IMPACTS OF R&D TAX INCENTIVES – RESULTS FROM AN OECD SURVEY AND ANALYSIS

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BETTER POLICIES FOR BETTER LIVES

Outline of today's talk

1. OECD evidence on the use of R&D tax incentives
2. Findings from the OECD literature survey on the impacts of R&D tax incentives
3. OECD contribution to analysing the impact of R&D tax incentives

Why measure R&D tax incentives?

- 70% of OECD R&D takes place in business sector
- Public support in form of:
  - Knowledge generated in publicly-funded research base, used by firms: universities, government labs, …
  - Financial support for firms.
    - Rationales: appropriability (spillovers), finance constraints.
    - Tax incentives vs. direct funding
      - Market-based, non-discriminatory given pre-set rules
      - "Easier" to administer and to claim
      - "Easier" compliance with trade, competition, etc… rules
  - R&D tax subsidies have become more widespread

Building evidence on R&D tax incentives

OECD Surveys on R&D tax incentives, 2007-2017

http://oe.cd/rdtax

microBeRD
CSTP-CIIE microdata project, 2016-19

http://oe.cd/microberd

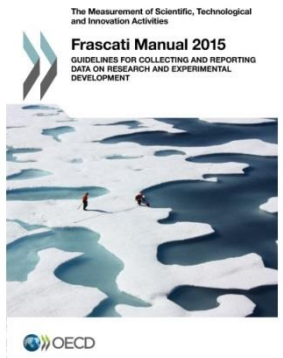
Understand how tax relief schemes are designed

