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BEYOND THE PROMISE OF AI, PRODUCTIVITY, AND THE FUTURE OF WORK

REALITIES FROM THE DANISH LABOUR MARKET AND LESSONS FOR EUROPE

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1. INTRODUCTION

Artificial intelligence (AI) is spreading through the labour market at remarkable speed. Since the launch of widely accessible generative AI tools, workers and firms have begun using AI for a growing range of cognitive tasks, including writing, coding, information processing, analysis and decision support. The technology is therefore no longer a distant prospect. It is a part of everyday working life for many workers in Europe.

The rapid diffusion of AI raises important economic and societal questions. Beyond democratic, legal, ethical and social concerns, AI has also renewed interest in productivity, one of the central challenges facing European countries. If AI enables firms and workers to produce more output with the same amount of labour and capital, it could become an important driver of future productivity growth. That matters, because productivity is the foundation for higher real wages, stronger public finances and rising living standards.

This policy study focuses on Denmark while placing the findings in a broader European Union (EU) context. In Denmark, as in much of Europe, productivity growth has slowed down over recent decades. This makes the potential impact of AI particularly interesting to investigate.

Denmark provides a highly relevant case because it has the highest workplace AI adoption rate in the EU. As AI is more widespread, it may therefore offer an early indication of how the technology could affect labour markets elsewhere.

Denmark and the other Nordic countries also have relatively favourable conditions for technological change: a digitally skilled workforce; advanced digital infrastructure; and a labour market model built on both flexibility and security.[1] Moreover, in the past decades, technological changes in Denmark have mainly led to productivity growth and shifts in job composition rather than increased unemployment. These features may support productive AI adoption, but they do not eliminate risks nor guarantee that the benefits will be broadly shared.

The macroeconomic consequences of AI remain uncertain. Research finds large productivity gains in some specific tasks and occupations,[2] but evidence on broader labour market effects is still limited. AI adoption is already high, yet recent studies and the analysis in this policy study find only modest short-run effects on wages, working hours and employment. The central question is therefore not only whether AI can raise productivity, but also whether the gains will reach workers.

The main result of this policy study is that AI has a productivity potential, but that the effects are likely to be gradual and depend heavily on how the technology is adopted into the workplaces. AI can enhance productivity and benefit workers, but if AI adoption is poorly managed, it can increase uncertainty, work pressure and unemployment.

A pro-worker approach to AI is therefore not only about protecting workers. It is also a precondition for making AI productive. The policy implication is clear: if AI is to contribute to stronger productivity growth and better outcomes for workers, adoption must be accompanied by investment in skills, active labour market policies, worker involvement and collective bargaining.

The policy study is structured as follows. First, it examines how rapidly AI is spreading across the European labour market and which workers and firms are most exposed. Second, it analyses the potential macroeconomic productivity effects of AI and why existing estimates vary substantially. Third, it investigates whether workers already benefit from AI-driven productivity gains and discusses the policies needed to ensure that future gains are broadly shared.

2. THE DIFFUSION OF AI IN THE LABOUR MARKET

Technological change has long been a central concern in economic research because it continuously reshapes labour markets. Whereas earlier waves of automation primarily affected manual and routine tasks, AI is more likely to affect cognitive and knowledge-intensive work, thereby changing the composition of occupations exposed to technological change.

The diffusion of generative AI has taken place at a historically unprecedented speed. Misch et al. showed that generative AI reached mass adoption substantially faster than earlier general-purpose technologies.[3] The launch of ChatGPT in November 2022 marked the first widely accessible generative AI tool for the general public. Within two months, the platform had reached an estimated 100 million monthly users. By comparison, it took approximately eight years for the internet to reach a similar user base, 15 years for television and 17 years for mobile phones.

AI is now being integrated into everyday work across a growing number of firms and sectors. Adoption still differs across industries, but the technology is becoming increasingly widespread. This section examines how AI has entered the labour market and highlights the institutional conditions that matter for turning broad adoption into prospects for higher productivity.

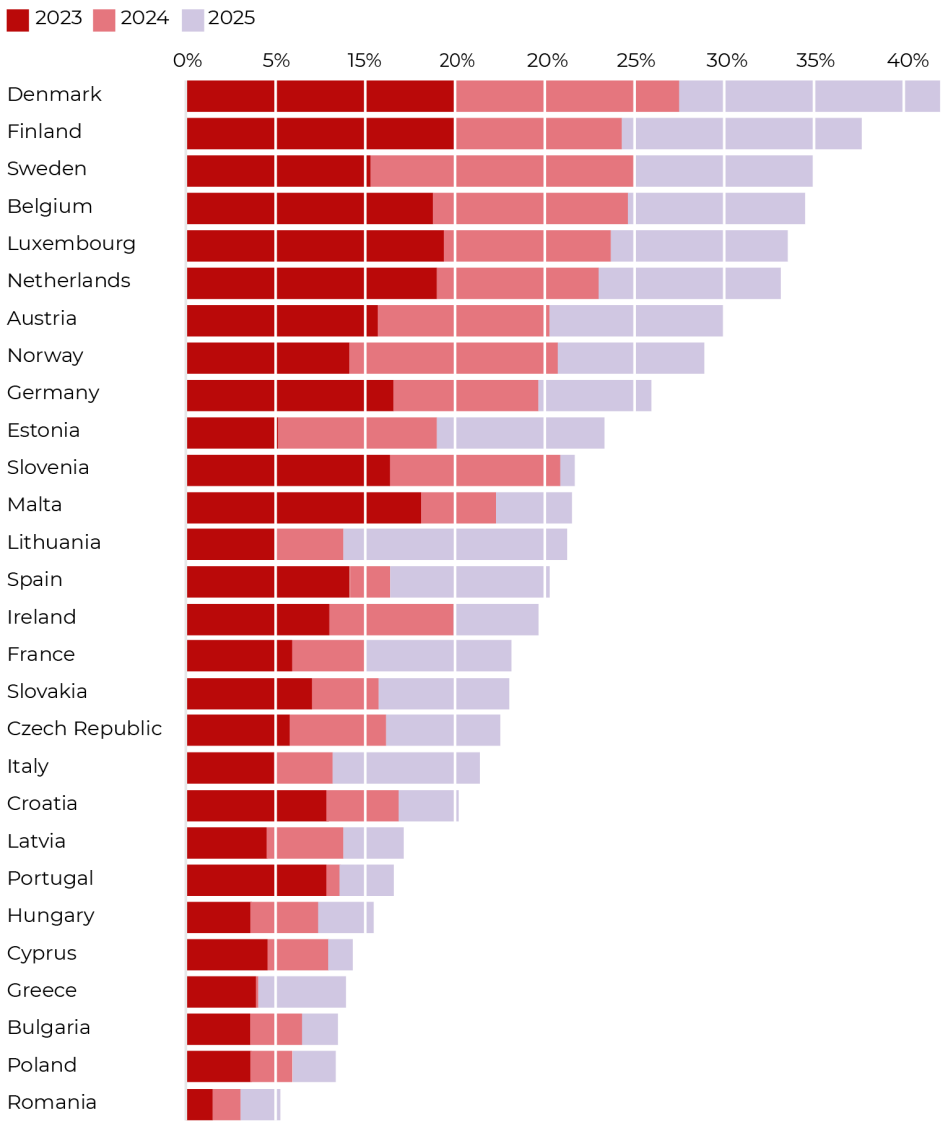
2.1 Nordic countries have the highest AI adoption in Europe

To illustrate how AI is spreading across the labour market in Europe, Figure 1 shows the share of enterprises using at least one AI technology between 2023 and 2025, based on enterprise survey data.

Denmark has the highest reported adoption rate in Europe. In 2025, 42% of Danish enterprises reported using at least one AI technology, compared with 28% in 2024 and 15% in 2023.

Other Nordic countries also rank among the leading adopters. Finland has an adoption rate of 38% and Sweden 35% in 2025. This pattern suggests that the most digitally advanced countries tend to adopt AI earlier and more extensively. Danmarks Nationalbank, the Danish central bank, also finds a positive relationship between AI adoption and income, indicating that AI is spreading fastest in countries with already high productivity levels.[4]

Figure 1. The share of enterprises using AI technologies in the EU 27 countries and Norway, 2023-2025.



Source: ECLM based on Eurostat.

Note: AI usage is based on survey data and it is measured for the 27 EU countries and Norway. The data cover enterprises with at least 10 employees in all sectors except agriculture, forestry and fishing, mining and quarrying, and the financial sector.

2.2 AI adoption is highest among large firms

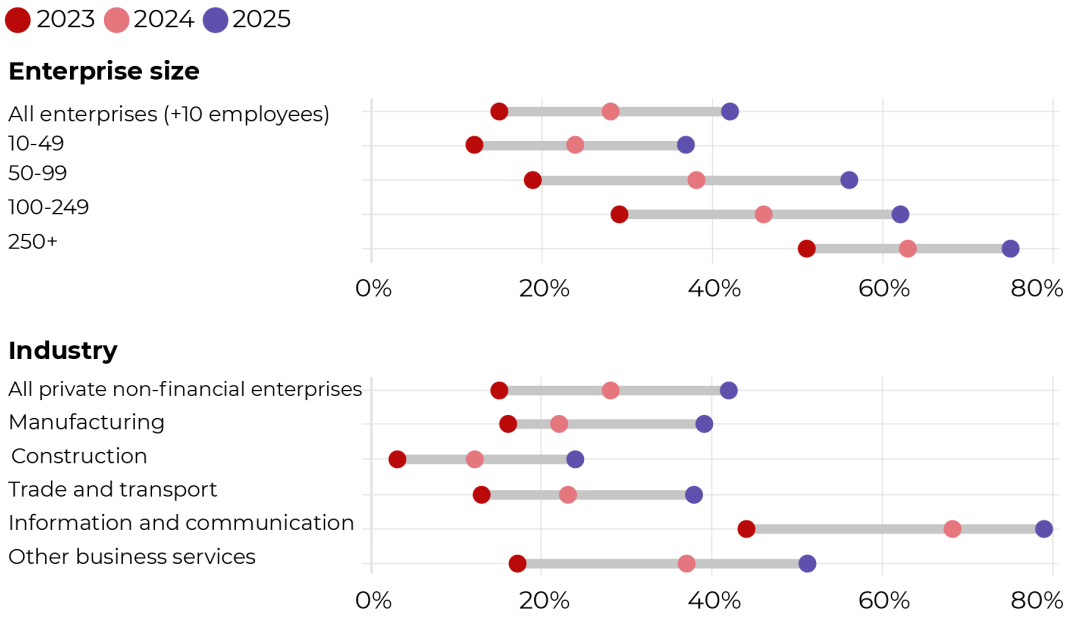
AI adoption also varies substantially across firm size and industry. As Figure 2 suggests, usage is most widespread among large enterprises, suggesting that implementation often requires significant financial, organisational and digital resources. Consistent with economies of scale, larger firms are generally better positioned to absorb the initial costs of adoption and integrate AI into existing workflows.

In Denmark, 37% of enterprises with 10-49 employees reported using at least one AI technology in 2025, compared with 75% of enterprises with more than 250 employees.

Across industries, AI usage is most widespread in information and communication services, where 79% of enterprises reported using at least one AI technology in 2025. By contrast, adoption remains lowest in construction, where 24% of enterprises reported AI use.

