PRODUCTIVITY GROWTH AND STRUCTURAL CHANGE IN AN ERA OF GLOBAL SHOCKS

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BETTER POLICIES FOR BETTER LIVES

A brief Roadmap

- Recent Trends
- Possible Explanations
- The role of the digital transformation and the Covid Shock

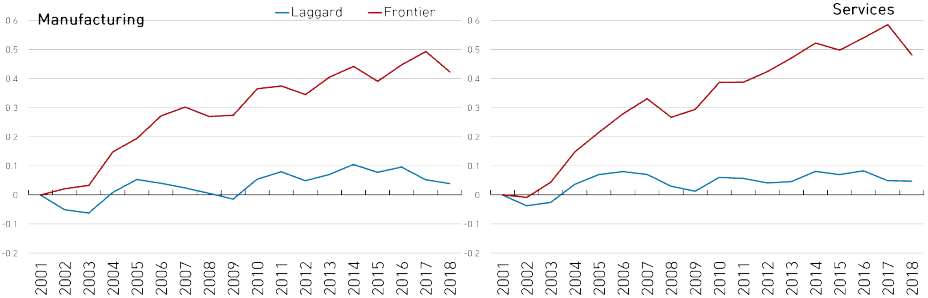
- The role of (New Industrial) Policies

- Big thanks to the PIE division and to members of the DynEmp, MultiProd, AI diffuse and Reallocation network

Productivity Slowdown and Increasing gaps between "the best and the rest" globally …

- Last two decades: slowdown in economic growth across OECD countries
- Widening labour and multifactor productivity gap between the global frontier and other firms

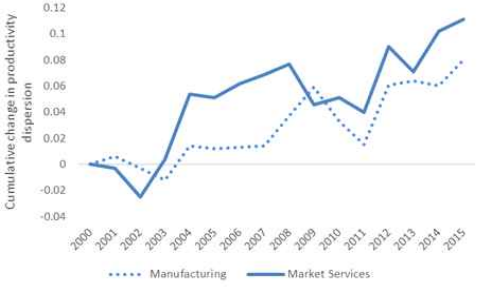
Labour productivity – frontier vs. laggard firms



Source: OECD, based on Orbis 2020, updated from Andrews et al. (2016).

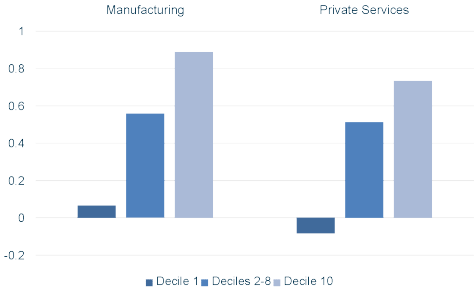
… within country

Productivity dispersion has increased over time within countries and sectors



Notes: Productivity dispersion (90-10 ratio in MFP à la Woolridge) within manufacturing and market services, normalised to 2000.
Source: Corrado, Criscuolo, Haskel, Himbert, Jona-Lasinio (2020)

The gap is widening in particular in the lower tail of the productivity distribution



Notes: average yearly labour productivity growth over the period 2001-2018.
Source: MultiProd v2.

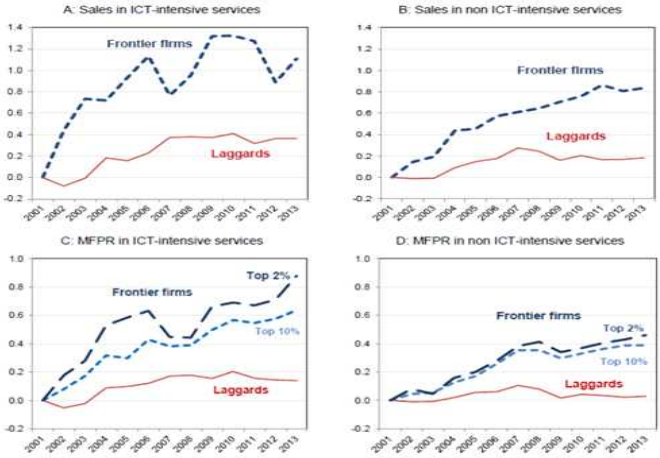
…And also…

- Increase in **profit** dispersion
- Increase in **mark-ups and declining labour share**
- A few superstar firms thriving and gaining market shares & Increase in **industry concentration**
- Declining **business dynamism** also at the top (lower churning at the frontier) especially in digital intensive sectors
- Increase in wage inequality, both within and between firms

Why?

