Indicators for a knowledged-based growth policy in the EU:

tacking stock and moving forward

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Indicators for an EU knowledge-based growth policy

- A very brief view on EU growth and innovation performance
  - **Which indicators do we need to trace?**
- A very brief view on current EU growth and innovation policies
  - **Which indicators are being used?**
- The way forward
  - **Which indicators are being developed?**

Which indicators do we need to trace?

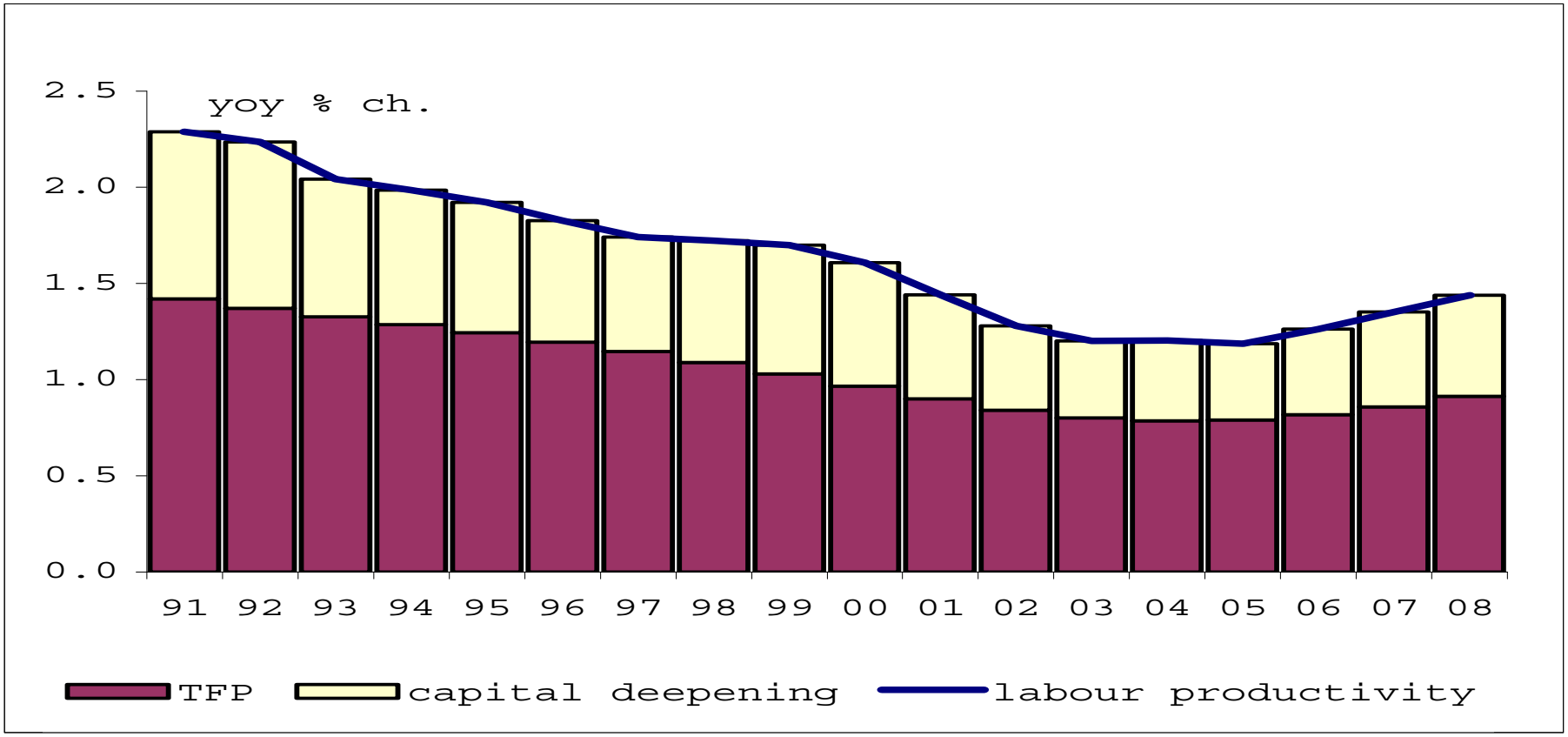
A very brief diagnosis of EU's innovation and growth performance

Diagnosing EU productivity performance

- European (labour) productivity had been catching up with the US for 50 years…
- …but since 1995 US productivity accelerated again away from Europe,
  - with consistently lower productivity growth rates in the EU and no sign of catching up
    - Both growth components (capital intensity and MFP) interrupted their downward trend pre-crisis, but hard to say whether this is a structural break

EU's TFP and Capital Intensity Growth Interrupted their Downward Trend

Contributions of total factor productivity and capital deepening to trend labour productivity