Despite these differences, the overall picture is one of broad and rapidly expanding AI diffusion across enterprise sizes and sectors in Denmark. A similar picture emerges across Europe, where AI adoption is highest among larger enterprises and in knowledge-intensive sectors, while remaining lower in more traditional and manual industries.[5]

Figure 2. Share of enterprises using AI in Denmark, by size and industry, 2023-2025.



Source: ECLM based on Statistics Denmark.

Note: The data cover enterprises with at least 10 employees in all sectors except agriculture, forestry and fishing, mining and quarrying, and the financial sector.

2.3 Northern European countries appear relatively well prepared for AI

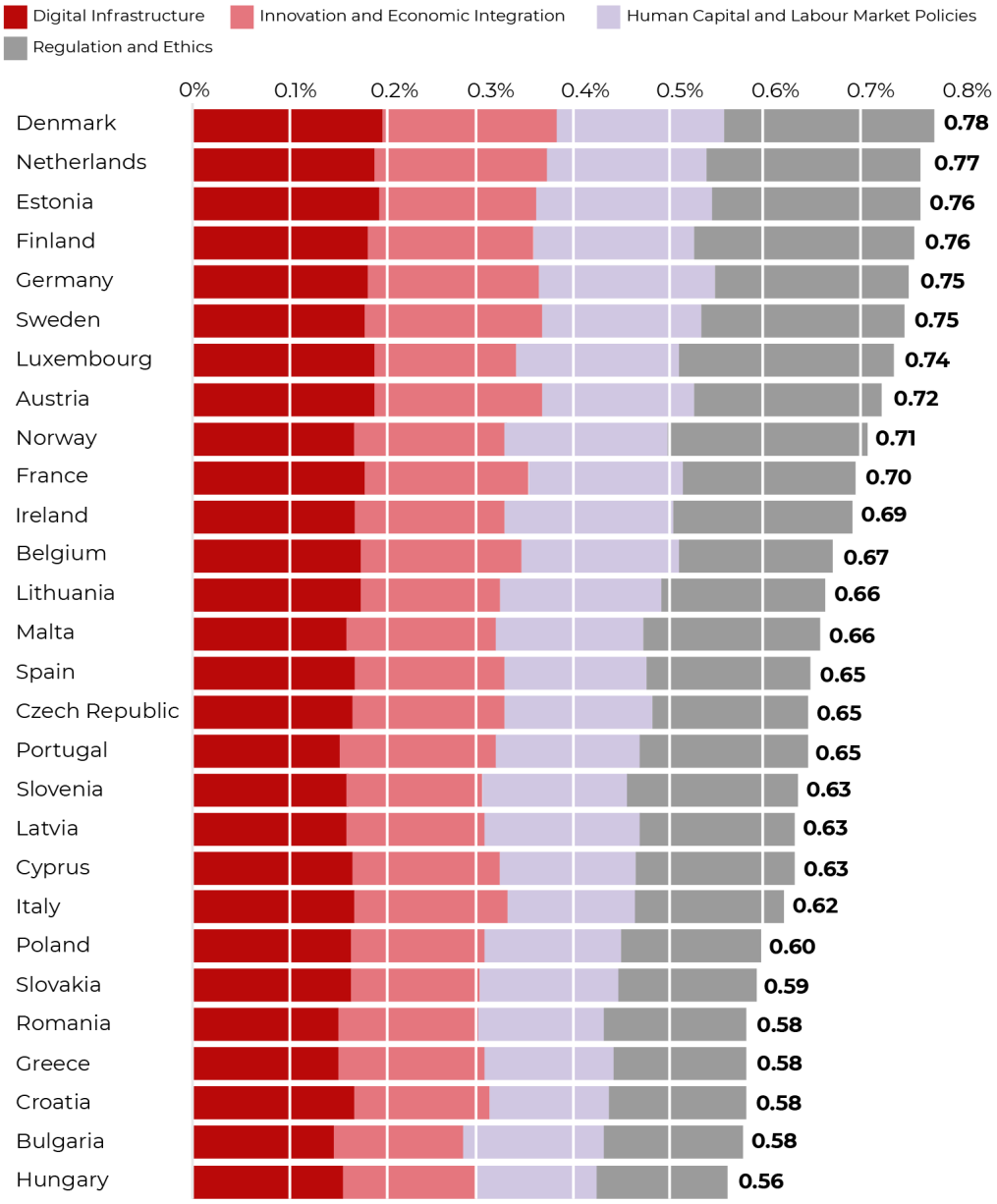
The productive use of AI depends not only on access to the technology, but also on the institutional conditions that shape its adoption, including digital infrastructure, labour market institutions and investment in education, skills and lifelong learning.

The IMF's AI preparedness index assesses countries' readiness for AI based on 28 indicators (Figure 3).[6] Denmark and several other Northern European economies rank among the best prepared for AI, which suggests stronger preconditions for adoption than in many other European countries.

Denmark's position reflects a digitally skilled workforce, a digital public sector and a labour market characterised by both flexibility and security. These features may improve the conditions for benefitting from technological change, but they do not remove the uncertainty surrounding actual productivity effects or the need for political responses.

Cazzaniga et al. also show that countries with higher AI preparedness tend to have a larger employment share in AI-exposed occupations.[7] Hence, higher preparedness is associated with higher potential for augmenting jobs, but also higher risk of job displacement.

Figure 3. AI preparedness index (0-1) in the EU 27 countries and Norway, decomposed into pillars.



Source: ECLM based on Cazzaniga (2024), IMF.

2.4 Perceptions of AI in the labour market

Enterprises in Denmark generally report positive but still modest effects of AI on their business activities in 2024 (Figure 4). The assessment covers areas such as earnings, products and services, decision-making, workflows, and the development of new products.

The pattern broadly mirrors the adoption results presented in the previous subsections. Assessments are more positive in parts of the economy where AI adoption is already more widespread, particularly among larger firms and within information and communication services. This is unsurprising, as firms with more extensive AI adoption are also

more likely to have accumulated the experience and capabilities needed to benefit from the technology.

The most frequently reported positive effects concern workflows and internal processes, though firms also report positive effects on the development of new products and services. This suggests that AI is currently used primarily to support existing tasks and improve efficiency within established work routines, but the survey also indicates that AI has the potential to foster innovation.

As 2024 represents a relatively early stage of AI adoption, measurable business effects remain limited. Only 9% of enterprises reported a positive impact on earnings.

Many providers of AI models have drastically increased the costs of AI tokens, often to the point where using AI is more expensive than the human labour it has substituted and that, as a consequence, some – especially large firms – are now actively scaling back and limiting AI use.[8]

It will therefore be important to monitor whether AI adoption translates into higher firm-level productivity, profitability and wage growth in the coming years.

Figure 4. Share (%) of Danish enterprises reporting positive effects of AI across business activities in 2024.

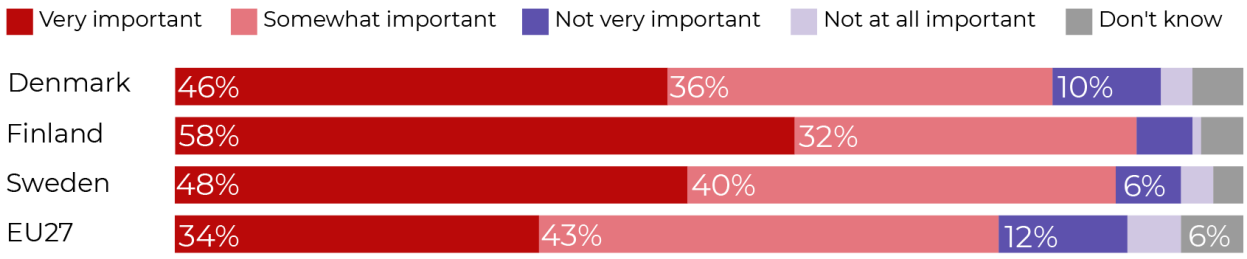
	Earnings	Products or services	Decision making	Workflows	Development of new products
All private non-financial enterprises	9%	14%	9%	19%	8%
Information and communication	31%	46%	27%	47%	35%
Other business services	11%	20%	11%	25%	12%
Trade and transport	8%	10%	7%	17%	4%
Manufacturing	7%	9%	7%	15%	3%
Construction	5%	5%	4%	9%	3%
250+ employees	24%	36%	28%	50%	20%
100-249 employees	17%	24%	18%	35%	12%
50-99 employees	14%	20%	15%	26%	11%
10-49 employees	8%	12%	7%	16%	7%

Source: ECLM based on Statistics Denmark.

Survey evidence of individuals suggests a partly different set of issues more broadly. Eurobarometer survey evidence shows that many Europeans support clear rules for the use of digital technologies in working life. Support is particularly strong for rules that protect privacy, ensure transparency, limit excessive monitoring and prevent fully automated decision-making in the workplace. [9]

In the EU, 77% of respondents consider it somewhat or very important that workers and their representatives are involved in shaping how AI is adopted. The share is even higher in the Nordic countries (Figure 5). This points to a clear demand for worker voice and co-determination in the implementation of new technologies.

Figure 5. Share of respondents from Denmark, Finland, Sweden and the EU27 who believe that the involvement of workers and their representatives is important in the design of AI adoption.



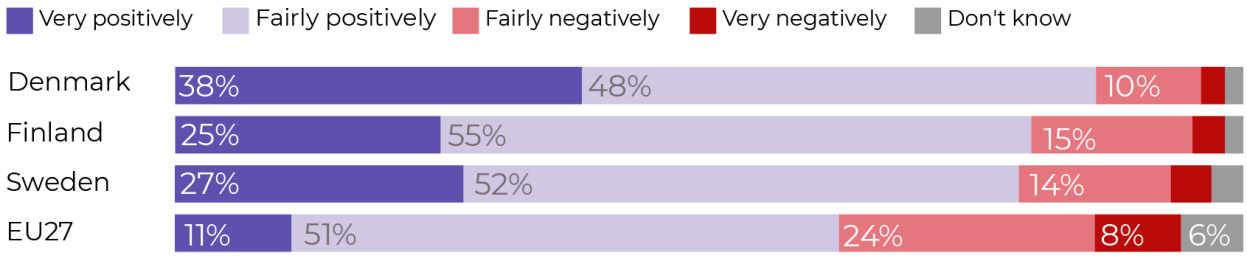
Source: ECLM based on Eurobarometer.

Note: The figure shows the share of respondents answer to the question: "How important, do you think involving workers and their representatives in the design and adoption of new technologies would be in addressing risks and maximizing the benefits of digital technologies, including Artificial Intelligence, in the workplace?"

At the same time, workers' overall perceptions of AI are not predominantly negative. In the EU, 62% report a very or fairly positive view of AI, while the share in Denmark is 86% (Figure 6). Nordic workers therefore appear relatively open to AI, possibly reflecting both higher digital exposure and greater confidence that technological change can be managed within a relatively secure labour market framework.

These results should nevertheless be interpreted with caution. Survey responses capture expectations, concerns and narratives about AI rather than a measure of the actual consequences of AI. Many workers may use AI indirectly without necessarily identifying it as such.

Figure 6. Share of respondents from Denmark, Finland, Sweden and the EU27 perception, negatively or positively, about the use of robots and AI in the workplace.



