R&D Tax Credit: Theory and Practice

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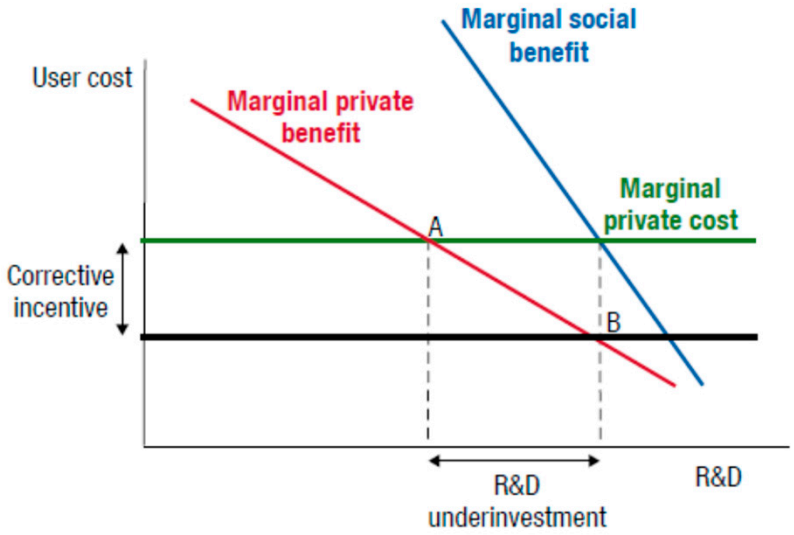
Economic Rational of R&D Tax Credit

- ☐ "Market failure" as economic rationale of subsidizing R&D expenditure
- ● Externality = Social benefit of R&D may exceeds private benefit due to external benefit/ spillover
- ✓ Technology diffusion and knowledge spillovers
- ☐ Asymmetric information = Potential of R&D activity may not be observable by lenders such as banks.
- ✓ Firms undertaking R&D activity may be financially constraint.

- ☐ In practice, can we quantify external benefit and/or financial constraint?
- ● "Domestic social rates of return to private R&D are generally estimated to be two to three times the private return " as noted in IMF(2016) ⇒General estimate does not apply to Individual R&D activities
- ➢ Do we rightly target to R&D expenditure or should we??

Annex Figure 2.2.1. Underinvestment in Research and Development (R&D) and the Efficient Corrective Incentive



IMF Fiscal Monitor (2016).

What R&Ds are innovative?

- ☐ Not every R&D activities are truly innovative.
- ✓ What is innovation??
- ☐ In theory, innovation implies new technology to the world..?
- Some R&D may be just imitation of existing technology or improving it.
- They may be new to own country but not to the world
- ☐ Definition of novel R&D is not clear….
- And it differs among different countries.
- ☐ Even scope of R&D is sometime not obvious.
- ✓ How should we treat IOT (and Omotenashi in Japan context) ?

