

Discussion: Is international R&D tax competition a zero-sum game? Evidence from the EU

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Overview

- Topic is an important one, understudied.
 - Increasing number of countries offer various R&D tax credits and patent boxes
- Two serious prior studies of R&D tax credit competition:
 - Wilson (2009) for US states
 - Bloom & Griffith (2001) for G5 + 3 others
 - Both show offsetting impacts of R&D tax price in and out of state/country
- Current paper confirms this using data on 10 European countries, more recent time period.

Comments

- Measurement issues
 - Meaning of zero-sum
 - Data construction
- Broader issues
 - EU policy issue
 - Patent boxes
 - Micro-foundations
- Minor comments for the revision (full paper)

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What does zero-sum mean?

- Zero-sum: R&D tax credit induces an additional euro of R&D in country while reducing total R&D by one euro in other countries
- Thought experiment: Germany and Denmark
 - $R\&D_{DE} = 10 \times R\&D_{DK}$ (80 billion euros vs 8 billion)
 - Reduce tax price in Germany by 10%, leaving all else unchanged
 - increases German R&D by 0.8B euros,
 - reduces Danish R&D by 0.08B euros
- More complicated if several countries and a weighted price, but message is that equal and opposite coefficients on prices in and out do not imply zero sum effects unless countries are of equal size.
 - Qualitatively: larger credits in larger countries lead to R&D increases in total; larger in smaller countries lead to R&D decreases
 - Answering the question will require some simulation.

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Data construction

- Take country-level KLEMS data, add R&D spending back into output and construct R&D capital.
- Net out variable costs, to leave a weighted sum of capitals, weighted by their returns.
- Assume r constant across capitals, known δ and π
 - Solve for r
- Problem: R&D depreciation choice? deflator choice?
 - Needed for construction of R&D capital
 - Also implicit in ex post $\rho_R = r + \delta_R + \pi_R$
- Hall (2005) presents evidence that private $\delta > 15\%$, but economy-wide rate may be lower
- Opposing effects on R&D capital and required rate of return ρ
- Result is unclear – useful robustness check?
 - May not matter with country and time dummies
- What R&D was used? Business R&D (BERD)?
- Double counting of capital & labor?

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Patent boxes

- Currently: Netherlands, Belgium, Luxembourg, France, Portugal, UK, Spain, Hungary, Malta, Cyprus, Lithuania Switzerland, China
- Even suggested recently for the US
- New study by Alstadsaeter, Barrios, Nicodème, Skonieczna, and Vezzani looks at 2000 largest R&D-doers worldwide and their patenting
 - As one might have expected, MNEs shift patents more than R&D in response to these tax reductions
 - EU/OECD considering rules to ensure R&D location (some countries already do)

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EU policy

- The EU generally has a prohibition against state aid to firms, to avoid zero-sum games of this kind
- However, there are block exemptions, including for various R&D subsidies and tax treatments, e.g.
 - Aid for research and development projects
 - Aid for technical feasibility studies
 - Aid for industrial property right costs for SMEs
 - Aid for young innovative enterprises
 - Aid for innovation advisory services and for innovation support services
- Results here raise some questions about this exemption

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Some thoughts on micro

- Results depend on the decisions of individual firms
 - Multinationals and the decision to open a new lab
 - Domestic firms may respond, less likely to move elsewhere
- Slow adjustment (already captured by the lag)
- Decision will depend on other factors, such as availability of personnel, cost of other inputs, local regulation
 - See the literature on MNE R&D location choice [[Hall 2011 survey](#)]
- Useful to support this work with evidence based on microdata

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Minor comments (for the revision)

- If you use LaTeX, learn how to increase font size, especially for the tables
- More information on data construction
- Timing of patent variable?
- Show LR coefficients and their s.e.s on all tables.
- Better to always use time dummies
- System GMM? Reduce instruments by omitting longer lags
- *Ex ante* vs *ex post*?
- Choice of R&D depreciation rate - sensitivity
- Explore use of R&D deflator (various BEA pubs)
- Accelerator model? See [Mulkay, Mairesse, and Hall \(2000, 2001\)](#).

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EU State aid exemptions

Aid for Research & Development & Innovation

Beyond the more traditional categories of R&D aid, the block exemptions also includes a series of innovation measures to foster the competitiveness of European industry via more money spent in R&D&I.

- Aid for research and development projects
- Aid for technical feasibility studies
- Aid for industrial property right costs for SMEs
- Aid for young innovative enterprises
- Aid for innovation advisory services and for innovation support services
- Aid for the loan of highly qualified personnel
- Aid for research and development in the agricultural and fisheries sectors

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