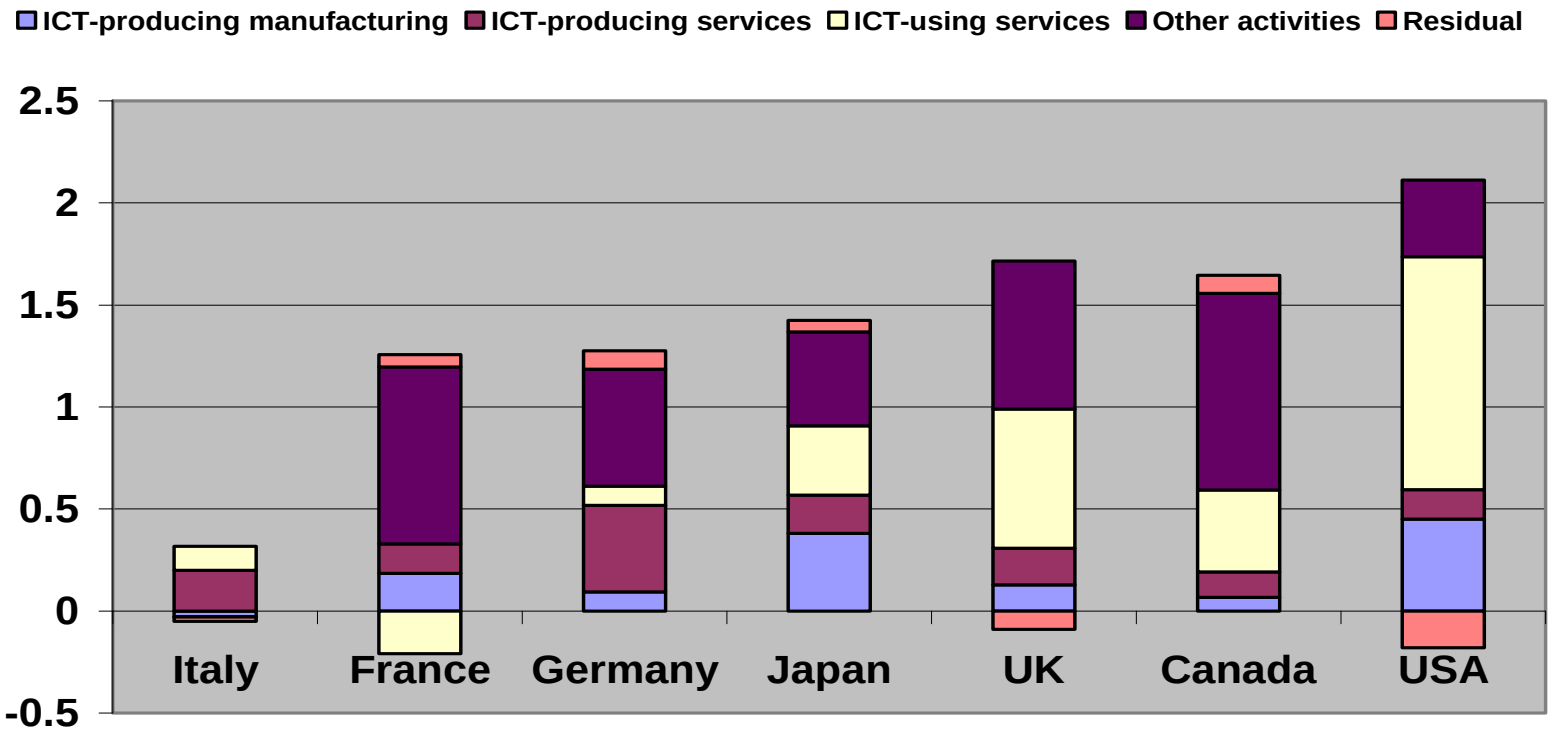
Source: AMECO

The sources of EU's productivity growth gap

- A gap from high-growth sectors:
  - ICT using market service sectors
- A gap from high-growth firms:
  - Not only lower spending on ICT, but also lower effectiveness of this spending by EU firms (Bloom, van Reenen et al (2007))
    - not by US MNEs in EU !!
- Creative destruction process is hindered
  - Entry, but especially growth of new firms to larger, more efficient scale is hampered;
  - Exit of inefficient firms is hampered

