PRODUCTIVITY PERFORMANCE IN THE OECD AREA: AN INTERNATIONAL PERSPECTIVE

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DIRK PILAT
ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

dirk.pilat@oecd.org

A disclaimer

- This presentation does not necessarily reflect the views of the OECD or its member countries.

Outline

- A brief overview of growth performance in the OECD area:
  - The OECD Productivity Database.
  - Some measurement issues related to productivity growth.
  - Growth in GDP per capita, labour productivity and labour utilisation.
  - Growth accounting results for some OECD countries.

- Focus on some factors affecting productivity growth:
  1. ICT: the role of investment, production and use of ICT.
  2. Innovation and R&D.
  3. The role of services.

- Focus on some OECD activities to improve measurement of productivity and its determinants.

Data: OECD Productivity Database

- Aggregate productivity growth:
  - GDP from Annual National Accounts.
  - Labour input: consistent series of employment and hours worked for each country.
  - Labour productivity: 28 OECD countries (excl. Luxembourg, Turkey)
  - Capital input: capital services based on 6 assets (3 ICT), applying hedonic prices and standardised method.
  - MFP: Estimates for 18 OECD countries.
  - Total economy only, business sector under development.
  - Database is available on-line and will be updated regularly, as new data become available, see www.oecd.org/statistics/productivity
- Industry data: OECD STAN database (national accounts).
- Firm-level data: Several different projects (in co-operation with statistical offices and researchers).

OECD estimates of capital services (1)

- Capital services – productive capital stock – services are linked to an age-efficiency profile.
- Different assets are weighted by their user costs – the rental price of the capital good.
- OECD approach:
  - Capital services based on 6 assets (3 ICT).
  - Investment data from national accounts where possible (e.g. Canada, US) and from University of Groningen for small EU countries.
  - Estimates for early years are courageous (long time series lacking).
  - Total economy only.
  - Mean service life of assets and age-efficiency profile from BLS approach.
  - 2 sets of results – national deflator and “harmonised” deflator for ICT assets – relative prices of ICT develop in parallel.

OECD estimates of capital services (2)

- User costs: - requires nominal rate of return, depreciation rate and rate of asset price change.
- Rate of return (Schreyer, 2004):
  - Endogenous - cost of capital exhausts gross operating surplus and part of mixed income, but restrictive assumptions
  - Exogenous – less restrictive, but more difficult to calculate
- OECD approach: exogenous rate of return
  - Computation:
    - Average of 6 interest rates of different type and maturity
    - Deflate by CPI ==> real interest rate
    - Average of real interest over 20 years
    - Re-inflate by smoothed CPI (centred moving average)
  - Depreciation: computed in model (based on age-price function that is consistent with hyperbolic age-efficiency function)
  - Asset price change: smoothed series, centred moving average

Planned work on the productivity database

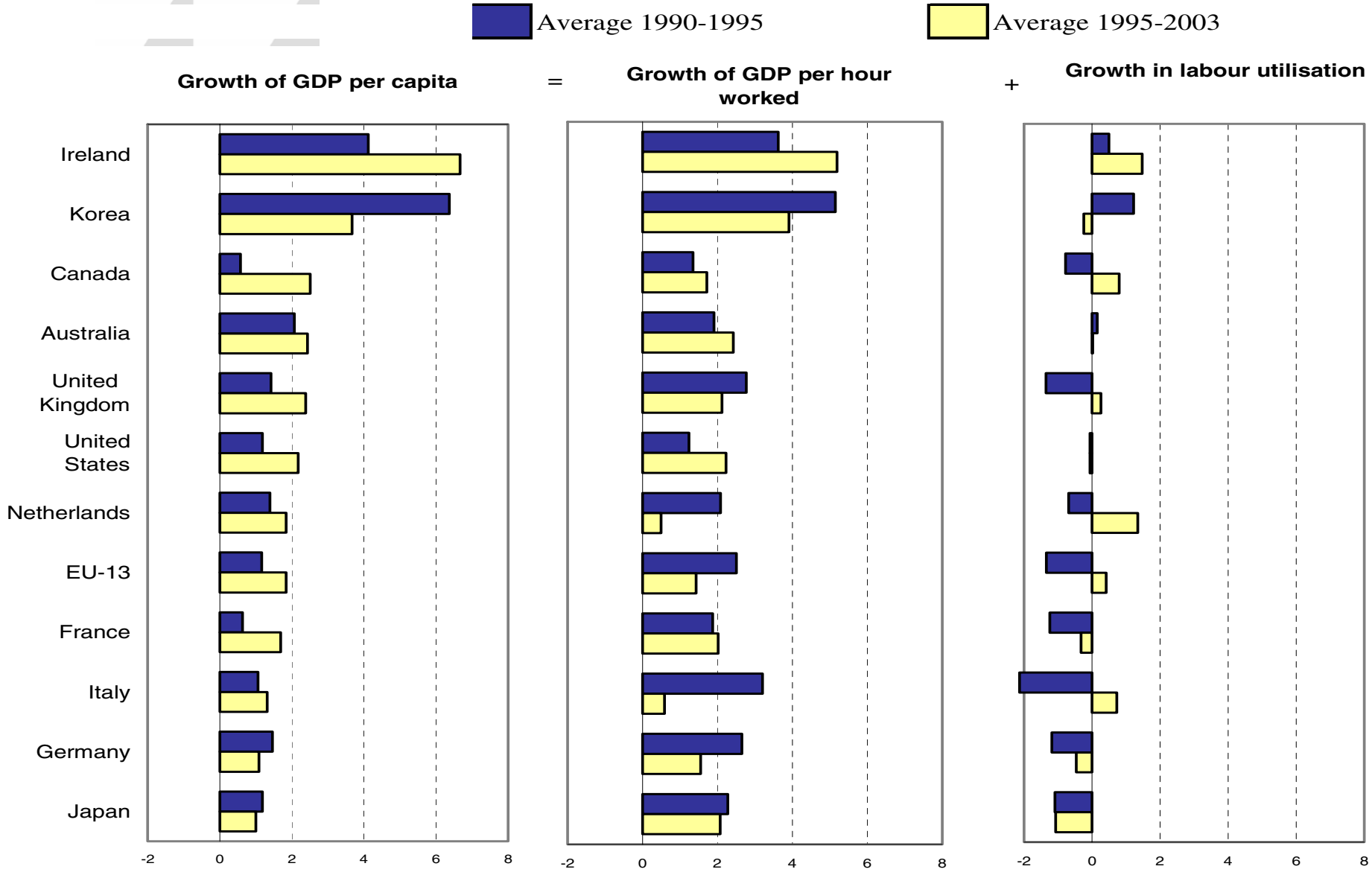
- Estimates of business sector productivity:
  - But what is the business sector?
  - Capital services data at the industry level weak for many countries.
- Work to improve data on labour input – improving employment in national accounts and consistency of hours and employment series.
- Capital services:
  - Adjusting software investment for some countries (e.g. Japan).
  - (Possibly) adjusting for hedonic prices for software investment.
  - Adjustment for taxes in user costs calculations.
- Labour composition based on labour force surveys.
- Extension to more OECD countries and key non-OECD countries – if possible.
- More metadata – description of sources and methods.

Some factors that currently affect the comparability of estimates of labour productivity growth

- GDP in current prices:
  - Expenditure on military equipment – US includes more in GDP.
  - FISIM – allocation differs across countries.
  - Software – still a problem
  - The informal economy - ?
- Constant price series:
  - Hedonic prices and index numbers: these interact
  - Services measurement – but impact on total GDP is uncertain.
- Labour input:
  - Several employment series available: conceptual differences (e.g. jobs versus workers, national vs. domestic) and based on different sources.
  - National accounts series are not (yet) standardised across countries.
  - Hours worked are poorly harmonised across countries.
- Most of these problems are currently being addressed: they are larger for the measurement of productivity levels.

