

The future of work: a transatlantic perspective on challenges and opportunities



TRANSATLANTIC EXPERT GROUP
ON THE FUTURE OF WORK

The future of work: a transatlantic perspective on challenges and opportunities

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Foreword

Transatlantic discussions about labour have a long history and continue to be highly topical. A 1996 memorandum of understanding signed by United States Secretary of Labor Robert Reich and then European Union Social Affairs Commissioner Pádraig Flynn created the transatlantic Working Group on Employment and Labor-Related Issues to address issues including investments in human capital, active labour-market policies and developments in the wider international context. A quarter of a century later, these issues remain pertinent. But in an ever-changing labour-market landscape, including digitalisation, rapid technological advances and the emergence of new forms of work relations, they take on new meaning and urgency. The creation in 2022 of a Trade and Labour Dialogue (TALD) under the auspices of the EU-US Trade and Technology Council (TTC) underlines the importance of transatlantic dialogues.

In early 2021, in the spirit of transatlantic cooperation and of the 1996 working group, Bruegel and the German Marshall Fund of the United States established the Transatlantic Expert Group on the Future of Work, supported by a grant from the European Union. The goals of the expert group were to promote dialogue, mutual learning and the exchange of best practices among the experts, and to develop policy findings to inform EU and US policymakers about challenges on which they will need to reflect in the coming years.

To establish the expert group, we identified experts with diverse backgrounds from civil society, academia, think tanks, labour and the business community. Almost everyone we invited accepted the invitation, suggesting that experts believe there is a great potential for transatlantic dialogue on the future of work. The 34 expert group members were divided roughly evenly between the EU and the US. EU members were based in ten countries.

During 2021-2022, 15 internal meetings were held. On three occasions, we held plenary discussions with the participation of all members. The expert group was divided into three

smaller working groups, and each of these working groups had four meetings – often with the participation of other working group members. The three working groups focused on:

- Technology as a driver of change in the future of work,
- The inequality challenge and the role of education, skills training and social partners,
- The future of social protection policy.

All meetings except for the last plenary were held online. These internal meetings were inspired by kick-off remarks, sometimes by expert-group members, sometimes by outside experts to whom we are grateful: Daron Acemoglu (Institute Professor, Massachusetts Institute of Technology), Rebecca Dixon (Executive Director, The National Employment Law Project), Werner Eichhorst (Team Leader, Coordinator of Labor Market and Social Policy in Europe, IZA Institute of Labor Economics), Carl Benedikt Frey (Future of Work Director, Oxford Martin School, University of Oxford), Susan Houseman (Vice President and Director of Research, W.E. Upjohn Institute on Employment Studies), Laura Nurski (Research Fellow and Project Leader ‘Future of Work and Inclusive Growth’, Bruegel), Priyanka Sharma (Vice President US, World Education), Thiébaud Weber (Director of Partnerships, Matrice), and Loukas Zahilas (Head of the Department for Vocational Education and Training and Qualifications, the European Centre for the Development of Vocational Training).

The numerous insightful discussions of the expert group shaped our understanding of the impacts of technologies on the future of work, their distributional consequences, the need for evolving social protection systems and the roles of social partners and policy measures in addressing related challenges, among other topics. Beyond these internal discussions, we organised five public events, recorded four podcasts, and published seven papers and five blog posts. This e-book is a collection of those publications.

I am deeply grateful to all members of the expert group (see page 7) for dedicating their time and sharing their expertise in order to improve our understanding of these issues

throughout this two-year period. Special thanks go to our moderators and speakers who contributed to our five public events (see page 10) and four podcasts (see Page 13), and to the authors of the papers and blogposts.

The expert group would not have seen the light of the day without the tireless work of my project management colleagues at Bruegel and GMF, Anne-Marie Brady, Katerina Geisler, Daniel Mayer, J. Scott Marcus, Astrid Ziebarth and Sam duPont, who helped to set up the expert group, organised the various events, contributed to papers, blogposts and podcasts, and managed the administrative issues related to this project. The invaluable support from the Bruegel communications team is gratefully acknowledged. Last but not least, financial support from the European Union made this project possible, and special thanks go to colleagues from the European External Action Service for guiding us in the best implementation of this project.