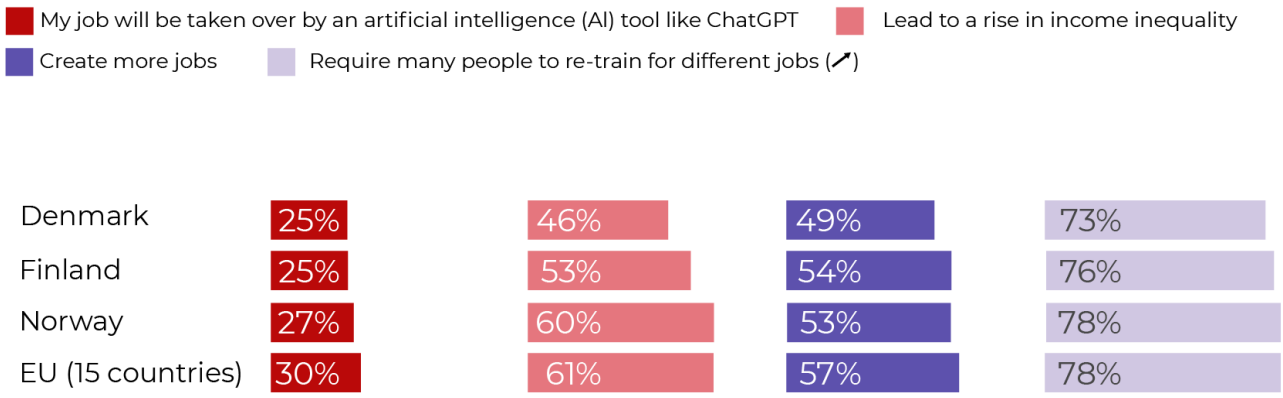
Source: ECLM based on Eurobarometer.

Other survey evidence points in the same direction. Danish workers are generally positive about AI, but they are more convinced that it will benefit firms and society than that it will benefit workers directly. 78% believe that AI will benefit companies, 61% believe it will benefit society as a whole, but only 45% believe it will benefit workers.[10] This suggests that workers broadly accept the possibility that AI may raise efficiency, while remaining more uncertain about whether these gains will improve conditions for workers.

A further source of ambivalence concerns job security and the need for skills adjustment. According to the OECD's Risks That Matter survey, 25% of Danish workers believe their job could be taken over by AI, while 73% believe AI adoption will require substantial retraining and upskilling (Figure 7).

This reinforces the view that worker attitudes are neither simply optimistic nor pessimistic. Rather, they combine openness to technological change with concrete concerns about adjustment, security and distribution.

Figure 7. Share of respondents from Denmark, Finland, Norway and the EU27 who believe AI is likely to affect society in specific ways over the next 5-10 years.



Source: ECLM based on OECD.

2.5 A labour market characterised by flexibility and security is vital for AI adoption

A key element of AI preparedness is a labour market that can adapt efficiently to technological change. The so-called Danish flexicurity model combines high labour mobility with income security and active labour market policies, enabling workers and firms to adjust to changing skill demands while limiting the social costs of economic transformation.

Over the past four decades, approximately 300,000 jobs – corresponding to 10-15% of the total employment – have been created and nearly as many have disappeared each year, reflecting a continuous process of structural change (Figure 8). Importantly, technological progress does not simply replace existing jobs with identical ones. Between 1995 and 2022, employment declined in parts of manufacturing and agriculture while expanding significantly in IT-related and knowledge-intensive occupations. Technological change, therefore, has reshaped the composition of employment rather than reducing overall job creation.

International research highlights the importance of the Danish labour market model in facilitating

technological transitions. The IMF points to labour mobility, income security and active labour market policies as key factors supporting the reallocation of workers in response to AI-driven change.

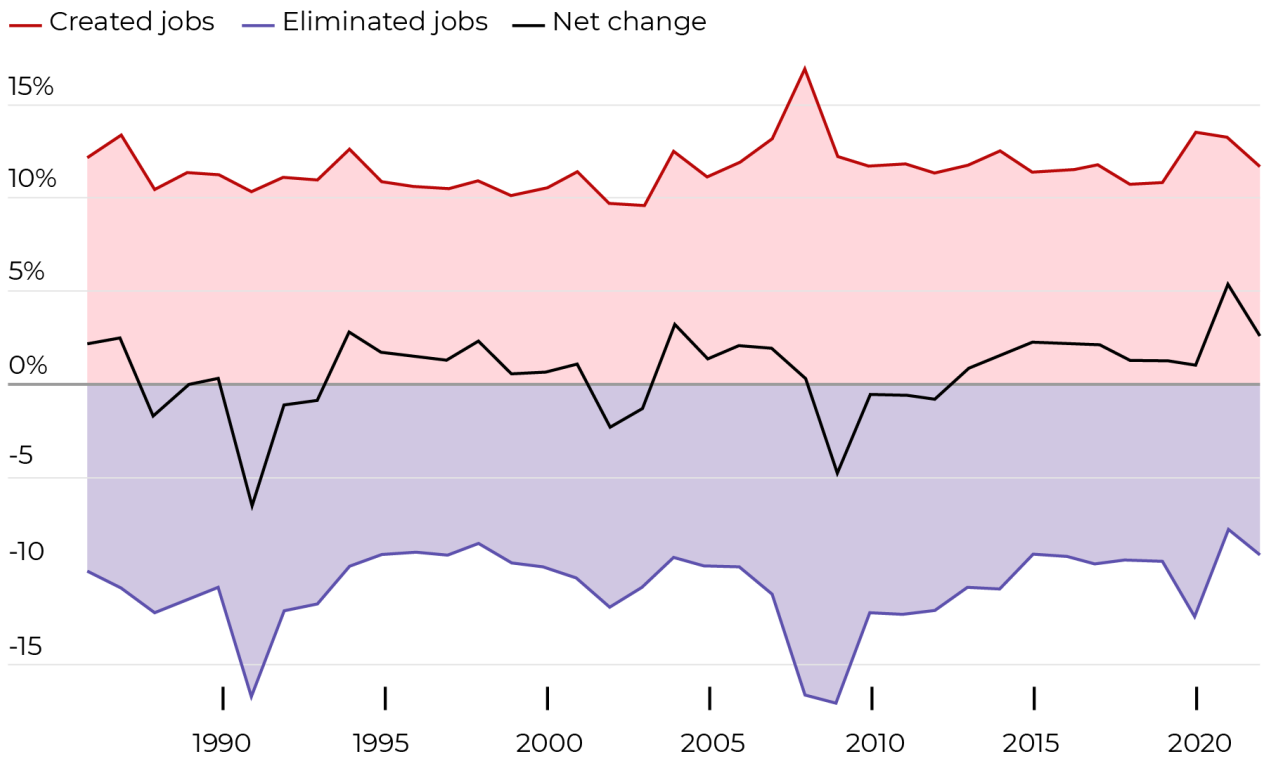
This dynamic is closely linked to the theory of creative destruction, that is, technological progress drives productivity by reallocating labour and capital from declining activities towards more productive and innovative ones.[11] In this context, the Danish labour market model may be particularly important, as it supports reallocation by protecting workers rather than specific jobs through income security, retraining and continuous skills development.

Compared with other European countries, Denmark exhibits high labour market mobility. In 2025, 40.6% of unemployed individuals moved into employment within one quarter, compared with 23.3% across the EU-27.[12]

Nonetheless, Denmark faces many of the same challenges as other European countries. The IMF estimates that around one fifth of the workforce is exposed to a risk of displacement from AI-driven change.

Despite Denmark's strong position, emerging challenges could weaken the foundations of the flexicurity model. A declining replacement rate in unemployment benefits, reductions in employment services and growing pressures on the education and training system may reduce the likelihood of positive AI adoption.

Figure 8. The annual number of jobs created and eliminated in Denmark as a share of total employment, 1986-2022.



Source: ECLM based on Statistics Denmark.

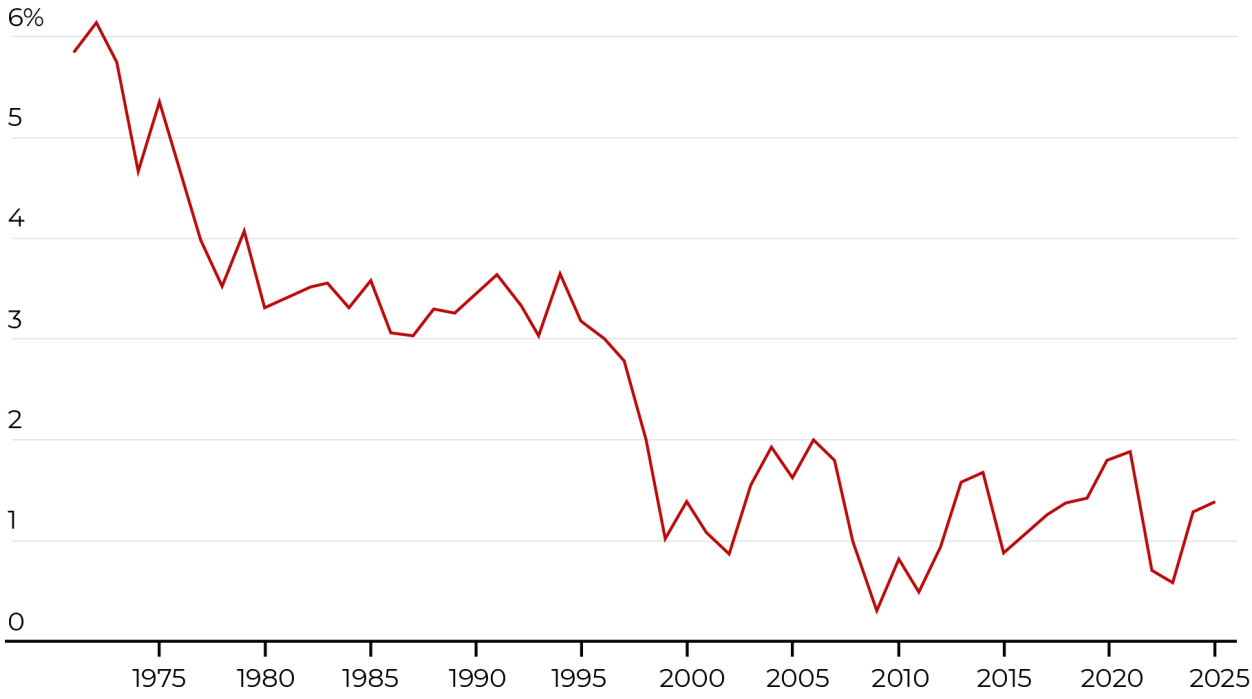
2.6 Declining productivity growth across Europe

The potential impact of AI on productivity is central to the broader debate about Europe's relatively weak productivity growth.[13] Weak productivity is a challenge in both Denmark and Europe, as it is the foundation for higher wages, stronger public finances and rising living standards. Against this backdrop, the EU should aim to move closer to the US example in terms of productivity growth and innovation, but it should do so without the drawbacks of the US social model.[14]

To understand this slowdown and where AI might make a difference, research typically distinguishes between labour productivity and total factor productivity (TFP). Labour productivity measures the amount of output produced per worker or per hour worked. TFP captures how efficiently all production inputs, including labour and capital, are combined.

Over the past decades, both Denmark and the rest of Europe have experienced a marked slowdown in productivity growth.[15] In Denmark, annual labour productivity growth has fallen from around 6% in the early 1970s to approximately 1% today (Figure 9). TFP growth typically follows the path of labour productivity. In Denmark, it has averaged around 0.5% annually over the past five years.[16]

Figure 9. The annual growth rate in labour productivity in Denmark, 1971-2025.



