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Alfonso Arpaia*

How Skills Can Drive Competitiveness

In *The Competitive Advantage of Nations*, Michael Porter (1990) argues that a nation's primary goal is to ensure rising living standards for its citizens. Achieving this goal hinges on the productivity with which capital and labour are utilised, which, in turn, relies on industries' capacity to innovate. This capacity is shaped, among other factors, by resources like skilled labour and infrastructure. Paul Krugman (1990) wrote in his book *The Age of Diminished Expectations*, "Productivity isn't everything, but, in the long run, it is almost everything" and emphasised that "a country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker" (p. 11).

Over the last decade, Europe has experienced strong employment growth, with an annual job expansion averaging around 1%, compared to just 0.3% between 2002 and 2013 (Figure 1). After 2014, employment growth became a key driver of economic performance, while productivity growth weakened. Employment rates for the 20-64 age group have risen to over 75%, nearing the 2030 target of at least 78% set in the European Pillar of Social Rights Action Plan. While this has supported income per capita growth post-pandemic, it is likely that because of ageing this mechanism will provide less support in the future. Productivity growth, therefore, becomes increasingly critical. Unfortunately, productivity growth in Europe has slowed significantly over the past 20 years.

As noted in Mario Draghi's (2024a, 2024b) report on *The Future of European Competitiveness*, the EU's persistently weak productivity growth – especially compared to other

advanced economies like the United States – is a major challenge, undermining competitiveness, job creation and economic resilience. Skills development is a key lever for reversing this trend. As stressed by President von der Leyen (2024) in her political guidelines, labour and skills shortages are among the many "structural brakes" on EU competitiveness. Promoting the diffusion of digital technologies, boosting investments, and establishing a Union of Skills focusing on adult and lifelong learning are among the strategic objectives of the new Commission.

This paper discusses how skills can contribute to productivity growth. First, it explores how improving the skills structure of the population – i.e. in the quality of human capital – can boost labour productivity growth, particularly in comparison to the US. However, these gains, may not be self-sustaining if they occur mostly in mature industries. Second, it examines the impact of human capital on productivity growth. The good labour market performance of the last decade has been characterised by persistently high labour and skills shortages. These shortages do not only constrain labour growth but may also delay or suspend critical investments with negative effects on productivity growth. Third, it explores how labour shortages influence total factor productivity (TFP) growth. Finally, the paper concludes with policy implications, focusing on the EU framework to support skills development.

Workforce upskilling and its contribution to productivity growth: Insights from growth accounting

The relationship between skills and productivity is extensively documented in the literature on economic growth. In Solow's exogenous growth model, productivity is determined by labour, capital and the efficiency with which these inputs are combined within the production process. Key drivers include capital deepening (more capital per worker), shifts towards a more skilled workforce and improvements in TFP, which reflect overall production efficiency as well as technological progress. A skilled workforce not only optimises the use of existing capital but also facilitates resource shifts from low- to high-productivity industries. This dynamic highlights the critical role of educational attainment and skills development in driving productivity growth.

Figure 2 shows the key drivers of hourly productivity growth, highlighting the EU's well-documented decline in productivity growth – both in absolute terms and relative

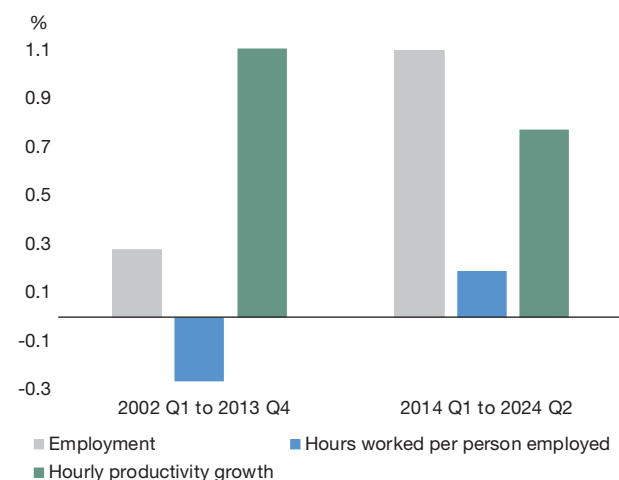
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Figure 1
Hourly productivity and employment growth (annual averages over the period)



Source: Eurostat, national accounts.

to the US. This decline is predominantly explained by declines in TFP growth and capital accumulation. A notable but often overlooked factor is the stronger contribution of labour composition changes to productivity growth in the EU compared to the US.¹ After the global financial crisis, rising unemployment among low-skilled workers

¹ In EU KLEMS, the labour composition is calculated by weighting the total hours worked by different categories of workers based on their marginal productivity (the value of the services provided), approximated with their share in total compensation (Jorgenson & Griliches, 1967). This method accounts for both labour quantity and service value.

