



Government Incentives for Business R&D and Innovation: An International Comparison

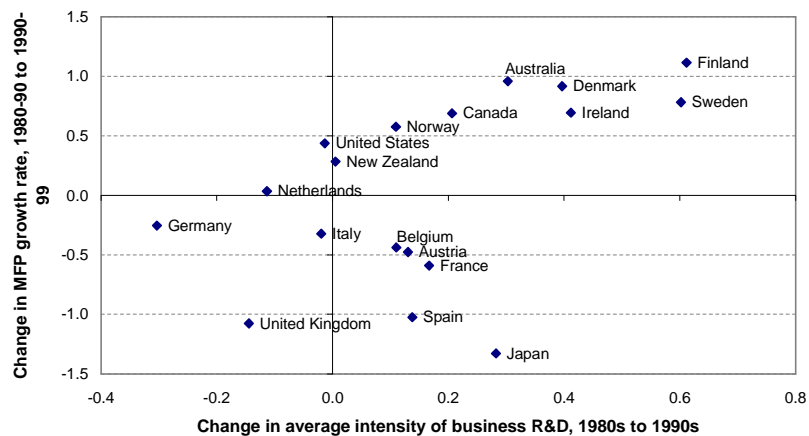
Jerry Sheehan
OECD Science & Technology Policy Division

*EIRMA Roundtable Meeting: Selecting the Right
Environment for R&D and Innovation*

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Context: R&D linked to innovation and growth



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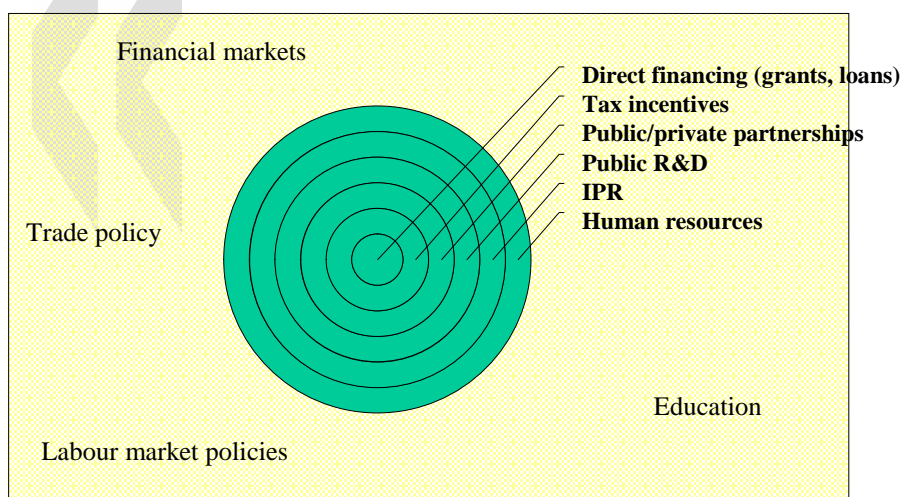
Many countries aim to increase R&D spending

| Country | 2000 | Current | Target | Date |
|----------------|-------|---------|-------------------|------|
| Austria | 1.95% | 2.19% | 2.5% of GDP | 2005 |
| Canada | 1.92% | 1.87% | Top 5 in OECD | 2010 |
| EU-25 | 1.80% | 1.86% | 3.0% | 2010 |
| Germany | 2.49% | 2.50% | 3.0% | 2010 |
| Hungary | 0.80% | 0.95% | OECD avg. | 2006 |
| Ireland | 1.15% | 1.13% | 2.5% of GNP | 2010 |
| Korea | 2.39% | 2.64% | Double investment | 2007 |
| Norway | 1.60% | 1.67% | OECD avg. | 2005 |
| Spain | 0.94% | 1.03% | 1.29% of GDP | 2003 |
| United Kingdom | 1.85% | 1.87% | 2.5% of GDP | 2014 |

Source: OECD Science, Technology and Industry Outlook 2004

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Policies to stimulate R&D and innovation



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What is an R&D tax incentive?

Policy instrument that aims to increase business expenditure on R&D by providing financial benefits through the tax system

- Typically in the form of a tax *credit* to be taken against taxes owed, or as an *allowance* that reduces taxable corporate earnings.
- Typically administered through *corporate tax system*, but the Netherlands operates it through *wage/payroll tax* reductions
- *Increasingly popular*: used in 18 OECD countries in 2005, up from 12 in 1996. Still *not universally* used.