Source: Statistics Denmark.

Note: Chained values, 5 year moving average.

3. AI'S POTENTIAL TO ENHANCE PRODUCTIVITY

AI and its implications for productivity growth have attracted significant attention in recent economic research. If AI enables workers and firms to produce more output with the same amount of labour and capital, it could strengthen both profits and wage growth.

This section reviews the rapidly expanding literature on AI and productivity, with a particular focus on Denmark and the EU at large. Substantial disagreement remains about the size of AI's productivity effects, and the section therefore also discusses why estimates differ so widely across studies.

3.1 AI and productivity have attracted tremendous attention in recent research

The macroeconomic effects of AI vary considerably across studies. Estimates depend on a chain of assumptions about which tasks are exposed, how much efficiency AI creates in those tasks and whether organisations adjust in ways that allow potential gains to materialise. AI may improve productivity by making existing tasks faster or cheaper, but it may also support innovation and the creation of new products or services.

At the same time, AI may generate uncertainty among workers regarding job security and future career prospects. Such concerns can negatively affect job satisfaction and motivation, which can ultimately affect productivity negatively. This complexity helps explain why research reaches markedly different conclusions about the magnitude of AI's future productivity effects.

One of the most influential contributions to this question is the task-based framework developed by Acemoglu.[17] This approach implies that overall productivity effects depend fundamentally on microeconomic mechanisms. If AI primarily generates efficiency gains through productivity improvements at the task level, aggregate outcomes can be approximated through estimates of AI exposure and efficiency gains at the task level. It has become the foundation for much of the recent literature.

In his research, Acemoglu estimates relatively modest aggregate effects.[18] The baseline scenario suggests that AI will increase TFP by approximately 0.71% over a ten-year period, which is equivalent to 0.07 percentage points of additional annual TFP growth. These measures are low compared to more transformative narratives.

Building on a similar framework, Aghion and Bunel arrive at larger projections, but underline the uncertainty of applying this approach.[19] Depending on the assumptions applied, they find that AI could raise annual TFP growth by between 0.07 and 1.24 percentage points, with a median estimate of 0.68 percentage points. They argue that productivity effects from AI may materialise more rapidly than earlier technological shifts, as many AI applications can be deployed using existing machines as computers.

Many randomised controlled trial studies find substantial productivity gains in specific tasks and occupations. Brynjolfsson et al. find that access to generative AI tools increased productivity among customer service workers by approximately 15%.[20] Notably, the largest improvements were observed among less-experienced workers, suggesting that AI reduces skill gaps within occupations.

Peng et al. document enormous productivity gains among software developers using AI coding assistants.[21] They find that software developers with access to an AI pair programmer were able to complete tasks 55.8% faster than similar developers

without access to AI. This suggests that software developers are some of the most exposed to AI.

Teutloff et al. find similar patterns in the Danish labour market based on an analysis of occupational exposure to AI.[22] Software developers and in general occupations characterised by cognitive routine tasks have the highest potential to be affected. They also highlight that high-income employees generally have more potential to take advantage of large language models, such as ChatGPT. Hence, highly paid white-collar workers are both more exposed to technological disruption and more likely to realise productivity gains from AI adoption.

Such findings underpin more optimistic estimates of AI's productivity potential. For example, Baily et al. argue that AI could trigger a new productivity boom, adding 1.8-2.8 percentage points to annual labour productivity.[23] These estimates rely heavily on AI's potential to increase innovation and support the development of new products. However, the evidence on this innovation channel remains mixed.

Evidence from European firm-level studies suggest that productivity levels are increasing at a substantial but relatively modest level. Aldasoro examines more than 12,000 European firms and finds that AI adoption causally increases labour productivity by 4%, on average, in the EU over a ten-year period, but there are no detectable short-term effects on employment levels.[24]

The gains are concentrated among medium-sized and large firms and the firms possessing the technological capacity to integrate AI effectively. The results suggest that, at least in the short term, AI functions primarily as a complementary input that enhances efficiency rather than replacing labour. These projections align with the results of Bergeaud,[25] rather than with scenarios predicting an immediate productivity boom.

Evidence from broader labour-market analyses paints a more restrained picture. Studying worker outcomes in Denmark, Humlum and Vestergaard find limited labour-market effects despite substantial productivity potential, with no significant impact on wages nor working hours.[26] This highlights the difficulty of translating task-specific productivity gains into labour market outcomes.

One explanation is that experimental studies typically focus on occupations with particularly high AI exposure, making it difficult to generalise findings to the broader labour market. Another is that productivity gains often emerge only gradually. Brynjolfsson et al. describe a "productivity J-curve",[27] whereby firms must first invest in organisational change and upskilling of employees before productivity gains materialise.

Other firm-level evidence points in the same direction. Based on a survey of business executives, Yotsov et al. find that most firms report little impact of AI on productivity or employment over the past three years.[28] 90% report no impact on employment or productivity within their firms. The same executives predict that AI will boost productivity at their firms by an average of 1.4% and cut employment by 0.7% over the next three years, suggesting that the effects of AI are emerging and still not realised.

The emerging literature suggests a nuanced conclusion. AI clearly has the potential to raise productivity at the task and firm level. Yet the aggregate macroeconomic impact will depend on diffusion speed and other firm-level factors, such as the nature of the tasks to be automated, the firm size, or training and skills development. Current estimates range from negligible effects to increases in annual labour productivity growth of up to 2.8 percentage points. While considerable uncertainty remains, most studies suggest that the impact of AI is likely to materialise gradually over the coming decade.

3.2 Nordic countries are expecting the highest productivity gains from AI

Recent research also suggests that the productivity effects of AI are likely to differ substantially across countries.

An important contribution is by Misch et al., who apply a task-based framework to estimate the productivity effects of AI across European countries.[29] Their results point to substantial cross-country heterogeneity. In particular, Nordic and high-income countries such as Denmark and Norway are estimated to experience relatively large productivity gains from AI, with contributions of around 0.4 percentage points to annual TFP growth. By contrast, countries such as Romania, Bulgaria, Poland and Hungary are estimated to realise more modest gains, closer to 0.1 percentage points annually.

Based on Misch et al.,[30] Figure 10 illustrates the variation in productivity measures across countries and assumptions on task exposure. The preferred solid estimate is derived from 44 different scenarios, combining measures of occupational AI exposure with country- and sector-specific adoption rates.

A key input into these estimates is the measurement of "AI exposure", which captures the extent to which tasks or occupations can be affected by AI technologies. Here, the literature offers a range of approaches, leading to substantial variation in estimated exposure levels. Some studies suggest that AI-exposed tasks may account for around 20%,[31] resulting in relatively small effects.

Eloundou et al. apply a similar approach where exposure is measured at the task level.[32] They estimate that 80% of the workforce could see at least 10% of their job tasks influenced by the deployment of AI and around 19% of employees potentially experiencing an impact on at least half of their tasks.

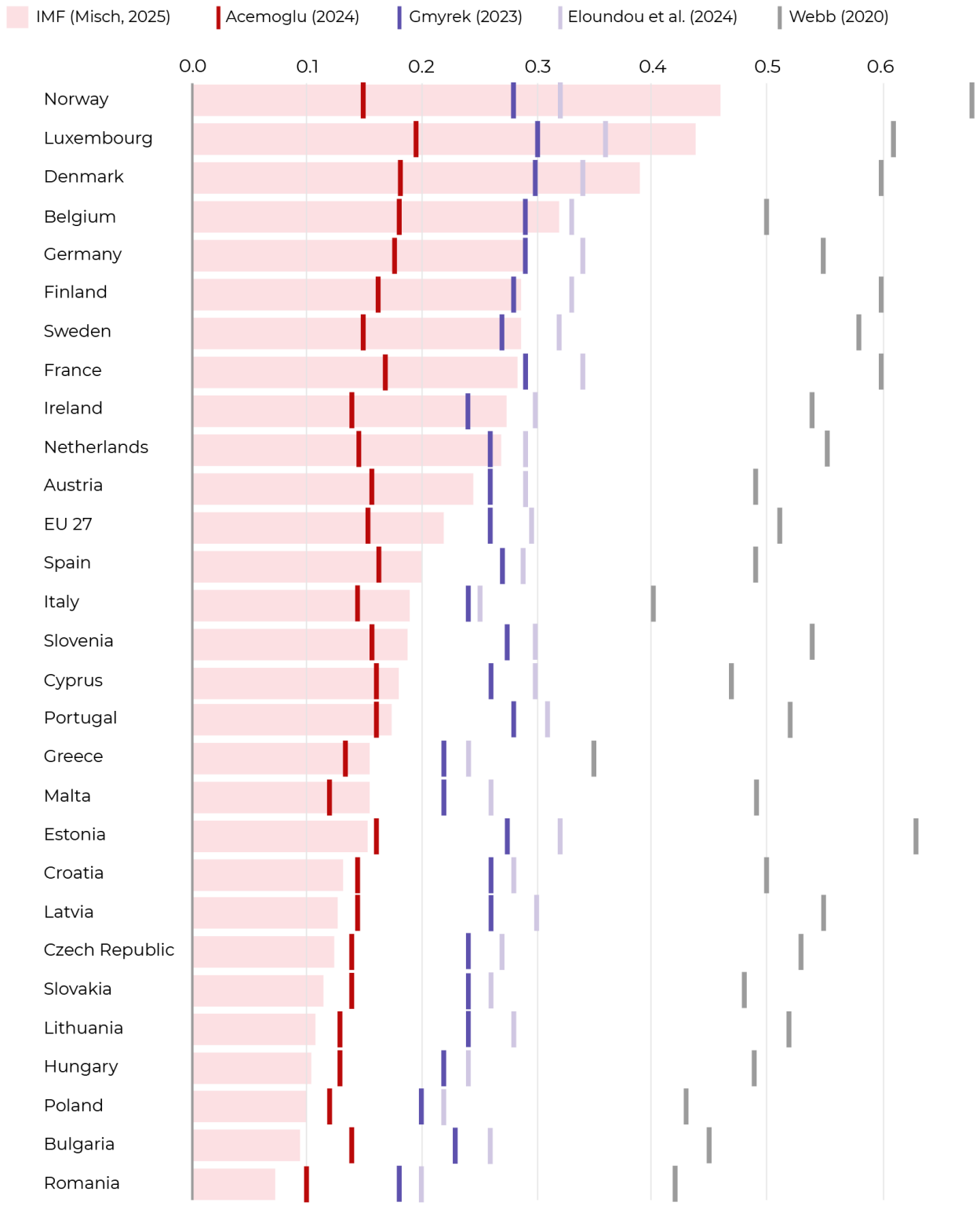
Gmyrek et al find relatively similar estimates where exposure is measured at occupational level and then assigned to different exposure scores.[33]

Other contributions rely on measures linking AI-related patent activity to occupational task content For example, Webb uses the overlap between job task descriptions and patents to construct a measure of the exposure of tasks to automation.[34]

These differences reflect several structural factors. First, high-income countries such as Luxembourg tend to have a larger share of tasks that are exposed to AI, particularly in knowledge-intensive occupations. Second, firms in these economies typically face stronger incentives to invest in AI due to higher labour costs. Third, the preparedness in terms of digital infrastructure, organisational capital and workforce skills to integrate AI is generally high in Nordic countries (see Figure 3).