Understand how much is dedicated to R&D tax support

Codify, collect and compare across countries

Basis for impact analysis

Incorporate into measurement methodology



http://oe.cd/frascati

OECD 2016 STI policy paper
Incidence & Impact

Co-funded by the Horizon 2020 Framework Programme of the European Union

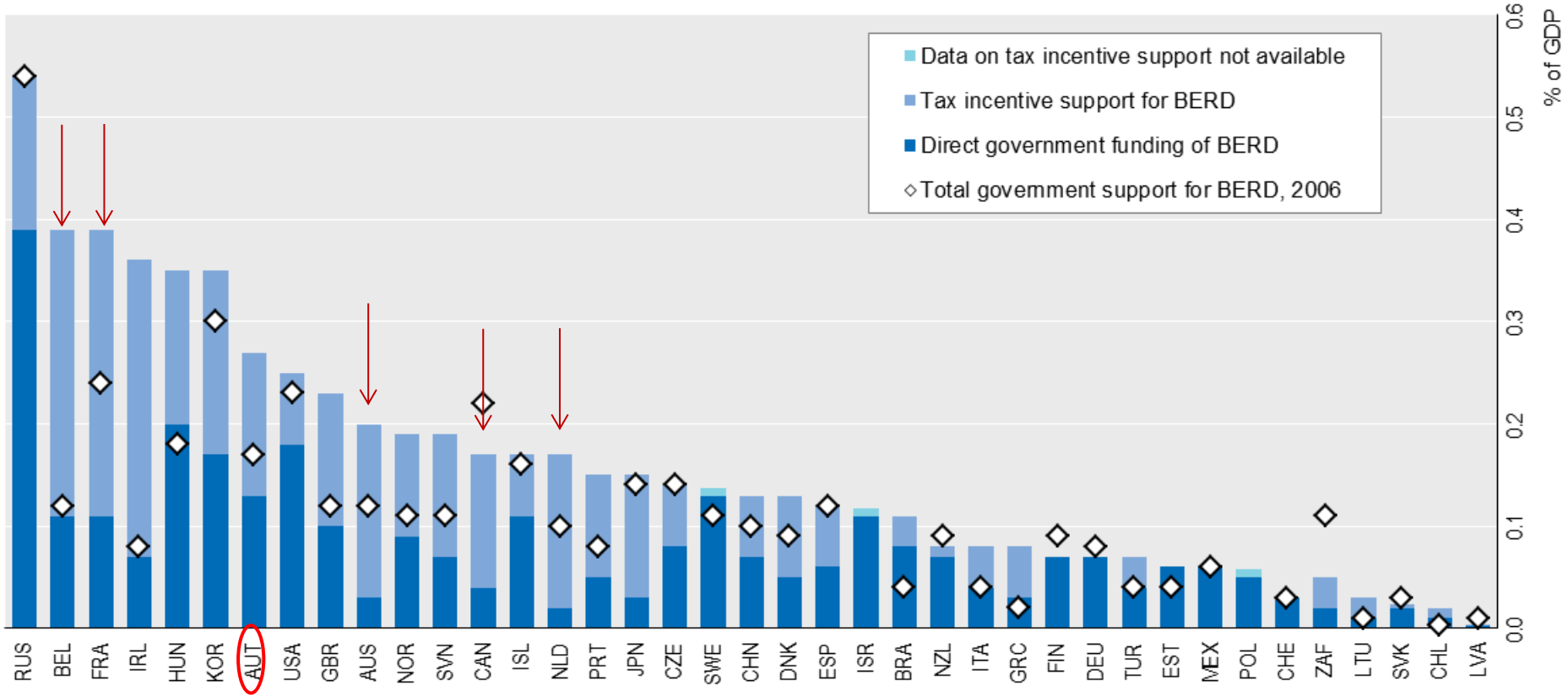
INCIDENCE AND DESIGN OF R&D TAX INCENTIVES IN THE OECD AREA

http://oe.cd/rdtax

How is public support split between direct funding (R&D procurement + grants) and tax support?

Direct funding of business R&D and R&D tax incentives, 2015

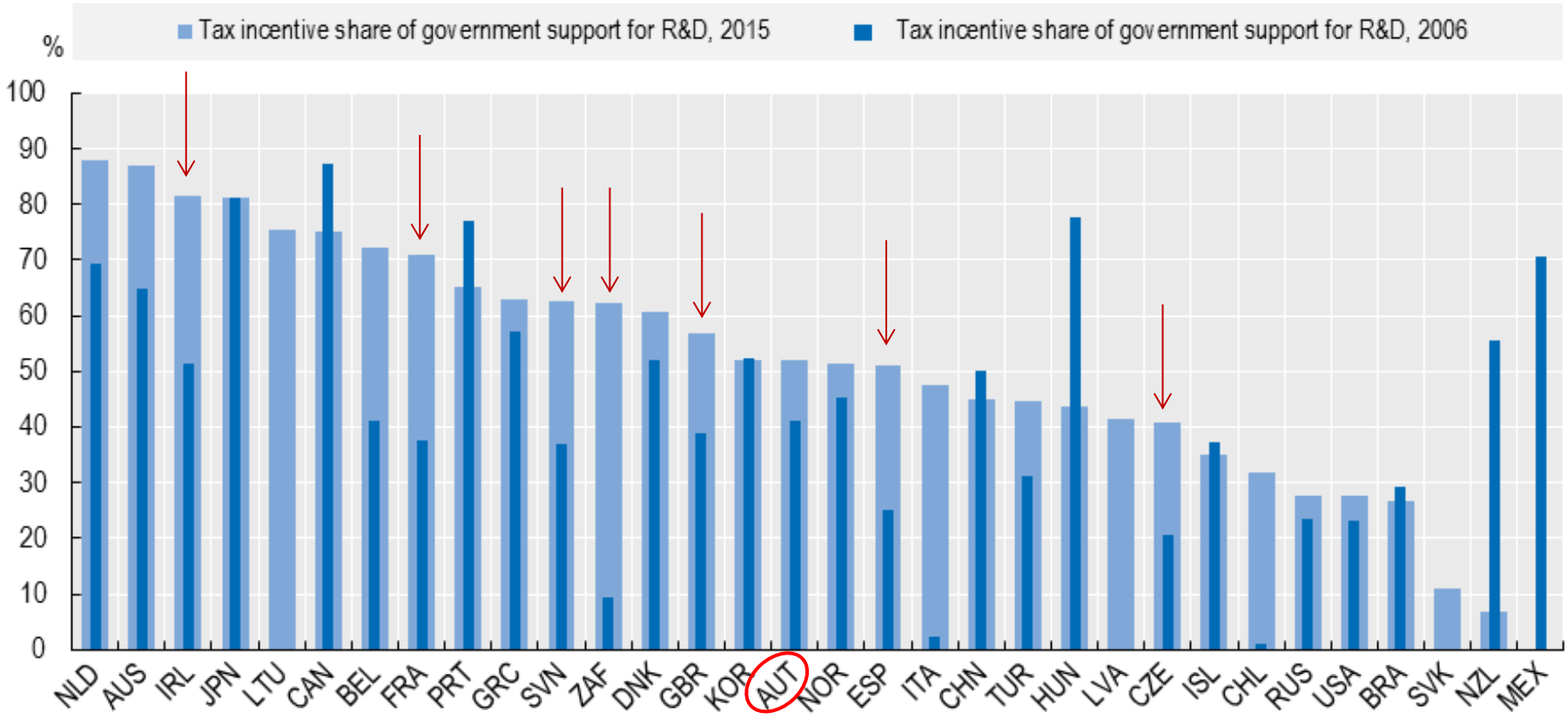
As a percentage of GDP



Source: OECD, R&D Tax Incentive Indicators, http://oe.cd/rdtax, July 2017.