Figure 5.3 Definition of novelty for R&D tax incentives across countries

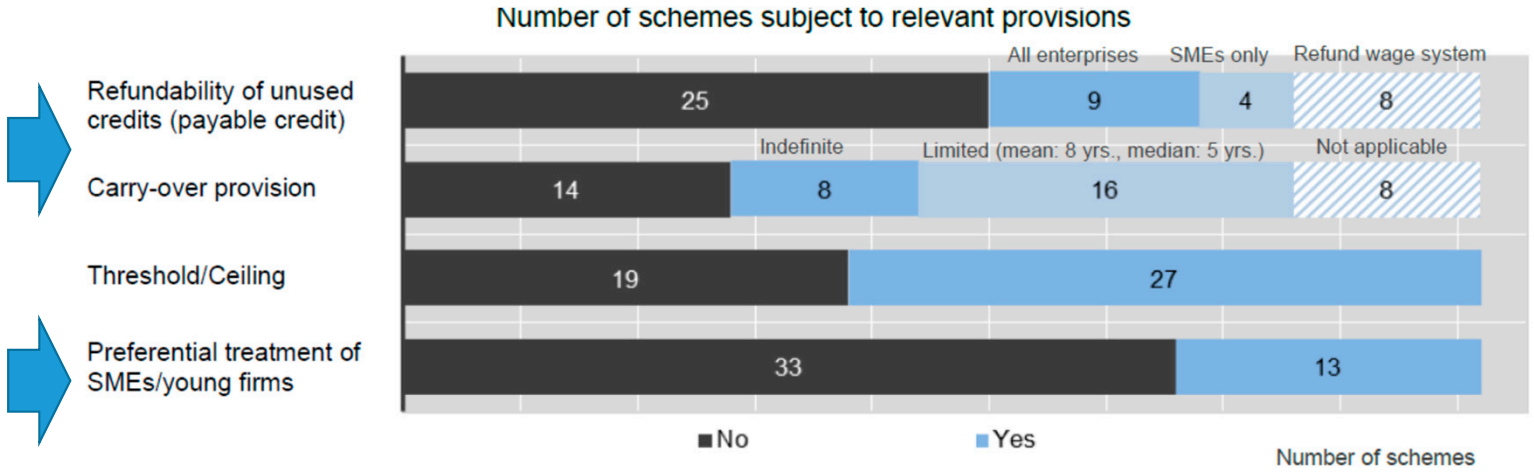
New to the world	New to the country	New to the firm	Ambiguous
•Belgium •Canada •France •Lithuania •Poland •Portugal •Romania •Slovenia •Spain •Sweden •United Kingdom •Croatia •Czech Republic	•France •Japan	•Austria •Denmark •Finland •Ireland •Italy •Japan •Latvia •Malta •Netherlands •Norway •Poland •Slovak Republic •United States	•Bulgaria •Greece •Hungary •Israel

A Study on R&D Tax Incentives European Commission (2013)

Policy instruments to promote R&D

- Given that it is socially desirable to promote R&D expenditure, what policy instruments to be used?
- There are different schemes for the same purpose
  - ✓ Tax credit: refundable or non-refundable
  - ✓ carry over of R&D expenditure
  - Targeting SMEs/ young firms?
- ⇒ Are we using just right policy instruments??

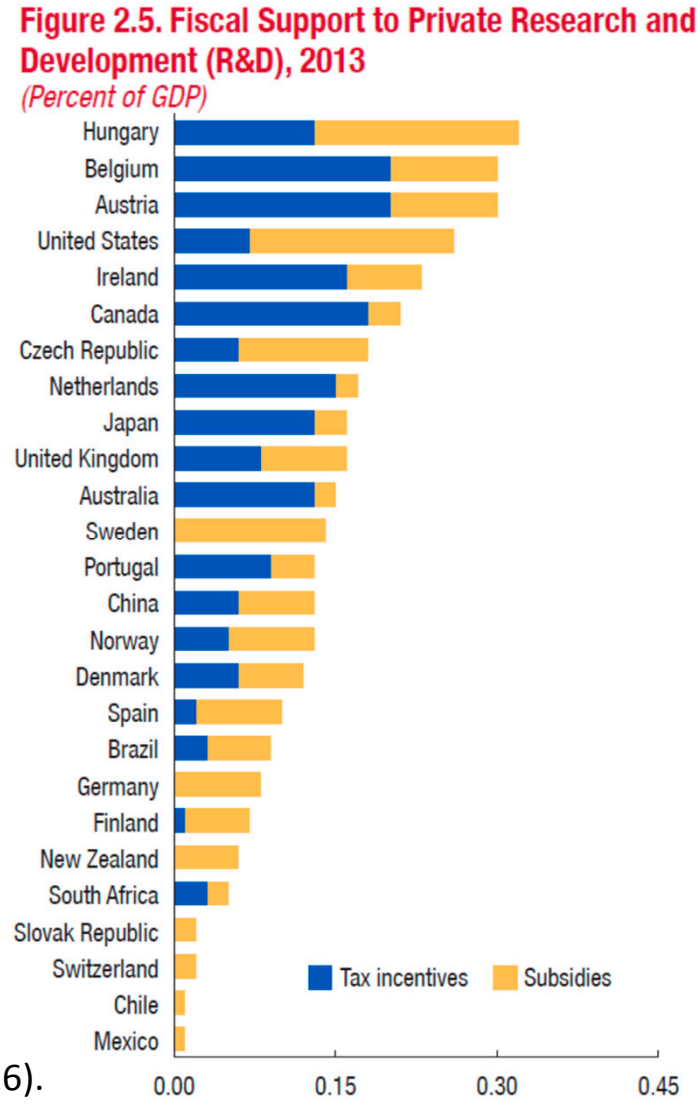
- If financial constraint, policy should be designed to deal with it.
- If new firms are more innovative, we better target them