This may also help explain the relatively high estimated productivity potential in Germany and Belgium in Figure 3. Although neither country is considered a digital frontrunner, relatively high labour costs and a large share of AI-exposed tasks create strong economic incentives for AI adoption.

Figure 10. Productivity gains from AI under different assumptions about exposure, measured as annual contributions to TFP growth in the EU27 countries and Norway (percentage points).



Source: ECLM based on Misch (2025), IMF.

3.3 Many jobs are partly exposed to AI in Denmark

A central question in assessing the economic impact of AI is to what extent AI augments or replaces jobs. AI may raise productivity by supporting existing job functions, but it may also create disruption if a large share of tasks can be automated.

AI is different from earlier waves of automation. Whereas previous technological changes primarily affected routine manual work, AI is more likely to affect cognitive and knowledge-intensive occupations.

To assess task exposure in Denmark, we combine occupational tasks and job functions following the approach of Hatzius.[35] Based on this method, 6% of jobs are estimated to have more than half of their tasks potentially exposed to AI automation (Figure 11). A much larger share, 71%, falls into an intermediate category where 10-50% of tasks are exposed, while the remaining 23% are assessed as largely unaffected.

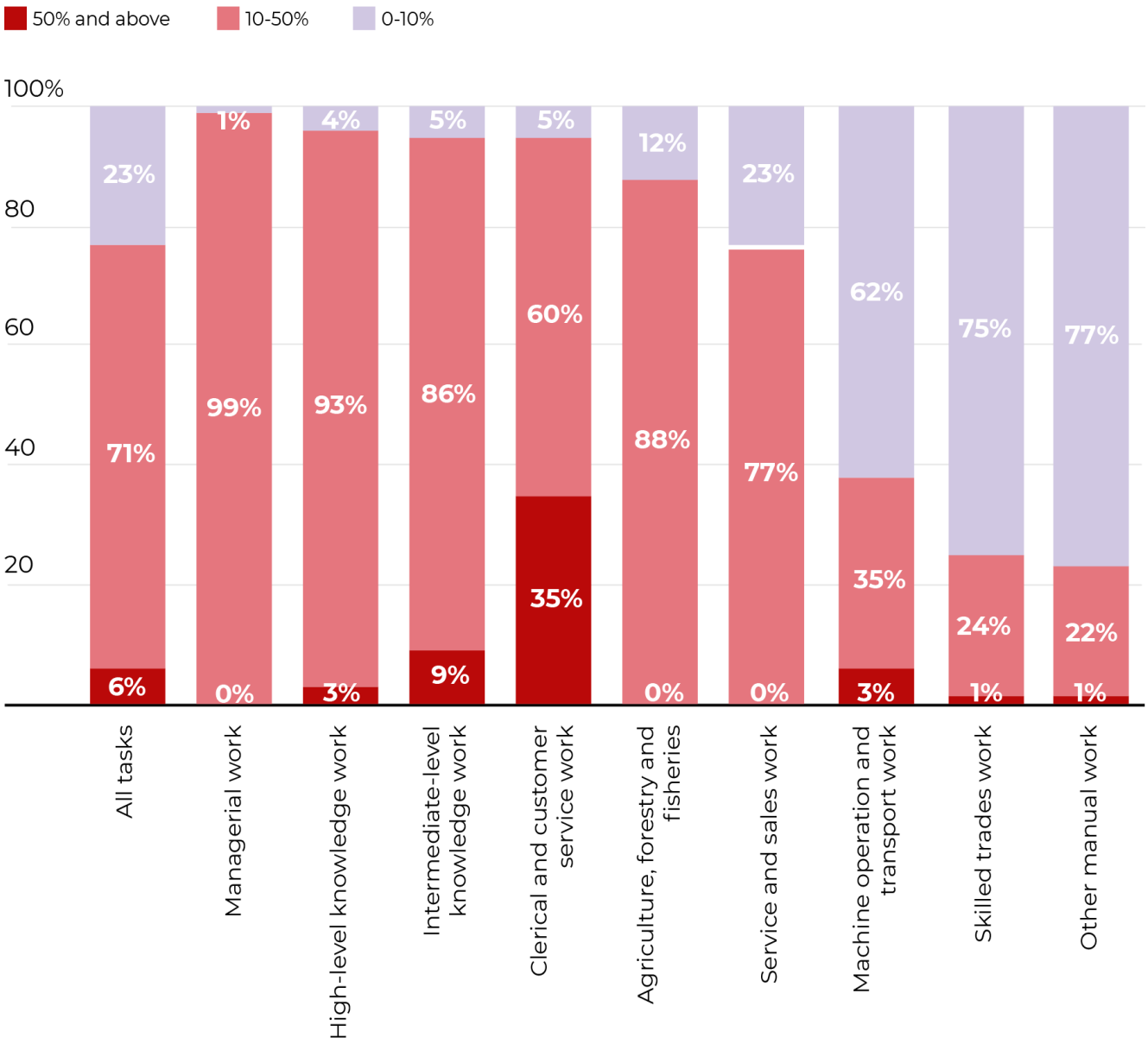
Exposure varies substantially across occupations. Among office and knowledge-based jobs, 35% have more than half of their tasks exposed to AI. In several other occupational groups, no jobs are placed in this high-exposure category. By contrast, around 75% of jobs in skilled trades and manual occupations are assessed as largely unaffected by AI technologies.

Following much of the literature, jobs where 10-50% of tasks are exposed are interpreted as mainly augmented by AI, while jobs with more than 50% exposed tasks are considered to face a higher potential for substitution. These categories should be interpreted as measures of potential exposure, not as realised labour market effects.

The results therefore suggest that, at its current stage, AI is more likely to function as an augmenting tool for the majority of workers than as a direct replacement. However, as capabilities improve and adoption becomes more widespread, the potential for substitution may increase over time.

This interpretation is supported by recent findings from Massenkoff and McCrory, who find no increase in unemployment in highly exposed industries.[36] They do, however, identify a modest decline in hiring among younger workers in these industries, suggesting that AI may affect labour demand even though aggregate employment effects are not visible.

Figure 11. The share of jobs on the Danish labour market that AI could replace, complement or have no effect on by type of work.

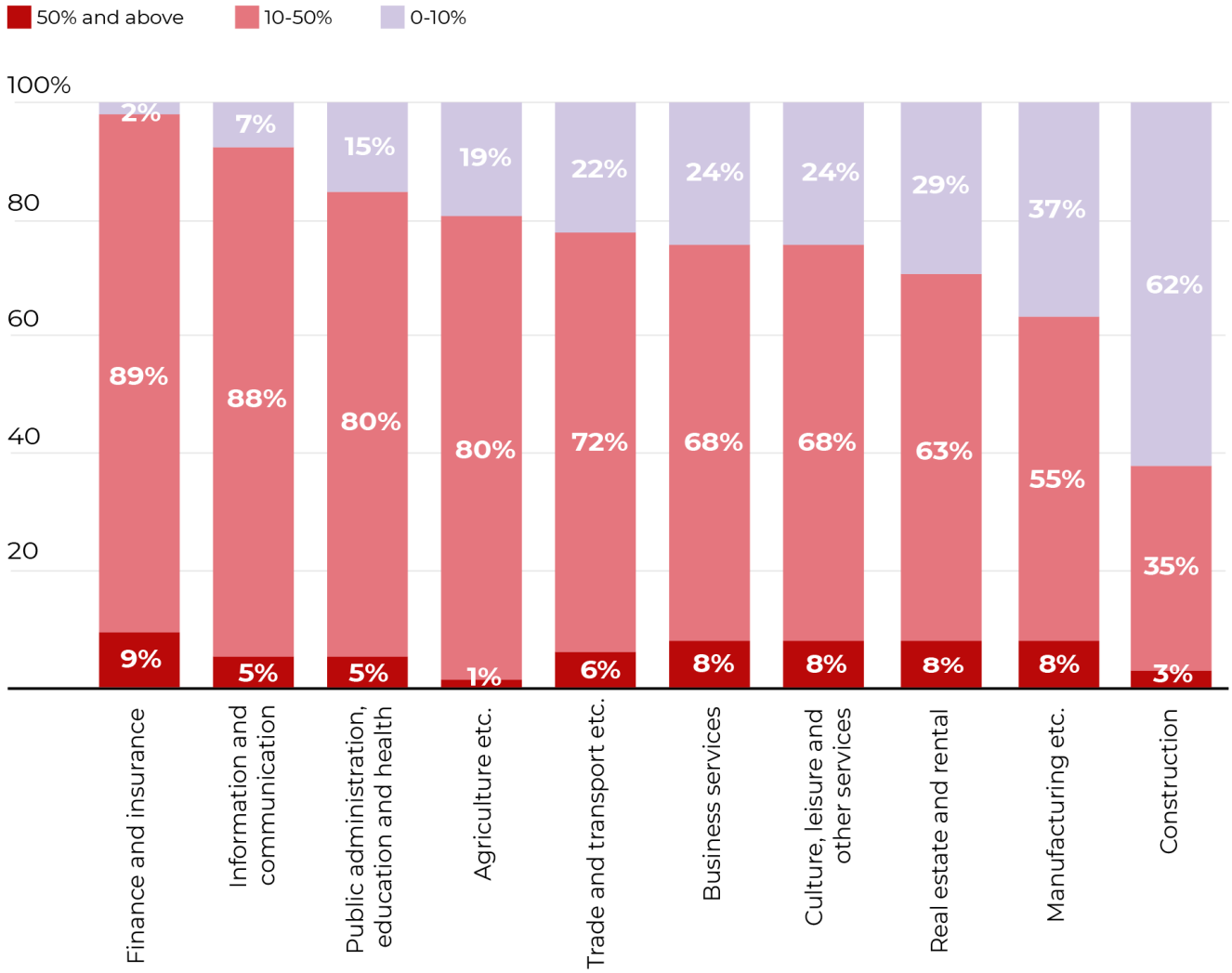


Source: ECLM based on Statistics Denmark and Hatzius (2023).

Exposure also varies across sectors. Construction appears least affected, with 62% of jobs estimated to be unexposed, reflecting the high share of manual tasks that remain difficult to automate with current AI tools. By contrast, finance and information and communication services exhibit higher exposure due to their concentration of cognitive and data-intensive tasks (see Figure 12).

Still, no broad sector is estimated to have more than around 10% of jobs in the high-substitution category. Exposure may nevertheless be substantially higher within specific occupations, particularly among software developers and other digital professions. **Overall, the findings point to widespread partial task exposure rather than immediate large-scale job automation.**

Figure 12. The share of jobs on the Danish labour market that AI can potentially affect by industry.



Source: ECLM based on Statistics Denmark and Hatzius (2023).

METHOD

The estimates are based on Hatzius, "The potentially large effects of artificial intelligence on economic growth", which uses the O*NET database, covering more than 900 occupations and their associated tasks.

Based on a review of the literature, 13 of O*NET's 39 task categories are potentially automatable by generative AI. Tasks within these categories are assigned a complexity score from 1 to 7, and tasks with a complexity level of 1-4 are considered potentially automatable.

Examples of fully automatable tasks are "Skim an article to gather the main point" and "Interpret a blood pressure reading", while highly complex analytical and research-oriented tasks are assumed to remain beyond the capabilities of current AI systems, for example, "Determine the reaction of a virus to a new drug".