March 2023

Zsolt Darvas

Project leader, Senior Fellow, Bruegel

Members of the expert group

The Expert Group consists of 34 experts from the EU and the US. They range from civil society, academia, think tanks, labour and the business community.

The Transatlantic Expert Group is comprised of three working groups:

Working group 1: Technology as a driver of change in the future of work

- [Antonio Aloisi](#), Marie Skłodowska-Curie Fellow and Assistant Professor, IE Law School, IE University, Madrid
- [Jeffrey Brown](#), Science & Technology Policy Executive, IBM
- [Tsai-wei Chao-Muller](#), Director, Digital Technology and Innovation & Digital Trade, DIGITALEUROPE
- [Valerio De Stefano](#), BOF-ZAP Research Professor, KU Leuven
- [Mamta Kapur](#), Europe Research Lead, Talent & Organization/ Human Potential, Accenture
- [Diane Mulcahy](#), Visiting fellow, Bruegel
- [Georgios Petropoulos](#), Marie Skłodowska-Curie Research Fellow, Sloan School of Management, MIT / Research Fellow, Bruegel
- [Volker Rosenbach](#), Consulting Partner, Deloitte Germany
- [Michel Servoz](#), Senior Fellow, German Marshall Fund of the United States
- [Lisette Sutherland](#), Director, Collaboration Superpowers
- [Laura Taylor-Kale](#), PhD Candidate, Stanford University
- [Michael Watt](#), Technical Officer, International Labour Organization
- [Stephen Zoepf](#), Chief of Policy Development, Ellis & Associate / Lecturer, MIT
- [Veena Dubal](#), Professor of Law, Harry & Lillian Hastings Research Chair, University of California, Hastings

Working group 2: The inequality challenge and the role of education, skills training and social partners

- [Molly Bashay](#), Senior Policy Analyst, Postsecondary education and workforce development, Center for Law and Social Policy
- [Maxime Cerutti](#), Director, Social Affairs department, BusinessEurope
- [Karolina Dreszer-Smalec](#), President, National Federation of Polish NGOs (OFOP)/ Vice President, European Civic Forum/ former member, European Economic and Social Committee (EESC)
- [Suresh Naidu](#), Professor of Economics and Public Affairs, School of International and Public Affairs, Columbia University
- [Louise Grabo](#), Secretary General, Swedish Fintech Association/ Member, European Economic and Social Committee (EESC) representing the National Youth Council of Sweden/ President, Maktsalongen, a Swedish NGO working for gender equality
- [Esther Lynch](#), Deputy General Secretary, European Trade Union Confederation
- [Sharon Rowser](#), former Vice President, Deputy Director, Policy Research and Evaluation Department, MDRC
- [Maria Savona](#), Professor of Innovation and Evolutionary Economics, University of Sussex/ Science Policy Research Unit & Professor of Applied Economics, Department of Economics and Finance, LUISS University
- [Rebecca Smith](#), Director of Work Structures, National Employment Law Project
- [István György Tóth](#), Director, Társi Social Research Institute

Working group 3: The future of social protection policy

- [Christina Behrendt](#), Head, Social Policy Unit, Social Protection Department, International Labour Organization
- [Indivar Dutta-Gupta](#), Adjunct Professor of Law, Co-Executive Director, Georgetown Center on Poverty & Inequality (GCPI)
- [Kathryn Anne Edwards](#), Economist, RAND Corporation/ Professor, Pardee RAND Graduate School

- [Anke Hassel](#), Professor of Public Policy, Hertie School
- [Robert Hawkins](#), McSilver Associate Professor in Poverty Studies, Silver and the Associate Dean for Academic Affairs, New York University
- [Karolien Lenaerts](#), Research Manager, research group Work, Organization and Social Dialogue, HIVA Research Institute for Work and Society, KU Leuven
- [Renaye Manley](#), Deputy Director, Strategic Initiatives department, Service Employees International
- [Mathias Maucher](#), Policy and Project Coordinator, Social Services Europe
- [Graham Owen](#), Former (retired) Director of Social Services, Municipality of Trosa, Sweden
- [Kathleen Romig](#), Senior Policy Analyst, Center on Budget and Policy Priorities

Public events

28 April 2022

COVID-19 and the shift to working from home: differences between the US and the EU

What changes has working from home brought on for workers and societies, and how can policy catch up?

