018

Source: OECD R&D Tax Incentives database: Implied tax subsidy rates on R&D expenditures; OECD Main Science and Technology Indicators: BERD as percentage of GDP.

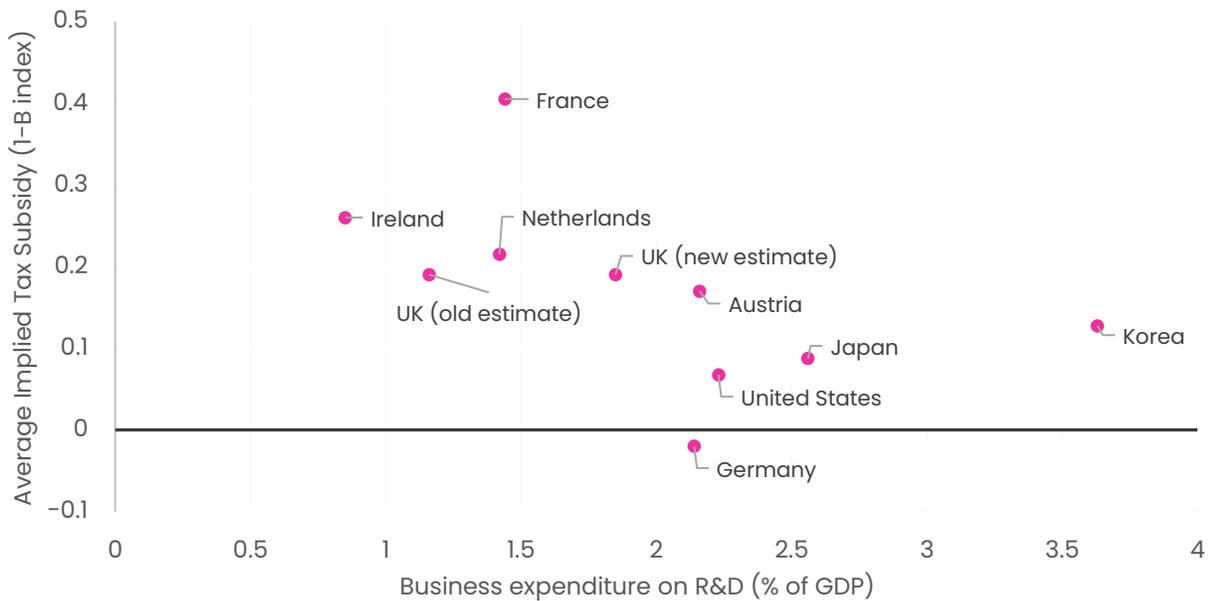
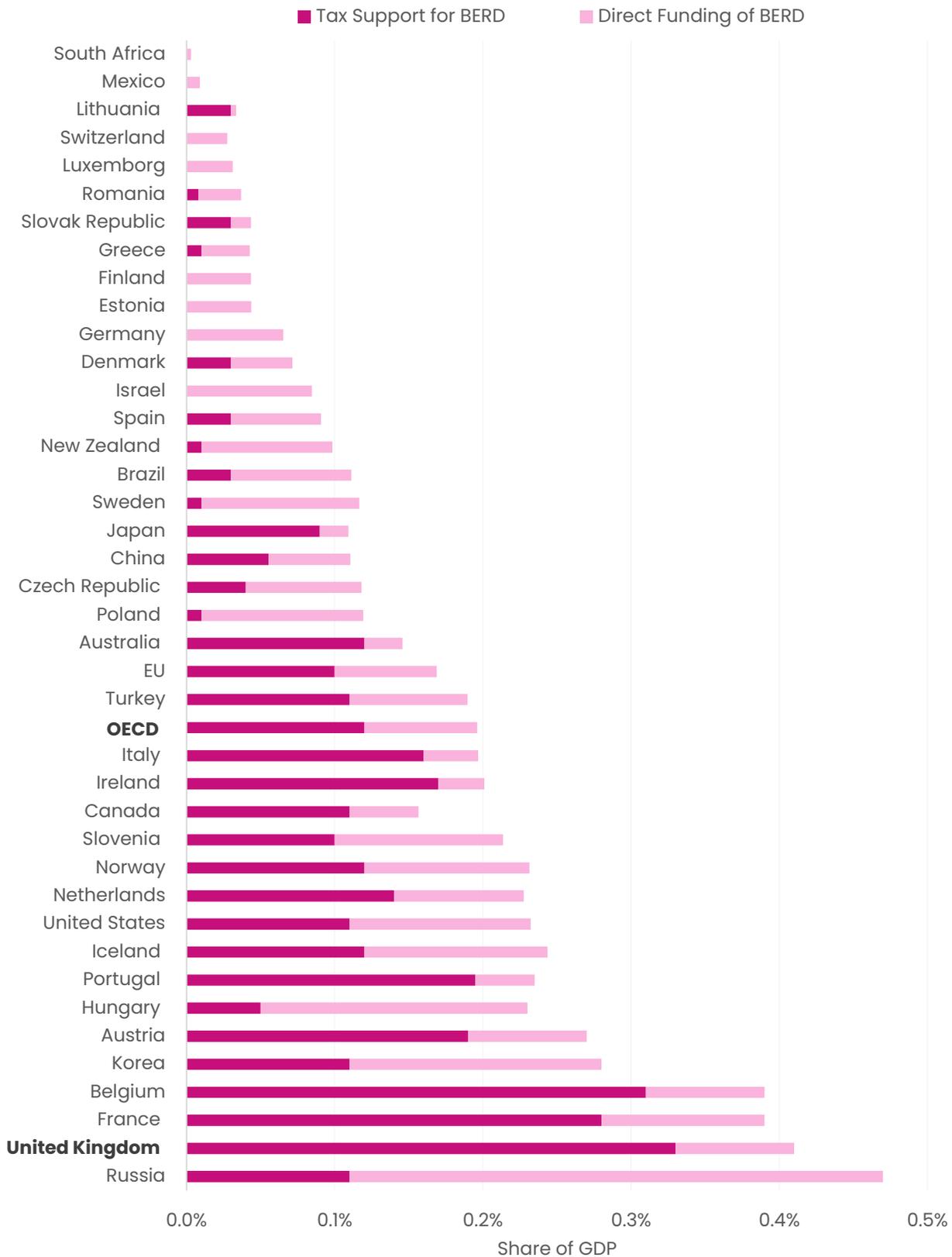


Figure 5: Direct government funding and tax support for business R&D, 2019

Source: OECD R&D Tax Incentives database: April 2022

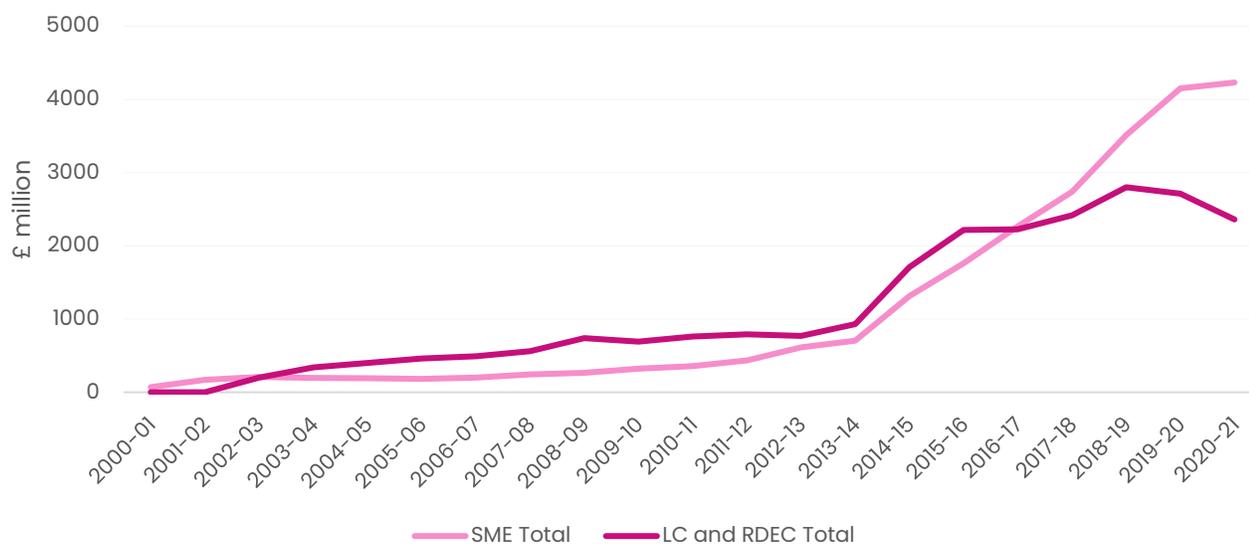


Chapter 2: Why have the costs of R&D tax incentives climbed

Despite the UK having relatively comparable headline rates of tax relief to other OECD countries, the cost of the UK's regime is significantly higher as a share of GDP. Given that UK businesses spend around the OECD average on R&D (discussed further below), the cost of the UK's R&D tax credit schemes is likely to be down to a combination of a broader eligible cost base, greater use of the scheme by eligible firms, or higher levels of fraud.

