Are high-growth firms overrepresented in high-tech industries?

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Andel av totalt jobbskapande

10% accounts for 89% of all jobs created

1% accounts for 53% of all jobs created

Targeting HGFs?

• European Commission (2010) mentions support for high-growth small and medium-sized enterprises (SMEs) as a political objective in its Europe 2020 strategy, highlighting the share of fast-growing, innovative firms as a key indicator to measure the strategy’s progress.

• Shane (2009) states that because most start-ups have no growth ambitions and a large majority of them will not survive, policies should instead target HGFs. His (only) suggestion is to provide more financial incentives for small firms to undertake R&D.

• Many policies for promoting growth in HGFs are strongly biased toward high-technology sectors, typically defined as industries with a high degree of R&D intensity, indicating that policymakers view high-tech industries as the main generators of HGFs (Mason & Brown, 2013).

• Whether HGFs have a higher presence in high-tech industries is thus important from a public policy perspective.
Our contribution

• HGFs seem to exist in most industries and are not necessarily synonymous with high-tech firms (Brännback et al., 2010; Henreksson & Johansson, 2010; Mason & Brown, 2013).

• If anything, HGFs seem to be overrepresented in service industries (Henreksson & Johansson, 2010).

• According to Buss (2002: p.18): “policy makers chase high-tech firms as a priority when other sectors might pose better opportunities.”

• However, this advice based on studies that generally consider a limited number of industries, apply restrictive firm size thresholds, and use a high level of industry aggregation.

• The question of whether HGFs are overrepresented in high-tech industries - or elsewhere - has yet to be satisfactorily answered. We try to fill this gap.
Hypotheses to be tested

H1: Ceteris paribus, HGFs will be more common in industries with greater R&D intensity.

H2: Ceteris paribus, HGFs will be more common in manufacturing industries with greater R&D intensity.

H3: Ceteris paribus, HGFs will be more common in service industries with more human capital.
Data

• All limited liability firms in Sweden are required to submit annual reports to the Swedish Patent and Registration Office (PRV).

• The data used in this study are collected from PAR, a Swedish consulting firm that gathers economic information from PRV.

• Our data thus comprise all Swedish limited liability companies active at some point between 1997 and 2008,

• We have access to information on firms’ R&D expenditures, i.e., the total amount spent on R&D annually, which we use to compute R&D intensity.
We define HGFs as the one percent of firms in the overall economy with the highest (absolute or relative) employment or sales growth over a three-year time period.

This yields:
Absolute employment-HGFs
Relative employment-HGFs
Absolute sales-HGFs
Relative sales-HGFs
Our dependent variable is the share of HGFs in an industry $i$, i.e:

$$SHGFs_i = \frac{\text{Number of HGFs}_i}{\text{Number of firms}_i},$$

where $SHGFs_i$ is measured at the 4-digit NACE industry level.

An industry has an overrepresentation of HGFs if the share of HGFs in the industry is higher than the share of HGFs in the overall population, i.e. more than 0.01 or 1 percent.

Control variables: Average firm age, standard deviation firm age, number of firms, number of employees, market concentration, exit and entry. All lagged by one period to avoid problems of simultaneity.
Model

- The share of HGFs in industry $i$ is a proportion bounded between zero and one. Makes linear regression unattractive, as it may yield fitted values that exceed the lower and upper bounds.

- Employ a logit transformation? However, this requires that the values of the prediction lie within the unit interval. Omitting 0s and 1s would lead to a truncation problem that risks biasing the results.

- Following the approach proposed by Papke and Woolridge (1996), we employ the logit link function (i.e., the logit transformation of the response variable) with the binomial distribution.

- In this fractional logit approach, the effective assumption is that 0s and 1s represent very low and very high proportions that "accidentally" result in a proportion of 0 or 1.

- Robustness check. OLS with robust standard errors yielded similar results.
## Results

Table. Fractional logit marginal effects. Robust z-statistics in parentheses.

<table>
<thead>
<tr>
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<th>Absolute employment-HGFs</th>
<th>Relative employment-HGFs (%)</th>
<th>Absolute sales-HGFs</th>
<th>Relative sales-HGFs (%)</th>
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<tbody>
<tr>
<td><strong>R&amp;D intensity</strong></td>
<td>-0.0010 (-1.55)</td>
<td>-0.0011* (-1.85)</td>
<td>-0.0045** (-2.06)</td>
<td>-0.0016*** (-3.38)</td>
</tr>
<tr>
<td><strong>High-tech</strong></td>
<td>0.0010 (0.22)</td>
<td>0.0077 (1.01)</td>
<td>0.0203*** (2.32)</td>
<td>-0.0063*** (-4.67)</td>
</tr>
<tr>
<td><strong>KIS</strong></td>
<td>0.0270*** (5.32)</td>
<td>0.0095** (2.25)</td>
<td>0.0185*** (3.75)</td>
<td>0.0025 (1.08)</td>
</tr>
</tbody>
</table>
Robustness checks

• We have information on mergers and acquisitions, enabling us to distinguish between organic and acquired growth. Results are not particularly sensitive to the inclusion of mergers and acquisitions.

• As robustness checks, we also define the dependent variable at the three- and five-digit levels. Results are similar, although the high-tech manufacturing dummy seems somewhat sensitive to aggregation.

• We used longer time periods and the 3% and 5% of firms with the highest growth when defining HGFs. Our results are robust to these changes.

• We also exclude industries with fewer than 30 employees and 100 employees, respectively, to investigate whether our results are driven by industries with small firms. Now, the coefficient for R&D intensity is only negative and significant when growth is measured in terms of sales. Otherwise, results are qualitatively similar.
In summary...

Our findings cast doubt on the wisdom of targeting R&D-intensive industries or subsidizing R&D in order to promote HGFs.

On the other hand, HGFs appear to be more prevalent in knowledge intensive service industries, contradicting the hypothesis that HGFs are equally common in all industries.

Human capital, rather than R&D, thus seems to be the crucial factor to explain the prevalence of fat tails in the growth rate distribution.
THANKS FOR LISTENING