Sectoral patterns of total factor productivity growth: EU vs. US

DG ECFIN

Economic Policy Committee

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Motivation and objective

New **challenges for EU competitiveness** have emerged

- discussions in Eurogroup; Draghi and Letta reports
- productivity is **key to competitiveness** (EU needs to "grow and become more productive", Draghi report)

EU's competitiveness gap with US is tied to **relatively weak productivity growth**

- capital deepening mainly over the financial crisis years
- a persistent gap in terms of Total Factor Productivity (TFP) growth

TFP growth advantage of US over EU also linked to differences in sectoral composition of output, i.e. it has a **sectoral dimension**

- this analysis: **sector-level account** of TFP growth patterns, using latest vintage of EU-KLEMS
- contributions of TFP by industry to: (i) labour productivity growth; (ii) aggregate TFP growth
- different time periods

TFP - what is it, and how to measure it?

Total factor productivity (TFP) as a **key measure of productivity**

- TFP summarises the **efficiency of all production factors** when taken together in production
- TFP embodies **technological and organisational innovation**
  - may therefore overlap with intangible capital
- TFP also reflects the state of **regulatory and business environment**

How to **measure TFP**?

- **residual** in a neoclassical growth model with proper measurement of capital and labour services under constant returns to scale and perfect competition in factor markets
- need to have **very good estimates of the contribution of the various types of capital** (incl. intangible) and labour
- **EU-KLEMS** has become reference for harmonised, industry-level data to analyse productivity growth

Labour productivity growth decomposition

- labour productivity (value added per hour worked) growth consists of changes in **labour composition** (e.g. skills) + changes in **capital intensity per hour worked** (for different types of capital) + **TFP growth**