Figure 6: Cost of R&D tax credits

Source: HMRC research and development tax credits statistics 2022, RD2. (2020-21 figures are provisional)



Both the SME and large company schemes have seen significant cost increases since 2013-14, with the SME scheme increasing from £705 million in 2013-14 to £4.2 billion in 2020-21 (as per provisional figures from HMRC).⁸ The RDEC scheme was introduced in 2013-14 and the large company (LC) scheme phased out over the following three years – the cost of these schemes combined in 2013-14 was £930 million, but had grown to £2.4 billion by 2020-21.

This points to a significant increase in the utilisation of R&D tax credits by firms which, although costly to the Treasury, is a positive signal that companies are increasing their investment in R&D as a result of the incentives.

The prevalence of fraud within R&D tax credit schemes

Emerging evidence suggests that UK R&D tax reliefs suffer from high levels of fraud and leakage. Former Cabinet Secretary Lord Turnbull recently argued in a Parliamentary committee that “There is no way that R&D has grown 50 per cent compound for six years, that is completely implausible. A very large part [of the growth in the scheme] is bogus and something needs to be done.”⁹ The Times

recently published an investigation into fraudulent claims to the SME scheme, noting that ‘the level of fraud and error has been so high that for the third year in a row HMRC auditors have refused to sign off its latest accounts.’¹⁰

The latest HMRC estimates of R&D tax credit ‘rate of error and fraud’ are 7.3% for the SME scheme and 1.1% for the RDEC scheme. The SME tax credit scheme rate of fraud is higher than the Universal Credit scheme (5.0%) and the COVID-19 Self-Employment Income Support Scheme (4.5%) for example. But the rate is not high enough to explain the high cost of the scheme relative to other countries: even if there was no error and fraud the scheme would still be the most expensive among comparable countries at around 0.31% of GDP (assuming HMRC’s fraud estimate is accurate).¹¹

Changes to rates, floors, and caps have increased costs

Fraud is not the only contributor to the rising cost of the SME relief. There were a number of changes to the schemes in the last ten years that are likely to have contributed to the sharp cost increase.

Table 2: Amendments to the R&D tax credits (2012–2015)

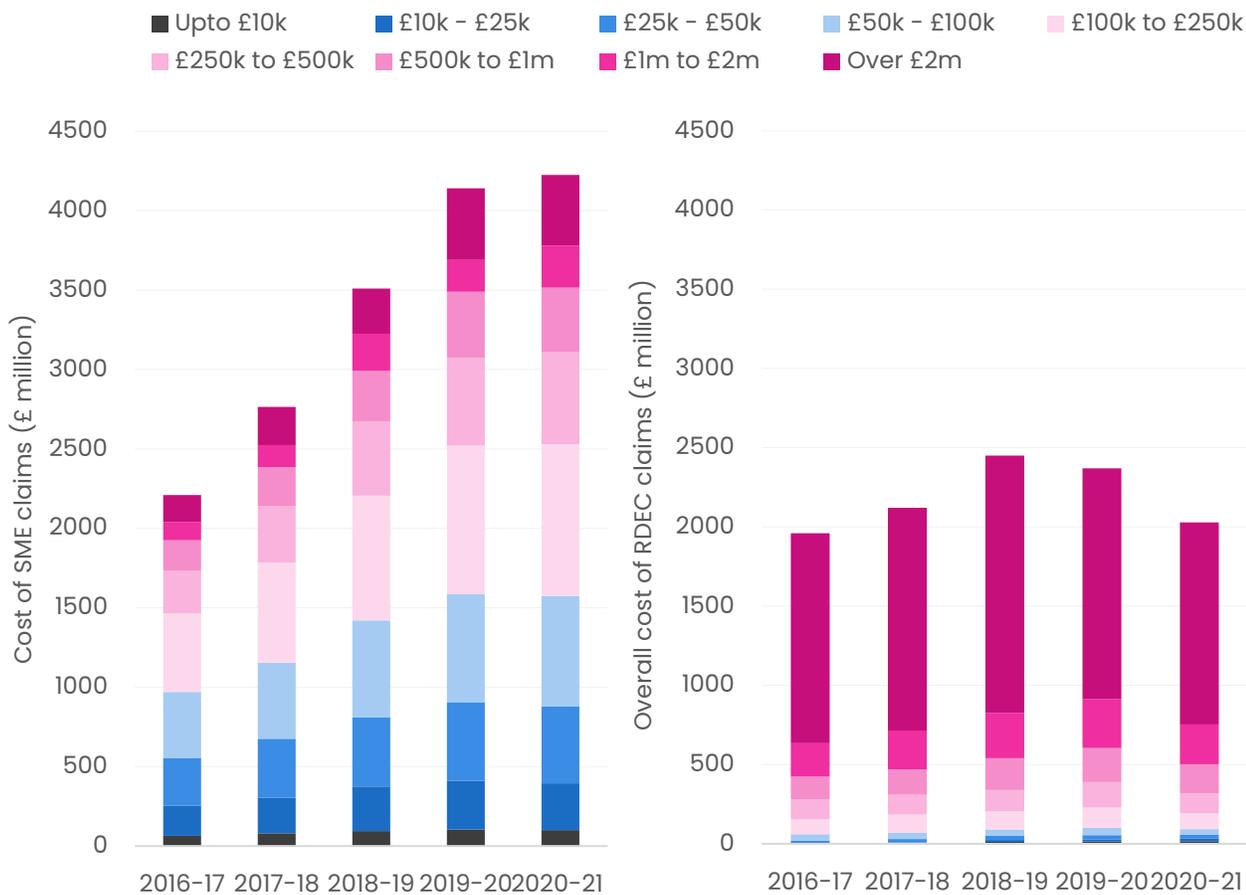
2012	<ul style="list-style-type: none"> • The cap on SME claims, based on NI and PAYE receipts, was removed (this was reinstated in an amended form in 2021). • The minimum spending level of £10,000 was removed so SMEs with any level of R&D expenditure could start claiming. • Changes were made to the rate of enhancement for eligible spending, and the relief rate of the SME scheme, increasing the effective rate for profit-making firms. • The eligibility definitions were amended, making it easier to claim for the cost of externally provided workers.
2013	<ul style="list-style-type: none"> • The RDEC scheme was introduced, and will gradually replace the LC scheme over the following 3 years.
2014	<ul style="list-style-type: none"> • SME tax credit rate increased from 11% to 14.5%, increasing the generosity of the scheme for loss-making firms.
2015	<ul style="list-style-type: none"> • SME scheme rate of enhancement for eligible spending increased further. • RDEC scheme rates increased from 10% to 11%.

However, it is worth noting that these changes were made in a period where corporation tax was falling from 30% in 2002 to 20% in 2015. A falling corporation tax rate would be expected to decrease the amount claimed in tax credits, which is the inverse of what we see in the UK's cost figures. Although the headline corporation tax rate dropped significantly, the small profits rate has not changed to the same degree, fluctuating between 21% and 19% in the same period, mitigating the effect on smaller firms in particular.

So increasing rates for both schemes and the removal of both the cap and floor on SME claims drove up overall costs. The removal of the claim floor in particular will have allowed the many firms doing a small amount of R&D to claim on the scheme. The downside of allowing many small claims to be made is that it is more difficult for HMRC to ensure compliance, as the administrative burden of checking many small claims is much higher than the burden of investigating a small amount of large claims. However, we can see in Figure 7a that the cost of small claims is not a significant driver in the overall cost of the SME scheme, making up only 2.4% of the total cost of the SME scheme in 2020-21.

Figure 7a: Overall cost of SME claims by size **Figure 7b: Overall cost of RDEC claims by size**

Source: HMRC research and development tax credits statistics 2016-2021, RD7 (2020-21 figures are provisional)



The cost of individual claims has been increasing

The increasing cost of the schemes is driven by an overall increase in claims, and particularly by larger claims. From 2016-2021 the number of SME claims with a value of up to £100,000 increased by 70%, while the number of claims worth over £100,000 increased by 116%.¹² The RDEC scheme has grown more slowly, with the number of claims under £100,000 decreasing by 8% over the same period, and the number of claims over £100,000 increasing by 26%. However, the cost of individual claims to the RDEC scheme is much higher, with claims in the over £2 million bracket cumulatively costing over £1.6 billion in 2018-19 compared to a cost of £285 million in the same bracket for the SME scheme. The overall cost of the SME scheme is higher though, due to the high cumulative total of mid-cost claims (£30,000-£500,000).