Changes in labour use contributed to growth in GDP per capita

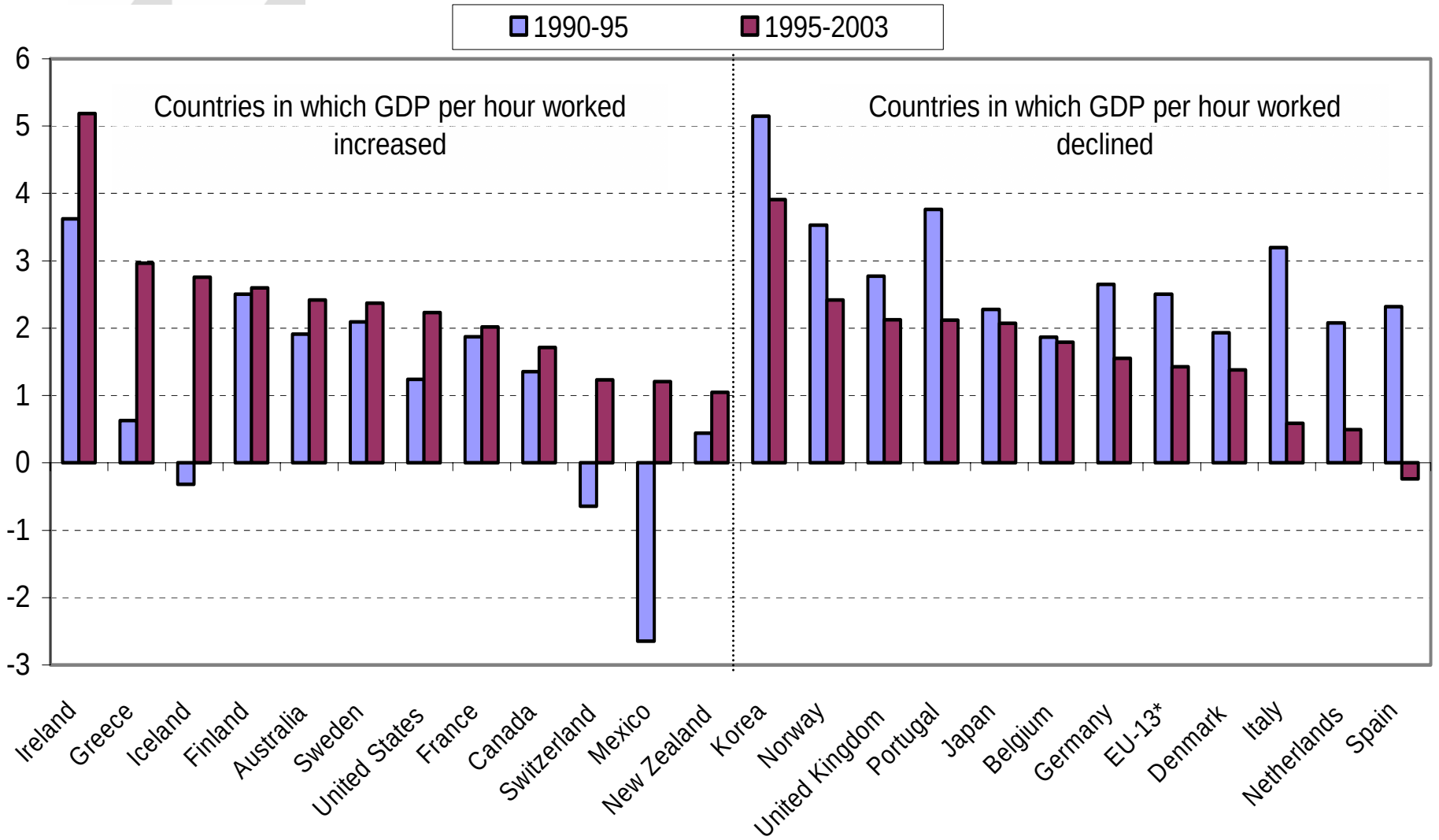
Contribution of productivity and labour use to growth in GDP per capita, %



* EU-13: Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, United Kingdom.

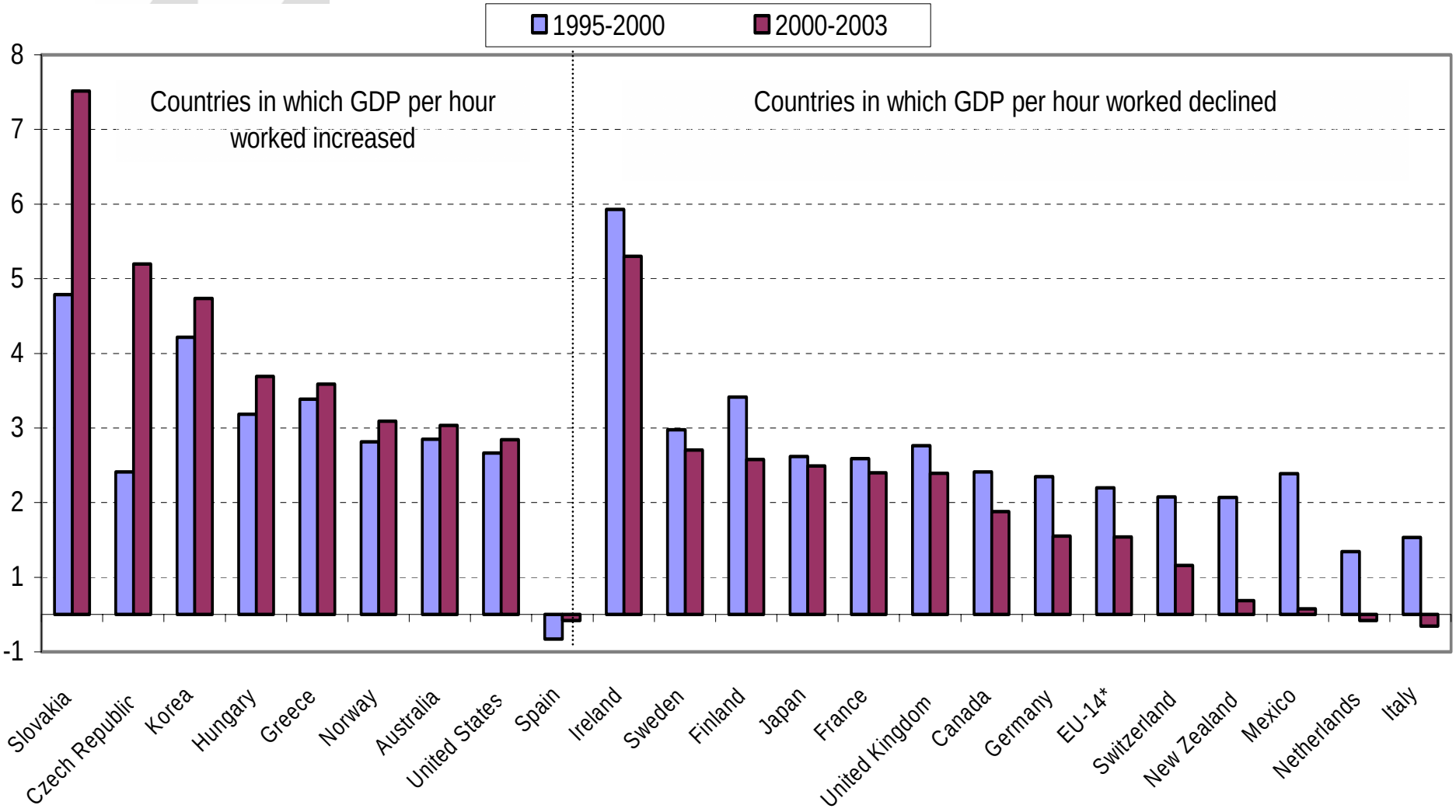
Labour productivity growth picked up in the late 1990s ..