Moderator:

J. Scott Marcus, Senior fellow, Bruegel

Speakers:

- Laura Nurski, Research fellow, Bruegel
- Mamta Kapur, Europe Research and Thought Leadership Lead – Talent and Organization/Human Potential, Accenture
- Jose Maria Barrero, Assistant Professor of Finance, Instituto Tecnológico Autónomo de México

Event webpage: <https://www.bruegel.org/event/covid-19-and-shift-working-home-differences-between-us-and-eu>

7 June 2022

Productivity effects of AI: Are there transatlantic differences

How should businesses and governments respond to unlock the productivity potential of artificial intelligence?

Moderator:

J. Scott Marcus, Senior fellow

Speakers:

- Arturo Franco, Senior Vice President, Thought Leadership, Mastercard Center for Inclusive Growth
- Andrea Glorioso, Policy officer, European Commission
- Francis Hintermann, Executive Director, Accenture Research, Accenture

Event webpage: <https://www.bruegel.org/event/future-work-and-inclusive-growth-annual-conference>

17 October 2022

Digital reskilling: empowering under-resourced communities on both sides of the Atlantic

What skills are needed for the digital future, and how can governments and companies support the retraining of people who lack these skills?

Moderator:

Astrid Ziebarth, Senior fellow tech & society, The German Marshall Fund of the United States

Speakers:

- Duygu Güner, Affiliate fellow, Bruegel
- Anne Kjær Bathel, Founder and Managing Director, ReDI School of Digital Integration
- Laura Maristany, Vice President of External Affairs, Bitwise Industries

Event webpage: <https://www.bruegel.org/event/digital-reskilling-empowering-under-resourced-communities-both-sides-atlantic>

16 November 2022

A transatlantic conversation on the Future of Work

How do the United States and the European Union address the challenges arising from the ever-changing labour market landscape and is there a scope for transatlantic cooperation?

Moderator:

J. Scott Marcus, Senior fellow

Speakers:

- Tanya Goldman, Counselor to the Secretary, Office of the Secretary, United States Department of Labor
- Stefan Olsson, Deputy-Director General for General Employment, Social Affairs and Inclusion, European Commission

Event webpage: <https://www.bruegel.org/event/transatlantic-conversation-future-work>

28 November 2022

Inequalities, inclusion, and employment: a transatlantic perspective

What factors contribute to inequalities on both sides of the Atlantic, and how should policymakers address them?

Moderator:

Zsolt Darvas, Senior fellow, Bruegel

Speakers:

- Maxime Cerutti, Director of the Social Affairs department, BusinessEurope
- Suresh Naidu, Professor of economics and international affairs, Columbia University

Event webpage: <https://www.bruegel.org/event/inequalities-inclusion-and-employment-transatlantic-perspective>

Podcasts

13 April 2022

Making remote work, work

How do we address the challenges of remote work? Lessons from both sides of the Atlantic.

For people who want to go back to the old way of work, the train has left the station. COVID-19 has given a huge impetus to working from home for those jobs that can, where more individuals are able to choose when and where they are most productive, and companies can choose what they want remote work to look like. Giuseppe Porcaro is joined by J.Scott Marcus and Lisette Sutherland to explore remote work on both sides of the Atlantic. Together they discuss work-life balance, gender gaps, skill acquisition, modernisation of workflows, technology adoption, managerial culture and flexibility enhancement.

- Giuseppe Porcaro, Head of Outreach, Governance and Human Resources, Bruegel
- J.Scott Marcus, Senior Fellow, Bruegel
- Lisette Sutherland, Director, Collaboration Superpowers

Podcast webpage: <https://www.bruegel.org/podcast/making-remote-work-work>

05 October 2022

Inequality across the Atlantic

A conversation about inequality developments in the European Union and United States in light of the changing nature of jobs

The COVID-19 pandemic, Russian invasion of Ukraine, energy crisis and the resulting high inflation have created new worries about inequality on both sides of the Atlantic. Labour markets and occupations have gone through profound changes as a result of technological progress, globalisation and changes to labour market institutions, among many other factors. In this episode of the Sound of Economics, Giuseppe Porcaro hosts Indivar Dutta-Gupta and István György Tóth for a conversation about the evolving nature of inequality on both sides of the Atlantic, what are the drivers of this wedge and what policy tools are needed to address it?

