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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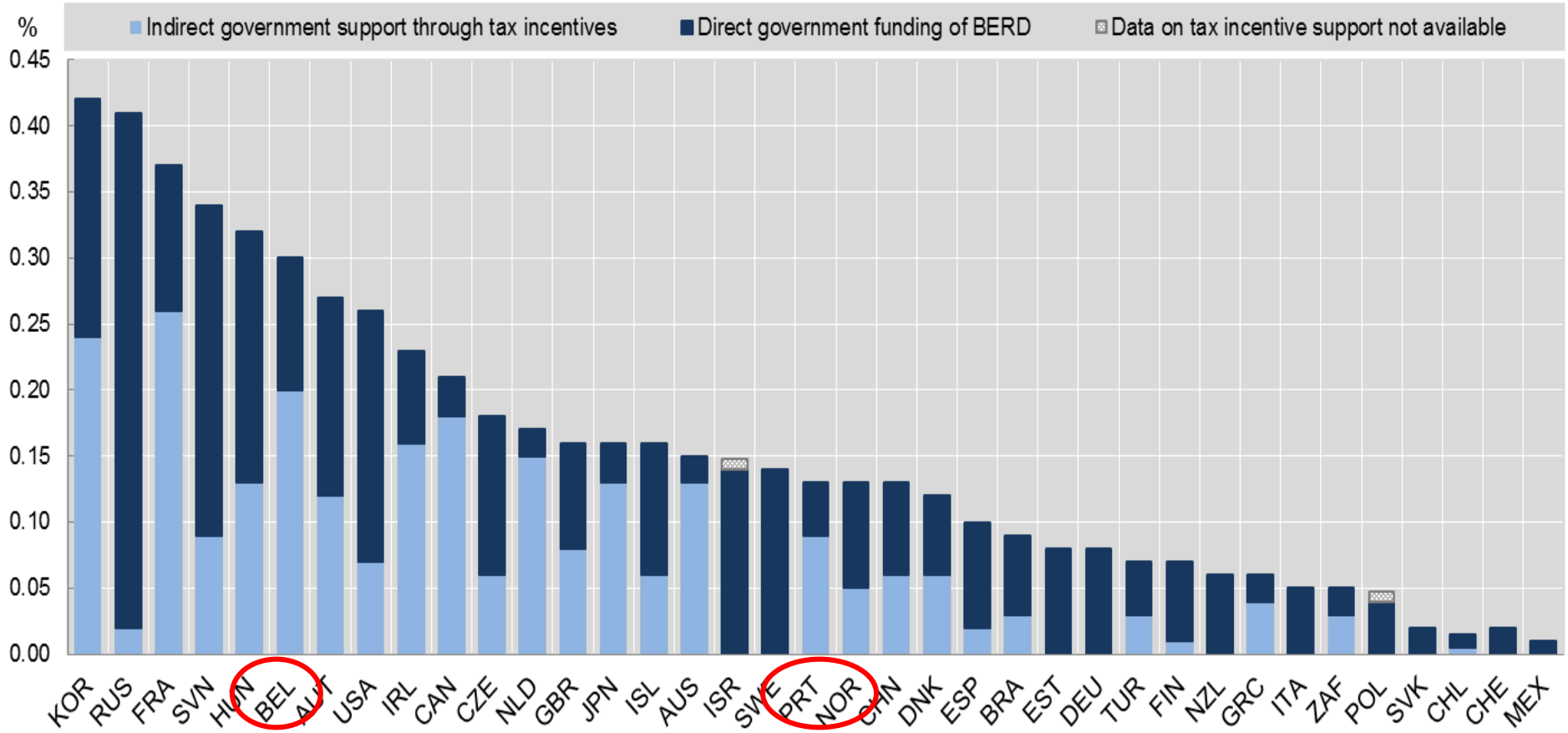
BETTER POLICIES FOR BETTER LIVES

R&D tax incentives matter!

