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Value for money? New microeconometric evidence on public R&D grants in Flanders☆

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ABSTRACT

A significant amount of money is spent on programs to stimulate innovative activities. In this paper, we review the effects of a specific government-sponsored commercial R&D program from various angles. We start by evaluating whether we find positive effects of subsidies on R&D investment and R&D employment. Then, we analyze how the observed effects of subsidies on R&D intensity and employment vary over time, vary if the firm receives also support from other sources, vary depending on how many supported projects a single firm has at the same time or vary if a firm gets support consecutively. Finally, we estimate the macroeconomic impact of these grants in terms of R&D employment. We conclude that (i) the policies are not subject to full crowding out, (ii) the treatments effects are stable over time, (iii) receiving subsidies from other sources in addition to the program under evaluation does not decrease the estimated treatment effect, and (iv) receiving grants repeatedly does not decrease the magnitude of the treatment effects either. Using a back-of-the envelope calculation, we estimate that, on average, five R&D jobs are created (or maintained) per supported project in the Flemish economy.

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1. Introduction

The impact of subsidies on firms' innovative behaviour has been of interest in economic literature for many years now. In line with this literature, we are interested in knowing what the effect of one specific instrument is on firms' R&D intensity and R&D employment, namely the effect of subsidies for R&D from the Flemish government (northern part of Belgium). We employ econometric treatment effects models for estimating the treatment effect on the treated. As studies like this are nowadays more or less standard in the scholarly literature and even in policy practice, we go beyond the typical application of treatment effects models. Usually scholars estimate a treatment effect on the treated (see e.g. the survey by Cerulli, 2010), and then conclude whether a subsidy program is subject to full or partial crowding out effects. In this present study, we add a number of further tests that are of interest for policy makers in their daily decision making. The analyses presented in this paper are based on detailed discussions that the authors had with the representatives of the public agency administering the innovation policy instruments in Flanders, the "IWT Vlaanderen". In particular, the policy makers were interested in the following questions: Knowing from earlier evaluations that the estimated treatment effects are positive (see Aerts and Czarnitzki, 2006), it has been of primary interest whether

- the estimated treatment effects vary over time;
- the receipt of subsidies from other sources on top of IWT grants reduces the effect of the local policy program;
- funding the same firm repeatedly creates an increased risk of crowding out effects;
- and whether granting multiple projects to the same recipient firm in the same time period increases the risk of (partial) crowding out.

In addition to the questions mentioned above we also show that the treatment effects remain stable across different samples of firms i.e. using

i. a representative sample of firms in the Flemish economy (the "full sample")
ii. a subsample of firms that at least indicated some propensity to innovate (the "sample of innovators")

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iii. a subsample of small and medium-sized firms, as a popular subscheme in Flemish innovation policy is a program foreseen for grants distributed to small and medium-sized firms (the "KMO program").

As we have quite detailed information on innovation project grants in Flanders, we are also able to conduct a back-of-the-envelope calculation on how many R&D jobs are created in the Flemish economy because of subsidies to the business sector.

The following section will provide an overview on the institutional background and functioning of the funding agency. Section 3 reviews the existing literature and the undermining theory. In Section 4, we present the econometric method. Section 5 provides information on the data. Section 6 shows the econometric results and Section 7 provides information on the macroeconomic effect of the Flemish innovation policy on the Flemish economy. Section 8 concludes.

2. Institutional background[1]

2.1. The IWT

The agency for Innovation by Science and Technology in Flanders ("Innovatie door Wetenschap en Technologie in Vlaanderen" (IWT)) is a governmental agency, established by the Flemish Government in 1991. It was established to give shape to the new competences in science and technology that were transferred from the federal to the regional governments in Belgium. Since this transfer of competences made of innovation policies a regional matter, the IWT has been created as the key organization for support and promotion of R&D and innovation in Flanders. In addition to offering Flemish companies and research centres financial support, advice and a network of potential partners in Flanders and abroad, it also supports the Flemish Government in defining and adapting its innovation policy.