Labour productivity growth decomposition before GFC

TFP is main contributor to labour productivity growth

TFP persistently growing in a handful of industries

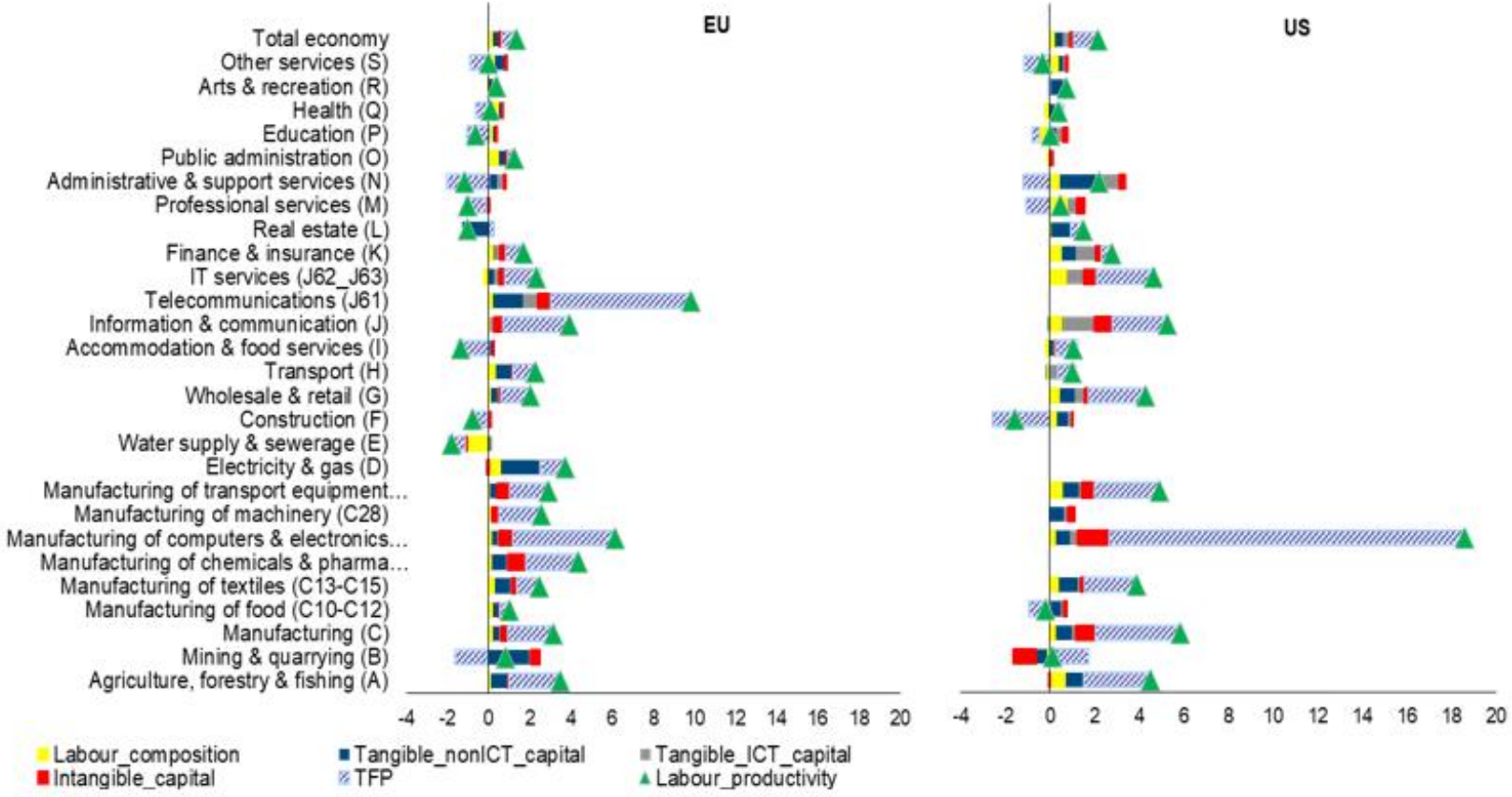
In pre-GFC period

EU: large contribution of TFP to labour productivity growth in **telecommunications** and network industries (liberalisation and pro-competitive reforms), **IT services** and **manufacturing**

US: stronger contribution of **computers and electronics** (Moore's law); **wholesale and retail** (exploitation of scale economies)

