

Lisbon Research and Policy Workshop, 12-13 October: What is the potential of new financing schemes for fostering science and technological innovation?

*Innovative ways of financing science and innovation: some findings from OECD work*

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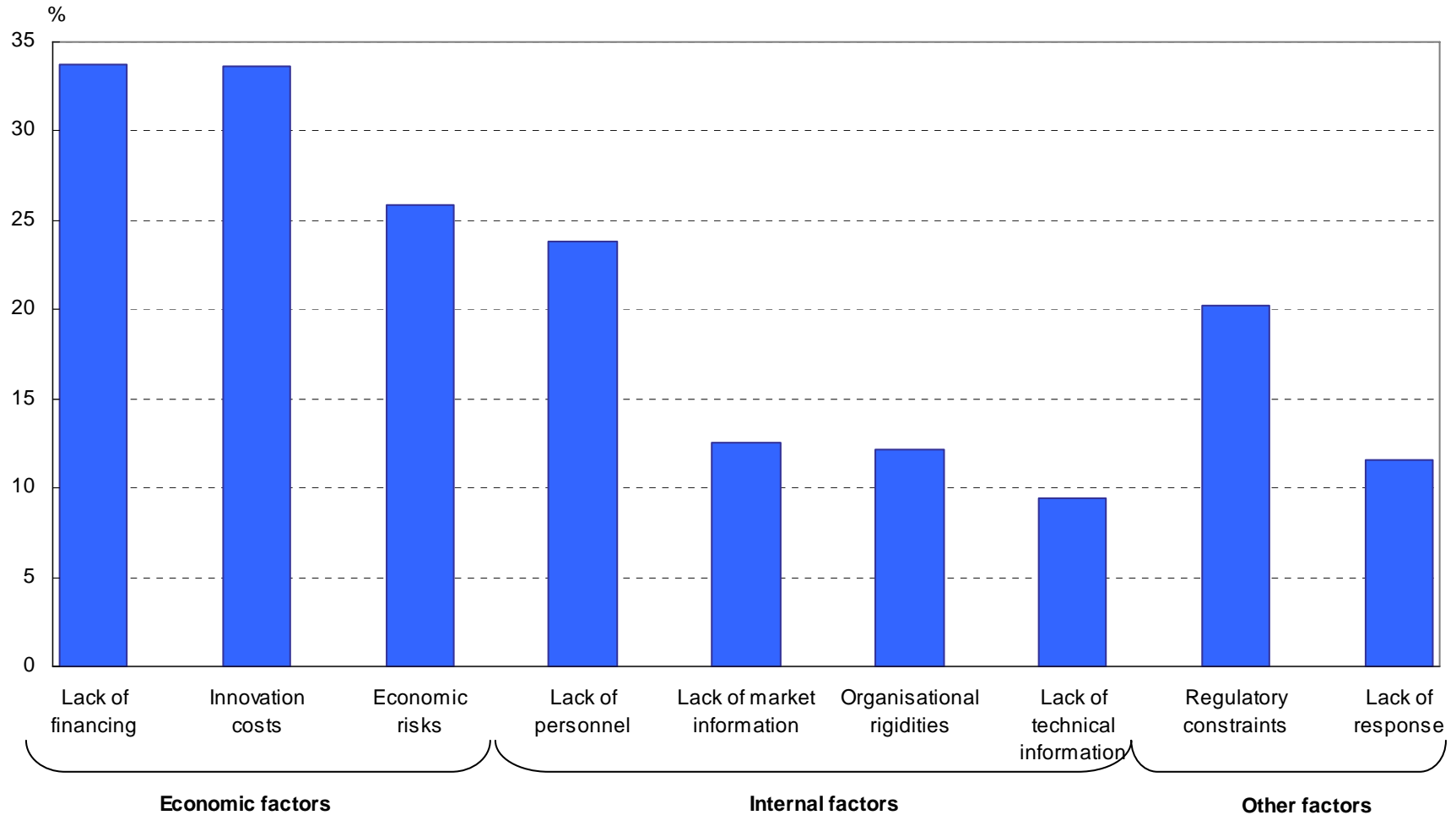
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# Outline

- New factors: Intangible investment and open innovation
- New ways of leveraging intangible assets
- Venture capital – enhancing access to risk capital
- Support for business R&D – trends and some new approaches
- Public-private partnerships
- Concluding remarks

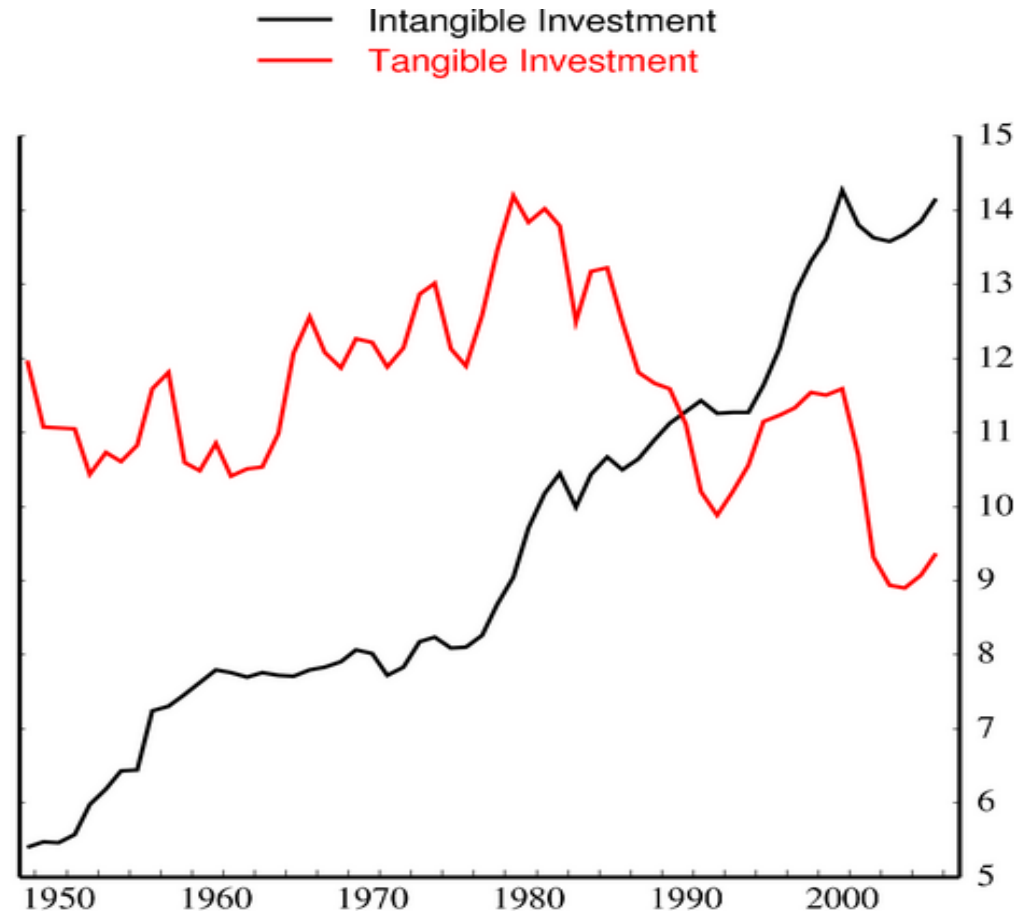
# Lack of financing remains a key barrier for innovation

Percentage of European services firms identifying a factor as highly relevant, as a share of all firms expressing relevance, 1998-2000



# The context is changing: the composition of investment is shifting towards intangible assets ...

- Estimates for the United States show that intangible investment (software, R&D, training and organisational factors) is now larger than investment in machinery, equipment and buildings.
- Intangibles are often not included in firm (& national) accounts.
- Estimates for the UK confirm the US estimates.