Source: OECD, Measuring R&D Tax Incentives, www.oecd.org/sti/rd-tax-stats.htm, October 2015.

Tax credit versus subsidy

- There has been increasing use of R&D tax credit to boost R&D
  - Without refundability and/or carry over provision, only profit making firms benefit from R&D tax incentives.
  - ✓ New innovative firms cannot benefit from tax incentives unless they do not earn positive profit
- In theory, subsidy may be more suitable to support innovative firms especially new firms.
  - ✓ Government can better target to socially beneficial R&D activities as IOT and environment protection
  - ✓ Accountability/ transparency improves as subsidy expenditure is clearly stated in budget as opposed to tax expenditure
- In practice, administrative procedure of applying R&D subsidy may be cumbersome.
  - ✓ Government may lack information on truly beneficial R&Ds.
  - ✓ R&D tax incentive on contrary support general R&D expenditures



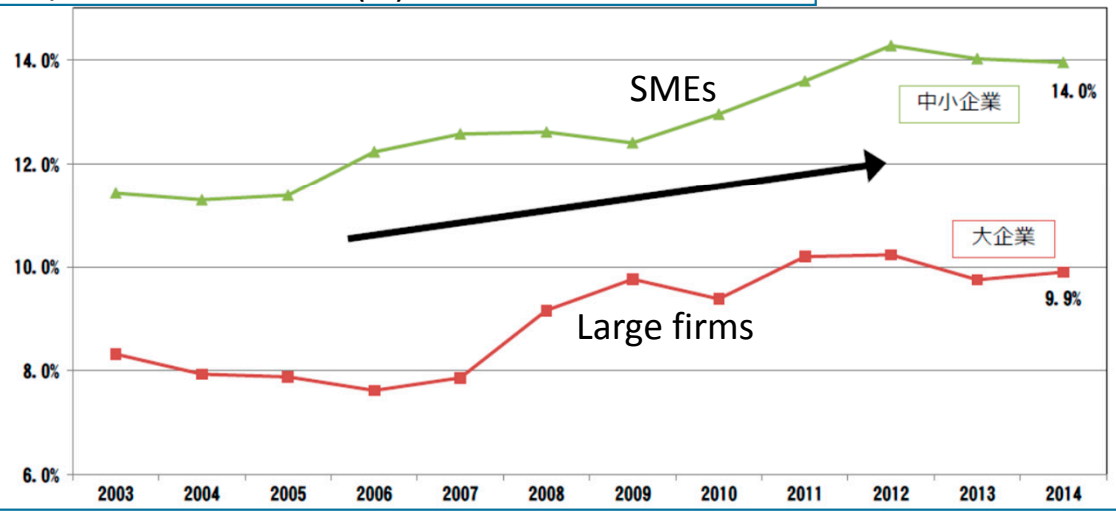
IMF Fiscal Monitor (2016).

