

Policy Briefing

Estimating policy mix effects: Grants and tax credit complementarities for R&D and innovation outcomes

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Governments provide support to private sector R&D and innovation through a range of policy schemes including direct R&D grants and indirect R&D tax incentives. As a result, firms receiving support often benefit from a 'policy mix' of interacting policy instruments. These interactions could be either synergistic, neutral, or even lead to a reduction in the potential effect of the individual policies. Here, using data from the UK innovation survey we explore the input and output additionality of policy-mix allowing for potentially different effects for different group of firms.

Key findings

We consider the input additionality on R&D and the output additionality effect on innovation of grant support only, tax credit only and a policy mix of both types of support. Key findings are:

- There is strong evidence of input additionality from each type of public support but also some attenuation or substitution effects between the input additionality of grants and tax-incentives.
- Innovation output additionality is consistently positive from tax-incentive-only, and the related policy-mix. However, grant-only output additionality effects are notably smaller in scale and statistically much weaker. Here, there is also complementarity between tax and grant measures leading to stronger policy-mix output additionality.
- Input additionality effects are consistently larger – 2-3 times – the scale of output additionality effects.
- The relationship between input and output additionality varies between groups of firms: input (output) additionality is stronger (weaker) among low productivity firms, while input (output) additionality is weaker (stronger) in high productivity enterprises.

Authors



Rita Nana-Cheraa

The Productivity Institute
Warwick Business School
Rita.Nana-Cheraa.1@wbs.ac.uk



Stephen Roper

Enterprise Research Centre
and Warwick Business School
Stephen.roper@wbs.ac.uk



Kevin Mole

Enterprise Research Centre
and Warwick Business School
Kevin.Mole@wbs.ac.uk

Examining policy mix effects

Previous studies either tend to consider input or output additionality in isolation providing little insight into relative levels of additionality, and whether any innovation input additionalities firms achieve are translated into enhanced innovation outputs. Our analysis is based on a pooled sample from three cross-sectional waves of the UK Innovation Survey (UKIS) which had been merged with the Business Structure Database. This data provides information on public R&D and innovation supports relating to direct R&D grants and indirect R&D tax incentives.

The study sample consist of over 42,000 observations for which 94.6% are non-public support recipients, 3.3% received tax-incentives-only, 0.9% received grant-only, while 1.2% received both tax and grant support. Three policy effect outcomes are considered: Investment in internal R&D (input additionality), and product and process innovation (output additionality). The identification strategy is based on propensity score matching with coarsened exact matching.

Sample sub-groups findings suggest input additionalities are strongest in lower productivity firms although these firms then struggle to generate significant output additionalities. Also, while each of the three policies has a positive and significant R&D investment additionality regardless of firm size, the effect of both tax-incentives-only and grant-only is higher for small firms.

Policy and evaluation implications

We find strong evidence of heterogeneity in policy effects suggesting that 'average' estimates of additionality effects may provide a misleading indication of additionality profiles for different types of firms. Moreover, our results suggest that policy evaluation or targeting based on input additionality alone may significantly over-estimate or misrepresent long-term policy benefits (which may also be different for alternative groups of firms). And, finally interactions between policy measures also suggest the difficulty of evaluations based on single policy instruments.

Full paper link:

<https://www.enterpriseresearch.ac.uk/our-work/publications/>