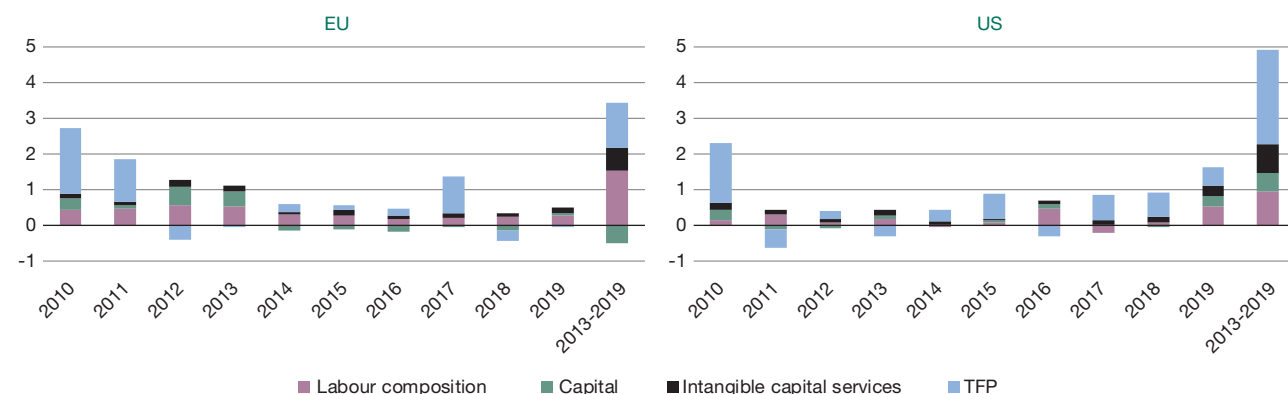
raised the average skill level of the employed, boosting productivity growth, as shown in Figure 2 (see Ward & Zinn, 2024). This trend persisted in subsequent years. Between 2013 and 2019, changes in labour composition contributed 1.5% to EU productivity growth compared to just under 1% in the US, consistent with studies highlighting its stable contribution in driving EU productivity growth (e.g. van Ark, 2017). Notably, during this period, human capital accounted for about 50% of hourly labour productivity growth in the EU compared to 20% in the US (Figure 3).

The EU-US difference in the contribution of labour to productivity growth largely stems from disparities in educational attainment. According to OECD data, in 2023, 50.7% US adults (aged 25 to 64) had tertiary education, compared to only 37.3% in the EU. As EU educational attainment continues to improve, the importance of the labour composition is likely to remain high. This highlights the importance of policies supporting workers' capabilities through education, training and skill development.

The contribution of labour composition varies across industries. Figure 4 shows the contribution of workforce skill upgrades to productivity growth in the EU and the US between 2013 and 2019. For the EU, notable contributions to industry-specific productivity growth (above 1%) are observed in several industries such as manufacturing of furniture; professional, scientific and technical activities; wholesale and retail trade; basic metals; and the manufacturing of wood, paper and food products. These industries, though varying in digital intensity, are primarily mid-tech sectors (Fuest et al., 2024), where Europe outperforms the US in both capital deepening and TFP growth.

Figure 2
Labour productivity growth and its driving factors in the EU and the US

in percentage points



Note: Due to data availability, the EU refers only to 11 member states: AT, BE, DE, DK, ES, FI, FR, IT, NL, SE, UK.

Source: EU KLEMS.

Figure 3
Contribution to hourly labour productivity growth in the EU and the US, 2013-2019



Note: Due to data availability, the EU refers only to 11 member states: AT, BE, DE, DK, ES, FI, FR, IT, NL, SE, UK.

Source: EU KLEMS.