Financial constraint and SCC

- In practice, financial/ cash constraint especially on SMEs (and new firms) is exacerbated due to fixed liability/cost such as social security contribution (SSC)
- Given that R&D in general should be supported, it may be SSC that should be mitigated to enhance it
  - ➢ Tax incentive lowers CIT burden not SSC
  - ➢ Cutting CIT may not be helpful much for innovative but not yet profitable firms
  - ➢ In the Netherland, R&D spending can be deductible from SSC (WBSO).
  - Unused R&D tax credit in CIT may be used to lower SSC
  - Or overall SSC on firms should be reduced
  - ✓ Sifting from CIT/SSC to VAT may support R&D activities.

Burden of Social security contribution on firms in Japan

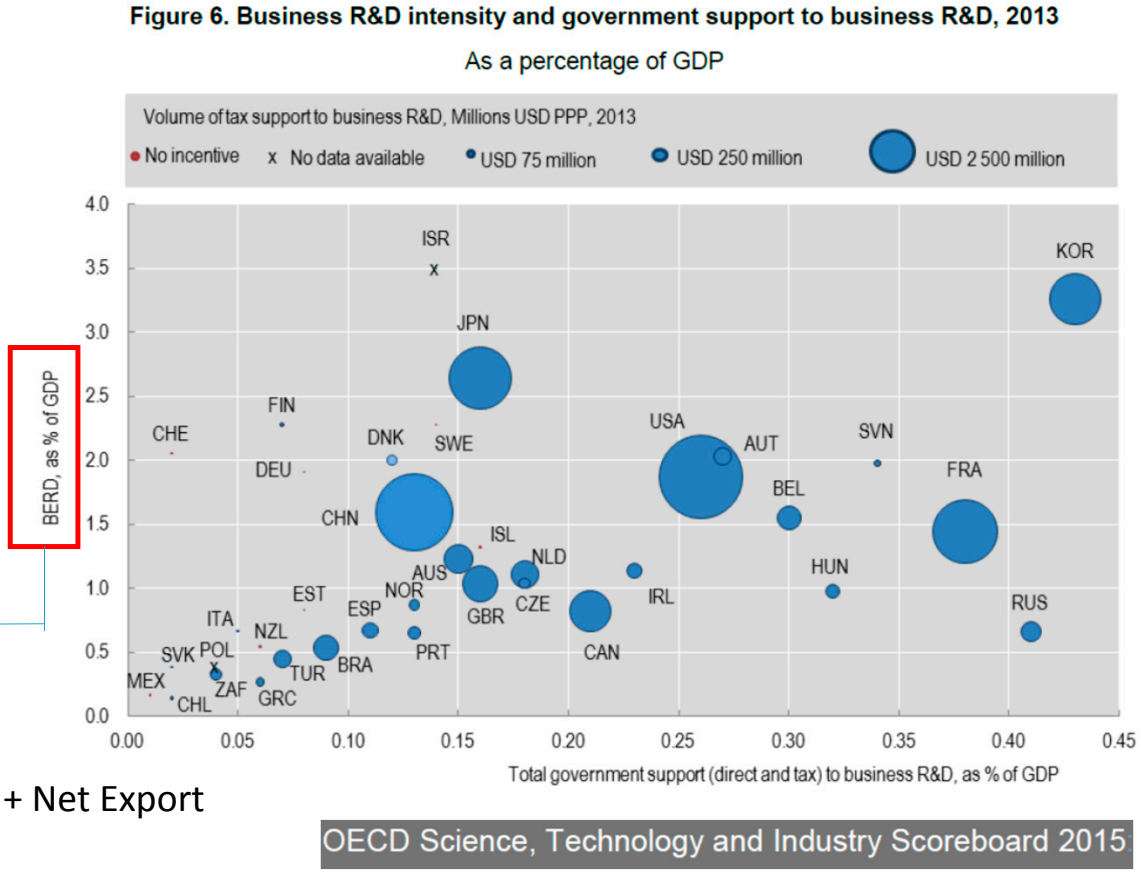
SSC/Proceeds of Sales (%)



METI(2016).

