Intellectual Assets in Japan

View from the OECD

28-30 November 2005
Intellectual Assets Week of Japan
RIETI conference

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OECD

I. Why does the OECD study Intellectual Assets?

OECD Project on the Intellectual Assets and Value Creation

Ministers meeting at the OECD in May of 2004 recognised:

"…the critical importance of 'intellectual assets', including the human capital, innovation and business networks in enhancing productivity and in sustaining growth in a competitive global market. They proposed a programme of work aimed at ***improving understanding of the role of intellectual assets and their importance to economic performance***."

Background:
Strong Japanese, UK, NLD & Nordic interest

- Danish requirement of an intellectual capital statement;
- Overhaul of UK Company Law;
- METI's "Intellectual Property Disclosure Guidelines"
- Motivating factors:
  - Ageing populations;
  - New competitors;
  - Outsourcing / off-shoring phenomenon;
  - IT driven productivity & complementary investments;

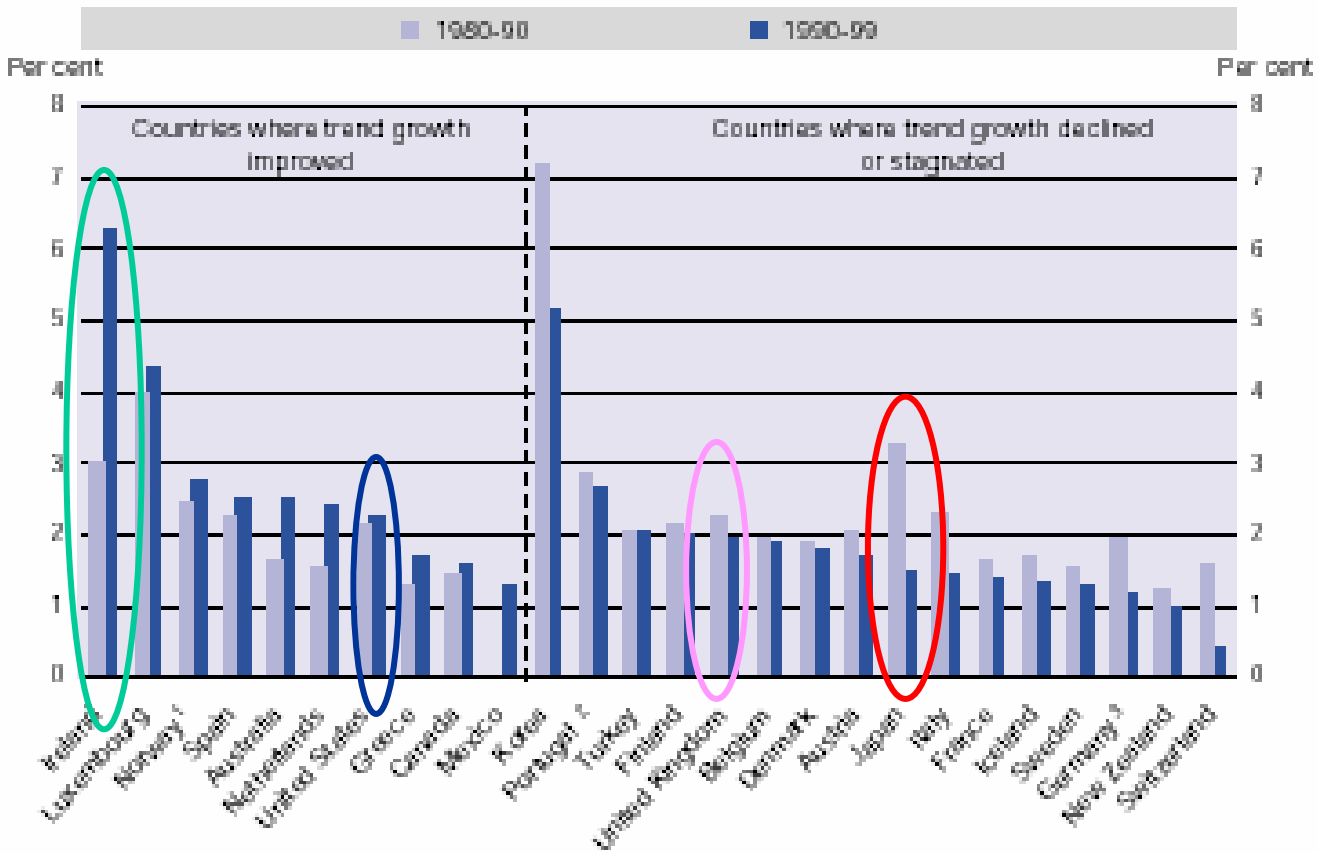
Background:
Previous OECD work on Intangibles

- 1962 Conference on Measurement of R&D (Frascati Manual);
- 1992 Technology and Economy Programme;
- 1998 Technology, Productivity and Job Creation project;
- 1999 Symposium on Measuring and Reporting Intellectual Assets;
- **2001 Growth Study ("The New Economy: Beyond the Hype").**

OECD members have shown divergent Economic Performance. But WHY?

Figure I.2. Uneven trend growth of GDP per capita

Total economy, percentage change at annual rate



Note: *Trend growth in the 1990s was higher than in the 1980s in several countries: Australia, Canada, Greece, Ireland, Luxembourg, Mexico, the Netherlands, Norway, Spain and the United States. But trend growth declined substantially in Italy, Switzerland, Japan and Korea. The decline in trend growth in Germany is influenced by the unification process.*

1. Total Norway.
2. 1980-98.
3. West Germany for 1980-90; Germany for 1991-99.

Source: OECD, based on data for the OECD *Economic Outlook*, No. 68. See Scarpetta et al. (2000) for details.

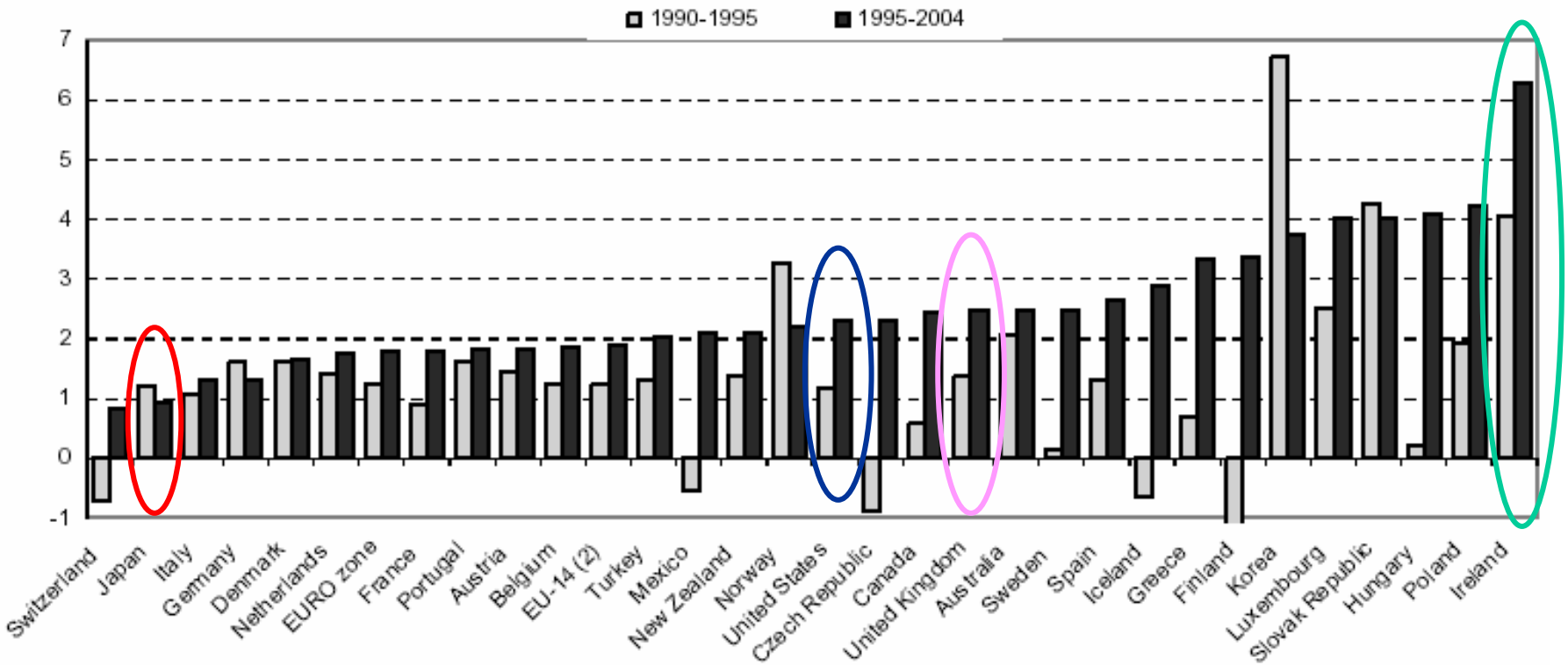
Winners and Losers

Source: OECD's Growth Report, "The New Economy : Beyond the hype" 2001.

Current Ranking of GDP per capita Growth

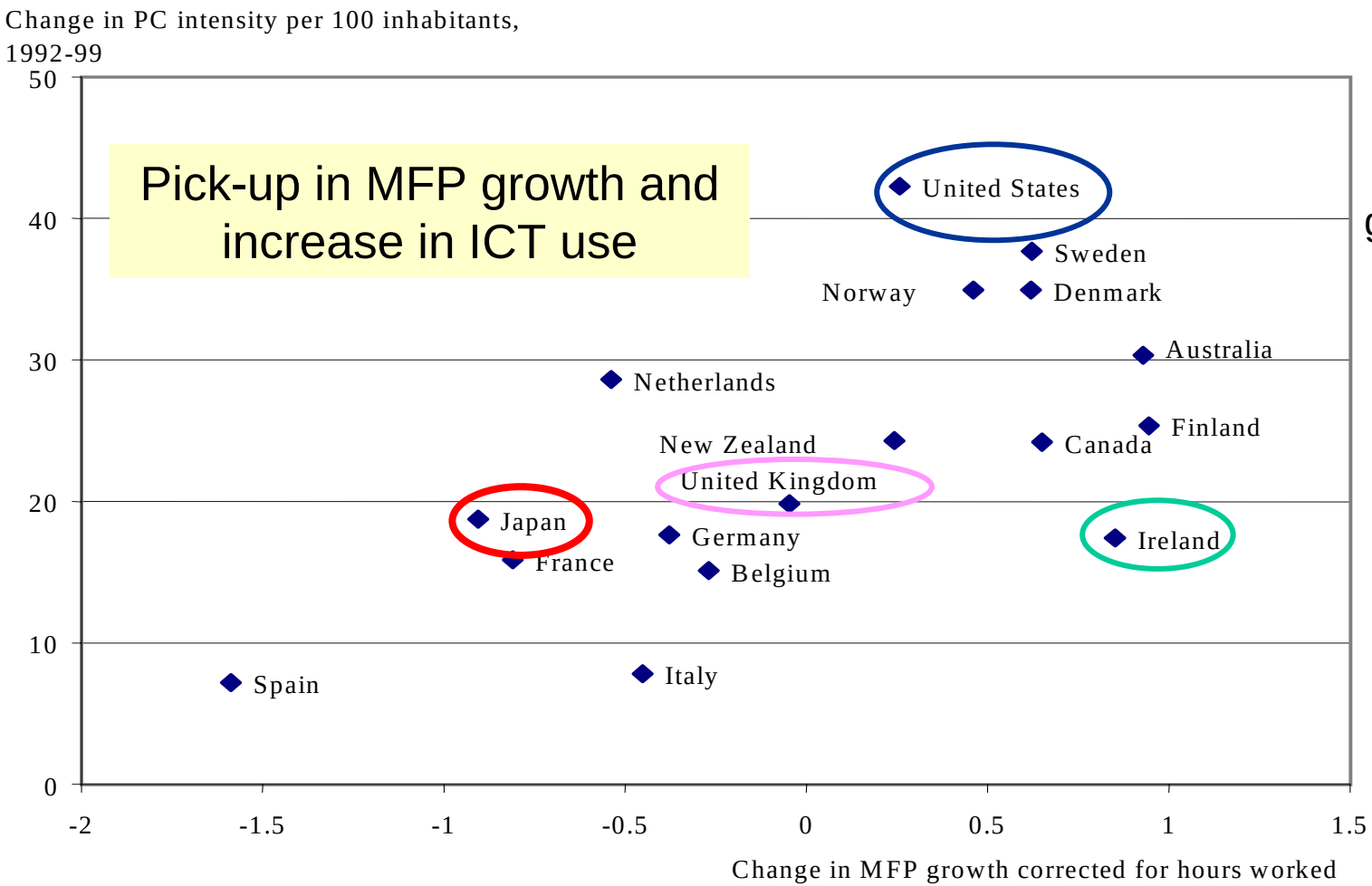
Growth in GDP per capita, 1990-95[1] and 1995-2004

Total economy, percentage change at annual rate



1. Or earliest available year, i.e. 1991 for Hungary and 1992 for the Slovak Republic.
2. EU-14: Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and the United Kingdom.

Reason was ICT use, Innovation, Entrepreneurship and Human Capital : Micro Economic Drivers of Growth = IA

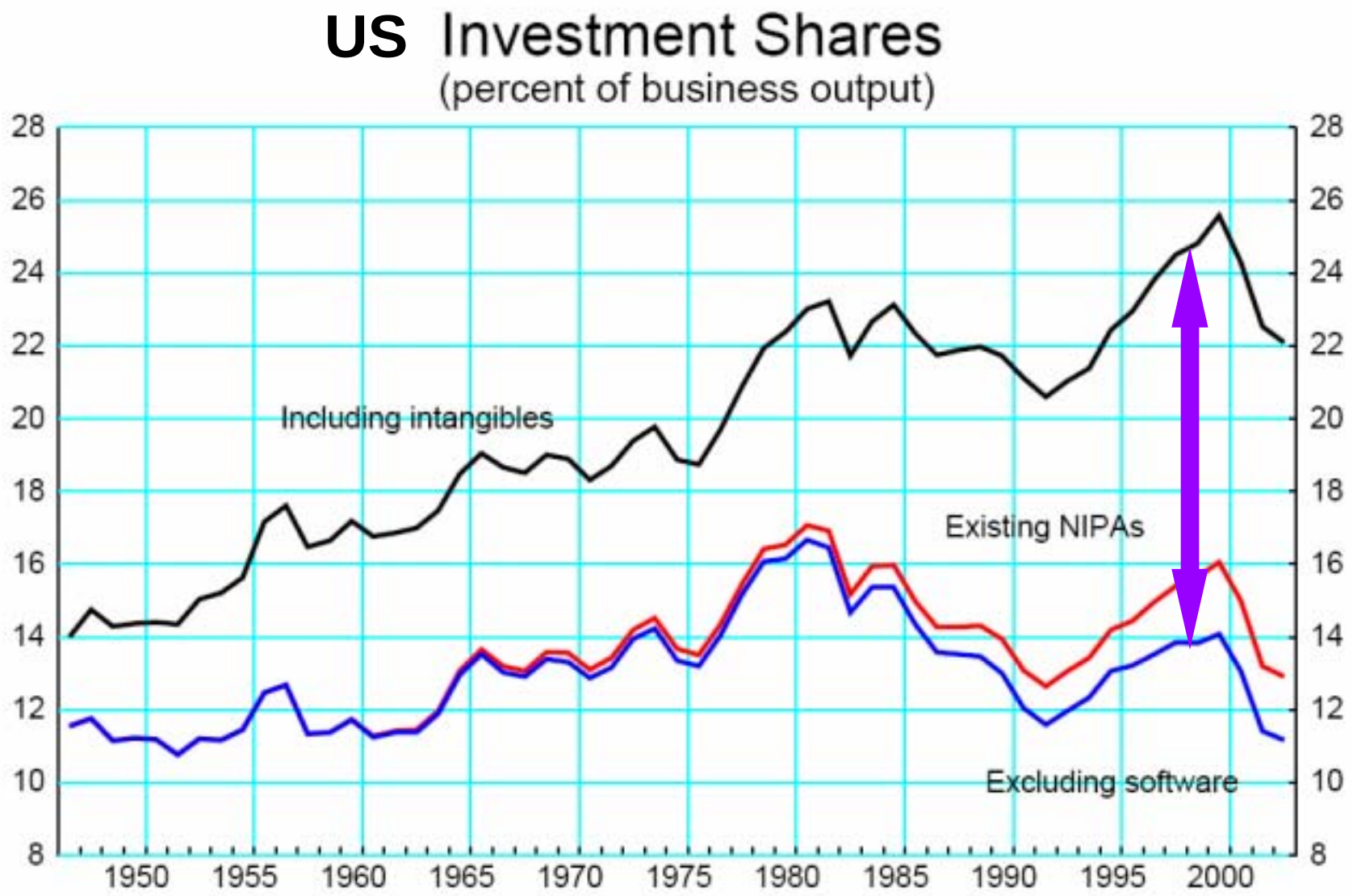


Greenspan noticed US productivity growth in late 1990s came from **Intangibles.**

Note: Change in multi-factor productivity growth corrected for hours worked, average 1990s minus average 1980s.

Source: OECD

How big are Intellectual Assets?

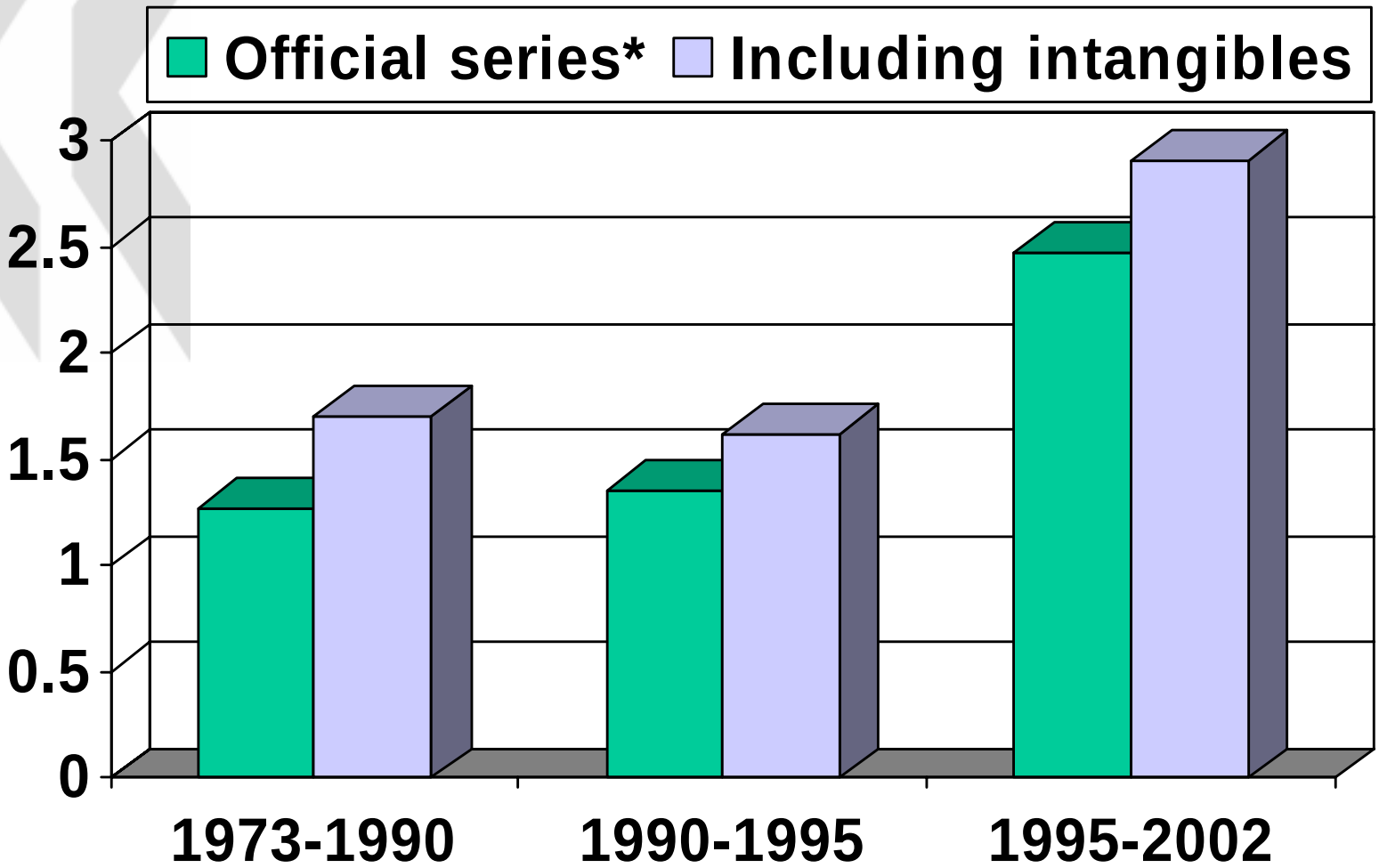


Source: Corrado, Huten & Sichel, 2004

NIPA = National Income and Product Accounts

US Labour Productivity

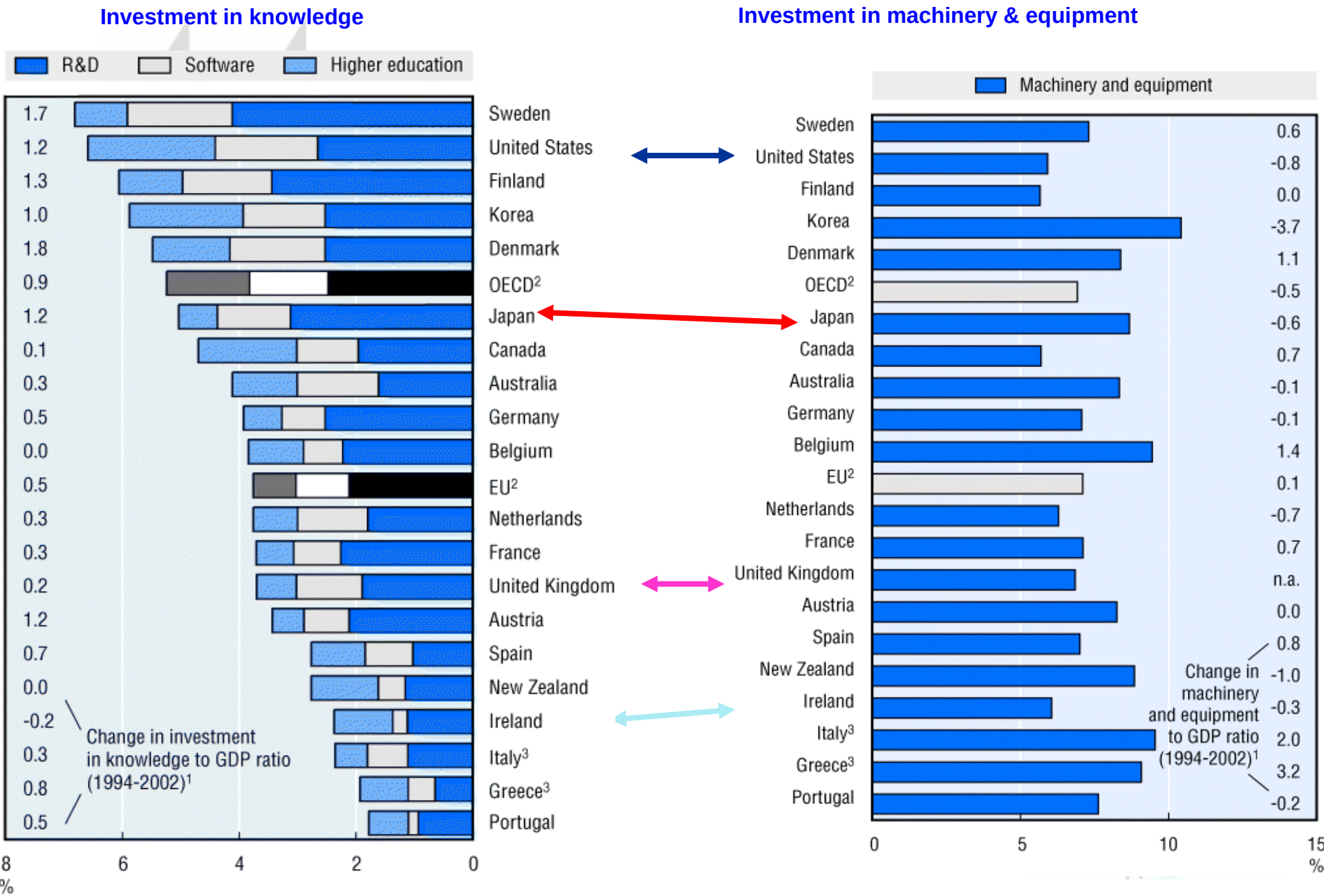
(AAGR, Output per hour worked)