annual compound growth of GDP per hour worked. In %



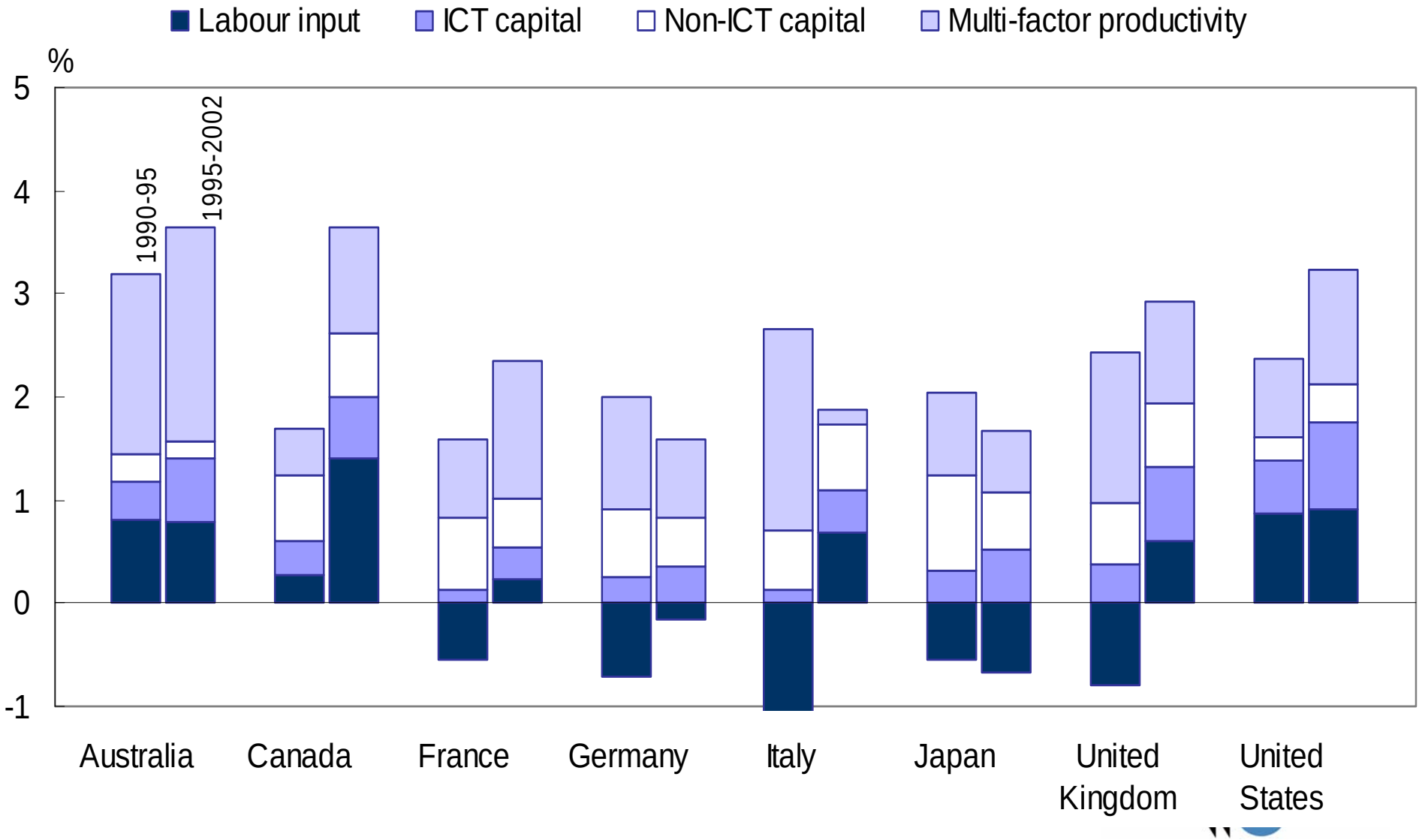
.. but slowed down in recent years

annual compound growth of GDP per hour worked. In %



Strong growth is based on a combination of factors

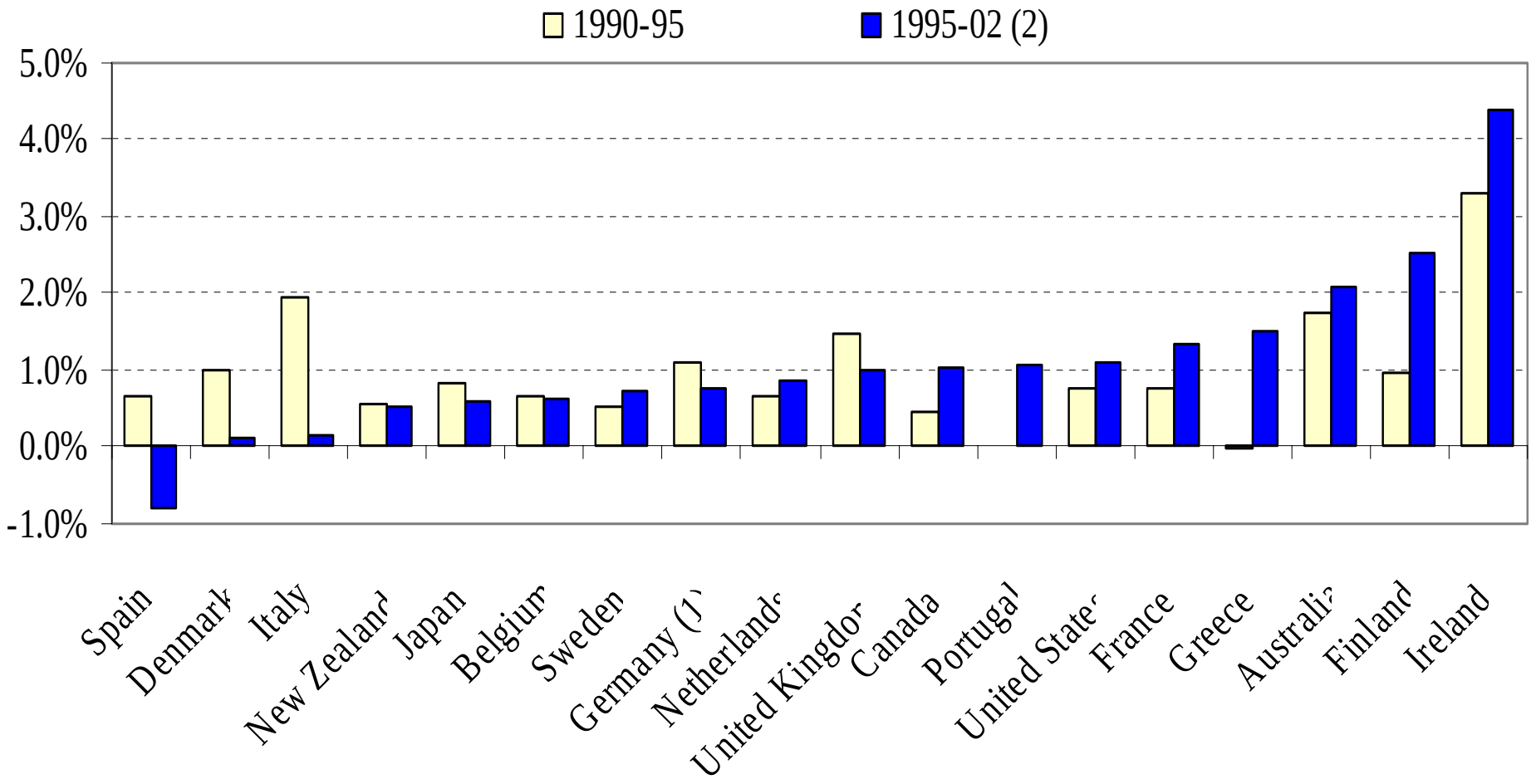
(% contribution to GDP growth, 1990-95 and 1995-2002)



OECD Productivity Database, September 2004; Italy and UK: 1995-2001.

MFP growth picked up in some countries

(average annual % growth, 1990-95 and 1995-2002)



OECD Productivity Database, September 2004.

Focus on some drivers of growth

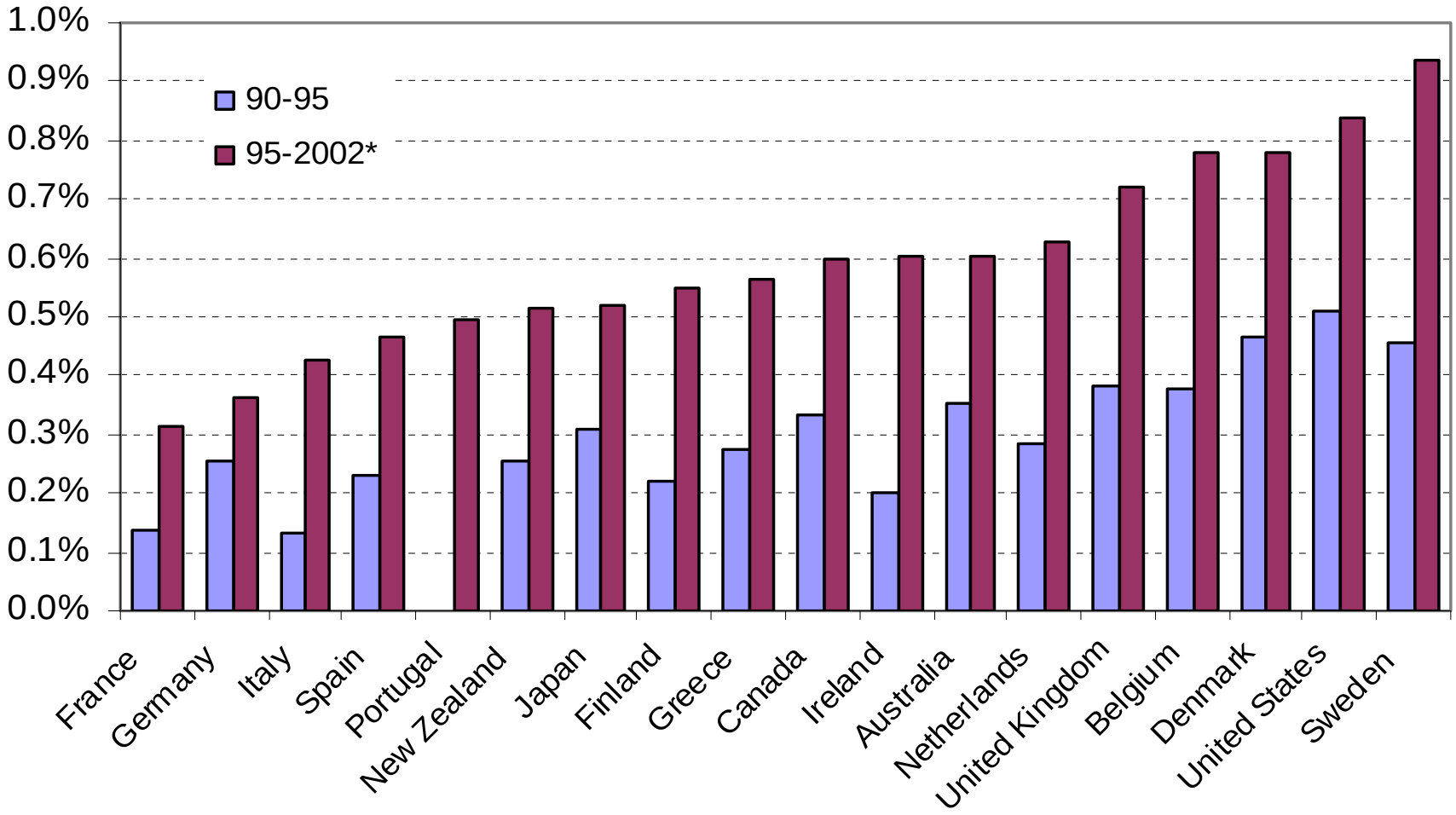
1. **ICT:** The extent to which OECD countries have benefited from ICT investment and ICT use.