# ... and Firm Strategies are changing: From Closed to Open Business Innovation

## Old model: closed innovation

- Firms identify needed technological advances
- Firms conduct R&D internally, often in corporate laboratories
- Firms incorporate advances into new products & services
- Product revenues finance additional R&D

## New model: open innovation

- R&D linked to business strategy (new funding models, incentives)
- Acquisition of technology (licensing, corporate VC, M&A, collaborative research)
- Externalisation of R&D results (licensing, spin-offs)
- Globalisation to tap into world-wide knowledge and talent
- More diverse set of innovators (public sector, SMEs, services)
- Greater role of users

# Intangible investment – the challenge

- Firms increasingly create value through their intangible assets:
  - Brands, reputation and quality
  - Patents and trademarks
  - R&D, software, skills
  - Supplier and customer relationships, etc.
- Only some intangible assets are recognised in firm accounts – typically if a value has been established in the market - a large part of a firm's corporate assets is thus not reported in financial accounts.
- Financial statements are therefore less useful for shareholders and capital markets – which can lead to misallocation of resources.
- Innovative firms are most likely to be affected by this problem.

# Intangible investment – the way forward

- Problems:
  - What should be disclosed and how?
  - What kind of information should be provided by the firm?
  - How can this information improve management and operations
- Financial accounts typically can not include this non-financial information - as much is not monetised - reform of accounting standards is therefore not sufficient.
- The solution: Narrative reporting of non-financial information by firms on assets and their value drivers (how they make their assets create value – i.e. what is their business model).
- Need for guidance on what and how to report – on a voluntary basis.

# Guidance for non-financial reporting

Type	Institution/Country	Initiative	Scope	Application	Year
Narrative/non-financial reporting (e.g. contextual information on major factors affecting a company's performance)	European Union	Public	All companies except SMEs	andatory	003
	Australia	Public	Listed companies	andatory	003
	Canada	Public	Listed companies	andatory	003
	Germany	Public	All companies	andatory	004
	United Kingdom	Public	Quoted companies	oluntary	005
	United States	Public	Listed companies	andatory	003
Specific reporting about intellectual assets (e.g. stand-alone reports on intellectual assets)	European Union	Public	All companies	oluntary	002
	European Union	Public	SME		
	Australia	Public	All companies	oluntary oluntary	006 002
	Austria	Public	Public universities	andatory	002
	Denmark	Public	All companies	Voluntary	003
	Germany	Public	SME	Voluntary	004
	Japan	Public	All companies	Voluntary	005

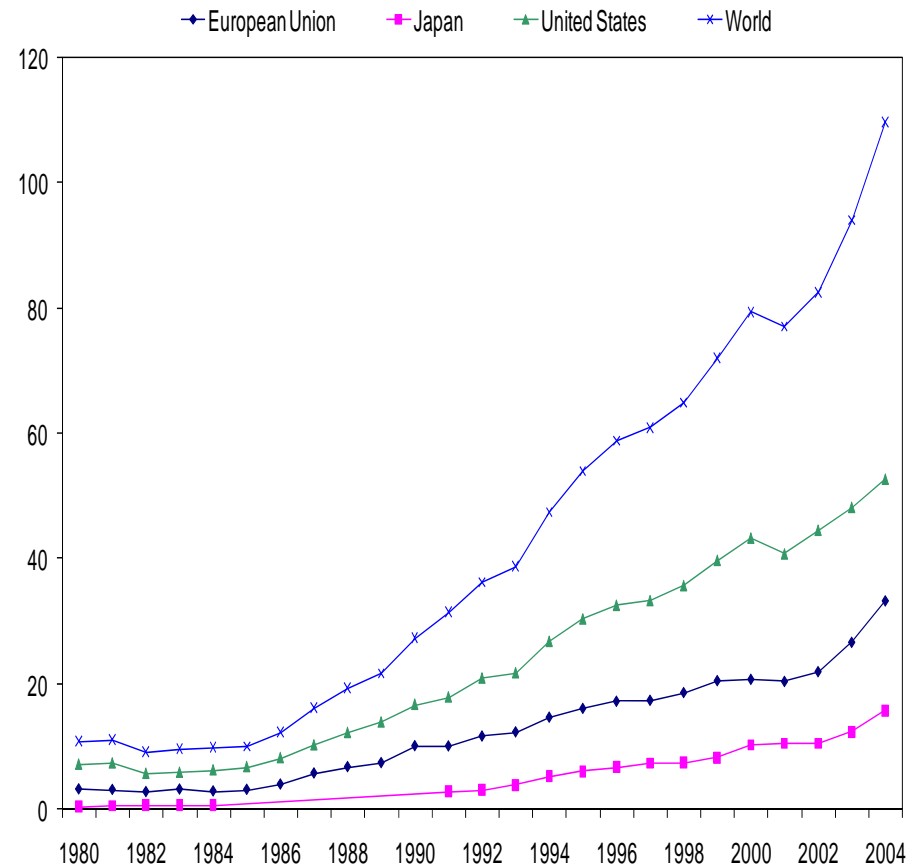
Source: OECD, 2006, Intellectual Assets and Value Creation – Implications for Corporate Reporting.



# New ways of leveraging intangible assets

- The growing importance of intangible assets is accompanied by many new ways of using them to generate revenue and finance follow-on innovation, e.g. through licensing.
- Licensing can facilitate the entry of small firms that often lack the assets to commercialise their inventions.
- Technology markets for licensing are better developed in the United States and Japan than in Europe, accounting for a larger share of formal R&D.