ICT-using services were unable to drive growth in continental EU countries

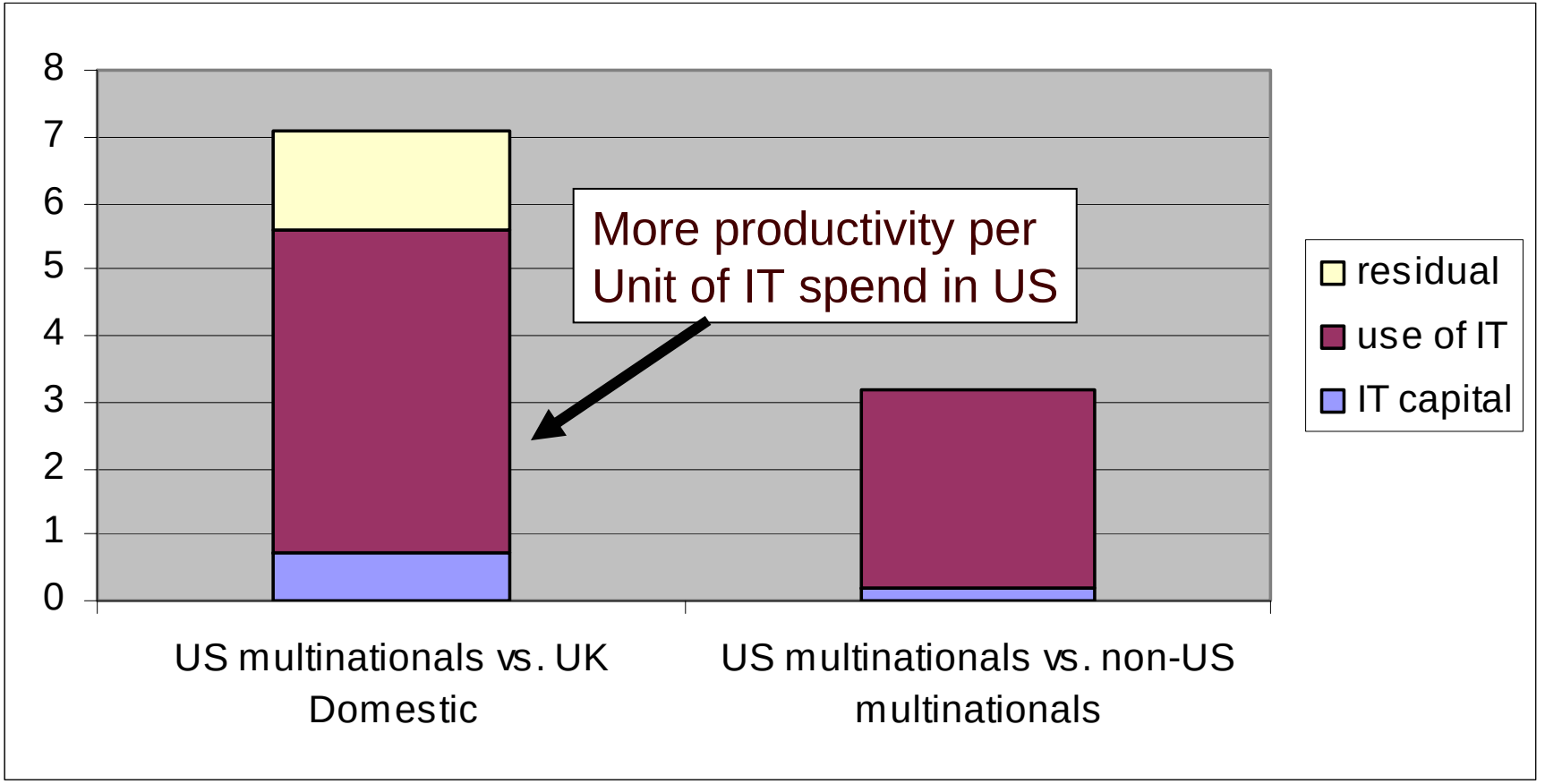
1996-2002



Source: Ameco from EUKlems

Productivity gap between US multinationals and EU multinationals mainly due to better *use* of ICT. Not simply greater U.S. spending on IT.

