

The evolution of Norway's National Innovation System

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-Fagerberg, J., Mowery, D. and Verspagen, B. (eds. 2009) Innovation, Path Dependency and Policy: The Norwegian case, Oxford University Press

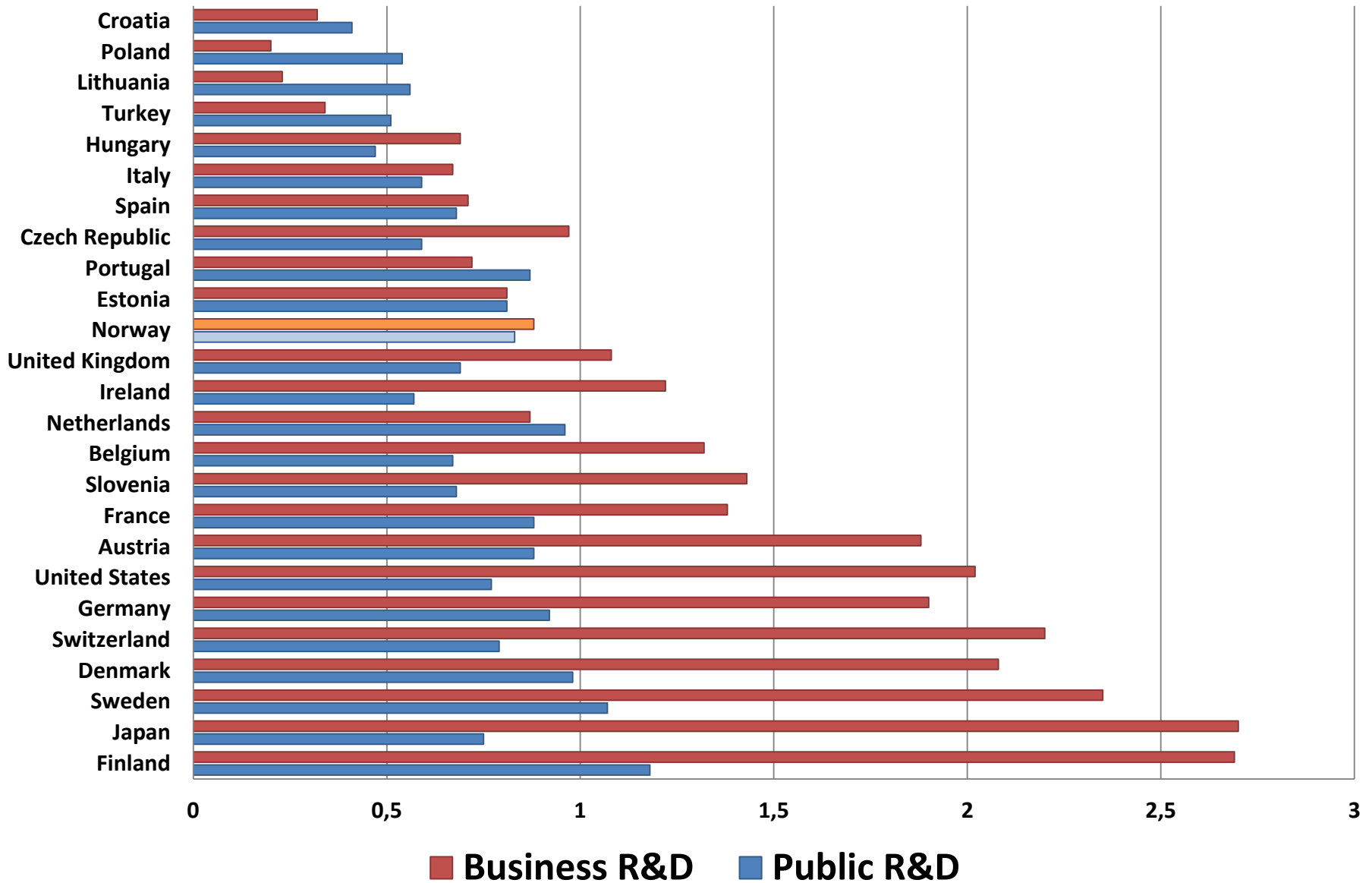
-Fagerberg, J, D. Mowery and B. Verspagen 2009. The evolution of Norway's national innovation system, Science and Public Policy, 36: 431-444