## Receipts from international licensing



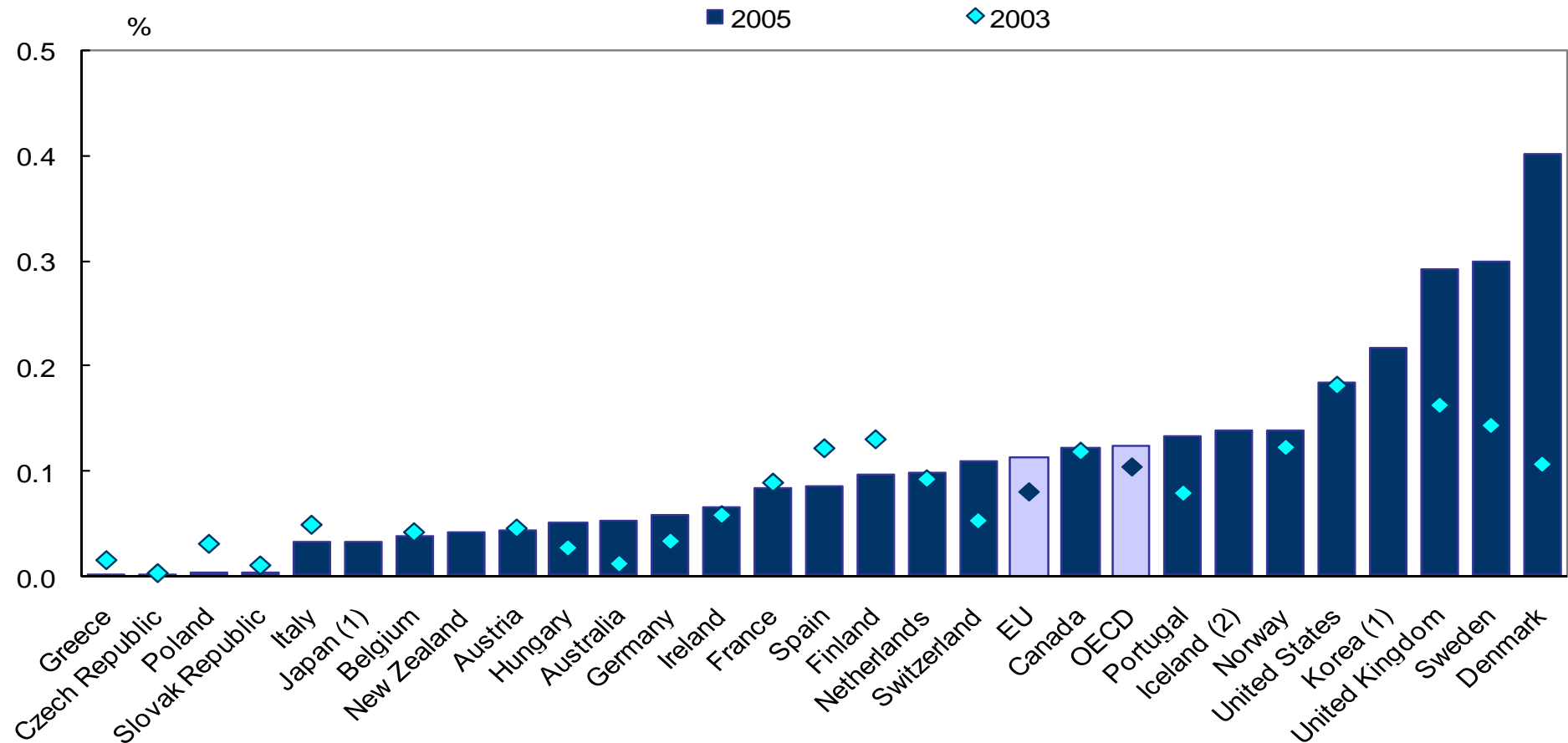
# The development of knowledge markets

- The growth of licensing is only one sign of the growing importance of knowledge markets.
- A related sign is the growing use of IPR as collateral to access finance, in particular for new, early-stage firms as IPR is their main contribution to future earning power:
  - Start-up firms use their IPR to raise capital
  - SME often license out their inventions
  - Large firms (e.g. in electronics) may cross-license parts of their IP portfolio
- Intermediaries in the markets for knowledge include:
  - Financial firms (e.g. Swiss Re) that acquire patent portfolios
  - Patent Value Funds – institutional funds that invest in patent portfolios.
  - Public auctions of IPR
- Policy is only slowly adjusting to the growth of knowledge markets. Challenges include:
  - Improving the operation of patent systems
  - Disclosing and diffusing information
  - Better valuation of patents

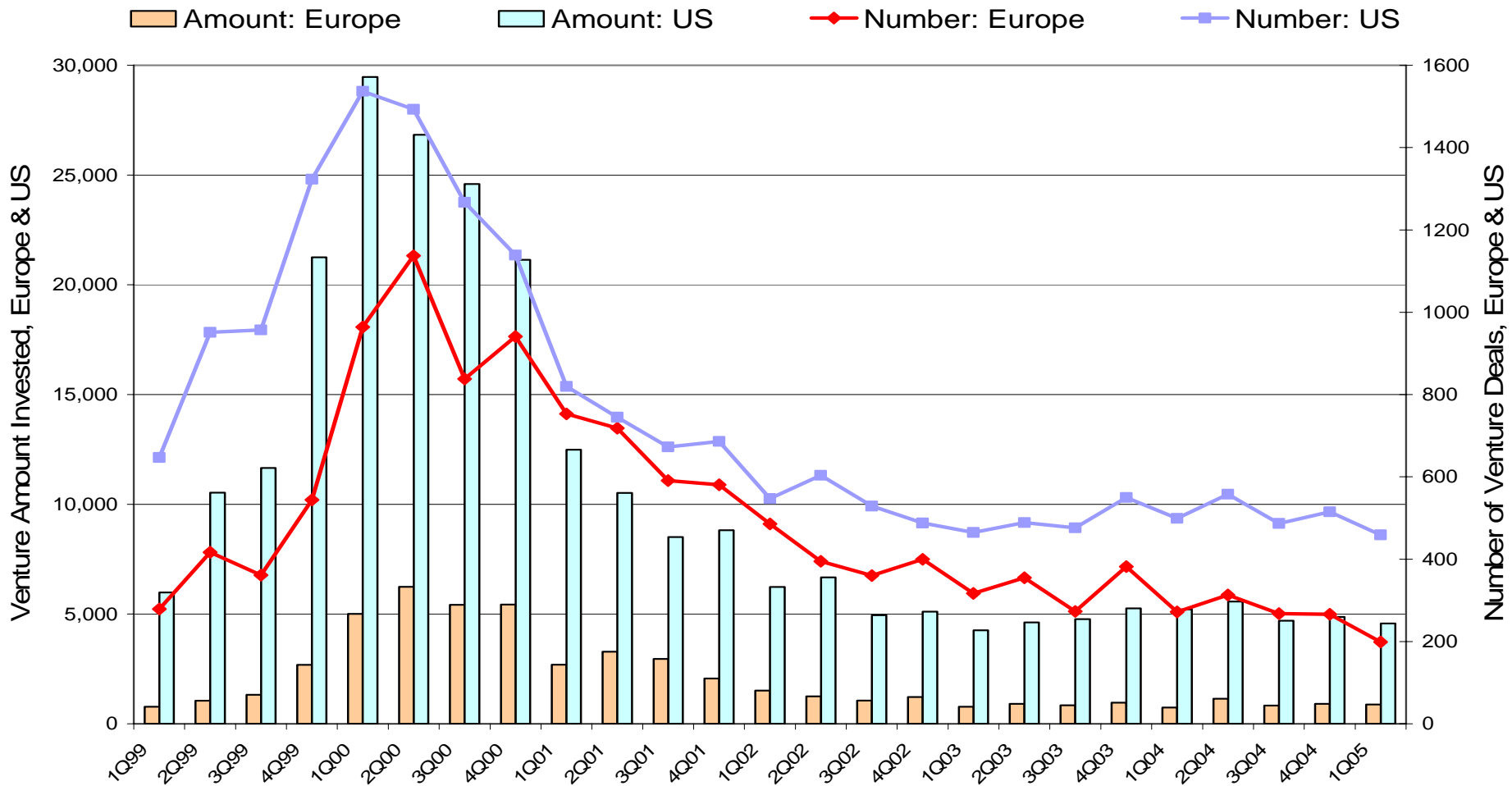
# Venture capital – a key role in innovation