- The role of the digital transformation and the rise of the intangible economy…
  - Digital technologies lower entry costs, ease sharing of ideas, ease market penetration
  - Need complementary investments, increasing importance of tacit knowledge, intangibles are non-rival and scalable
  - Economies of scale and network externalities can reinforce winner-takes-most dynamics
- … and its (lack of) diffusion across heterogeneous firms
  - Complementary skills and intangibles hard to accumulate (hire and develop) for smaller firms
  - Advantages for larger firms that gain market shares and apply higher mark-ups

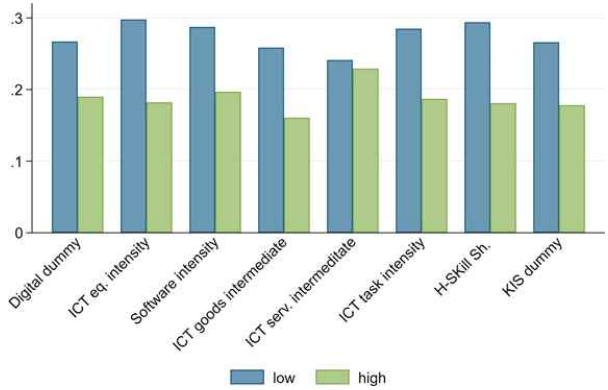
Productivity Gaps larger in digital service



Source: Andrews et al. (2016).

And catch-up weaker

Estimated strength of the catch-up effect and industry characteristics, LP



Source: Berlingieri et al. (2020)

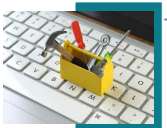
Characterising Diffusion of Digital technologies: evidence based on recent work focusing on AI

Firm size

- Larger firms

Firm age

- To some extent young firms

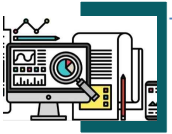


Sector of activity

- Heterogeneity
- Especially ICT and professional services

Skills

- ICT specialists
- Socio-emotional and ICT skills
- ICT training



Technology & intangibles

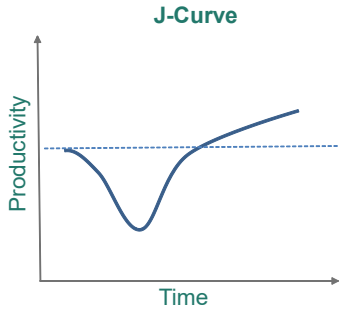
- Other complementary digital technologies
- Digital infrastructure

Market size

- Export participation

Source: based on Calvino et al. (2023) and Calvino and Fontanelli (2023)

...and links with productivity



Elaboration based on Brynjolfsson, Rock, and Syverson (2019)

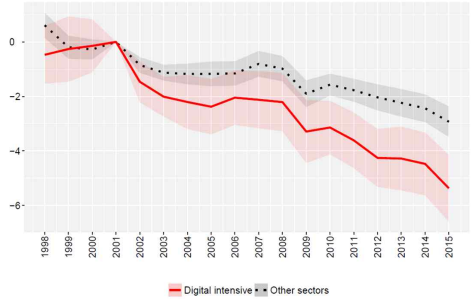
- Diffusion across firms requires **intangibles and human capital**
  - It takes time for productivity gains to materialise
  - Especially for GPTs such as AI (J-curve)

- **What do we see so far** in OECD recent and ongoing work?
  - AI users tend to be **more productive**, especially the largest ones
  - These premia do not seem to reflect the use of AI alone
  - Complementary assets play a key role, with productivity advantages likely related to the **selection** of more digital and competitive firms into AI use