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

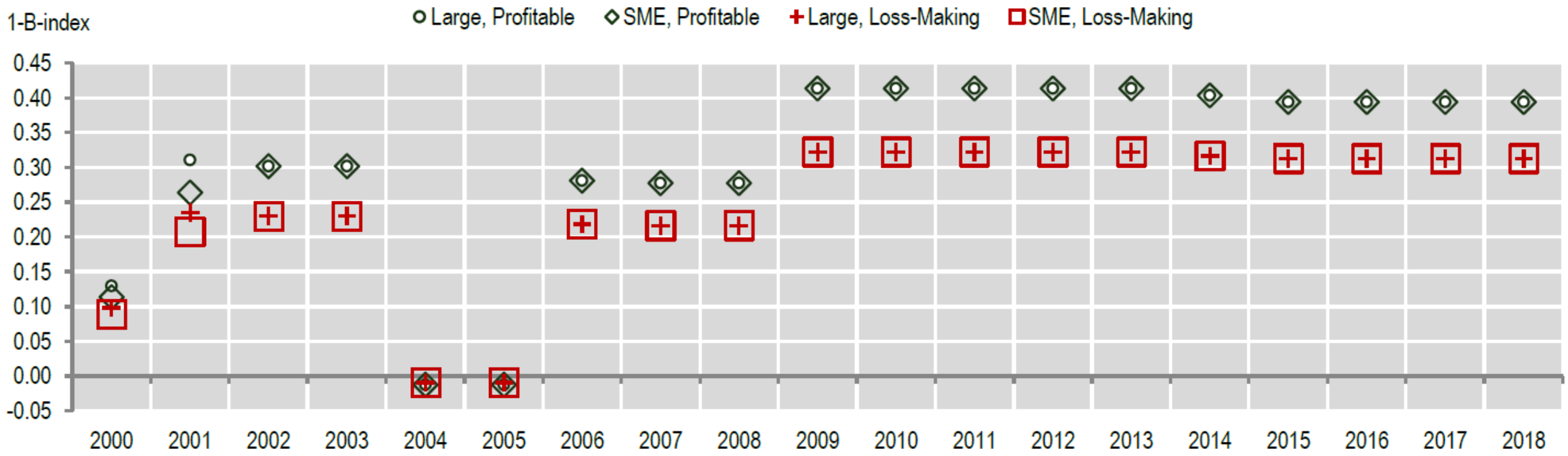


Source: OECD STI Scoreboard 2015, based on OECD, R&D Tax Incentive Indicators, www.oecd.org/sti/rd-tax-stats.htm and Main Science and Technology Indicators, www.oecd.org/sti/msti.htm, June 2015.Statlink: http://dx.doi.org/10.1787/888933274317.

Design and heterogeneity matters!

