

Innovation and Research
Policies in International
Comparison:
Two Case Studies of R&D
Subsidies

Otto Toivanen

HECER

University of Helsinki

Innovation policy

- At least since the 1950's, recognition that research and development important for growth.
- Strong rationales for public policies in general, and R&D subsidies in particular.

This talk

- Theoretical justifications.
- Problems with implementation.
- Case studies: Finland and Norway.
- Conclusions.

1. Theoretical justifications

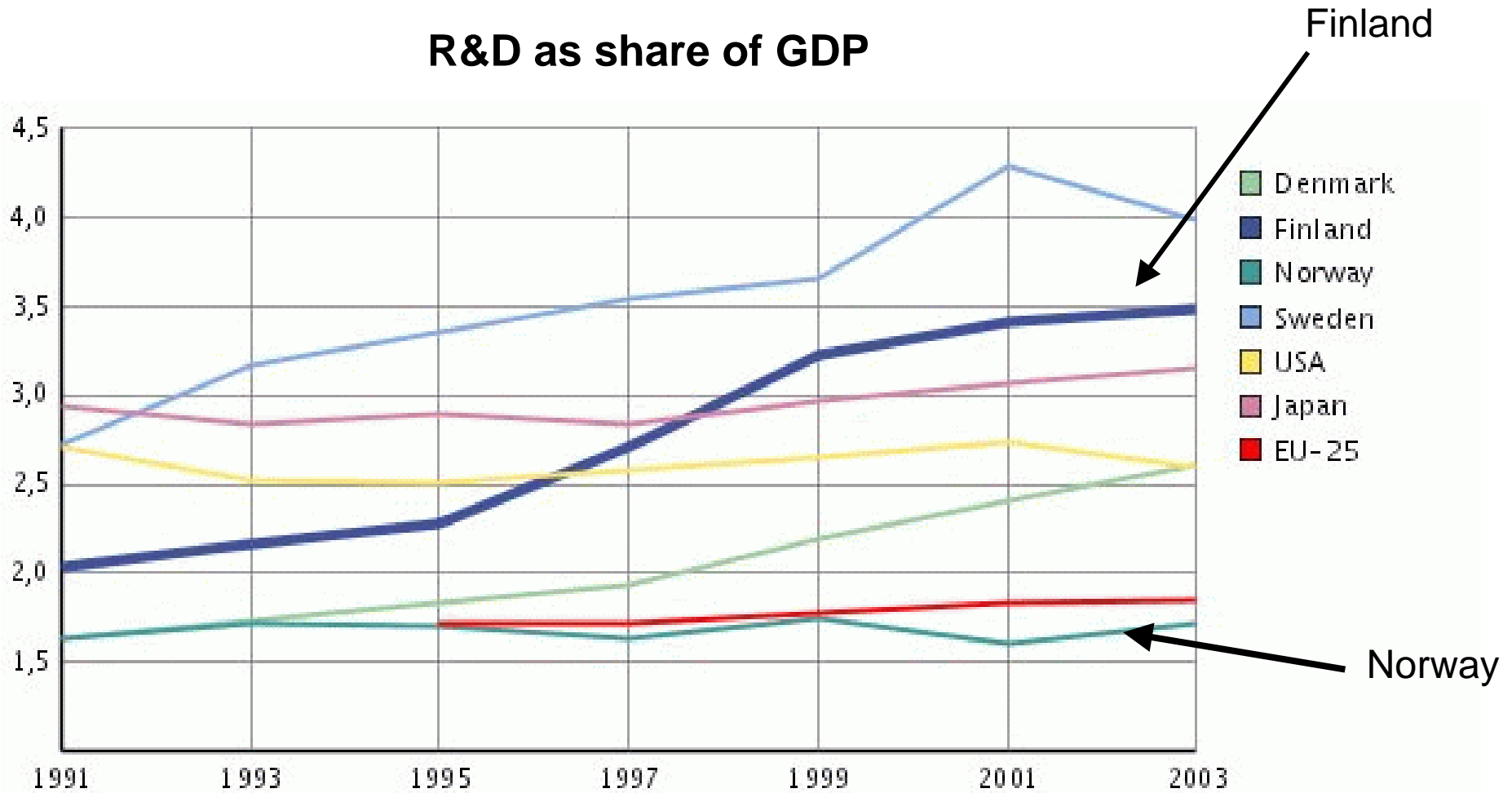
- Markets, left to themselves, do not achieve the socially optimal allocation of resources for innovation.
- Main variations:
 1. externalities: consumer surplus, informational spillovers, rents to workers.
 2. financial market imperfections.