More firms have been applying for tax credits

One driver of the cost of the SME scheme is an increasing number of firms applying. From 2013-2019 there was an increase in the number of first-time applicants for the SME tax credit, peaking at 17,770 first-time claims in 2018-19, up from 4,785 in 2013-14.¹³ This is evidence of the increasing popularity of the scheme. This is likely to be driven by the increasing number of small claims, which was made possible by the removal of the claim floor of £10,000 in 2012. Why these firms have started investing in R&D, and if it is as a result of the incentives regime, is not clear because of limited sampling of small firms by the ONS.

Regarding Lord Turnbull's claim that "There is no way that R&D has grown 50 per cent compound for six years", it is possible many firms have started investing in R&D because of the tax credit, but it is also possible that these firms have started *claiming* for R&D they were already doing that previously fell under the claim floor. The fact that the number of claims has continued to climb since the floor was removed suggests some of the growth has been from new R&D activity.

Figure 8: Number of first-time applicants for R&D tax credits

Source: HMRC Research and Development Tax Credits Statistics 2016-2022, Tables RD7 and RD8. (Note: 2020-21 figures are provisional. No data available for claim sizes before 2016. COVID-19 lockdowns are also likely to have impacted the amount of R&D firms could do in 2020-21)



Claims have grown across all industrial sectors

Analysing the cost of R&D tax credits by sector shows that firms in the information & communication; professional, scientific & technical; and manufacturing sectors have been the major claimants of SME tax credits making up a combined 69% of the total cost of the scheme in 2020-21. Growth in the cost of claims has been relatively similar across sectors, with SMEs in construction being the notable exception with an increased share from 2016-2020. The share of R&D tax credits claimed by the professional, technical & scientific sector and information & communication sector is unsurprising as these are traditionally R&D intensive. It is encouraging that manufacturing SMEs are also spending a comparatively large amount on R&D, as this suggests the types of manufacturing, they are doing is high-value, but it is notable that large companies in this sector claim the most R&D credits by a substantial margin.

In the RDEC scheme manufacturing has been the dominant sector, both in the number and cost of claims, making up 31% of the total claims in 2020-21 down from a peak of 38% in 2018-19. Other sectors have maintained similar shares of the cost of the RDEC scheme from 2016-21. This suggests that increases in R&D spending have not been driven by growth in a particular sector.

Figure 9: Cost of SME scheme claims by sector

Source: HMRC Research and Development Tax Credits Statistics 2016-2022 (2020-21 figures are provisional)

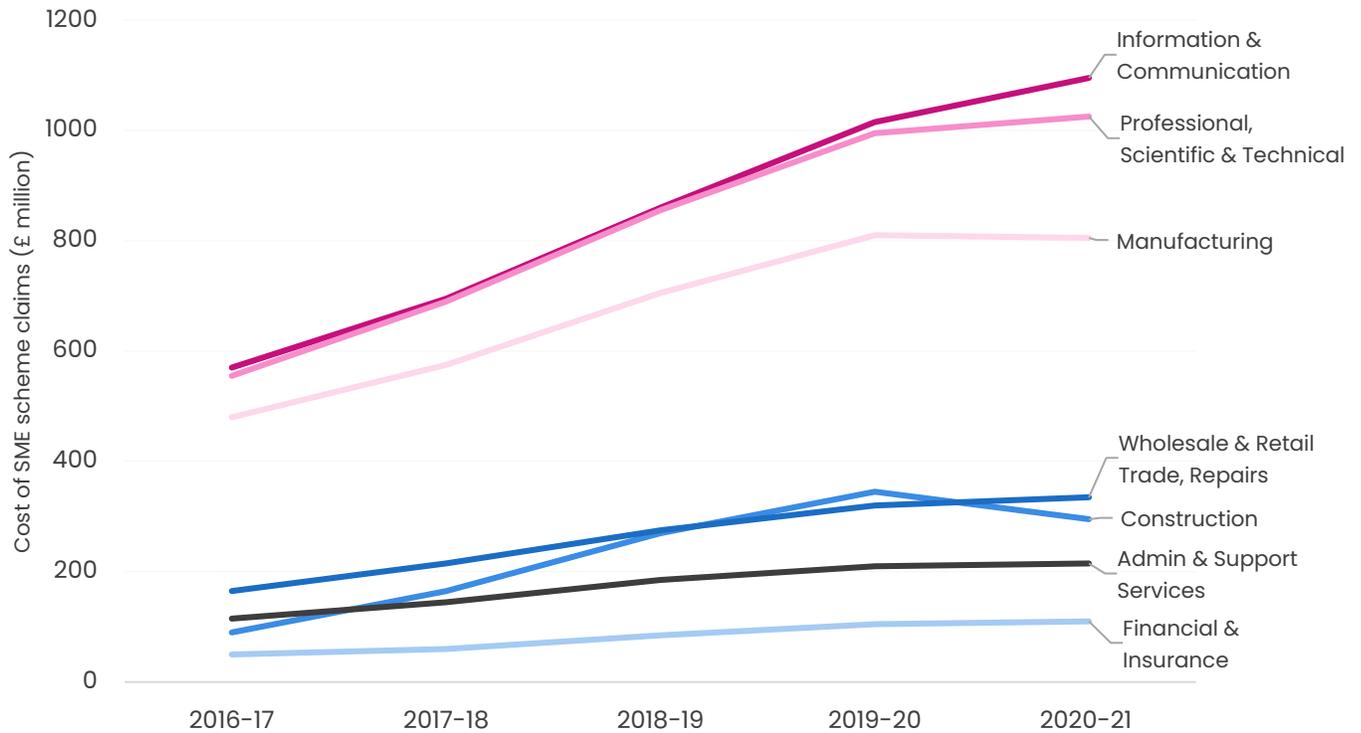
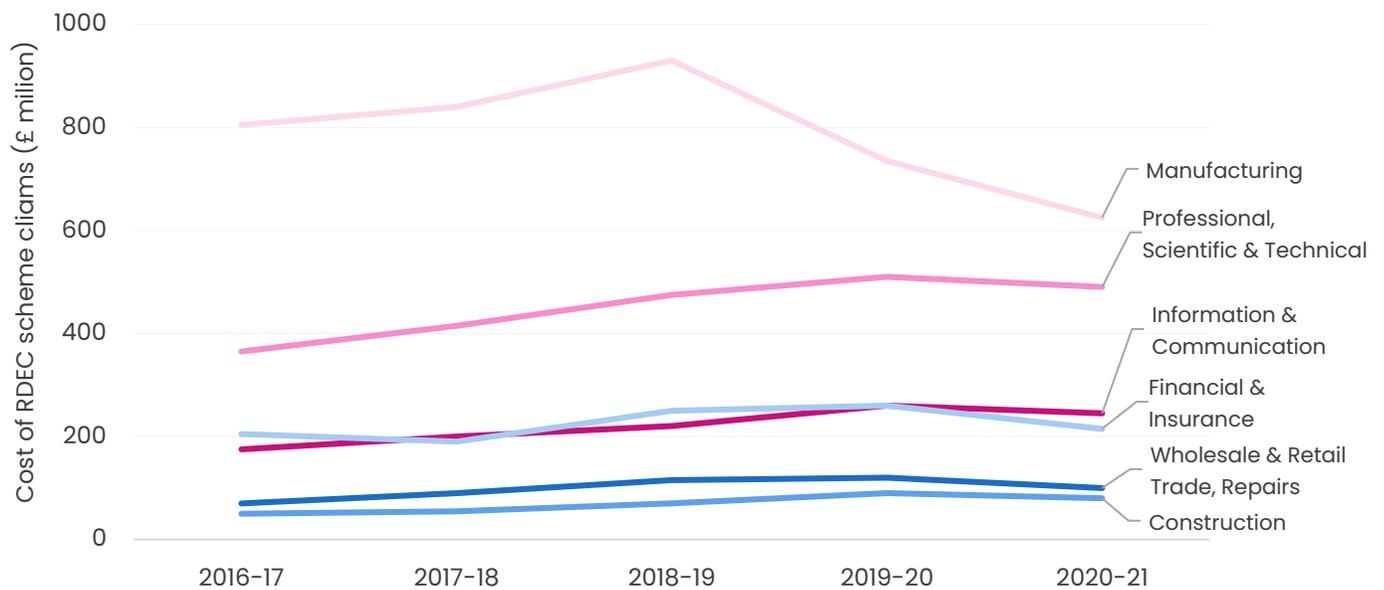