- Giuseppe Porcaro, Head of Outreach, Governance and Human Resources, Bruegel
- Indivar Dutta-Gupta, President & Executive Director, CLASP Center for Law and Social Policy
- István György Tóth, Director of Tarki Social Research Institute

Podcast webpage: <https://www.bruegel.org/podcast/inequality-across-atlantic>

09 November 2022

Changing labour markets, changing social protection

How can Europe and the United States adapt social protection system to meet the vastly developing labour market?

Social protection is the mechanism that addresses amongst other issues, poverty reduction, education, health, social inclusion, and empowerment. In the United States and in Europe social protections were initially designed between 1880 and 1945 with the full-time, dependent employee in mind. In this episode of The sound of economics, Giuseppe Porcaro invites Anke Hassel and Kathleen Romig to discuss the challenge that confronts the United States and Europe, in the context of a changing labour market and the increase in nonstandard work.

- Giuseppe Porcaro, Head of Outreach, Governance and Human Resources, Bruegel
- Anke Hassel, Professor of Public Policy, Hertie school
- Kathleen Romig, Director of Social Security and Disability Policy, Center on Budget and Policy Priorities

Podcast webpage: <https://www.bruegel.org/podcast/changing-labour-markets-changing-social-protection>

16 December 2022

Transatlantic Perspectives on Digital Automation Technologies

Views from USA and Europe on the future of Digital Automation Technologies and their implications for the Future of Work

ChatGPT is the latest example of technology that appears to be able to execute tasks that would have required the services of high level academics not too long ago. Similar AI initiatives are taking place across the world, which begs the question: is automation coming for knowledge work next? In this episode of the Sound of Economics, Giuseppe Porcaro invites Maria Savona and David Autor to discuss different perspectives and lessons from the US and Europe on the design of digital automation technologies and their implications for the future of work.

- Giuseppe Porcaro, Head of Outreach, Governance and Human Resources, Bruegel
- Maria Savona, Professor of Applied Economics at the Department of Economics at LUISS University, Rome and Professor of Economics of innovation at SPRU, Science Policy Research Unit at the University of Sussex, UK
- David Autor, Ford Professor in the MIT Department of Economics

Podcast webpage: <https://www.bruegel.org/podcast/transatlantic-perspectives-digital-automation-technologies>

Blog posts

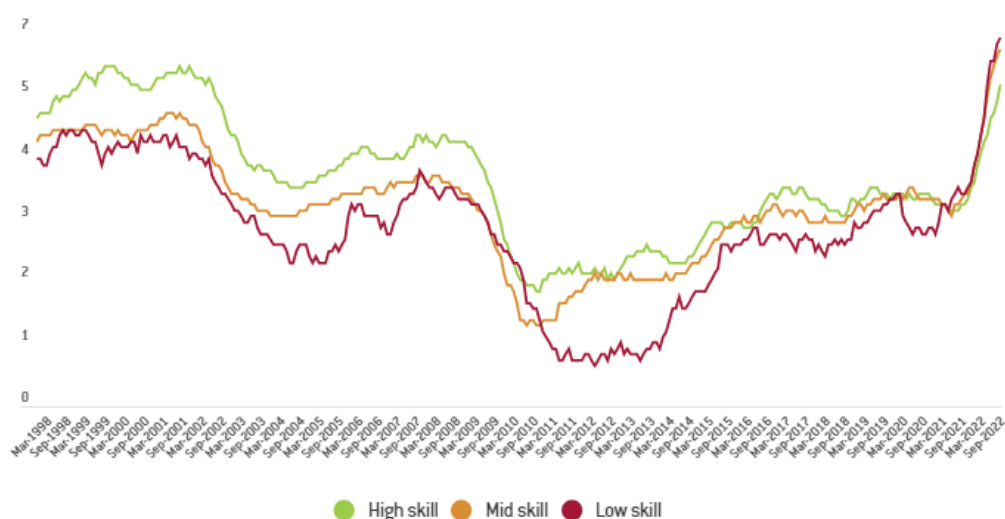
The sometimes puzzling differences in transatlantic earnings growth

Zsolt Darvas and Maria Savona

The earnings of low-skill workers in the United States have typically grown more slowly than those of high-skill workers. Earnings growth for workers with mid-level skills has typically fallen between the rates for those with high and low skills. Data on earnings by skill level is available from the Atlanta Fed's Wage Growth Tracker starting in 1997 (Figure 1). The dataset shows a similar picture for earnings growth by education: highly-educated workers (who typically have high-level skills) have benefitted from faster wage growth than those with middle levels of education, while the least educated (who typically have low skills) saw the slowest wage growth.