-Fagerberg. J. (2009) "INNOVASJONSPOLITISKE VIRKEMIDLER", www.kunnskapsdugnad.no

Main questions

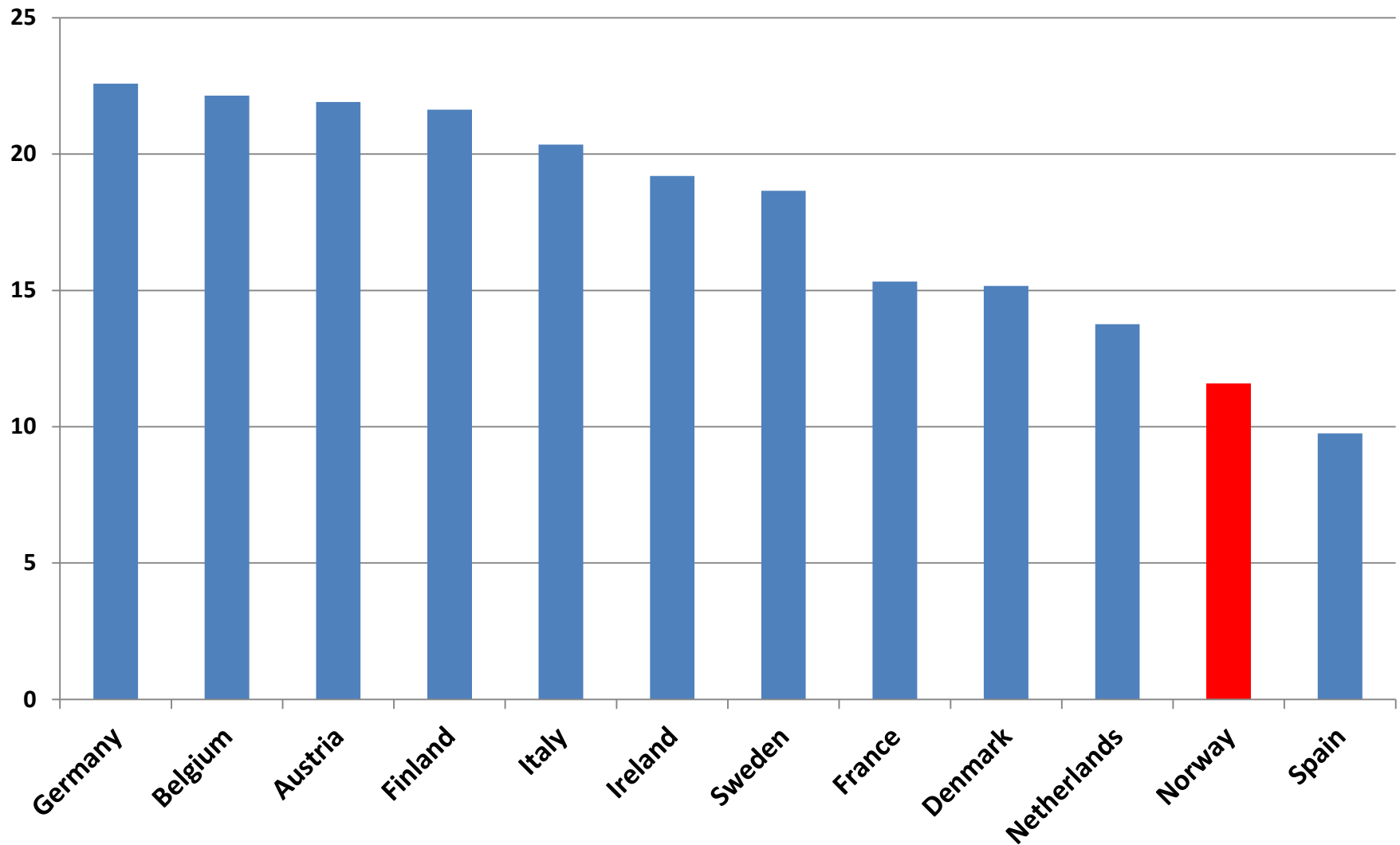
- What characterizes **innovation in Norway** (compared to other countries)?
- Why has it developed the way it did? A historical and **evolutionary** perspective.
- Is its performance «satisfactory? What are the **challenges** ahead?
- **Innovation policy** in Norway: What characterizes it and (how) does it work?
- But first some «**stylized facts**» ...

R&D, percentage of GDP, 2010 (Eurostat)



Novel innovators, percent of all firms, 2008

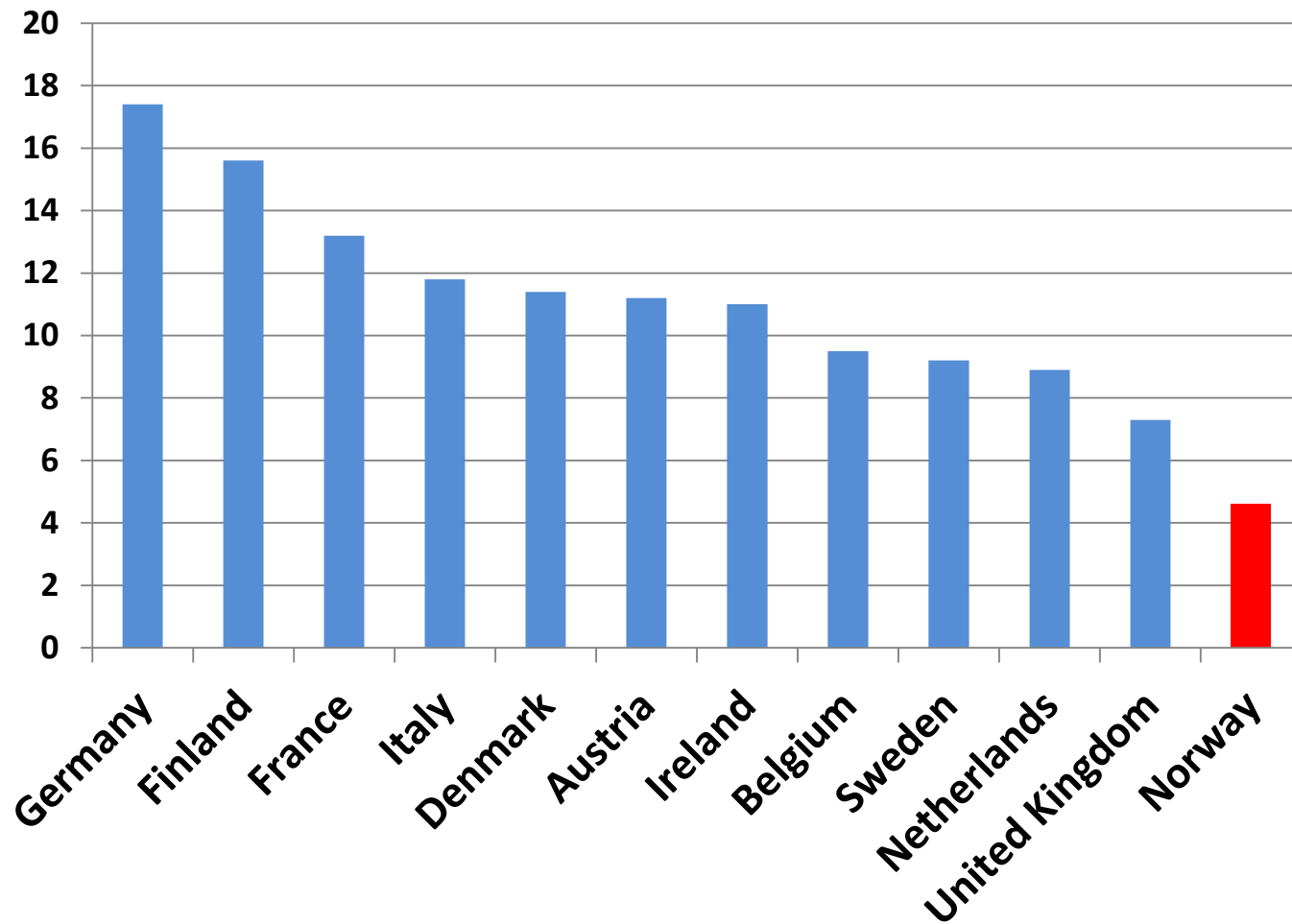
(CIS 6)