2. Problems in implementation

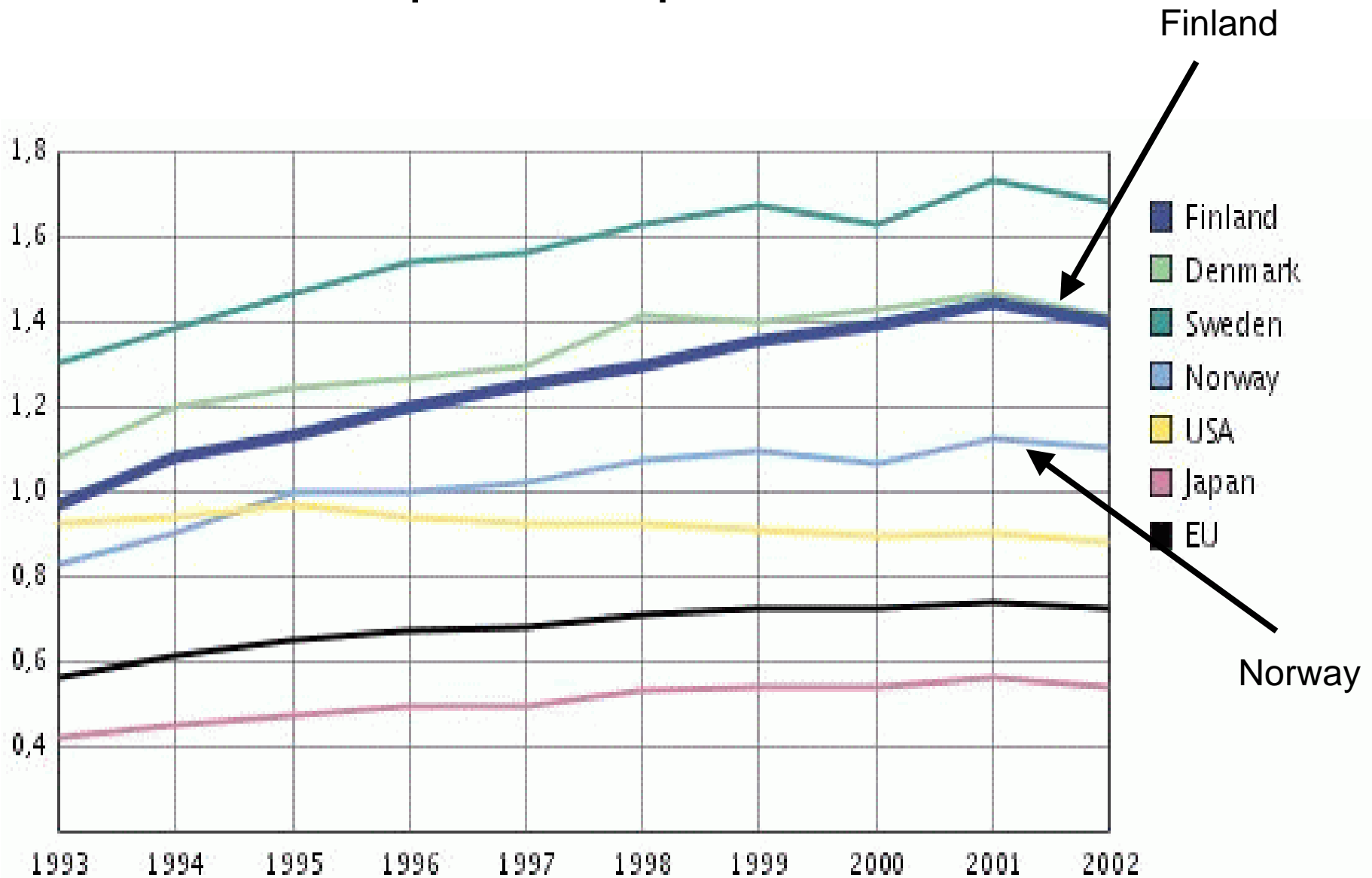
- R&D subsidies necessitate case-by-case government decisions. → Effects on horizontal nature of support?
- Informational requirements of optimal subsidies may be too large.
- Public sector incentives in active financing.