Other research has confirmed that these developments have characterised the US labour market from the early 1980s. In 2022, low-skill and mid-skill wage growth has accelerated notably (Figure 1), but this hardly compensates for the preceding four decades.

Figure 1: Annual wage growth in the United States, 1997-2022, %



Source: Atlanta Fed's Wage Growth Tracker, which is based on the monthly Current Population Survey (CPS) from the US Census Bureau. Note: 12-month moving average growth rates based on hourly wage data. The skill categories used by the Wage Growth Tracker are high-skill (managers, professionals and technicians), mid-skill (office and administration, operators, production and sales), and low-skill (food preparation and serving, cleaning, individual care services and protective services).

But most of Europe is different. A few European countries look like the US in terms of earnings growth, but in many, wages of workers in low-skill occupations increased faster than wages of high-skill occupations from 2006 to 2018, as we demonstrated in a paper for the Transatlantic Expert Group on the Future of Work.

It should be noted that European wage data is scarcer than data for the US. Eurostat's frequently updated quarterly labour cost indicators do not differentiate according to individual characteristics of employees, like occupation and educational level. For such data, the Structure of Earnings Survey provides information every fourth year. The latest available data is for 2018, while the first observation is 2006 for most EU countries.

Figure 2 reports data for six of the ten main occupational categories: managers and professionals are usually classified as having the highest skills and their earnings are higher than in other occupations; technicians and clerical support workers typically have mid-level qualifications and are in the middle of the income distribution; workers in sales and elementary occupations typically have low-level qualifications, low skills and low earnings.

Figure 2: Real earnings by occupation in EU countries (2006=100)

This interactive figure is available online at <https://www.bruegel.org/blog-post/sometimes-puzzling-differences-transatlantic-earnings-growth>

Among 26 EU countries (data for Croatia is not available from 2006), the high-skilled benefitted from the fastest earnings growth only in Bulgaria, Ireland and the Netherlands, with managers and professionals generally seeing the fastest earnings growth. In Malta, the two mid-skill occupations (technicians and clerical workers) saw the fastest earnings growth, followed by the two high-skill occupations, while low-skill occupations (sales and elementary occupations) saw the slowest earnings growth.

In eleven countries, meanwhile, low-skill earners experienced the fastest earnings growth (Austria, Estonia, Hungary, Latvia, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden): the two low-skill occupations were either the top two or in the top three for earnings growth, outpacing both high-skill occupational categories.

In the remaining eleven countries the evidence is mixed, yet there is at least one low-skill occupation that benefitted from faster earnings growth than at least one high-skill occupation. The same mixed outcome characterises the United Kingdom.

In the US, automation has driven wage inequality

Explanations for diverging earnings growth depending on skills and educational levels include technological change, globalisation and changes in labour markets, such as the declining bargaining power of low-skill workers or the relative reduction in minimum wages. However, technological change may have played the dominant role in the United States.

For example, Daron Acemoglu and Pascual Restrepo argued in 2021 that the relative wage declines experienced by workers doing routine tasks in industries experiencing rapid automation explain between 50% and 70% of changes to the US wage structure over the last four decades. Examples of automation include industrial robots replacing blue-collar workers in manufacturing and specialised software replacing clerical workers. They also concluded that offshoring contributes to task displacement, but accounts for a smaller portion of observed wage changes than automation. Rising market power, markups, import competition and deunionisation do not appear to play major roles in US wage inequality.

Some compelling theories suggest that automation can be the main driver of wage inequality. Acemoglu and Restrepo also developed a framework in which automation technologies expand the set of tasks performed by capital, and displace workers previously employed in these tasks. Workers displaced from routine tasks typically have low or mid-level skills. Displaced workers compete against others for non-automated tasks, bid down their wages and spread the negative wage effects of automation more broadly through the population. The positive impact of task displacement on productivity, GDP and the average wage level could be a counter-balancing factor, but this effect was found modest.