* Excludes software

Source: Corrado, Huten & Sichel, 2004

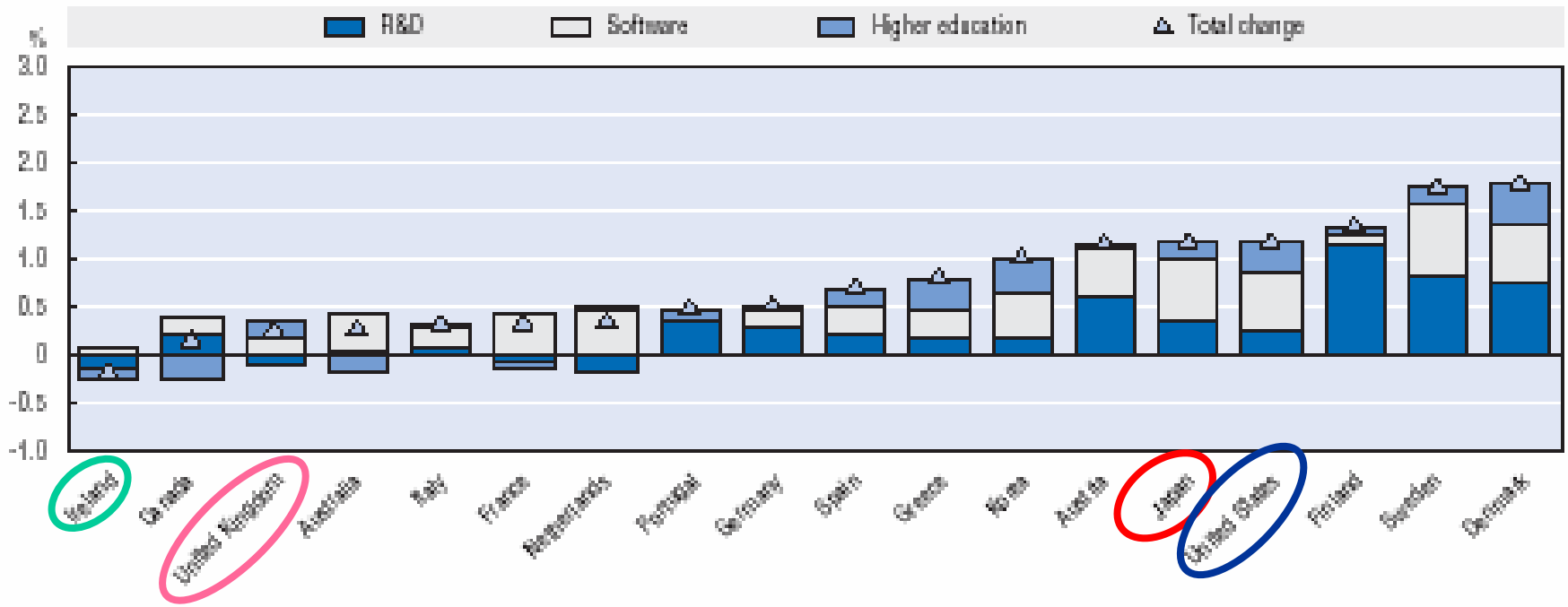
How big are Intellectual Assets?



OECD STI Scoreboard 2005

As a percentage of GDP, 2002

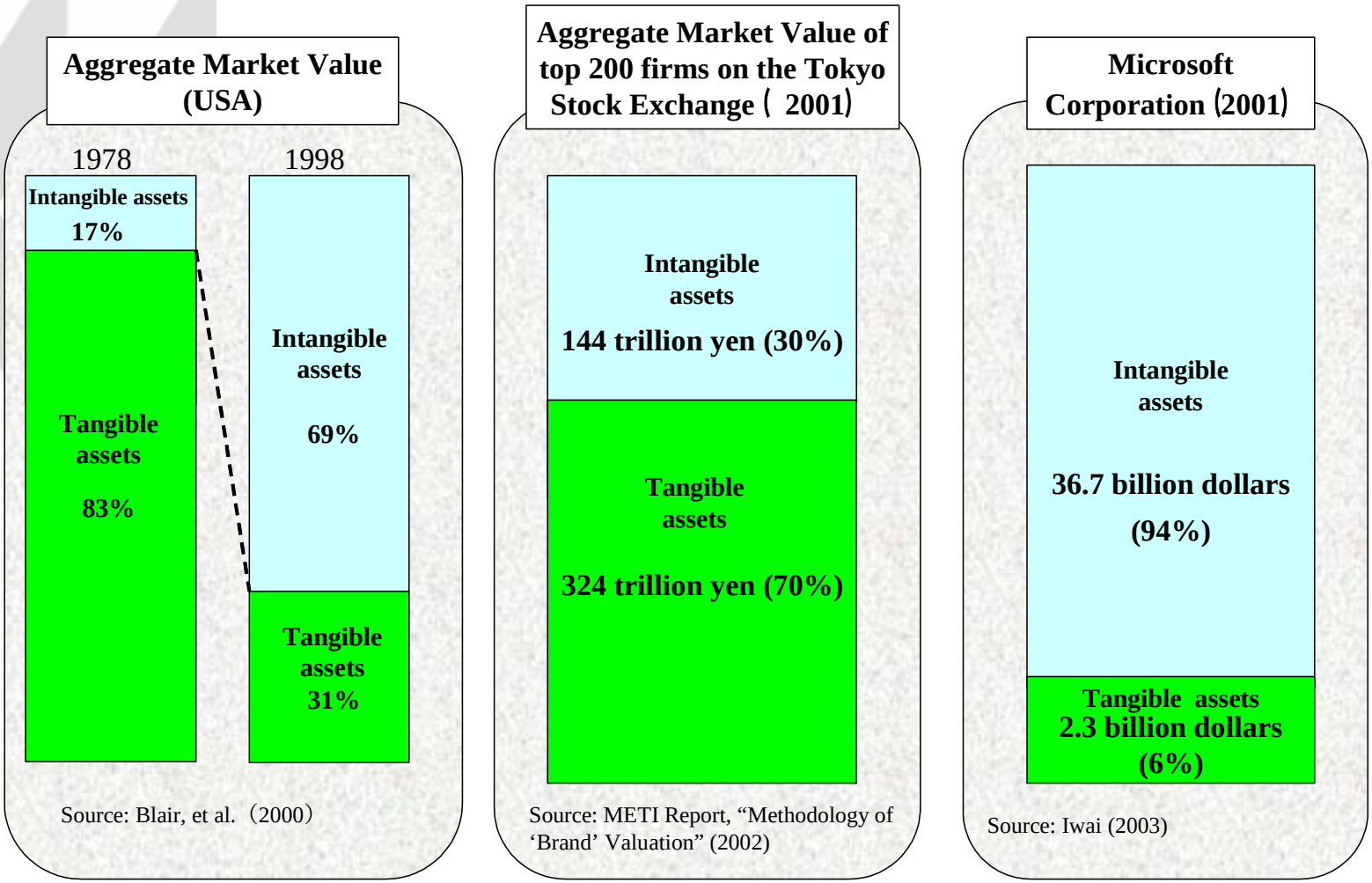
Contributions to the growth of investment in knowledge, as a percentage of GDP, 1994-2002[1]



1. 1994-2001 for Greece and Italy. 1995-2002 for Korea. EU figure excludes Belgium, Greece and Italy. OECD figure excludes Belgium, Greece, Italy and New Zealand.
2. Excludes Greece and Italy.
3. 2001 data.

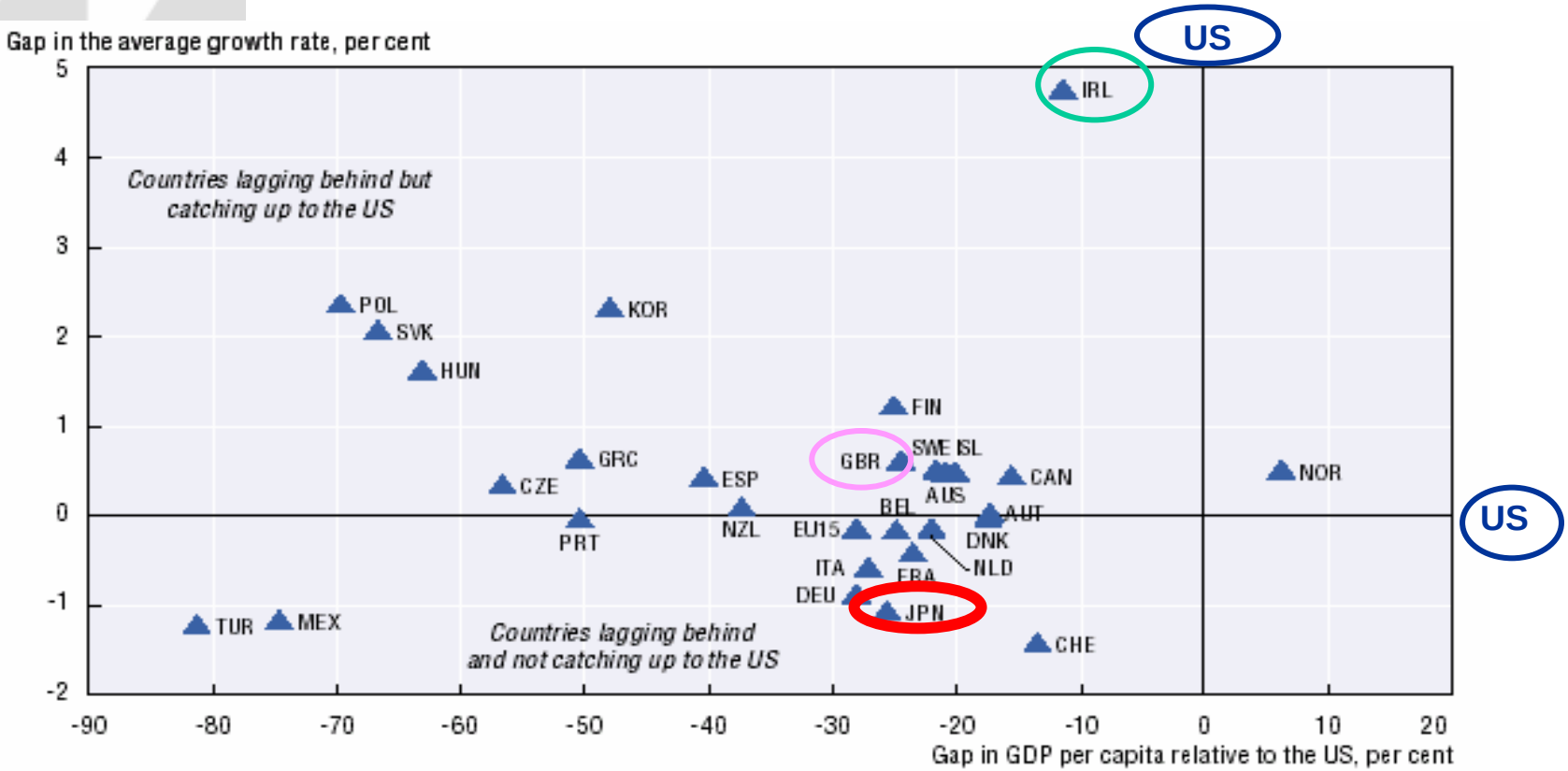
How big are Intellectual Assets?

The transition to a knowledge-based economy



GDP per capita levels and growth rates: Gap *vis-à-vis the US*

Winners and Losers (II)



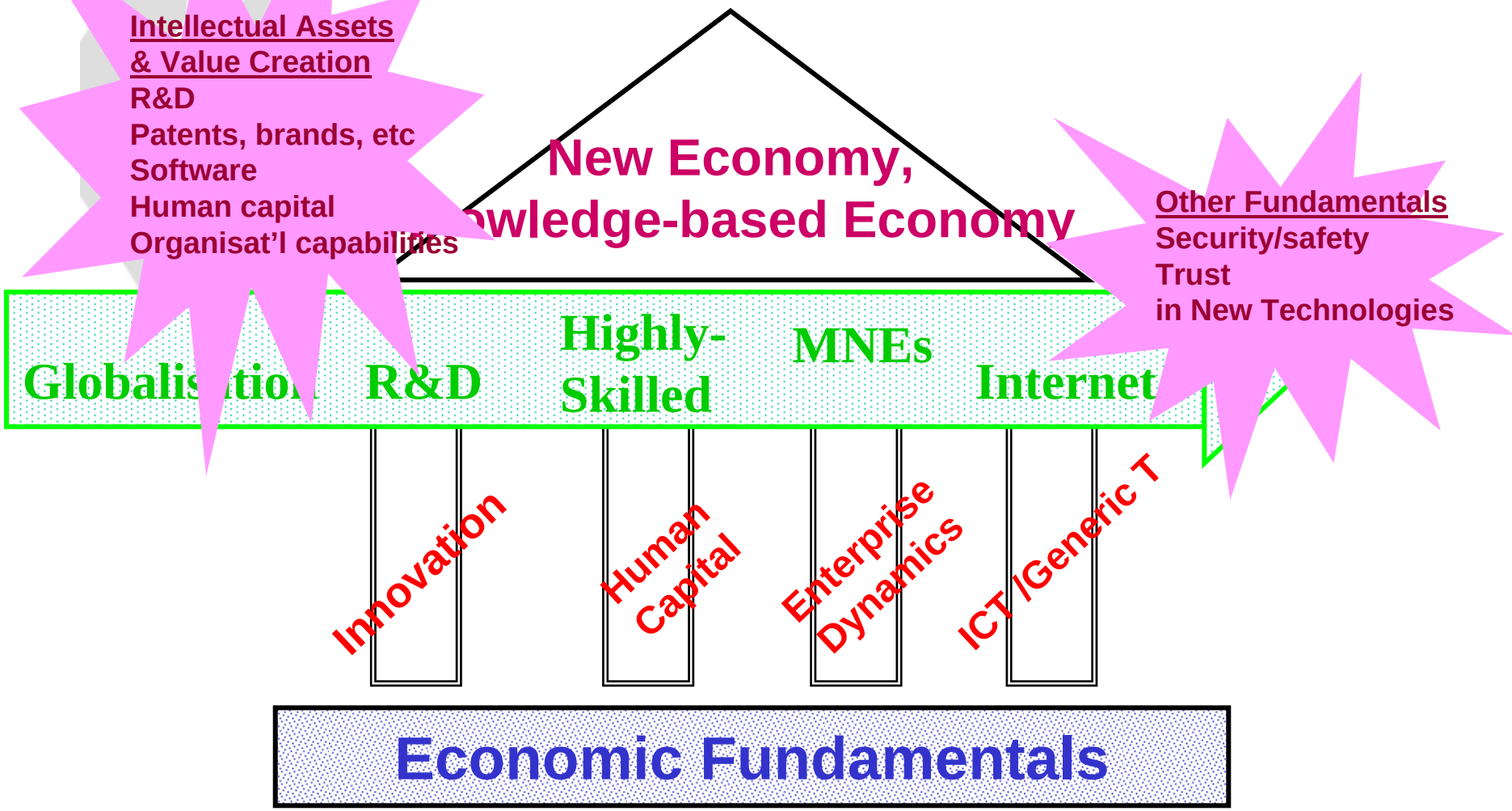
Note: EU15, excluding Luxembourg.

1. The average growth rate of GDP per capita is calculated over the period 1994-2003 on the basis of volumes data from national accounts sources. The level of GDP per capita is for 2002 on the basis of 2000 PPPs.

Source: OECD, *National Accounts of OECD Countries*, 2004 and *OECD Economic Outlook*, No. 76.

Going for Growth – Economic Policy Reforms (2005), OECD

Micro Economic Drivers of Growth:
A Greek Temple of New Economy



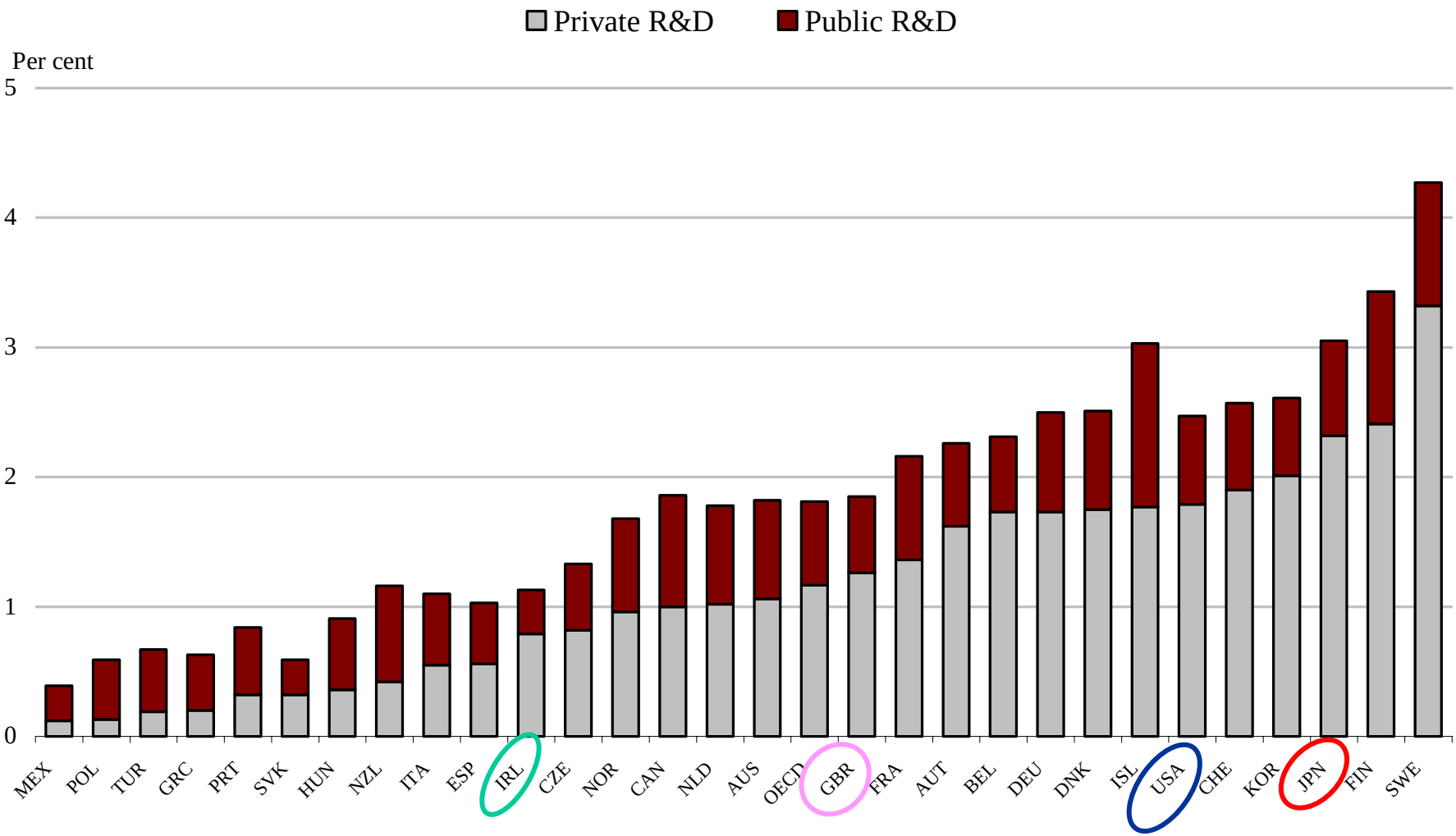
Components of Intellectual Assets

- **R&D/ Innovation system**
- **IPR: Patents, copyrights, brands, etc**
- **Software / Business models / Organisational capabilities**
- **Human capital / Training**

1. R&D / Innovation system of Japan

- High R&D Intensity
- Business R&D driven
- Globalisation of R&D : Increased Role of MNE and mobile high-skilled workers
- Entry of major new - R&D - players in the world arena - China, India.
- Is Japan's "Closed" system sustainable?
- Centralized system?