3. Finland and Norway

R&D as share of GDP



Scientific publications per 1 000 inhabitants



Figures on US patenting, various countries.

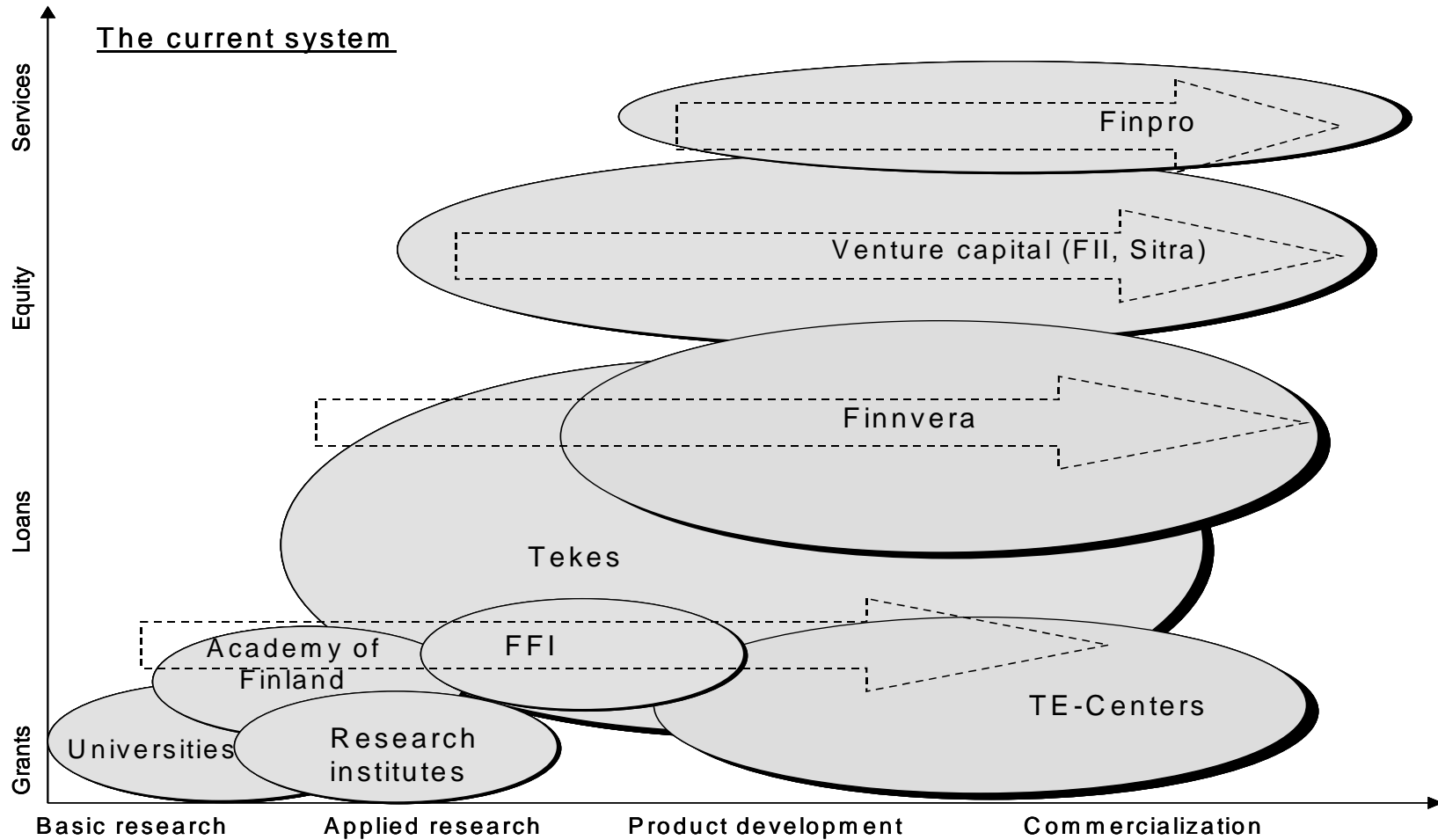
Country	Patents per year		Patents per 100 000 in habitants		Annual growth rate	
	1968–1997	1992–1997	1968–1997	1992–1997	1968–1997	1992–1997
G7						
UK	2547	2494	4.4	4.3	0.20 %	3.10 %
USA	46913	66325	19.8	25.2	1.60 %	5.30 %
Reference Group						
Finland	214	438	4.5	8.6	8.60 %	10.00 %
Israel	234	577	5.3	10.2	10.10 %	13.30 %
Norway	101	137	2.4	2.9	4.93 %	4.26 %
Spain	105	173	0.3	0.4	4.20 %	3.10 %
Asian Tigers						
Hong Kong	39	95	0.7	1.5	12.50 %	9.60 %
South Korea	443	1989	1.1	4.4	27.70 %	27.90 %