Impact of R&D

- How to assess tax support for R&D activities?
  - ➢ There are two different but often confused views..
  - ➢ Macroeconomic stabilization versus economic growth
    - Short run = Stabilization
      - ✓ Keynesian view = R&D spending as macroeconomic demand
    - Long run = Growth
      - ✓ Supply side/classical economics perspective = R&D as improving TFP or productivity
- What is role of R&D tax incentives??



OECD Science, Technology and Industry Scoreboard 2015

Long run

Short run

Output= Consumption + Investment + Gov. Spending + Net Export

Growth

Multiplier effect=Stabilization

Growth effect

- "An increase of 10 percent in private R&D in an average advanced economy would boost the level of GDP by about 1.3 percent in the long term" (IMF2016)

☐ R&D spending in general improves TFP=Productivity

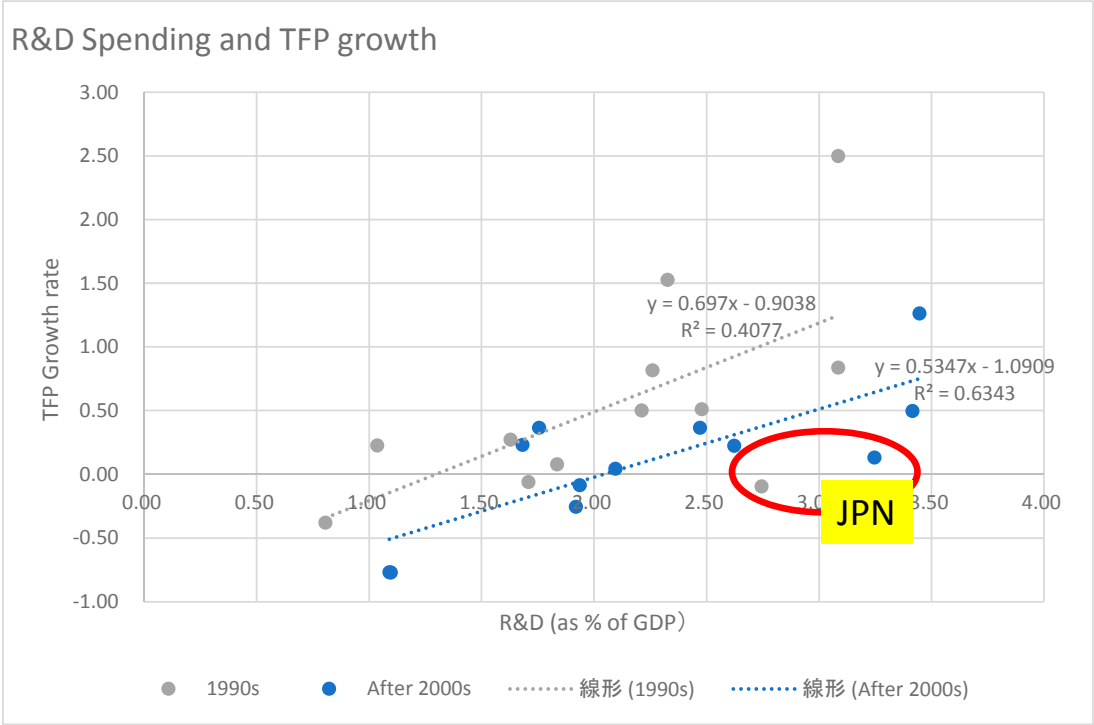
☐ Its performance a bit differs among different countries

➢ R&D activities in some countries are more productive than others

✓ Japan has under-performed

☐ Not only quantity=a size of R&D spending but also quality = fields and players of R&D may be important

➢ How to improve quality of R&D by tax incentives and/or subsidy??



Sample: BEL,CAN,FIN,FRA,DEU,ITA,JPN,NLD,ESP,SWE,GBR,USA

R&D

Growth Account

Growth rate = TFP (Total factor productivity) + α Labor force increase + (1-α) Capital investment

IP/Patent Outflow?