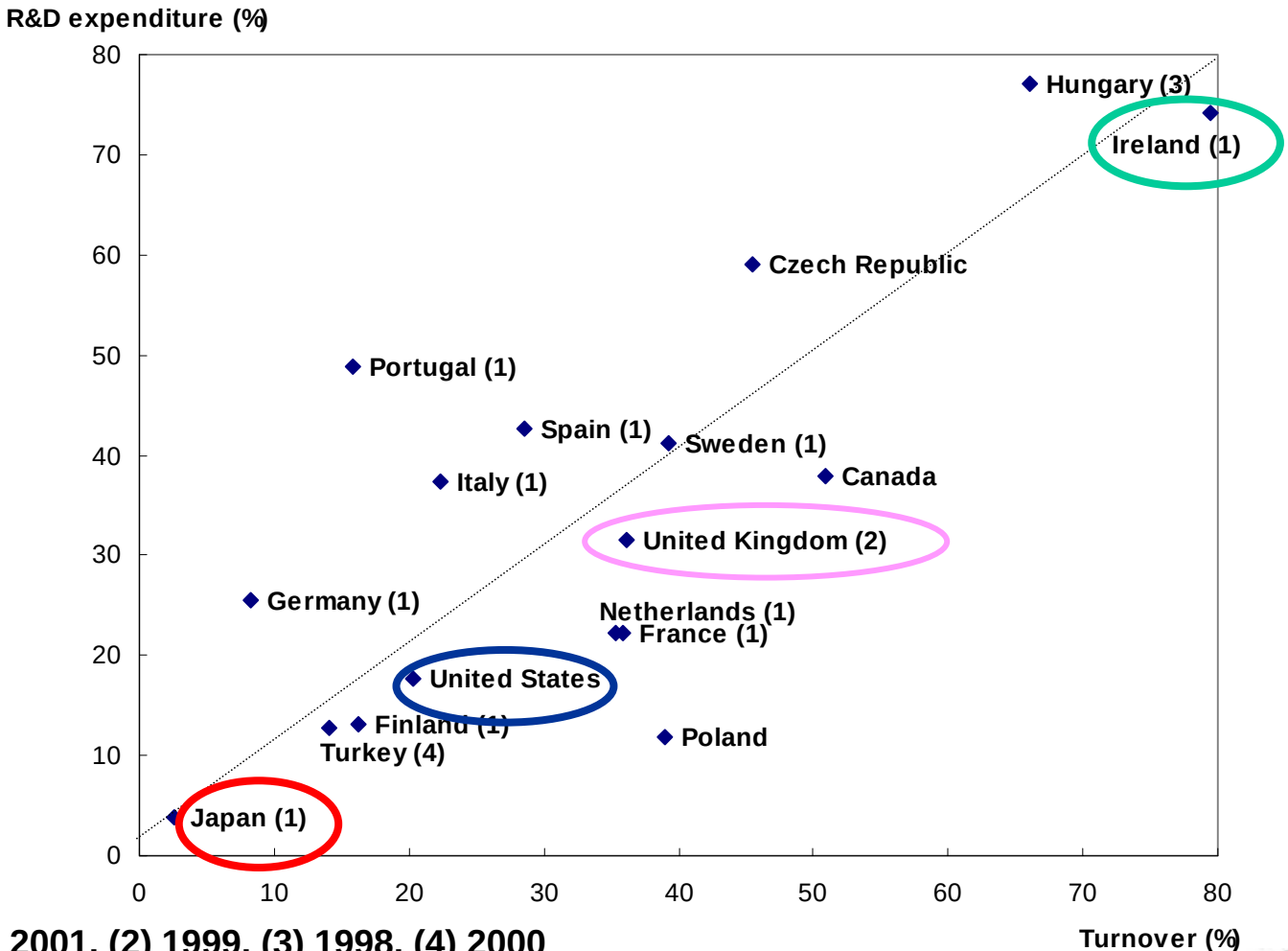
R&D Intensity: Business and public spending on R&D as a percentage of GDP, 2003



Source **: OECD Main science and technology indicators database.**

Share of multinational enterprises in R&D and turnover

Share of R&D expenditure and turnover of affiliates under foreign control in total manufacturing R&D and turnover, 2002



(1) 2001, (2) 1999, (3) 1998, (4) 2000

Source: OECD, Activities of Foreign Affiliates database

R&D: Business, public, foreign... absorptive capacity, impacts...

- Business R&D is a key driver of productivity growth
- Public R&D is also contributes to productivity growth
  - Econometric studies (STI WP 2001/3 by D. Guellec et. al. ; M. Khan 2005)
- But a lot depends on countries' absorption capacity
  - Infrastructure, **human capital**
- Foreign R&D plays an important role
- Benefits of foreign R&D closely linked with **openness**
  - Mobility of researchers and students, FDI, joint ventures, collaboration
- Important to understand the **interactions** between different sources of R&D funding or types of performers and over all absorptive capacity
- Impact of R&D and human capital on productivity growth differs across countries.

Ireland: Success of Comprehensive Strategy for Growth Model for a Region?

- Education reform to create skilled workers (English speaking and relatively low-cost)
- Trade Liberalization to enter EU in 1973
- Attract Foreign Direct Investment in manufacturing (tax incentives) and subsequently in services
- Regulatory reform
- Invest in R&D by Higher Education as well as Foreign Business
- National = Regional Strategy in the expanding EU

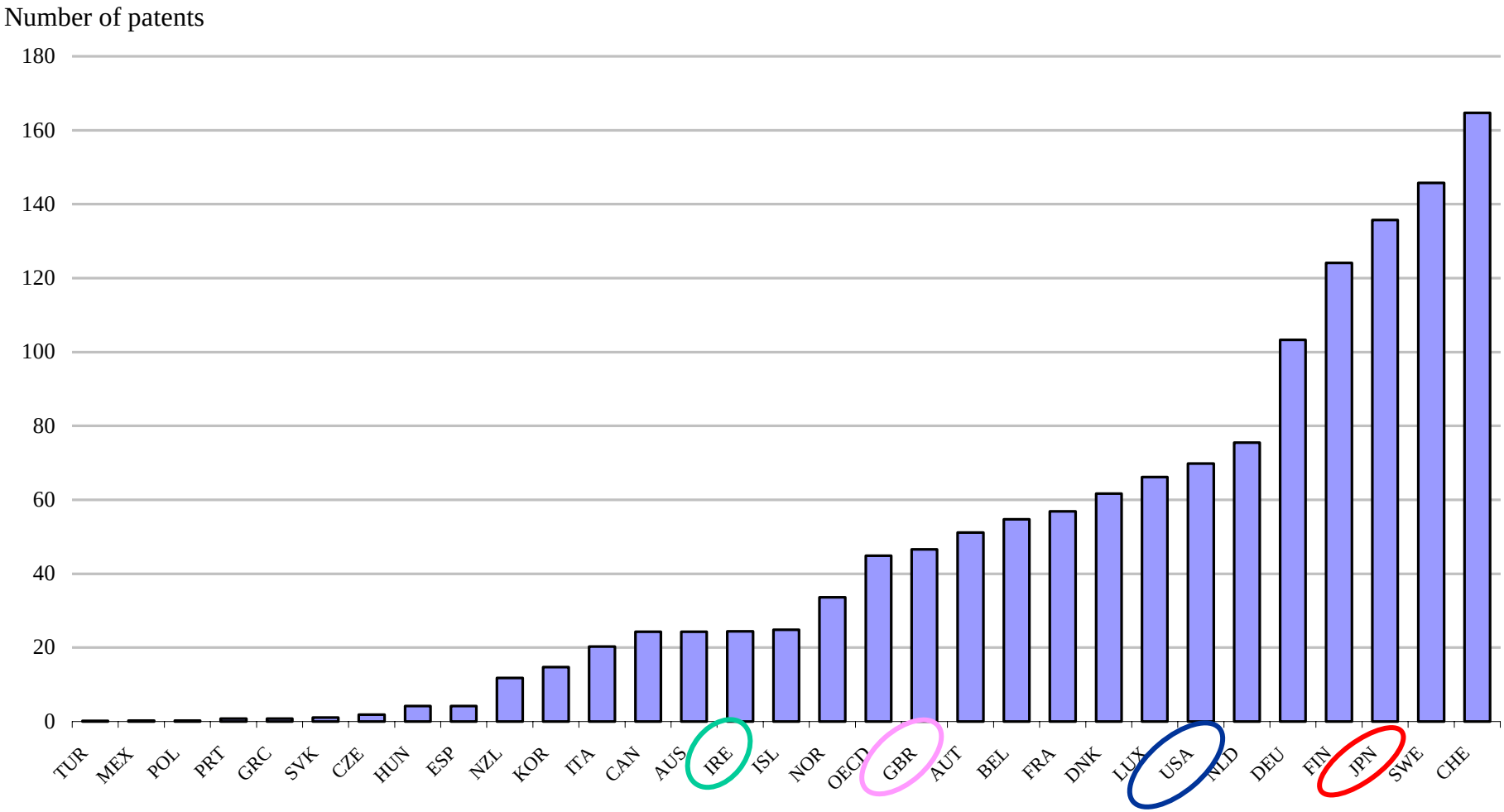
Regions link each other beyond the Nation States. Seoul, Tokyo, Beijing, Shanghai, Dalian, Hyderabad, Silicon Valley, San Jose, Austin, Catalonia, Langedoc-Roussillon, Trentino etc **compete and interact.**

2. Intellectual Property Rights : What Patent Statistics tell us.

- Increasing worldwide trend in collaborative patenting
- Strongly driven by patenting of ICT inventions, and also biotechnology patents
- Science systems under increasing pressure as private stakeholders play increasingly strong role
- Intensifying pressure to address trademark counterfeiting and other IP infringements (OECD work on " the Economic Impact of Counterfeiting.")
- Some sectors move to more open / collaborative innovation system away from "proprietary" system.
- Challenge to Japan: Openness and De-Centralisation
- Challenge to the current Intellectual Property Protection Regime.

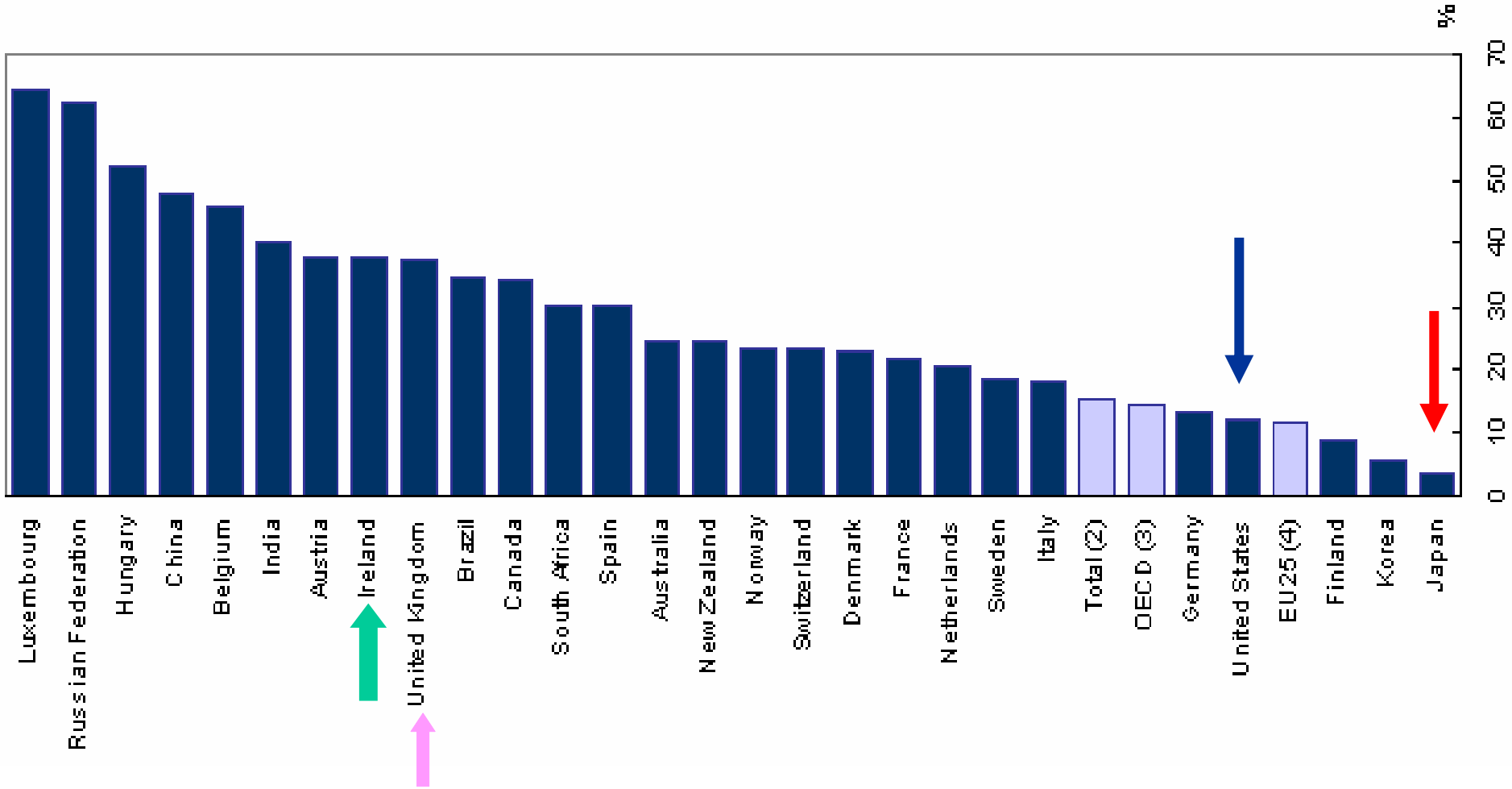
Triadic patents per working-age population, 2001

Number of patents in the triadic per million of working age population



Share of patents held by foreigners

Foreign ownership of domestic inventions, 1999-2001.

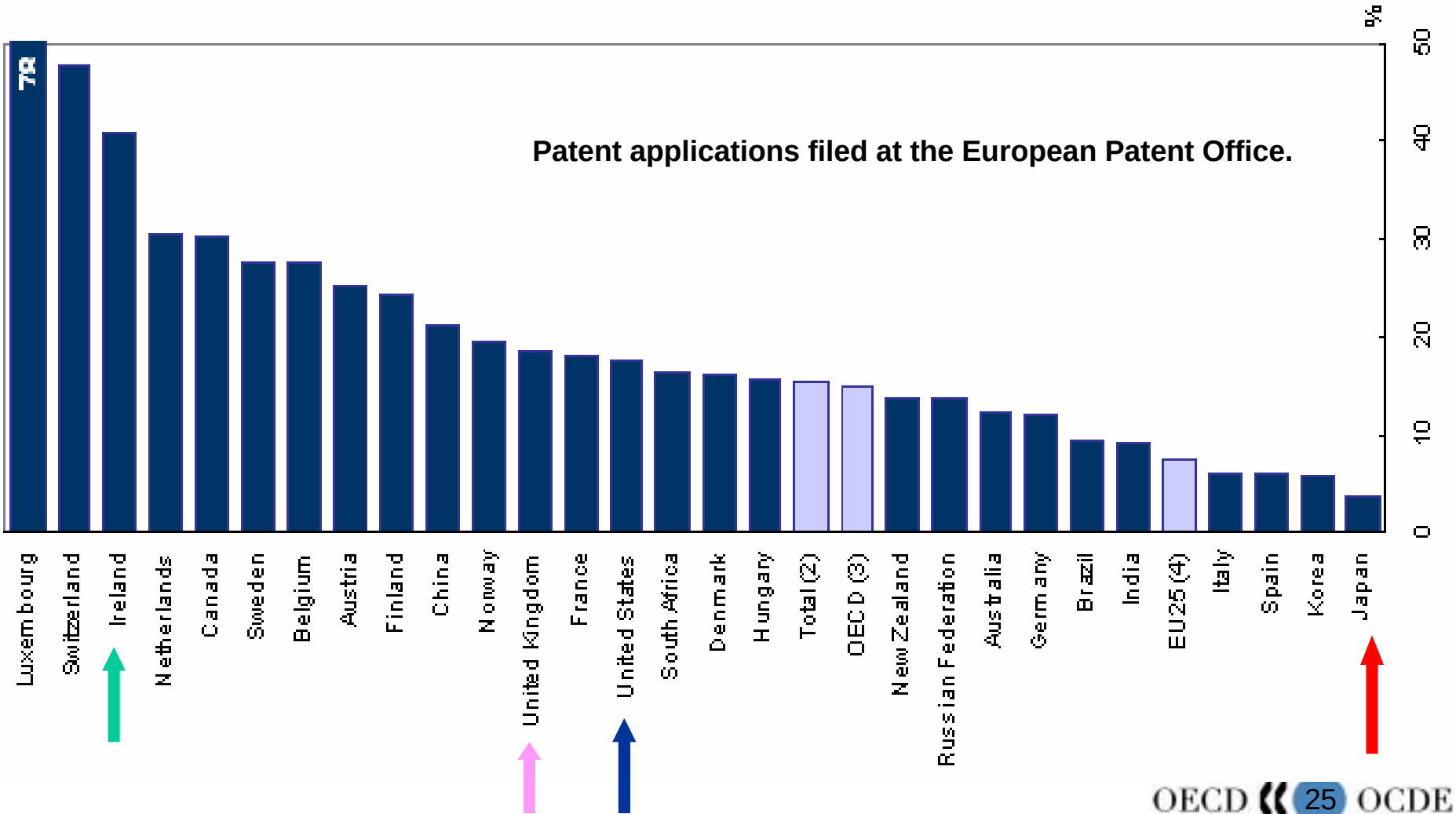


Patent applications filed at the European Patent Office.

Source: OECD, Patent database

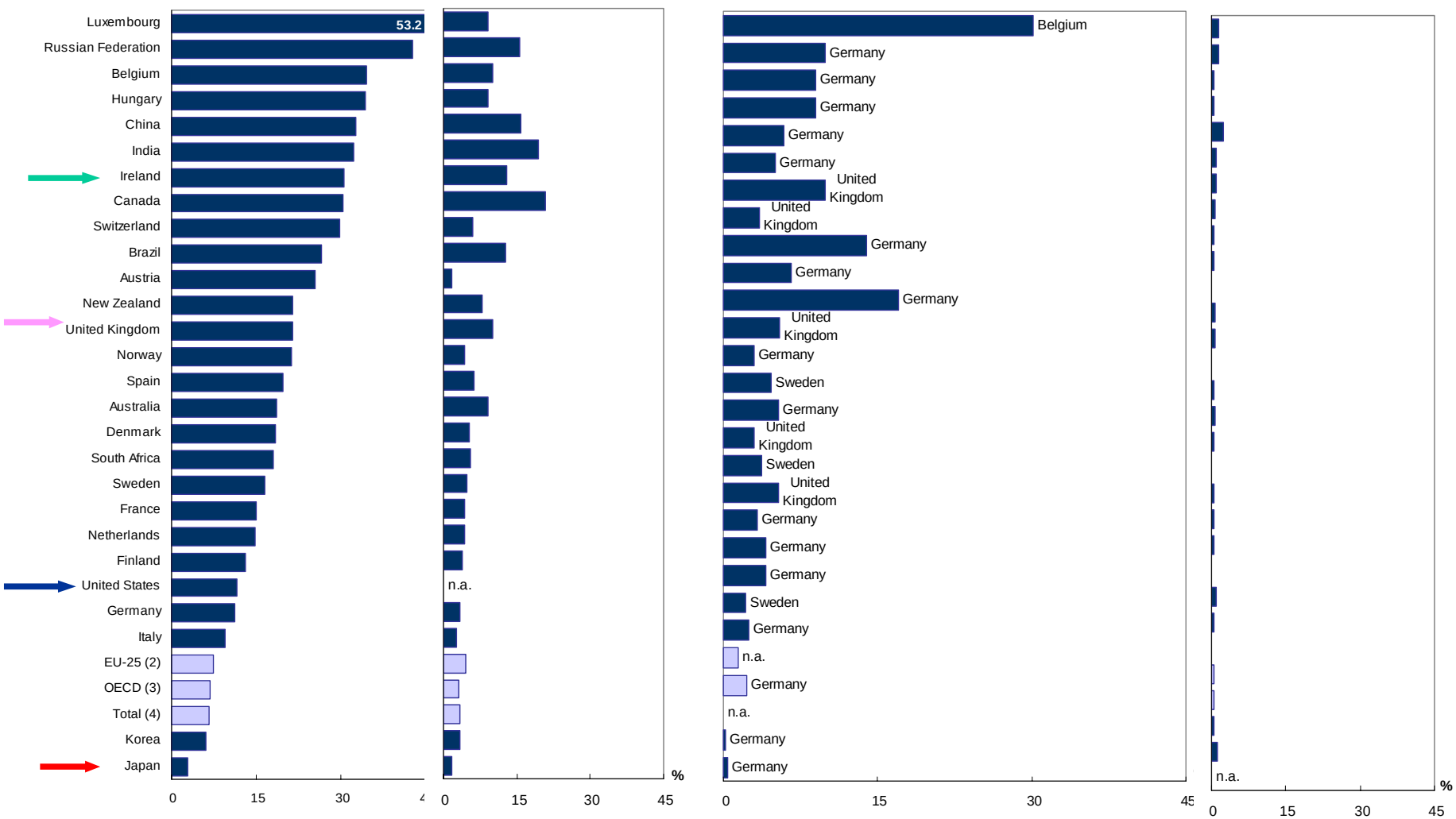
Share of patents registered abroad

Domestic ownership of inventions made abroad, 1999-2001.