----Better management and organization in US firms---

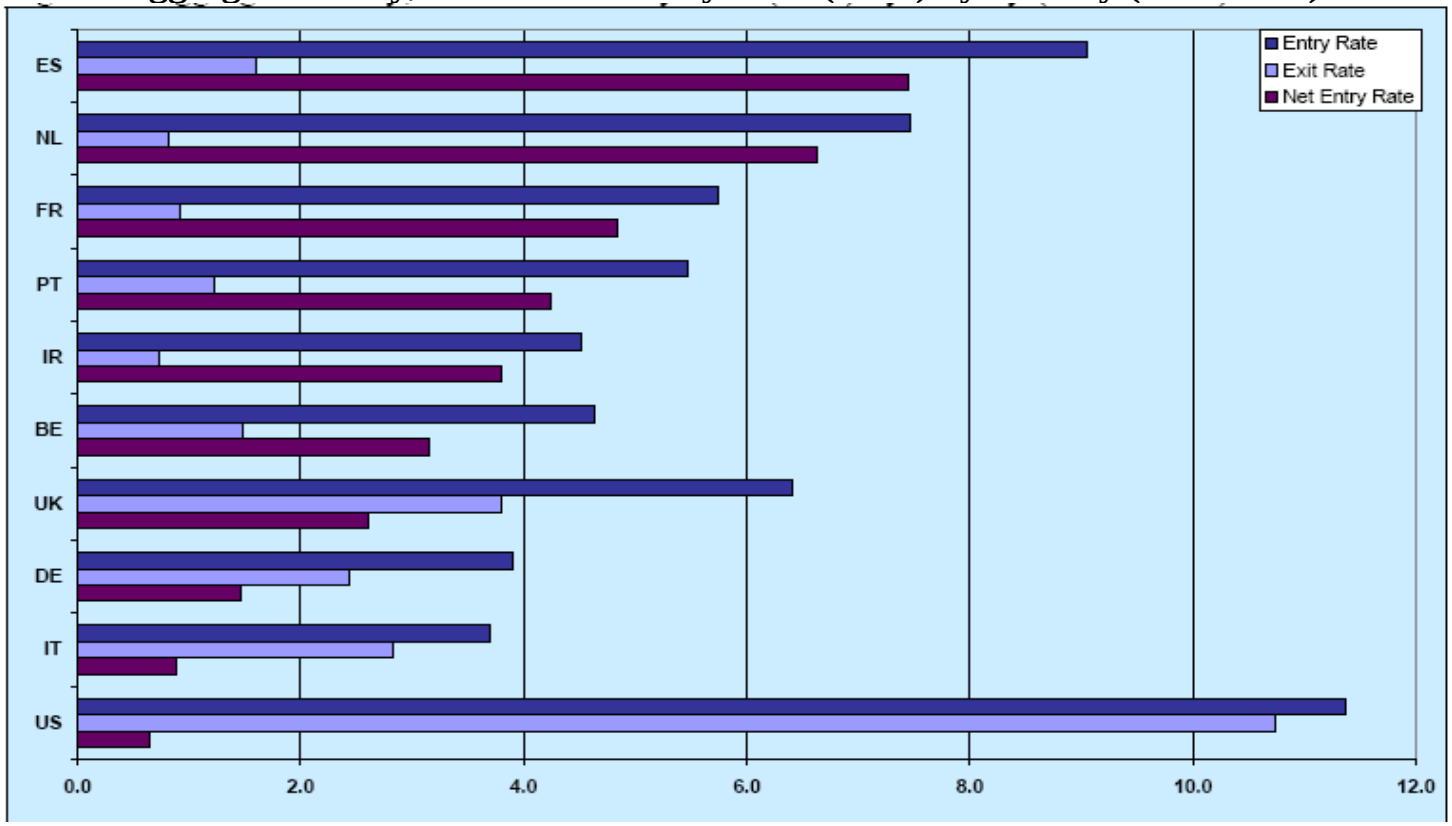


Notes: Estimated percentage difference in labour productivity after controlling for materials, non-IT Capital, age, industry, multi-plant firm, region.

Source: Derived from Bloom, Sadun and Van Reenen (2007), Table 3, ONS Census ABI data

Entry, but mainly exit, lower than in US

Aggregated entry, exit and net entry rates (in %) by country (1997-2003)

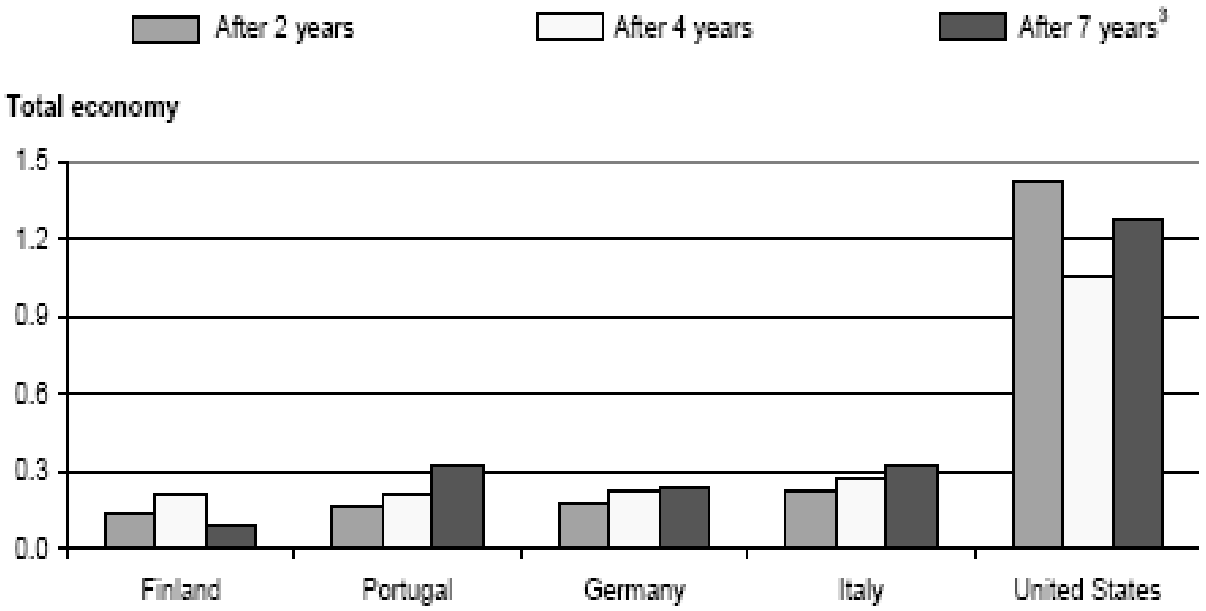


Source: "Impact of Market Entry and Exit on EU Productivity and Growth Performance", M. Cincera and O. Galgau (2005). EC Economic Papers 222.

Lower EU post-entry growth than in US

Net employment gains among surviving firms at different lifetimes

(net gains as a ratio of initial employment)