Labour productivity growth and its contributors

EU (left) vs. US (right), 1996-2007, in p.p.



Notes: Average for 1996-2007. EU is the GDP weighted average of AT, BE, DE, DK, ES, FI, FR, IT, NL, SE.

Source: European Commission elaborations on EUKLEMS data.

Labour productivity growth decomposition after GFC

In post-GFC period

Deceleration of TFP growth compared with pre-GFC period

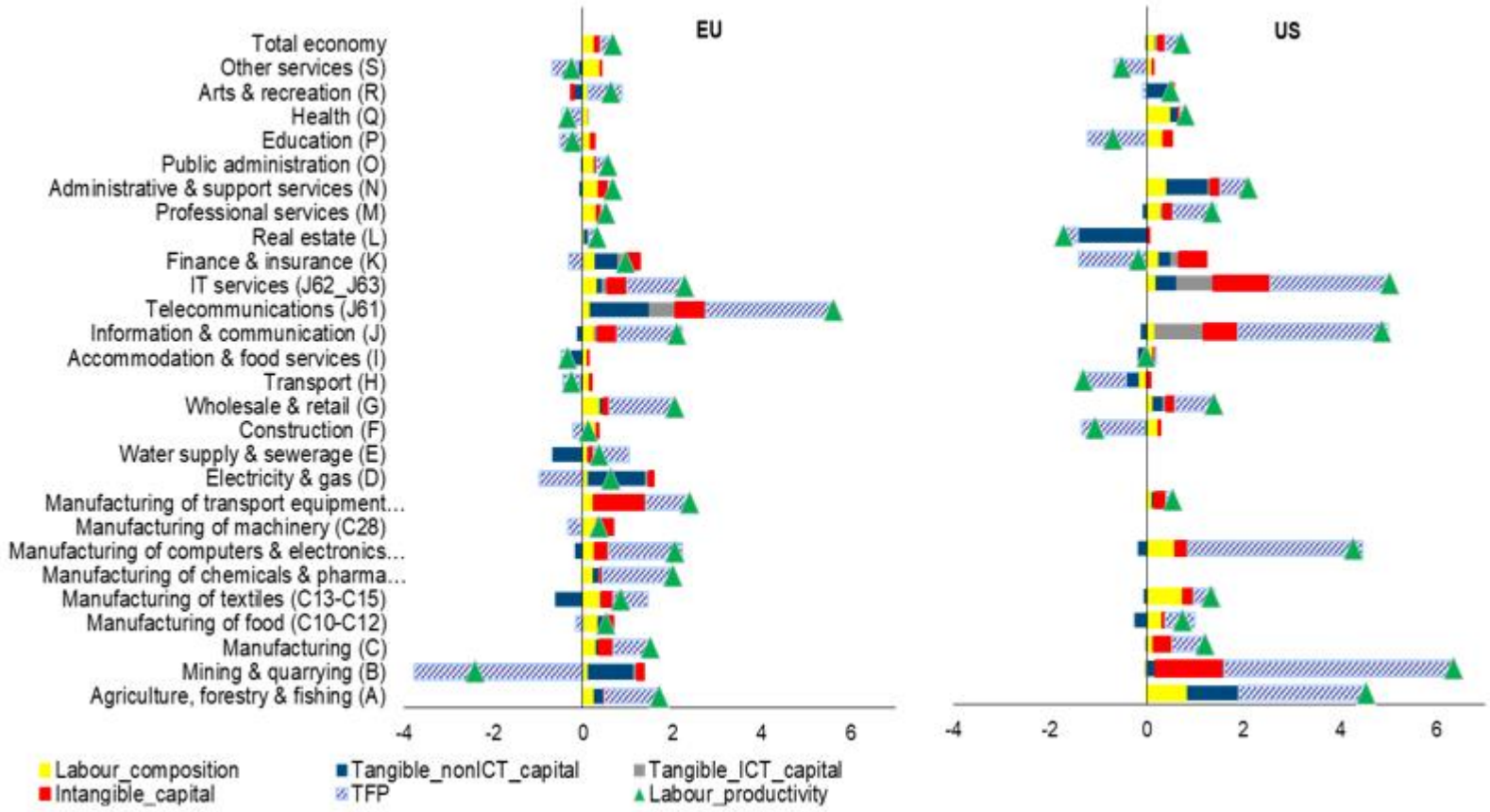
TFP remains key driver but stronger contribution of **intangible capital** and **labour composition**