From Trajtenberg (2001), author's own calculations using NBER patent data

4. Case: Finland

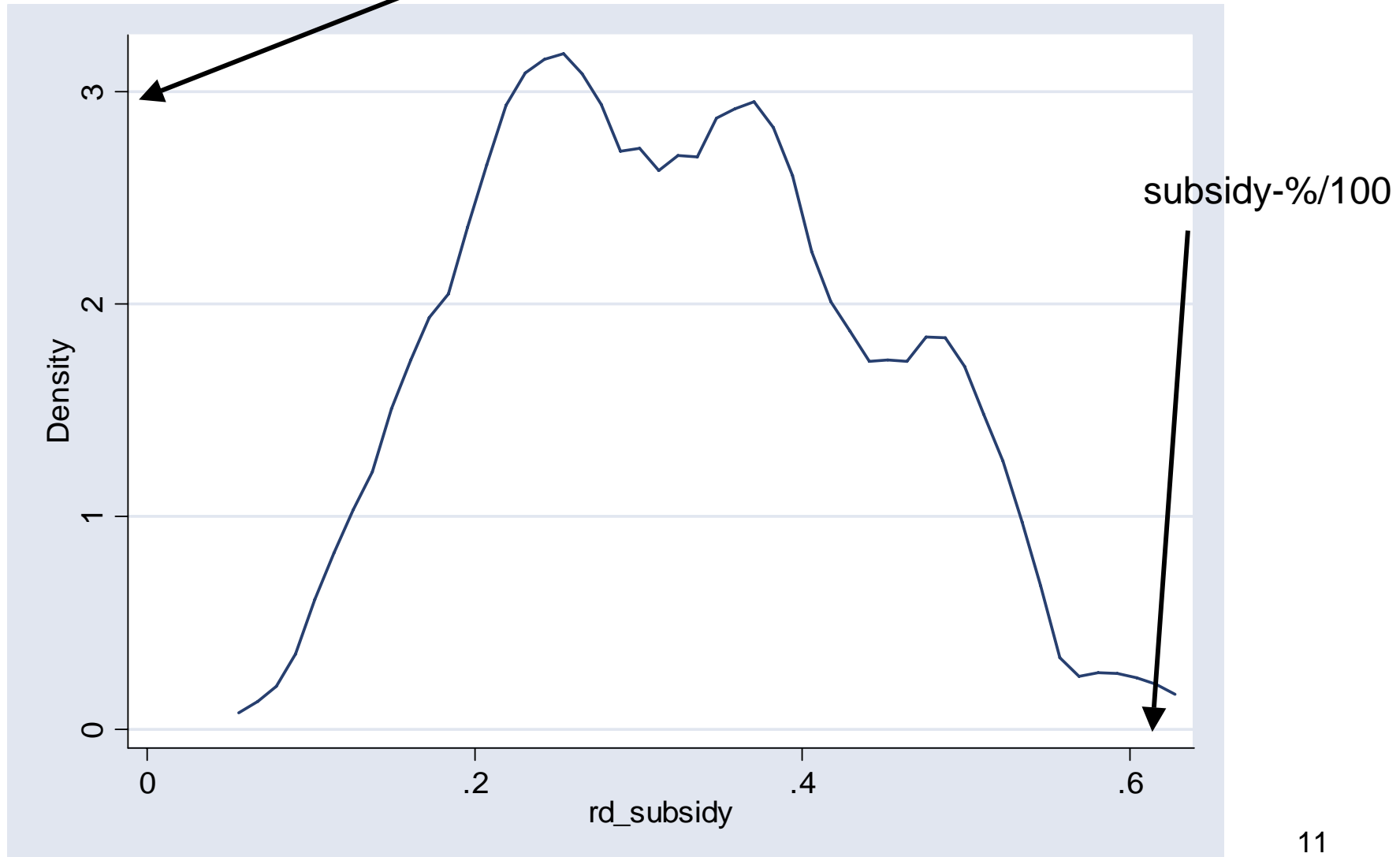
- R&D subsidies a major policy tool since early 1980s.
- The landscape of government institutions to do with R&D large and varied.
- Subsidies pay a varying % of R&D costs.
- Important: unsolicited applications, review process.