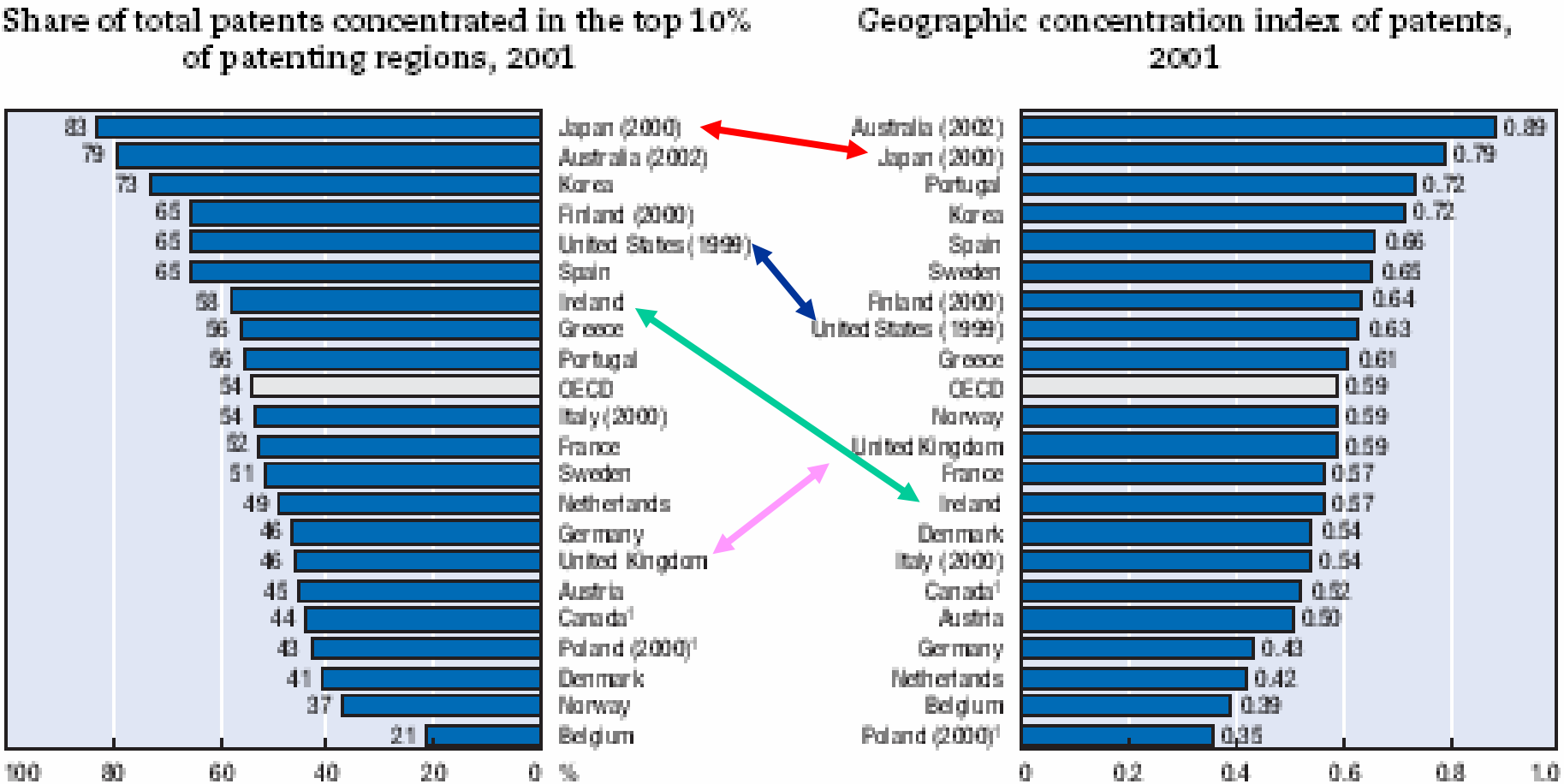
Source: OECD, Patent database

Share of patents[1] with foreign co-inventors, 1999-2001

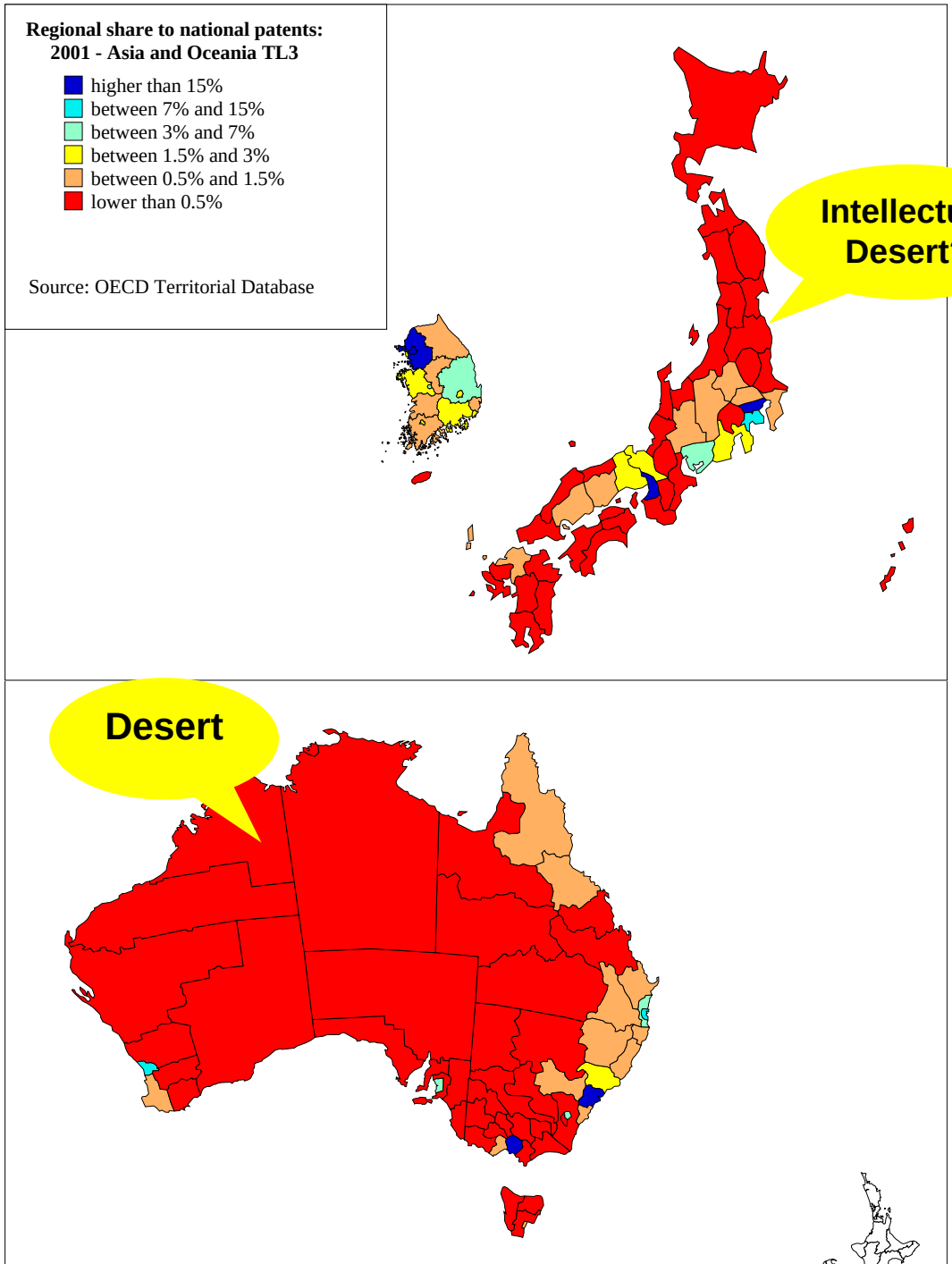


Source: OECD, Patent database

C.11. Geographic concentration of patents



Geographic concentration of patents

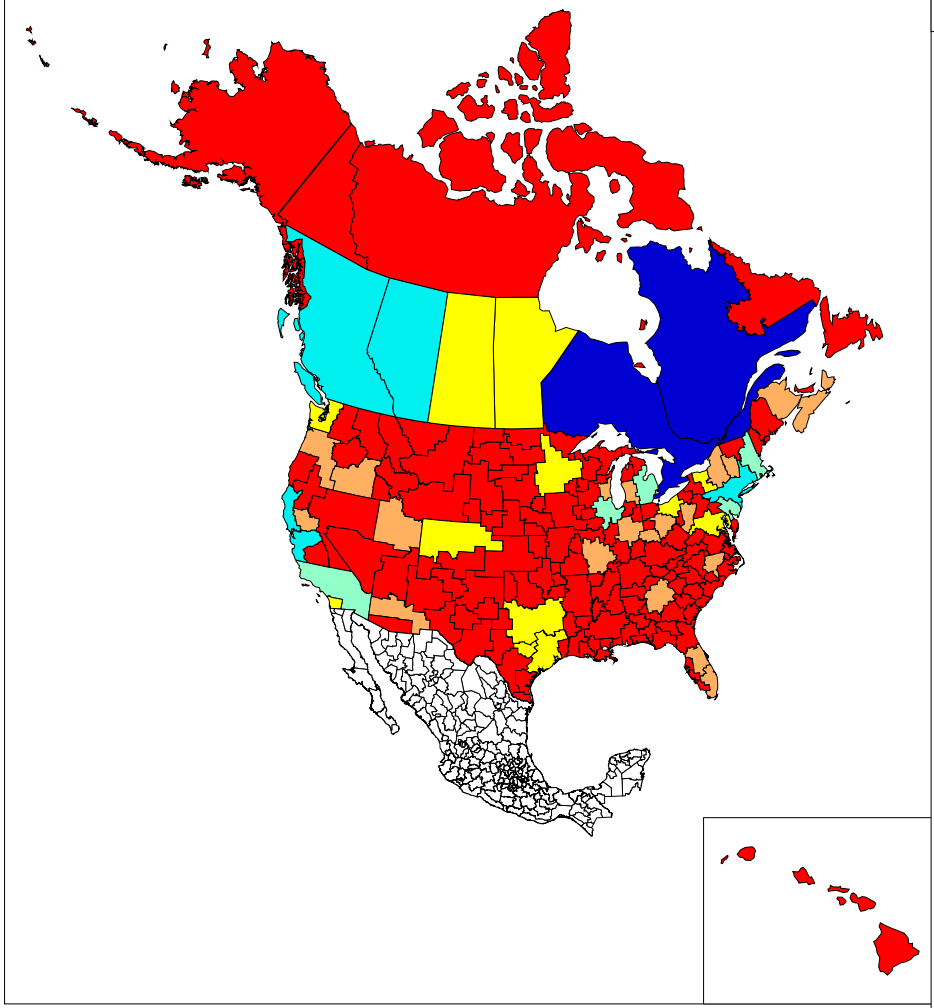


OECD Regions at a Glance 2004

Regional share to national patents: 2001 - North America TL3 (Canada TL2)

- higher than 15%
- between 7% and 15%
- between 3% and 7%
- between 1.5% and 3%
- between 0.5% and 1.5%
- lower than 0.5%

Source: OECD Territorial Database



Regional share to national patents: 2001 - Europe TL3 (Poland TL2)

- higher than 15%
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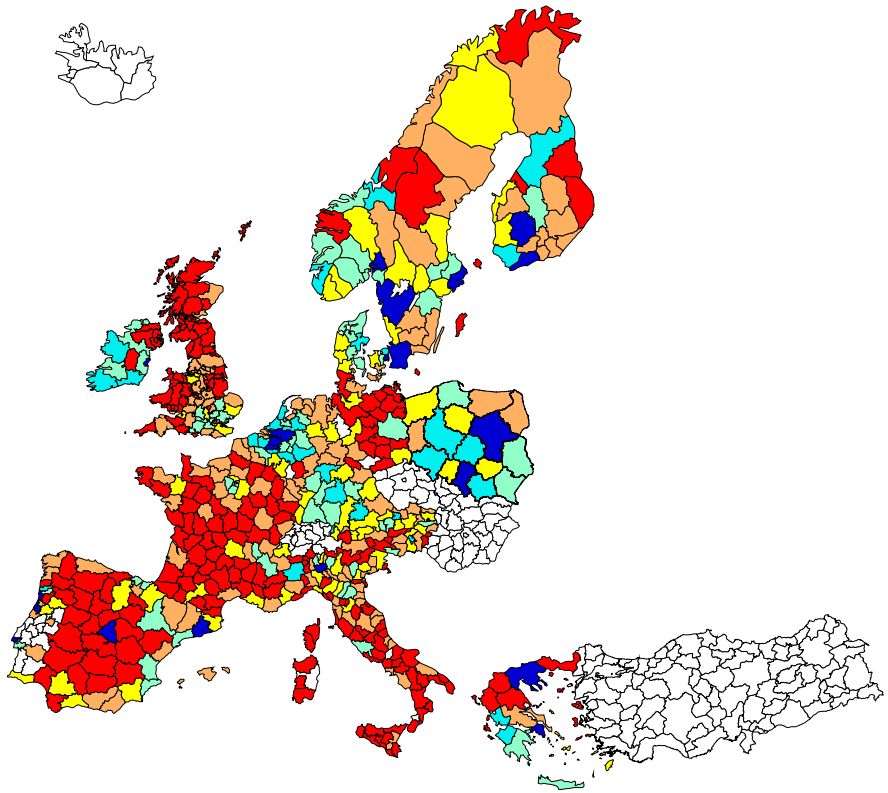
Source: OECD Territorial Database

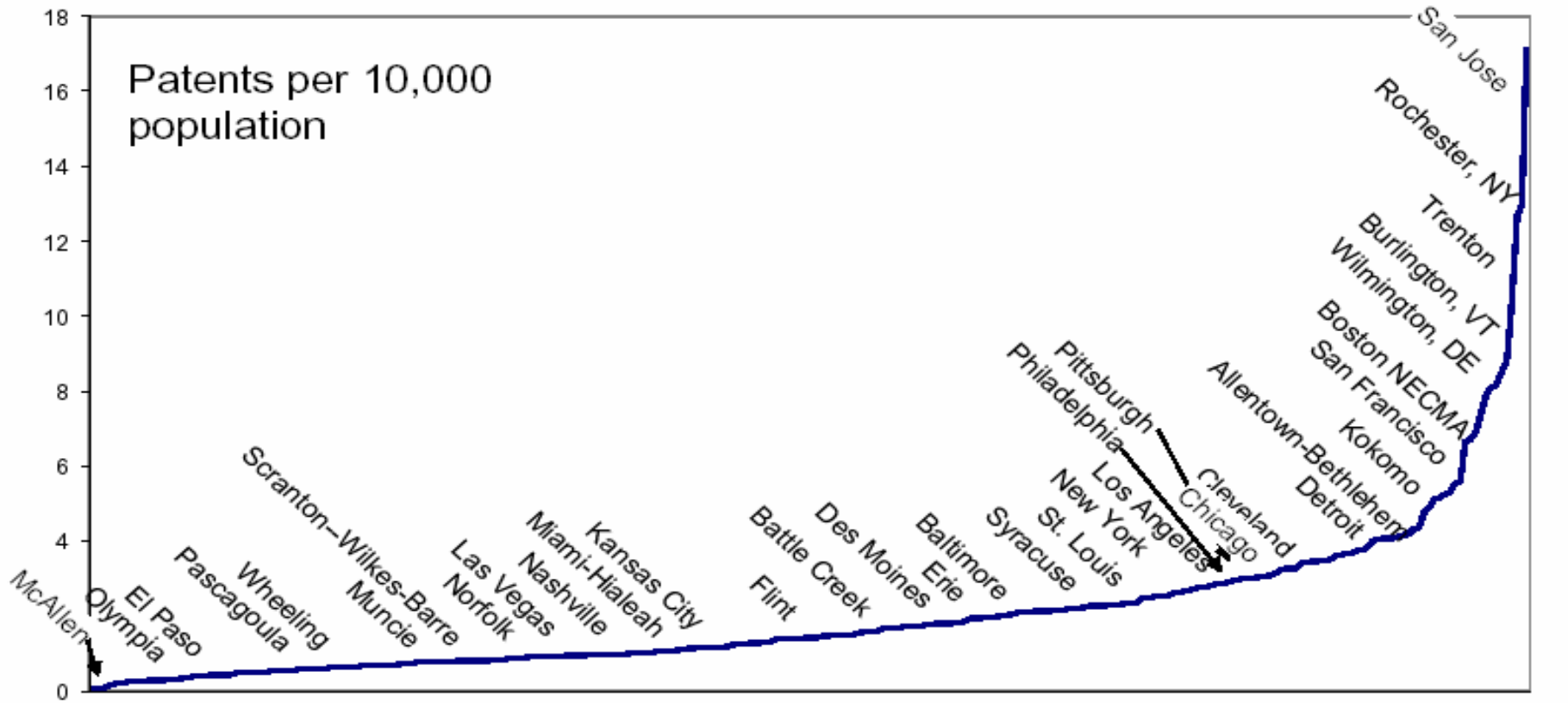


MATCHING AND LEARNING IN CITIES:
URBAN DENSITY AND THE RATE OF INVENTION

Gerald Carlino, Satyajit Chatterjee, & Robert Hunt*

(Ferrara OECD conference on IAVC Oct 2005)

Figure 1: Patent Intensity

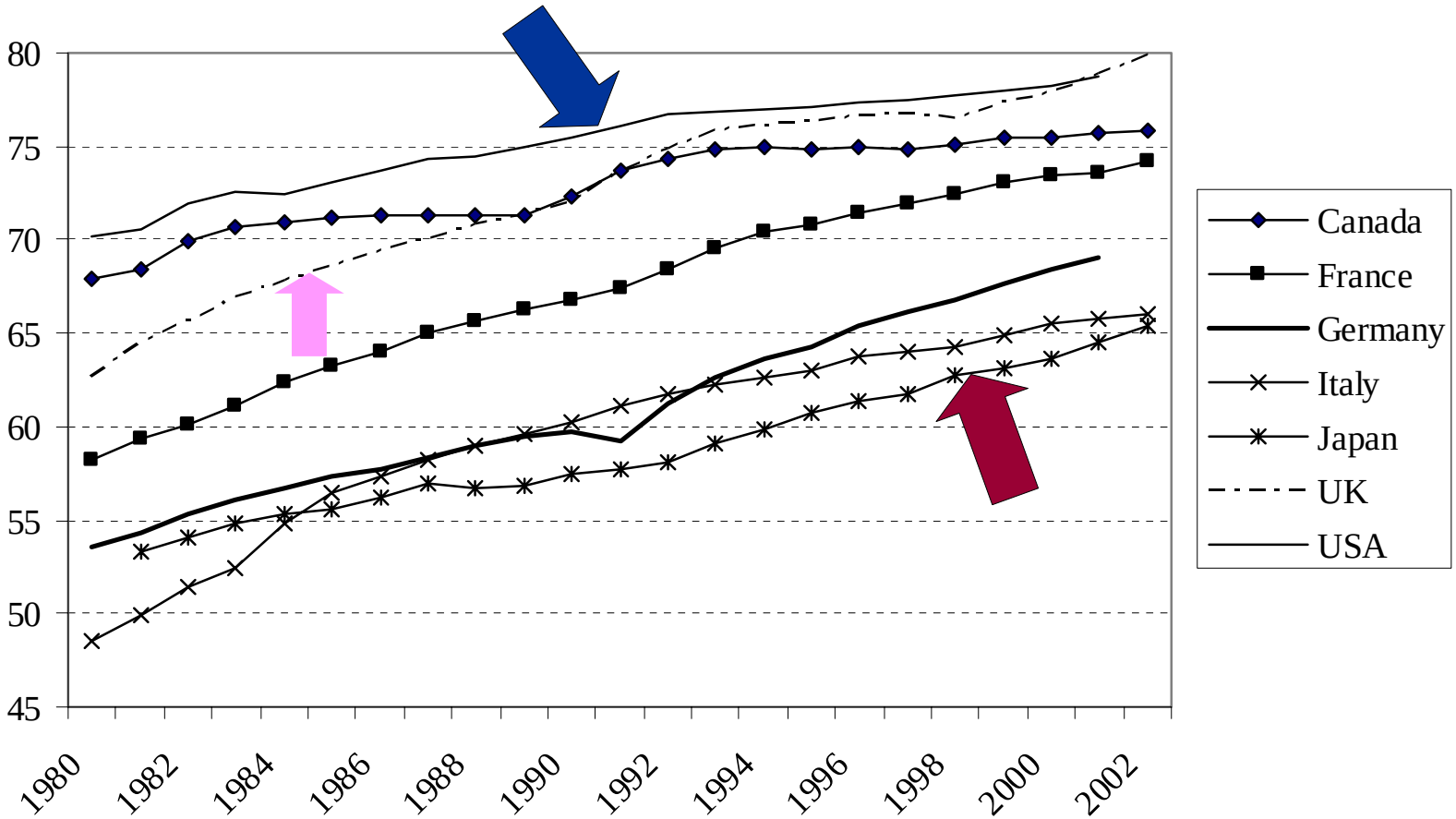


3. Organisational Capabilities, Business Models, Software

- Growth increasingly driven by **Services / New trend of "Service Economy"**
- Investment in ICT is important but **its use** is more important
- Competitive forces of new entrants which are usually more innovative. Role of Venture Capital
- MNEs are generally more productive: Japan is not using their capability.

The contribution of services to OECD economies is growing

(share of services in total employment, 1970-2002, in %)

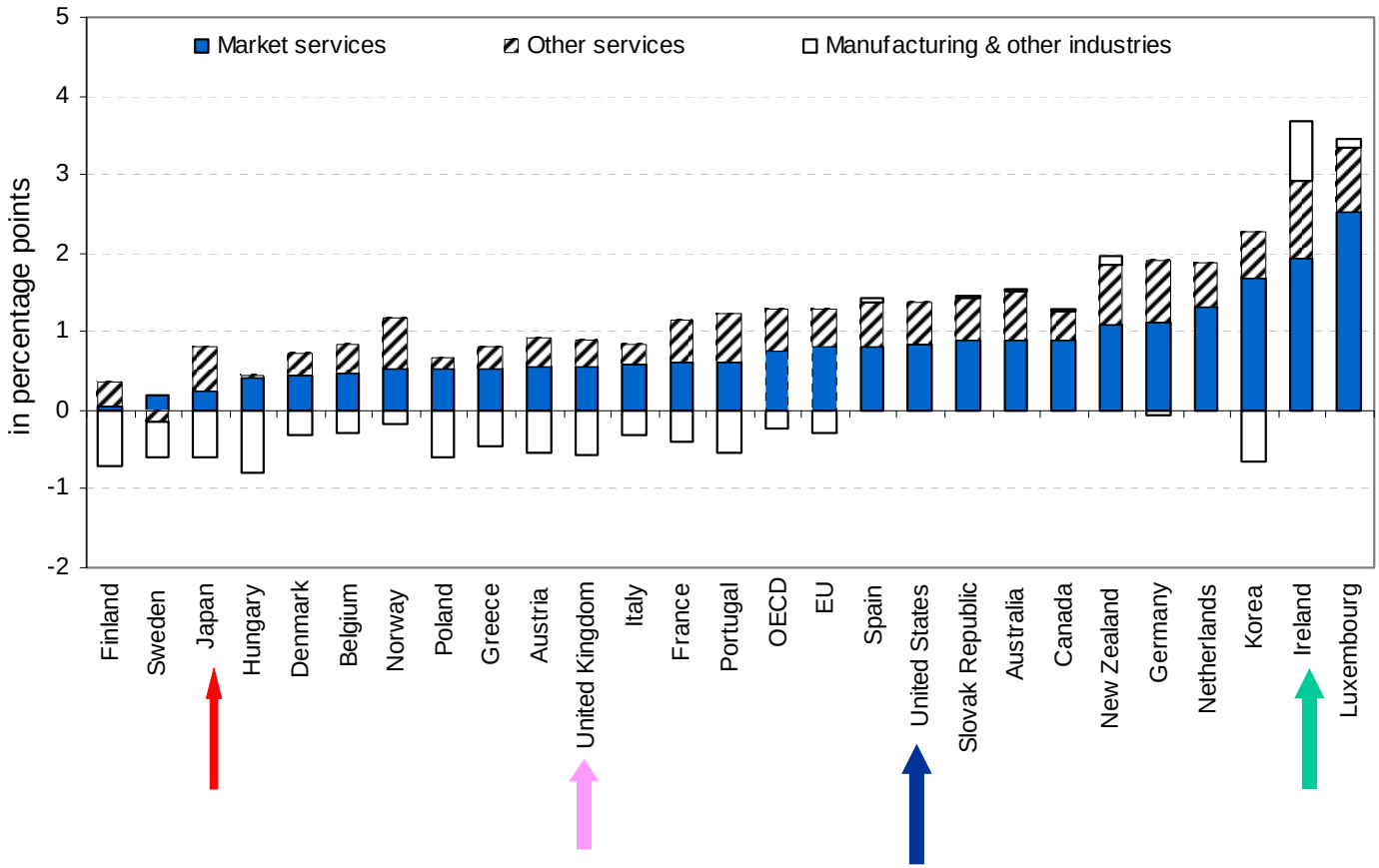


- Growing also in Japan
- But Japan is still more manufacturing oriented than others

Source: OECD STAN Database, 2004

Services now account for almost all employment *growth* ...