David Autor in 2019 also argued that technological change has played a major role in US wage inequality and highlighted the issue of polarisation: the hollowing out of mid-skill,

non-college blue-collar production and white-collar administrative support jobs. He suggested three mechanisms to explain why. First, non-college workers have been shunted from mid-skill career occupations that reward specialised and differentiated skills, into traditionally low-education occupations that demand generic skills. Second, technological change has depressed mid-wage employment disproportionately among non-college workers in urban areas, thus directly reducing average non-college wages. Third, technology has created an excess supply of less-educated workers that depresses non-college wages generally.

Other theories show that if high-skilled workers are complements to machines and low-skilled workers are substitutes for machines, then automation leads to an increasing share of college graduates in the population, increasing income and wealth inequality, and causes a declining labour share in total income. Greater complementarity between robots and older workers, and greater substitutability between robots and younger workers, has also been found. Since older workers tend to earn more than younger workers, this process also increases inequality. Automation could also increase inequality via increased returns to wealth.

In Europe, the role of automation in inequality is unclear

European labour markets are similar in some ways to US labour markets, such as in the increase in jobs with high-level education attainment (and also an increase in people with tertiary education) and the reduction in jobs with low-levels of educational attainment. Polarisation is also observed in Europe: the numbers of high-skill jobs and the numbers of low-skill service occupations have grown. By contrast, the number of middle-skill jobs (such as clerks, machine operators and assemblers) has declined in Europe.

Polarisation in Europe is illustrated by changing employment shares. From 2002 to 2016, the employment share of high-skill workers increased by 8 percentage points, that of low-skilled workers increased by 1 percentage point, while that of mid-skilled workers fell by 9 percentage points. Low-skill and mid-skill jobs are significantly exposed to automation.

In terms of the extent of automation, the US and the EU saw similar trends from 1993 to 2016 in the deployment of industrial robots, while robot density (number of robots per number of workers) has consistently been higher in the EU than in the US. The EU lags behind the US in artificial intelligence investment (by a large margin) and adoption (by a smaller margin). The World Economic Forum's ITC adoption rankings puts ten, mostly small, EU countries ahead of the US, and five small EU countries ahead in terms of digital skills. The EU's Digital Economy and Society Index shows big differences across the EU, but it does not compare to the US.

Thus, there are several similarities between the EU and US in labour-market and technology-adoption trends, though the US is more advanced in digital technologies. It's puzzling that, if automation is the main driver of US earnings inequality, why similar earnings growth inequality is not seen in Europe.

It may be that labour market characteristics influence how the gains from automation are shared more with workers. One analysis found no overall effect of robotisation on average earnings in 20 European countries from 2010 to 2015, but found a positive effect on average earnings for workers in countries with above-median collective bargaining coverage. Collective bargaining might reduce inequality. Other 'European' factors could include labour-market regulations, minimum wages and differences in industrial structure and technology adoption. Further research should study the role of these and other possible factors in explaining transatlantic differences – and within-EU differences – in earnings growth.

Artificial intelligence: how to get the most from the labour-productivity boost

Georgios Petropoulos

In the last decade, labour productivity growth has slowed, despite the fast development of new efficient general-purpose digital technologies, including machine learning and artificial intelligence (AI). This productivity slowdown is a paradox. Does it mean the hopes about the potential of these technologies to transform societies and improve people's lives were false? A paper by Petropoulos and Kapur (2022), prepared for the Transatlantic Expert Group on the Future of Work, discussed what lies behind this paradox and makes policy recommendations on how to get the most out of AI in terms of productivity and economic growth.

As a starting point, Brynjolfsson et al (2021) showed there are deeper causes of the AI productivity paradox. AI is a general-purpose technology that penetrates many economic sectors. Analogous technologies with such a general scope include the steam engine, electricity and computers. A common characteristic of these technologies is that for each, it took years after their introduction for the pay-off to be seen in the productivity statistics. For instance, after the introduction of electricity in American factories, productivity was stagnant for over two decades. Only after managers re-invented their production lines using distributed machinery, a technique made possible by electricity, did productivity belatedly surge. Each general-purpose technology requires the development of sufficient complementary innovations and adjustment of the demand side, in order to have an impact on productivity.