Trends in government support for business R&D through direct funding and tax incentives

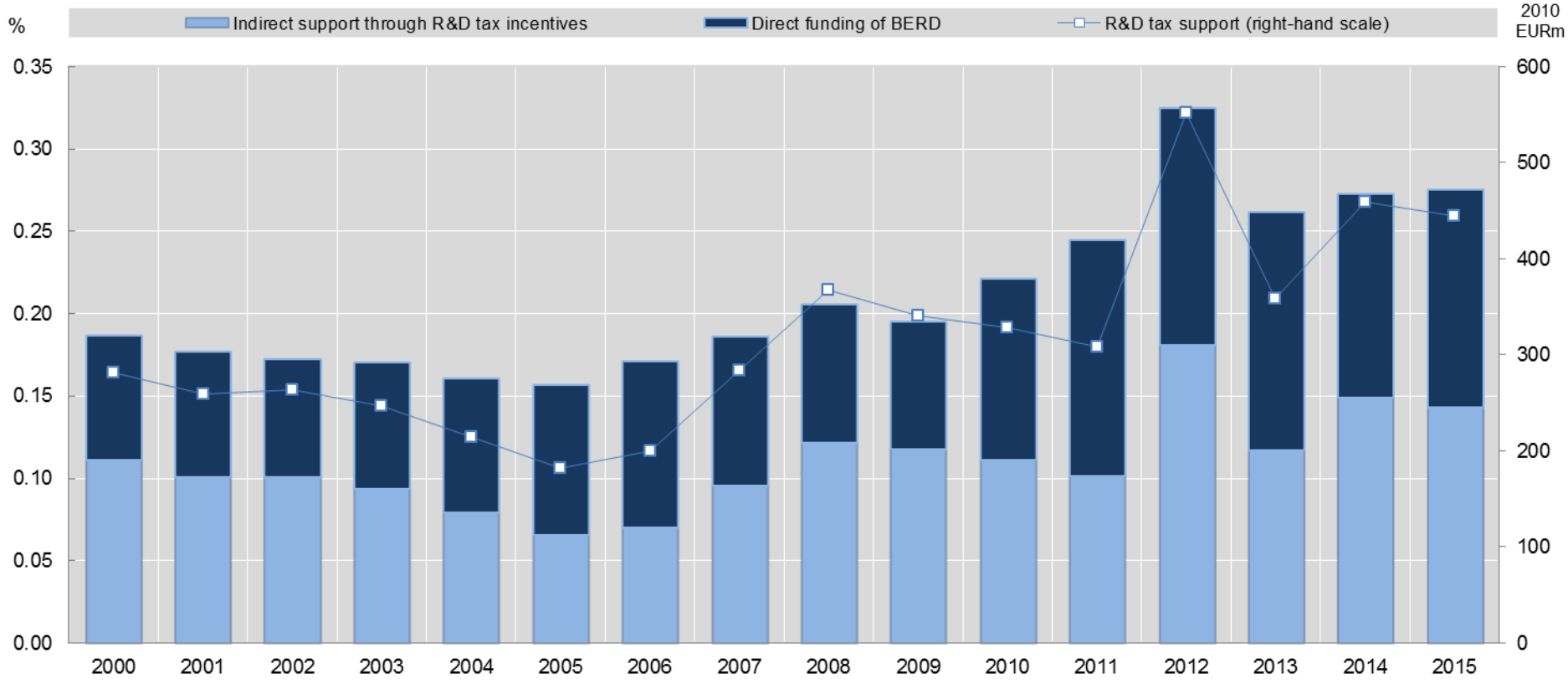
Tax support as a percentage of total (direct and tax) government support for business R&D, 2000-15



Source: OECD, R&D Tax Incentive Indicators, http://oe.cd/rdtax, July 2017.

Trends in direct and tax incentive support for business R&D, Austria

As a percentage of GDP and in 2010 EUR million, 2000-2015



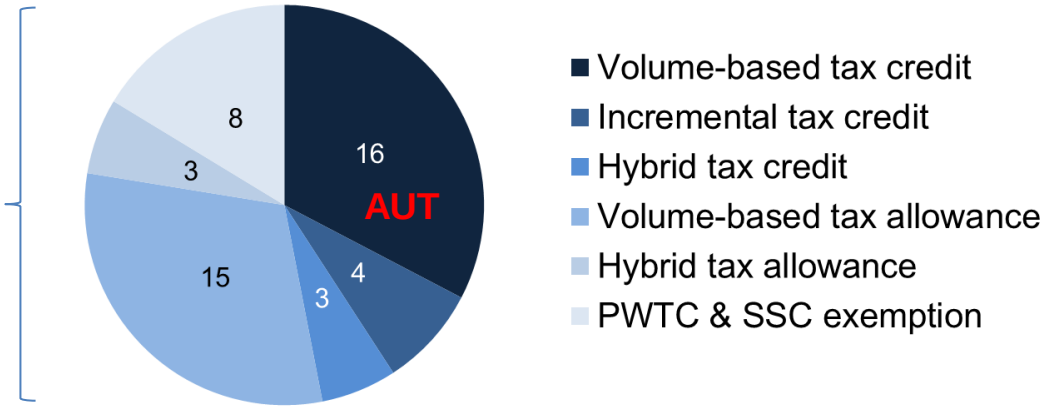
Source: OECD, R&D Tax Incentive Indicators, http://oe.cd/rdtax, July 2017.
See OECD country profiles – AUT 2016