2. **Innovation and R&D** – its role and how to foster greater innovation and R&D.

3. **The role of services** – any particular problems?

The US and small EU countries have had a large contribution of ICT investment, France, Germany and Italy a small one

(contribution of ICT capital services to GDP growth, in percentage points)



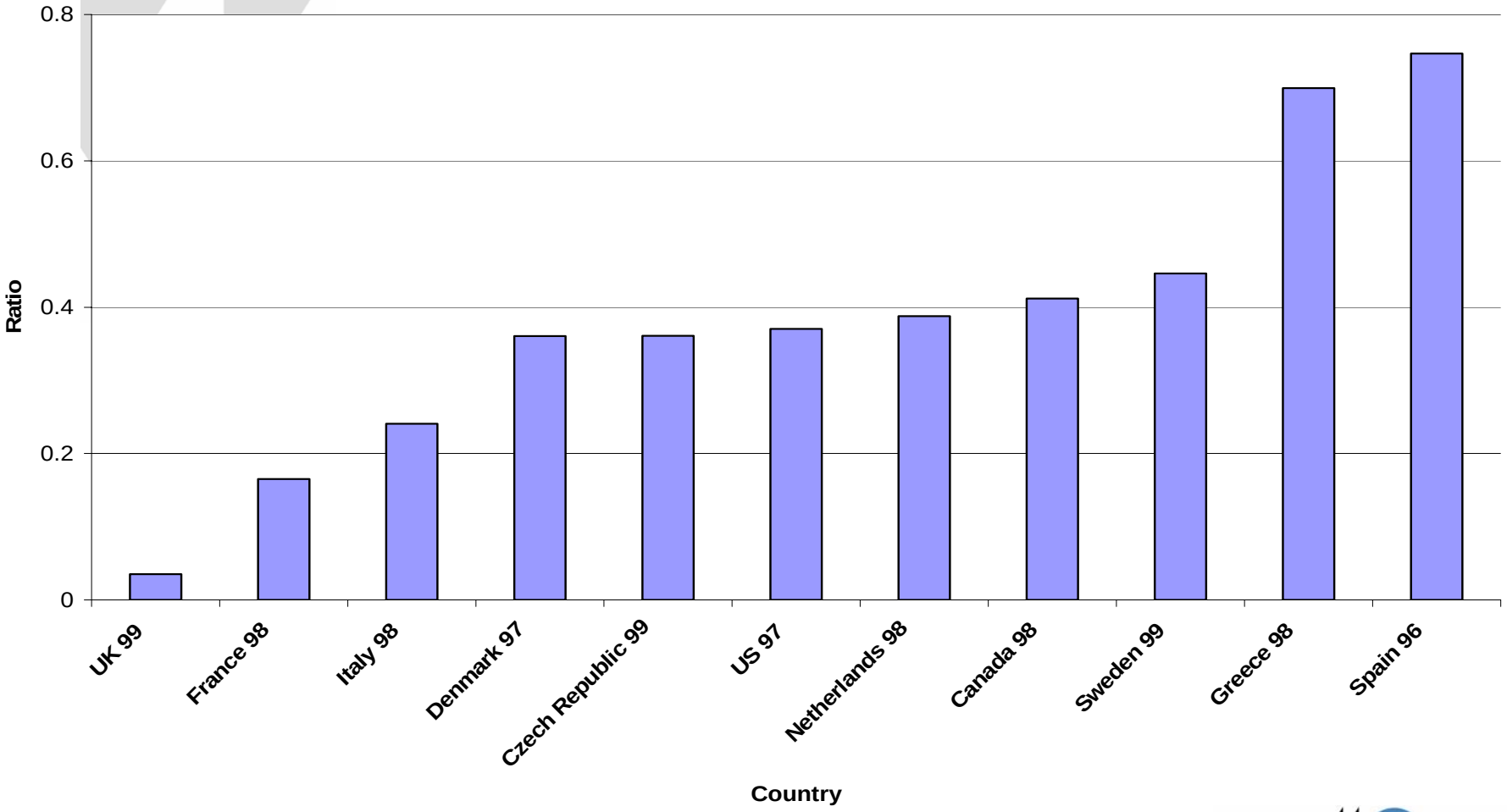
Source: OECD Productivity Database, September 2004.

Why the differences in ICT investment?

- Returns (& investment) in ICT depend on other factors:
  - Skills, innovation, organisational changes.
  - The scope for such changes depends on the overall business environment.
- Competition matters:
  - Competition forces firms to enhance efficiency.
  - Firms that invest first/most in ICT are often new or foreign.
  - Competition reduces the costs of ICT & fosters diffusion.
- Structural factors – share of services and of large firms.
- The macro environment – more hype in the US?
- Measurement, notably of software.

Statistical uncertainties: countries have different degrees of capitalising software spending

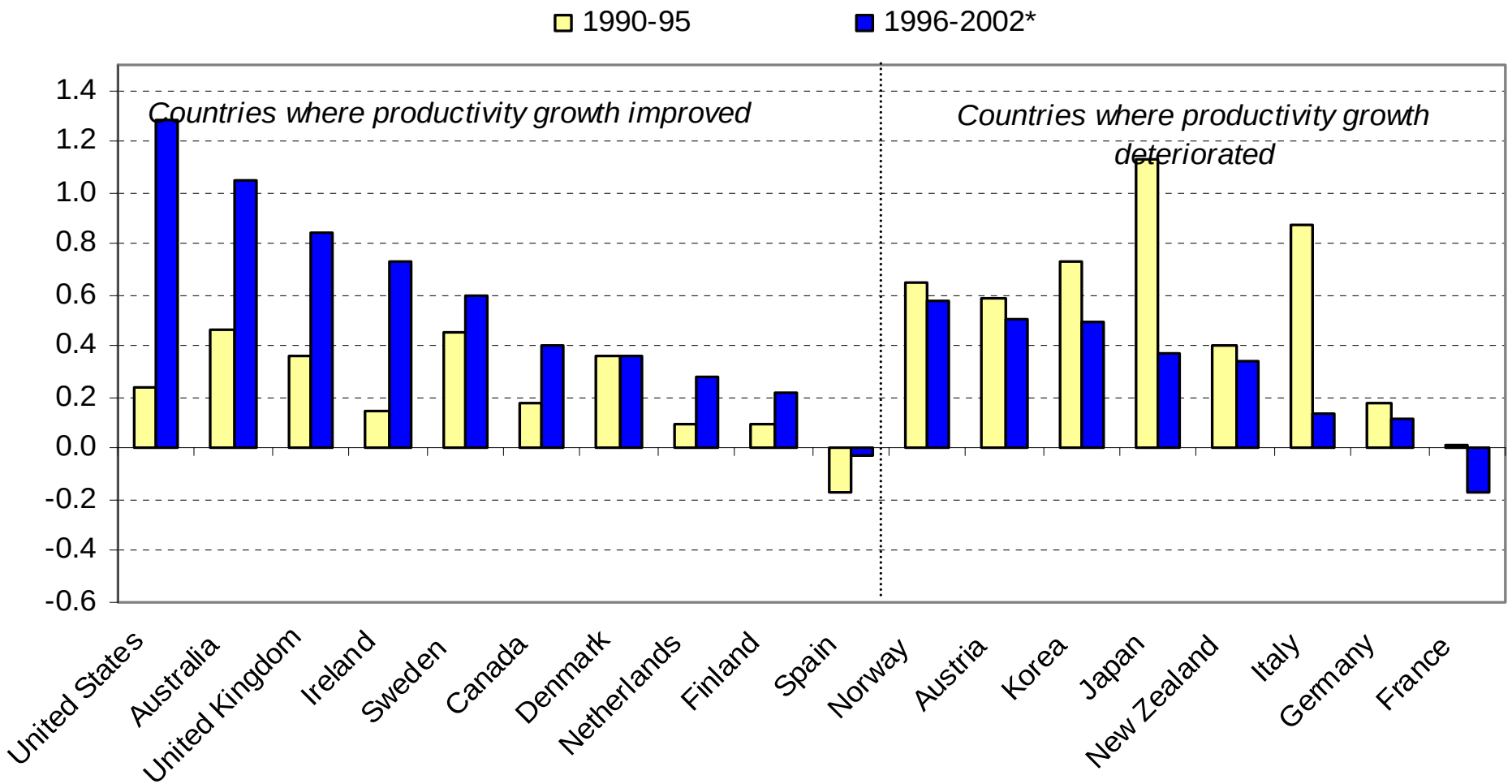
(share of total supply of software that is treated as investment in national accounts)