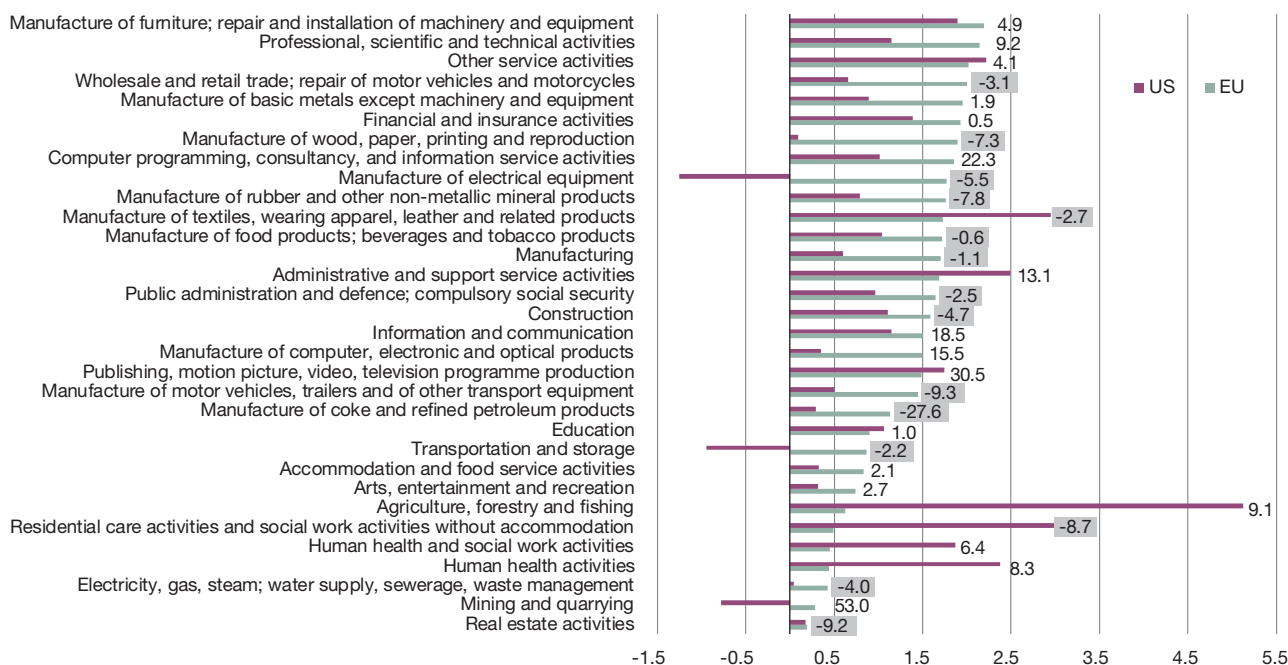
Conversely, in industries critical for the digital transition such as computer programming and information and communication (encompassing IT services and computer manufacturing), the upgrading of human capital remains insufficient to close the productivity gap with the US. Moreover, in digital-intensive sectors such as publishing,

motion picture and broadcasting, and administrative support, the US advantage is further amplified by the change in the composition of labour. This suggests that the EU's sectoral allocation of skills does not fully meet the needs of a dynamic and competitive economy. While improving educational attainment is essential, it alone is not enough to ensure sustainable productivity growth. Achieving this requires robust measures to facilitate the reallocation of resources, including skilled labour, across sectors.

The role of skills extends beyond the direct impact of more productive workers

Skill improvements not only make workers more productive but also enable a more efficient use of existing capital and facilitate the adoption of new production technologies. As highlighted by endogenous growth models, human capital is crucial for fostering innovation (Romer, 1990) and driving the adoption and diffusion of new technologies (Nelson & Phelps, 1966). A skilled workforce complements capital, particularly intangible assets such as R&D and software development, while generating positive externalities such as knowledge spillovers, which fuel growth in skill-intensive industries (Ciccone & Papaioannou, 2009). Moreover, skilled workers adapt

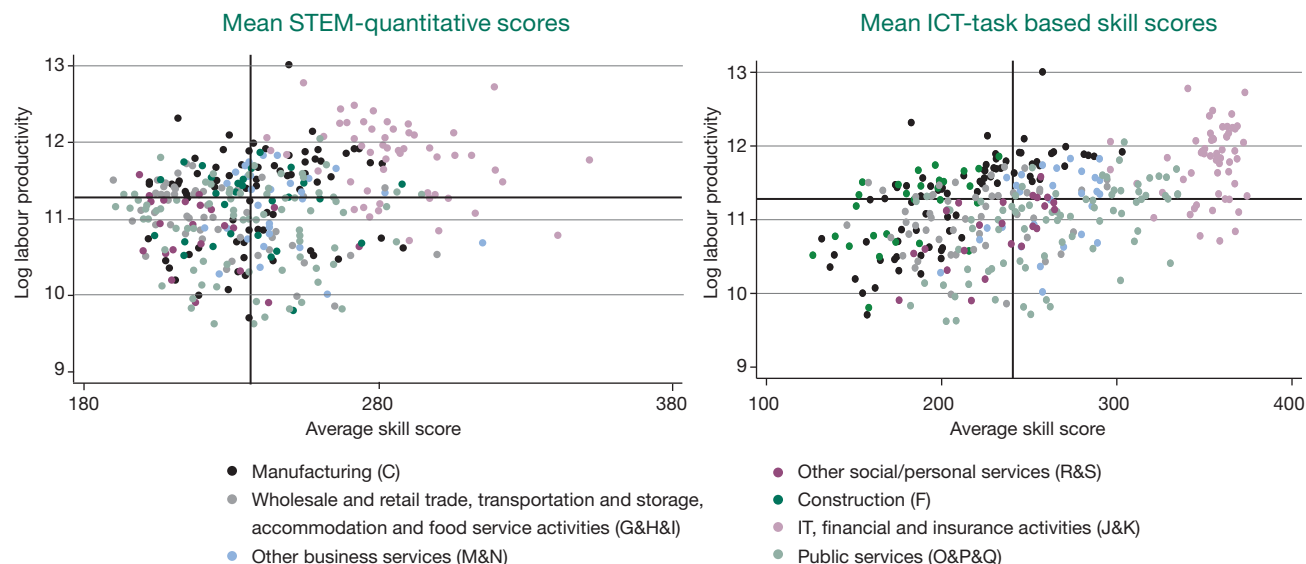
Figure 4
Contribution of changes in labour composition to labour productivity growth in the EU and the US, 2013-2019