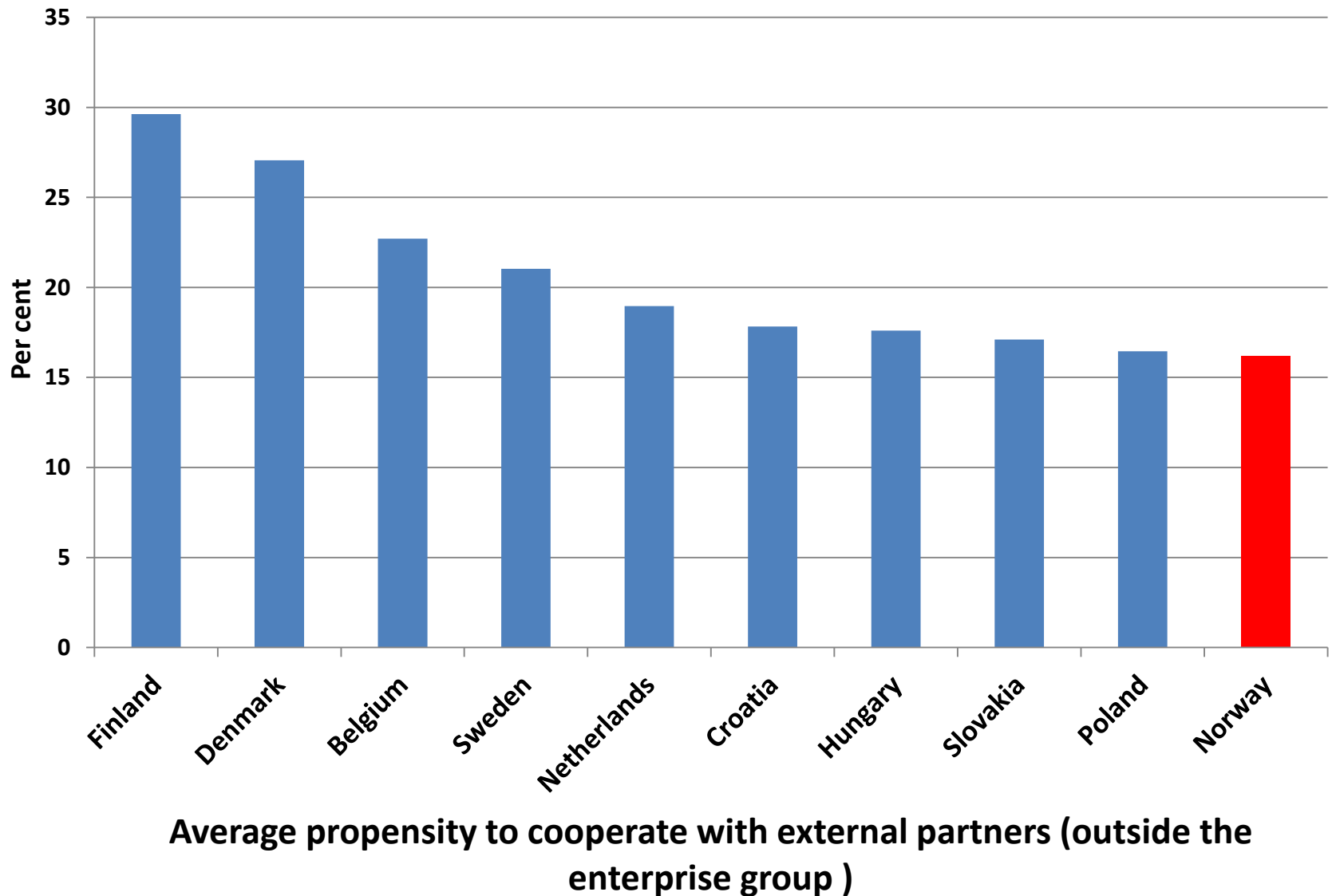
Novel = new to the market (not only to the firm itself)

Innovative products, share of sales, 2008

(CIS 5)



Innovation cooperation, 2008 (CIS 6)