The Finnish Innovation Support System



Distribution of R&D subsidies to those firms that are granted one

relative frequency of different subsidy-%s



Evidence on effectiveness / Finland

- Hyytinen and Toivanen (2005), Ali-Yrkkö (2004) and Piekkola (2005) find positive effects / no crowding out of private R&D.
- Ali-Yrkkö (2005) finds positive effects on R&D employment.
- Hyytinen and Toivanen (2005) find positive effects on growth (expectations).

But also...

- Takalo, Tanayama and Toivanen (2005) find that:
 - firms with most profitable projects do not apply.
 - application costs very high.
 - returns to subsidies may not justify costs.
 - subsidies do mainly not vary systematically over industries.

5. Case: Norway

- Norwegian National Program for Information Technology 1980s and 1990s.
- Objective: to promote production and applications of IT in Norway.
- National champions in new disguise?
Heavily concentrated support.

Evidence on effectiveness / Norway

- Klette & Moen (1999): Subsidized firms do not differ in profits, investment.
- They do differ *negatively* in growth, labor productivity, and TFP.
- Klette & Moen (1998): No additionality, but an increase in later R&D investment.

also...

- Moen (2004, 2005) traces the careerpaths of employees who used to work in the subsidized firms:
 - Little or no evidence of spillovers through employees.

6. Finland and Norway

- Matching grants in Norway.
- In Norway, explicit concentration on one industry.
- Norway tilted towards large firms.
- Exogenous effects: IT/mainframes in late 80's versus mobile phones in early 90s.

7. Conclusions

- Theoretical justifications for public support for private R&D have empirical support.
- Major hurdles of "active" forms of financing:
 - informational requirements.
 - incentive issues.
 - political economy issues.

Conclusions c'ed

- Norway – Finland comparison:
 - Norway: large firms, "national champion".
 - Finland: unsolicited applications. BUT: increasingly programs.
 - Even in Finland where things appear to work, open question whether justified from a return point of view.