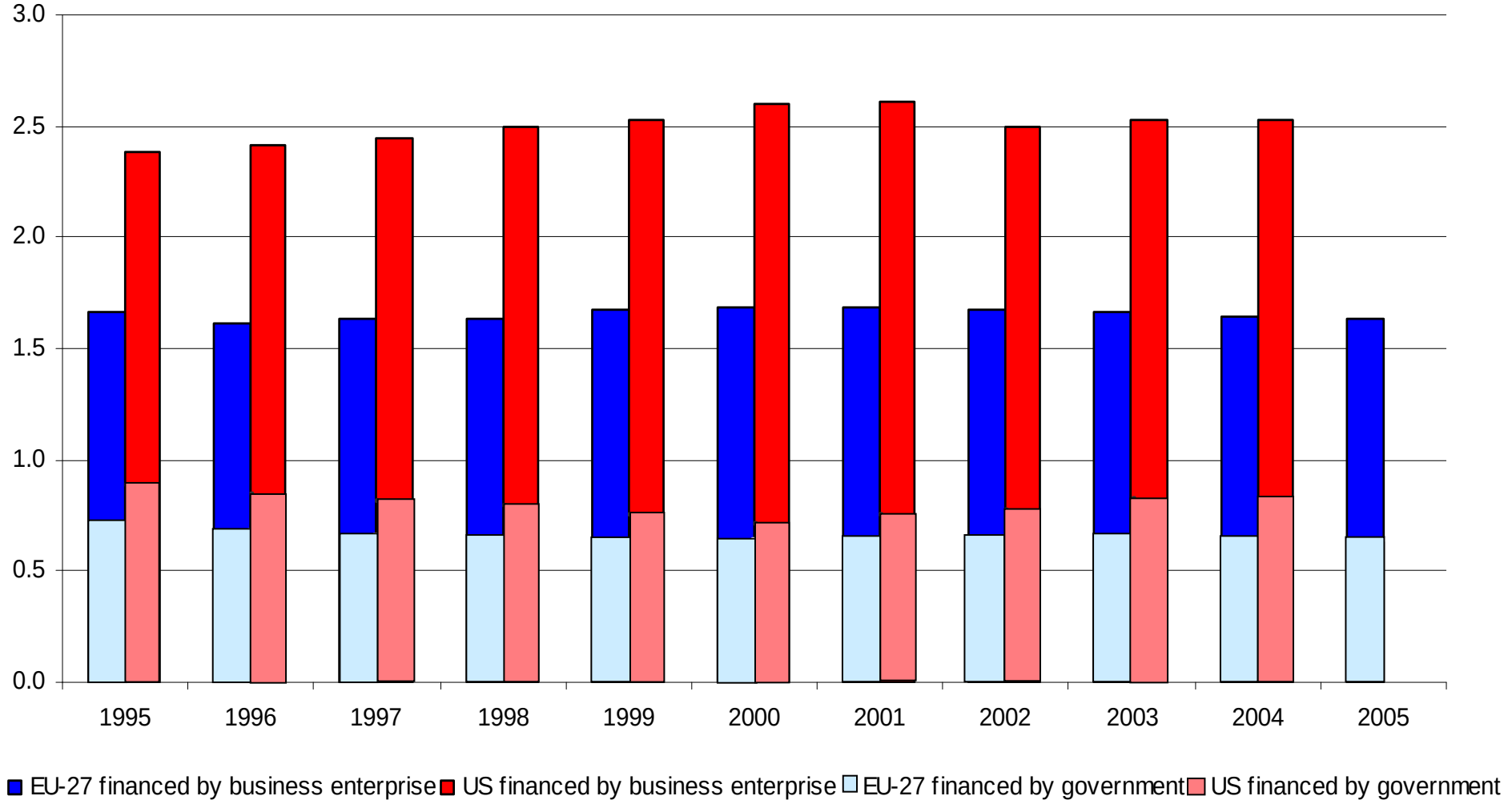


Source: "Comparative Analysis of Firm Demographics and Survival"(2003) by E. Bartelsman, S. Scarpetta,and F. Schivardi, OECD Economics Department WP 348.

Diagnosing EU's R&D deficit

- If recent trends continue, nor the 2% private nor the 1% public target for R&D expenditures will be reached by 2010.
  - In 2003 R&D intensity almost stagnant at 1.93% of EU-25 GDP; Based on recent trends, China is forecasted to catch up with EU before 2010 in terms of R&D intensity
- 85% of EU's R&D deficit is due to the business sector
- There is no significant catching up in business R&D spending

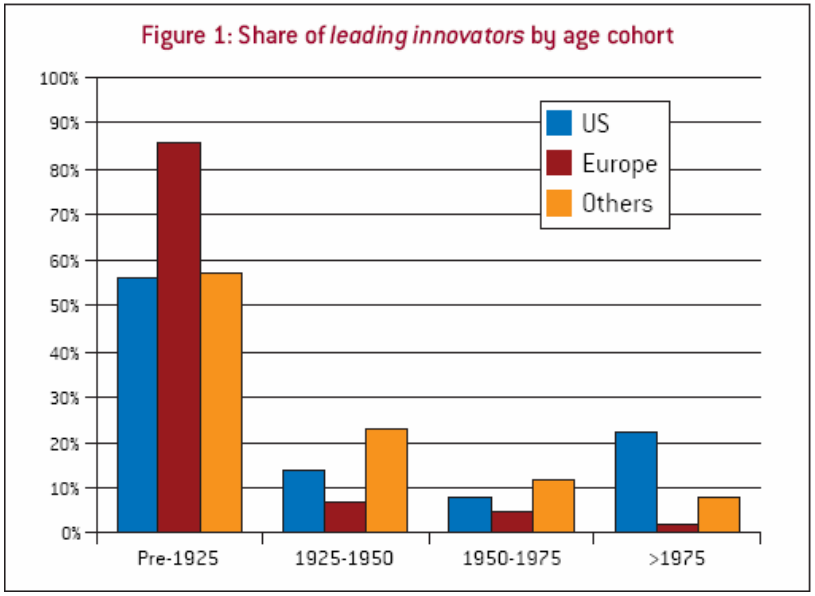
…no significant change in business R&D expenditures



The sources of EU's R&D deficit

- The nature of EU's industrial structure is a major reason for the business R&D investment deficit (KfG O'Sullivan report)
  - EU is specialized in medium-tech (rather than high-tech sectors)
  - EU has less Young Innovative Companies

Some evidence on Europe's missing young firms among leading innovators



The graph is based on a sample of 226 companies, obtained from matching firms in the FT Global 500 (2007) with the 2007 EC-IPTS Top 1000 R&D scoreboard companies. Leading Innovators are thus defined both by the size of market capitalization and R&D expenditures. The US has 80 companies in the sample, Europe 86 and other countries 60.