- High potential growth firms typically have negative cash flows, untried business models (important intangible assets) and uncertain prospects – traditional financing is often inadequate.
- Venture capitalists provide equity through various stages of the firm cycle and often also provide a coaching function – they are hands-on investors.
- Venture capital is particularly important in some sectors (ICT, biotechnology, etc.) and has underpinned some of the key new companies that have emerged in recent years (notably in life sciences)

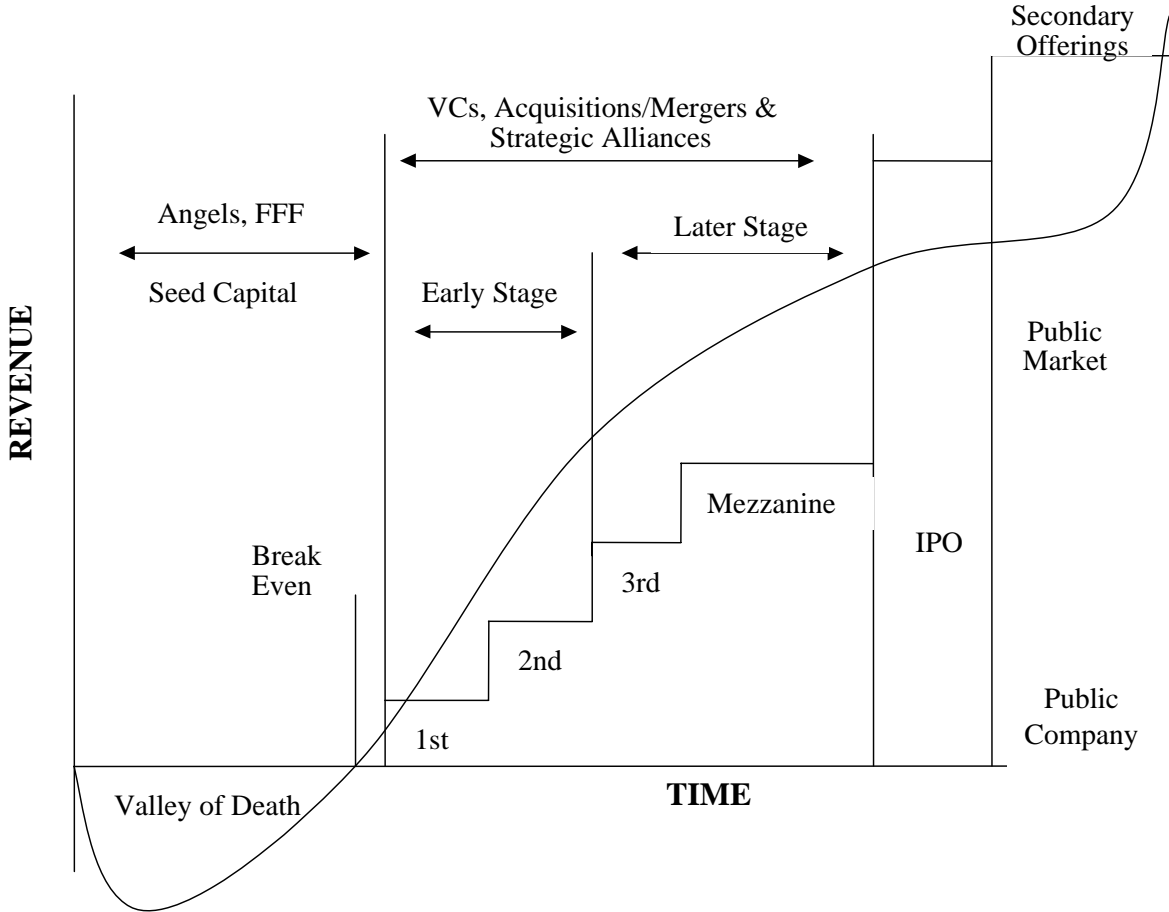
# Markets for venture capital differ considerably across OECD countries (as % of GDP)



# ... and reflect a highly cyclical market



# Venture capital's role in financing



Source: Cardullo (1999).

# Why the variation in venture capital?

- Several possible explanations, e.g.:

- Lack of entrepreneurship and informal investment
- Lack of appropriate pools of savings and/or regulation of institutional investment that discourages investment in risk capital.
- Absence of suitable legal structures for venture capital
- Unattractive returns on venture capital, particular in early stages
- Lack of exit strategies, e.g. equity markets suited for high-growth companies
- Taxation policies that discourage entrepreneurship and/or risk capital.

- Government policies are often aimed at addressing these barriers.