TFP deceleration in **computers and electronics**, notably in US

TFP acceleration in **IT services**, notably in US

Labour productivity growth and its contributors

EU (left) vs. US (right), 2013-2019, in p.p.



Notes: Average for 2013-2019. EU is the GDP weighted average of AT, BE, DE, DK, ES, FI, FR, IT, NL, SE.

Source: European Commission elaborations on EUKLEMS data.

TFP growth: comparison EU vs US across industries, post-GFC

Over 2013-2019, overall TFP growth stronger in **US** than in **EU**

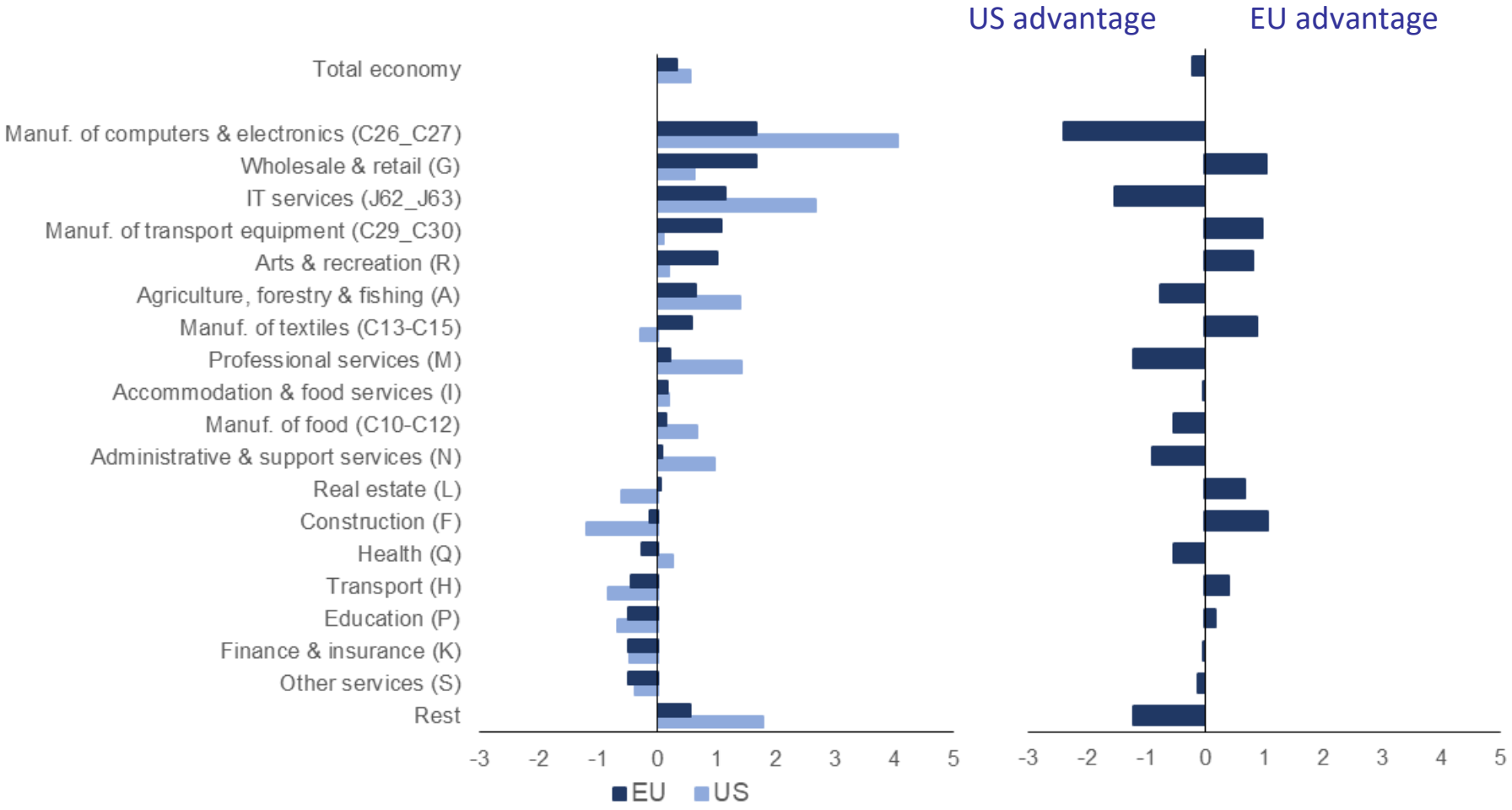
US advantage

- computers and electronics
- IT services, professional and business support services

EU advantage

- transport equipment, textiles
- wholesale and retail trade, construction, real estate

Annualised TFP growth (%): EU, US, and difference EU-US, 2013-2019



Notes: EU is the GDP weighted average of AT, BE, DE, DK, ES, FI, FR, IT, NL, SE. "Rest" category groups together a subset of smaller industries.

Source: European Commission elaborations on EUKLEMS data.

TFP growth contribution from individual sectors, post-GFC

Industry contributions to total economy TFP growth

- accounts for within-industry TFP growth and changing value added shares
- bars sum up to total economy TFP growth