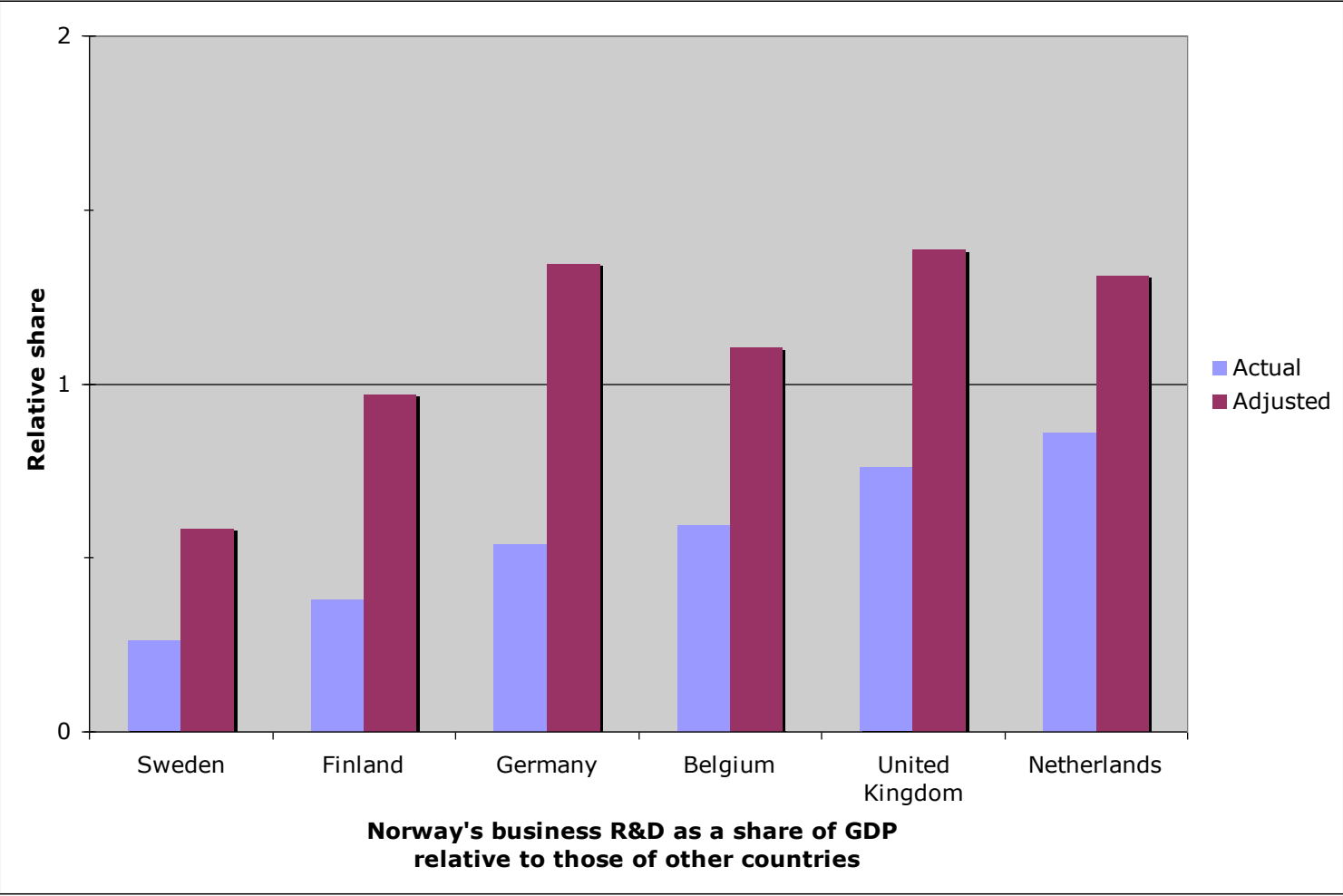
Norway's innovation performance not very impressive



- Norwegian businesses invest **much less in R&D** than other rich countries on Europe
- And it is also **low on most innovation indicators**
- To what extent can this be “explained” by cross-country **differences in production structure?**
- Some results from Fagerberg et al (2009) who investigated this ...