We have mapped the occupations reported by Hatzius to Danish DISCO occupation codes. This provides an estimate for each occupation of the share of complexity-weighted tasks potentially exposed to AI automation.

The results should primarily be interpreted as indicating relative differences across occupations rather than precise estimates of the absolute level of AI exposure.

3.4 AI is expected to boost productivity in Denmark, but uncertainty remains

As discussed above, a common approach in the literature to quantify the productivity effects of AI is the task-based framework. The intuition is (1) to assess how large a share of tasks is exposed to AI, and (2) to estimate the efficiency gains that can be realised for those tasks.

Formally, the impact on TFP can be expressed as the product of four key components. However, there is considerable uncertainty associated with each of these components. In particular, the following first three are subject to substantial debate, which explains the wide range of estimates found in the literature:

1) **77% of jobs are exposed to AI**

   At the upper end, our analysis suggests that 77% of jobs in Denmark are exposed to AI, interpreted as between 10 and 100% of working time potentially being affected (see Figure 11).

   Based on an estimation of the exposure to AI of every task, Gmyrek et al. find 18.5% of tasks are exposed to AI in high-income countries, including most European countries.[37] Conversely, relying on abilities rather than tasks, Pizzinelli et al. estimates that the share is around 60% in advanced economies.[38]

   Denmark is, as previously shown, among the countries most advanced in terms of AI readiness and adoption. As a result, our lower bound follows Danmarks Nationalbank,[39] which estimates that between 39 and 61% of tasks are exposed to AI.

2) **For 80% of tasks that are exposed to AI, AI can have a positive impact on profitability**

   Exposure alone does not imply that it is economically optimal to adopt AI. The technical feasibility and economic profitability of replacing or augmenting tasks with AI must also be considered.

Based on a literature review, Aghion and Bunel estimate that between 23 and 80% of exposed tasks can be profitably automated.[40] The lower bound is informed by evidence on computer vision, which is a narrower field and tends to have more limited profitability.

In Denmark and other countries with a high degree of exposure, but where many jobs are only partly affected, this share is likely to be lower, as the scope for cost-efficient automation is more limited.

For example, an accountant may use AI to automate routine data entry and invoice processing. While these tasks are technically exposed to AI, they may constitute only part of the accountant's job. The remaining tasks may require judgement, client interaction and responsibility, making full automation of the job economically unattractive.

3) **The deployment of AI could result in average labour cost savings of 40%**

To estimate cost savings, the literature typically examines how AI affects productivity at the occupation level, translating productivity improvements into reductions in labour costs. Aghion and Bunel find that average labour cost savings range between 27 and 40% for tasks where AI is implemented.[41]

However, these estimates may be optimistic for countries like Denmark. Acemoglu finds substantially lower savings for more complex tasks where the cost savings are 7% instead of 27%.[42] Given that Denmark, other Nordic countries, and the EU at large have a high share of such "hard" tasks, average cost savings are likely to be in the lower end of the range.

Moreover, realised savings depend crucially on effective implementation and organisational adaptation and not technological potential alone. A productive adoption involves changes in work organisation and upskilling of workers, which may further moderate short-term profits.

4) **Reductions in labour costs may translate into up to 51% of productivity gains**

The labour share is measured as the share of labour costs in value added. Following Danmarks Nationalbank,[43] based on data from Statistics Denmark, the labour share in Denmark is estimated at approximately 51%.

This parameter determines how strongly reductions in labour costs translate into aggregate productivity gains. Some studies use slightly higher values up to around 60%.[44]

The combination of these four components leads to a wide dispersion in estimated productivity effects. While Aghion and Bunel find that AI could increase TFP in the USA by between 0.07 and 1.24 percentage points annually,[45] Danmarks Nationalbank estimates a range of 0.1 to 1.0 percentage points for Denmark.[46]

From this policy study's findings, in the median estimate illustrated in Table 1, AI raises TFP in Denmark by approximately 0.3-0.4 percentage points per year, which is closely aligned with recent estimates by Bergeaud and Misch.[47] This reflects an assumption of relatively high exposure to AI, but more moderate realised efficiency gains.

Table 1. Estimated yearly TFP gains from AI in the next ten years in Denmark.

	Lowest estimates	Central scenario	Highest estimate
Share of tasks exposed to AI	39%	50%	77%
Share of these tasks for which it is cost-effective to use AI	23%	40%	80%
Average saving costs	27%	35%	40%
The labour share	51%	51%	51%
Yearly TFP gains, percentage points	**0.11**	**0.36**	**1.26**

The upper-bound estimate of 1.26 percentage points is included to illustrate how sensitive the results are to each parameter. Even moderate changes in a single component can lead to large differences in aggregate productivity outcomes.

An important additional perspective is the time profile of these effects. While Table 1 presents average annual gains over a ten-year horizon, it is likely that the initial impact will be closer to the lower bound. The first three components are all expected to increase over time as technologies improve, costs decline and organisations adapt.

This dynamic helps explain why empirical studies often find no or limited short-term productivity gains from AI, despite highlighting substantial potential. It is also consistent with the "J-curve" pattern, where productivity improvements are delayed after initial investments and adjustment costs.

3.5 Implementation gaps and workers' concerns about AI might affect productivity negatively

Much of the existing literature estimates the potential effects of AI rather than its realised impact on workplaces. Whether productivity gains materialise depends not only on the technology, but also on how it is implemented and in which tasks it is used.

If AI is introduced in ways that reduce worker autonomy, intensify monitoring or increase work pressure, the effects can become counterproductive. Case studies of Nordic workplaces show that digital management systems may weaken job quality and increase stress.[48] If high productivity demands result in physical or mental exhaustion, it might ultimately imply negative consequences for productivity.

A related point is that AI can lower performance when it is applied to the wrong tasks. Dell'Acqua et al. show that AI improves productivity and quality for tasks within its capability frontier, but it can reduce performance when workers rely on it in tasks that fall outside that frontier.[49] Especially in the public sector, where case workers are often faced with complex, individual situations and regulatory contexts, automation can be counter-productive and still require human involvement.[50] This underlines the risk of extrapolating strong results from controlled settings to the broader economy.

> *Regulation, worker involvement and collective bargaining are not only relevant for protecting workers, but they are also necessary conditions for ensuring that AI is implemented in ways that improve productivity.*

There is also growing evidence that AI-related uncertainty may itself weaken workplace performance. Chuang et al. point to links between AI use, higher stress and a greater risk of burnout,[51] while Jin et al. find that AI-related job insecurity and negative emotions can reduce employees' work-related wellbeing.[52]

Taken together, these findings suggest that **the productivity effects of AI depend not only on the capabilities, but also on the way it is applied at the workplaces**. If implementation erodes job quality or weakens trust, productivity gains may be smaller than expected.

This strengthens the need for a pro-worker approach to AI adoption. **Regulation, worker involvement and collective bargaining are not only relevant for protecting workers, but they are also necessary conditions for ensuring that AI is implemented in ways that improve productivity.**

4. DO WORKERS BENEFIT FROM AI-DRIVEN PRODUCTIVITY GAINS?

Productivity creates the economic basis for higher wages. When productivity rises, each hour worked becomes more valuable, allowing firms to generate higher output with the same labour input. Hence, productivity growth is seen as a central component to improvements in real wages.[53] If AI increases productivity, it raises the key question to what extent productivity gains translate into improved outcomes and wellbeing for workers.

A growing body of research documents substantial productivity gains from AI in specific job types and in experimental settings. There is also a lot of research on potential TFP gains from AI, as described in Section 3.

Thus far, **there is limited evidence that AI adoption has translated into better outcomes for workers in terms of wages**.

Humlum and Vestergaard contribute significantly to this body of research, examining worker outcomes before and after the launch of ChatGPT (first publicly widespread available AI) in November 2022.[54] Despite rapid AI adoption, they find no statistically significant effects on wages or working hours between adopters and non-adopters in Denmark. However, they find that **productivity gains tend to be higher when AI adoption is actively supported by employers** through encouragement of AI use, worker-specific training and deployment of in-house AI models.

When it comes to unemployment, Massenkoff and McCrory apply a similar approach using the launch of ChatGPT as a natural experiment.[55] They observe the tendency to lower recruiting hurdles among younger employees, but no increase in unemployment among exposed workers.

Against this background, this section examines labour-market developments among Danish workers who report using AI for work-related purposes. Following the existing literature, we use the release of ChatGPT in November 2022 as a common event date and compare subsequent developments in earnings and employment between AI users and other workers. The following sections briefly present the data, methodology and main results, while a detailed description of the empirical analysis is provided in the Online Appendix.

4.1 Data

The analysis combines the Danish Culture Habits Survey (Kulturvaneundersøgelsen) with monthly administrative register data from Statistics Denmark. The final sample consists of 3,113 individuals aged 25-60 who were employed immediately before the release of ChatGPT in November 2022, with labour-market outcomes observed from November 2018 to November 2025. Respondents are classified as AI users if they subsequently report using AI for work-related purposes.

Table 2 presents descriptive statistics for the full analytical sample and separately for AI users and other respondents. The two groups differ along several pre-release characteristics, suggesting that AI adoption is unequally spread among workers. AI users have higher average earnings during the period from November 2021 to October 2022: average monthly earnings are 44,300 Danish kroner among AI users compared with 34,400 Danish kroner among other respondents, while average log earnings are 10.5 and 10.3, respectively. In contrast, average employment rates over the same period are similar across the two groups, at 95.6% among AI users and 96.4% among other respondents.

AI users are also younger and have less accumulated labour-market experience. Their average age in October 2022 is 41.7 years, compared with 45.2

years among other respondents, while average labour-market experience is 15.2 and 18.3 years, respectively. Women account for 42.5% of AI users and 52.1% of other respondents.

Table 2. A summary of weighted descriptive statistics by reported work-related AI use for AI users and other respondents in Denmark.

Variable	Full sample	Other respondents	AI users	Difference
Average earnings, 1,000 DKK (Nov. 2021 - Oct. 2022)	38.3 (20.3)	34.4 (16.2)	44.3 (24.4)	9.9
Average log earnings (Nov. 2021-Oct. 2022)	10.4 (0.6)	10.3 (0.6)	10.5 (0.6)	0.2
Average employment rate (%) (Nov. 2021 - Oct. 2022)	96.1	96.4	95.6	-0.8
Age, years (Oct. 2022)	43.9 (10.1)	45.2 (9.9)	41.7 (10.1)	-3.5
Total Labour Market Experience, years (Dec. 2021)	17.1 (11.6)	18.3 (11.7)	15.2 (11.2)	-3.1
Female (%)	48.4	52.1	42.5	-9.5
Occupation shares (%)				
Managers	4.2	2.5	7.0	4.5
Science and Engineering Professionals	3.3	2.2	5.2	3.0
Health Professionals	5.7	5.9	5.3	-0.6
Teaching Professionals	10.8	9.5	12.8	3.3
Business and Administration Professionals	4.0	2.2	6.6	4.4
Information and Communications Technology Professionals	3.3	1.3	6.3	5.0
Legal, Social and Cultural Professionals	4.6	3.4	6.4	3.0
Other Professionals	0.4	0.1	1.0	0.9
Technicians and Associate Professionals	11.4	10.0	13.6	3.5
Clerical Support Workers	9.0	8.0	10.6	2.5
Service and Sales Workers	13.0	16.2	8.1	-8.1
Manual, Production, and Elementary Occupations	17.6	24.6	6.6	-18.0
Occupation Not Classified	12.7	14.1	10.5	-3.6
Number of individuals	**3,113**	**1,880**	**1,233**	

Source: Estimates based on the Culture Habits Survey and registers from Statistics Denmark

Note: All statistics except the number of individuals are weighted using the official survey weights. Continuous variables are reported as weighted means with weighted standard deviations in parentheses. Employment rates, the female share, and occupation shares are reported in percent. The difference column reports AI users minus other respondents. Differences for variables reported in percent are expressed in percentage points. Occupational groups are based on DISCO-08. Major group 2 is disaggregated at the two-digit level, while major groups 6–9 are combined. Individuals without a classified DISCO-08 occupation are included under "Occupation Not Classified." Sample counts are unweighted.