EU: larger contributions in

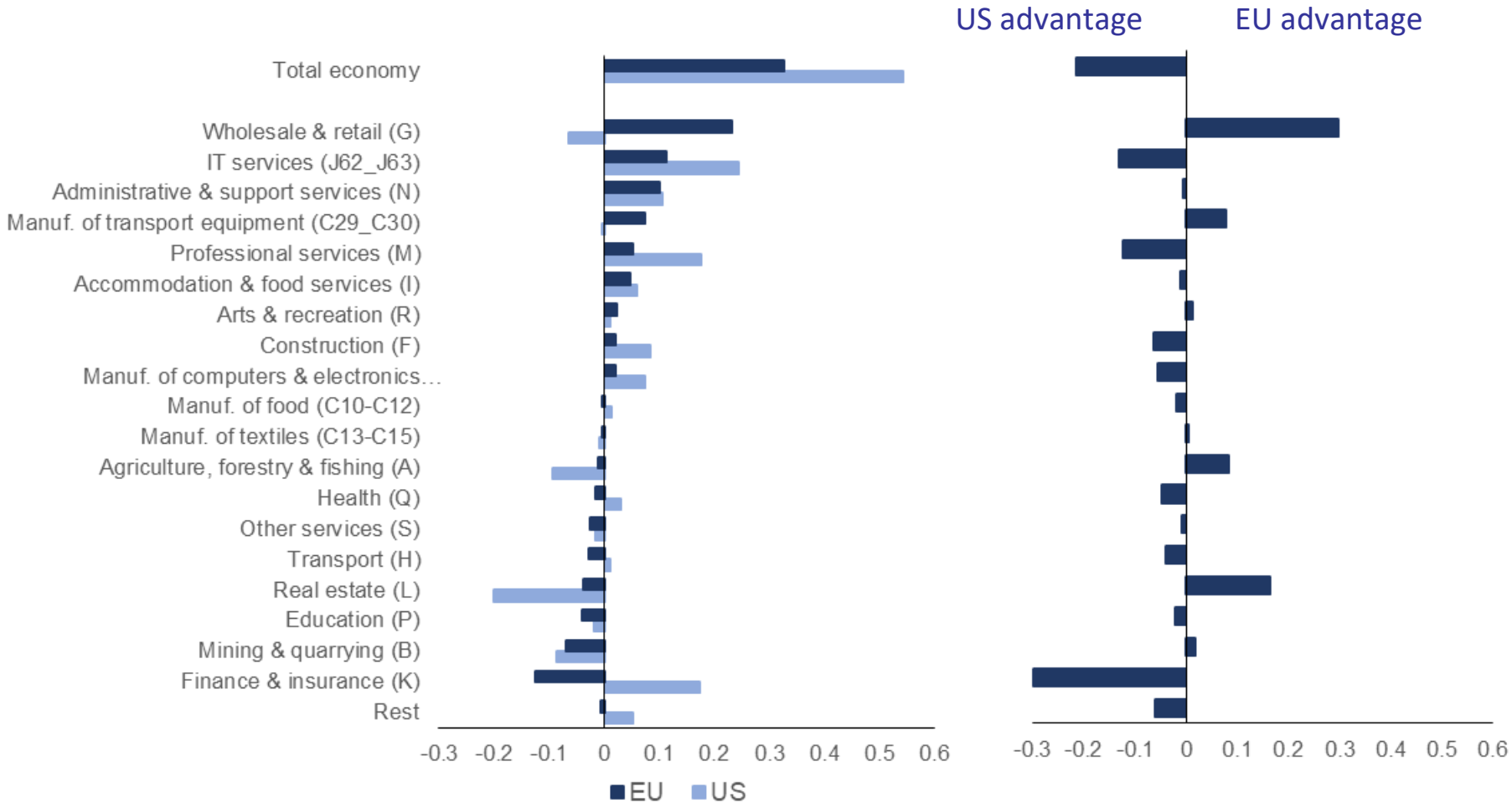
- wholesale and retail trade, transport equipment, real estate

US: larger contributions in

- finance, IT services, prof. services, construction, computers

In US, only non-negligible contribution from **manufacturing** is computers

Industry contribution to annual total economy TFP growth (%): 2013-2019



Notes: EU is the GDP weighted average of AT, BE, DE, DK, ES, FI, FR, IT, NL, SE. "Rest" category groups together a subset of smaller industries.

Source: European Commission elaborations on EUKLEMS data.

EU: changing sectoral contributions to total TFP growth

Stronger contribution from services over time, but less than in the US

- IT services, professional services
  - less than in US
- wholesale and retail trade
  - more than in US, but likely cyclical
- reduced role of finance
  - opposite to the US