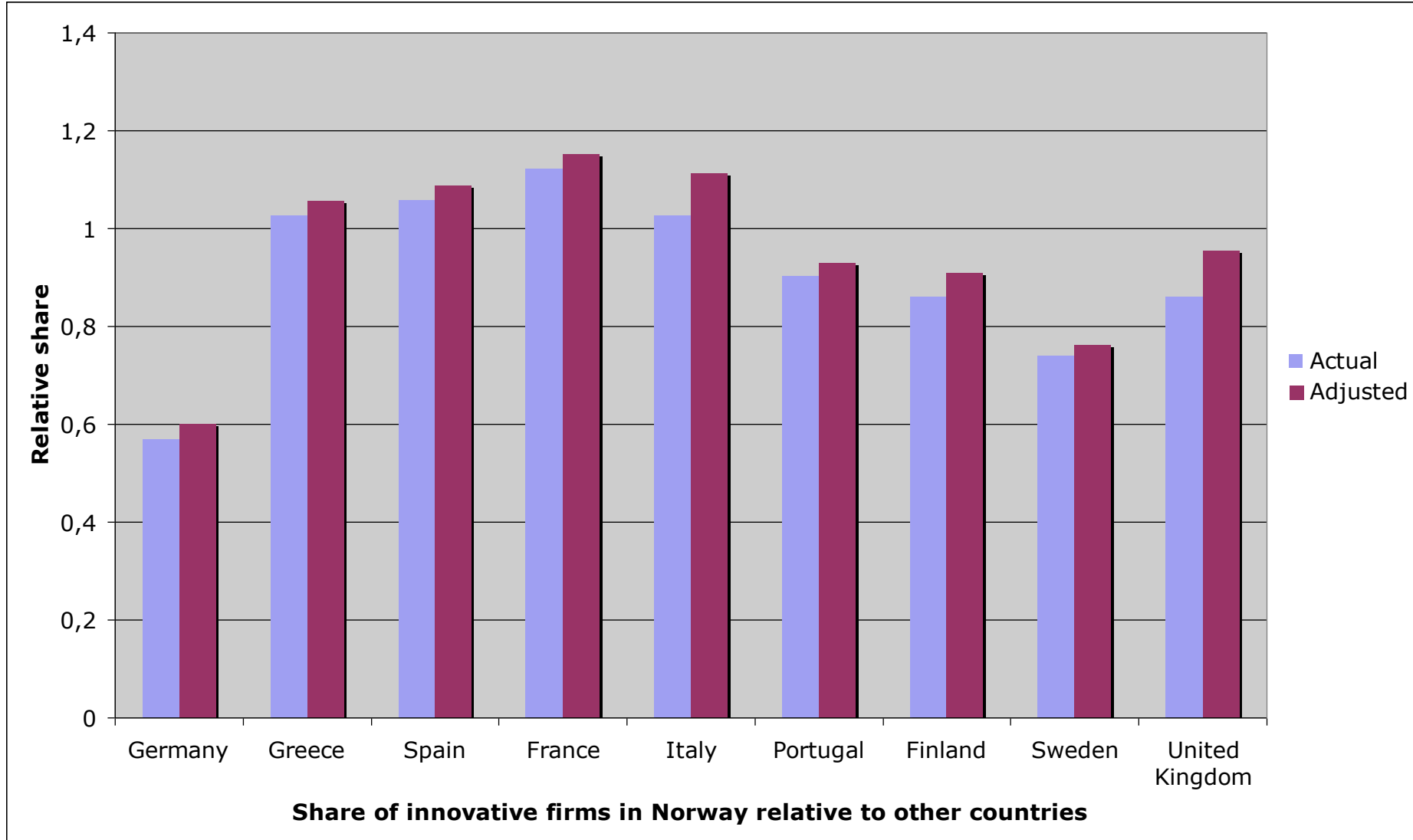
“Structural” factors?

Share of business R&D in GDP, actual and **adjusted** for structural differences, 2001/2002 (OECD)



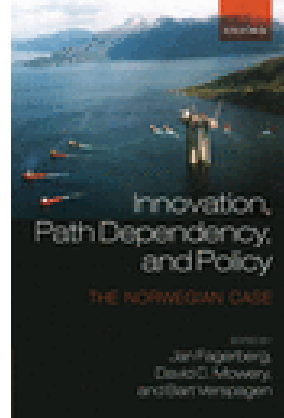
Same calculation for innovation, 2004

(CIS4, Eurostat)



A historical (evolutionary) perspective

- Innovation as an **interactive phenomenon**
- Innovation system as frameworks for such interaction
- National dimension important (users, suppliers, **competence(labour), R&D infrastructure, policy**)
- **Industries/sectors differ** in their needs; these contribute to shape the NSI through market relationships and political demands
- The resulting political and economic «set up» in turn influences who succeeds; **path dependency** («insiders» versus «outsiders»)
- And **lock-in**? A challenge for policy (Narula 2002)?



The Norwegian experience

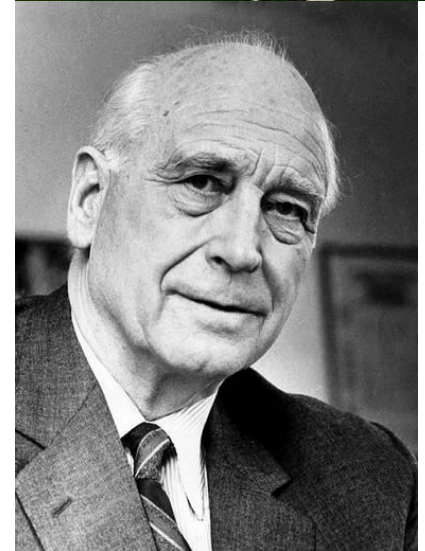
- **”Co-evolution”** between industry, the R&D infrastructure and politics shaped the development of the Norwegian NSI
- Norway, rich on resources (land, forest, fish, metals, waterfalls, oil and gas), industries exploiting these advantages (**natural resource based industries**) developed
- These industries did innovate, but - as elsewhere - performed **little (inhouse) R&D**, and – if needed - bought R&D services (searched for competence) externally
- A national **R&D infrastructure (and policy set up)** adapted to the needs of these industries gradually **evolved**

The Norwegian NSI, continued ...