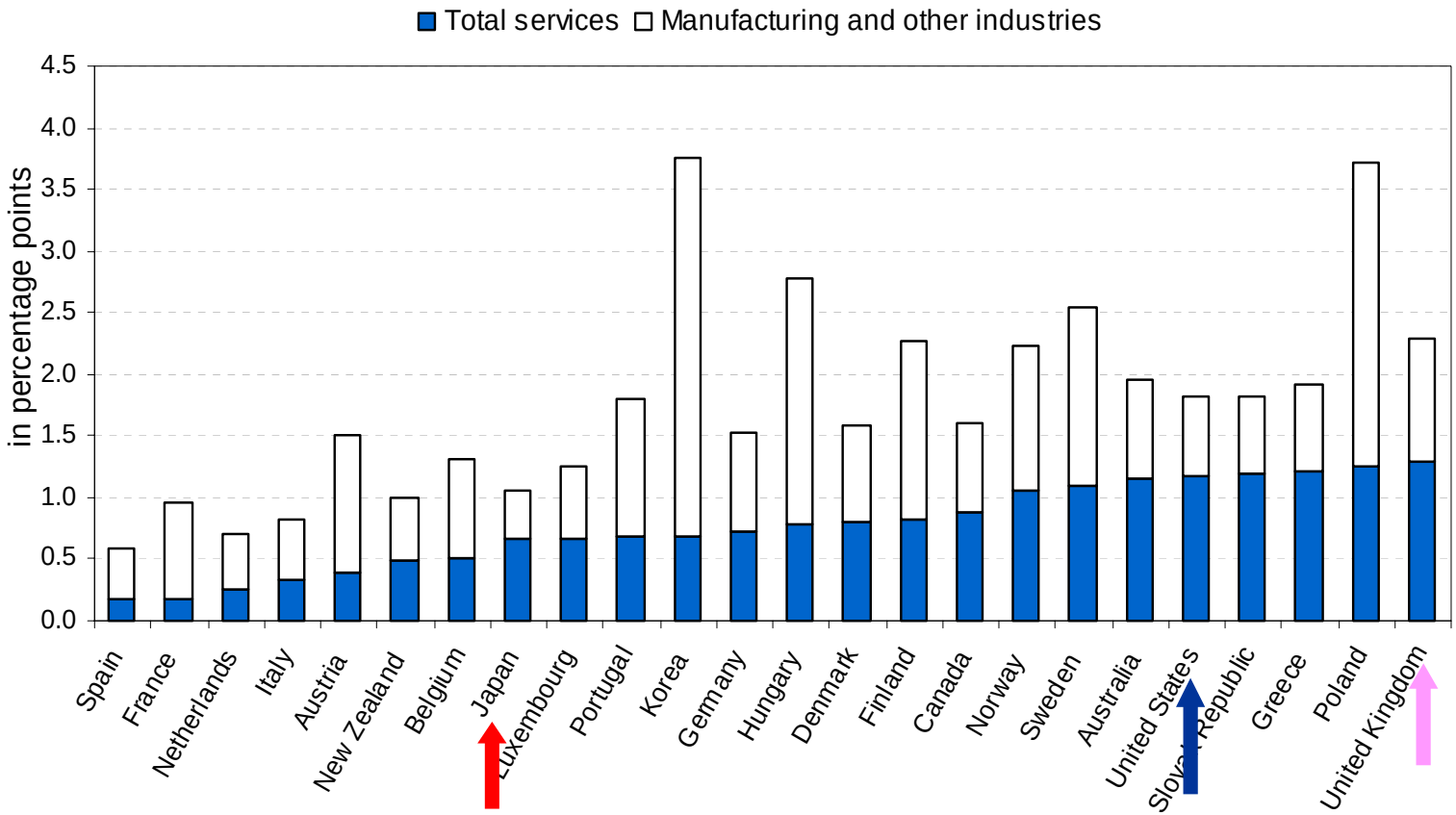
Contribution to aggregate employment growth, 1990-2002, percentage points



Source: OECD STAN Database, 2004

… and for a considerable share of productivity growth

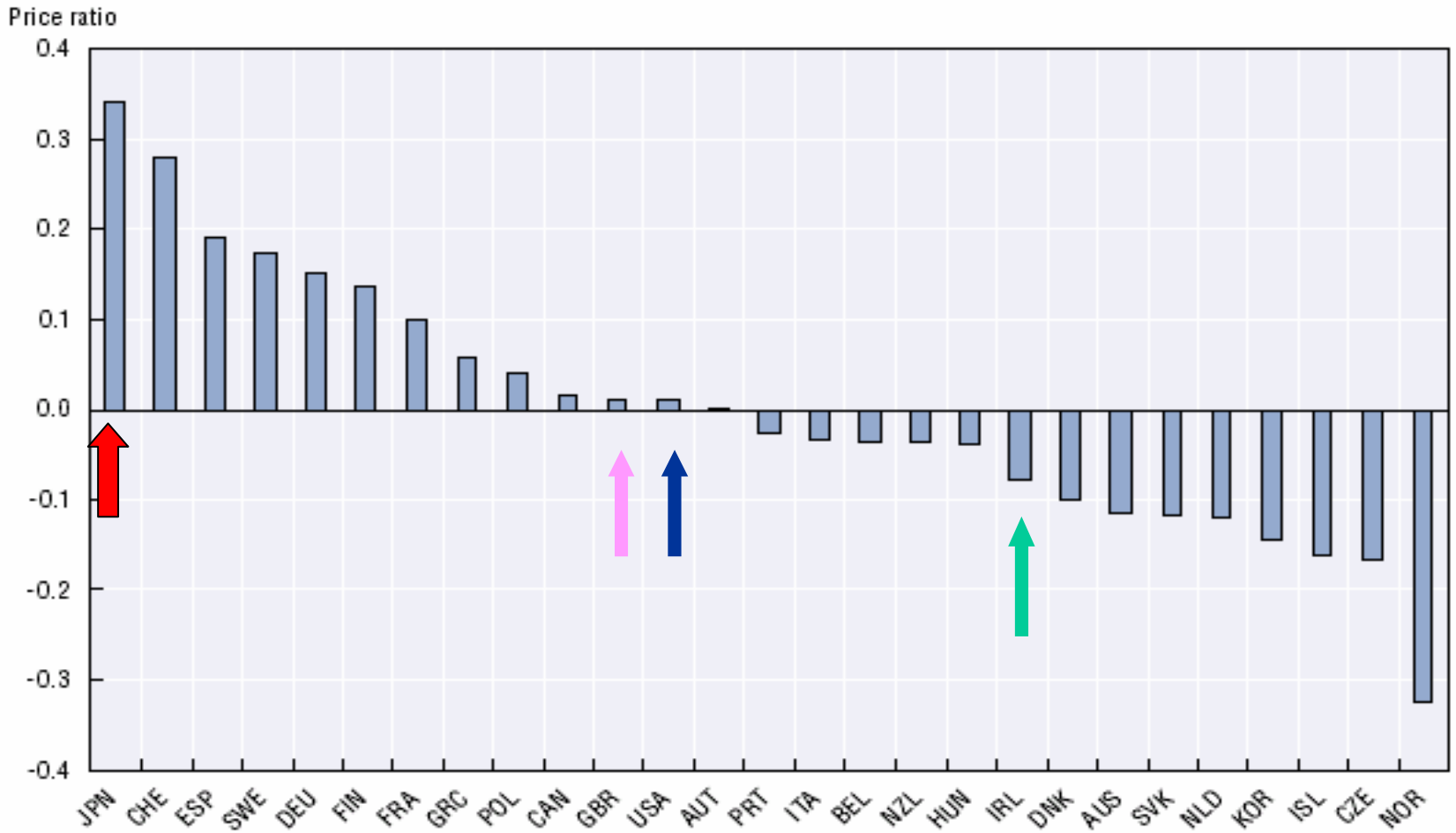
Contribution to aggregate productivity growth, 1990-2002, percentage points



Source: OECD STAN Database, 2004

Relative price of services and GDP per capita

The relative price ratio adjusted for differences in the level of GDP per capita

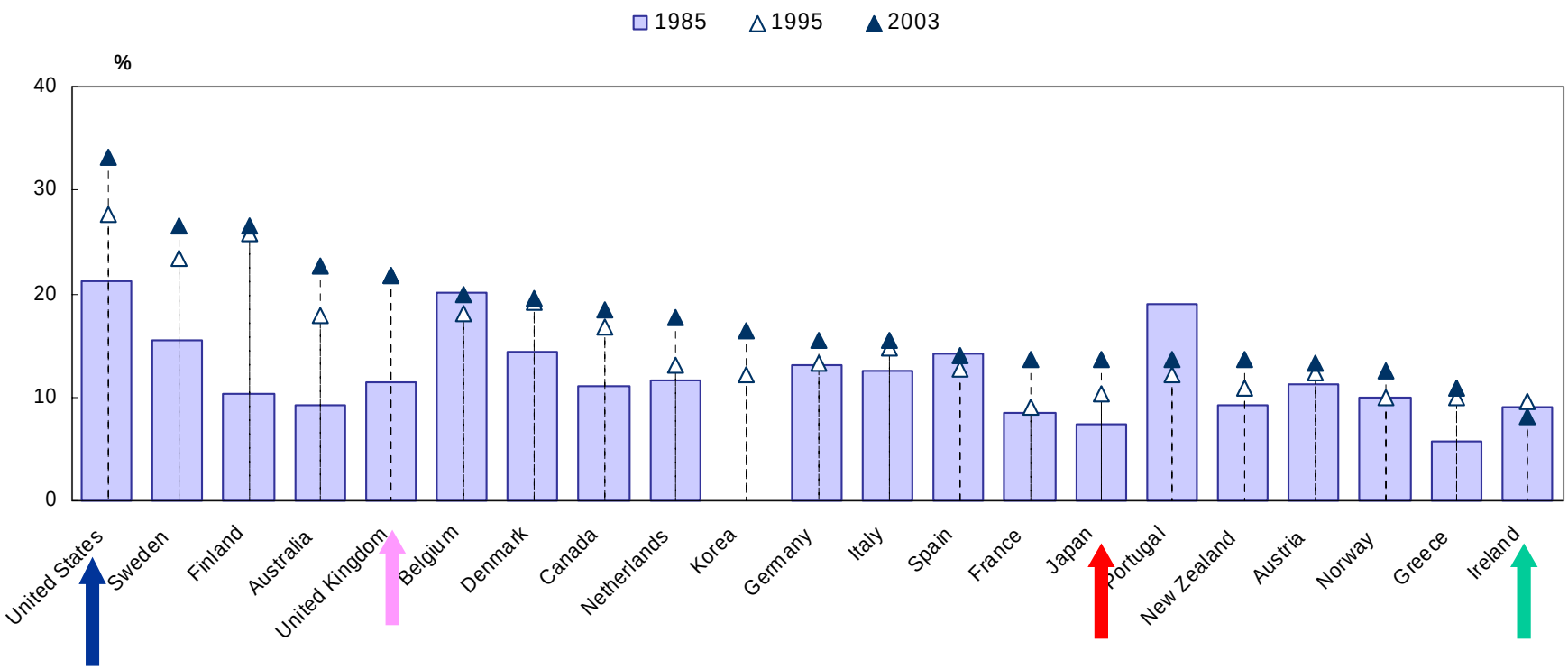


Measured as the difference between the actual and the fitted value of the price ratio appearing in previous slide.

Going for Growth – Economic Policy Reforms (2005), OECD

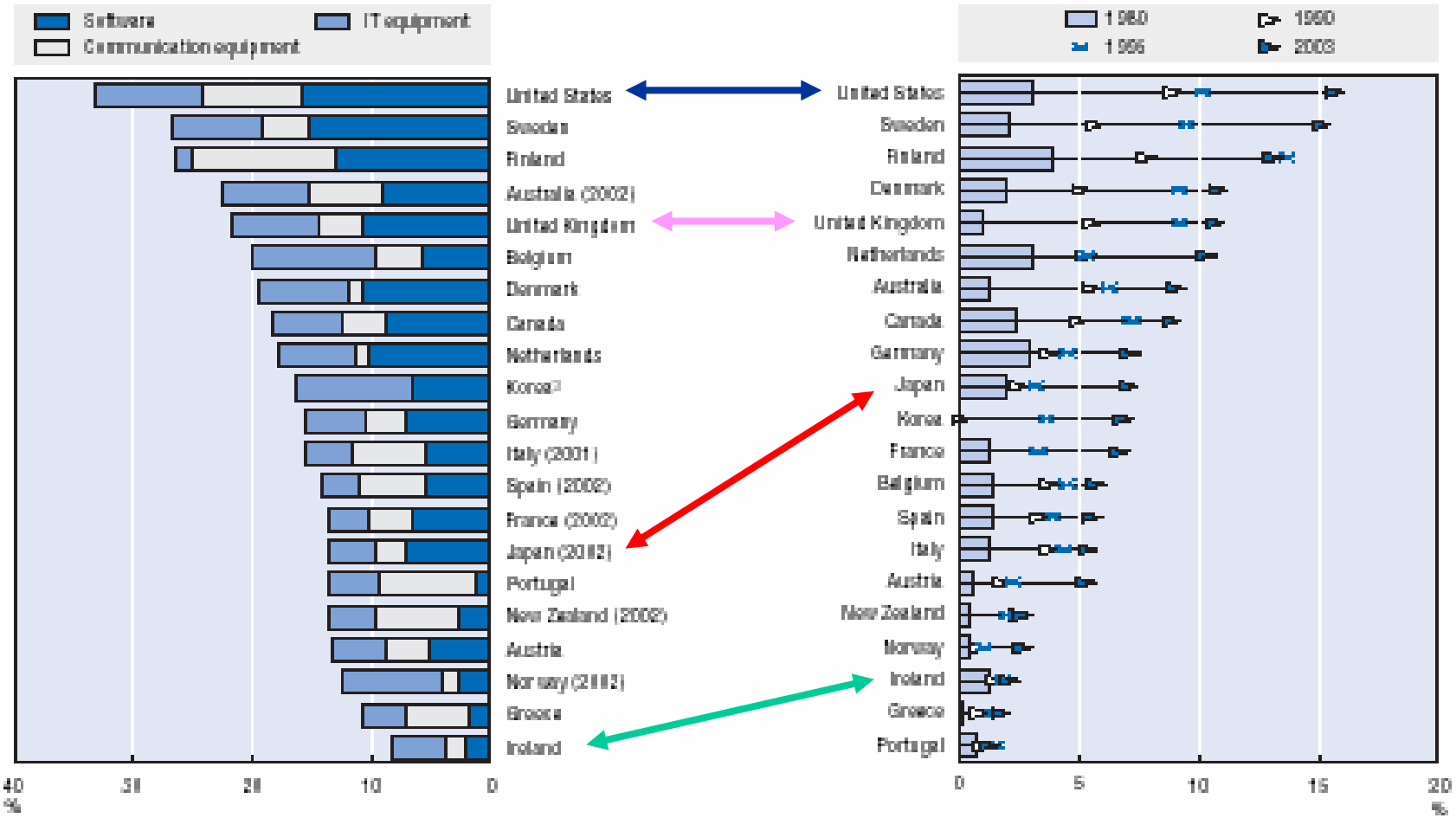
Investment in ICT

As a percentage of gross fixed capital formation



ICT investment by asset[1] in OECD countries, 2003

As a percentage of non-residential gross fixed capital formation, total economy



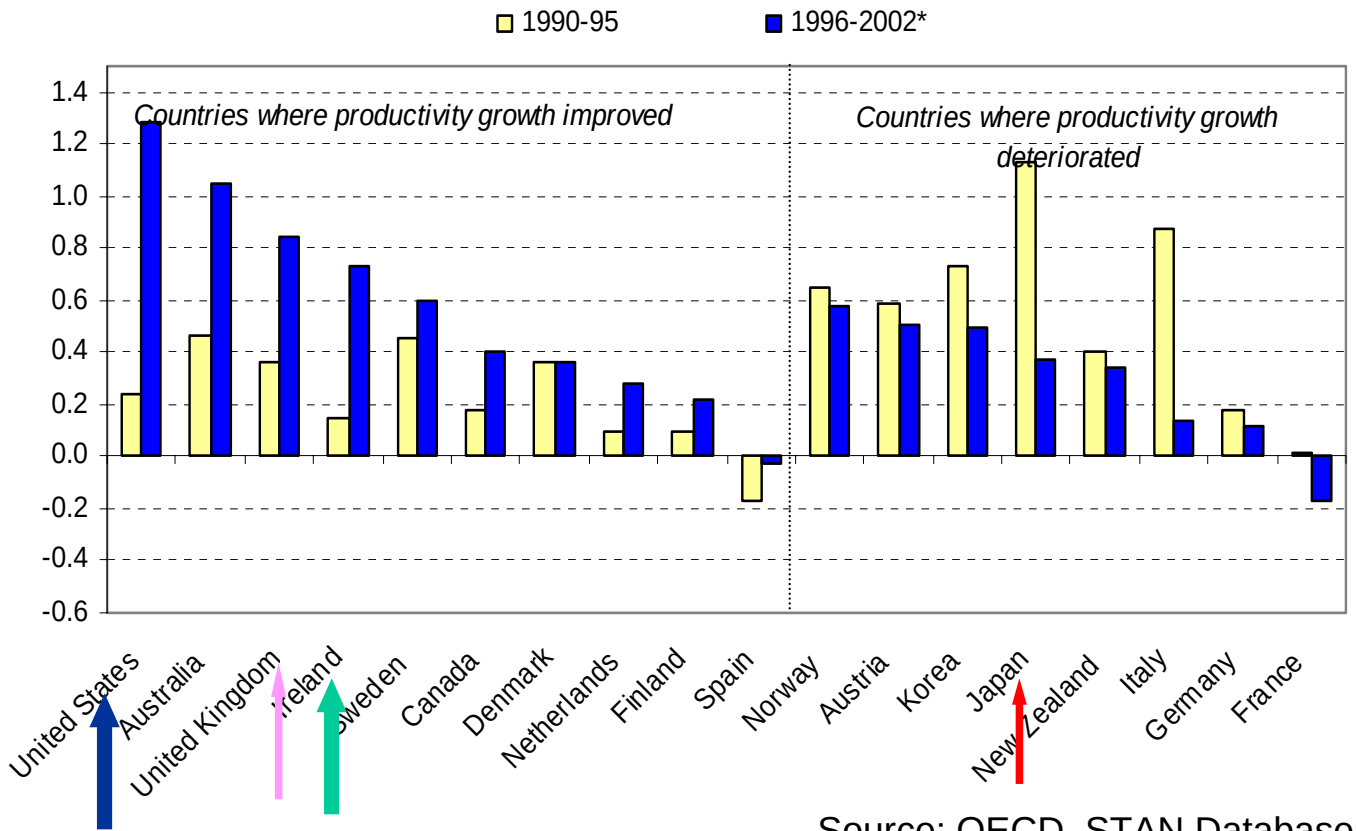
Software investment[1] in OECD countries, 1990-2003[2]

As a percentage of non-residential gross fixed capital formation, total economy

1. ICT equipment is defined as computer and office equipment and communication equipment; software includes both purchased and own account software. In Japan, investment in software is likely to be underestimated, owing to methodological differences.
2. 2002 for Australia, France, Japan, New Zealand, Norway and Spain, and 2001 for Italy.
3. Communication and IT equipment for Korea.

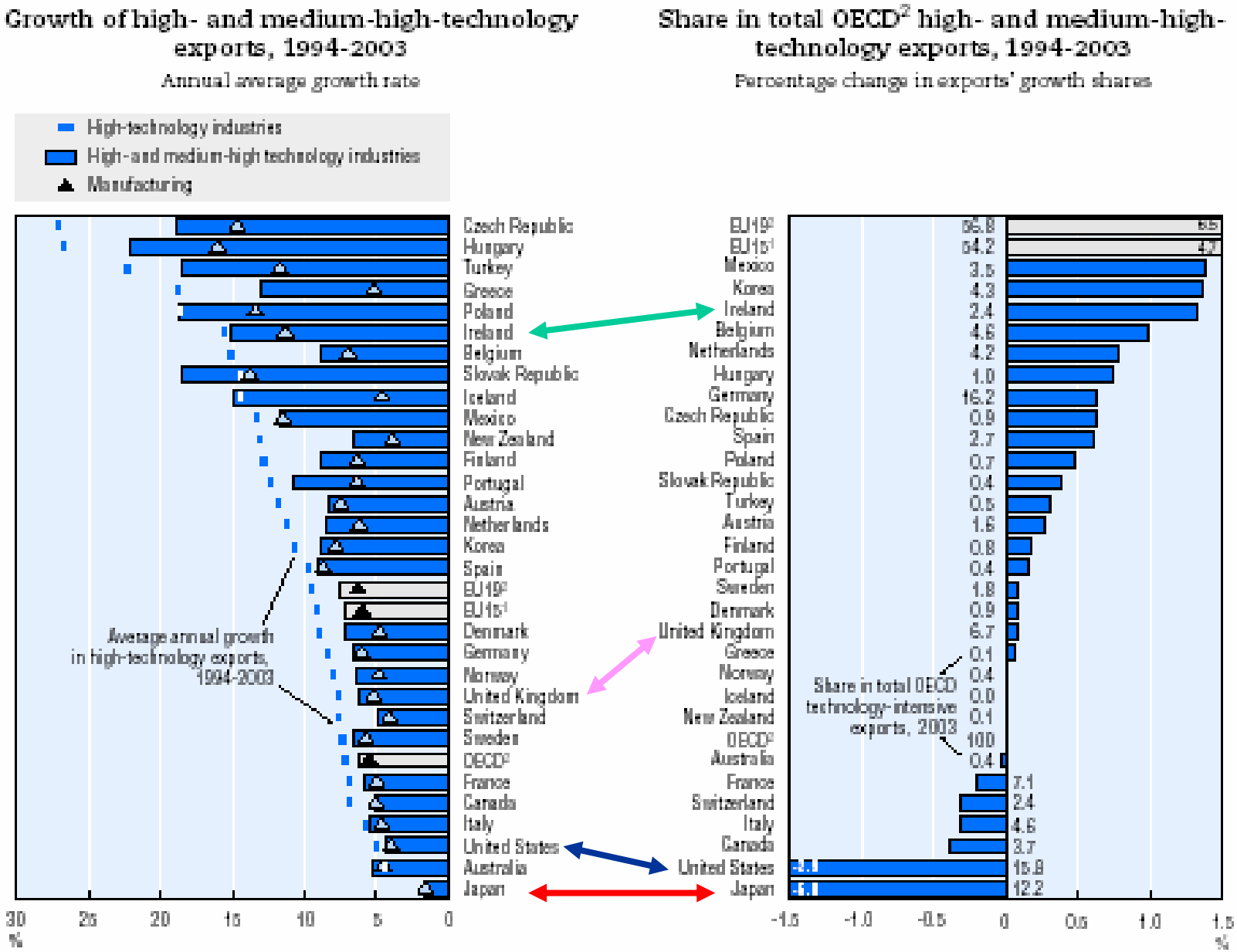
StatLink: http://dx.doi.org/10.1787/133021685100

ICT-using services have shown more rapid productivity growth in some OECD countries
(contribution to average labour productivity growth, in per cent)



Source: OECD, STAN Database, September 2004.