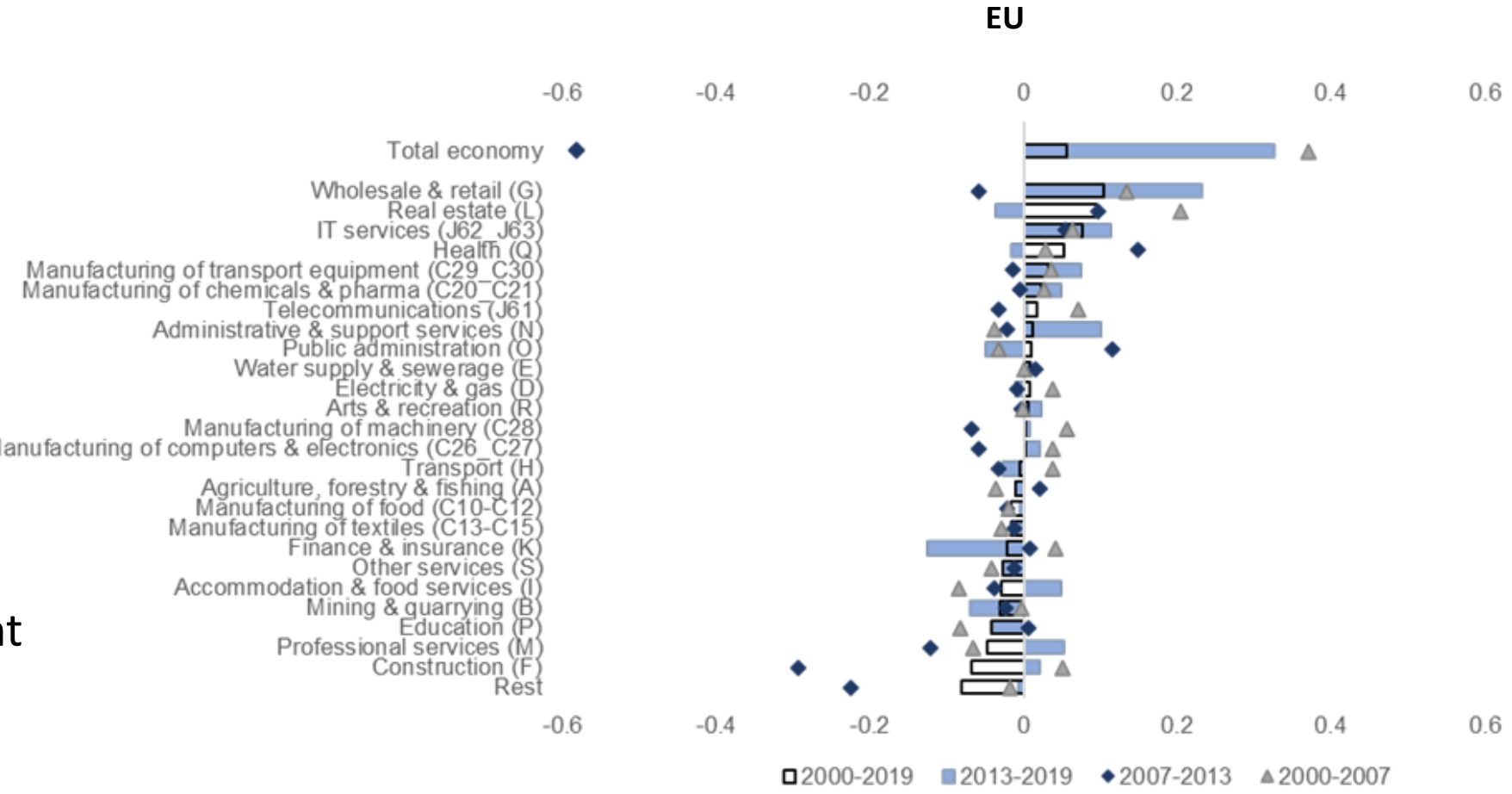
Growing contribution of chemicals, transport equipment