Figure 10: Cost of RDEC scheme claims by sector

Source: HMRC Research and Development Tax Credits Statistics 2016-2022 (2020-21 figures are provisional)



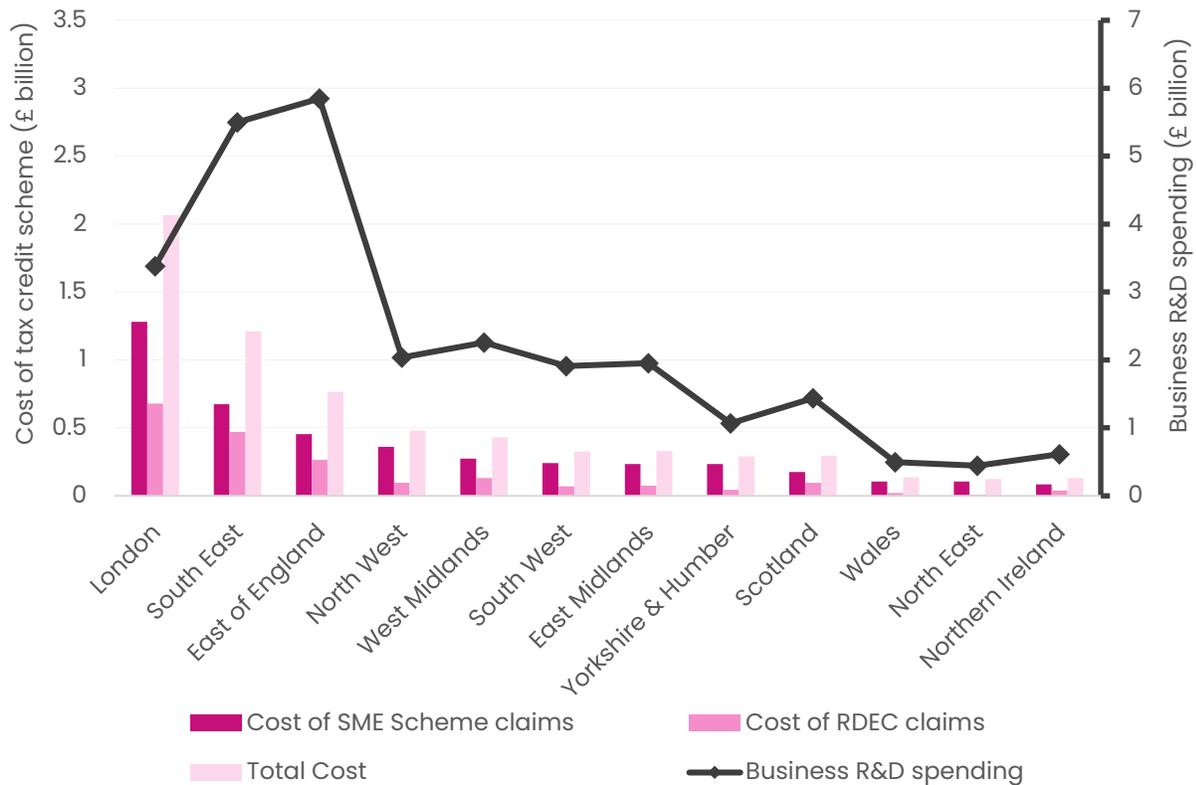
R&D tax credits have directed more money to the most prosperous UK regions

The largest share of R&D tax credits goes to firms based in London, with the South East and East of England regions claiming the second and third largest shares. Some of this will be driven by the 'Headquarter effect:' HMRC registers the R&D activity where the headquarters of the company are which are more likely to be in London and the South East. As a result, R&D could be taking place elsewhere but won't be measured as such. It's important to note that the R&D expenditure figures reported above do not take into account the October 2022 uplift by ONS (uplifted regional data is not yet available), and therefore under-represent R&D spending by small firms.

This illustrates the regressive nature of R&D tax credits, as they benefit regions which have more money to spend, entrenching the inequality in R&D investment. A Government looking to level up would seek to balance R&D tax reliefs with direct spending on business R&D, as occurs in all other comparator countries, to target investment at places with untapped potential.

Figure 11: Regional breakdown of the cost of claims to the R&D tax credit scheme 2020-21

Source: HMRC Research and Development Tax Credits Statistics 2022, Table RD5; ONS Research and development in UK Businesses, 2020, Table 7a. (This data is provisional)



Chapter 3: Are R&D tax incentives working?

So when it comes to boosting private sector innovation, the UK is out of step with other countries in focusing on R&D tax reliefs much more than direct investment in business R&D. And our scheme is much more expensive as a proportion of GDP, due to high levels of fraud on top of an increasing number of claims. But is our approach having the desired result? This section considers evidence on the impact of the UK's approach.

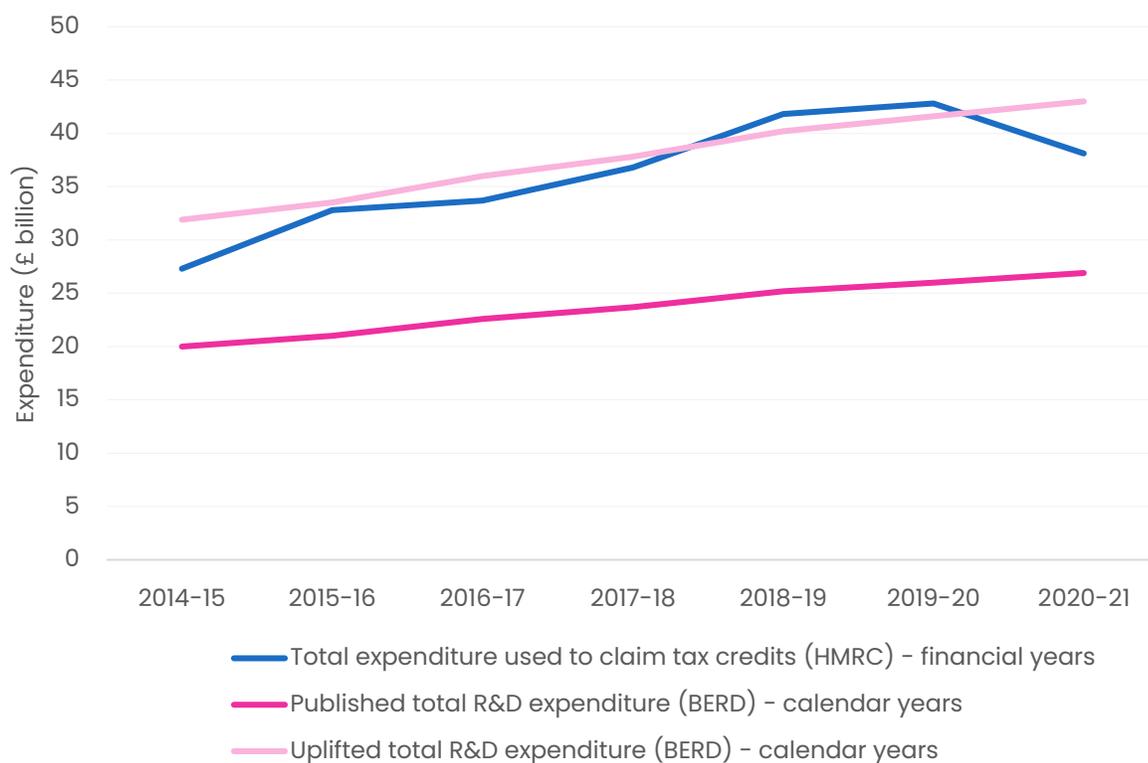
Have tax credits increased business R&D?

Previous critiques of the UK R&D incentives scheme, such as David Connell's 2021 report 'Is the UK's flagship industrial policy a costly failure?' highlighted the disconnect between claims to HMRC and ONS estimates of private R&D spending.¹⁴ There was a gap of around £15 billion pounds between what ONS surveys suggested businesses were spending on R&D and the higher figure businesses were claiming to have spent on R&D in their tax returns. But the recent uplift of ONS estimates, which is retroactive for the years 2018, 2019 and 2020, closes this gap.¹⁵

The uplifted figures also bring UK R&D spending up to the Government target of 2.4% of GDP. In fact, according to the new ONS estimates, that target was met in 2019.