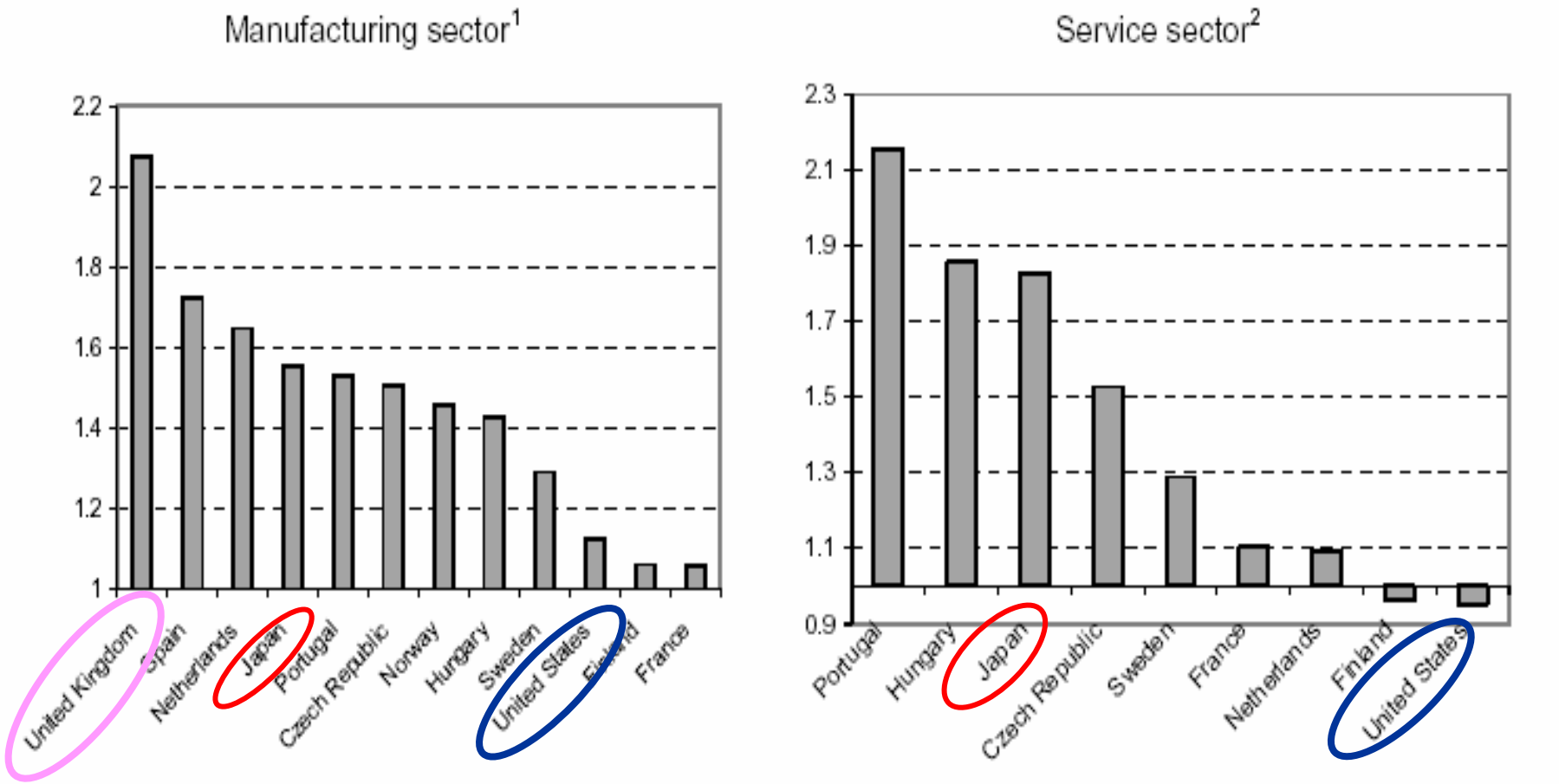
- **But this effect has remained relatively modest in Korea**



1. Excluding Luxembourg.
2. Excluding Luxembourg and the Slovak Republic.

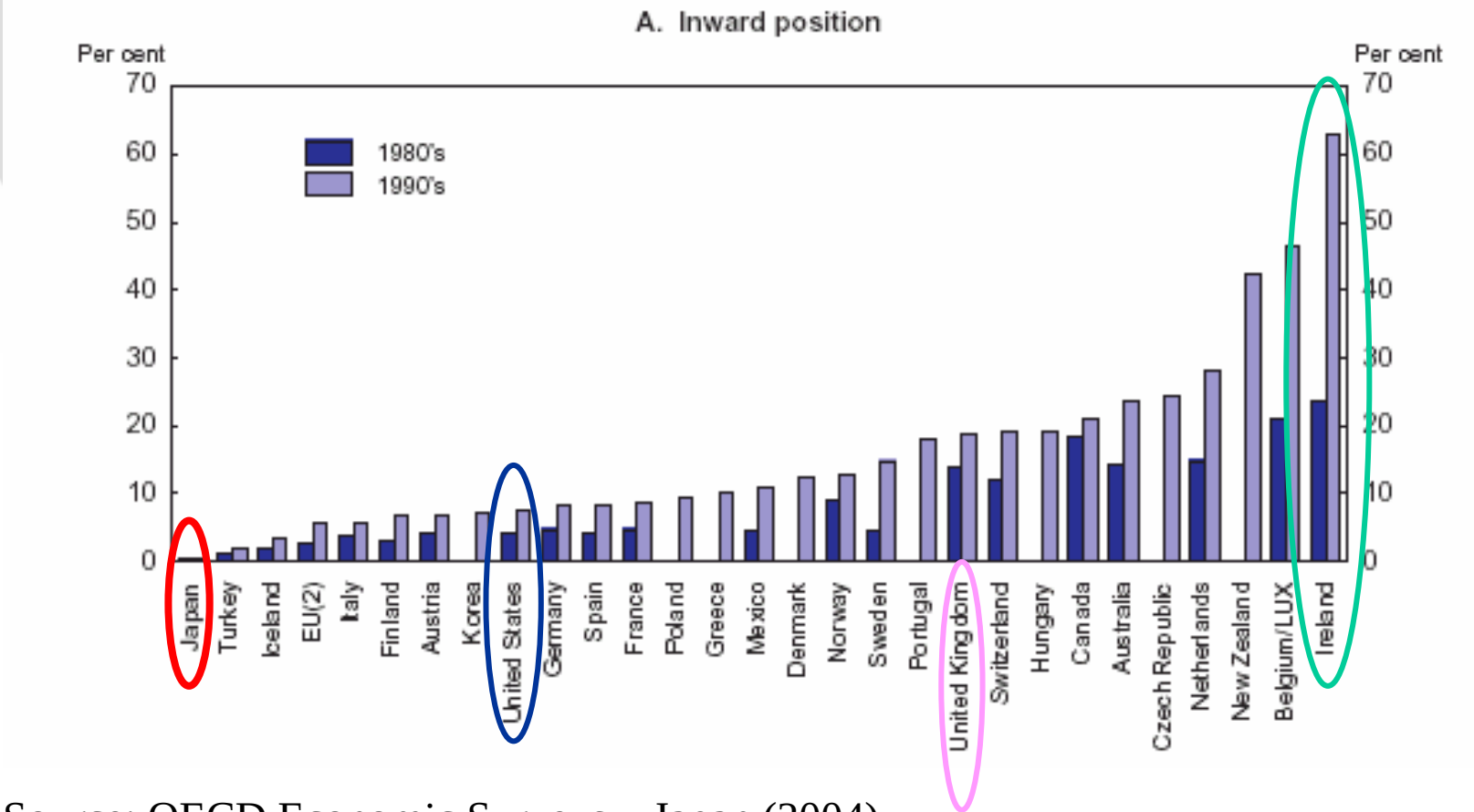
StatLink: http://dx.doi.org/10.1787/520574817683

Relative labour productivity of foreign affiliates, 2002



OECD Compendium of Productivity Indicators 2005

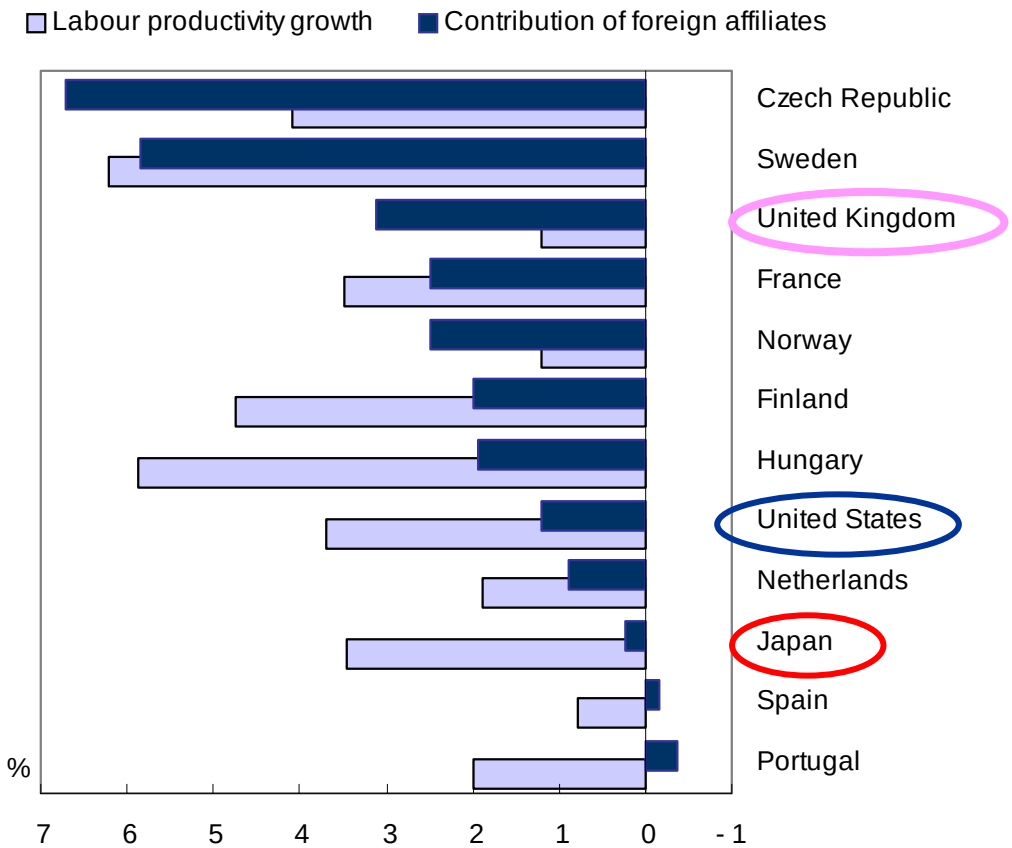
Inward FDI (per cent of GDP)



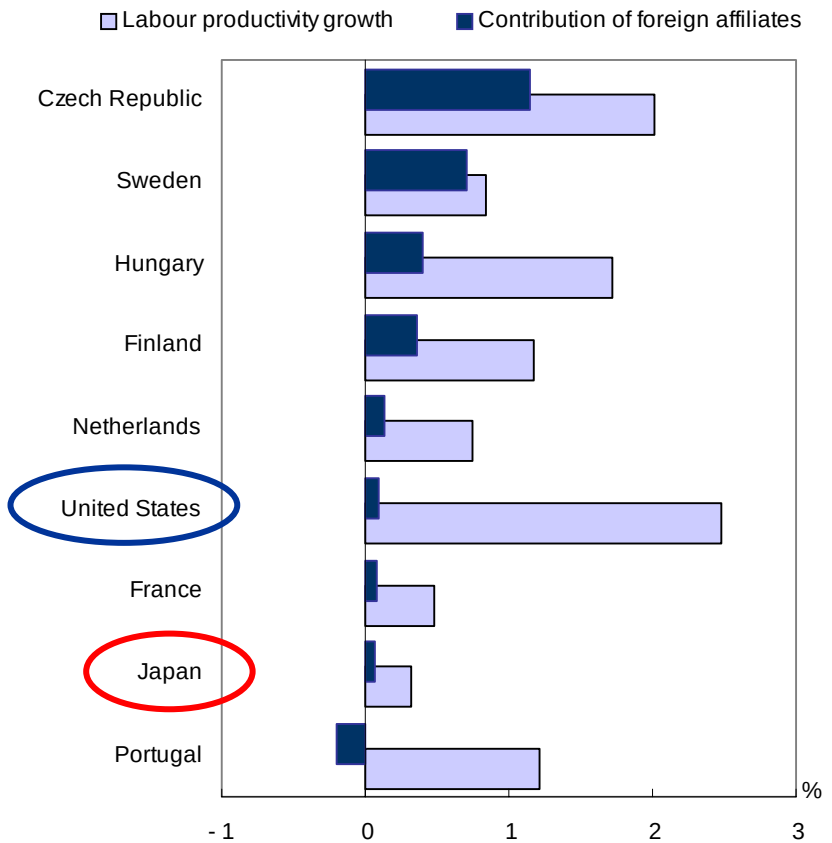
Source: OECD Economic Surveys – Japan (2004)

Contribution of multinationals to labour productivity growth, **1995-2001** (percentage points)

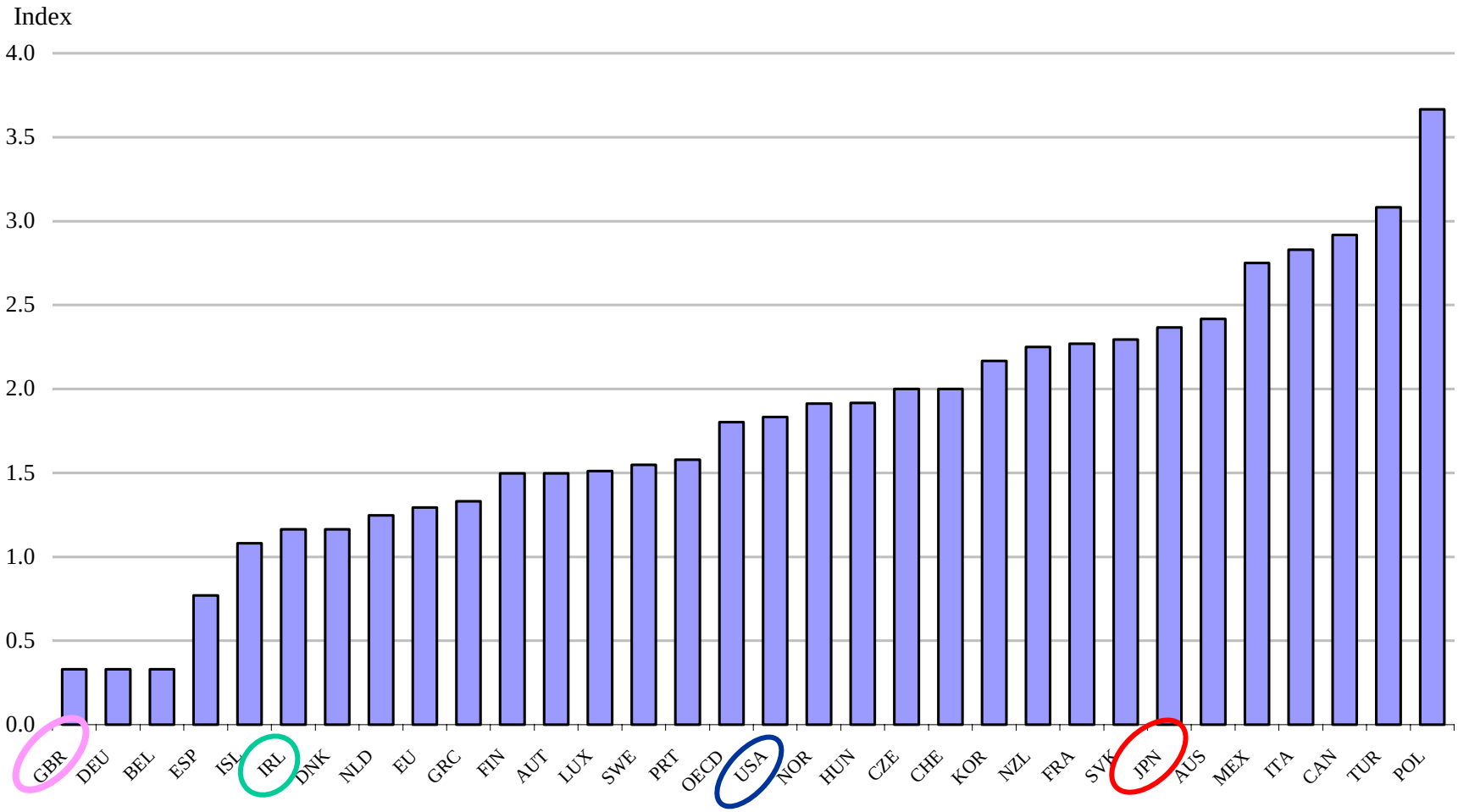
Manufacturing



Services



Ownership barriers to foreign direct investment, 2003

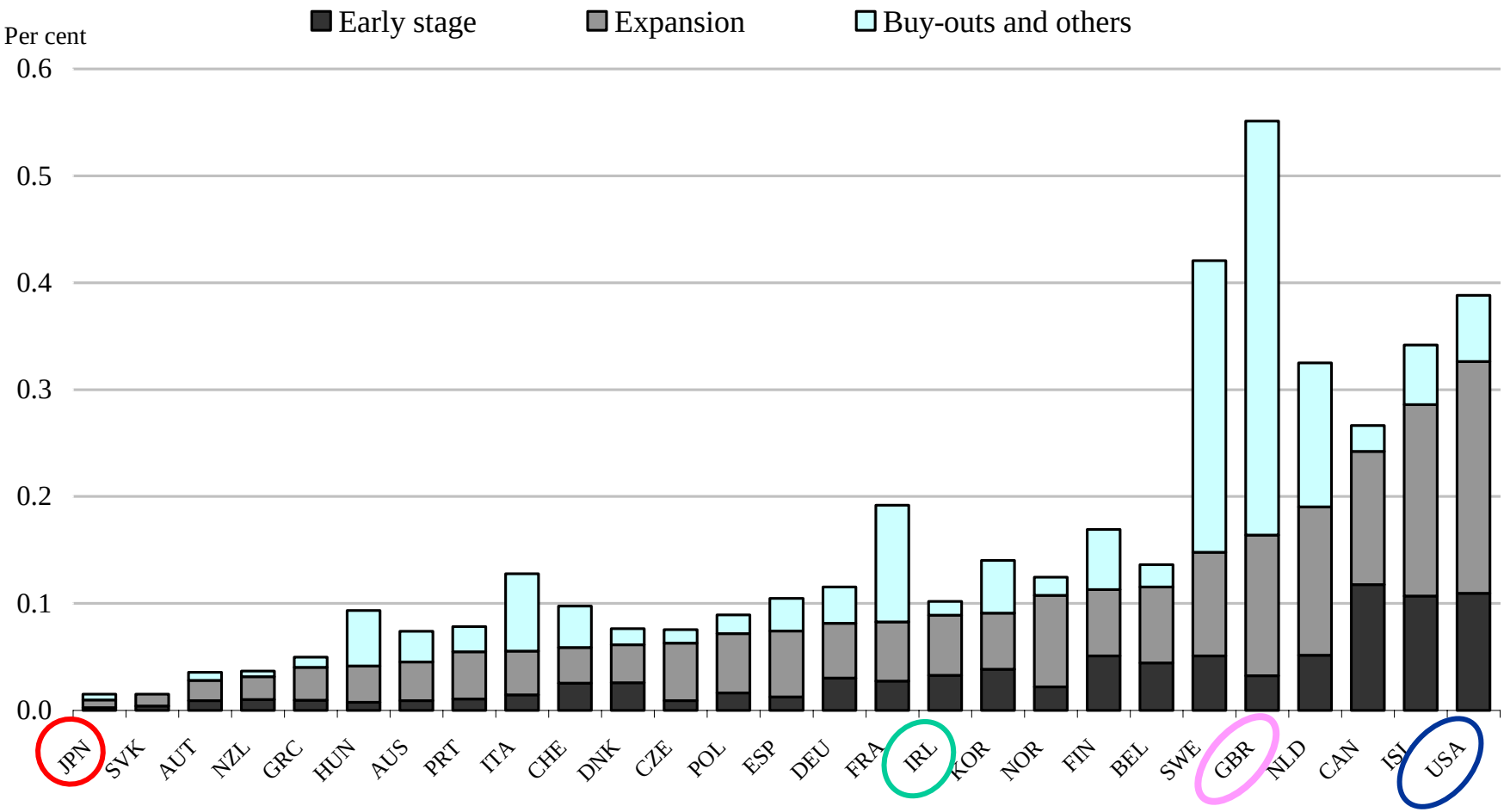


1. Index scale of 0-6 from least to most restrictive.

Source **: OECD *Economic Policy Reform, Going for Growth*, 2005.**

Venture capital investment flows as a percentage of GDP

Average over 1995-2002[1]



1. 1995-2001 for Australia, Japan, Korea and New Zealand. Countries are ranked according to the sum of early stage and expansion.

