The Heterogeneous Effects of R&D Tax Incentives and the Role of Policy Mix
Findings from the 1st phase of the OECD microBeRD project

R&D and Innovation Policies for the Marketplace
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Direct funding and federal tax support for business R&D, 2013 (% GDP)

Design and heterogeneity matters!

Example 1: R&D tax incentives in Portugal

1-B-Index by firm size and profit scenario

Design and heterogeneity matters!

Example 2: R&D tax incentives in Norway

1-B-Index by firm size and profit scenario

 Approaches to studying R&D tax incentives

- Firm-level single-country
- Aggregate cross-country
- Firm-level cross-country microBeRD
microBeRD: Distributed microdata approach

As seen on... Dynemp and Multiprod

Confidential national microdata

R&D survey data

Corporate tax data

Statistical code

Incentive design information

Non-confidential harmonized output

1. Moments of firm distribution ➔ micro-aggregated regressions
2. Firm-level distributed regressions
Micro-aggregated regressions

Methodology

• Country-size-industry-year

• Link R&D performance to user cost of R&D
  \[ \text{B-Index} \]

• Control for many other factors
  \[ \text{value added, country-industry-size FE, industry-year FE, size-year FE} \]
Micro-aggregated regressions

Estimated R&D user cost elasticities

- Implied gross incrementality ratios
  - Overall: 1.0
  - Small: 1.4
  - Medium: 0.9
  - Large: 0.4
Micro-aggregated regressions
Size or R&D performance?

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>By size</th>
<th>By average R&amp;D expenditure</th>
<th>By industry R&amp;D intensity</th>
<th>Horse race</th>
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</thead>
<tbody>
<tr>
<td>log intramural R&amp;D</td>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>log B-Index</td>
<td>-0.243*</td>
<td>-0.601***</td>
<td>-0.594***</td>
<td>-0.653***</td>
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<tr>
<td></td>
<td>0.141</td>
<td>0.072</td>
<td>0.079</td>
<td>0.176</td>
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<tr>
<td>x medium (50-249 emp.)</td>
<td>-0.431**</td>
<td>0.184</td>
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<td>0.101</td>
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<td></td>
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<td>0.223</td>
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<tr>
<td>x small (10-49 emp.)</td>
<td>-0.725***</td>
<td>0.197</td>
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<td>0.067</td>
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<td>0.265</td>
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<tr>
<td>x initial mean(R&amp;D)</td>
<td></td>
<td>0.484***</td>
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<td>0.495***</td>
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<td>0.068</td>
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<td>0.111</td>
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<tr>
<td>x initial industry R&amp;D/VA</td>
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<td>0.342***</td>
<td>0.044</td>
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<td>0.128</td>
<td>0.127</td>
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<td>N</td>
<td>5355</td>
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<td>5355</td>
<td>5355</td>
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</tbody>
</table>

**Note:** All regressions control for log(value added), country-industry-size FE, industry-year FE and size-year FE. Standard errors clustered at country-industry-size level. Countries: AUS, AUT, BEL, CHE, CHL, CZE, DEU, ESP, FRA, ISR, ITA, JPN, NOR, PRT, SWE.
Among existing & new R&D performers

R&D capital and extramural R&D

No wage effects (part-time R&D employment)

Exp. development vs. research
3 types of DiD analysis

1. Tax relief beneficiaries vs. non-beneficiaries
   AUS, AUT, BEL, CHL, FRA, JPN, NOR, SWE

2. Tax incentive change: affected vs. non-affected firms
   AUS, BEL, CHL, CZE, FRA, NOR, PRT, SWE

3. Direct support beneficiaries vs. non-beneficiaries
   AUS, AUT, CHL, CZE, DEU, FRA, ITA, JPN, NOR, NZL, PRT, SWE

Methodology

Leveraging tax relief microdata
Firm-level regressions

Input additionality by country and method
What does this mean?

Input additionality
0.4 (large) vs. 1.4 (small)
(driven by level of R&D)

• Heterogeneity and design matter!

• R&D ceilings/thresholds likely to increase overall input additionality
  – But spillovers stronger for larger firms? (Bloom et al., 2013)

• How to incentivize large R&D performers?
  – Mission-oriented policies? Procurement?

Thank you

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