Declining entry rates and rising concentration

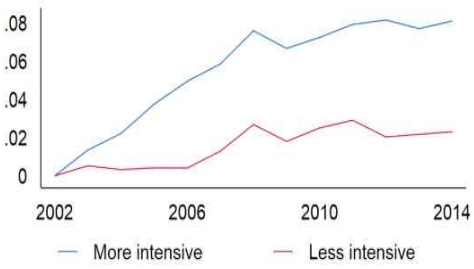
Entry rates

Average trends within country-sector - cumulative change in percentage points



Source: Calvino and Criscuolo (2019)

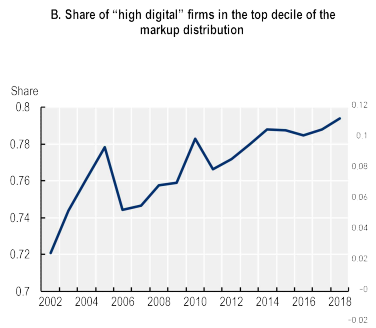
Increases in concentration have been higher in intangible intensive sectors

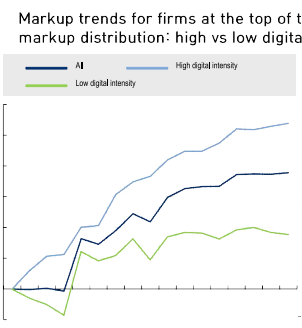


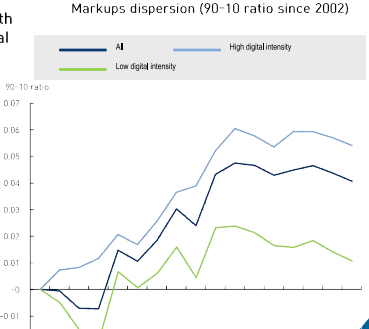
Note: Top 8 concentration. Changes in the (unweighted) mean concentration across country-industry pairs.
Source: Bajgar, Criscuolo and Timmis (2020)

Mark-ups have increased more in digital intensive sectors

(index normalised to 0 in the initial year)



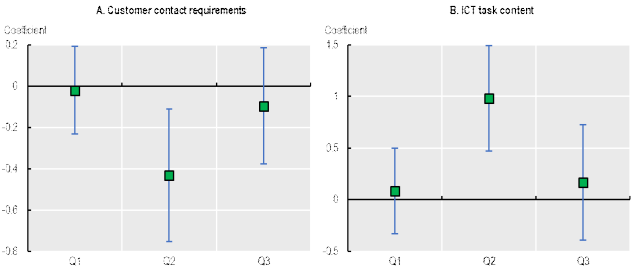




Source: Criscuolo (2021).

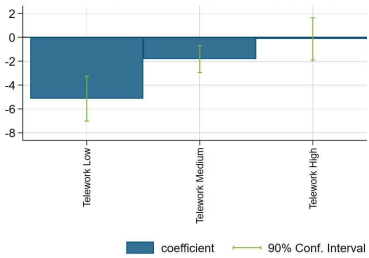
Digital intensive sectors have been relatively sheltered from COVID-19

Higher ICT task content is associated with a lower decline in entry in 2020-Q2



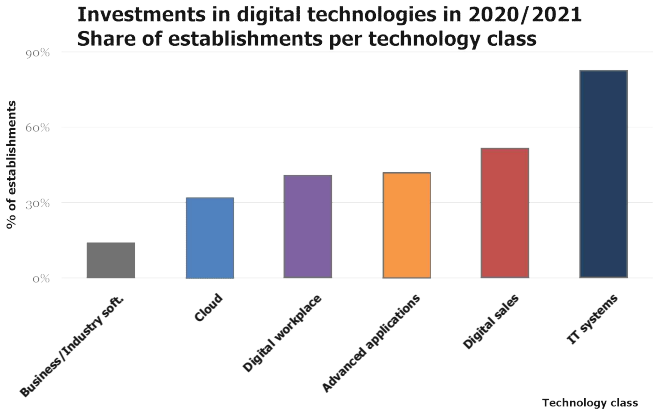
Source: OECD (2021) "Business dynamism during the COVID-19 pandemic. Which policies for an inclusive recovery?"