Figure 12: Expenditure used to claims R&D tax credits vs ONS estimates of business R&D expenditure

Source: ONS business enterprise and research and development statistics (2022), HMRC R&D tax credits research (2022)



SME R&D is now estimated to be much higher than previously thought

The ONS reports that it has been under-surveying small businesses' R&D activity, after considering small business claims to HMRC and businesses in ONS' Annual Business Survey reporting R&D activities. It is not possible to increase the coverage of these historic surveys, so ONS has applied a multiplier to the historic estimate of UK business R&D by around 63% each year.¹⁶ This suggests that there has been a significant group of small businesses undertaking R&D that have been previously invisible to the ONS, but have become visible through their interaction with the R&D tax credit.¹⁷ As there is no new raw data, or any disaggregated statistics from ONS (these may become available in a later release) it is difficult to estimate which sectors have seen the greatest increase in R&D investment, or where this growth is located.

When compared to other technologically advanced nations, the new figures still place us in the middle of the field, just below the OECD average for R&D investment (2.7% in 2020). R&D spending at 2.4% of GDP means the UK is still far behind the leaders, countries such as Korea (4.8% of GDP) and Israel (5.4% of GDP), and also behind countries with economies more comparable in size to the UK's – Germany and Japan each spending more than 3% of GDP on R&D.¹⁸ Our ambitions should exceed being average if we want to be a “science superpower”.

What about productivity?

If businesses are actually spending more on R&D than originally thought, then why is the UK still suffering from persistent low productivity?

The productivity benefits of private R&D are widely accepted, but recognised to be difficult to effectively measure. One possible explanation for why increasing private R&D has not yielded similar gains in national productivity is that there is a time lag. A 2009 European Investment Bank (EIB) paper states, “any assessment of the benefit from R&D spillovers must take due account of lags, with the already long and variable delays for firms reaping private R&D returns, suggesting that the time taken for social returns to manifest themselves in the form of transfers of new knowledge to other firms, industries or countries is likely to be even longer.’ The paper estimates the impacts from an increase in R&D tax credit rates, with the first positive effects to Total Factor Productivity (TFP) being felt as much as ten years after the policy change.¹⁹

A more recent meta-analysis of studies on R&D spillover effects also suggests that the positive impacts on innovation and productivity are likely to be time-lagged.²⁰ Given that the significant growth in the UK's R&D tax incentive schemes started around 2013, it is unsurprising that we have yet to see significant positive spillover effects driving increased TFP. However, we should expect to see improvements soon.

Problems with the UK's R&D incentive schemes

The ONS' new estimates of business R&D spending are an encouraging sign that R&D tax incentives are boosting innovation. But the cost of the UK's R&D incentives are the highest in the OECD, while R&D intensity is just below average. So, ministers should urgently consider reforms to the R&D tax incentive schemes to increase their efficacy and additionality. The following section outlines the problems they should seek to fix.

1. The SME R&D tax credits scheme is poorly designed

Currently the effective rate of relief is uncertain for SMEs that are close to the break-even point in profitability. Firms with a small profit will first apply losses-brought forward and depreciating assets to their corporation tax liability, then if there is any left, they will apply the R&D tax credit. This may cover their entire corporation tax liability, in which case leftover R&D tax credit allowance can be claimed in cash. The current SME scheme design means the effective rate of relief is different depending on if it is applied against corporation tax or as a cash credit, or a mixture of the two. If firms are loss-making, the rate will be up to 33% but if they are liable for corporation tax then the rate of relief will be up to 25%.²¹ This complexity makes it difficult for firms to effectively budget their R&D investments.

The newer RDEC scheme (introduced in 2013) improved on the earlier LC and SME schemes (introduced in 2002 and 2000 respectively). These improvements, made in consultation with firms, included giving a fixed rate regardless of the company's tax position and applying the relief before tax, making it more visible in company accounts.

The fixed rate of relief, regardless of tax position, gives much greater predictability when it comes to cash flow forecasting. Applying the tax credit before tax puts it 'above the line' in accounting calculations. This predictability and visibility boosts the impact of the tax incentive in encouraging more investment in R&D. The discrepancy in calculated additionality ratios between the RDEC (between 2.4 and 2.7)²² and SME (between 0.6 and 1.28)²³ schemes could be in part because of the higher visibility and predictability of the RDEC credit as a result of the superior policy design.

2. R&D capital reliefs fail to support pre-profit firms and are internationally uncompetitive

Research and Development Allowances (RDAs) currently offer enhanced tax relief on R&D capital expenditure. This allows firms to receive tax relief on eligible plant, machinery, and buildings expenditure in the first year, rather than through the standard capital allowances mechanism. Firms utilising RDAs deduct eligible costs in order to receive relief from corporation tax, meaning firms in a year without corporation tax liability (e.g. loss-making firms) cannot benefit from the RDAs in that year. France, Belgium, Ireland, and the Netherlands all offer incentives for firms that invest in R&D capital, but that don't have taxable profits.²⁴ This makes investing in R&D capital abroad a more attractive prospect for some UK companies. The system also has multiple perverse incentives. UK firms can subcontract research to foreign facilities and receive the full tax credit benefit of this cost,

as long as it's less than 65% of their total R&D claim. But if they built the R&D facility in the UK and did the research themselves they would not receive the full benefit from the R&D tax credit as the capital expenditure would not qualify for the more generous R&D tax credit rates, only the RDAs. Loss-making firms have an even more powerful incentive to contract research abroad as they would not benefit from the RDAs on capital costs.

There is also an argument that capital expenses should be considered as a particularly useful type of R&D investment. Buildings and machinery that are bought for R&D purposes are likely to have some of the strongest spillover effects, for example on skilled employment.²⁵ If a firm invests in an R&D facility, they are going to want to utilise that investment for the long term. Plant and machinery investments are also more difficult (or impossible in the case of buildings) to move abroad. All of these factors suggest R&D capital expenditure should be incentivised more.

3. HMRC uses questionable definitions of R&D

The OECD's Frascati Manual is now in its seventh edition and has become the global standard for defining, classifying and measuring research and development. Although the Frascati Manual was foundational in the definition HMRC developed in the year 2000, there was a decision to depart from this internationally recognised standard and to instead use a bespoke definition developed by the Department for Trade and Industry.

The Frascati Manual has since been updated to include considerations of modern R&D practices, like in computer science, and details worked examples across different fields to clarify eligibility. Meanwhile the BEIS definition used for the UK's R&D tax reliefs has stayed broad, with an absence of worked examples of how companies should apply the definition to business activities in different research-intensive sectors. There are, however, some reforms due to come into force next year to update eligible activities and expenditure to include some modern data science practices – discussed further in the next chapter.

The result is that it is not clear what exactly counts as 'R&D' for tax purposes, with reports that different agents at HMRC will take different interpretations of what is eligible for tax relief. These vague guidelines are simultaneously open to abuse and cause some businesses to fail to realise when some of their investment *should* count as R&D. If the boundary between what is eligible R&D activity and what is not is unclear, it becomes difficult for HMRC to challenge claims of dubious R&D activity. Discussions held in support of this research note indicated that, on occasion, HMRC have been unable to argue in court that claims were for activities not considered R&D because the definition was sufficiently loose.

4. Tax consultancy is unregulated and exaggerates claims for tax relief

For SMEs the R&D tax credit is an important funding source. In a COADEC survey, 69% of SMEs that had received the credit reported that the R&D tax credit was 'very important' for their firms' early-stage survival and growth.²⁶ The fact that loss-making firms can claim a cash credit is a vital part of the scheme and helps the UK offering stand out internationally.

But the proliferation of R&D tax consultants, many of whom operate on a ‘no win, no fee’ basis taking their commission from the amount of tax relief secured, is a worrying sign of leakage in the system. Professionals in tax advice have expressed concern in Parliamentary committee hearings, with the Institute of Chartered Accountants in Scotland, saying “the biggest concerns we have are about who can advise on R&D [tax relief]. The one change we would like to see is anything that helps to tighten up who gives advice,” and the Institute of Chartered Accountants in England and Wales explaining: “there are advisors out there who aren’t necessarily looking at all the rules in detail, or perhaps looking at putting claims in that are speculative at best”. Lord Turnbull argued that “this is a major financial scandal.”

The consultants are taking a cut from the tax relief intended for the innovating firms – immediately reducing the efficiency of the scheme. There’s also concern within the tax industry that some consultants, with their fees based entirely on the amount of tax reliefs companies earn, are inflating the eligible R&D activities of small firms, and profiting at HMRC’s expense.²⁷ We have also heard from small business owners that they are regularly targeted by tax consultants offering to increase the amount of R&D tax credit they receive. This behaviour would go part-way to explaining why the amount of R&D claimed to HMRC is so much larger than it should be. But if the SME R&D tax credit was easier to understand, fewer businesses would need to use R&D tax consultants.