4.2 Methodology

Following Humlum and Vestergaard,[56] we compare labour-market developments around the release of ChatGPT in November 2022 between individuals who subsequently report work-related AI use and other respondents. We use a dynamic difference-in-differences event-study framework focusing on monthly earnings and employment. The model includes individual and calendar-month fixed effects and controls for differential developments associated with predetermined age, gender, labour-market experience and occupation. The main results are presented as six-month averages of the underlying monthly estimates.

Importantly, the exact timing of individual AI adoption is not observed, as AI use is measured in surveys conducted after the release of ChatGPT. The estimates should therefore not be interpreted as causal effects of AI adoption, but as differential labour-market developments between workers who subsequently report using or not using AI.

Further details on the data, sample construction and empirical methodology are provided in the online Appendix.

4.3 Results

4.3.1 Wages

Figure 13 presents the weighted event-study estimates for log earnings. It shows the six-month averages of the underlying monthly coefficients.

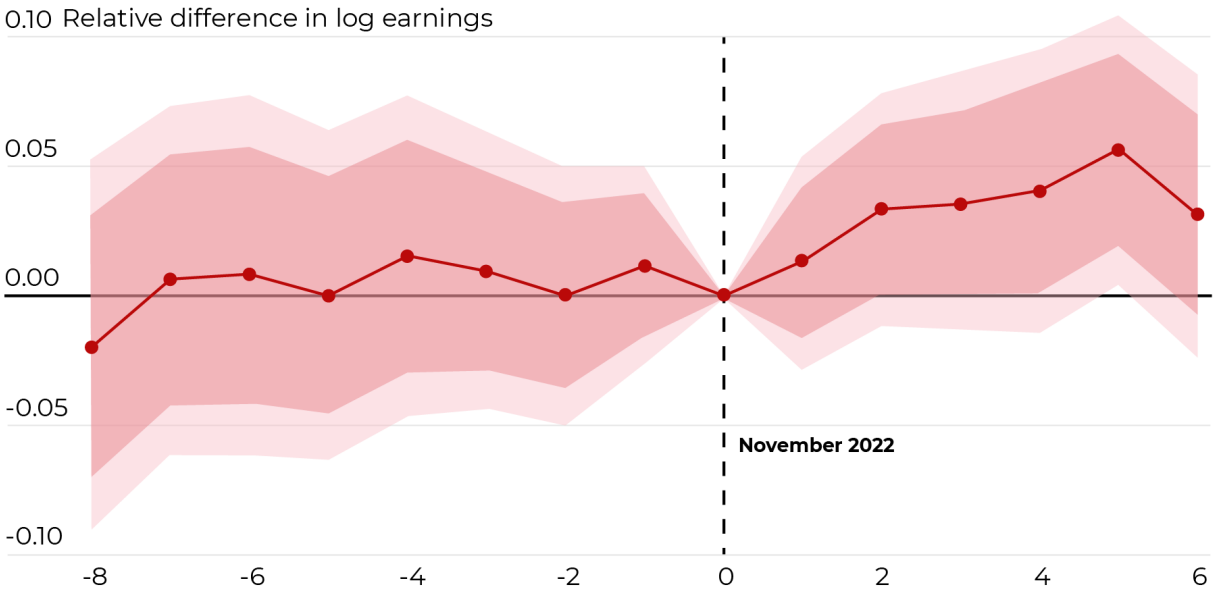
The pre-ChatGPT-release estimates provide little evidence of a systematic difference in earnings trends between AI users and other respondents. In this specification, none of the estimates from the pre-release period indicate a statistically significant difference between the two groups.

After November 2022, the estimates are positive and for the most part increasing in magnitude. The estimate reaches 0.056 log points in months 25-30 after the release of ChatGPT, corresponding to an approximately 5.6% increase in earnings difference between AI users and other respondents relative to the difference in November 2022.

Overall, **the earnings estimates indicate an increasingly widening gap in the wages of workers who use AI and those who do not**, particularly later in the post-ChatGPT-release period. As documented in Section 4.1, there are already substantial differences in labour-market outcomes between AI users and non-users. The emerging differences in earning trends hence suggest that these existing inequalities may widen as AI is becoming more widespread.

To compare, the pre-ChatGPT-release estimates for AI users and other respondents do not display this systematic pattern. Although the estimated wage difference remains positive in the final six-month period, the estimate is too uncertain to conclude that wages developed differently between AI users and other respondents. This supports the interpretation that the post-release divergence reflects a genuine emerging effect of AI adoption.

Figure 13. Differences in log earnings by reported work-related AI use for weighted six-month averages of monthly event-study estimates, relative to November 2022, in Denmark.



Source: Estimates based on the Culture Habits Survey and registers from Statistics Denmark.

Note: Six-month averages of monthly event-study coefficients from the specification described in the section Empirical Strategy. The x-axis denotes six-month periods relative to November 2022, the omitted reference month. Dark shading shows pointwise 95% confidence intervals; light shading shows simultaneous 95% confidence bands. Standard errors are clustered at the individual level.

4.3.2 Employment and working hours

Figure 14 presents the weighted event-study estimates for the employment rate. The coefficients measure changes in the employment rate difference between AI users and other respondents relative to the difference in November 2022.

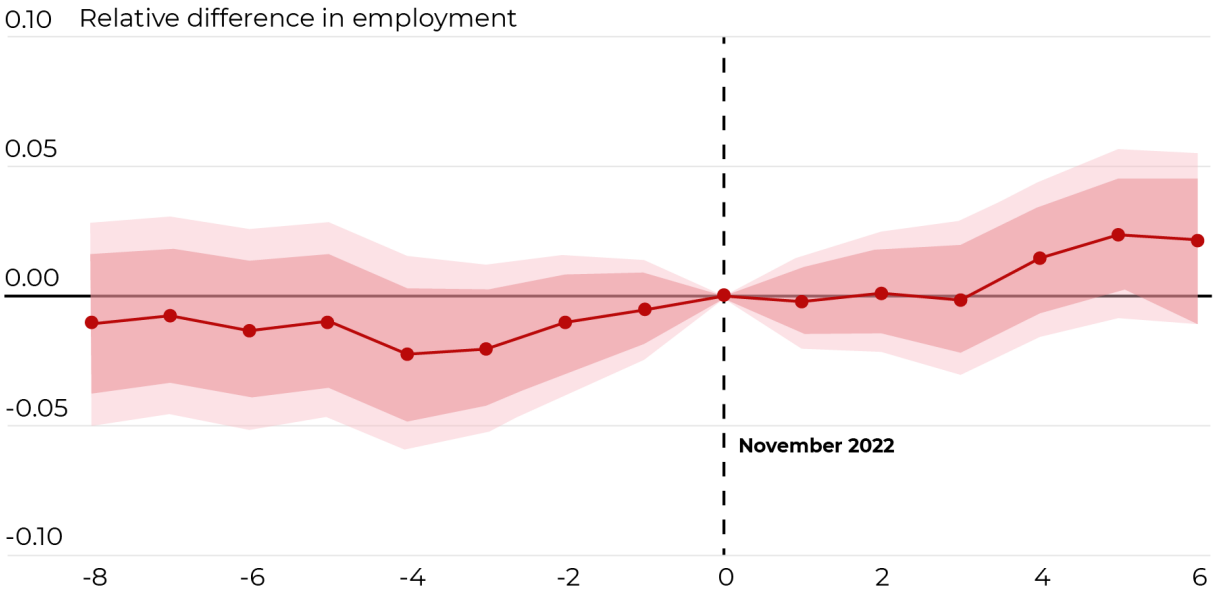
The pre-release estimates are consistently negative, although none are statistically different from zero.

Following the release of ChatGPT in November 2022, the estimates initially remain close to zero before becoming positive and generally increasing in magnitude later in the post-release period. In the six-month specification, the estimate reaches 0.023 in months 25-30, corresponding to a 2.3 percentage point increase in the employment rate difference relative to November 2022. The estimate remains positive at 0.021 in months 31-36.

Overall, the estimates indicate that the employment rate difference between AI users and other respondents becomes positive in the later post-release period, beginning roughly two years after the release of ChatGPT. The results therefore provide some evidence that **AI adoption may be associated with higher chances of employment for workers, risking discriminating non-adoptors on the labour market**.

However, the employment results warrant caution because the pre-release coefficients display a visible negative pattern, even though none of the pre-release estimates are statistically different from zero. Moreover, none of the post-release employment estimates are statistically significant.

Figure 14. Differences in employment rate by reported work-related AI use for weighted six-month averages of monthly event-study estimates, relative to November 2022, in Denmark.



Source: Estimates based on the Culture Habits Survey and registers from Statistics Denmark.

Note:Six-month averages of monthly event-study coefficients from the specification described in the Empirical Strategy section. The x-axis denotes months relative to November 2022, the omitted reference month. A coefficient of 0.01 corresponds to a 1 percentage-point difference in the employment rate. Dark shading shows pointwise 95% confidence intervals; light shading shows simultaneous 95% confidence bands. Standard errors are clustered at the individual level.

Looking at working hours at the intensive margin (i.e., the hours worked for those in employment), a mild upward trend in relative working hours for AI users following the introduction of generative AI emerges. However, the estimated effects are small and statistically insignificant. Therefore, this policy study finds no significant effects on working hours after controlling for predetermined characteristics and occupation specific trends. In other words, **there is no indication yet that AI has led to fewer working hours** (see Online Appendix).

4.4 Interpretation

The results of this policy study suggest **that the labour market impact of AI remains limited at this stage**. We find no robust evidence that AI adoption has significantly increased wages or employment rates nor that it has reduced working hours 31-36 months after the release of ChatGPT in November 2022. This finding is broadly consistent with recent studies, including those by Humlum and Vestergaard[57] and Massenkoff and McCrory,[58] which likewise document limited short-term labour market effects from generative AI.

On top of the thus-far limited productivity gains identified in this policy study, the findings also suggest that **AI adoption is unevenly distributed across the workforce**. Young, male workers with higher levels of education and earnings are more likely to report work-related AI use, raising concerns that the benefits of AI may accrue disproportionately to groups that are already advantaged in the labour market. If these differences persist, AI could contribute to widening existing broader societal inequalities, risking leaving vulnerable groups, such as women; older workers; or persons with disabilities, illness or mental health conditions, behind.

However, the results should be interpreted with caution. Given the subsequent measurement of work-related AI use and the absence of individual adoption dates, these patterns should be interpreted as changes in the differences between the two groups.