Design issues: Tax incentives not all the same

- **Different structure**
 - Credit vs. allowance
 - Volume vs. incremental (i.e., apply to *all* R&D or just *increase* in R&D)
- **Different target firms**
 - Most broadly applicable to *all* firms (France, Ireland, US show no preference)
 - SMEs receive special treatment in many countries (Canada, Italy, Netherlands, Norway, UK, etc.)
- **Different types of R&D**
 - R&D or all innovation expenses (e.g., in Spain)
 - In-house vs. external R&D
 - Some preferences for funding public & basic research (Denmark, Japan, Norway, UK)
- **Other types of expenditures**
 - Cost of licensing patents in Canada, France, Hungary, Portugal, Spain
 - Patent defense and technology monitoring in France
 - Foreign R&D (within EEA) allowed in Ireland; not in US, Australia or Canada
- **Administration/enforcement**
 - R&D projects certified in advance in Netherlands, Norway, Spain
 - Claimed company-level expenditures subject to review by tax authorities in Australia, Ireland, UK, US
- **Budgeting**
 - Most countries have no budget for R&D tax incentives. Claims vary depending on corporate R&D expenditures
 - A priori budget established in Netherlands

Why use R&D tax incentives? Weighing the merits

| Stated Advantages | Caveats/disadvantages |
|---|--|
| Raise business R&D spending by relaxing financial constraint. | But what type of R&D is motivated? What are impediments to R&D? |
| Lets market allocate resources—no picking winners/losers | No ability to shift resources to key areas with large “social returns.” Does alter market decisions of R&D vs. other company expenditures. |
| Accessible to all R&D-performing firms | But may not encourage new R&D performers |
| Low administrative costs | Hidden costs—costs shifted to firms and tax authorities |
| Simplicity, especially for volume-based credits | Can result in large deadweight loss (i.e., funding R&D that would have happened anyway). |
| Might attract global R&D investment | Not clear tax considerations are major factor in R&D location decisions |

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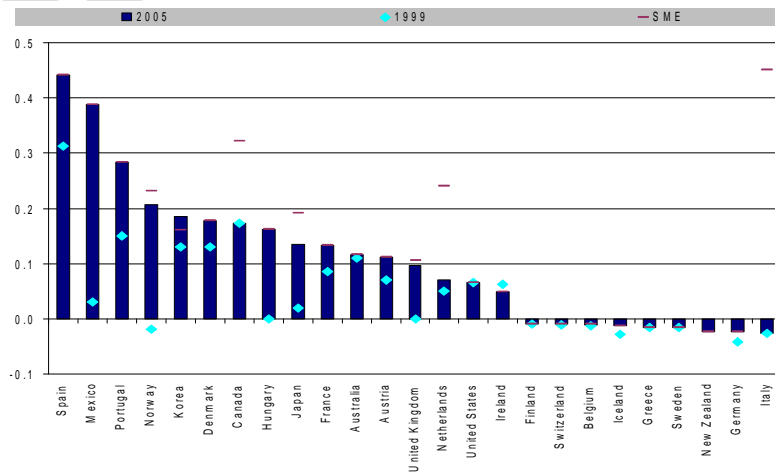
How effective are tax incentives for R&D?

- Evaluation is difficult
 - No tangible, identifiable output associated w/ the R&D
 - Costs to government and industry are diffuse
 - Hard to compare participants/non-participants
- Effect dependent on details of design & implementation
 - Volume-based vs. incremental
 - Generosity of credit, basis for computing increment
 - Special provisions (small firms, basic research)
 - Were firms aware of the credit – and willing to claim it
- Econometric analysis of *additionality*: *how much more R&D*
 - Variation in results: roughly 1:1+ return
 - Canada: CAD 1.38 for each CAD of lost tax revenue
 - Netherlands: €1.02 in short term; €1.10 in longer term
 - OECD: 1% decrease in cost of R&D leads to 0.1% gain in R&D in short term and 1% gain in long term
 - Italy: 1% reduction in user cost increases R&D by 1.5-1.8%
 - Do not entice non-performers to start R&D (EC study)