# Potential roles for public policy include

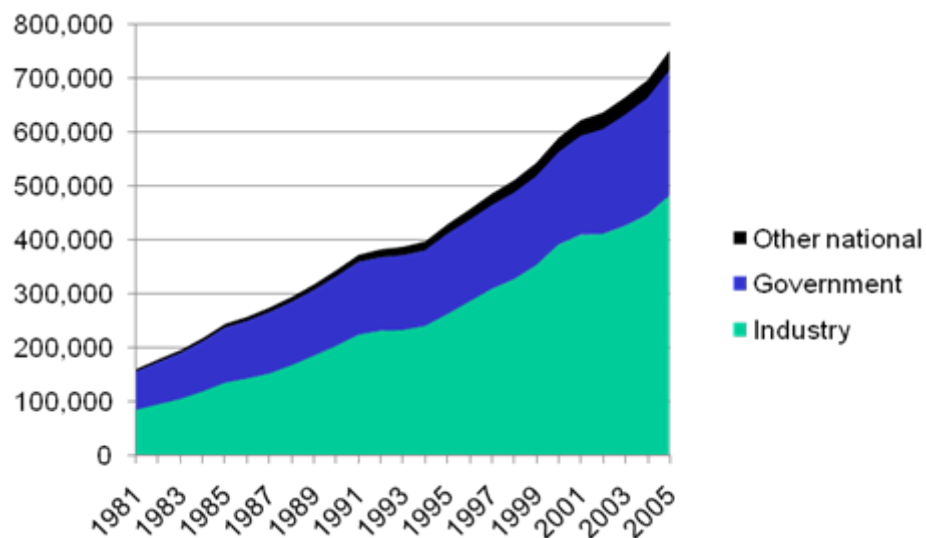
1. A favourable overall economic and institutional framework for entrepreneurship and innovation.
2. At early stages of the entrepreneurship process, informal channels of finance are more significant than formal channels. This sector is one where official support to spur development might be effective.
3. The legal and institutional infrastructure must include appropriate vehicles for venture capital.
4. An active community of investors with flexibility to invest in risk capital is an important component of the risk capital market.
5. “Growth stock exchanges” are an important stimulus to risk capital by providing exit mechanisms for companies in advanced stages of the venture capital cycle.
6. There is a close relationship between the risk capital market and other forms of private equity, especially buy-outs.
7. Public financial support for newer and high technology companies should not distort incentives.
8. Tax policy should be constructed so as to provide investors in new enterprises with reasonable risk-adjusted returns.



# The financing of R&D has also changed over time ...

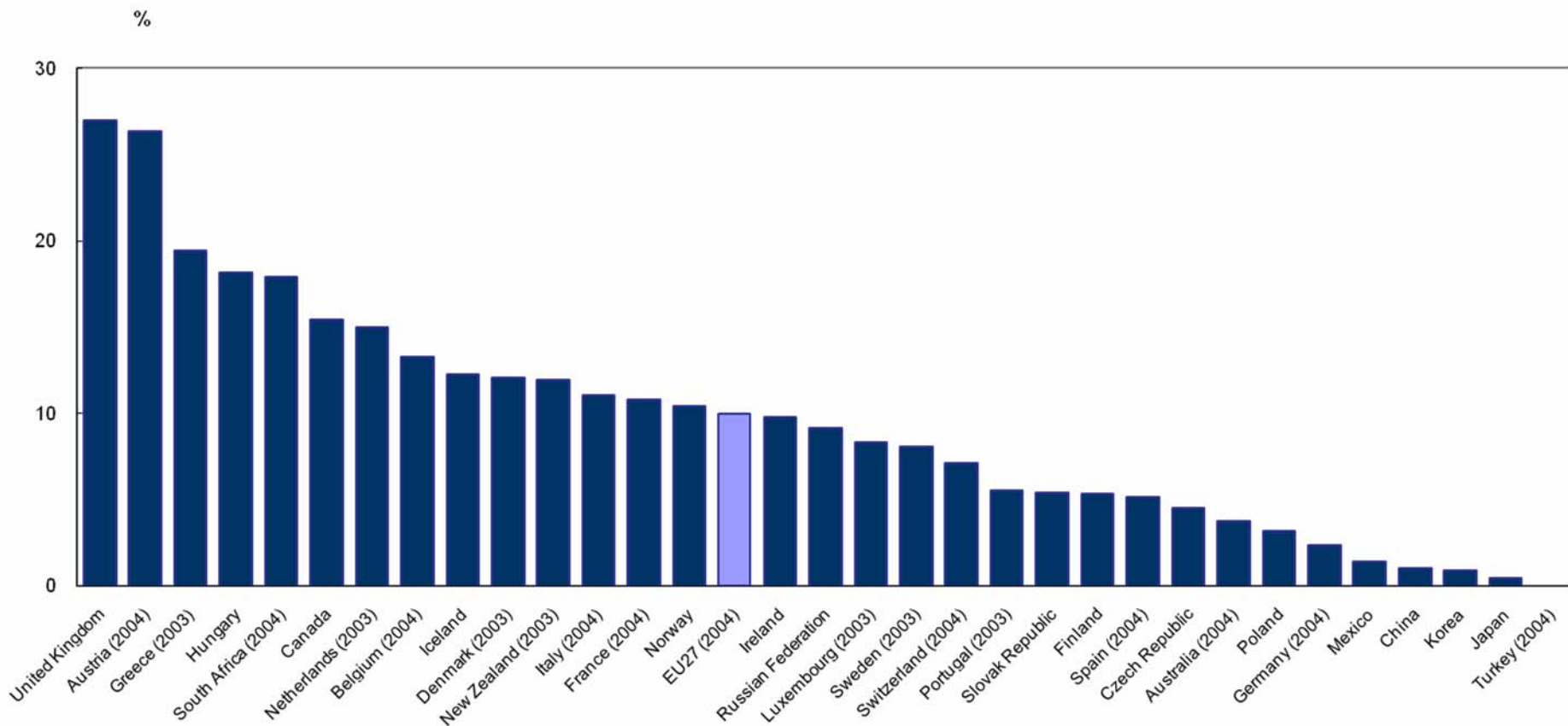
- Business financing of R&D has taken on greater importance as innovation has become more important for firm performance – high-tech industries have grown in particular.
- Government's share has declined and other national sources (notably non-profit institutions) have become more important sources of R&D financing.

