Beyond the Golden Triangle:

Evaluating the impact of government R&D support on firm-level innovation inside and outside of the Oxford-Cambridge-London region

IRC Report No: 040

Executive Summary

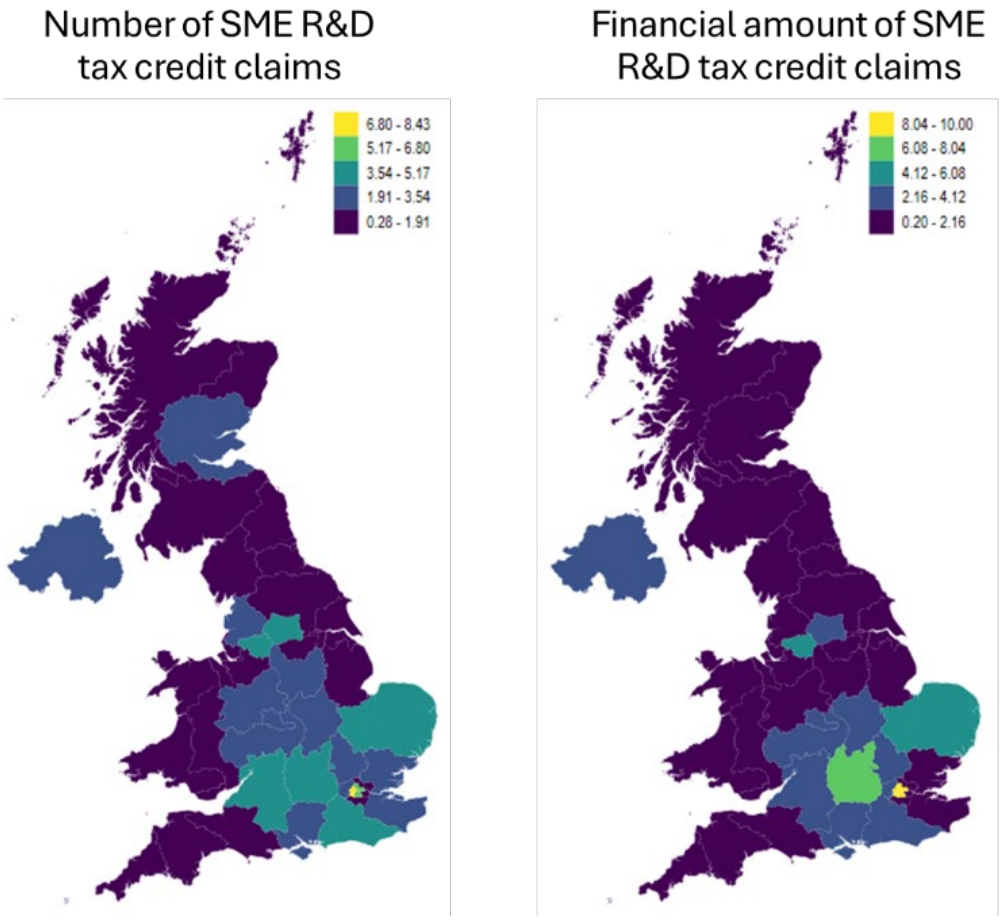
Background

This project examines the impact of Research and Development (R&D) tax credits on the innovation performance of Small and Medium-sized Enterprises (SMEs). The analysis focuses on comparing SMEs based in the UK's so-called 'Golden Triangle', located in the South-East of England between Oxford, Cambridge, and London, with SMEs based in the UK's other regions. We examine whether the effectiveness of R&D tax credits for SMEs is significantly influenced by being located in the Golden Triangle. We focus on the Golden Triangle because significant research shows it has received a disproportionally large and sustained level of public R&D investment over several decades. This has developed a critical mass of R&D infrastructure such as Universities, science labs and clusters of high-tech firms, which is largely unavailable to firms in other UK regions.

Firms based in the Golden Triangle may be able to combine these unique location-specific advantages with the support provided through R&D tax credits to achieve superior innovation performance. A key concern for policy is that this may place firms in the UK's other regions at an implicit disadvantage, inadvertently widening regional R&D inequality. As shown in Figure 1, R&D tax credit claims for SMEs are highly concentrated in the geographical area broadly defined as the Golden Triangle. According to Figure 1, not only do many more SMEs submit R&D tax credit claims in the Golden Triangle, but the value of these claims is much higher.

Notwithstanding this concern from a policy perspective, evidence on the region-specific effectiveness of R&D tax credits is currently lacking. This is a significant gap in knowledge for the UK research and innovation system. R&D tax credits are by far the largest R&D support targeted at firms, accounting for approximately £7 billion per year. For scale, this

equated to approximately 14% of total UK business expenditure on R&D (£50 billion in 2023). In terms of the industrial base, we focus on SMEs because much research argues that they are a key engine of radical innovation within the UK economy, as they seek to challenge larger incumbent firms and compete internationally. However, previous studies also highlight that SMEs face the most acute obstacles to innovation and are thus a key target for R&D policy support.



Source: HMRC Research and Development Tax Credits Statistics 2023. Note: The R&D tax credit claim amount for Inner London West is capped at 10, as this is a significant outlier which distorts the rest of the map (the true number is 16.7).