- unlike US

Reduced role of computers

- as in US

Industry contribution to annual total economy TFP growth (%): EU, 2000-2019



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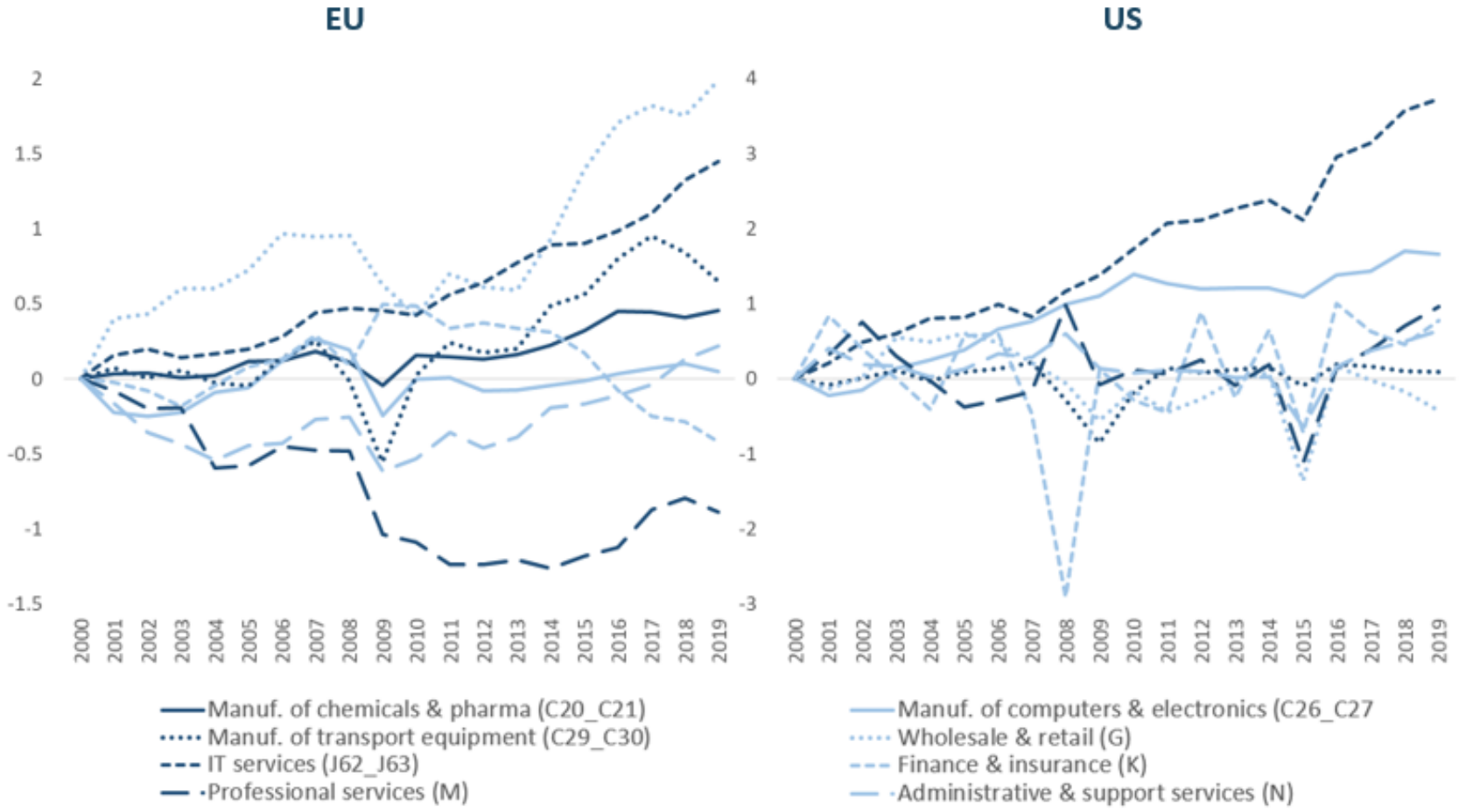
Source: European Commission elaborations on EUKLEMS data.

Cumulative contribution to overall TFP growth

Stronger contribution of **ICT manufacturing and services** in US linked to TFP growth rates and size of sectors

Cumulative contribution to total TFP growth, selected industries



Notes: EU is the GDP weighted average of AT, BE, DE, DK, ES, FI, FR, IT, NL, SE. Manufacturing of chemicals and pharmaceuticals (C20_C21) is missing for the US.

Source: European Commission elaborations on EUKLEMS data.