5. R&D tax incentive statistics are opaque and not granular enough to be useful

HMRC currently provides statistics for each of the tax credit schemes, broken down by number and cost of claims, sorted by region and industry sector. Since the 2018 statistics release the number and cost of claims by cost band and company size have also been included in the statistical tables. This gives a limited picture of business R&D, and prevents a detailed analysis of firm activity, which activities are driving R&D costs, and what kind of research is being done where.

HMRC is currently proposing a discontinuation of the supplementary tables in the R&D tax credits statistical publication – this would remove the (already limited) geographical and sectoral data in R&D tax credit claims.²⁸

In contrast, Innovate UK grants publish detailed information about the projects grant money is spent on including the names of recipient organisations, their postcode, project costs, detailed sectoral information, a description of the project and the type of research. This information is essential for detailed analysis of the UK’s science and technology strengths, for the preparation of industrial strategy, and other work by interested parties such as investors or educational institutions determining the skills in demand in UK industries.

What reforms has the Treasury announced for the tax credit schemes?

Following a review of R&D tax reliefs launched at the 2021 budget, the Government has announced a number of reforms that will come into force from April 2023.²⁹

1. **Broadening eligible R&D expenditure to include the costs of datasets, cloud computing and pure maths.**

Following consultations with industry, HMRC have responded to calls to adapt the R&D tax credit to cover previously exempt modern R&D practices. This is welcome – HMRC should continue to consult industry on what modern R&D practices entail, so that the tax credit can incentivise this activity.

2. **Tightening of eligible expenditures to exclude most R&D subcontracted outside the UK**

A significant amount of UK business R&D is being performed abroad – £5.9 billion in 2019.³⁰ But the evidence suggests that a significant amount of the positive spillovers from R&D are characterised by network effects at home, through geographic clustering, proximity to research institutions and low cost of knowledge transmission.³¹ So the Government has taken steps to tighten eligible expenditure to domestic R&D.

Restricting the R&D tax credits to spending within the UK will reduce the cost of the scheme, but will also change firm behaviour. The reform will effectively make contracting research to foreign firms more expensive, which will in turn make UK research sub-contractors more competitive, but may also lower the overall amount firms spend on R&D. Without knowing the elasticities of firms contracting R&D it is impossible to know if the onshoring of spillover effects from sub-contracted research will outweigh the reduction in demand for R&D due to the effective cost increase. Impact estimates have yet to be released by the Government at the time of writing.

3. **Claims will have to be made digitally, endorsed by a senior officer of the company, and details of any agent providing advice for the claim must be included in the claim. Companies making claims for the first time in at least three years will also have pre-notify HMRC of their R&D tax credit claim.**

HMRC have stated that these reforms were introduced to tackle abuse of the R&D reliefs, but they are likely to have secondary benefits as well.

Digitising the claims process should make it easier for firms to submit their claims. And if HMRC is more prescriptive with the information necessary for the pre-notification requirement, companies may not feel the necessity to use R&D tax consulting services to fill out their tax return later on. Reducing the necessity for tax consulting increases the effective rate of the R&D tax credits, as there is no longer a third party taking a cut from the relief.

Endorsement from a senior officer of the company will ensure the visibility of the credit in the management of the company. This should help the credit incentivise further R&D investment.

Tax consultants will now have to include their details on claims, making them more visible to HMRC. This should help HMRC identify bad actors, and make tax consultants think twice before including questionable expenses in tax returns that may be reducing the additionality of the relief.

All of these reforms are welcome, and should help the scheme become more effective, while reducing abuse. But they do not go far enough. In Chapter 3 we propose improvements to R&D tax incentives that will further improve their effectiveness.

Note on the Patent Box

The Patent Box benefits companies making a profit from patented products. These profits are subject to a 10% rate of tax, rather than the standard 19% corporation tax rate. Companies must elect into the benefit, by notifying HMRC in writing. Unlike the R&D tax credit schemes, the Patent Box does nothing to support loss-making firms.

The Patent Box has been subject to a number of criticisms.

First, it benefits only a narrow subset of firms. Of the £1.22 billion spent on the Patent Box in 2020, 95% was claimed by large companies and 46% of the relief was claimed by London-based companies. Over half of the companies that claimed the relief were in the manufacturing sector.³² Penny Simmons, legal director of Pinsent Masons, has argued that: ‘The under-use of the Patent Box by SMEs provides yet more evidence that when reviewing the R&D tax reliefs system, the government needs to prioritise and safeguard the availability and effectiveness of reliefs for SMEs’.³³ Given that the Government suggests allowing ‘around 5 years’ to apply for patent protection, it seems likely that the Patent Box also offers little help to new companies.³⁴

Second, it rewards only a narrow type of intellectual property. While patents are common in the manufacturing sector, they are less relevant in other industries. In fintech for example a valuable algorithm might be kept in-house as a trade secret, or in software development a programme might be copyrighted. The Federation of Small Businesses reports that the most common IP protection used by small businesses in the UK is confidentiality (including NDAs) and copyright (22% and 15% respectively), while the *least used* (only 5%) is patent protection.³⁵ This helps explain why 95% of the Patent Box relief goes to large firms.³⁶

Third, it provides limited incentives to invest. Patent Box relief is distanced from R&D activity, as patents only generate profits many years after the R&D is completed. This means the incentive has less ability to encourage R&D investment, although it could impact the valuation of R&D intensive firms and those that hold patents. A 2018 IPPR report argued: ‘The Patent Box... almost certainly does little to increase innovation but costs almost £650 million per year.’³⁷

Fourth, it distorts the tax system in a way that favours large multinationals. Firms that operate in multiple jurisdictions could choose to hold their patents in the UK, while conducting R&D activity and generating spillover benefits abroad. David Connell from the University of Cambridge has

argued that: ‘Case studies suggest that [the Patent Box] has generated inadequate economic benefits, despite paying subsidies to the profitable UK subsidiaries of international corporations worth up to £50k per annum for each of their employees.’ Stanford and MIT academics recently argued that ‘Patent Boxes are an example of a harmful form of tax competition that distorts the tax system under the guise of being a pro-innovation policy. In contrast to well-designed research and development tax credits—for which it is hard to manipulate the stated location of research labs—Patent Boxes should be discouraged’.³⁸ This concern is mitigated against to some degree by the nexus framework. The modified nexus approach was developed as part of the OECD Base Erosion and Profit Shifting Project (BEPS) to make sure that companies benefiting from the Patent Box relief had done the R&D that contributed to the invention.

Given the Patent Box costs over £1 billion and suffers from these design flaws, is there a case in a difficult fiscal moment for the Government to end the scheme?

There are strong arguments in the Patent Box’s defence.

The narrow targeting of the Patent Box – in terms of firm size, sector, and type of intellectual property – is undeniable. But the firms who do benefit are strategically important for the UK economy. Life sciences firms, for example, make substantial use of the Patent Box. And they add significant value to the UK economy – PWC calculates life sciences firms contributed £36.9 billion in gross value added (GVA), 584,000 jobs and nearly a fifth of all business R&D to the UK in 2019.³⁹ GlaxoSmithKline, one of the largest life sciences firms, views the UK as an attractive location for a number of factors, including the Patent Box.⁴⁰

HMRC’s evaluation of the Patent Box suggests that firms using the relief display a 10% increase in investment as a result.⁴¹ But the most important effect is likely to be on the UK’s competitiveness. Neighbouring countries employ Patent Boxes too – France and Spain match the UK’s Patent Box rate of 10%, the Netherlands with a rate of 9%, Ireland at 6.25%, and Belgium with a very competitive rate of 3.75%.⁴² Companies developing patentable products, in particular those which are likely to be very profitable, will look to develop these products in a jurisdiction that provides the most favourable tax rate. As noted above, the OECD nexus approach means that it is increasingly difficult for companies to move patents to different jurisdictions for tax purposes, meaning that if companies want to take advantage of the Patent Box in a country, they must do the R&D behind that patent in that country as well.

It is unsurprising that there is limited data on the impact of the Patent Box. It has only existed since 2012, and patents can take well over a decade to develop, register, and then begin generating profits. Nonetheless, improving the transparency of the Patent Box will be key to evaluating its success. If it is seen to deliver results, the Government could consider expanding it to include other forms of intellectual property.

The Dutch 'Innovation Box' could be a good model for this reform: companies report the profits they make from innovations in their corporate tax returns, and eligible profits are liable to a reduced rate of corporation tax (9% compared to the headline rate of 25%). This is a similar process to the UK's Patent Box. However, the eligibility is much broader than just patented inventions. Any innovation is eligible for this relief – but the company has to prove that the R&D for the innovation was done in-house. The mechanism for this is through the Netherlands R&D tax scheme Wet Bevordering Speuren Ontwikkelingswerk (WBSO) which allows companies to pay lower payroll taxes based on their R&D spending. In order to claim in the Innovation Box, companies will have had to declare the R&D that went into the innovation in previous years' WBSO declarations.

