

# Evaluation of R&D subsidies in the case of industry-specific technology stocks with spillovers

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- **AIM:** What's the growth effect of innovation policies reducing the cost of researchers?
- **CONTRIBUTION:** Use a DSGE model (DynEMItE) to simulate the effect of a 10 percentage point cut in researchers' cost in Belgium, accounting for industry specificities, inter-industry trade dependence and knowledge spillovers
- **RESULTS:** A more favorable fiscal treatment of researchers' wage generates a greater output expansion in Market services (+1.59%), followed by low-tech manufacturing (0.67%).

- 1 R&D policy variable
- 2 R&D technology formulation
- 3 Data issues

- 1 The Implicit Tax Subsidy (*ITS*) rate for R&D expenses

$$ITS = 1 - B$$

$$B = \frac{1 - A}{1 - \tau} = \frac{1 - (z \times \tau + c)}{1 - \tau}$$

$\tau$  corporate income tax rate

$A$  discounted value of R&D outlays

$z$  R&D tax allowances rate

$c$  R&D tax credit rate

If  $z = 1$  and  $c = 0 \Rightarrow B = 1 \quad ITS = 0 \quad$  NO tax incentives to R&D

## COMMENTS

$\Rightarrow$  In Belgium (source: OECD)  $ITS = 0.16$ ,  $B = 0.84$ ,  $\tau = 0.25$  and  $z = 1$ .....  $c$  has to rise from 0.12 to 0.195 (+80%) to **cut ITS** by 0.10 pp....  **$c$  is the focus instrument**

$\Rightarrow$   $ITS$  is computed at country level and refer to total R&D expenses. How do you infer the portion **related to labor** rather than to capital expenses?

Do you project it at industry level **using the sector share of high-skilled workers?**

## 1 Your work:

$$ird_{r,t} = v_r A_{r,t-1}^{\psi} A_{-r,t-1}^{\epsilon} LRD_{r,t}$$

where  $ird$  is research expenses,  $LRD$  research employment,  $A$  earlier patent (idea) stock ( $r$  denote industries).

## 2 Bottazzi & Peri (2007) (B&P 2007):

$$I_{r,t} = f(A_{r,t-1}, A_{-r,t-1}, ird_{r,t})$$

where  $I$  new ideas (patent),  $ird$  is research workers and  $As$  are earlier stocks.

## COMMENTS

⇒ Your equation does not seem a KPF, neither an R&D investment equation. Does it work as a **wage equation**?

⇒ B&P (2007) use a similar equation to assess empirically (panel VECM) the directional of causality assumed in the model. **Causation** runs from research expenses to ideas (as in any **KPF**)

- Sector 1: Agriculture, Mining, Low-tech manufacturing, Utilities, Construction
- Sector 7: Market services

## COMMENTS

Does industry aggregation **drive** results? .... Very wide and heterogeneous aggregates...

Sector 1 is **miscellaneous** including very different sectors

Market services **intensive of R&D** are Computer Services (62) and Professional services (72)...