Yearly Net Job Creation Rate by teleworkability during Covid Crisis



Source: OECD Project on COVID-19 Business Support and Reallocation

Investments in digital technologies increased during the pandemic…



Note: results include 20 countries and are computed for plants reporting information on at least one product. Digital technology classes include products with similar functionalities.

Source: **Preliminary** evidence from Calvino et al., *forthcoming* , based on Spiceworks data

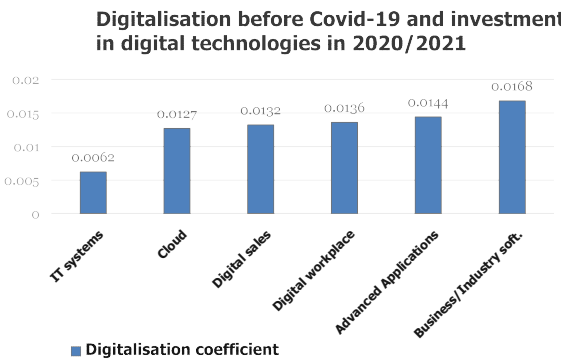
...especially those that were already (larger and) more productive…

Productivity before Covid-19 and investments in digital technologies in 2020/2021

Digital classes / Productivity quantiles	IT systems	Digital sales	Digital workplace	Advanced applications	Cloud	Business/ Industry software
Bottom 10%	***	***	***		***	
10%-40%	***	***	***		**	
Reference class						
60%-90%		*	***		***	***
Top 10%	***	***	***	***	***	***

Notes: The table displays the relation between firm labor productivity (in 2019) and probability of investment in each digital class in 2020 and/or 2021 (IT systems, Digital sales, Digital workplace, Advanced Applications, Cloud, Business/Industry software). In each column, the estimated regression model is a linear probability model that employs the digital class dummy as dependent variable and includes productivity class, age class, and other complementary factors (IT staff, overall digitalisation proxy) as main independent variables. The digital class dummy is equal to 1 if the firm has invested in the digital class in 2020 and/or 2021. The productivity variable is computed as turnover over employment in 2019. Productivity coefficients are computed w.r.t. the 40%-60% productivity class. Each regression includes 2-digit sector-country fixed effects and employs robust standard errors. Included macro sectors are NACE sectors C, D, E, F, G, H, I, J, K, L, M. Results are robust including also size as additional control. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: **Preliminary** evidence from Calvino et al., *forthcoming* , based on Spiceworks data

...and more digital intensive



- The level of *ex-ante* digitalisation is positively related to digital investments during the Covid-19 pandemic
- Similarly, the presence of specialised human capital (IT staff) tends to be positively related to digital investments in 2020/2021
  - This appears particularly true for more productive firms

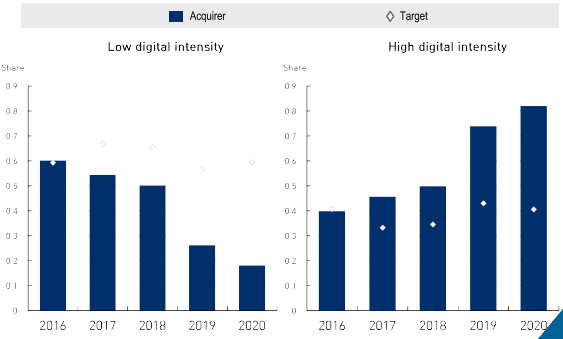
Notes: The graph displays the relation between firm digitalisation (in 2019) and probability of investment in each digital class in 2020 and/or 2021 (IT systems, Digital sales, Digital workplace, Advanced Applications, Cloud, Business/Industry software). The *ex-ante* level of digitalisation is computed as an index [0,100] which accounts for the number of digital functions at the plant level w.r.t. the number of digital functions for each country-sector. The estimated regression model is a linear probability model that employs the digital class dummy as dependent variable and includes the digitalisation index, productivity class, age class, and presence of IT staff as main independent variables. The digital class dummy is equal to 1 if the firm has invested in the digital class in 2020 and/or 2021. Each regression includes 2-digit sector-country fixed effects and employs robust standard errors. Included macro sectors are NACE sectors C, D, E, F, G, H, I, J, K, L, M. Results are robust including also size as additional control. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