Source: Ahmad, 2003.

ICT-using services have shown more rapid productivity growth in several OECD countries

(contribution to average labour productivity growth, in per cent)



A firm-level perspective on ICT and productivity growth – project involving 13 OECD countries

Firm-level studies show that ICT use can help improve performance

- Firm-level evidence builds on new surveys of ICT use.
- Positive impacts of ICT on labour productivity (and MFP, where measured) or market shares in all countries (also where there is little evidence at the industry level):
  - But these impacts are conditional on other factors and firm characteristics (skills, innovation, organisational change).
  - Not all firms succeed – experimentation and selection play a role.
  - ICT is part of broader firm strategies to improve performance – it is no panacea.
- Networking technologies are particularly important.
- The impacts of ICT are also found in the service sector (despite lack of evidence at the industry level).

Why only clear industry-level impacts in some OECD countries, but good evidence on impacts at the firm level?

- Industry-level impacts of ICT in some countries may still be disguised by other factors.
- Lags – the US invested earlier and more – industry-level impacts in other countries might still come in time.
- US firm-level impacts may be larger (as suggested by a US-Germany comparison at the firm level) – perhaps because of greater scope for reorganisation and complementary innovation).
- Successful (new?) US firms may be able to gain more market share (e.g. Walmart) – more re-allocation – greater aggregate impacts.
- Spill-over effects? - Perhaps already some of this in the US (and Australia), not much in other OECD countries.
- Measurement?

Some ongoing statistical work on ICT

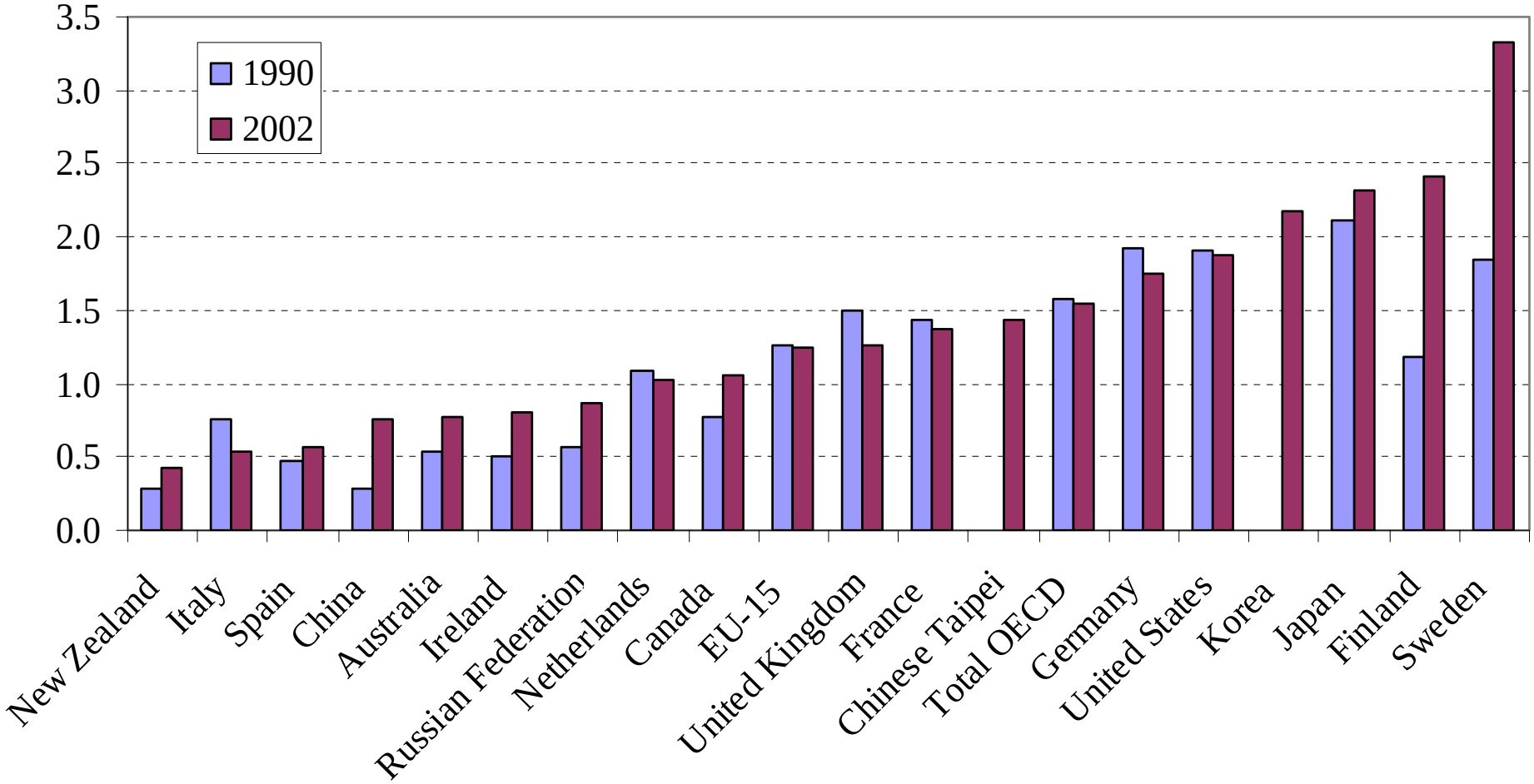
- Improving estimates of ICT investment:
  - Software – some progress, but still a problem.
  - Better business surveys of investment.
- Hedonic deflators – OECD handbook by Jack Triplett has just been released, but now need for practical implementation.
- Measuring new applications of ICT – electronic finance, electronic business processes.
- Also statistical work on other new technologies – biotechnology and nanotechnology.

R&D and innovation

- Econometric studies suggest considerable impacts of R&D on MFP growth:
  - Business and government/university R&D all play a role.
  - Foreign R&D is the most important for (almost) all countries.
  - Domestic R&D helps to absorb foreign innovations – and this may be getting harder.
- Current policy focus in many countries (including EU) is to increase R&D intensity through explicit R&D target
- But R&D is endogeneous to the growth process and depends on several other structural characteristics.
- Moreover: not all innovation is technological – fostering innovation in services remains a challenge.