Change in sector size and TFP growth, post-GFC

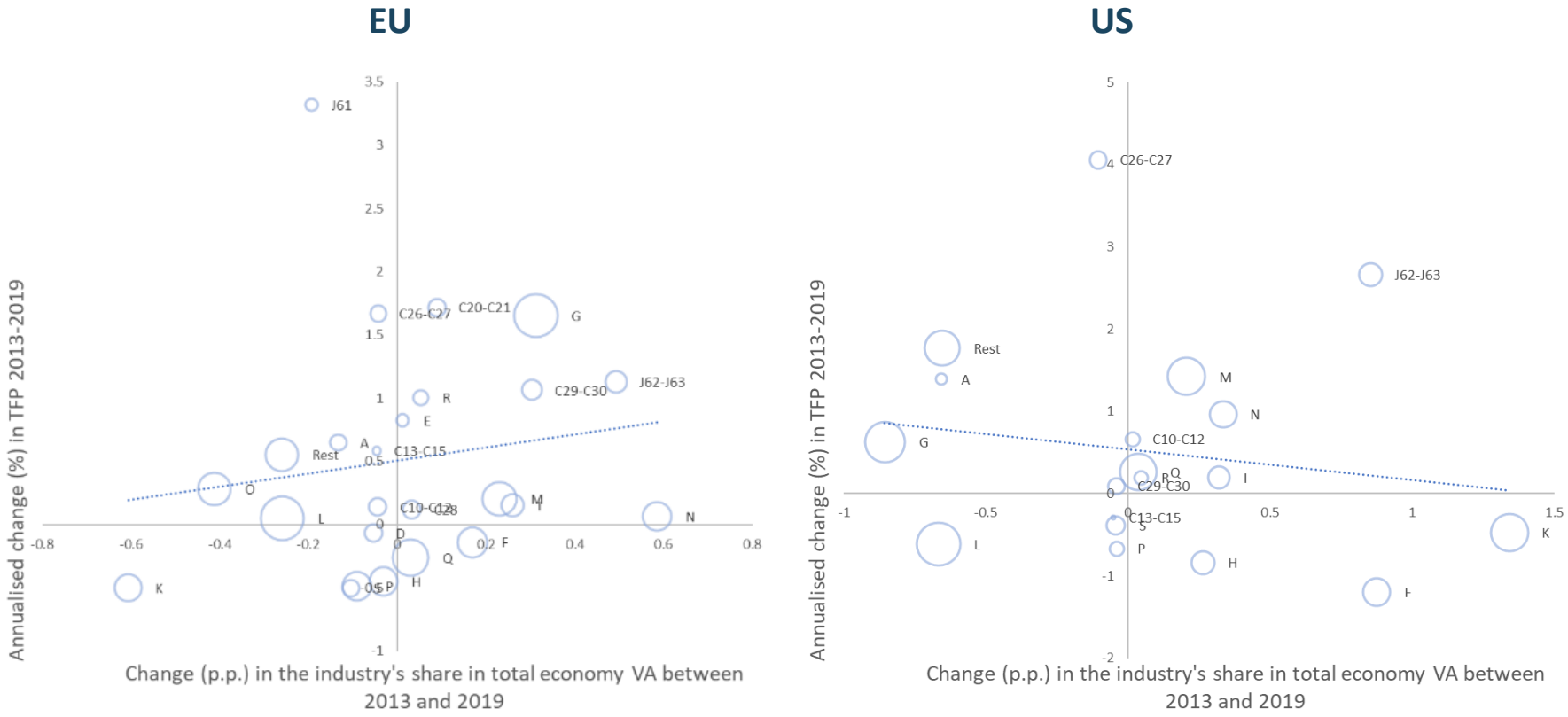
Are industries with higher TFP growth **expanding**?

- correlation positive in EU
- negative in US

Some **reallocation** ongoing in EU

- but much less strong growth of IT services (J62_J63) than in US

Change in industry's share in total economy VA vs. change in industry's TFP, 2013-2019



Notes: EU is the GDP weighted average of AT, BE, DE, DK, ES, FI, FR, IT, NL, SE. "Rest" category groups together a subset of smaller industries. Bubble size represents industry's share in total economy VA in 2019.

Source: European Commission elaborations on EUKLEMS data.

Conclusions (I)

Sources of productivity growth

TFP accounts for **bulk of labour productivity growth**

- followed by tangible and intangible capital deepening

Contribution of TFP growth **declining over time**

- growing contribution of intangible capital and labour composition

Industry patterns

Bulk of aggregate TFP growth recorded in **relatively few industries**

US displays much higher TFP growth in **IT services and manufacturing of computers**

- strong TFP spurts in the US followed with some lags from TFP acceleration in the same sector in EU

Slower EU **transition towards high TFP growth services**

- TFP gains in EU to a greater extent associated with dynamics pertaining to mid-tech manufacturing (e.g. Fuest et al., 2024)

TFP growth advantage of US over the EU, linked to both

- **higher TFP growth rates** in sectors generating large TFP gains and
- **larger shares** of these industries in total value added

Conclusions (II)

Implications for policy, echoed inter alia in the Draghi report

Differences in TFP growth across industries suggest room for enhancing TFP growth by **improving resource allocation**

Persistent differences in TFP growth within industries across countries (notably EU vs. US) linked to **differences in innovation performance** and framework conditions that support it

EU sectoral TFP growth patterns respond more sluggishly to changing innovation potential

- role of **equity, venture capital and other forms of financing** risky activities of young innovative firms ("unicorns")