Financing of R&D, 1981-2005



# ... funding from abroad is also important ...

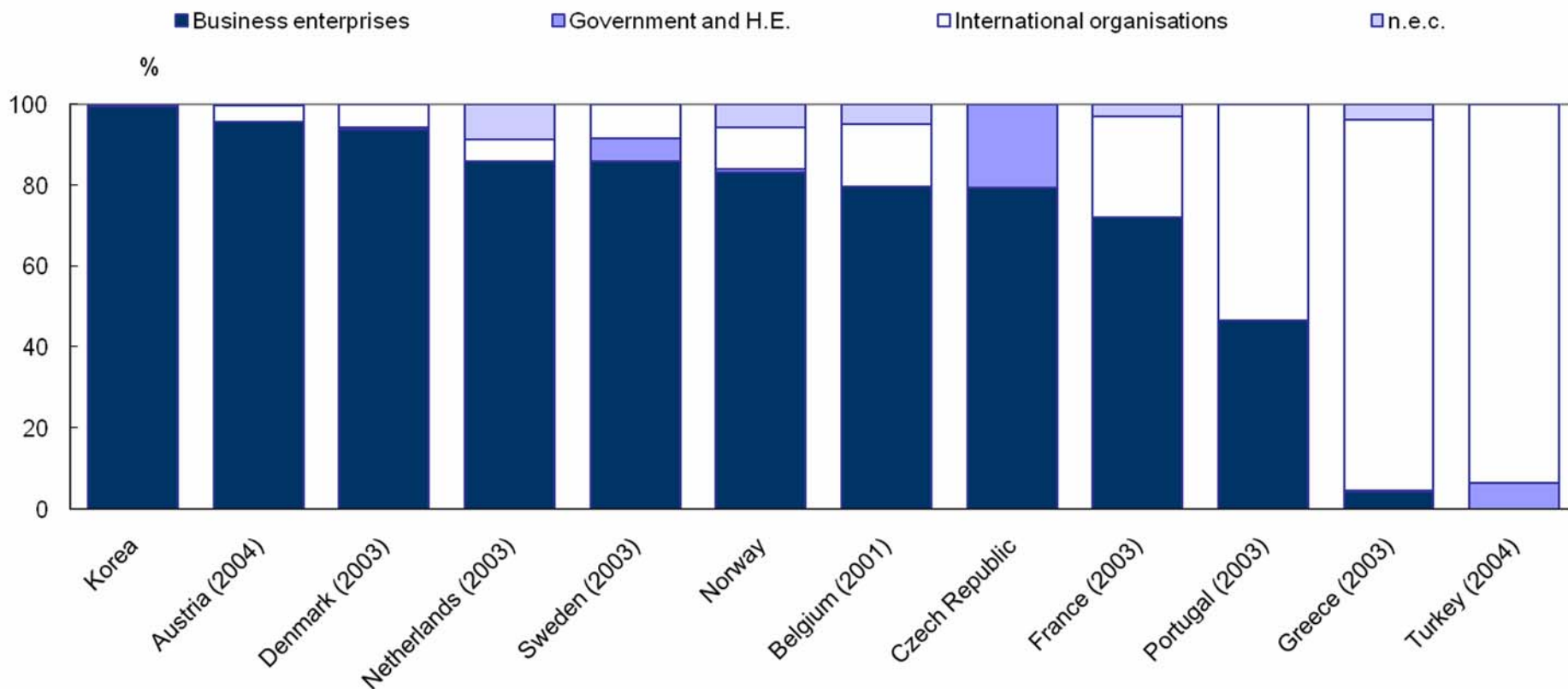
(as a % of total business R&D, 2005)



Source: OECD, STI Scoreboard 2007.

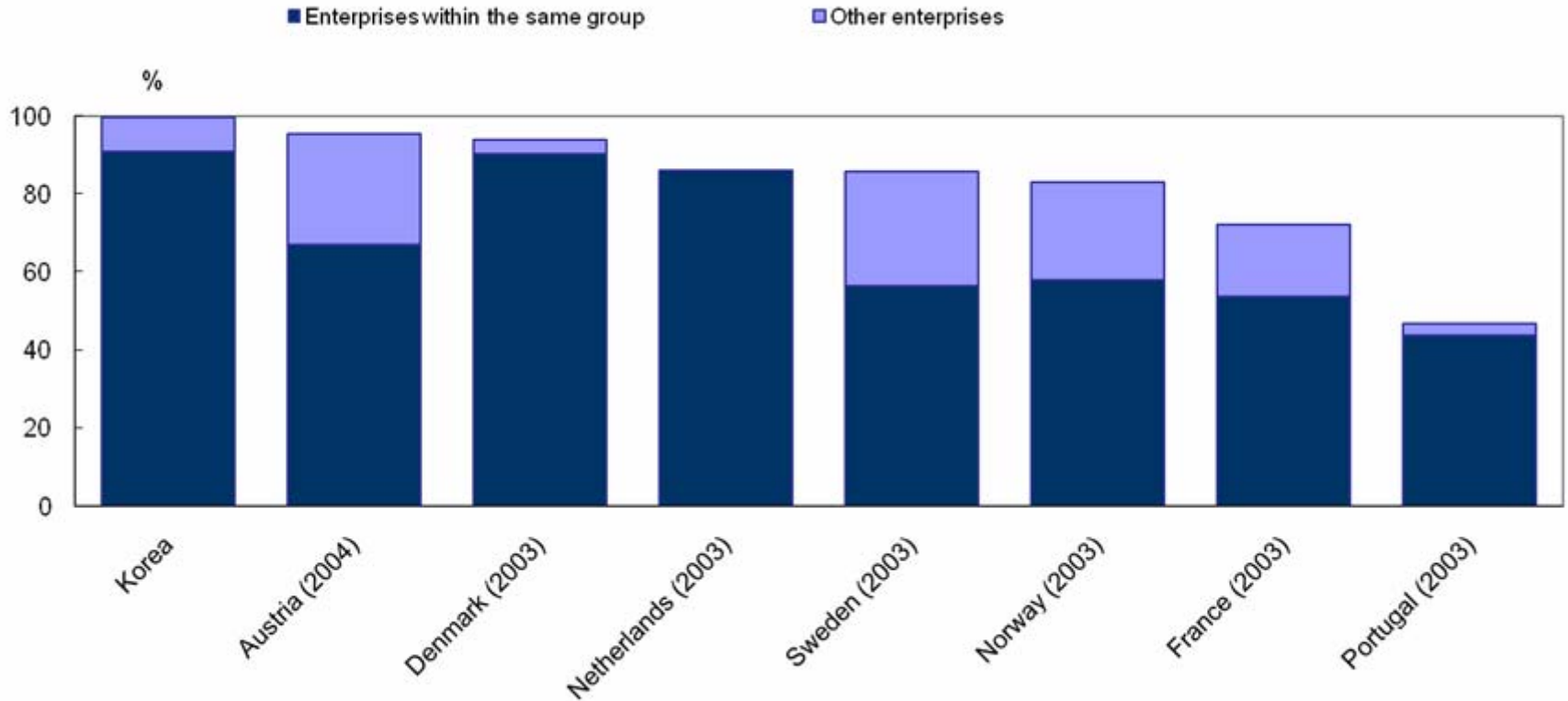
# ... and originates from several sources ...

