Assessing the impact of business engagement with publicly funded science

Bettina Becker[a], Stephen Roper[b] and Enrico Vanino[a]

[a] Enterprise Research Centre and Aston Business School, Aston University, Birmingham, B4 7ET
[b] Enterprise Research Centre and Warwick Business School, University of Warwick, Coventry, CV4 7AL
b.becker@aston.ac.uk; stephen.roper@wbs.ac.uk; e.vanino@aston.ac.uk

Through its publicly funded Research Councils the UK invests around £1.7bn annually in supporting scientific research. This investment is set to increase sharply in future years as the Industrial Strategy Challenge Fund is steadily expanded to £2bn in 2020. To date, assessments of the impact of this public investment have been partial and largely case-based. Where quantitative assessments of impact have been attempted they have often relied on the limited information of innovation surveys or focussed on specific elements of the public science system. Several previous studies add to the substantial evidence from a range of countries on the positive role of research grants, subsidies and tax credits in helping firms to innovate successfully (Zuniga-Vicente et al. 2014).

In our study we analyse for the first time the comprehensive effect of public support to innovation, assessing the impact of engaging with publicly-funded research grants on the performance of UK firms. We draw on funding and partnership data from Gateway to Research which provides information on funding provided by all of the UK Research Councils over the 2004 to 2016 period as well as the characteristics of the partners involved in each research project. Data on business performance is taken from the Business Structures Database which provides longitudinal data on business performance for all UK firms in terms of employment, turnover and productivity growth.

Our study responds to the call by (Scandura 2016) for more extensive research on the performance effects of publicly funded scientific research. We extend the existing evidence base in several ways. First, we provide the first comprehensive assessment of the business impacts of public science investments in the UK. Second, as we have data from each of the Research Councils we are able to compare the impact of firms' engagement in basic science projects funded by different organizations. Third, we are also able to explore the potential continuous effect of engagement, according to the value of research grant received. Fourth, we are able to compare levels of impact between sectors, firm size bands and regions. Finally, thanks to the longitudinal data on both firm performance and engagement with the publicly funded science system, we are able to assess time lags between firms' engagement with the science system and any impacts on firms' growth in the short, medium and long term.

We employ a difference-in-differences propensity score matching technique to analyse the differences in performance between almost 10,000 UK firms who received publicly-funded research grants and a matched comparator group of firms which received no support. Comparing their performance before and after the award of the research grants we are able to estimate the causal effect of publicly-funded research grants on the performance of firms, taking into account the endogenous factors influencing the decision and the self-selection of firms into this kind of R&D support. Our findings show that receiving a research grant has on average a positive impact for employment and turnover growth. Employment grows faster both in the short and in the medium term, while turnover and labour productivity growth effects are stronger in the medium term, suggesting a time lag between the grants award and the ability of firms to commercially exploit the outcome of their R&D activity. Moreover, we find that the impact of publicly-funded research grants is stronger for manufacturing firms, in particular for high-tech manufacturing companies compared to low-tech manufacturing and other services firms. The positive impact is also incremental as the overall value of the grant increases.

References:

Scandura, A. 2016. University–industry collaboration and firms' R&D effort. *Research Policy* **45:1907-1922**.

Zuniga-Vicente, J.A.; C. Alonso-Borrego; F.J. Forcadell; and J.I. Galan. 2014. ASSESSING THE EFFECT OF PUBLIC SUBSIDIES ON FIRM R&D INVESTMENT: A SURVEY. *Journal of Economic Surveys* **28:36-67**.