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How to compare the generosity of tax incentives: B-index

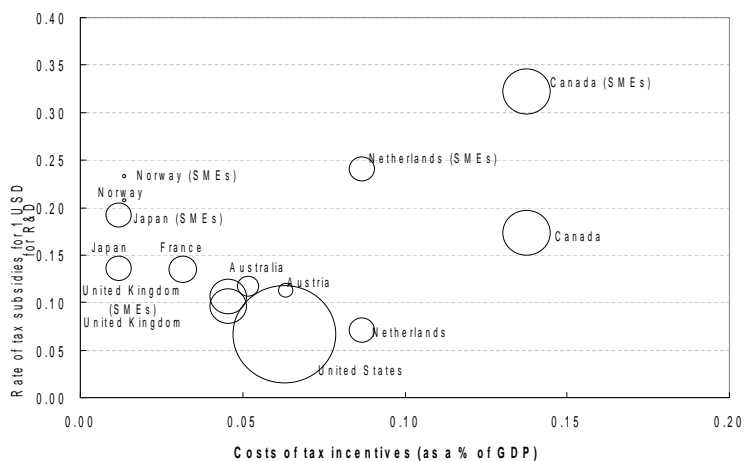
Rate of tax reduction for 1 unit of R&D spending (1 minus B-index)



Source: Warda (2005).

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Relationship between B-index and cost-to-government of tax incentives



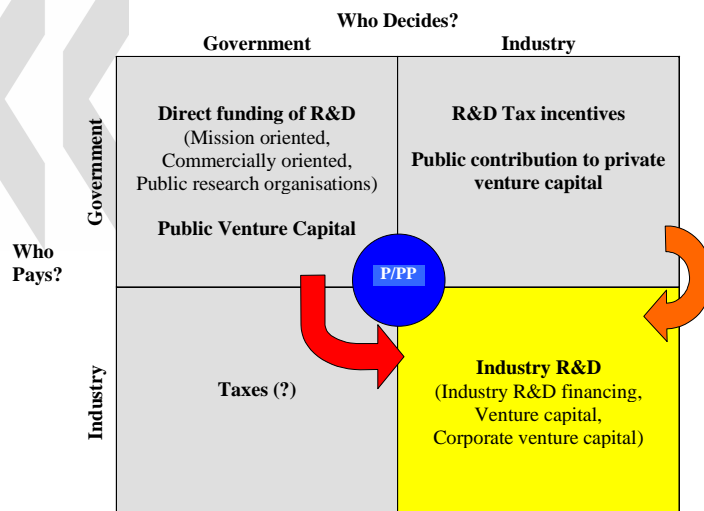
Source: OECD MSTI database, 2005 and national statistics.

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Tax incentives for investments in other intangibles?

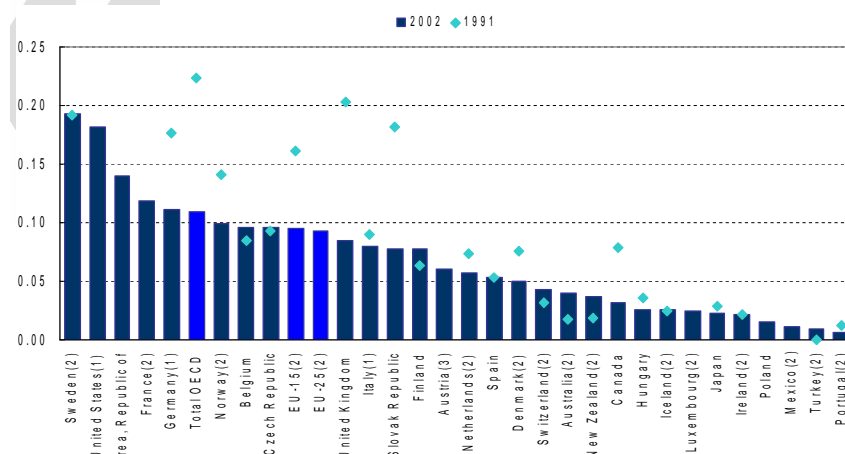
- Intellectual property
 - Cost of patent (acquired) usually depreciate
 - Some “accelerated depreciation” and investment incentives
 - Ireland, Hungary, Korea, Switzerland offer exemptions on royalty income.
- Worker training
 - Uniformly treated as a current expense
 - Special incentives in Austria, France, Japan, Korea, Netherlands, Spain and US (state level)
 - Some targeting of small firms; volume, incremental and hybrid
- Software
 - In-house development can be considered R&D in some countries
 - Purchased software typically capitalised and depreciated.