(business R&D funded from abroad by source , 2005)



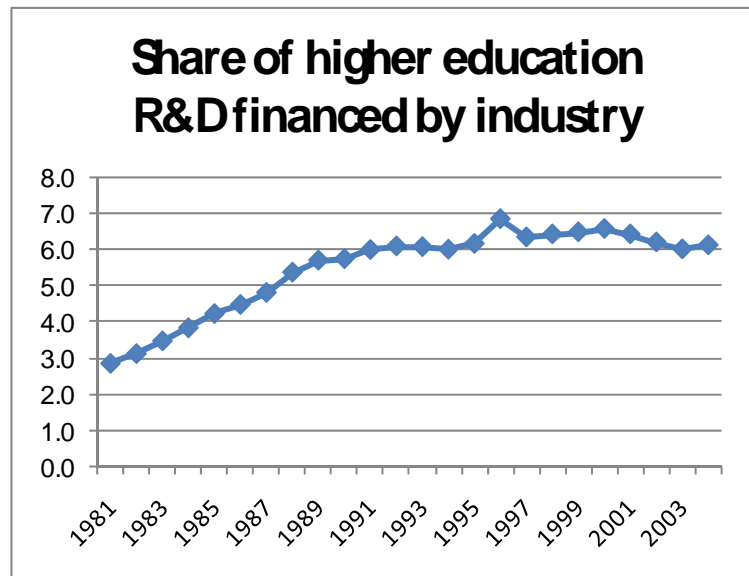
## ... including from other firms

(funding from foreign firms, as % of funds from abroad, 2005)

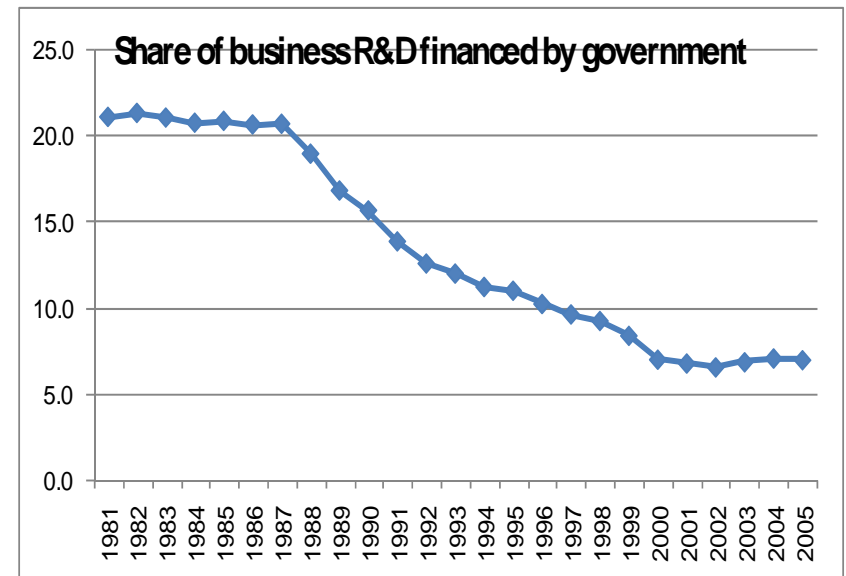


# With some implications for R&D financing

- Firms have started to finance R&D in universities to access basic research.



- At the same time, governments are funding less business R&D through direct support.

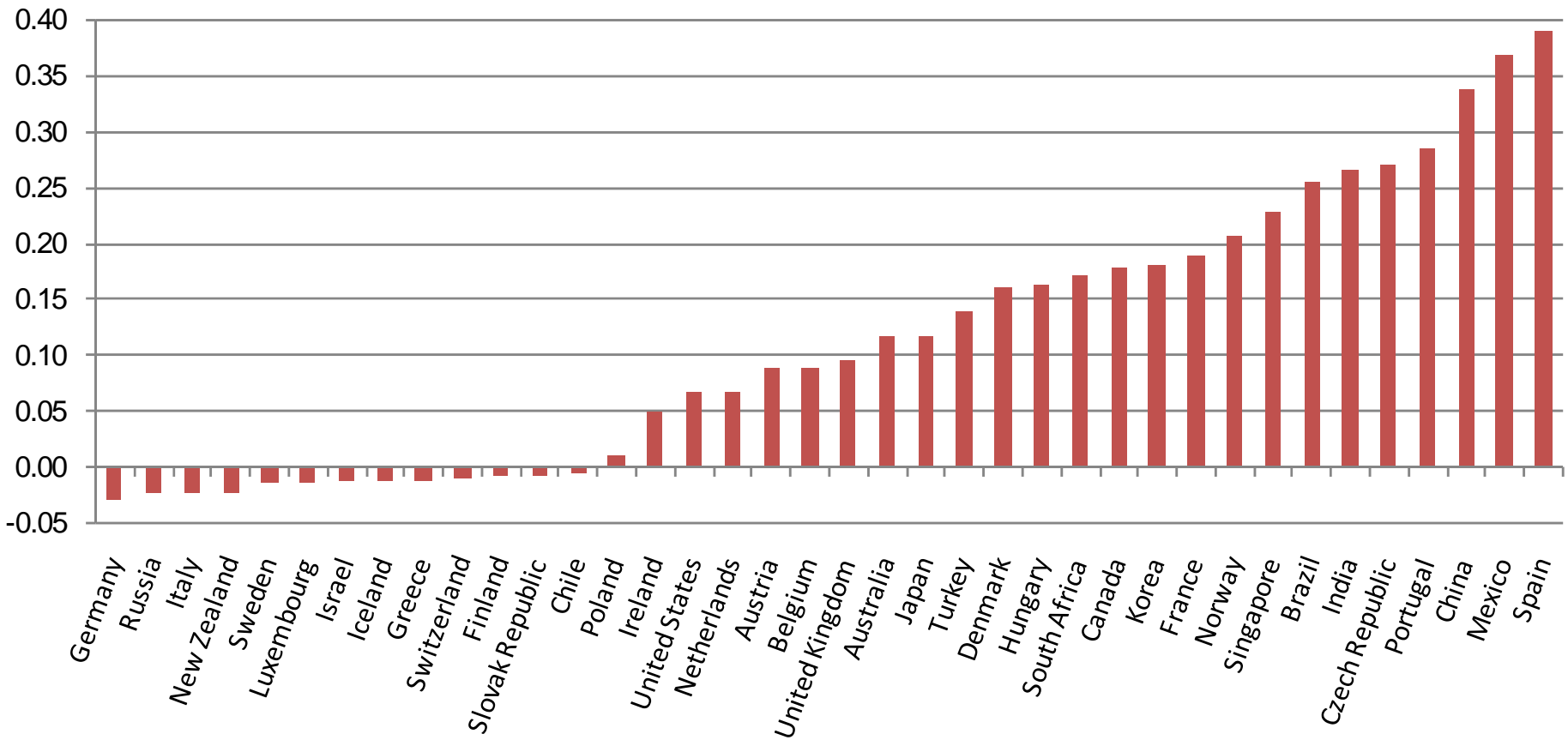


# One government trend – a greater focus on fiscal support for business R&D

- Indirect way of encouraging business R&D, e.g. through:
  - Immediate write-off of current R&D expenditures
  - Tax credits or tax allowances against taxable income
  - Depreciation allowances
- 20 OECD countries had tax credit schemes in 2006, up from 18 in 2004.
- Increasingly also used in emerging economies, e.g. Brazil, China, India, Singapore and South Africa.
- Considered more neutral than direct support.