Note: The numbers represent the growth of labour productivity due to capital deepening and TFP growth.

Source: EU KLEMS.

Figure 5

STEM and ICT skills and productivity for non-managerial workers in OECD countries

Note: Figures are based on country-specific averages by industry. Industries are colour-coded by industry clusters to aid the reader. Each marker represents a country industry marker. The horizontal and vertical lines represent the median value of productivity and STEM/ICT skill scores. Countries included in the analysis: AUT, BEL, CAN, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HUN, IRL, ISR, ITA, JPN, KOR, LTU, NLD, NOR, NZL, POL, SVK, SVN, SWE, TUR and first wave of USA. However, some industries are missing for EST, ISR, JPN, NZL and TUR (also KOR when estimating ICT skill scores). The sample consists of 343 observations.

Source: Cammeraat et al. (2024).

more rapidly to technological changes, acquire new competencies, and perform emerging tasks effectively. This adaptability enhances their contribution to TFP growth, underscoring the broader role of an educated workforce in fostering innovation and enabling the successful adoption of cutting-edge technologies.

The empirical evidence corroborates the positive impact of skills on TFP growth. Productivity is typically higher in countries with better education and training systems, and more educated and healthier workforce (Zymek, 2024). Innovation rates are also higher in more skill-intensive firms (Hall, 2013). The OECD (2021) reports that high-skilled employees account for about a third of the workforce in the most productive firms, more than twice as many as in the least productive firms. Several studies show that ICT-led productivity gains are more likely in firms that employ a relatively more skilled workforce, with a strong correlation between ICT-related human capital and firm productivity (Hagsten et al., 2016). The introduction of new practices and organisational changes also generate large increases in productivity in firms with a higher share of skilled workers (Biagi & Parisi, 2012). The role of soft skills is also particularly important. For France, Guadalupe et

al. (2022) find that TFP grew significantly in sectors with a high concentration of occupations requiring strong mathematical and social skills. In contrast, it declined in sectors where a large share of occupations involved low task intensity in these skills. Recent research also links higher technical and specialised skills (e.g. acquired in science, technology, engineering and mathematics (STEM) fields) to better productivity outcomes (Cammeraat et al., 2024). Figure 5 illustrates a positive relationship between STEM and ICT skill scores and labour productivity, with a large dispersion across country-industry pairs.

To assess the importance of skills upgrading, Table 1 presents the results of a panel regression examining the relationship between TFP growth and educational attainment for a panel of EU26 member states from 2009 to 2023. The findings show a significant positive correlation between TFP growth and the share of the population with tertiary education, even when accounting for the impact of TFP growth in the US, which is regarded as the global productivity frontier. The impact of educational attainment on TFP growth remains consistent across various model specifications. The estimated effects have substantial implications given the disparities within the EU and the EU-

Table 1

The impact of educational attainment and educational outcomes on total factor productivity growth