Issue is role of tax incentives in *policy mix*



Direct government funding declining

Government-funded business R&D as % of GDP



Notes: 1. 2003; 2. 2001; 3. 2000
Source: OECD STI Outlook 2004

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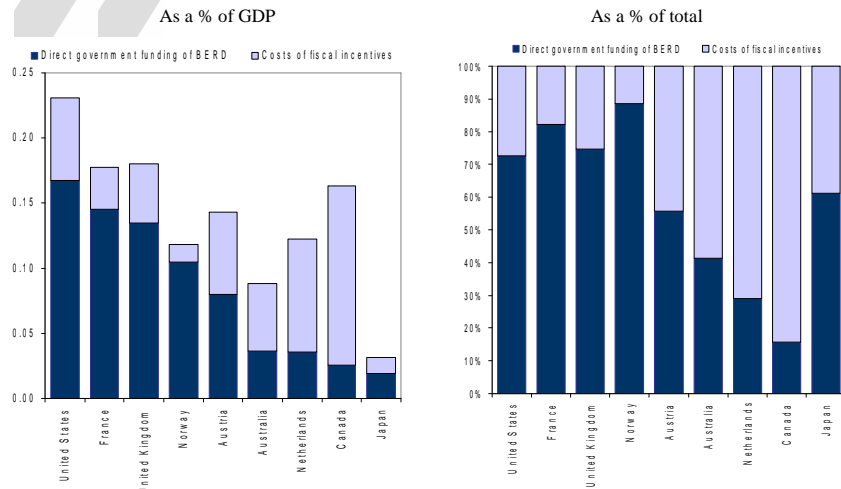
Direct funding vs. tax incentives: the costs

| Country | Cost of tax incentives | | Direct funding (PPP) | |
|-------------|------------------------|--------|----------------------|--------|
| | PPP millions | % BERD | PPP millions | % BERD |
| Australia | 328 | 6.8 | 219 | 4.1 |
| Austria | 154 | 4.5 | 193 | 5.6 |
| Canada | 1381 | 14 | 258 | 2.6 |
| France | 543 | 2.2 | 2655 | 11.1 |
| Japan | 431 | 0.5 | 681 | 0.8 |
| Netherlands | 470 | 8.1 | 175 | 3.4 |
| Norway | 24 | 1.3 | 178 | 10.4 |
| UK | 860 | 2.8 | 2408 | 10.9 |
| US | 6356 | 3.1 | 23,535 | 10.7 |

Source: OECD, based on national statistics

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Relative shares of direct funding and tax incentives



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Direct funding vs. tax incentives: benefits

Econometric analysis by Guellec and Van Pottelsberghe

- Both have positive effect on business R&D. Tax incentive short-lived; more effective if stable over long period of time.
- Substitutes for each other: increasing one reduces effectiveness of other.
- Increasing direct support beyond threshold (13% of business R&D) reduces effectiveness.

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Balancing the policy mix

- Direct funding and tax incentives not substitutes but complements
 - Which types of firms to target (large, small, R&D intensive, non-performers?)
 - Which “market failure” to address (financial constraints, risk and uncertainty, timeframe for ROI, others?)
- But is the distinction blurring
 - Tax incentives more targeted to types of firms and types of R&D
 - Tax incentives can involve ex-ante review and selection by government officials
 - So, will the two become different means of offering more similar types of support???

Issues for consideration

- What do firms perceive as the benefits of tax incentives?
 - Do they generate additional R&D? Of what kind?
 - Do they distort or reward R&D behaviour?
 - Do they influence location decisions? To what degree
- How can tax incentives be improved?
- How do tax incentives compare to other government R&D supports?

For more information. . .

*STI Outlook 2001
Drivers of Growth*



STI Outlook 2004



*STI Scoreboard
2005*



www.oecd.org/sti/sti-outlook

www.oecd.org/sti/innovation

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