- ☐ Both R&D site and IP can be internationally mobile
- ☐ Even R&D tax incentives/subsidy support R&D investments, their generating IP/Patent may move outside
- ➢ There can arise not only international tax competition over R&D activities but also over IP/patent
- ✓ Harmful/ Self defeating competition
- ➢ Given that many firms/subsidiaries across countries are being involved in R&D activities, it is increasingly difficult to identify right place of IP/patent to locate
- ✓ Multi-national firms may be able to undertake cherry-picking behavior, undertaking R&D in a country with generous R&D tax incentives and moving IP to another country with lower patent box tax rate.
- ✓ National government cannot recover tax revenue from successful R&Ds

Tax Factors	*Belgium*	*Netherlands*	*United Kingdom*
Headline tax rate	6.8%	5%	10%
Year Enacted	2007	2007, 2010	2013
Qualified IP	Patents and extended patent certificates	Patents and IP derived from technological R&D activities	Patents, supplementary protection certificates, regulatory data protection, and plant variety rights
Applicable to existing IP?	IP granted or first used on or after 01/01/2007	IP after 31/12/2006	Yes
Applicable to acquired IP?	Yes, if further developed	Yes, if further self-developed	Yes, if further developed and actively managed
Includes embedded royalties?	Yes	Yes	Yes
Can R&D be performed abroad?	Yes, if qualifying R&D centre	Yes, for patented IP; strict conditions for R&D IP	Yes

Patent Box Policies
Gaétan de Rassenfosse, University of Melbourne
2015

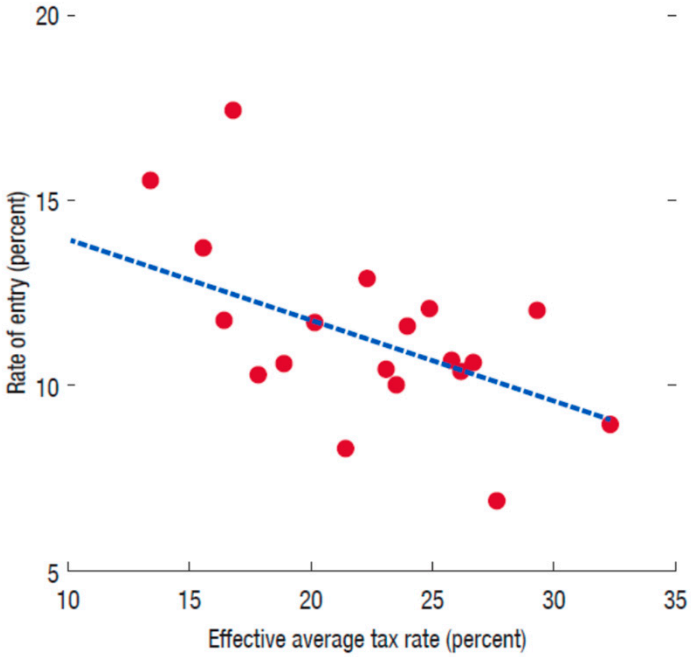
IP/Patent can move to lower tax country

In the End….

- ☐ Although there are empirical evidences that (i) R&D serves to enhance growth and (ii) R&D tax incentives/ subsidy can promote R&D activities, tax incentives/ subsidy may not be eventually an effective policy instrument
- ✓ R&D activities may not be rightly targeted and its quality may not improve
- ✓ Loss making firms that are financially constrained cannot benefit from tax incentive
- • Proceeds of R&D may not even stay in country
- ☐ Better way?
- ➢ It is better to target new firms
- ✓ New firms tend to be more innovative
- ➢ Lower corporate tax rate/SSC and simple tax scheme may serve to improve business environment for new firms and promote their entry
- ✓ More socially beneficial/ productive R&D may be enhanced.

Figure 2.14. Entrepreneurial Entry and Business Taxation

As average corporate income tax rates increase, business entry rates tend to decrease.



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