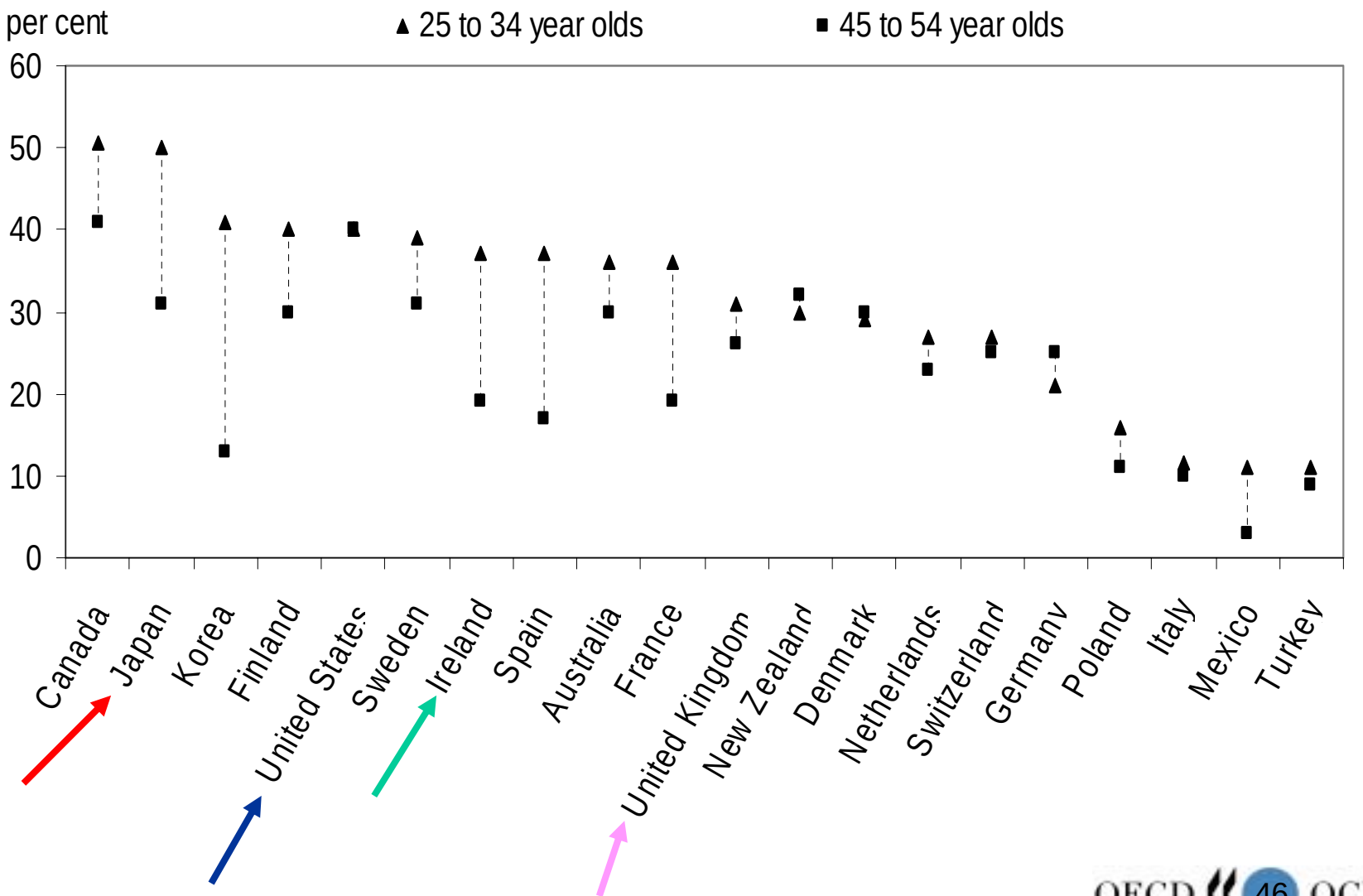
***Source* : OECD venture capital database.**

4. Human Capital : The Key for Knowledge Economy

- Internationalisation of R&D: The Great Hunt for the Best and the Brightest.
- “The Flight of the Creative Class” by Richard Florida
- Mobile High-Skilled Workers: Chinese and Indian Researchers are key for American success.
- Off-shoring of less-skilled job is neither substantial nor crucial.
- Are Japanese cities comfortable enough to attract the World Creative Class?

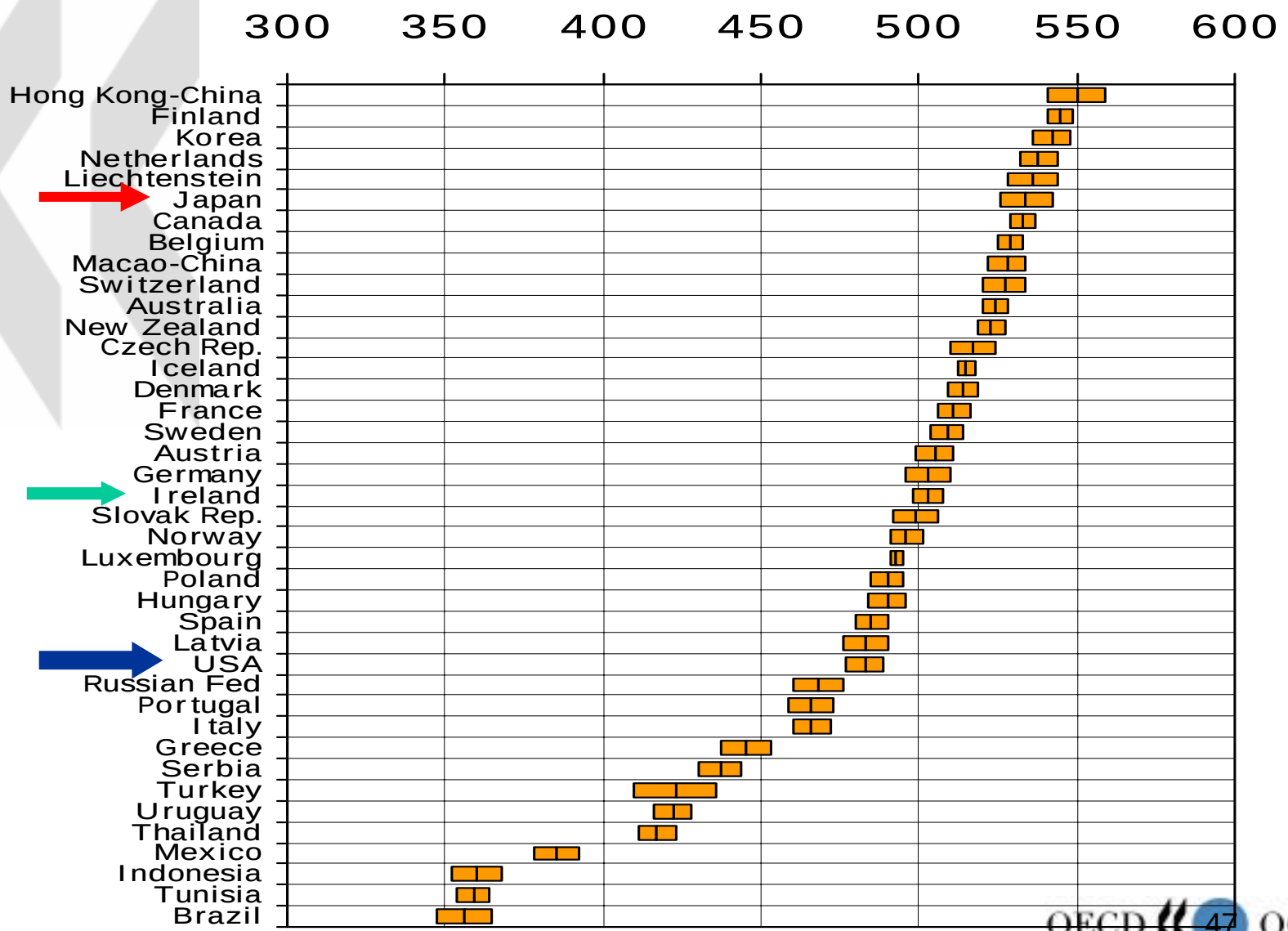
Rise in human capital

(% of population with tertiary level education, 2002)



OECD, *Education at a Glance*

PISA: Mean mathematics scores – overall (All)
Japanese 15 years old are doing well.

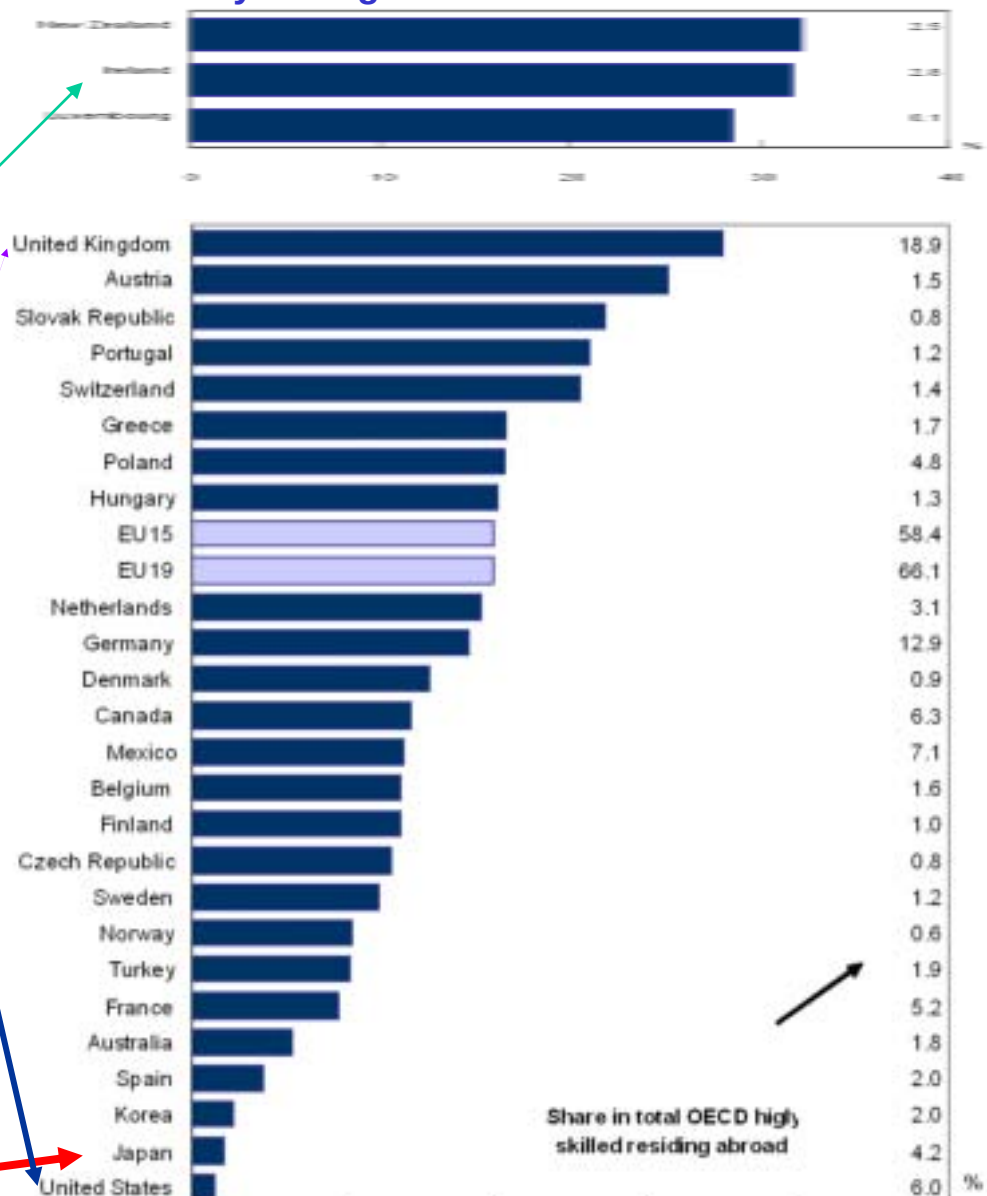


OECD (2004), *Learning for tomorrow's world: First results from PISA 2003*, Table 2.5c, p.356.

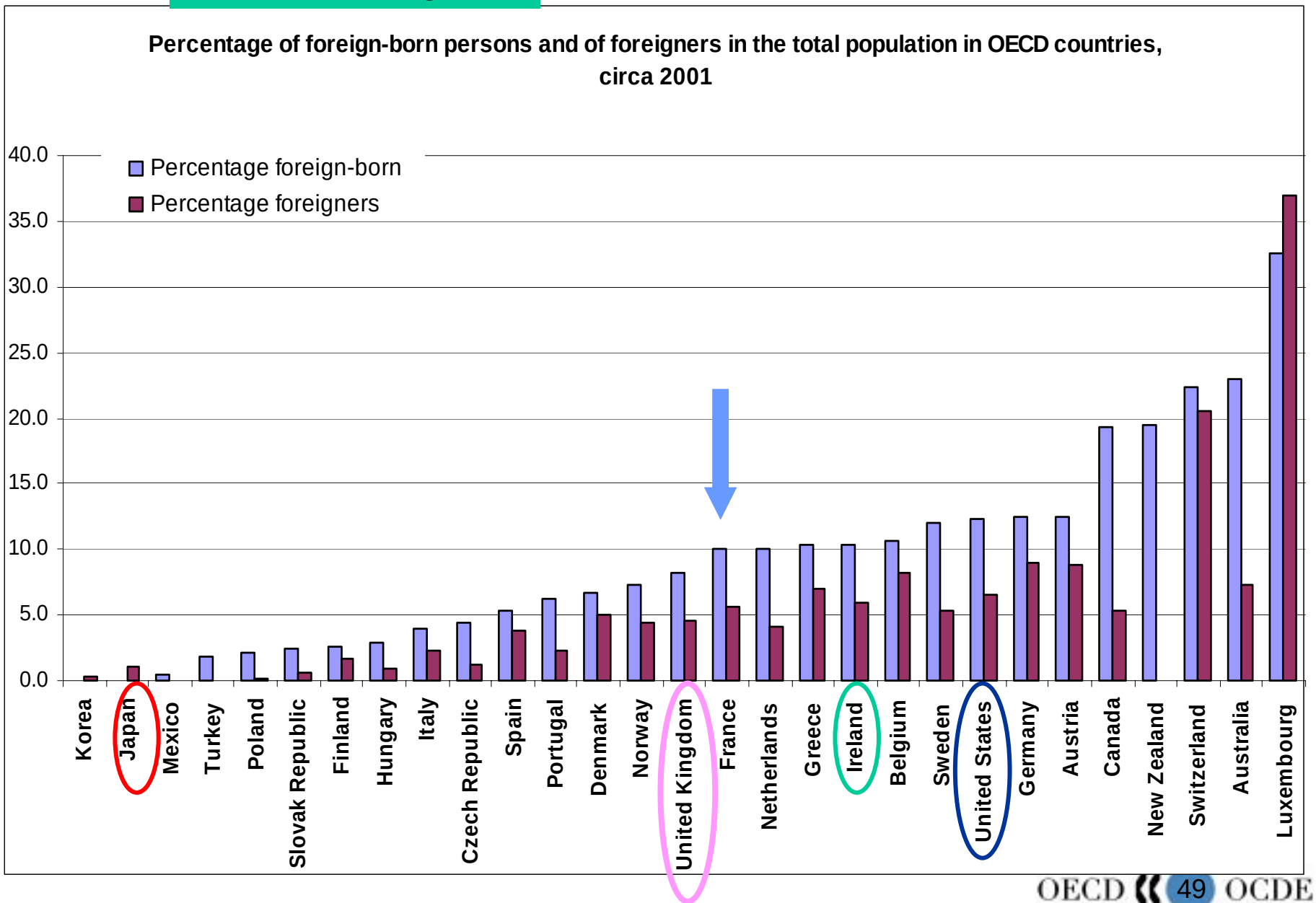
Highly skilled Migrants

Immigrants as a % of highly skilled native population

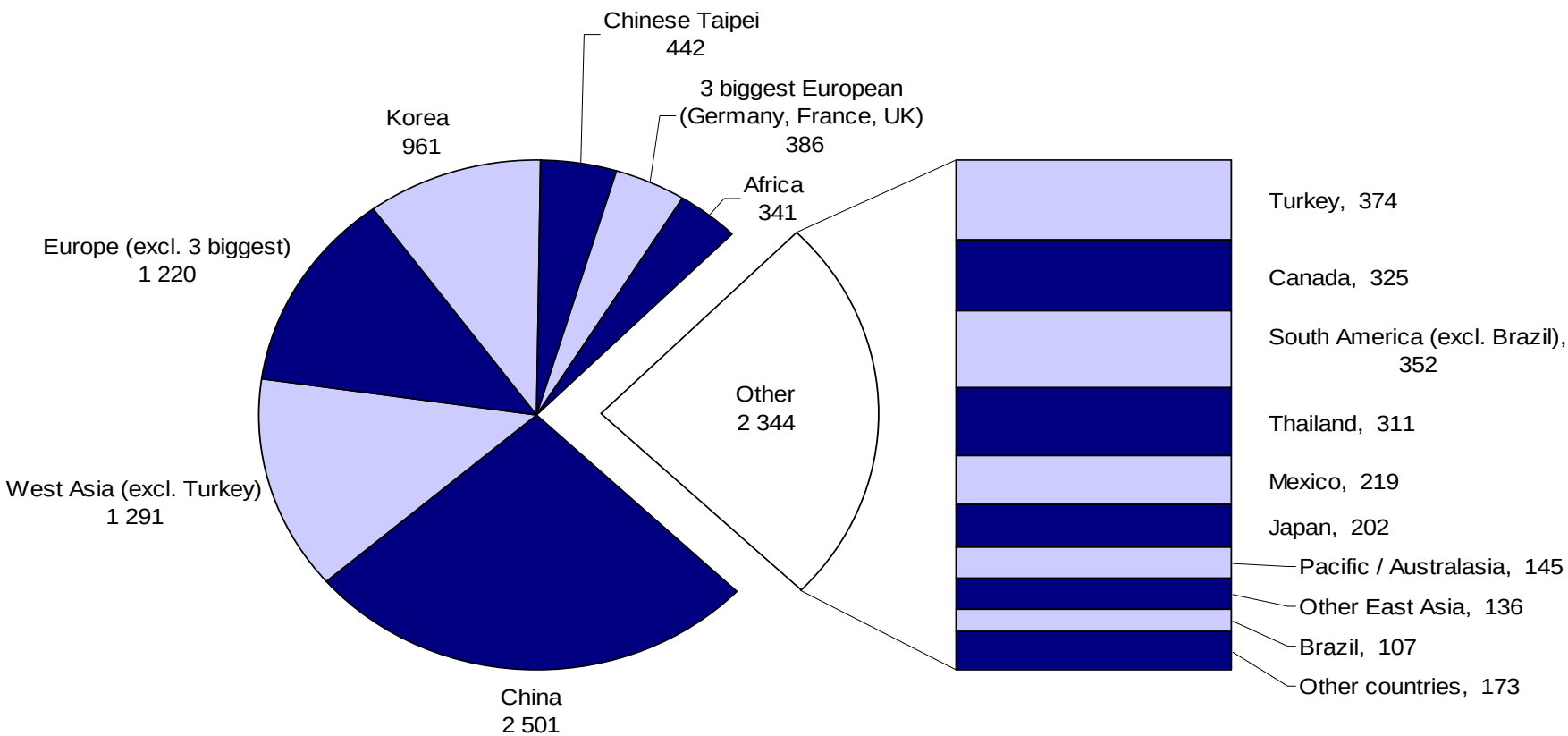
Emigrants as a % of highly skilled in the country of origin



International Migration



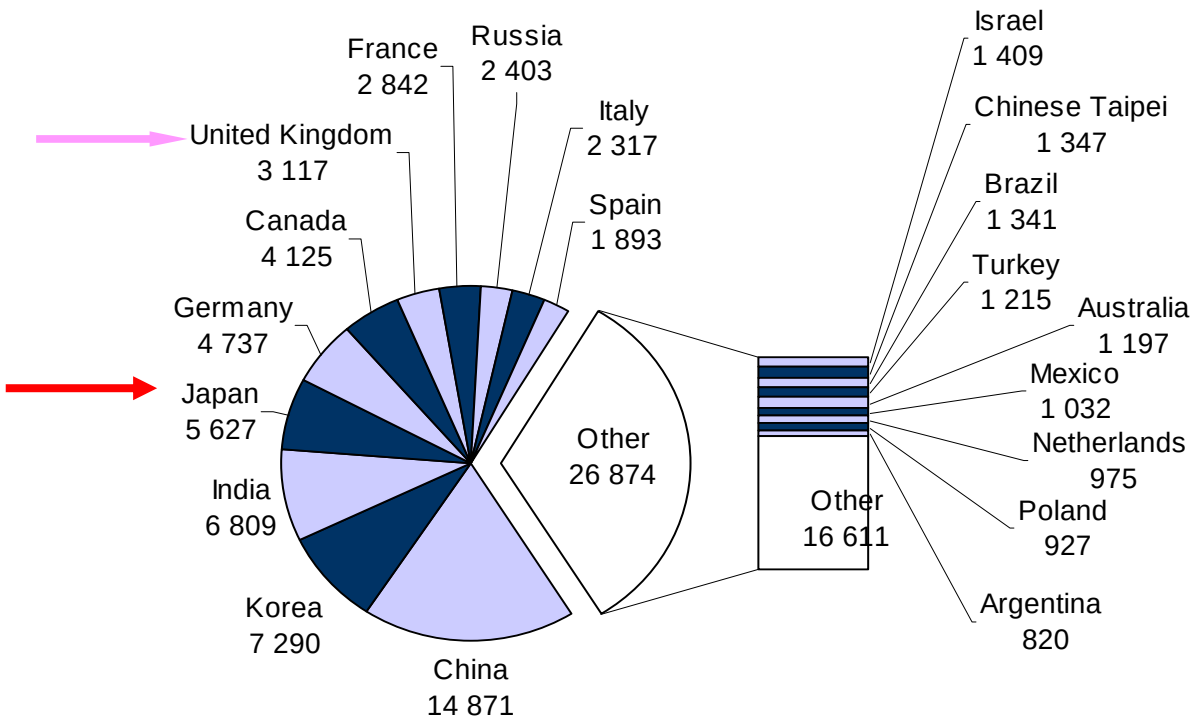
Number of S&E doctorates awarded to non US citizens in the US, by citizenship, 2000-03



9 486 S&E doctorates awarded to foreign students in 2003 in the United States

Source, National Science Foundation (US), Science & Engineering Doctorate Awards 2003