Young is defined as founded after 1950; US has 24 young leading innovators in sample, Europe 7; The total is the sum of all 226 leading innovators in the sample.

Table 1

Contribution of young leading innovators to total leading R&D and sales: US and Europe

	R&D	Sales
US	28%	15%
Europe	2%	6%
Total	16%	12%

Source: Bruegel Policy Brief: A lifeline for Young Radical Innovators, Veugelers (2009)

Improving EU's knowledge-based growth capacity:
addressing a systems failure

- Stimulating Capacity building
  - Public R&D infrastructure
  - Education in general and Higher Education in particular (S&E researchers)
  - Stimulating Private expenditures on creation and adoption of new technologies (tax incentives, subsidies)

- Framework conditions to improve incentives for knowlegde-based growth, **especially**
  - Large integrated product markets (single market, esp services
  - Well functioning product markets (competition and ease of entry & exit), labour markets (labour mobility), (venture) capital markets
  - clear IPR regimes, regulations and standards;

- Improving Technology Transfer/Diffusion (Eg clear property rights, ISL mechanisms, absorptive capacity of users, investment in complementary assets),

Which indicators do we need to trace?

- looking beyond **knowledge creation** indicators only **(3% Barcelona target),** to include
  - **knowledge diffusion/adoption (**esp ICT**),**
  - **structural change** (churning) and
  - **framework conditions**
    - Evidence on which factors/regulations are impeding actors's knowledge-based growth
- Looking beyond indicators individually: a systems-approach

Which policies are currently being used in the EU?

A quick view on current EU policy practice in the area of R&D, innovation and growth

The Lisbon Agenda: a systemic policy of structural reforms for growth?

- Investments in knowledge-based economy
  - Invest in education and training
  - Invest in R&D and innovation
  - Encourage production and use of ICT
- Product Market Reforms:
  - Improve the functioning of the Internal Market for goods & services
  - Liberalisation of network industries
  - Opening up of markets (entry regulation..)
  - Improve the business environment (reduce regulatory burden, esp for start-ups
- Financial Market Reforms : Promote EU financial integration
  - FSAP, RCAP, enhancing comparability of companies financial statements, ...
- Labour market and social reforms
  - Improve incentives to participate and remain in the labour market;Increase the labur market flexibility; modernatisation of social protection...

Lisbon Mark II

- 2004 Mid-term Review called for
  - Stronger focus on growth & jobs
  - Improved policy governance and ownership by Member States
- 2005 Partnership for Growth & Jobs (Lisbon II)
- 2006 Priority Actions
  - Investing more in knowledge & innovation
  - Unlocking business potential (esp SMEs)
  - Increasing employment for priority categories
  - Energy & Climate Change

More attention in innovation policy to improving demand for innovation

- The Ahö report (2005) had put the need for large enough markets that are friendly to innovation at the core of its proposals for reviving the Lisbon Agenda.
- This demand-focus has been taken up more recently in EU innovation policy discussions:
  - “lead-markets”-strategy : including public procurement practices aiming at the removal of barriers that would lead to the uptake of new products and services.
  - The review of the Internal Market includes a focus on how to make it more innovation friendly.

RTD policy at EU level

- 2007 Green Paper on European Research Area
  - The **ERA** concept encompasses three inter-related aspects:
    1. a European 'internal market' for research, where researchers, technology and knowledge can freely circulate;
    2. effective European-level coordination of national and regional research activities, programmes and policies;
    3. initiatives implemented and funded at European level.

- 2008: Ljubljana process: evaluating ERA and its contribution to Lisbon objectives
  - Monitor progress on ERA
    - Are ERA countries closer integrating on S&T?
  - Monitor effectiveness of ERA wrt Lisbon
    - Does ERA integration contribute to growth?

Which indicators are currently being used ?