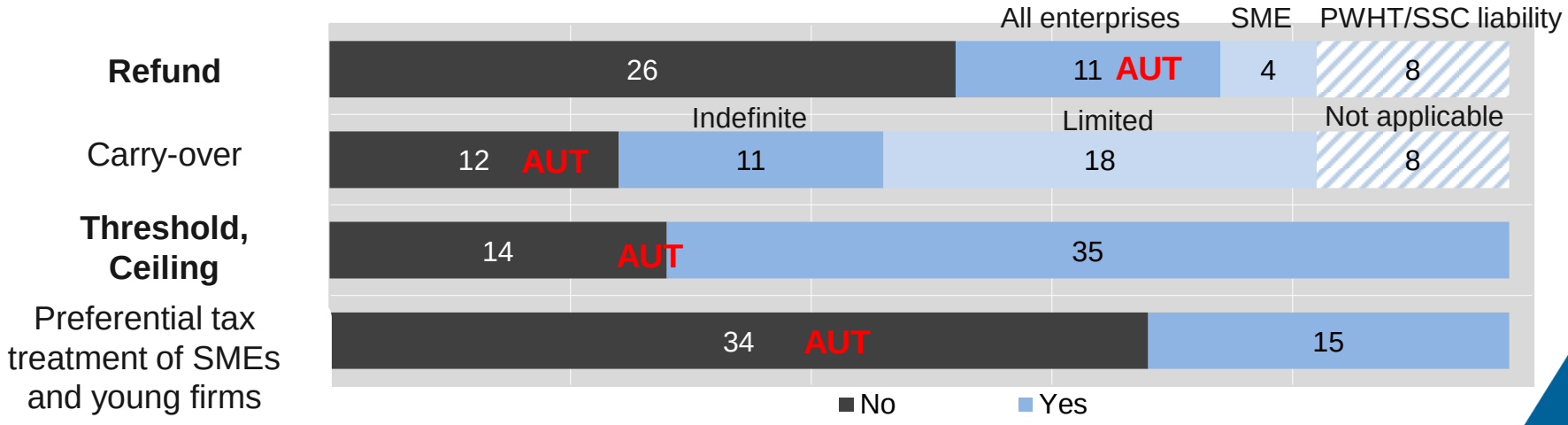
Key R&D tax incentive design features

Types of schemes used in OECD and partner economies, 2016

Number of schemes

CIT offset
- Tax credits
- Volume-based

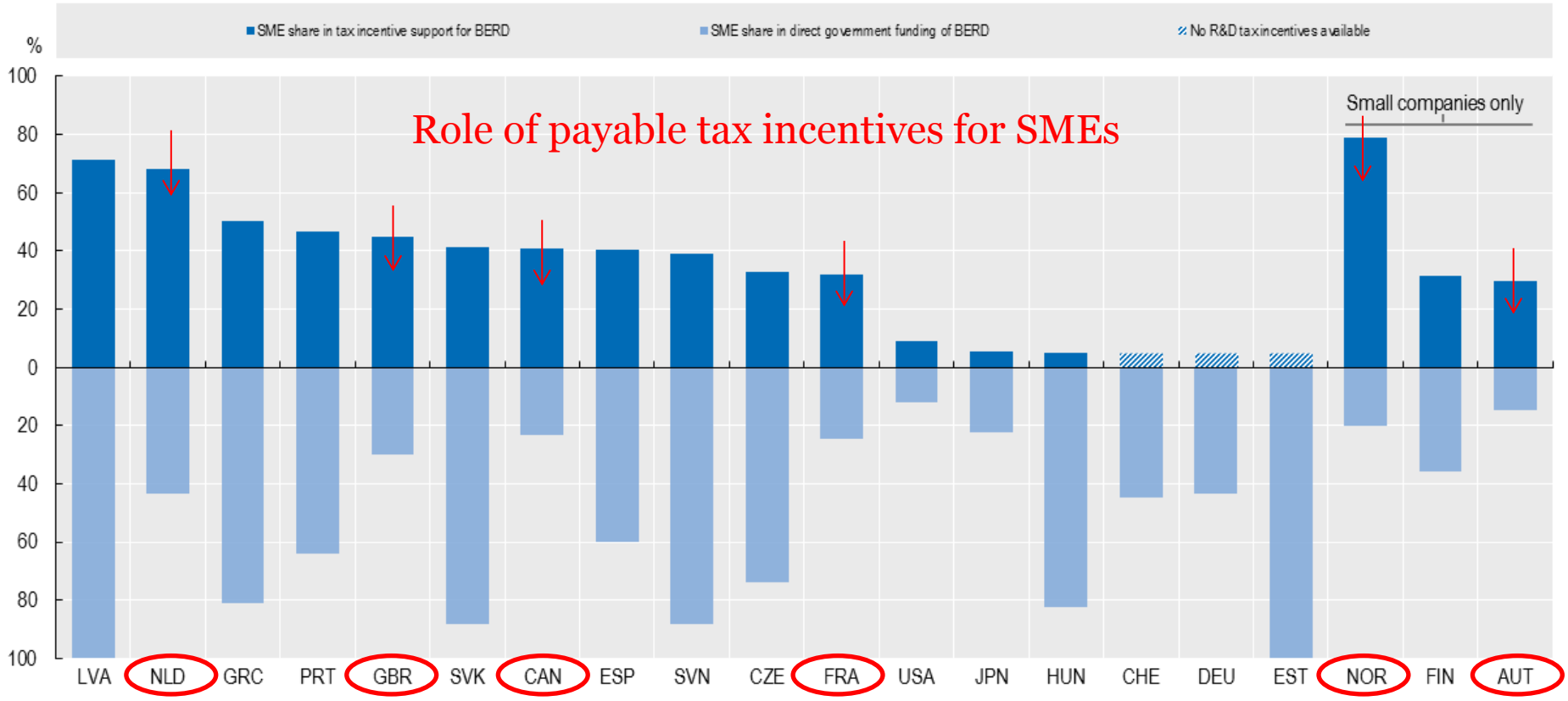




Source: OECD, R&D Tax Incentive Indicators, http://oe.cd/rdtax, July 2017.

Direct funding and tax incentive support for business R&D by SMEs, 2015

As a percentage of government support for BERD in each category



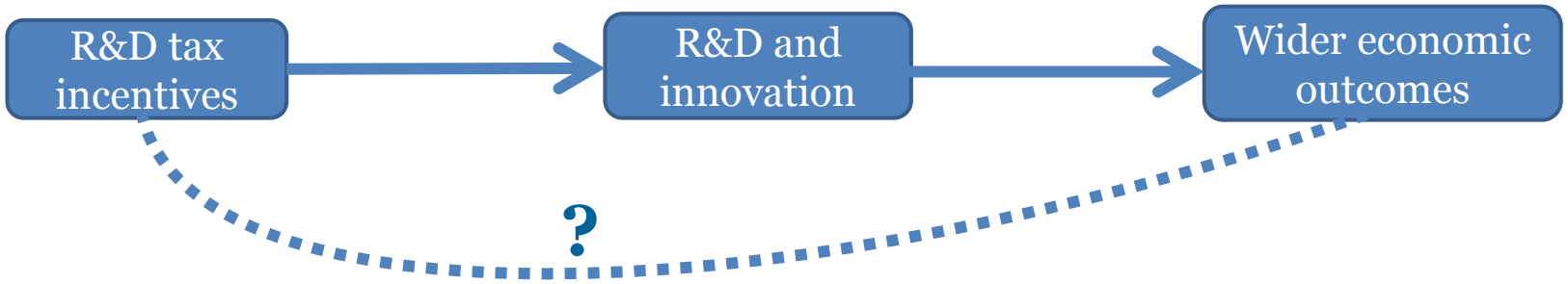
Source: OECD, R&D Tax Incentive Indicators, http://oe.cd/rdtax, July 2017.

OECD LITERATURE SURVEY OF THE IMPACTS OF R&D TAX INCENTIVES

OECD (2016), "R&D Tax Incentives: Evidence on design, incidence and impacts", OECD Science, Technology and Industry Policy Papers, No. 32, OECD Publishing, Paris.

http://oe.cd/rdtax

OECD literature survey - roadmap



Expenditure-based tax incentives

- Impacts on
  - **Input:** R&D investment
  - **Output:** Innovation and wider economic outcomes
  - Other outcomes: **R&D location** and firm dynamics
- **Heterogeneity in impacts** – firm size, policy design
- **Tax vs. direct support**