Panel a								Panel b		
Dependent variable TFP growth	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Dependent variable TFP growth	(8)	(9)
Educational attainment (-1)	0.22*** (0.03)	0.22*** (0.04)	0.29*** (0.05)	0.30*** (0.05)	0.29*** (0.05)	0.27*** (0.04)	0.25*** (0.04)	Educational attainment nine years earlier	0.15*** (0.04)	0.18*** (0.05)
TFP growth in the US		0.53*** (0.05)	0.58*** (0.20)	0.66*** (0.20)	0.6*** (0.20)	0.6** (0.2)	0.70*** (0.19)	TFP growth in the US	0.59*** (0.19)	0.66*** (0.19)
Log(TFP(-1))	-15.9*** (4.2)	-15.8*** (4.7)	-19.0*** (4.5)	-19.1*** (4.4)	-17.5*** (4.4)	-18.0*** (4.6)	-17.3*** (5.01)	Log(TFP(-1))	-12.5*** (3.86)	-13.4*** (4.34)
								Change in adult participation in learning in the four weeks before the survey (-3)	0.22** (0.095)	
								Participation rate in education and training (-1)		0.05* (0.025)
								Country fixed effect	Yes	Yes
PISA variables										
Mean score in mathematics (-1)			0.04*** (0.02)				0.04*** (0.02)			
Mean score in reading (-1)				0.05*** (0.01)						
Mean score in science (-1)					0.02* (0.01)					
Mean score in mathematics, the EU relative to the US one year earlier						0.006 (0.08)				
Mean score in mathematics, the EU relative to the US nine years earlier							0.23*** (0.08)			
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes			

Notes: Panel regression on 26 member states over the period 2009–2023. Panel-corrected standard error. * significant at 10%, *** significant at 1%.

Source: Author's own estimates based on AMECO for TFP growth and the OECD PISA for the average scores in science, mathematics and reading.

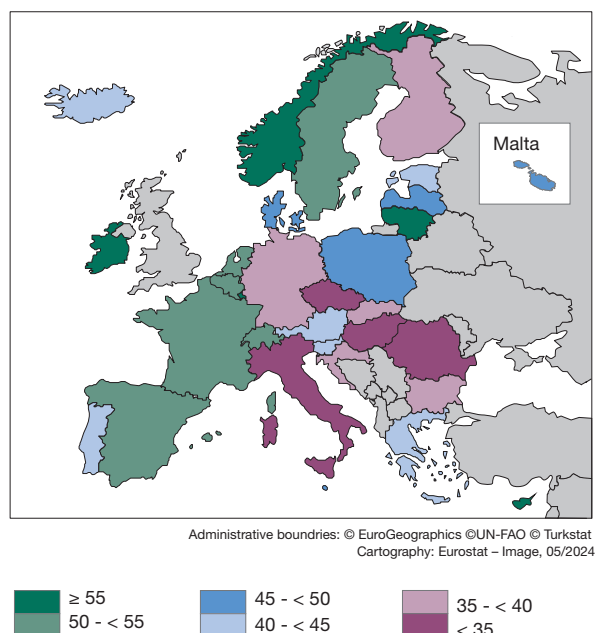
wide target of achieving a tertiary education attainment rate of at least 45% of 25- to 34-year-olds by 2030.² The supply of human capital varies considerably across member states (Figure 6). As of 2023, only 18.6% and 21.6% of the population aged 25–64 had attained tertiary education in Romania and Italy, respectively, compared to 54.5% in Ireland and 49.4% in Sweden. These disparities are even more pronounced among younger cohorts: for the 25–34 age group, the gap between the highest-performing country (Ireland) and lowest-performing country (Romania) reaches an outstanding 40.2 percentage points (pps).

Low participation in formal education significantly affects the logical-analytical and cognitive skills of the adult population. Countries with lower attainment levels underperform in PIAAC (Programme for the International Assessment of Adult Competencies) assessments of literacy and numeracy skills, limiting workers' potential productive capacity. For example, increasing the lowest tertiary attainment rate in the EU to match the highest level (a 36 pps rise) could result in a 7.9% increase in TFP growth. Between 2010 and 2023, Italy and Romania reported the smallest increases in tertiary attainment rates, at just 5 pps and 6.8 pps, respectively. In contrast, countries such as Belgium, Czechia, Greece, Spain, Croatia, and Hungary, achieved increases of around 10 pps. This smaller rise could potentially enhance TFP growth by 2.2 pps. For Italy, such an improvement would represent nearly

² Council Resolution on a strategic framework for European cooperation in education and training towards the European Education Area and beyond (2021–2030) 2021/C 66/01.

Figure 6
Tertiary education attainment, 2023

Percentage of population aged 25-34



Note: 2030 EU-level target is 45%.

Source: Eurostat, Education attainment statistics.

a tenfold increase in its average annual TFP growth over the same period (0.2%). This analysis highlights the critical importance of policies aimed at expanding access to higher education and fostering the development of skills closely aligned with labour market demands, particularly in countries with lagging attainment levels.