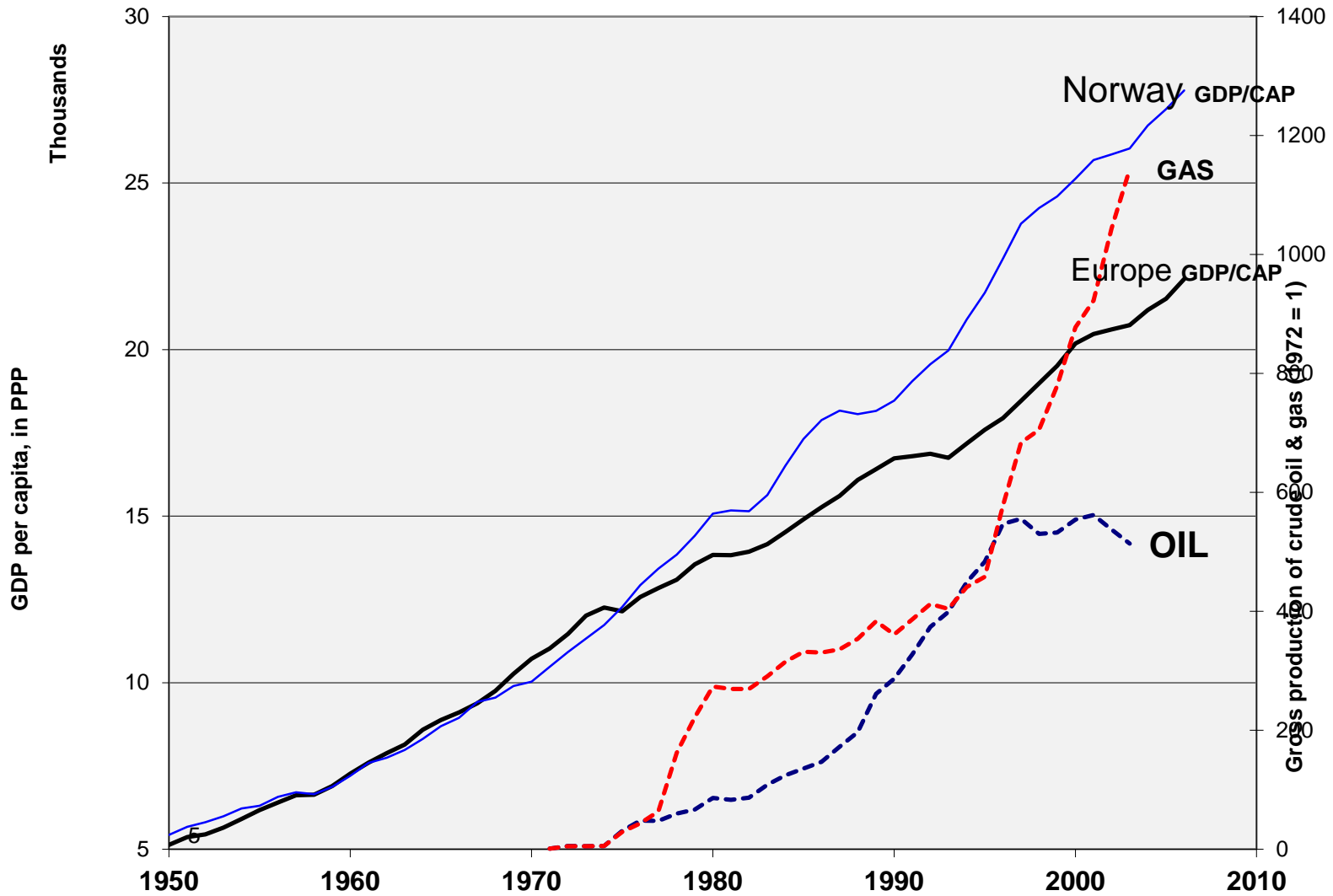
- The process started in **mining, agriculture/forestry and the maritime sector** and continued – from the first half of the 1900s onwards – with industries based on the exploitation of **hydroelectrical** energy
- Result: Little (own) R&D, but a a relatively large sector of (mainly state-owned) **R&D institutes** serving these industries (up to 30-40% of the firms in these industries report cooperating closely with such institutes)
- The **oil and gas industry** shared these characteristics, and the national R&D infrastructure gradually (from the 1970s onwards) **adapted** to its **growing needs**
- Today the oil and gas industry **dominates the economy** and engages – directly and indirectly - a large share of the available **talent and competence**

Challenging path dependency?