The intensity of business R&D differs considerably

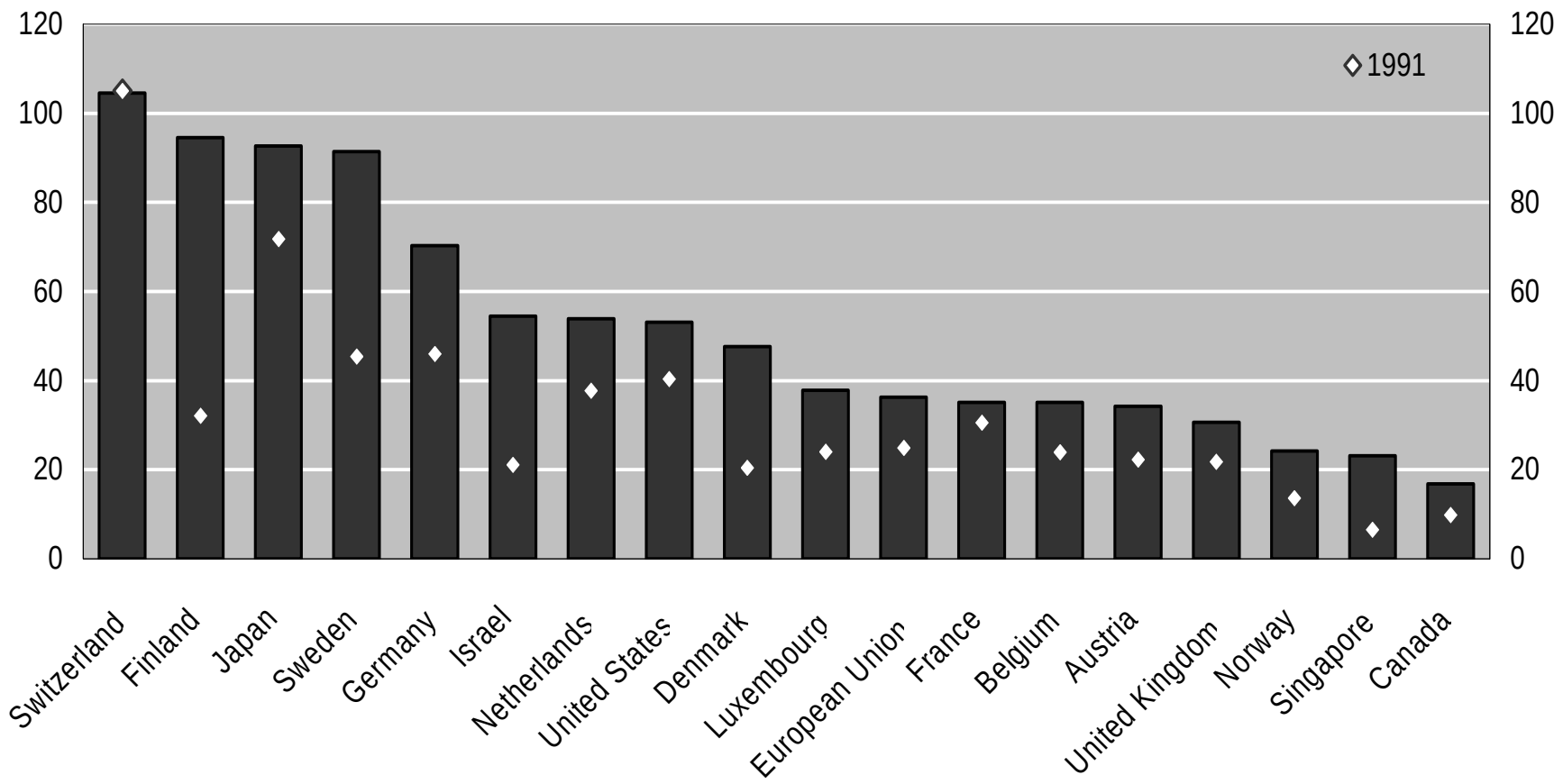
(Business R&D expenditure as % of GDP)



Source: OECD MSTI Database, July 2004

In terms of innovation performance, as measured by triadic patents, countries also vary considerably

9. Number of triadic patent families[1] per million population
according to the residence of the inventors, for priority year 2000

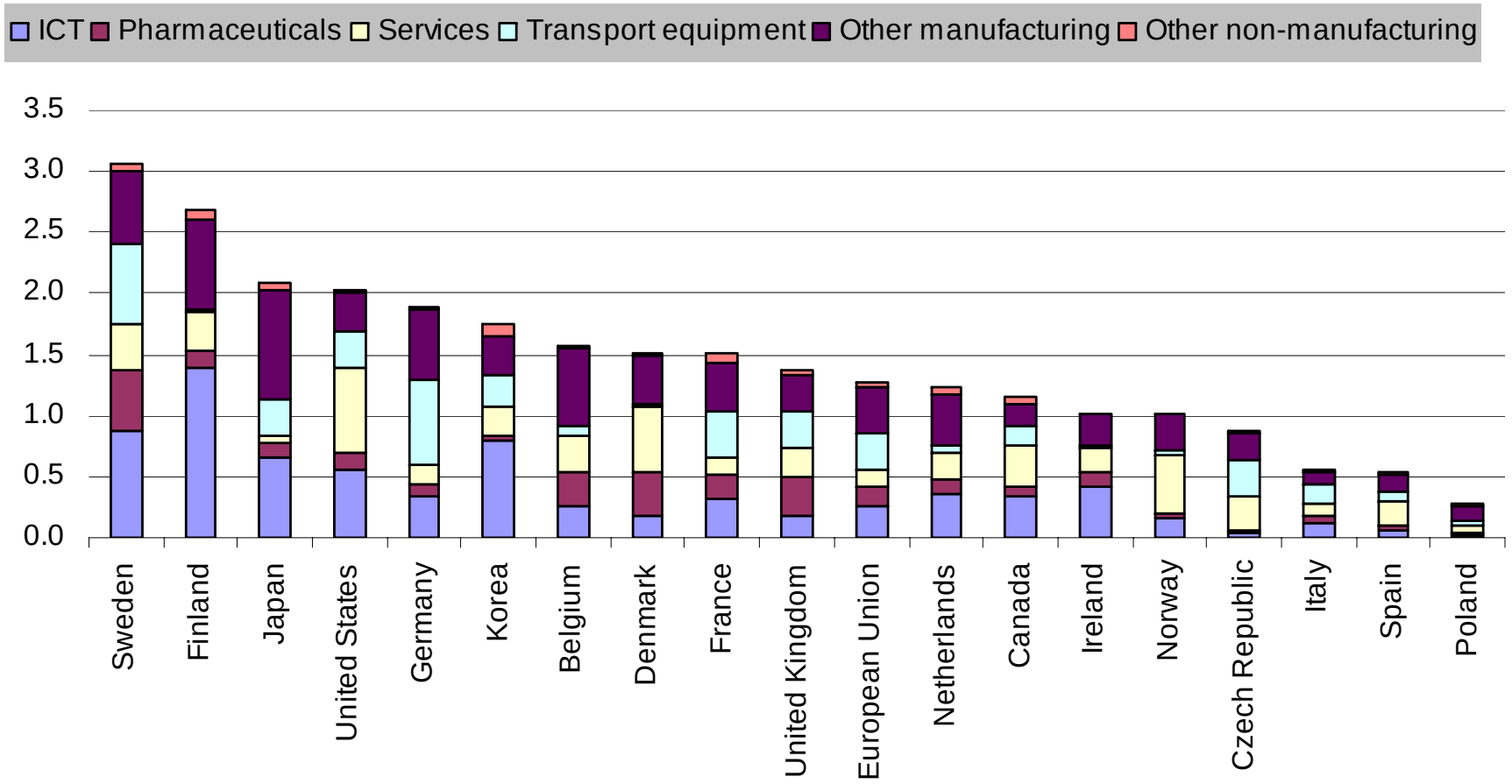


1. Patents all applied for at the EPO, USPTO and JPO. 2000 figures are estimates.

* OECD Patent database, July 2004.