While there are concerns with the operation of the Patent Box and limited data on its efficacy, scrapping it would send the wrong message. It would be further evidence of UK science policy churn, at a moment when international firms are seeking stability, particularly when it comes to the tax regime. And it would weaken the case for international companies to locate productive activity in the UK at a moment when other Governments, particularly the US, are aggressively courting them. The Patent Box should be placed under close review, but remain in place for now.

Chapter 4: Recommendations

This chapter sets out recommendations to improve the R&D tax regime, to drive up private sector R&D while also improving value for money for taxpayers.

1. Make the benefit of the SME scheme more predictable and more visible

The SME R&D tax credit scheme needs to be reformed. The more recent RDEC scheme improved on the earlier LC and SME schemes, giving a fixed rate of return regardless of the company's tax position and making the relief more visible in company accounts. These improvements boosted the efficiency of these reliefs and should be adopted by the SME scheme.

The reformed SME scheme would offer a fixed gross credit of 44% of eligible R&D spending, which can be applied to corporation tax liability, and in the case there is no liability the remainder – net of tax – can be claimed as a cash credit.

The 'enhanced deduction' would no longer be necessary. As in the RDEC scheme, the credit would be taxable income, liable to corporation tax of 25%, resulting in an effective benefit rate of 33% (the current top effective rate offered in the SME scheme). For firms still paying the lower rate of corporation tax, which will apply to smaller firms under certain circumstances, the headline rate would be 41% to maintain the effective rate of 33%.

The reforms would not change the effective top rate of SME R&D tax relief, so firms that have budgeted for the current scheme will be able to maintain or upgrade their cashflow forecasts with regards to the tax credit.

The greatest improvement from updating the SME scheme in-line with the RDEC scheme is that it would ensure that the rate of relief remains the same regardless of a company's tax position. This gives much greater predictability when it comes to cash flow forecasting.

Under the current scheme, the SME in the example above received a total benefit of £6,062.50 for R&D investment of £25,000, or 24%. Say in the following year, the company spent a similar amount on R&D (£25,000), but broke even for tax purposes, so had no tax liability. Under the current SME scheme, it could surrender all of its enhancement (£32,500) for a tax credit at 14.5%, resulting in a cash payment of £4,712.50, or 18.85% of its R&D investment. If in its third year, it spent the same again, but for separate reasons made a taxable loss of £50,000, it could claim a tax credit of £8,337.50, or 33.35% of its R&D investment.

This lack of consistency in the effective benefit rate of the SME relief occurs due to the interaction between the mechanism for relief and the company's wider tax position, and because the expenditure on which an R&D claim is made is tax deductible regardless of the existence of R&D tax relief. Under the recommended changes to the SME scheme the company above would receive the same rate of relief regardless of tax position.

Moving the relief calculation to the pre-tax accounts, as in the RDEC scheme, also puts the tax credit 'above the line' in accounting calculations making it more visible in company accounts. Improved predictability and visibility would boost the impact of the tax incentive, increasing the additionality of the credit approaching that of the RDEC scheme.

The estimated cost of updating the SME tax credit, making the rate more predictable for firms, would be around £525 million based on 2020-21 provisional statistics.

Recommendation 1: The SME scheme should be updated to match the more modern RDEC scheme, with a fixed relief rate regardless of a company's tax position. This would increase the predictability and visibility of the relief, increasing its impact on company spending decisions.

2. Expand capital spending benefits to loss-making firms

The Research and Development Capital Allowances (RDAs) should be extended so that capital expenditure is eligible for a cash credit for loss making firms. So-called 'sticky spending' in research capital is precisely the kind of spending that will help ensure long-term benefits from investments in R&D. Categorising plant, machinery and buildings bought or constructed for R&D purposes as expenditure eligible for a cash credit will help growing firms to invest more in the equipment they need to drive innovation. This would keep the UK's R&D capital incentives competitive with other countries which currently offer a cash credit for capital spending. Particularly our close neighbours, France, Belgium, Ireland and the Netherlands, which offer this kind of support for loss-making firms at a rate of 25%, 6%, 24% and 11% respectively.⁴³

There is a precedent for providing a cash credit for capital expenditures. From 2008-2020 the Government offered a first-year tax credit on energy-efficient capital allowances as part of its enhanced allowances for energy and water efficient plant and machinery policy. This policy provided enhanced capital allowances to reduce a firm's tax bill if they invested in energy or water efficient technology, much like the RDAs do with R&D related capital. But the policy *also* provided a cash credit that could be redeemed by loss-making firms that invested in eligible technology.⁴⁴ This same provision should be incorporated into the RDAs scheme.

For the reasons outlined above in the recommended SME tax credit reforms, the rate of relief should be maintained regardless of tax position. This would mean a cash credit rate of corporation tax (due to increase to 25%) – competitive with the rate of R&D capital support available in our neighbouring countries.

Recommendation 2: Research and Development Capital Allowances (RDAs) should provide a cash credit for loss-making firms. This would support growing firms to make long-term commitments to R&D in the UK in a time when the cost of funding capital expenditure is increasing.

3. Provide clearer guidance on R&D definitions

Alongside the inclusion of data sets, cloud computing costs and pure maths in the definition of eligible R&D for tax credits, HMRC should update its broader definitional guidance. The 2015 update of the Frascati Manual to its 7th edition resulted in a better definition of R&D than HMRC's current guidelines (based on the 6th edition), with careful demarcation of the borderline between R&D, innovation and other business activities – with specific examples for different industries. HMRC could adopt these examples, or develop its own, but in either case the specific examples illuminating the edge cases would help companies to know what is eligible and help HMRC enforce compliance in line with the specific examples.

Having well-defined boundaries between what activities can be claimed as R&D and what cannot likely result in lower claims, as under the current broad guidelines it can be difficult for HMRC to argue that activities aren't R&D. But the stricter definition of R&D activity would also incentivise more innovative behaviour from firms which deliver greater spillover effects. As stricter guidelines force firms to invest in cutting-edge research and development in order to qualify for the credit as opposed to claiming for less innovative activities as they might do now.

Recommendation 3: HMRC should update guidance with industry-specific examples of what activities are eligible, and ineligible, for R&D tax credits. This would reduce the need for R&D tax consultants and help HMRC enforce compliance.

4. Tax consultancy must be regulated

The R&D tax credit reforms planned for April 2023 include a provision that 'claims will need to include details of any agent who has advised the company on compiling the claim'.⁴⁵ This will help the government identify rogue agents that are consistently inflating claims, but it does not go far enough.

Two thirds of tax-agents are members of a professional body that sets standards for their members.^a These bodies uphold professional standards through codes of conduct and ethics, as well as enacting complaints and disciplinary processes in cooperation with HMRC. The bodies ensure adherence to professional standards through both desk-based reviews and practice visits.⁴⁶ These professional bodies are also responsible for supervision of their members' adherence to certain regulations such as Anti-Money Laundering (AML) legislation – agents that are not members of a professional body are supervised by HMRC.

Seven professional bodies jointly produce the Professional Conduct in Relation to Taxation (PCRT) which is endorsed by HMRC and sets out fundamental principles and standards for tax planning,

^a Examples of these bodies include: Association of Chartered Certified Accountants, Association of Taxation Technicians, Institute of Chartered Accountants, Chartered Institute of Taxation

which members of the professional bodies must adhere to.^b The principles include professional competence, confidentiality, integrity and specific standards of practice, with ‘helpsheets’ containing further guidance and examples.⁴⁷

In order to protect firms that require tax advice, we propose that all tax consultants and tax accountants who wish to be named on R&D tax credit applications must hold membership of one of the seven professional bodies that adheres to the PCRT. This will ensure all R&D tax advice meets a minimum standard, and agents adhere to a code of practice. This will also reduce fraud by weeding out rogue tax consultants, and ease pressure on HMRC by shifting all AML compliance to the professional bodies.

This reform is supported by some tax professionals, for example, in a Parliamentary committee the Association of Accounting Technicians argued that “the risk represented by that current lack of regulation, manifested by HMRC’s own figures, in which it states that two-thirds of the instances of non-compliance errors, etc are down to the one-third of tax agents that are not regulated... we would contend that there is more that can be done by way of the ongoing work around the regulation of the tax advisory market that could help improve this situation.”

This would mean tax advisors were treated in a similar way to financial advisors in the UK. All financial advisors are regulated by the Financial Conduct Authority and must pass qualifications and meet requirements to ensure they are providing suitable advice.⁴⁸

In practice this would mean that, in addition to the Government’s proposed reform of including details of agents that have advised a company with their R&D tax credit claim, those agents would have to be registered members of one of the bodies that adheres to the PCRT and provide their membership number with the claim.