Increasing the years of education of the employed is necessary but not sufficient, as improvements in the level of education need to be effectively accompanied by advances in the quality of education. The PISA (Programme for International Student Assessment) survey, which assesses the proficiency of 15-year-olds in reading, mathematics and science, reveals significant disparities in educational performance across countries. Estonia leads the EU in all three dimensions, with Ireland also standing out as a top performer. Table 2 reveals significant heterogeneity in PISA scores across countries, with a strong rank correlation between mathematics and science scores (0.8) and between science and reading scores (0.8). However, the weaker correlation between mathematics and reading proficiency (0.6) suggests that these two core components of human capital are somewhat distinct, likely reflecting differences in school curricula and teaching methods.

Table 2
Mean score in PISA, 2022

	Mathematics	Reading	Science
EE	510	511	526
NL	493	459	488
IE	492	516	504
BE	489	479	491
DK	489	489	494
PL	489	489	499
AT	487	480	491
CZ	487	489	498
SI	485	469	500
FI	484	490	511
LV	483	475	494
SE	482	487	494
LT	475	472	484
DE	475	480	492
FR	474	474	487
ES	473	474	485
HU	473	473	486
PT	472	477	484
IT	471	482	477
MT	466	445	466
SK	464	447	462
HR	463	475	483
EL	430	438	441
RO	428	428	428
CY	418	381	411
BG	417	404	421
US	465	504	499

Note: Drops in PISA scores exceeding the average are marked in grey; improvements in PISA scores are highlighted in green.

Source: OECD.

The findings suggest that proficiency in one domain (e.g. reading) aids but it does not necessarily guarantee similar proficiency in others (e.g. mathematics), underlining the need for balanced curricular improvements to strengthen all aspects of educational quality. Table 2 illustrates that, with few exceptions (marked in green), proficiency in mathematics, reading and science has declined across all member states, with some (marked in grey) experiencing declines greater than the EU average. This deterioration in the quality of human capital may have negatively affected total productivity growth.

Columns 3 to 7 of Table 1 also account for the quality of the education systems as measured by PISA scores. These scores assess 15-year-old students and are not di-

rectly linked to the current human capital. Therefore, their impact on productivity growth typically emerges after five to ten years (Eurostat, 2024). Moreover, the positive correlation between PISA and PIAAC scores for the same generation suggests that student ability is a reliable predictor of adult test performance (Égert et al., 2024). Thus, PISA scores for individuals aged 20+ serve as a meaningful proxy for current human capital quality.³

In all specifications, the effect of the tertiary attainment rate consistently shows a significant positive effect on productivity growth. Proficiency in reading, mathematics and science also positively impacts productivity growth, but their effects are not jointly significant due to the correlation between themselves. A 58-point increase in the mean score in mathematics – the gap between the median and the minimum score in Table 1 – would raise TFP growth by about 2 pps. This coefficient remains similar in the specification with the score in reading. However, since the gap between the lower and the median score is larger (94 points), the marginal effects are higher: raising the reading proficiency of 15-year-old students from the lowest to the median score would boost TFP growth by nearly 5 pps. Similarly, an equivalent improvement in the mean score in science would increase TFP growth by about 1.5 pps.⁴ Finally, relative student performance also matters: a 10 pps increase in the mean score of EU countries relative to the US would result in a 2.3 pps rise in productivity after nine years.

These estimates do not account for the potential productivity gains from a more skilled workforce, as skills acquired through formal education take time to fully impact productivity. Investing in training and adult lifelong learning allows workers to adapt to evolving skills demand and helps employers to bridge gaps between required and available skills. This underscores the importance of education and training in driving productivity growth both within and across countries. While adult participation in education and training has increased in most member states, it remains far below the target set by the EU Action Plan of the European Pillar of Social Rights, which aims for at least 60% of adults to be in training annually. As of

2022, only two countries met this target, while the EU average lagged significantly behind at 39.5%.⁵

The Adult Education Survey (AES) reports participation rates in education and training for only five waves (2006, 2007, 2011, 2016 and 2022), limiting its use in regression analysis. Consequently, the EU Labour Force Survey (LFS) measure of participation rate in education and training over the last four weeks, available annually since 2000, is used to evaluate the relationship between adult learning and productivity growth. Robustness checks are conducted using the participation rate from the AES, assuming a constant rate between surveys.⁶

Columns 8 and 9 of Table 1 present estimates that evaluate the effect of adult learning on TFP growth. In both specifications, adult participation in education and training is positively associated with productivity growth. Specifically, an increase in the rate of change of the share of individuals aged 25 to 64 who received education and training over the past four weeks is estimated to raise TFP growth by 0.22%. However, this effect is not immediate, as it takes three years to materialise. The estimate implies that if the change in the share of adults participating in education and training had increased at the same pace as observed during the 2009-2023 period (i.e. 0.4 pps), productivity growth would have risen by 0.1 pp. Column 9 presents estimates of the impact of an increase in the participation rate in adult learning based on the AES. While the point estimate is less precise, it remains statistically significant at the 10% confidence level. It implies that a 10 pps increase in adult participation in education and training is associated with a 0.5 pps rise in TFP.