Industry composition matters

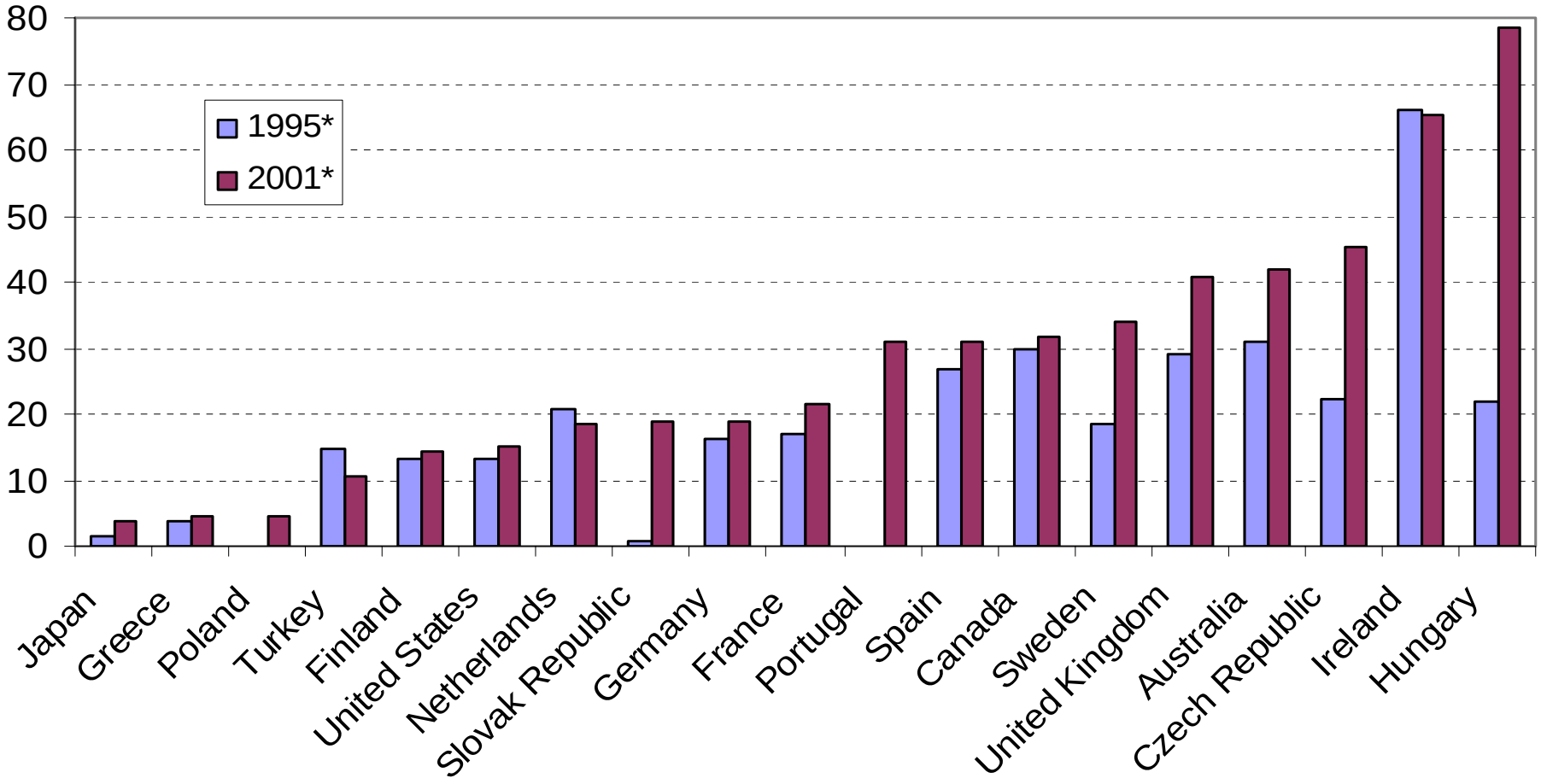
BERD intensity (as % of GDP) by industry sector



Notes: 1. Nearest available years; 2. IT manufacturing includes office, computing and accounting machines; communications equipment and electronic components.
Source: OECD MSTI Database, May 2003

R&D in small economies also depends on the ability to attract foreign direct investment

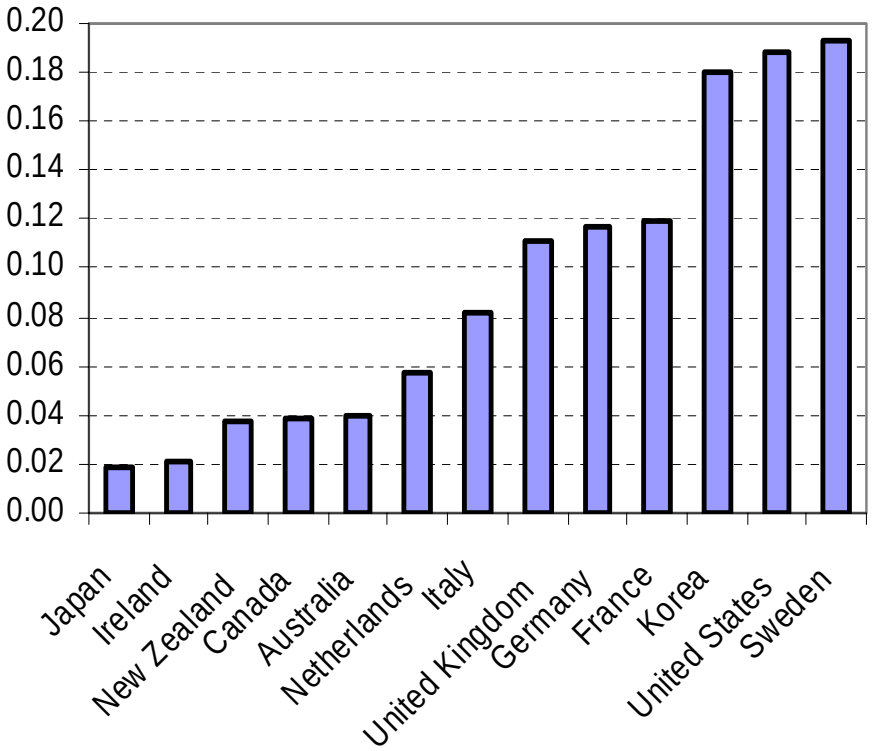
(share of R&D in foreign affiliates in total enterprise R&D)



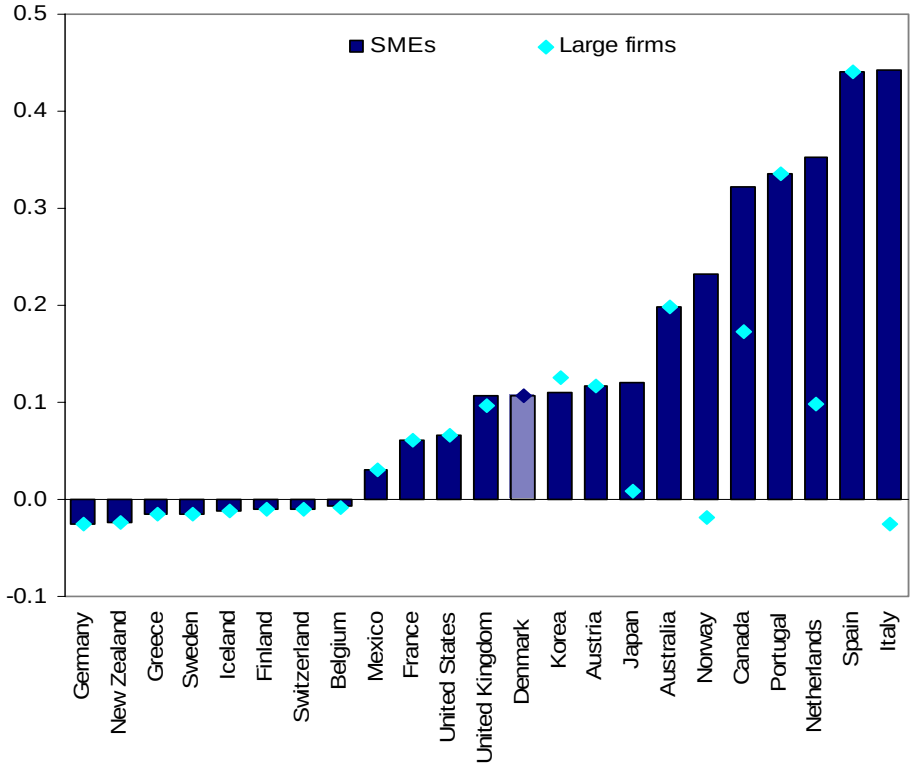
* Or nearest year available; Source: OECD, MSTI, 2004/1, July 2004.

Government support of business R&D may also matter for overall R&D spending

Government-financed BERD as a % of GDP, 1999



Generosity of tax regimes for R&D (B-index)



Raising R&D entails broader reform

- An environment that encourages business investment in R&D:
  - Differences in government/university R&D are not very large.
  - Econometric research suggest that product market regulation and high EPL may have negative impacts on R&D.
  - Fiscal incentives for R&D?
  - Attracting and retaining investments by multinationals
  - Fostering a strong science and technology workforce, either via domestic production or via immigration.
  - A good overall climate for business.
- In sum, higher R&D intensity is closely related to structural policies and changes in other areas – it is endogenous to growth.

