Do Targeted R&D Grants towards SMEs Increase Employment and Demand for Skilled Labor?

Sven-Olov Daunfeldt, Daniel Halvarsson, Patrik Tingvall & Alexander McKelvie
The puzzle

• A small number of new ventures and innovative small- and medium-sized enterprises (SMEs) account for a large share of net job creation and productivity growth in the economy (Wong et al., 2005 Henrekson and Johansson, 2010).

• However, due to a lack of financial resources or competitive elements, many SMEs are not able to survive their first years of operations (Nightingale and Coad, 2014; Shane, 2009).

• Targeted R&D grants have been brought forward as part industrial policy for most governments in Europe (Becker, 2015) to handle market failures and stimulate the growth of R&D-intensive SMEs.

• However, previous results on the employment effects of targeted R&D grants are inconclusive and most studies have data-, measurement-, and selection problems, which makes it difficult to construct a relevant control group of non-treated firms.
We want to investigate the effects of two Swedish government support programs targeted towards innovative SMEs. Both programs are designed to facilitate innovative activities and promote the long-run growth of the targeted companies.

The research questions that we try to answer are:

(i) Do these programs increase the number of employees in the targeted SMEs?

(ii) Do these programs increase the number of employees that have completed a higher education?
The selection problem

- Because selective grants are designed to target specific firms, any observed effects on the outcome of the targeted firms can equally well be a result of the selection process, rather than the effectiveness of the grant.

- Matching methods are typically used to overcome such selection issues, but they require longitudinal data on both treated and non-treated firms that enable researchers to construct appropriate control groups.

- Such longitudinal data on targeted R&D grants have until recently not been available.
Data

- We have access to the Micro Database over Government Supports to Private Business (MISS), which is a comprehensive dataset on government support programs that is compiled by the Swedish Government Agency for Growth Policy Analysis.

- The dataset includes a firm identification number, making it possible for us to merge MISS with a matched register-based employer-employee dataset from Statistics Sweden covering all limited liability firms (and their employees) in Sweden.

- We investigate the effects of two R&D programs, *Vinn Nu* and *Forska & Väx*, both targeted towards innovative SMEs with the explicit aim of promoting growth in number of employees and innovative activities.

- The programs are governed by Vinnova, a Swedish government agency under the Ministry of Enterprise and Innovation.
Table 1. Number of supported projects and average subsidy (SEK), VINN NU and Forska & Väx, 2002-2010.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of supported projects</th>
<th>Average subsidy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VINN NU</td>
<td>Forska &amp; Väx</td>
</tr>
<tr>
<td>2002</td>
<td>5</td>
<td>300 000</td>
</tr>
<tr>
<td>2003</td>
<td>16</td>
<td>193 977</td>
</tr>
<tr>
<td>2004</td>
<td>5</td>
<td>125 000</td>
</tr>
<tr>
<td>2005</td>
<td>19</td>
<td>211 111</td>
</tr>
<tr>
<td>2006</td>
<td>18</td>
<td>150</td>
</tr>
<tr>
<td>2007</td>
<td>18</td>
<td>65</td>
</tr>
<tr>
<td>2008</td>
<td>12</td>
<td>45</td>
</tr>
<tr>
<td>2009</td>
<td>14</td>
<td>165</td>
</tr>
<tr>
<td>2010</td>
<td>18</td>
<td>121</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>109</td>
</tr>
</tbody>
</table>
Three identification strategies

I. Identification of the effect of the treated over time (i.e. only firms that received a subsidy).

II. Identification of the effect of the treated when compared to a control group of similar firms that did not receive any subsidies. We rely on the matching methods of Coarsened Exact Matching (CEM), developed by Iacus et al. (2011, 2012), which has several advantages compared to the more commonly used Propensity Score Matching (PSM) (see e.g. King and Nielsen, 2016).

III. Identification of the effect of the treated when compared to the average outcome for all firms.
Regression model

DiD: \[ Y_{i,t}^{L} = \alpha + \mathbf{X}_{i,t} \mathbf{\beta} + T_t + \mu_i + \gamma(Grant)_{i,t} + \theta(Post)_{i,t} + \epsilon_{i,t} \]

Model Post-support effect

Note that different dependent variables require different models

Labor demand (Cahuc and Cylberg, 2004):

- \( \log L_{i,t} = \alpha_i + \beta_L \log L_{i,t-1} + \beta_w \log w_{i,t} + \beta_K \log K_{i,t} + \beta_{VA} VA_{i,t} + \epsilon_{i,t} \)

Demand for skilled labor (Hansson, 2000):

- \( \Delta \theta_{i,t}^H = \alpha + \beta_{wH/wL} \Delta \log w_H/w_L + \beta_K \Delta \log K_{i,t} + \beta_O \Delta \log O_{i,t} + \epsilon_{i,t} \)
Post-treatment effect of R&D grant on labor demand over firm size

---

Marginal effect

95% ki
Post-treatment effects of R&D grant on labor demand

- Labor demand
- 95% Cis
Post-treatment effect of R&D grant on demand for highly educated employees over firm size

![Graph showing the post-treatment effect, by firm size, 95% CIs, DiD estimation. The x-axis represents ln(sales) ranging from 4 to 12, and the y-axis represents the marginal effect on relative demand for labor ranging from -0.06 to 0.02. The shaded area represents the 95% confidence intervals, indicating the effect size and its variability across different firm sizes.](image)
Post-treatment effects of R&D grant on demand for highly educated employees
Conclusions

• We have investigated the effects of R&D grants that are designed to increase employment and facilitate the recruitment of key competences in SMEs. Our most striking result is the absence of positive and statistically significant effects.

• The lack of significant effects are troublesome considering that these R&D grants need to produce positive effects to cover the administrative costs that are associated with these programs.

• When the expected return of engaging in non-productive entrepreneurship is high, entrepreneurs might also use time and resources to apply for government firm support programs instead of developing their businesses (Baumol, 1990).

• The lack of significant results points toward the challenges involved in using targeted R&D grants as a way of promoting future growth among SMEs.