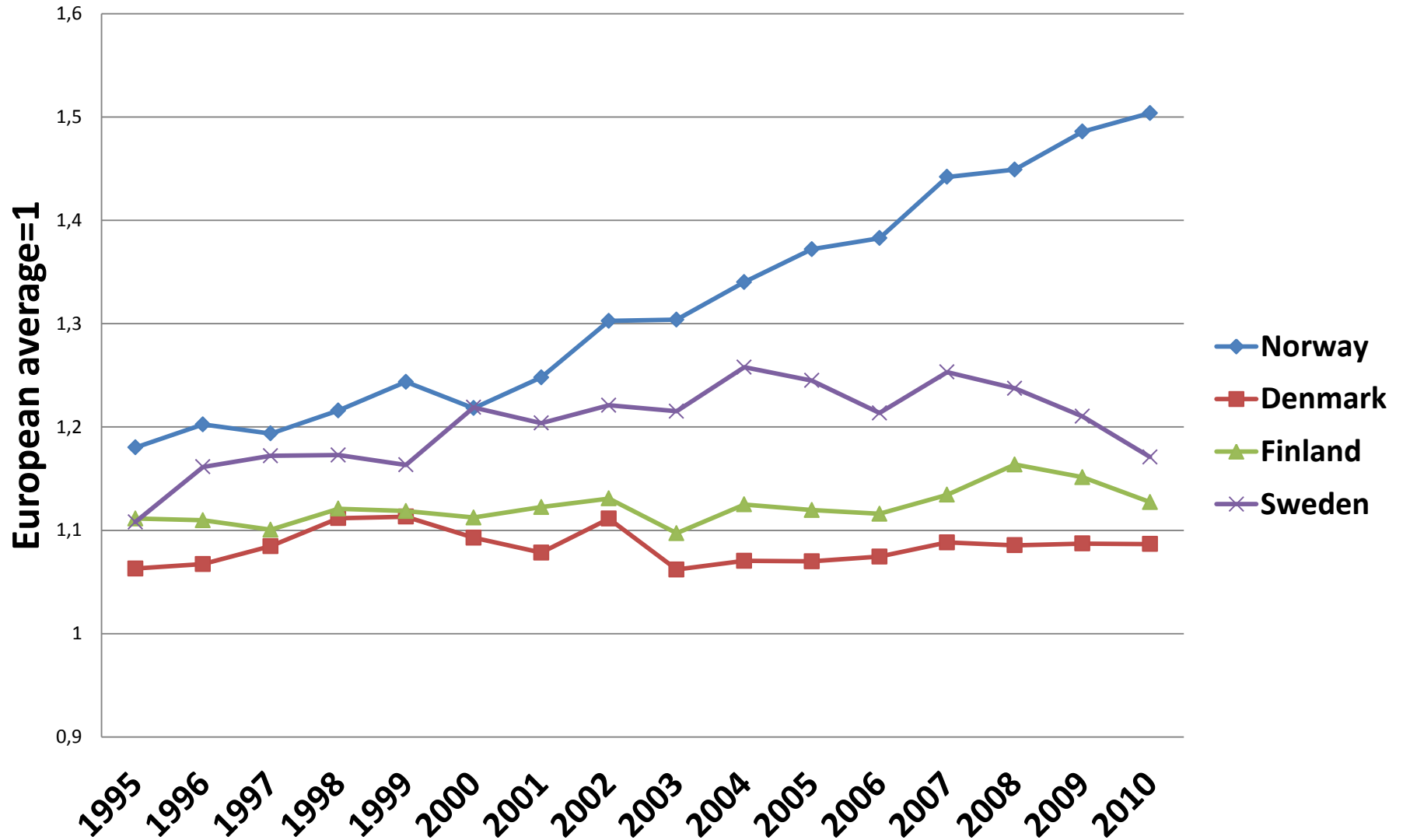
- The dream of the «modernizers»: A «**hightech**» **Norway** modelled on US/UK defence industry
- A concerted effort by **very influential people** (Jens Chr. Hauge, Finn Lied ...)
- Realized through **defence industry** (KV), dedicated **R&D establishments** FFI, TFI) & **policy** (NTNF etc)
- Some **technological successes** (GSM - invention), less so commercially (innovation), crisis of the 70s
- Result: The competence/cabilities subsumed by the growing **oil/gas** industry



The Norwegian economy at a glance



European compensation per employee (industry, PPP , OECD)



The challenge ahead

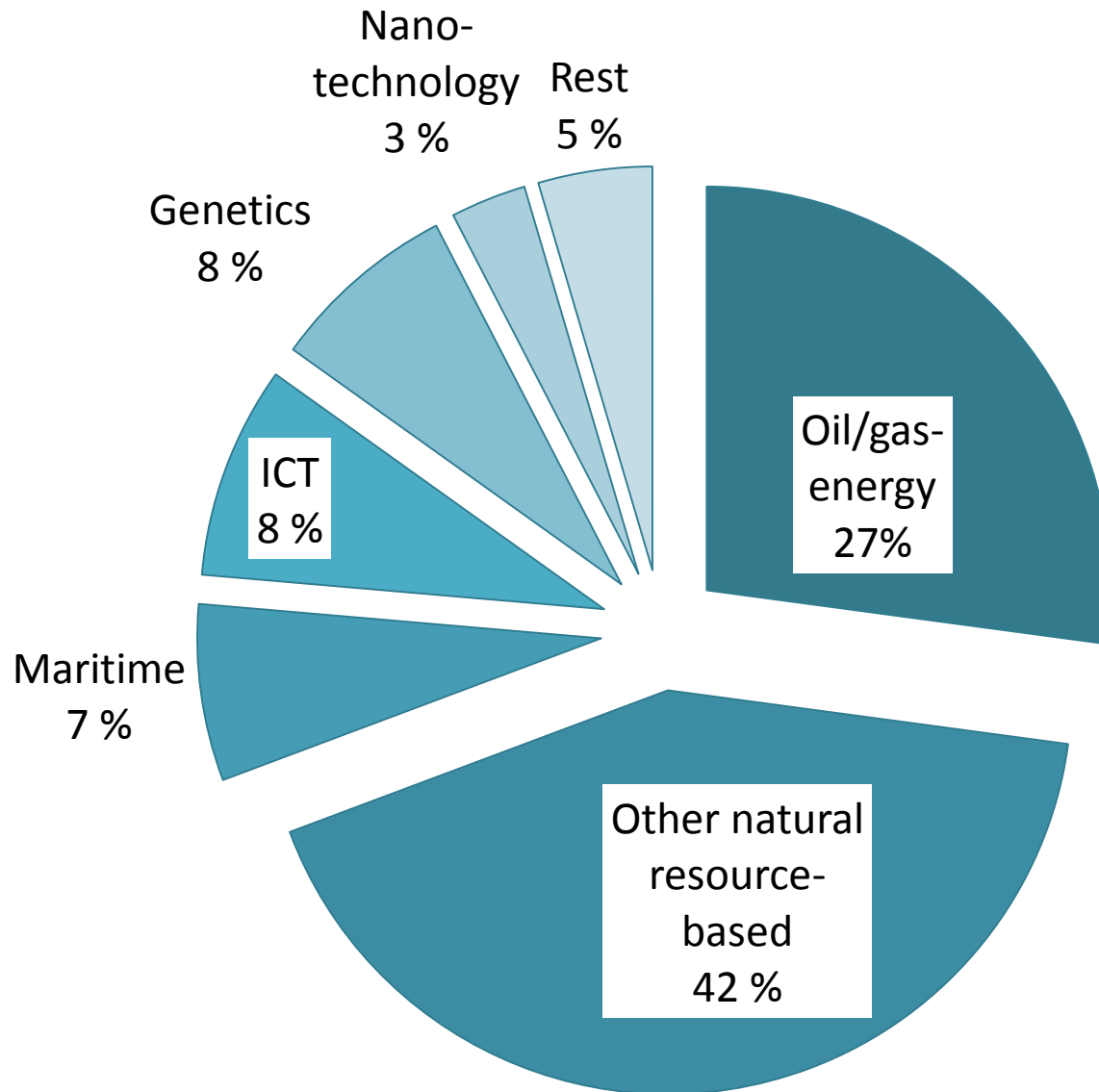
- The Norwegian **economy is strong** – what's the problem?
- **Oil and gas epoch will not last** for ever
- Where will **future growth** (in incomes and employment) come from?
- High dependence on oil and gas also makes the economy more **vulnerable**
- **High costs and low innovation** compared to other countries add to these problems
- Solutions: **Decrease costs** (welfare) or **increase innovation**?
- What can **innovation policy** contribute?