Example 1: R&D tax incentives in Portugal

1-B-Index by firm size and profit scenario

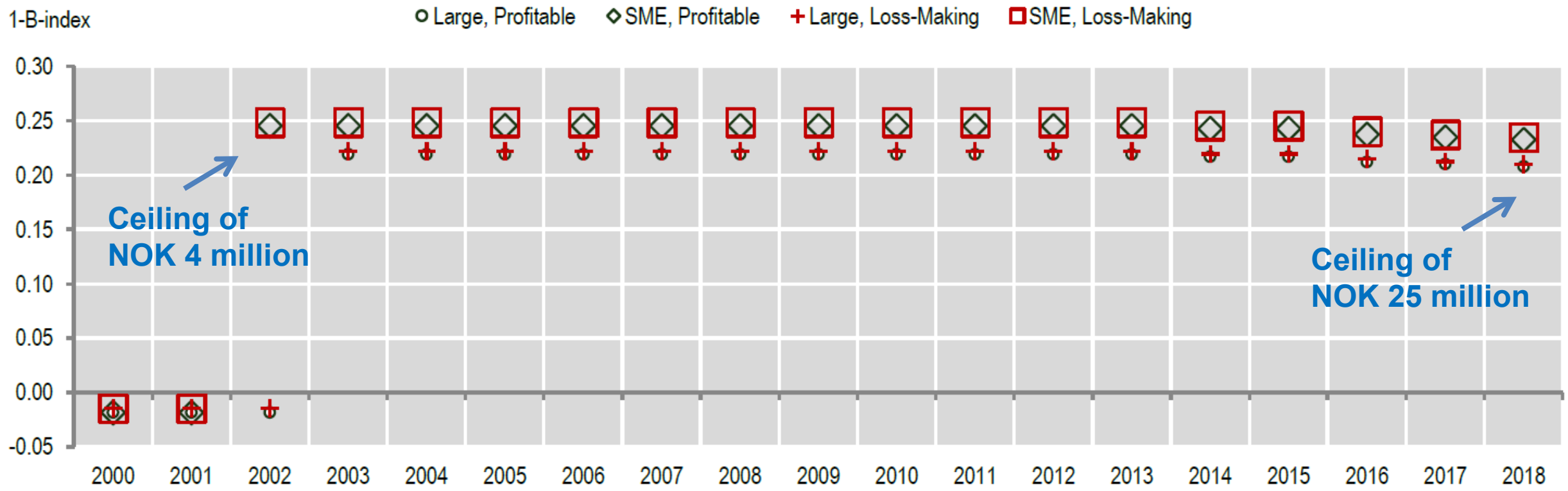


Source: OECD, R&D Tax Incentive Database, http://oe.cd/rdtax, March 2019.

Design and heterogeneity matters!

Example 2: R&D tax incentives in Norway

1-B-Index by firm size and profit scenario

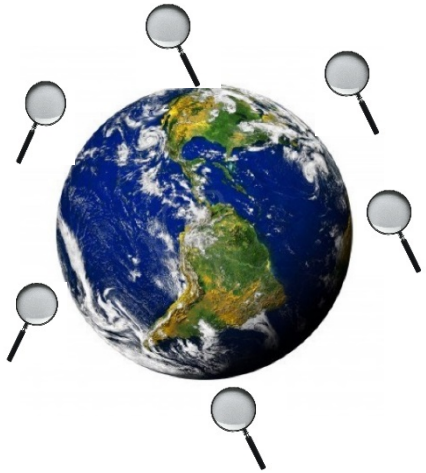


Source: OECD, R&D Tax Incentive Database, http://oe.cd/rdtax, March 2019.