Income-based tax incentives

Impacts on R&D investment

Input additionality

- Incrementality ratio, R&D price elasticity
- Robust evidence of positive effects
- Avg. long-run elasticity ~ 1 (Parsons and Phillips, 2007)
  - But variation across countries and firms!
  - Short-run elasticity smaller – adjustment costs
- Also evidence of positive effects at extensive margin:
  - Corchuelo and Martinez-Ros, 2009; Haegeland and Moen, 2007), Margolis and Miotti (2015)

Impacts on innovation outcomes

Output additionality

- Patents, introduction of new products and processes…

Output vs. input additionality

- Re-labeling of existing activities
  - Not supported by evidence (Mansfield, 1986; Hall, 1995)
- Input price increase (limited supply of researchers)
  - Some evidence: Goolsbee (1998); Haegeland and Møen (2007); Lokshin and Mohnen (2012); and Lokshin and Mohnen (2013)
  - But could capture quality – Moretti and Wilson (2014)
- Additional projects may have lower productivity

Impacts on innovation outcomes

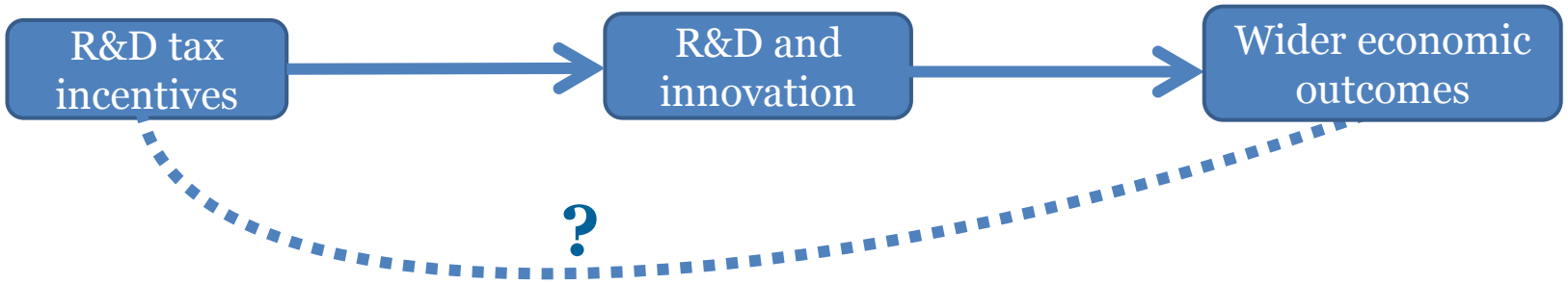
Estimation challenges

- Imperfect measures – patents…
- Time lag, spillovers

Evidence of positive impacts

- Czarnitzki (2011); Foreman-Peck (2013); Moretti and Wilson (2014); Bösenberg and Egger (2017)
- Dechezleprêtre et al. (2016)
  - Change in SME definition to estimate effect of UK tax credit
  - Positive effect on expenditure, own patenting and spillovers

Impacts on wider economic outcomes



Effect on productivity and employment growth

- **Evidence on direct link scarce**
  - Correlation between R&D tax incentives and productivity (Brouwer et al. 2005; Lokshin and Mohnen, 2007)
  - Effect on employment and wages depends on industry (Moretti and Wilson, 2014)
- **Cost-benefit analyses** tend to find positive results ↔ assumptions
  - Berger (1993); Russo (2004); Parsons and Phillips (2007); Lokshin and Mohnen (2012); Foreman-Peck (2013); and Dechezleprêtre et al. (2016).

Other outcomes: R&D location

Relatively unexplored issue

- Increase in total R&D vs. relocation
- Evidence suggests that cross-border effects are important
  - Most of increase in US state-level R&D due to tax incentives offset by decrease in nearby states (Wilson, 2009)
  - R&D in one country responds to a change in price in another (Bloom and Griffith, 2001; Montmartin and Herrera, 2015)
- Taxation can play a role
  - CIT (Bloom et al 2002 ; Griffith et al., 2011)
  - Tax incentives (Belberdos et al, 2016)
- But other factors seem to be more important
  - OECD (2011), Belberdos et al (2016)

Heterogeneity in impacts - firm size

Small vs. large firms

- Stronger effect found for small firms (Baghana and Mohnen, 2009; Agrawal et al., 2014; Azcona et al., 2014; Romero-Jordán et al., 2014; Castellacci et Lie, 2015; Rao, 2015).
  - Financially constrained firms (Kasahara et al., 2014; Kobayashi, 2014)

Heterogeneity in impacts - design

- **Incremental vs. volume-based**
  - incremental incentives have higher incrementality ratio (Parsons and Phillips, 2007; Lokshin and Mohnen, 2012)
  - May distort timing of R&D (Hollander et al., 1987; Lemaire, 1996)
  - Requires favourable market conditions for additional R&D (Köhler et al., 2012); accelerated R&D spending, only accessible up to a certain extent (Mohnen, 2013)
- **Temporary vs. permanent**
  - Limited take-up of a short term scheme (Kuusi et al., 2016)
  - Predictability important (Rao, 2015a; Guellec and Van Pottelsberghe De La Potterie, 2003