Figure 1: Number and financial amount of SME R&D tax credit claims by NUTS2 region

Findings

The project uses detailed data on SMEs from the UK's Longitudinal Small Business Survey (LSBS), collected annually by the Department for Business and Trade (DBT). Through thorough econometric analysis, our results show that:

- SMEs located in the Golden Triangle do not derive any significant additional innovation benefit simply by virtue of their location (i.e. overall innovation performance is similar for SMEs both within and outside of the Golden Triangle).
- In the UK overall, R&D tax credits are highly effective at driving SME radical innovation (i.e. both within and outside of the Golden Triangle).
- Importantly, R&D tax credits are more effective at driving radical innovation for SMEs within the Golden Triangle, relative to SME R&D tax credit recipients located in other UK regions (i.e. while the impact is positive throughout the UK, it is significantly higher in the Golden Triangle).

These results suggest that R&D tax credits are a highly effective Government R&D support for achieving desired policy outcomes. The fact that the impact occurs for radical innovation in SMEs is particularly important, as this is a key policy target which supports a competitive and resilient research and innovation system. Considering that the positive effects of R&D tax credits vary significantly by region highlights the importance of innovation policy that embeds a focus on clustering and agglomeration.

Actionable insights for policy

At approximately £7 billion per year, the UK's R&D tax credit programme costs a significant amount for the public purse in terms of tax receipts forgone. It has also come under criticism for the occurrence of fraud and error, where firms submit tax relief claims for activities other than those strictly defined as R&D. Issues such as these motivate calls to reduce the level of support available through the R&D tax credit, and/or make the process of claiming R&D tax credits more rigorous for firms (e.g. through more detailed audit checks). The findings from our research suggest that these calls may be misplaced, and should be handled with great care. Our analysis shows that, on average, R&D tax credits are highly effective at driving SME radical innovation. Increasing the complexity of the claiming system, or reducing the level of support, could jeopardise these positive and hard-to-achieve policy outcomes.

Our results for R&D tax credits in the Golden Triangle seem to confirm a suggestion which is prominent in previous academic studies and policy reports: SMEs located in the Golden Triangle can leverage location-specific advantages to supercharge the effectiveness of Government R&D support, in a way that is not available to SMEs located in other UK regions. SMEs located outside of the Golden Triangle may require specific tailored policy

interventions which enable them to leverage local advantages, as well as compensating for certain key factors which are unavailable in their local context.

Notwithstanding this key point, the positive aspatial benefits of R&D tax credits should be appreciated in the UK research and innovation system. When our results are considered in combination with data on UK regional R&D investment patterns (see Figure 1), the following insights become clear:

- The number of R&D-active SMEs located outside of the Golden Triangle is lacking.
- For the relatively small number of R&D-active SMEs in these 'other' regions, their R&D spending is relatively low compared to SMEs in the Golden Triangle.

In this context, an additional key role for policy appears to be the following:

- Increasing the number of R&D-active SMEs located outside of the Golden Triangle, so they can benefit from R&D tax credit claims, as our results show this is a highly effective R&D support.
- Developing the R&D capacity of the already R&D-active SMEs located in the UK's other regions, so that they can claim R&D tax credits to the same level as SMEs located in the Golden Triangle.

This suggestion is based on a combination of our results, and the data underpinning Figure 1, which shows that 56% of the total cost of R&D tax credit claims takes place in the Golden Triangle. These points can be interpreted as meaning that while all firms derive an R&D and innovation benefit from the highly effective R&D tax credit programme, firms in the UK's other regions do not derive the same level of benefits as firms operating in the Golden Triangle. A key means of inducing SMEs in non-Golden Triangle regions to become R&D active and increase their R&D investments to a sufficient level may be through targeted R&D grants, that have a specific goal of building place-based R&D capacity. Targeted R&D grant programmes can embed place-based policy into their design, and focus on SMEs outside of the Golden Triangle in an effort to close regional R&D performance gaps.

Now that you have read our report, we would love to know if our research has provided you with new insights, improved your processes, or inspired innovative solutions.

Please let us know how our research is making a difference by completing our short feedback form via this link.

You are also welcome to email us if you have any questions about this report or the work of the IRC generally: info@ircaucus.ac.uk

Thank you

The Innovation & Research Caucus

Authors

- Dr Kevin Mulligan (PI) – Queen's University Belfast
- Dr Ammu George – Queen's University Belfast
- Prof Justin Doran – University College Cork
- Dr Karen Bonner – Ulster University

Acknowledgements

This work was supported by Economic and Social Research Council (ESRC) grant ES/X010759/1 to the Innovation and Research Caucus (IRC)

About the Innovation and Research Caucus

The IRC supports the use of robust evidence and insights in UKRI's strategies and investments, as well as undertaking a co-produced programme of research. Our members are leading academics from across the social sciences, other disciplines and sectors, who are engaged in different aspects of innovation and research system. We connect academic experts, UKRI, IUK and the ESRC, by providing research insights to inform policy and practice. Professor Tim Vorley and Professor Stephen Roper are Co-Directors. The IRC is funded by UKRI via the ESRC and IUK, grant number ES/X010759/1. The support of the funders is acknowledged. The views expressed in this piece are those of the authors and do not necessarily represent those of the funders.

Find out more

Contact: info@ircaucus.ac.uk

Website: https://ircaucus.ac.uk/