Approaches to studying R&D tax incentives

Firm-level single-country

Aggregate cross-country

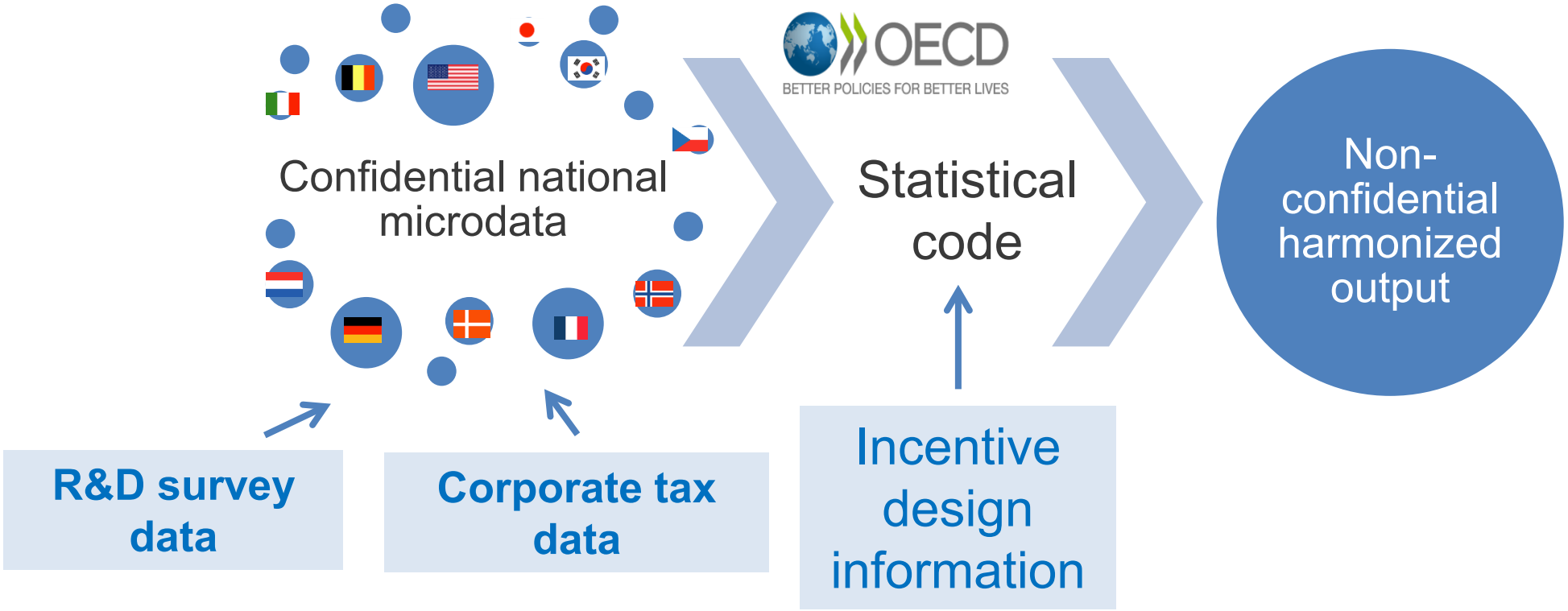


Firm-level cross-country

→ **microBeRD**

microBeRD:
Distributed microdata approach

As seen on... Dynemp and Multiprod



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

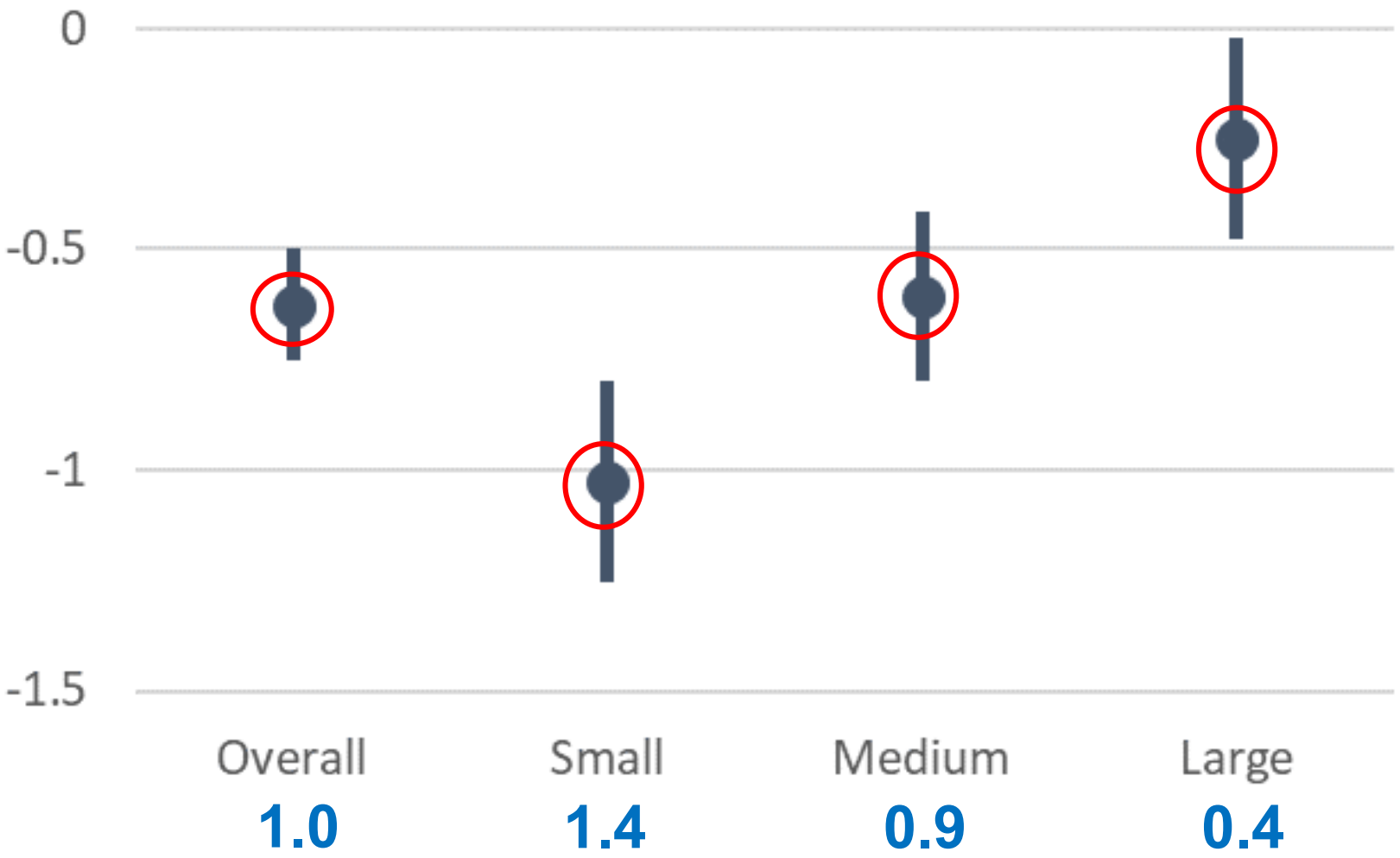
  ➡ B-Index

- Control for many other factors

  ➡ 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

Micro-aggregated regressions

Size or R&D performance?

Dependent variable = log intramural R&D	By size (1)	By average R&D expenditure (2)	By industry R&D intensity (3)	Horse race (4)
log B-Index	-0.243*	-0.601***	-0.594***	-0.653***
	0.141	*0.072*	*0.079*	*0.176*
x medium (50-249 emp.)	-0.431**			0.101
	0.184			*0.223*
x small (10-49 emp.)	-0.725***			0.067
	0.197			*0.265*
x initial mean(R&D)		0.484***		0.495***
		0.068		*0.111*
x initial industry R&D/VA			0.342***	0.044
			0.128	*0.127*
N	5355	5355	5355	5355

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.