Tax incentives vs. direct support

Limited evidence…

- Relative effectiveness
  - Larger additionality for tax credits but support different types of projects (Haegeland and Moen, 2007)
  - Grants more suitable for young, financially constrained firms (Busom et al, 2014)
- Interaction effect
  - Substitutes – Dumont (2015), Montmartin and Herrera (2015)
  - Complements – Bérubé and Mohnen (2009), Haegeland and Moen (2007), Falk (2009)

microBeRD

DISTRIBUTED MICRODATA PROJECT

ON THE INCIDENCE AND IMPACT OF

PUBLIC SUPPORT FOR BERD

http://oe.cd/microberd

European Commission

HORIZON 2020

The EU Framework Programme for Research and Innovation

Why microBeRD?

Microdata studies

- firm-level detail
- but only 1 country

Cross-country studies

- cross-country variation
- but aggregate

Microdata-based cross-country analysis of business R&D

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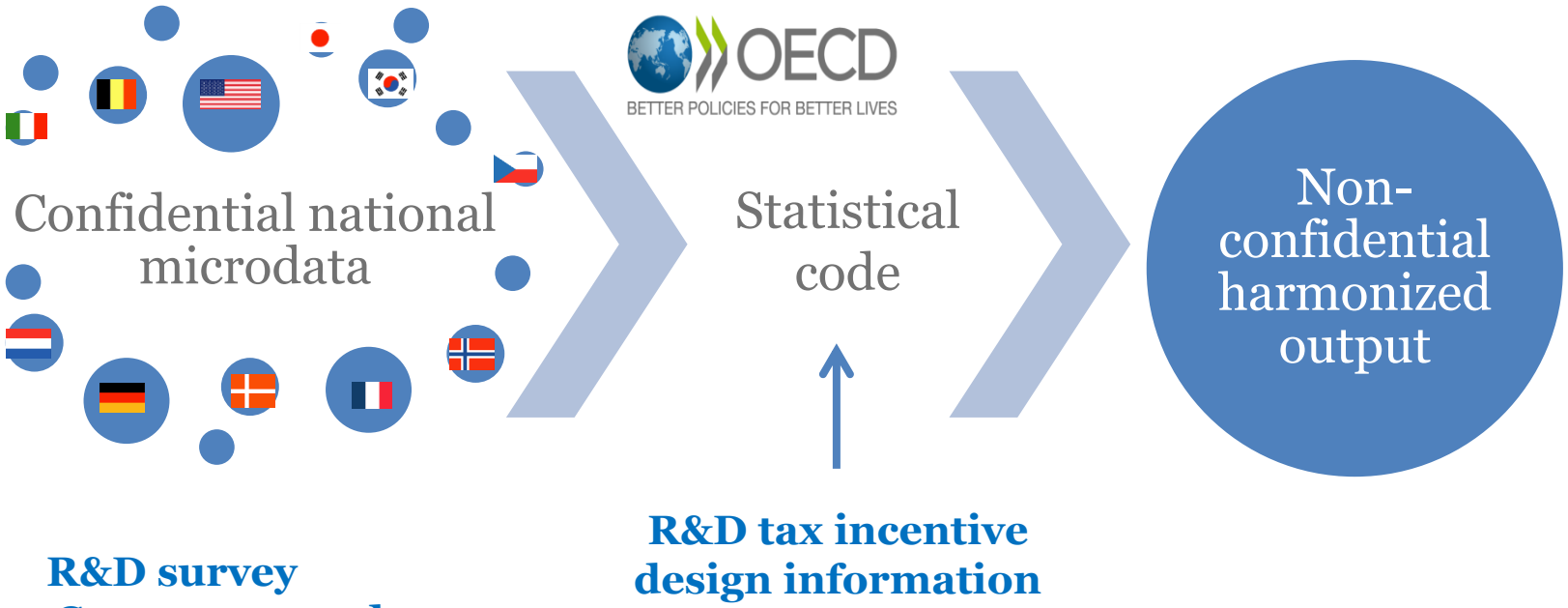
microBeRD

What is microBeRD?