Top 20 places of origin of foreign scholars in the US, Headcount, 2003-04



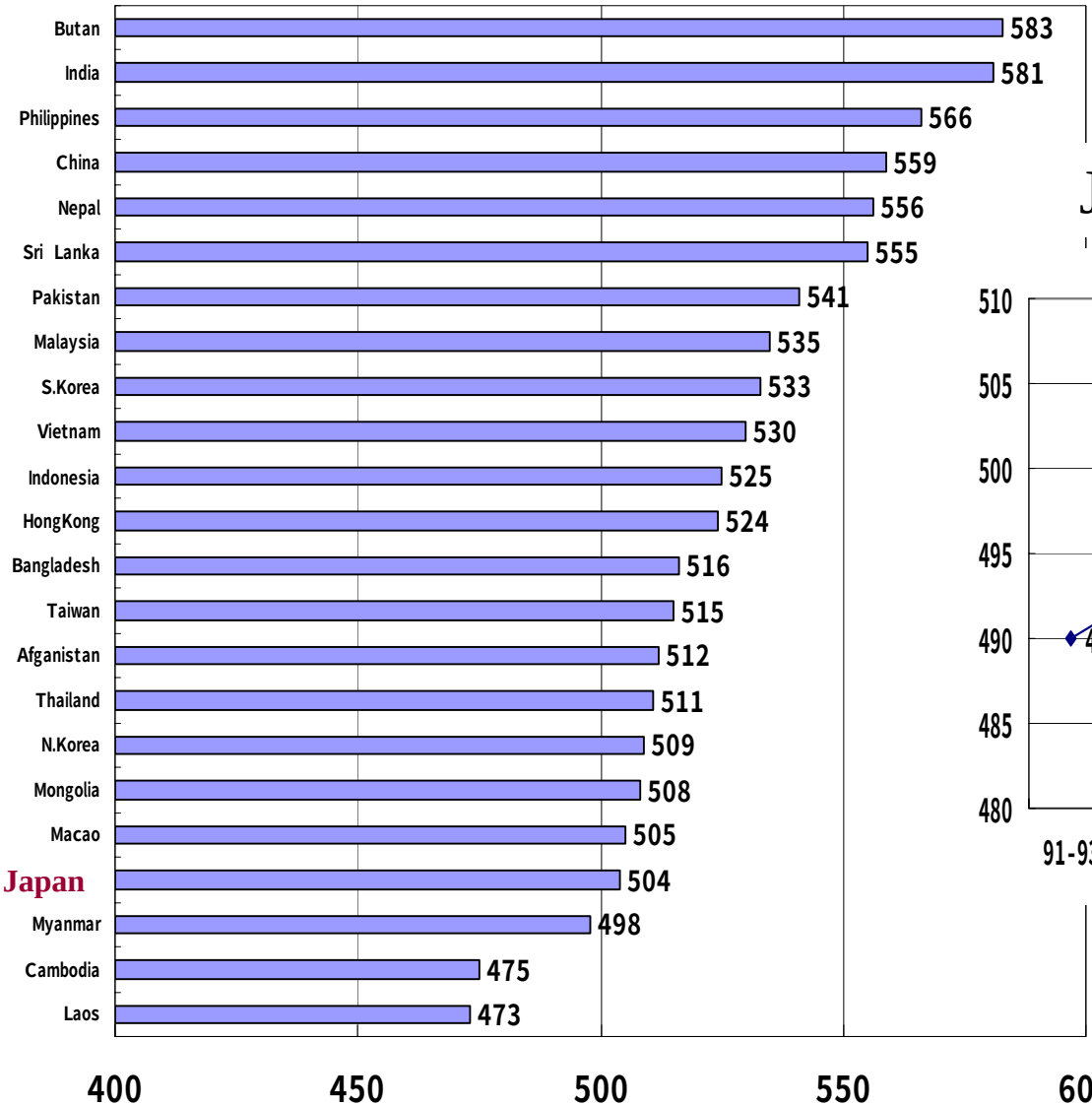
82 905 foreign scholars working in the United States academia in 2003/04

Source: OECD, based on Institute for International Education

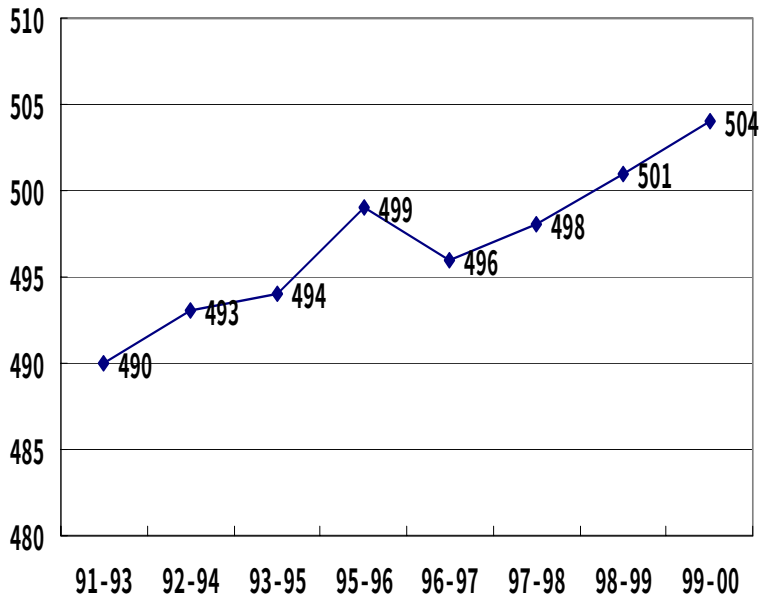
Urgent Need for Reform of Language Education

Comparison of TOEFL average scores by Country

TOEFL average scores (99-00)



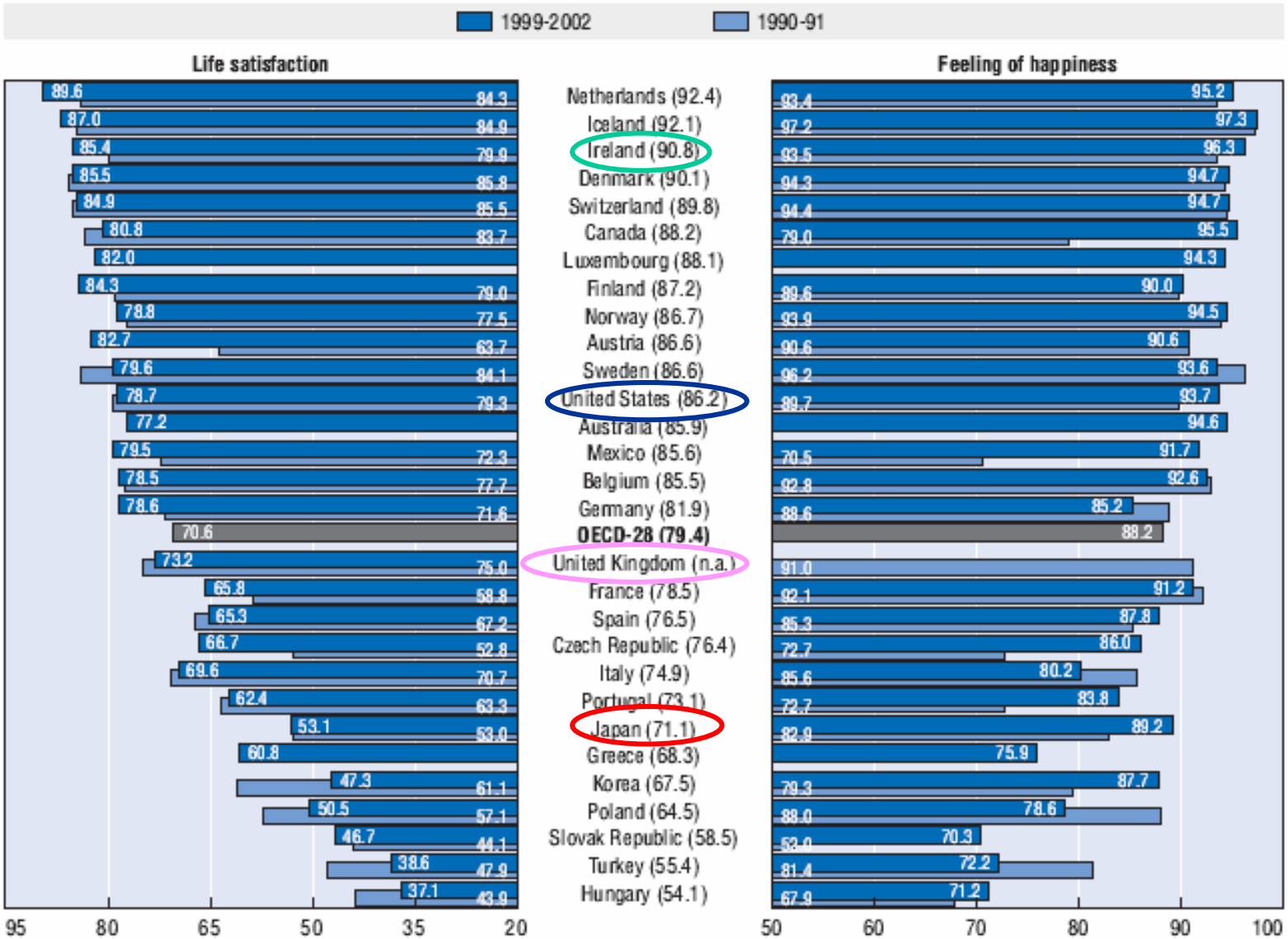
Japanese TOEFL scores



「TOEFL Test and Score Data Summaries」

CO1.1. **Life satisfaction and feeling of happiness, 1999-2002 and 1990-91**

Percentage of total respondents



n.a. = Not available.

Note: Data for Germany in 1990-91 refer to West Germany only. Data for the United Kingdom refer to Great Britain only. The countries are ranked in decreasing order of the average of satisfaction and happiness levels in 1999-2002, which are shown in parentheses. Values shown at the top and bottom of each bar refer to 1990-91 and 1999-2002 responses, respectively.

DE

II. Comprehensive and strategic approach for more open innovation system in Japan

1. Recognise the importance of Intellectual Assets in the Knowledge-based Economy

- *Awareness of IA*
- *IA Management tools*
- *Promote Innovation-Friendliness Test of all social and economic systems, e.g. EU's Lisbon Agenda.*
- *Guidelines for IA reporting for corporations*
- *Review of IPR regime*
- *Policy Mix of Innovation*
- *Evaluation Mechanism*

2. Open Innovation System: Use MNEs

- ***Remove unjustified barriers to FDI flows in order to bring in R&D investments and new technology by reforming domestic regulations and licensing requirements that prevent foreign firms from entering domestic markets. Further, activate the merger and acquisition market through regulatory reform.***
- ***Increase mobility of high-skilled workers / researchers into Japan.***

3. Improve access to early stage financing capital

- ***Promote financial markets reforms that facilitate the development of venture capital funds and access to new sources of finance by technology-based SMEs.***

4. Make the higher education system more responsive to business needs

- ***Improve the match between business needs and human resources development in higher education institutions by enhancing industry-university co-operation in areas related to management of technology and core engineering disciplines.***

5. Promote innovation in services

- ***Strengthen innovation in the service sector by designing policies to broaden opportunities for this sector to participate in innovation programmes***

- ***Encourage the development of regional clusters through decentralisation.***

Factors contributing to Innovation performance
Economics Department project "Innovation Policies"

Table A3.3 **Decomposition of R&D intensity relative to OECD average in the year 2000 (%, multiplicative)**

	Deviation from OECD Average	Explanatory Factors											Residual
		User Cost	Financial Factors	Exchange Rate	Non-BERD	Academic Links	Subsidies	Scientists	PMR	Foreign Exposure	IPR	Import Comp	
Australia	-38.4	1.6	1.1	7.2	11.2	-0.8	-1.3	-25.4	9.8	-49.1	-0.3	-0.1	7.9
Austria	1.3	0.0	-15.5	3.5	-1.8	-9.2	-0.2	-4.1	-1.2	21.3	-7.8	0.0	8.0
Belgium	27.0	-3.0	-3.9	0.5	-11.6	13.5	1.8	1.3	-2.4	107.0	1.7	-0.6	-3.9
Canada	-7.4	1.7	3.1	0.3	6.5	7.9	-1.3	-5.3	3.5	18.3	3.9	-0.5	11.1
Denmark	31.6	2.8	-10.1	-2.9	5.4	-9.9	1.0	-4.7	-1.1	55.7	-0.3	0.1	9.3
Finland	106.6	-0.2	1.6	3.5	28.2	3.5	-3.4	39.6	1.7	5.9	-0.3	-0.4	12.2
France	19.6	-1.9	0.8	2.4	11.4	-13.1	6.6	-7.1	-6.3	-20.9	1.9	0.1	-4.9
Germany	50.3	-5.0	-2.7	-2.4	3.6	-5.5	3.4	6.6	4.4	-24.5	-5.3	0.0	7.1
Ireland	-29.1	6.4	1.3	6.9	-27.4	22.8	-2.0	-2.2	-8.4	140.7	2.7	0.3	48.1
Italy	-54.2	-2.6	-3.4	0.4	-13.2	-3.5	-0.5	-35.3	-8.7	-29.8	-2.4	0.0	0.3
Japan	82.0	-2.2	-1.4	-6.2	15.7	-9.8	-1.2	61.2	-1.0	-70.5	-0.3	-0.3	7.5
Netherlands	-5.0	4.6	-0.9	-0.2	8.6	20.5	-2.3	-21.9	-1.3	110.1	-3.0	-0.1	-1.7
Norway	-19.5	-5.2	12.9	-3.9	-1.1	13.9	-5.4	17.5	3.6	5.0	3.2	-2.0	-33.2
Portugal	-80.9	5.6	-4.2	-1.5	-9.7	-8.1	-0.4	-44.5	-8.6	-7.0	21.5	2.0	10.3
Spain	-56.9	11.4	-3.0	-2.5	-20.3	5.7	1.3	-34.5	-2.5	-11.9	2.4	2.1	15.8
Sweden	153.8	-4.2	3.5	3.8	22.2	-12.1	3.5	50.7	4.3	18.8	-3.0	-0.1	-7.4
Switzerland	62.2	-2.8	17.6	-3.2	-2.0	-4.4	0.2	12.9	-5.4	110.4	1.7	-0.4	-23.4
United Kingdom	3.7	-3.6	13.4	-4.2	-5.3	2.1	4.1	-10.3	12.9	-10.3	-0.3	0.2	4.3
United States	75.2	-1.8	3.9	-0.4	-2.2	-3.1	-3.1	91.1	10.3	-70.2	-13.2	-1.0	8.3

All calculations are based on the coefficients reported in Column [3] of Table A3.2.
Non-BERD refers to the non-business R&D as a share of GDP. Academic links and subsidies refer to the combined effect of the two separate business funding and subsidy terms
Foreign exposure includes the impact of the foreign R&D stock terms and the openness term. Financial factors combines the profit share and financial market size variables.

Source: OECD, Economics Department, internal document "Innovation Policies: Innovation in the Business Sector", Feb '05.

III. Current OECD Project Formation on Intellectual Assets and Value Creation

OECD's Multi-disciplinary Approach

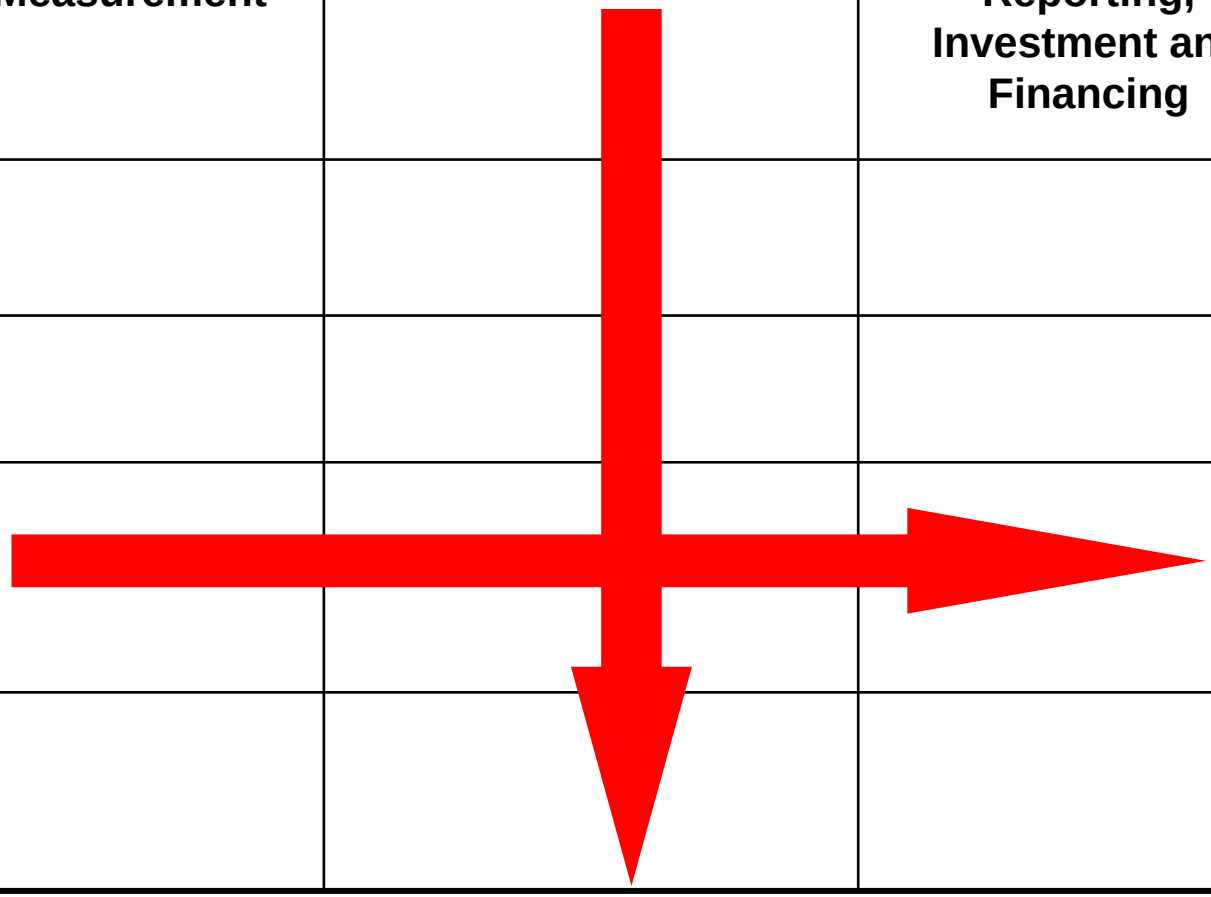
- **DSTI**: Measurement and Impact Analysis
  - Survey of various approaches and estimates;
  - New work on the international flows of IA;
  - Analysis of the relationship between various intellectual assets and economic performance (impacts) (firm- and economy-wide level)

- **EDU**: Human Capital
  - Examine (a) how more refined measures of human capital stock shed light on value creation; and (b) the impact of selected policies on value creation (as proxied by rates of return)
  - Review good practices of enterprise disclosure of information on stocks of human capital and their contribution to value creation by the firm.

- **DAF**: Non-Financial Reporting
  - Corporate Reporting and corporate governance

ANALYTICAL FRAMEWORK

	Definition and Measurement	Analysis of Impacts	Corp.Governance, Reporting, Investment and Financing
R&D			
Human Capital			
Intellectual Property (e.g. patents, brands)			
Software & Organisational capabilities			



Key Themes for OECD's IA-VC project

- Analysis and policy implications will be at both the firm- and the economy-wide-level;
- Exploit voluminous previous work on measurement and classification and will instead focus on valuation of these assets (separation of high- from low-value);
- Analyse their impact on outcomes like profits, share prices, productivity, economic growth;
- Seek to identify means by which firms can harness these assets for performance in the KBE.

Basic Outline

1.0 Introduction

2.0 Measurement

2.1 Economy wide estimates: R&D, HC, patents, software-org.

2.2 Firm estimates: R&D, HC, patents, software-org.

3.0 Impacts of IA

3.1 Economy-wide: R&D, HC, patents, software-org.

3.2 Firm: R&D, HC, patents, software-org.

4.0 Reporting

5.0 Implications for Policy Makers

STI Work Modules

- Literature survey on impacts of IA on economic performance;
- Impact on Productivity:
  - Business and Public R&D
  - Knowledge Spillovers (proxied by patents)
  - Human Capital
- Tax treatment of Business Investments (B-index)
- Software and organisational capabilities

IA-VC EVENTS

- 6 October 2004: OECD Forum on ***Valuation and Licensing of Intellectual Assets***, Paris;
- 25 March 2005: OECD Internal Seminar on ***The Contribution of Intangible Investments to US Economic Growth****, Paris;*
- 29-30 March 2005: ***Forum on the Internationalisation of R&D***, Brussels;
- 30 June – 1 July 2005: **Economic Valuation and Exploitation of IP** with EPO, Berlin;
- 20-22 October 2005: **International Conference on Intellectual Assets**, Ferrara;

Main Conclusions of the Berlin Conference on IP

- *The economic value of patents is increasing.*
- *Firms exploit the value of their patents through multiple channels.*
- *Efforts are needed to make the contribution of patents to economic value more visible.*
- *Markets for technology offer significant social and economic benefits, but are developing unevenly across the OECD.*
- *A range of intermediaries help technology markets to function smoothly.*
- *Public institutions have an important role to play.*
  - *Improving the administration of patent systems:*
  - *Providing information to markets*.
  - *Education and training.*
  - *Supporting patent management in the public sector*.
- *Improved data collection, diffusion and analysis are needed.*
- *Greater international and domestic policy dialogue should be encouraged.*

(Presentations are available at : www.oecd.org/sti/ipr)

Università
di Ferrara

OECD

INTERNATIONAL POLICY CONFERENCE
"Intellectual Assets and Innovation: Value Creation in the Knowledge Economy"
Ferrara, Italy, 20-22 October 2005

www.ferraraonintangibles.net/OECD-FerraraIntangiblesConference

Preliminary Messages on IAVC at the Ferrara Conference

- There is renewed interest in IA and their role in VC
  - in the context of increased globalisation
  - as strategic assets
  - w/ increased emphasis on openness of economies to new ideas
  - w/ company examples of fundamental restructuring which seizes IA as primary source of profit (e.g., Philips, iPod)
- OECD goal: to objectively evaluate importance of IA
  - in light of speculative bubbles (dot.com, current housing one?)
  - to provide analysis which identifies the function of IA as part of the corporate value creation
- So far: no clear evidence of a market failure
- But awareness may be an issue in large parts of OECD business community (what is the situation in Japan?)
- Lack of sufficient information on IA can have serious economic consequences

Restructuring or Boneyard:
The Need for Speed

While restructuring our Company in the 1980s, we spent much of our time talking about the accelerating pace of change: in world politics, in technology, in product introduction and in the increasing demands of customers. We don't have to do that anymore. Change is in the air. Newspapers and networks hammer it home daily. GE people today understand that pace of change, the need for speed, and the absolute necessity of moving more quickly in everything we do, from inventory turnover, to product development cycles, to a faster response to customer needs. They understand that slow-and-steady is a ticket to the boneyard in the 1990s.

"To Our Share Owners" (1990 Annual Report) of GE

Thank You!

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www.oecd.org/sti