Structural Indicators for the Lisbon Agenda

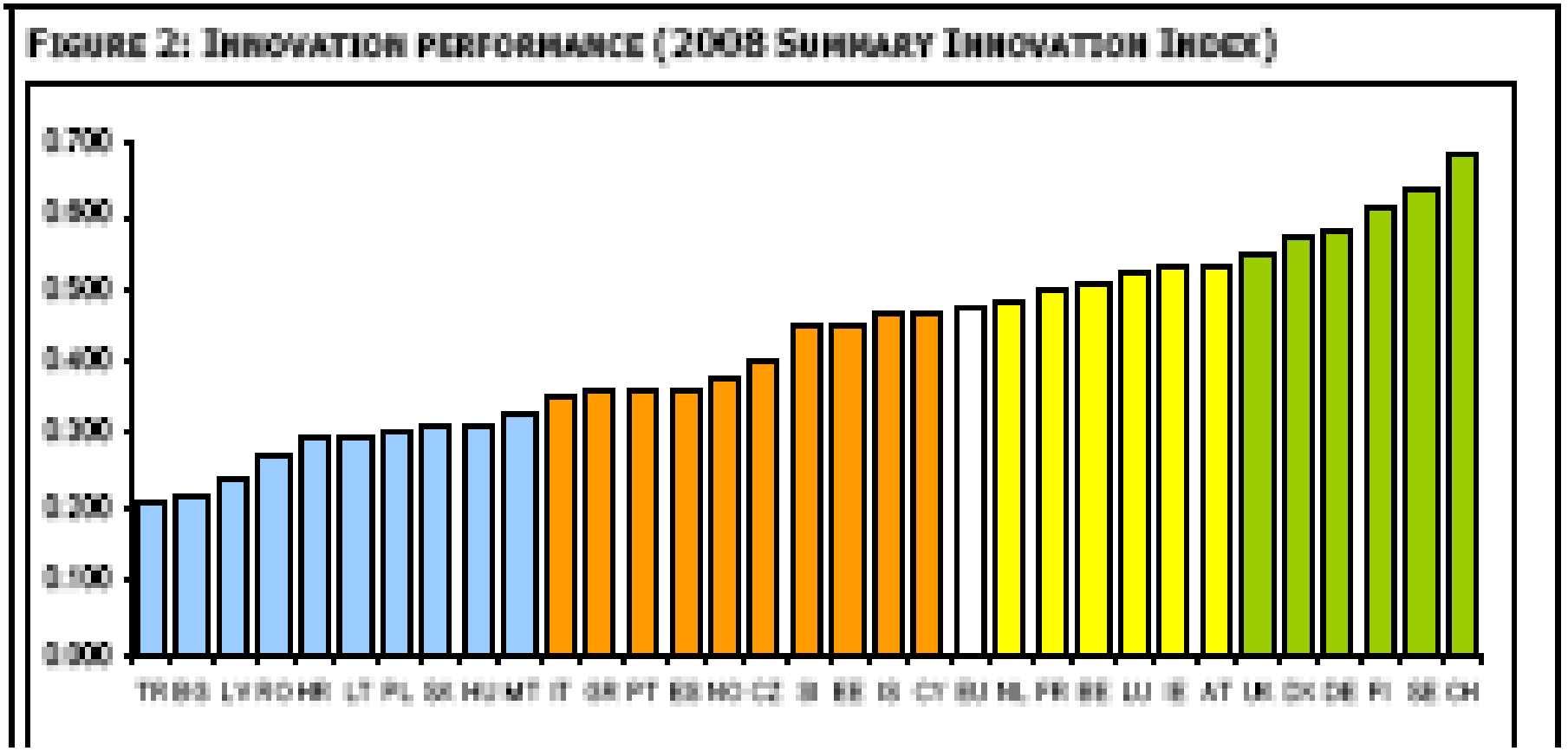
- Areas: General Economic Background, Innovation and Research, Economic Reforms, Employment, Social Cohesion and Environment
- Innovation and Research includes
  - **R&D expenditures as a % of GDP**
  - **Youth education attainment level by gender**
  - Spending on human resources (public expenditure on education)
  - Science and technology graduates – total/females/males
  - GERD (Gross domestic expenditure on R&D) by source of funds (private-public)
  - Patents – EPO/USPTO
  - Venture capital investments – early stage/expansion & replacement
  - ICT expenditure – IT/Telecommunications expenditure
  - Level of Internet access – households /enterprises
  - Broadband penetration rate
  - E-government on-line availability; E-government usage by individuals by gender; by enterprises ;
  - High-tech exports

Innovation Indicators

(European Innovation Scoreboard)

- **Enablers** include:
  - Human Resources
    - S&E graduates per 1000 population aged 20-29; Population with tertiary education per 100 population aged 25-64; Broadband penetration rate (number of broadband lines per 100 population) ; Participation in life-long learning per 100 population aged 25-64; Youth education attainment level;
  - Finance/support
    - Early-stage venture capital (% of GDP); Public R&D expenditures (% of GDP); Share of enterprises receiving public funding for innovation;
- **Firm activities:**
  - **Knowledge creation** includes Business R&D expenditures (% of GDP); ICT expenditures, non-R&D innovative expenditures (% of total turnover);
  - **Linkages & entrepreneurship** SMEs innovating in-house (% of all SMEs); Innovative SMEs co-operating with others (% of all SMEs); Firm renewal (SME entry & exit); public-private co-publications
  - **Throughput** including EPO patents per million population; USPTO patents per million population; Triad patents per million population; New community trademarks per million population; New community designs per million population
- **Output/effects** includes Employment in high-tech manufacturing and services (% of total workforce); Exports of high technology products as a share of total exports; Sales of new-to-market/firm products (% of total turnover); SMEs introducing innovations (%of all SMEs)