Inspired by: Innovation in firms, Dynemp and Multiprod



R&D survey
+ Corporate tax data
+ R&D grant/loan data
+ Business register data
+ Patent data
+ Innovation data

Project aims

1. Cross-country descriptive evidence

- structure & concentration
- characteristics of beneficiaries

2. Evidence on causal effects

- comparing effectiveness (cross-country, design)
- Effect on different types of firms
- Interaction
- Spillovers

3. Supporting analytical capacity

Progress so far and next steps

2016 – 2019

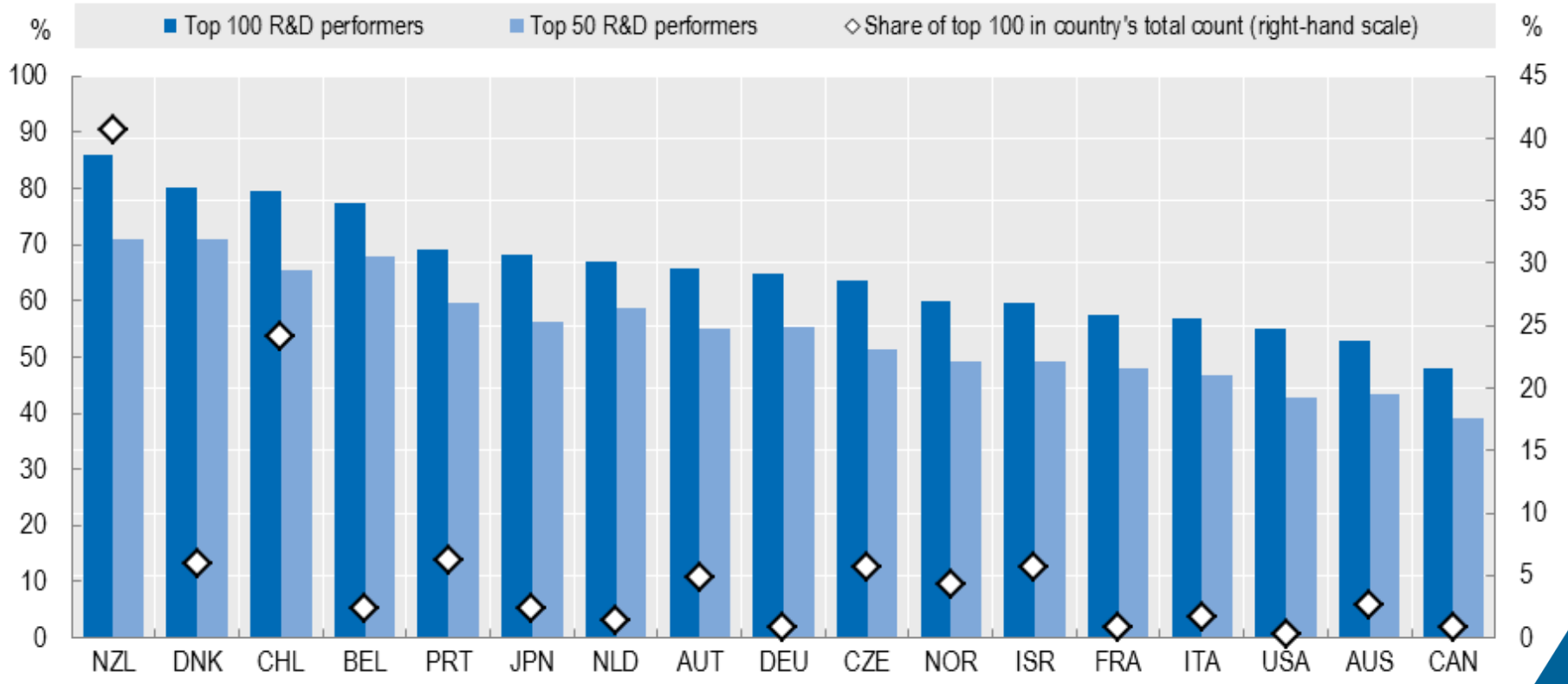
- Descriptive statistics on BERD ✓
- Micro-based subsidy rates ✓
- Within- and cross-country estimates of impact
- Heterogeneity, interaction, spillovers

Countries participating in microBERD

Top 50 R&D performers account for 40-70% of BERD – BERD highly concentrated across OECD countries

Top 50-100 R&D performers, 2014 or closest

As a percentage of domestic business R&D expenditure and of total count of performers



Source: OECD, based on preliminary results from the OECD microBeRD project, http://oe.cd/microberd , July 2017.

Conclusion

1. OECD evidence on the use of R&D tax incentives
2. Findings from the OECD literature survey on the impacts of R&D tax incentives
3. OECD contribution to analysing the impact of R&D tax incentives

Key messages - OECD survey and previous work

- ❑ Role of heterogeneity of R&D performers
- ❑ Balancing tax incentives and direct support
- ❑ Policy predictability, regulatory environment
- ❑ Income-based incentives: caution needed
- ❑ Key role of ex-post and ex-ante evaluation

Thank YOU

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