Source: **Preliminary** evidence from Calvino et al., *forthcoming* , based on Spiceworks data

COVID-19 saw an acceleration in Acquisitions by digital intensive buyers

- Risk that larger, more productive firms may further reinforce their market power with consequences for competition and concentration.
- M&A's volumes by firms active in high-digital sectors increased in 2020, driven by big corporations shopping in both high and low/middle digital sectors.

Share of M&A's total value in los vs high digital intensive sectors
OECD countries - 2016-2020

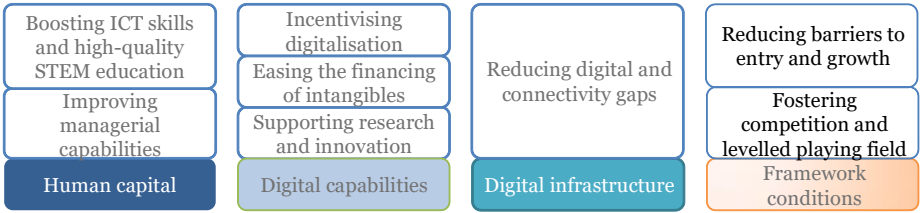


Notes: countries included AT, AU, BE, CA, CH, CL, CO, CR, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IL, IS, IT, JP, KR, LT, LU, LV, MX, NL, NO, NZ, PL, PT, SE, SI, SK, TR, US. Source: BvD Orbis-Zephyr.

The role of policies

Policy makers can play a key role to foster an inclusive digital transformation in the digital age

- The Digital transformation seem to come with widening **gaps between leading and other firms**
- A broad policy mix affecting incentives and capabilities may allow digital use and its returns to be **more widespread** across firms and sectors



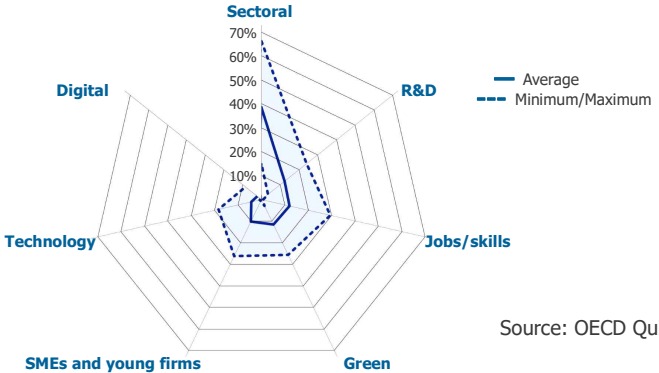
- Key role of:
  - Lowering the potential skills mismatch but also life-long learning and active labour market policies; universities
  - Access to finance for SMEs
  - Direct government support to business R&D and link with universities/research institutes

Important role of coherent approach

- Complementarities in policy interventions will be crucial for the post-pandemic recovery
  (e.g. Digital infrastructure and fiscal incentives need to be complemented by investments in human capital and continued availability of credit)
- Policies for an inclusive Digital transition will be important for green transition and climate neutrality:
  - **Over 60%** of trademarks protecting climate-related goods and services are ICT-related
  - **44% of green** start-ups created between 2016 and 2020 across OECD countries rely on digital technologies to offer green products and services

Relying on industrial Strategies

Industrial policy expenditures by eligibility criteria in 2021, % of total industrial policy subsidies and tax expenditures



Source: OECD QuIS Project

Thank you!

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Decomposing aggregate productivity growth