The effect of labour and skill shortages on productivity

Labour shortages persist across sectors and occupations, driven by structural shifts predating the pandemic.⁷ These changes stem from evolving occupational and skill demands fuelled by the digitalisation and the transition

3 The tertiary attainment rate may depend on the past quality of the education system. To account for this endogeneity, regressions were estimated factoring out the impact of PISA scores nine years earlier on the tertiary attainment rate. The adjusted attainment rate has a lower effect but remains statistically significant at the 1% level (0.2 for mathematics and reading score and 0.3 for science).

4 The gap between the lowest and the median score is higher than for mathematics (77) but the coefficient capturing its effect on TFP growth is lower (see Table 1).

5 Countries that achieved the target were Sweden (66.5%) and Hungary (62.2%).

6 The LFS indicator yields lower adult learning participation rates than the AES (European Commission, 2024b). In 2024, the Employment Committee Indicators Group endorsed the AES (excluding guided on-the-job-training) for monitoring EU adult learning targets, with a potential shift to LFS data to be reconsidered in 2025.

7 In certain sectors, such as healthcare and transport, poor working conditions emerge as a significant structural factor contributing to labour shortages; see section 7 of chapter 2 in the Employment and Social Developments in Europe 2023 report (European Commission, 2023a).

to environmental sustainability (Dorville et al., in press).⁸ Existing jobs are changing, new ones are emerging, and skill requirements are shifting, increasing demand for both specialised technical expertise and adaptable transversal skills (Draghi, 2024). Ageing further exacerbates shortages by reducing the labour supply and potentially hindering workers' capacity to adapt to technological advancements.

Skill shortages present a major obstacle to the EU effort to boost labour productivity growth. In innovative and high-tech sectors, the demand for skilled professionals is outpacing supply, as education and training systems struggle to keep pace with industry needs. Rapid technological advances further widen this gap by requiring specialised knowledge. These shortages are more likely to arise in innovative firms and sectors, where they can cause project abandonment, delays or even an outright inability to pursue innovation due to the lack of qualified personnel for R&D or the application of new technologies (OECD, 2024).

According to the European Skills and Jobs Survey (Cedefop, 2022), over eight in ten jobs demand at least basic digital skills, and almost seven in ten workers need basic or moderate digital skills. The survey also reveals that half of adult workers need to develop their digital skills, yet less than one-third undertook digital training during the 2020-2021 period.

Shortages are more pronounced in high-skill occupations (OECD, 2022, 2024). The *Employment and Social Developments in Europe 2023* report highlights a lack of specialised skills, particularly in STEM fields like ICT, crucial for technologies such as artificial intelligence, robotics and quantum computing. Skills gaps also hinder investment, with 51% of European firms in 2023 citing skilled staff shortages as a major barrier, compared to 47% of firms in the US (European Investment Bank, 2024).

The Digital Economy and Society Index (DESI) shows that four out of ten adults and every third person who works in Europe lack basic digital skills. Similarly, the lack of skilled workers in the "green sectors" can become a severe obstacle to the green transition. The success of the transition will crucially depend on the availability of workers with appropriate skills.⁹

8 For an early analysis of structural determinants of labour shortages, see chapter 3 of *Labour Market and Wage Developments in Europe, Annual Review* (European Commission, 2024c). For a deeper economic analysis, see Arpaia and Halasz (2023).

9 <https://digital-strategy.ec.europa.eu/en/policies/desi>.

Table 3

The impact of labour shortages on TFP growth

Dependent variable log TFP	Manufacturing	Services excl. wholesale	All NACE excl. wholesale
Labour shortages	-0.03*** (0.008)	-0.04 (0.027)	-0.035** (0.01)
Sample period	2009-2019	2009-2019	2009-2019
Country fixed effect	Yes	Yes	Yes
Period fixed effect	No	No	No

Notes: Panel-corrected standard error. * significant at 10%, *** significant at 1%.

Source: Author's own estimates based on AMECO for TFP growth and Business and Consumers survey data for labour shortages.