The total funding of the IWT amounted to € 297 million in 2008. The scope of existing funding programs is quite broad, including industrial R&D projects, EUREKA-projects, feasibility studies and innovation projects for SME's, support to industrial networks (sectoral research, technological advisory services, innovation stimulation), support to universities for strategic basic research (SBO), support to higher education engineering schools for technology diffusion actions, individual grants for PhD and post-doc research, support to universities for exploitation of their R&D-results and to larger "ad hoc" initiatives as decided by the Flemish government.

In its competence of also coordinating regional innovation initiatives such as regional development agencies, technological advisory services, sectoral research centres and industrial federations, the IWT can be viewed as both, a program owner (in close co-operation with the Flemish Minister of Innovation) and a program manager (selection and follow-up of research and innovation projects).

2.2. Funding by the IWT

IWT's funds for supporting R&D and innovation are directed to small as well as to large companies, universities, third level education institutions and other Flemish innovative organizations, individually or collectively. A wide range of activities is supported through this financial support, including feasibility studies, research and development projects for companies, strategic basic research and grants for research institutions and researchers, network projects and translation research for intermediary organizations.

Every year, some 600 companies benefit from IWT support (overall support, all measures cumulated). While in the past it was mainly manufacturing companies that have solicited the support of the IWT, nowadays, service providers are more and more represented.

In order to encourage smaller firms to perform R&D, a special program for SMEs has been put in place (the "KMO programma"). The maximum project cost a firm can submit under this program is € 200,000. Of these total project costs, the maximum subsidy rate is of 35% for a medium-sized company, and an extra 10% (hence 45% of the total project costs) for a small-sized company. If an SME collaborates with a public research institute or an international partner, it can submit a proposal of a maximum of € 250,000. If it collaborates with another firm (nationally), it can get 10% top-up in the subsidy rate.

Besides the KMO program, the IWT has the R&D program. In the latter, the basic subsidy rate that is of 15% for development and 40% for research. Furthermore, additional 10% are available for medium-sized enterprises and 20% additional support for small firms. Further support may be granted to projects that meet specific policy targets, like e.g. the promotion of sustainable technological development or cooperation with research institution. Finally, an extra 10% of support may be granted to projects involving substantial collaboration of several companies, provided that at least one is an SME or that the project entails an international cooperation. The general feature of the IWT subsidy scheme is its bottom-up character: it is a permanently open and non-thematic scheme.

With regards to the evaluation procedures, the IWT has a well-developed set of procedures for project evaluation, based on internal and external referees to evaluate the ex-ante effectiveness of the project proposals.

Initially, the evaluation criteria were heavily focussed on the scientific qualities and technological risks of the project. Gradually however, the economic dimension became equally – or even more – important, reflecting the shift from a purely R&D policy towards a more innovation related policy focus. This economic evaluation doesn't only concern the financial feasibility of the project or the commercial prospects for the innovating firm but also the economic return 'for Flanders'.

As part of the IWT's evaluation, other 'societal' qualities of the project–mainly concerning environmental sustainable development – are also considered, though to a lesser extent than the economic criteria. The evaluation gives access to extra support in the form of a priority ranking across existing subsidy schemes and of a financial bonus of 10% on the project budget. Hence, project evaluation in Flanders is closely linked to general policy criteria in a bottom-up innovation policy design.

3. Theoretical premises and literature review

3.1. Theory

In economic literature, the impact of innovation policies – and particularly direct subsidies for R&D – on firms' innovative behaviour has been of interest for many years now. The economic justification for governmental intervention for private sector R&D activities relies on the familiar market failure arguments (Arrow, 1962). Given these market failure arguments, most governments in industrialized economies attempt to correct them by designing policies, like for instance intellectual property right systems to improve appropriability of knowledge, tax reliefs to reduce the cost of R&D (see Hall and Van Reenen, 2000), direct subsidy programs

[1] The background information and stylized facts stem from Larosse (2004), http://www.eurotransbio.eu and www.iwt.be.

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