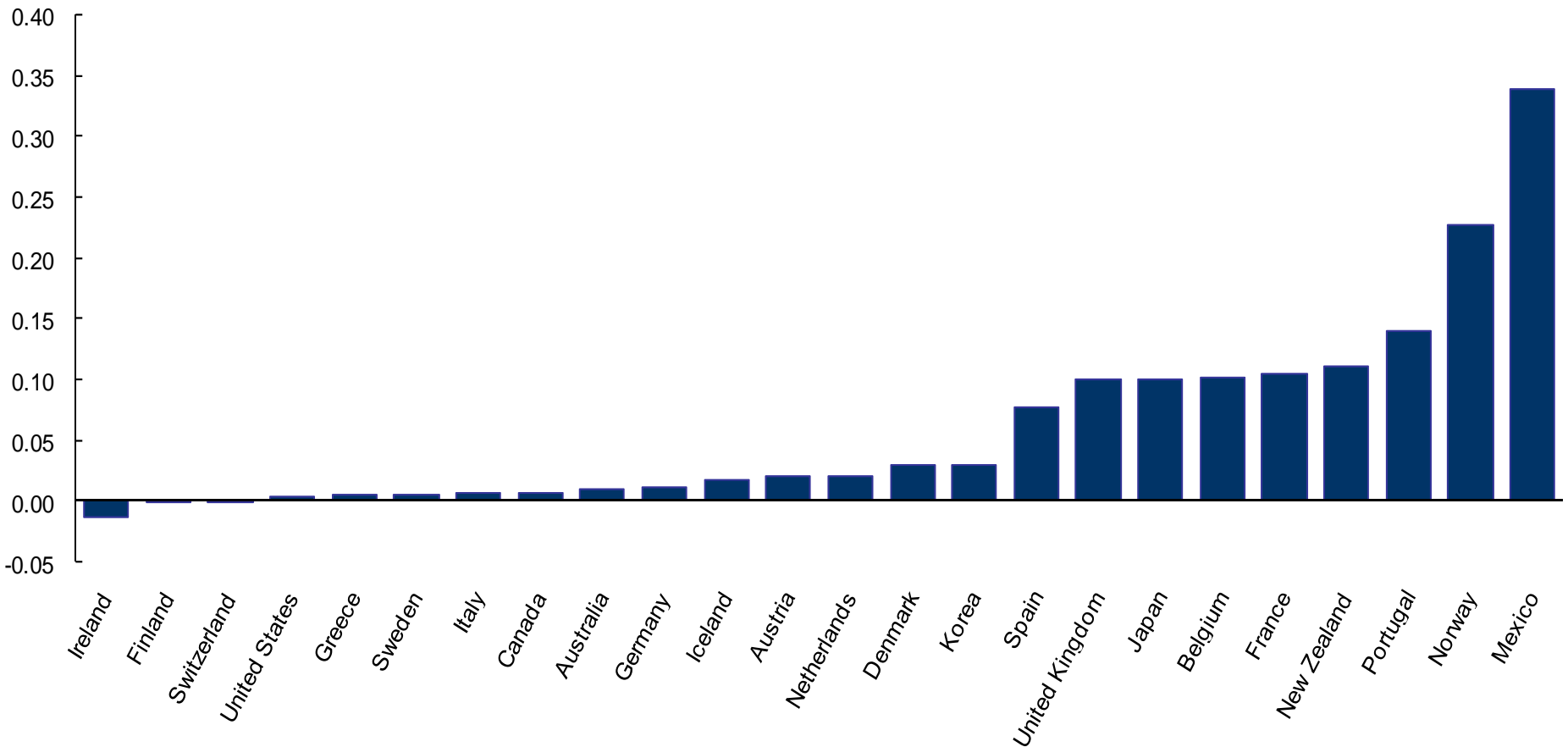
# Rate of tax subsidies differ considerably ...

(Rate of subsidy for 1 USD of R&D, large firms, 2007)



# ... and are increasing in several countries

(change in rate of subsidy for 1 USD of R&D, large firms, 1999-2007)





# New approaches to fiscal support are emerging

- Belgium, the Netherlands and Spain support researchers, instead of research expenditure, through fiscal support for labour charges.
- Advantages:
  - Supports cash flow in small firms with little revenue but high investment in intellectual and human capital.
  - Support early stage costs; credits for R&D spending subsidise later-stage *profits*.
  - May potentially be easier to control (depending on design)
  - May contribute to retaining human talent.
- For example, WBSO in the Netherlands:
  - As from 2006, 42% of the first EUR 110 000 of R&D wage costs can be deducted from wage tax and national insurance. For the remaining R&D wage costs the rate is 14%.
  - Self-employed people can obtain R&D tax relief of EUR 11 255.
  - Universities can also apply for WBSO tax deduction, when personnel are working on projects directly paid by companies, but also when personnel are working on certain types of public grants.
- Tax credits are also being applied to other intangibles, e.g. investment in corporate training (5 OECD countries incl Austria, France and Spain).

# Public-private partnerships are also of growing importance in financing innovation

- Public-private partnerships are expanding because:
  - They can provide effective platforms for pre-competitive R&D in areas where innovation is rooted in science
  - PPPs can help build innovative networks in new multidisciplinary research fields (e.g. nanotechnology, genomics)
  
- But also because they can contribute to other objectives:
  - They can increase the impact of public R&D funding on business R&D and business behaviour (e.g. changes in the type or orientation of research)
  - They can help create new avenues for commercial spill-overs from public research
  - They can help link SMEs to scientific research
  - They can increase synergies between regional innovation systems

# Key factors of success for PPPs

- Based on OECD case studies on several countries.
- Long-term commitment from both government and industry, based on a shared vision
- Achieve critical mass but also deep reach within the National Innovation System (e.g. complement large PPPs with support to smaller research teams).
- Build on existing networks but do not neglect areas where potential actors are still dispersed (e.g. in multidisciplinary research) and/or inexperienced.
- Implement efficient/competitive selection and steering/financing mechanisms that ensure a sustainable balance between public and private interests
- Other areas that require attention:
  - Organisation and management.
  - Evaluation - the key to learning and improvements in policy.

# Overall trends in public support for innovation

- Some streamlining of support programmes:
  - Efforts to reduce the range of programmes
  - Growing focus on competitive-based and merit based competitive funding
  - Growing focus on innovation instead of R&D, greater attention for services
  - Growing focus on supporting networks and clusters, instead of individual firms
- Focus on leveraging government procurement policies to foster innovation and develop lead markets, in particular in Europe
- Still questions on how to respond to “open innovation” and the more global nature of innovation; most support is still “domestic” in its focus.
- Overall: in search of “smarter ways” to support business innovation.

# Concluding remarks

- The nature of innovation is changing – innovation is more open, more global and involves a growing range of players.
- Networking and cooperation are becoming more important for successful innovation – users and suppliers play a growing role.
- This also affects the financing of innovation – a greater range of instruments and policies are emerging, markets and intermediaries are evolving rapidly.
- Many OECD countries still have difficulties and the non-availability of appropriate finance still remains a bottleneck.
- Comparative analysis of the situation and exchange of information on good policy practices can help.