More broadly, uncertainty remains regarding the long-term productivity potential of AI. While positive effects are well documented in specific settings and occupations, the evidence is less clear for broad economy-wide productivity gains. **AI may also generate limited or even negative effects when applied to the wrong tasks** (see Section 3.5[59]). At the aggregate level, labour market effects, such as changes in employment rates, remain largely absent so far.

Taken together, the results suggest that AI-related labour market effects are likely to emerge gradually rather than abruptly in Denmark. However, the rapid pace of AI adoption and its unequal spread among workers underline the importance of developing a strong worker-centred AI strategy to ensure that future productivity gains translate into better outcomes and wellbeing for workers.

“The rapid pace of AI adoption and its unequal spread among workers underline the importance of developing a strong worker-centred AI strategy to ensure that future productivity gains translate into better outcomes and wellbeing for workers.”

5. ENSURING THAT WORKERS BENEFIT FROM AI-DRIVEN PRODUCTIVITY GAINS

This section sets out policy recommendations for ensuring that AI-driven productivity gains translate not only into broader social and economic progress, but also better working conditions and wellbeing. The literature suggests productivity gains in the future, but they are yet to be materialised. A productive AI adoption requires worker security. Employees are more likely to use new technologies effectively when transitions are manageable, skills can be updated and gains do not accrue only to firms or a narrow group of workers. Pro-worker adoption is therefore not only socially desirable, but it is also an economic precondition for sustained productivity growth.

In the Nordic and broader European context, this policy study's findings point to four priorities: stronger investments in adult education; labour market policies that protect workers during transitions; digital infrastructure that enables the adoption of AI; and collective institutions that help ensure a fair, transparent implementation and shared benefits between employees and employers.

5.1 The role of trade unions

In Denmark, trade unions play a central role in determining whether productivity gains translate into higher real wages and better working conditions. Productivity growth is a precondition for rising living standards, but distribution depends on bargaining power, labour market institutions and the strength of collective representation.

Unions have at least three important functions in this context. First, they help secure wage growth when productivity rises. Second, they can influence how new technologies are introduced in the workplace, including issues such as training, work intensity, surveillance, autonomy and job quality. Third, they can support worker acceptance of technological change by helping ensure that implementation is negotiated, transparent and perceived as fair.

This is not only a distributional argument. Research on the Nordic model suggests that strong collective institutions can also support productivity by fostering trust, cooperation and coordinated adjustment.[60]

New evidence from the Danish Economic Council suggests that trade unions may also enhance productivity by counteracting labour market power among large firms.[61] When firms can suppress wages below workers' marginal productivity, employment becomes inefficiently low. By limiting this distortion, strong unions can improve labour allocation and raise aggregate productivity.

For European policymakers, the implication is that **AI policy should not be designed separately from social dialogue**. If workers are to benefit from AI-driven productivity growth, **unions and employer organisations must be part of shaping the institutional conditions for AI adoption**.

5.2 Investments in education

AI strengthens the need for a major expansion of adult education and lifelong learning. The Nordic countries perform well in education, but technological change increasingly means that skills acquired early in life are insufficient across a full working career. If AI is to complement rather than displace workers, opportunities for continuous upskilling must be available throughout working life.

OECD reinforces this argument,[62] highlighting skills shortages as a major barrier to AI adoption, particularly among small and medium-sized enterprises. Importantly, the report shows that the main skill needs are broader digital, analytical and problem-solving skills. It also finds that workers

receiving employer-supported AI training are more likely to report productivity gains. This is consistent with the findings of Humlum and Vestergaard.[63]

This is particularly important for workers with weaker formal qualifications, older workers and employees in occupations where AI changes tasks without eliminating jobs entirely. Policy should therefore strengthen adult and continuing training systems; improve access to short and flexible courses; and ensure broad access to digital, data and AI-related competences.

The Nordic countries provide a strong foundation for adult education, but the priority now is to scale it up and link it more closely with workplace needs as AI usage is expanding rapidly. This is also consistent with the wider literature stressing complementary investments in skills as a condition for productivity gains from new technologies.[64]

5.3 Security and flexibility on the labour market

Labour market policy remains central to a successful AI transition. As shown earlier in this policy study, Denmark's labour market is characterised by high job rotation and continuous structural change. This flexibility is an economic strength, but it is only sustainable when matched by security and active labour market policies.

The policy objective should therefore be to protect workers rather than specific jobs. Most jobs in Denmark are partly exposed to AI, and the evidence in this policy study suggests an upward trend. Nonetheless, some workers, especially those who are already vulnerable, will lose employment and face disruptive transitions. Those risks must be met with a strong income safety net, effective employment services and active labour market policies that help workers move into new jobs rather than absorb the cost of adjustment alone.

In that sense, **unemployment insurance and activation policies are not only social protections**. **They are productive investments that make technological change feasible.** This is also the core lesson of the flexicurity literature and of Aghion and Howitt's broader argument that successful structural change depends on institutions that support reallocation.[65]

A second implication concerns firms. Evidence from Denmark suggests that employer-led initiatives matter for whether AI adoption becomes productive. Encouragement from management, training efforts, and the development of in-house tools or models appear to support take-up and workplace usefulness, even if the short-term effects on wages and hours remain limited.[66] **Policy should therefore promote not only more AI adoption, but better AI adoption through workplace training, implementation support and diffusion of responsible practices, especially among smaller firms.**

5.4 Digital infrastructure

Digital infrastructure is another key precondition for ensuring that workers and societies benefit from AI. This includes not only connectivity and digital systems in firms, but also a strong digital public sector. Denmark's favourable starting point reflects decades of investment in digital government, high digital trust and widespread digital skills (e.g., Figure 3).

Digital infrastructure should also be understood broadly. It includes secure computing environments, trustworthy data governance and AI systems that work in Danish and other European languages. Without these foundations, adoption may remain concentrated in fewer frontier firms or large public organisations.

6. POLICY IMPLICATIONS FOR EUROPE

> *All in all, a pro-worker AI adoption and social security are not a barrier to competitiveness. They are a precondition for it.*

As Denmark is an early adopter of AI and has some of the strongest preconditions for productive implementation in Europe, the findings of this policy study are highly relevant for the broader European AI at work agenda.

Denmark has so far experienced only limited short-term effects on wages, working hours and employment. Hence, it is likely that similar or weaker immediate effects will be found in many other European countries. This does not mean that AI will be economically insignificant. Rather, it suggests that productivity gains are likely to emerge gradually and, for them to show a positive effect for workers, will depend on implementing some of the policy recommendations above (see Section 5). Especially unemployment and a growing skills gap need to be addressed at EU level.

A central implication is that EU AI policy should not focus narrowly on technology adoption. The evidence reviewed in this policy study suggests that AI is more likely to transform many jobs than replace them in the short term, but also that the benefits are not guaranteed. Employer support, training, worker involvement and collective bargaining appear to matter for whether AI becomes productive in practice. This points to a need for EU policy to connect industrial and digital policy more closely with social policy, lifelong learning and social dialogue.

The policy starting point differs substantially across countries. Nordic countries combine high digital readiness with strong labour market institutions, while other European countries may face weaker training systems, lower union density, less-developed digital infrastructure or more limited administrative capacity. This means that a one-size-fits-all approach is not sufficient and that in member states with less employment security, additional measures will be crucial to ensure that no one is left behind. EU-level policy should set common standards and mobilise investments in education and active labour market policies. The EU's new AI Literacy Framework, AI Continent Action Plan and Apply AI Strategy are all steps in the right direction.

All in all, a pro-worker AI adoption and social security are not a barrier to competitiveness. They are a precondition for it.[67]

Another important aspect to consider is the relationship between the increasing uptake of AI systems and the increasing dependence of European firms on US providers of (generative) AI models. Considering its dependencies and the evolving geopolitical context, the EU is pursuing an ambitious agenda of increasing its strategic autonomy through stimulating its own digital industries, thereby decreasing its reliance on non-European technology providers.

Beyond running contrary to the EU's autonomy ambitions, the (over)reliance on American models can also expose firms to serious risks, most notably illustrated when on 13 June the US Commerce Secretary issued a directive ordering Anthropic to suspend access for non-US citizens to its two most sophisticated models, Mythos 5 and Fable 5. Reportedly given only 90 minutes to comply with the directive, Anthropic suspended access to these models for all their customers, including Europeans. Whether nationality-based restrictions for American AI models will be introduced in the future remains to be seen; however, the Anthropic incident has made it clear that this is a realistic possibility with far-reaching consequences for European firms who have integrated these models in their daily work.

The EU should actively stimulate firms to adopt European models and, where such models are not available, create the necessary conditions for such models to be developed.

Ultimately, these two objectives – ensuring that the adoption of AI benefits workers and reducing Europe's reliance on foreign technology providers – should not be pursued separately from each other. After all, the goal is not simply to substitute American providers with European solutions, but rather to develop genuine alternatives where end users, such as workers, can exercise meaningful control over the technology, contributing to Europe's ability to develop and govern such technologies with full awareness of their social, economic, environmental and ethical implications. Genuine digital sovereignty, like a genuinely pro-worker AI transition, means putting people, rather than private or geopolitical power, at the centre of how these technologies are built, owned and used.[68]

7. CONCLUDING REMARKS

> *Investments in digital infrastructure, data access and innovation are necessary, but they must be matched by investments in adult education, active labour market policies, collective bargaining and social dialogue.*

AI has entered the labour market rapidly, but its real economic effects are still limited. The evidence reviewed in this policy study points to a clear productivity potential, particularly in knowledge-intensive tasks and digitally advanced economies. However, the observed short-term effects on wages and employment remain limited. It suggests that AI should neither be dismissed as hype nor treated as a technology that will automatically deliver broad-based productivity gains.

Beyond its effects on productivity, this policy study also highlights that, among survey respondents, workers who adopt AI reflect existing inequalities on the Danish labour market based on gender, age and skills. Therefore, if AI adoption has a positive impact on wages and employment for the already skilled and well-earning workforce, there is a risk of leaving vulnerable groups behind.

For Europe, this means that AI policy must be broader than a strategy for faster adoption. It should also be a strategy for better adoption. Investments in digital infrastructure, data access and innovation are necessary, but they must be matched by investments in adult education, active labour market policies, collective bargaining and social dialogue. These are not secondary social concerns. They are part of the productivity strategy itself.

The task for policymakers, employers and trade unions is therefore to ensure that AI is implemented with workers, not simply applied to them.

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AI DISCLOSURE STATEMENT

This publication was written in accordance with FEPS guidelines on the responsible use of AI in research and writing activities. AI tools were used to assist with coding and data processing, including support for code written in Stata and SAS. All AI-assisted code and outputs were reviewed, verified and modified by the authors, who retain full responsibility for the analysis and results.

Artificial intelligence (AI) is spreading rapidly across European labour markets, raising expectations of productivity gains as well as concerns about unemployment and working conditions. While existing research documents sizeable productivity gains for specific tasks and occupations, the broader economic effects remain uncertain, including whether these potential gains will translate into better outcomes for workers.

This policy study examines these developments through the case of Denmark. Our empirical analysis finds **no robust evidence that AI use has yet significantly changed wages or employment,** though there are indications that wage differences between AI users and other workers have widened. Moreover, **AI adoption is concentrated among already advantaged groups in the labour market.**

The findings suggest that **realising AI's productivity potential while ensuring broadly shared gains requires investment in skills, active labour market policies, worker involvement and collective bargaining.** These lessons are highly relevant across Europe.

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