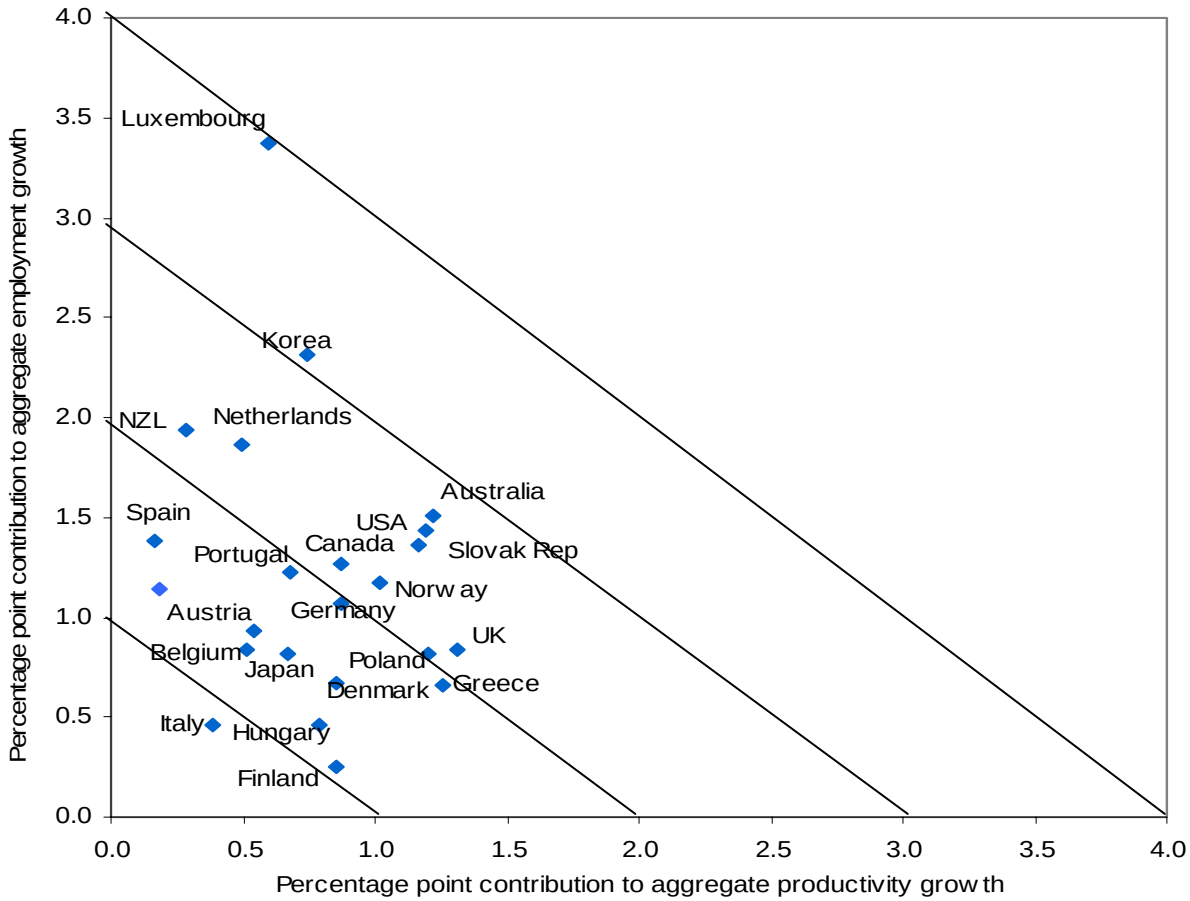
Some measurement challenges for innovation

- R&D – will possibly be included in new SNA – but issues to resolve, e.g. depreciation, price indexes, etc.
- Innovation in services remains hard to measure – OECD and Eurostat are revising the Oslo manual on innovation.
- Patents: OECD has developed a world patent database, that is available for research, see: www.oecd.org/sti/ipr

Services

The contribution of business sector services to employment and labour productivity growth differs across OECD countries

Contributions, 1990-2002, in per cent

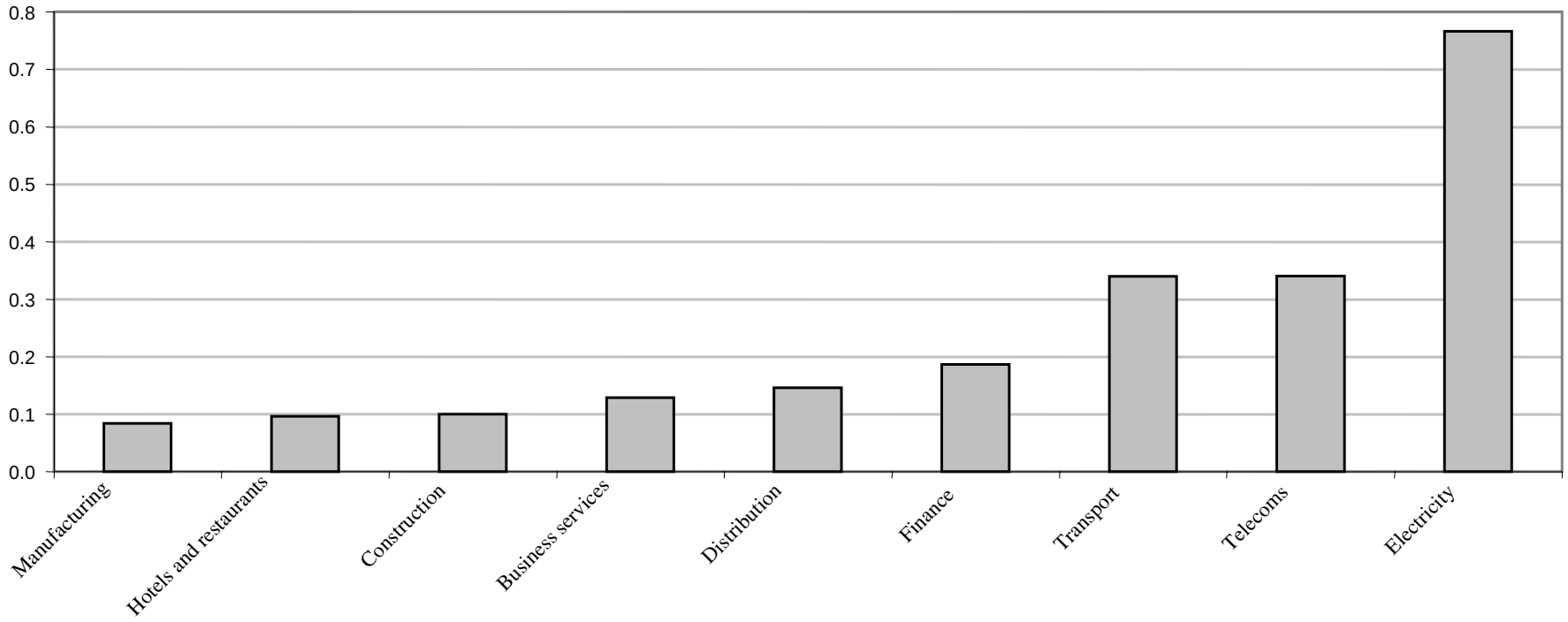


Source: OECD STAN Database, 2004

On possible constraint on competition: restrictions[1] on FDI, that particularly affect services sectors

Cross-sectoral patterns of FDI restrictions, [1] 1998-2000

Panel A. **Unweighted average of OECD restrictions by sector**



1. The indicator ranges from 0 (least restrictive) to 1 (most restrictive).

Source: OECD

Note (1): Restrictions refer to limitations on foreign equity, screening and approval Rules, and other restrictions on FDI (e.g. restrictions on the composition of boards).
Source: OECD Economic Outlook No. 73, June 2003

Measurement challenges for services

- Output measures: what is services output? Work is underway for finance and insurance.
- Price measures – work underway for many services.
- Volume measures – work is underway in many national statistical offices, including for sectors such as education, health and government.
- OECD workshop on 15-16 November will focus on some of these issues (e.g. for retailing).

Some other measurement issues

- Human capital:
  - Work to develop labour composition measures.
  - Understanding tails – the role of high-skilled workers.
  - A lot of work on education and skills – e.g. PISA.

- Firm dynamics:
  - Work on entry/exit – spreading Eurostat work to other OECD countries.
  - Possible new survey on entrepreneurship.
  - Firm-level analytical projects – work with micro data.

- Globalisation:
  - OECD handbook on economic indicators of globalisation forthcoming
  - Focus on the activities of multinational enterprises – outward investment and need to understand reporting by MNEs.

Conclusions

- OECD continues to work towards better statistics on productivity growth and its drivers:
  - GDP estimates – involvement in SNA revision
  - Labour input – Hours worked, integration of labour in NA, labour composition.
  - Capital input – broadening of concepts, e.g. inclusion R&D.
  - A wide range of statistical work on ICT, human capital, innovation, globalisation and entrepreneurship.
  - Developing analytical databases – e.g. STAN, patent database.
- Empirical and analytical work related to productivity typically responds to specific policy issues, e.g. :
  - The role of services – link to policies related to regulations and trade.
  - Globalisation and outsourcing – link to labour market policies, the structural adjustment of economies.
  - Value of intangible assets – link to IPR policies, etc.

Thank you

For more information:

dirk.pilat@oecd.org