Micro-aggregated regressions

Additional results

- ↑ 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 ↑

Firm-level regressions

Methodology

Leveraging tax relief microdata

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

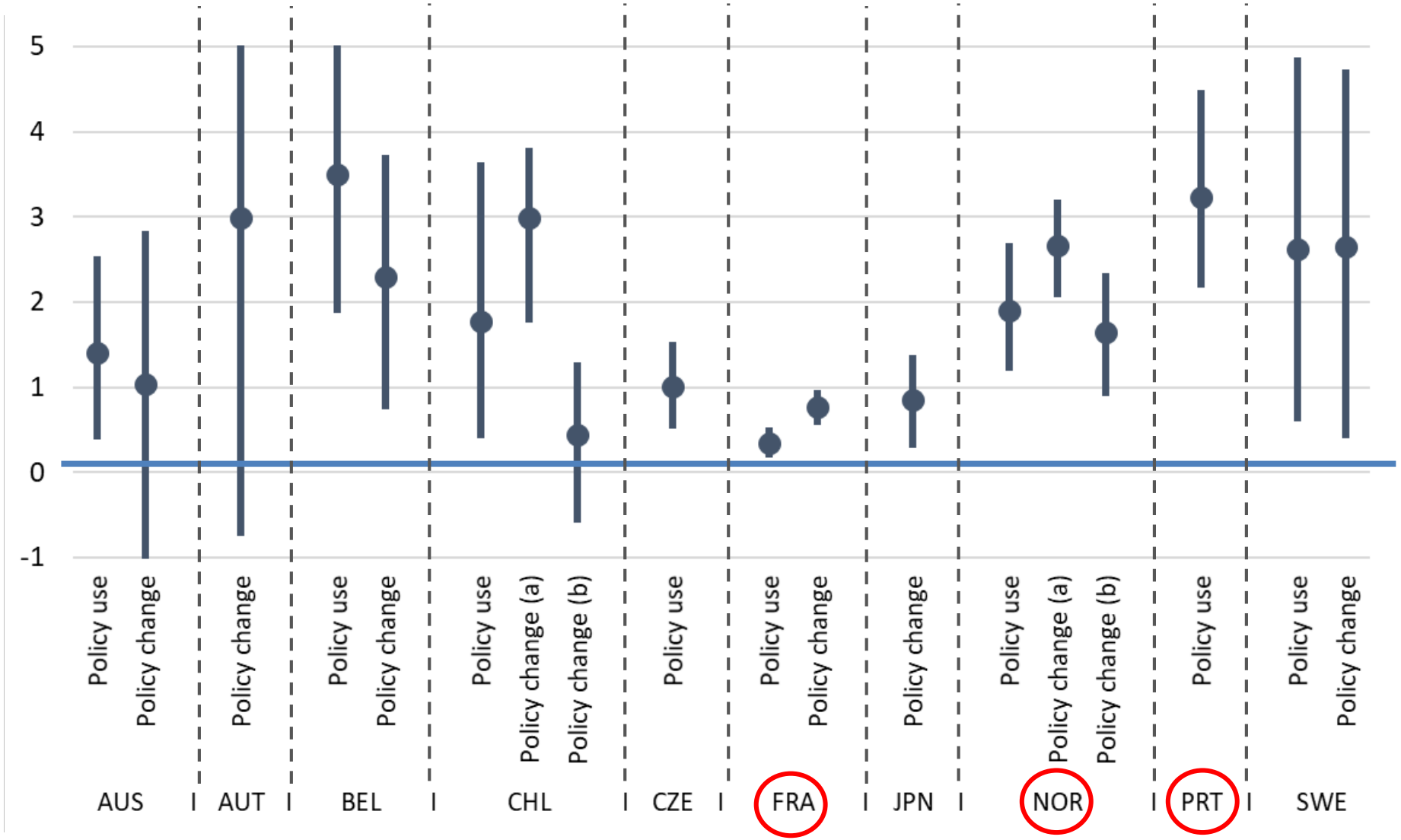
   AUS, BEL, CHL, CZE, FRA, NOR, PRT, SWE

3. Direct support beneficiaries vs. non-beneficiaries

   AUS, AUT, CHL, CZE, DEU, FRA, ITA, JPN, NOR, NZL, PRT, SWE

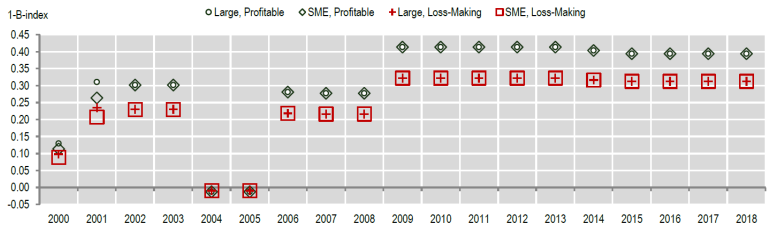
Firm-level regressions

Input additionality by country and method

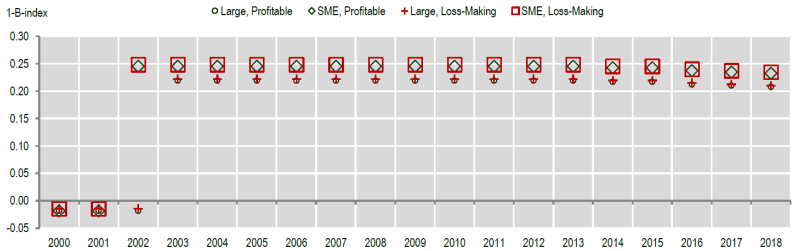


What does this mean?

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



Source: OECD, R&D Tax Incentive Database, http://oe.cd/rdtax, March 2019.



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- 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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