One potential negative consequence of this reform would be some unregistered agents may no longer be able to practice. The type of agents at risk would be those with significant experience, for example ex-HMRC employees, that have not taken the professional bodies’ exams, or micro-practitioners that deal with a specific area of tax advice, or work part-time, and are unlikely to be able to pass the entry requirements of the bodies which require more comprehensive knowledge of accounting and tax advice. In order to protect these practitioners, while also ensuring better oversight in the tax advice industry, there should be a provision to grandfather-in agents into a body that can provide oversight and ensure compliance but which can count current agents’ experience towards the entry requirements.

Reciprocal memberships through respected professional bodies abroad would allow professional tax accountants with international affiliations to continue to provide R&D tax credit advice to UK firms.

^b PCRT is produced by 7 professional bodies: the Association of Accounting Technicians (AAT), the Association of Chartered Certified Accountants (ACCA), the Association of Taxation Technicians (ATT), the Chartered Institute of Taxation (CIOT), the Institute of Chartered Accountants in England and Wales (ICAEW), the Institute of Chartered Accountants of Scotland (ICAS), and the Society of Trust and Estate Practitioners (STEP).

Recommendation 4: Tax agents named on R&D tax credit claims must be members of a regulatory body and adhere to a code of practice to reduce abuse of the schemes.

5. Improve transparency of R&D tax credit claims

HMRC publishes very little information on the substance of R&D tax credit claims. There is a single budget line for each tax credit scheme in HMRC's annual accounts, and data tables broken down by claim size, region and industrial sector. This high-level data limits the scrutiny that organisations can apply to the tax credits and the ability to use it for analysis of the UK's science ecosystem. Transparency in the actual research costs that businesses are claiming would be a great benefit to anyone working on UK R&D policy.

This is a particular problem for the Patent Box, where very little information is gathered and published by HMRC on the nature of the patents that are eligible for the relief and the activity undertaken to generate them. This needs to be addressed to help policymakers understand whether the Patent Box should be scrapped, maintained, or expanded.

Rather than reduce the amount of detail in tax credit statistics, as has been suggested in a recent consultation, HMRC should publish more details about *each* claim in their annual datasets. The enhanced reporting should include: the amount of R&D spending claimed, the location of the R&D activity down to the local authority level, the firm's industrial sector, a breakdown of costs (i.e. what proportion was spent on personnel, consumables, IT, subcontractors etc), and a one sentence description of the R&D project – following the example of InnovateUK project descriptions. This level of detail would protect the privacy of firms while providing valuable data for analysis of UK business R&D.

Recommendation 5: HMRC should provide more detailed data on the types of R&D businesses are doing, and which R&D costs make up the claims, to give a more detailed picture of the UK's R&D landscape.

Endnotes

- ¹ Bloom, Nick, Schankerman, Mark and Van Reenen, John (2013) Identifying technology spillovers and product market rivalry. *Econometrica*, 81 (4). pp. 1347-1393. ISSN 0012-9682
- ² Bloom, N. Van Reenen, J. Williams, H (2019) A Toolkit of Policies to Promote Innovation. *Journal of Economic Perspectives*, Volume 33, Number 3. Summer 2019. Pages 163-184
- ³ ABPI (2020) Technical report: raising UK productivity by including capex in R&D tax credits
- ⁴ HMRC (2021) Corporation Tax charge and rates from 1 April 2022 and Small Profits Rate and Marginal Relief from 1 April 2023
- ⁵ OECD R&D tax incentives database, 2021 edition
- ⁶ OECD (2013), "Definition, interpretation and calculation of the B index", *Measuring R&D tax incentives*.
- ⁷ Using the latest OECD figures - 2019
- ⁸ HMRC (2022), Research and development tax credits statistics 2022. RD2.
- ⁹ The Times (2022) Tax credit fraud is a 'major scandal', says peer. Wednesday 2nd November.
- ¹⁰ The Times (2022) 'Free money from HMRC': firms cash in on questionable tax credits. Saturday 29th October 2022.
- ¹¹ HMRC Annual Report and Accounts 2021-22
- ¹² Onward analysis of HMRC research and development tax credits statistics 2016-2021, table RD7.
- ¹³ HMRC Research and Development Tax Credits Statistics 2016-2022.
- ¹⁴ David Connell (2021) Is the UK's flagship industrial policy a costly failure? Cambridge University, Judge Business School.
- ¹⁵ ONS (2022) Comparison of ONS business enterprise research and development statistics with HMRC research and development tax credit statistics. 29 September 2022.
- ¹⁶ Onward analysis, using new figures from ONS (2022) Comparison of ONS business enterprise research and development statistics with HMRC research and development tax credit statistics. 29 September 2022.'
- ¹⁷ Richard Jones (2022) Soft Machines: Is the UK economy more R&D intensive than we thought?
- ¹⁸ OECD 2020 Main Science and Technology Indicators. GERD as a percentage of GDP.
- ¹⁹ McMorrow, Kieran; Röger, Werner (2009) : R&D capital and economic growth: The empirical evidence, EIB Papers, ISSN 0257-7755, European Investment Bank (EIB), Luxembourg, Vol. 14, Iss. 1, pp. 94-118
- ²⁰ M. Ugur, SA. Churchill, HM. Luong (2018) What do we know about R&D spillovers and productivity? Meta-analysis on heterogeneity and statistical power. Greenwich papers in political economy.
- ²¹ ForrestBrown. *R&D tax credits explained*.
- ²² G. Scott, T. Gilbert (2020) Evaluation of the Research and Development Expenditure Credit (RDEC). HMRC
- ²³ Shaan Devnani, Rohit Ladher, Nicholas Robin(2019) Evaluation of the Research and Development Tax Relief for Small and Medium-sized Enterprises. HMRC
- ²⁴ WPI Strategy (2021) Making the UK a science superpower: How enhanced R&D tax credits can support growth, jobs and levelling up
- ²⁵ ABPI (2020) Technical report: raising UK productivity by including capex in R&D tax credits
- ²⁶ COADEC (2019) Credit where credit's due: Reforming the R&D Tax Credit
- ²⁷ The Times (2022) 'Free money from HMRC': firms cash in on questionable tax credits. Saturday 29th October 2022.
- ²⁸ HMRC (2022) Consultation on changes to HMRC statistics publications.
- ²⁹ HMRC (2022) Research and Development Tax Relief reform
- ³⁰ Cecil Prescott (2021) GERD:R&D Funded by Business - Performed Overseas. ONS
- ³¹ J. Medhurst, J. Marsden, A. Jugnauth, M. Peacock, J. Lonsdale (2014) An economic analysis of spillovers from programmes of technological innovation support

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/288110/bis-14-653-economic-analysis-of-spillovers-from-programmes-of-technological-innovation-support.pdf

³² Patent Box relief statistics: September 2022

³³ Penny Simmons (2021) UK Patent Box 'not providing effective incentive' to life sciences SMEs. Pinsent Mason.

³⁴ GOV.UK, (2022) Intellectual property and your work. GOV.UK

³⁵ FSB (2018) Spotlight on Innovation

³⁶ HMRC (2021). Statistics on Uptake of the Patent Box. Patent Box.

³⁷ Grace Blakeley (2018) *Towards a fairer model for the corporate tax system*. The progressive policy ThinkTank

³⁸ Bloom, N. Van Reenen, J. Williams, H (2019) A Toolkit of Policies to Promote Innovation. *Journal of Economic Perspectives*, Volume 33, Number 3. Summer 2019. Pages 163–184

³⁹ PWC (2022) Life Sciences Superpower - growing the leading global hub in the UK. June 2022.

⁴⁰ GSK (2016) GSK announces significant new investment in UK manufacturing network. GSK

⁴¹ M. Rowe-Brown, H. James (2020) Patent Box Evaluation. HMRC.

⁴² Daniel Bunn (2022) Patent Box Regimes in Europe. Tax foundation

⁴³ ABPI (2020) Technical report: raising UK productivity by including capex in R&D tax credits.

⁴⁴ Jessica Garbett (2017) Loss makers get tax break for green efficiency. Whitefield Tax.

⁴⁵ HMRC (2022) Research and Development Tax Relief reform. GOV.UK

⁴⁶ HM Revenue & Customs Research Report 539 (2018) Role of professional bodies in the regulation of tax agents

⁴⁷ Professional Conduct in Relation to Taxation, 1 March 2019.

⁴⁸ Ministry of Defence (2020), Choosing a financial advisor. GOV.UK