Norwegian innovation policy

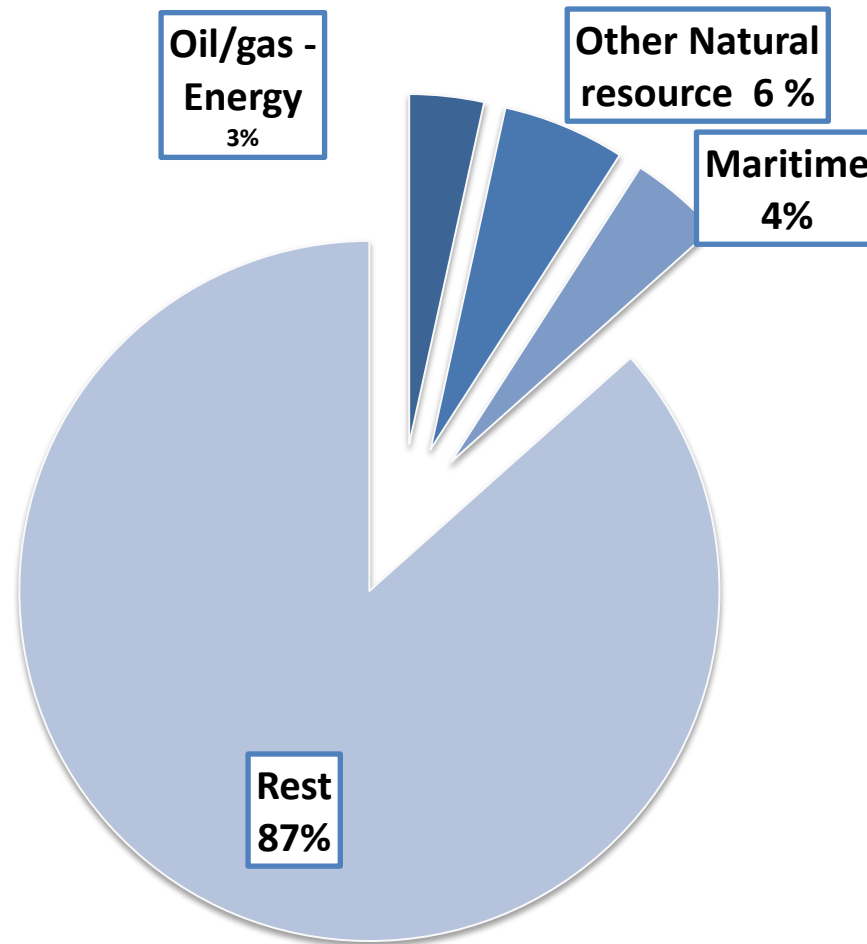
- Organisations/actors: Innovation-division in **NFR** (2002) and **Innovation Norway** (2004)
- Policy tools: Support to **projects** (NFR, IN), **loans** (IN) og **R&D-subsidies** (Skattefunn: tax credits)
- **Government**: Self glorifying white paper (2008)
- NFR: Support mostly through **targeted programs**, only a small part open to applicants independent of industry/theme
- IN: Support mostly to **primary** industries, backward **regions**, and **less innovative** projects, criticism from «Riks-revisjonen» (2008) and evaluation (2010)

*More: Jan Fagerberg(2009) "INNOVASJONSPOLITISKE VIRKEMIDLER",
www.kunnskapsdugnad.no*

Innovation support in Norway



Compared with employment



Revealed nature of Norwegian innovation policy

- Concentrated on politically and economically important (powerful) **natural-resource based sectors**: agriculture, forestry, fishery, regions, shipping, oil and gas
- With a very small share of total employment
- Only a small share of the support open for **competition independent of address and topic/industry**
- Clear evidence of **path dependency?**
- Need for reform?

Jim March



Exploration
versus
exploitation

- A necessary **balance**?
- Norway: Too much "exploitation" and too little "exploration"?
- "Group-think" and "**cognitive lock-in**" in the elite?
- "**Broad**" versus "**narrow**" innovation policies
- **Segmented** government – little **coordination** – The Finnish model
- A **new actor** needed? The Swedish example