Skill shortages may hinder TFP growth by limiting the benefits of FDI (Blomström & Kokko, 2003), distorting the allocation of talent across firms (Marshall, 1980), and reducing knowledge diffusion (Shimer, 2007). They delay the adoption and effective use of new technologies and may reduce productivity by overburdening workers, with extra hours or extra tasks, due to fatigue and worsening job matching.¹⁰ Labour shortages discourage investment in general skills training (Mohrenweiser et al., 2013) and in advanced techniques due to the lack of an appropriate workforce. Shortages may also prompt firms to retain their workers delaying labour reallocation and further constraining productivity growth.¹¹

The regression results in Table 3 confirm the negative impact of labour shortages on TFP growth. Across all sectors, labour shortages hinder TFP growth, though the effect in services is estimated with greater uncertainty. This is not surprising, as services have diverse production characteristics. For the total economy, a one standard deviation increase in the share of firms unable to expand production due to labour shortages is associated with a 0.6% decline in TFP growth.

Conclusions

Investing in human capital and closing the innovation gap with the US are essential priorities for the EU (Draghi, 2024a, 2024b). R&D drives innovation, while a well-ed-

10 La Barbanchon et al. (2023) find that hiring difficulties negatively impact firms' employment, capital, sales and profits, especially in growing sectors and high-skilled jobs, by reducing job-matching effectiveness.

11 Cohen (2023) and the Federal Reserve (2023) report that US firms, facing labour shortages, retained workers despite expected demand declines to preserve hard-won talent amid ongoing staffing challenges.

educated workforce fosters its dissemination. This paper advocates for policies that promote higher educational attainment, quality education and adult lifelong learning while ensuring alignment between supply and demand of skills to support sustainable productivity growth, especially in sectors crucial for the green and digital transitions. Improved guidance and access to high-quality lifelong learning enhance labour mobility, job matching and productivity growth.

Addressing skill gaps is essential to remove barriers to innovation and facilitate the adoption of new technologies. The European Social Fund Plus supports investments in jobs and skills, while the Just Transition Fund supports economic diversification and the restructuring of regions most affected by the shift to climate neutrality. Additionally, national Recovery and Resilience Plans, funded by the Recovery and Resilience Facility, are key to advancing R&D in green and digital technologies and strengthening human capital.

President Ursula von der Leyen's political guidelines (European Commission, 2024) and Mario Draghi's report on *The Future of European Competitiveness* stress the need to adapt education and training systems to meet evolving skill demands, particularly in sectors vital for the green and digital transitions (Draghi, 2024a, 2024b; European Commission, 2024c). Greater emphasis on adult learning and vocational education and training is crucial for upskilling and reskilling the workforce, preserving human capital in ageing societies and boosting competitiveness. Building a Union of Skills will be key to achieving these goals.

Reforming education and training systems to better align with labour market demand, including through refocusing EU funding for skills development, is crucial for equipping the workforce with the skills needed to adopt and disseminate new technologies, with a focus on basic skills, particularly in STEM fields. A new Action Plan on Basic Skills and a STEM Education Strategic Plan will aim to improve performance and increase the number of STEM teachers. Amid an ageing population, it is important to harness the potential of underrepresented groups and attract talent from outside the EU, as highlighted in the action plan on labour and skills shortages (European Commission, 2024a). This is particularly important in occupations facing EU-wide shortages to sustain growth and resilience. The EU Talent Pool will facilitate connections between job seekers from outside the EU and employers with vacancies in shortage occupations (European Commission, 2023b). The Skills Portability Initiative will facilitate the recognition of qualifications and the free movement of talent within the EU.

The European Skills Agenda provides a strategic framework to address upskilling and reskilling needs across the EU. Its flagship initiatives such as the Pact for Skills, the individual learning accounts (Council of the European Union, 2022b) and micro-credentials (Council of the European Union, 2022a) aim to foster skill acquisition and adult participation in education and training, ensuring a better alignment between skills and job market demands. Their timely implementation along with measures to enhance fair intra-EU mobility and attract global talent will enhance workforce adaptability to structural changes, particularly those driven by the green and digital transitions. These efforts will improve smooth labour reallocation, productivity and competitiveness, and support higher and sustainable wage growth while fostering better working conditions across the EU.

Finally, supporting the shift to high-productivity sectors requires balanced regulations that protect workers during periods of structural change while enabling labour market adaptability. Well-designed severance payments, job search support, and financial security during periods of unemployment can mitigate the uncertainty associated with job losses, encourage workers to embrace transitions and enhance workers' confidence in navigating these changes. Stable employment also motivates firms to invest in training and encourage workers to acquire new skills. Combining employment protection with targeted retraining and reskilling initiatives helps to address skills gaps, promote transferable skills, and facilitate a smoother and more equitable transition to a dynamic economy.

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