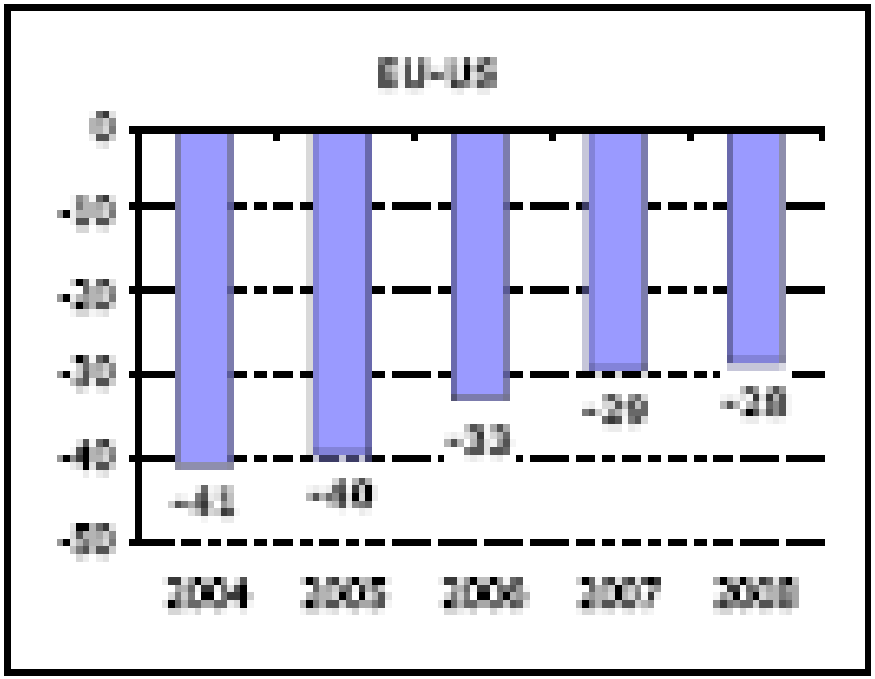
Summary Innovation Index (SII2008)



The SII is a composite indicator (0-1) of 29 indicators

Source: EIS 2008

EU-US gap: despite some catching-up: consistently a gap



Source: EIS 2008

Note: Limited set of indicators is used for EU-US comparison, due to data-availability

The way forward for EU policy making

Evaluating the choice of indicators

- **Are we measuring the right indicators?**

Missing or underdeveloped areas:

- Structural change: entry/exit/**growth** of **new technology firms**
- Incentives for innovation/framework conditions
- (International) diffusion/absorption of new technologies
- Systems/Linking Indicators
  - Industry Science Links

- **Are we measuring the indicators at the right level?**

Too high level of aggregation

- Sectoral/technology level
- Regional dimension
- Individual actors: researchers, firms, research institutes, …

- **Are we evaluating the indicators in the right way?**
  - Composite indicators ?

Developing New Indicators: Linkage Indicators (Industry Science Links)

- co-publications versus
  - R&Dcontracting
  - University patenting
  - Licensing of university patents
  - Cooperation in R&D, co-patenting, Inventor/researcher mobility
  - Informal spillovers, cross-citations
  - ….

Developing New Indicators for measuring EU integration

EU-RTD is currently designing an indicator system for assessing

- The making of ERA: is the EU becoming more integrated in RTD?
- The effects of ERA: does ERA contribute to Lisbon objectives?

Cf STC Indicators report 2008

Indicators for measuring EU integration

- International mobility of researchers (tertiary students, PhDs, S&E workforce)

- International R&D collaboration of firms (various types of partners)
- International co-patenting by various actors
- International co-publishing by various actors
- International scientific references to scientific publications & patents
- International patent citations to publications & patents
- International R&D operations of firms (R&D-FDI)
- International funding of Business R&D , Universities & PROs
- International) funding of International Research Consortia (CERN, …) (eg Eiroforum, ESFRI)
- High-tech trade in goods, services, capital equipment
- Technology Balance of payments (international licensing payments)
- Others: Weblinks …

Note: International: Intra-ERA and Extra-ERA

Poor availability of indicators, esp mobility of researchers, which is a pivotal variable;

Analysing the ERA-Lisbon objectives Link: does ERA matter for Growth ?

- Contribution of S&T inputs of ERA members to Innovations and GDP growth of ERA members;
  - effects of ERA process over time on improving contribution of S&T to growth of ERA members;
- International spillovers: GDP growth determined not only by own S&T, but also by other ERA countries' S&T inputs and beyond:
  - effects of ERA process over time in improving intra-ERA and extra-ERA spillovers;
- Assessing whether ERA contributes to faster global S&T integration of ERA members:
  - linking intra ERA integration to how ERA members are globally integrating (extra-ERA) : diversion or stimulus?

Conclusions

- There is loads of work going on and still to be done to get to an evidence-based innovation policy.
- Beyond the “creation” of better statistics, it is important to improve on the “diffusion” of S&T statistics.
  - Data should be more easily accessible by the relevant users: regional/national/EU policy makers but also researchers, who serve as an important intermediary to process the information into policy analysis.
- The process of creation and diffusion of S&T statistics, should be less linear, more interacted.
  - Users/researchers should be more actively involved in the process of design of the S&T statistics, so that they can inform the Statistical System of user needs, but also better understand the technical constraints of the Statistical System.
  - Build in evaluation, data-collection, at the policy design phase