In the case of AI, these complementary innovations involve intangible capital. Firms need to rethink their business models, managers need to develop expertise for the digital age, workers need to be retrained to interact with these new technologies, and complementary web applications and software need to be designed. Without these complementary innovations it is hard for AI to boost productivity. Therefore, over time, there will be two distinct phases in the impact of AI on growth: an initial phase when intangible capital is created and accumulated, followed by a productivity boom.

The fact that the AI productivity boom is expected does not mean just waiting for it to happen. Careful thought needs to be given to which policies will help the boom phase arrive earlier and to last longer. A proper policy framework should identify and mitigate the bottlenecks to the realisation of the economic and social benefits of AI.

AI bottlenecks

One bottleneck has to do with firms' financial constraints. Acemoglu et al (2022) showed that the most frequent reason for not adopting AI is that non-adopters find AI technologies expensive within their business models and production functions.

Specific policies should be prioritised to maximise knowledge spillovers without impeding innovators' incentives. Knowledge spillovers have traditionally been a central objective of government policy interventions. In the context of a strong intellectual property regime that keeps the value of innovation high, policies that aim at wider diffusion of AI technologies can be beneficial in building the intangible capital needed to arrive at the productivity boom phase. Becker (2015) and Bloom et al (2019) illustrated how R&D tax credits for AI investments can work well towards this goal.

Many countries provide incentives for research and development, such as allowing additional deductions against tax liabilities. However, national measures differ in terms of their generosity. An overall estimation by Bloom et al (2019) concluded that a 10 percent fall in the tax price of R&D leads to at least a 10 percent increase in R&D in the long run. Hence, AI tax credits can prompt the diffusion of these technologies, and could contribute to a significant accumulation of intangible capital in order to reach a critical mass, putting the economy on the productivity boom path.

The second bottleneck is methodological and has to do with being able to measure the impact of AI. Specifically, new frameworks are needed that are more suitable for measuring the contribution of AI to productivity (Brynjolfsson and Petropoulos, 2022). Current measurements, such as GDP, are insufficient when they only factor in tangible goods and services that are offered at positive prices. In the digital economy, many intangible goods

and services are provided at no financial cost to consumers. These still increase consumer welfare, create jobs and generate profit. Moreover, advancements in AI decision-making and prediction could generate new opportunities for economic growth that have never previously been realised.

Also needed are policies that focus on the supply of human capital, especially the training of managers and AI talent. Managers should become more familiar with the practical implications of AI in order to contribute to the reorganisation of work, towards a model in which AI machines and labour act as complements. This is important to avoid the risk of excessive automation. As Elon Musk put it: “Yes, excessive automation at Tesla was a mistake. To be precise, my mistake. Humans are underrated”¹. There is a risk that managers choose to overinvest in automated technologies that do not add much in terms of productivity, while neglecting the productivity boost of combining labour and AI capital in a harmonious way. Alongside investment in AI, managers should change fundamentally their perspectives on how their firms should adjust their work environments so workers can become more efficient by using AI machines. A human-centric approach is needed in industrial production and the provision of tasks, in order to grasp the full benefits of technology.

Acquiring capable AI talent is an important part of this. The complementarity between workers and AI systems requires workers to be well trained on how to interact with AI machines, in order to maximise the efficiency of production processes.

However, AI talent is currently very concentrated in a few superstar firms. Wang et al (2021) used US online job posting data from Lightcast from January 2010 to June 2020, and found that the top employers account for a large percentage of the total demand for frontier technology skills, including AI, machine learning, natural language processing, cloud computing and big data. More than a quarter of all job vacancies in the last decade that required AI skills were posted by the top 10 firms that employed people with AI skills. The

¹ <https://twitter.com/elonmusk/status/984882630947753984?lang=en>.

respective concentration percentage of more 'traditional' information technology skills is only 6.9 percent. Wide adoption of AI in order to maximise its knowledge spillovers, and therefore its social benefits, would require smaller firms to be able to hire AI experts, which will help them make complementary investments in intangible capital in order to grasp a fair share of these benefits.

Market power failure

In addition to education and training, another reason for the shortage of skills, especially in small and medium enterprises, has to do with the increased market power of the big companies (Philippon, 2019). This leads to only a small portion of firms capturing most of the talent and the benefits from AI technologies, and thus consolidating their positions in the markets in which they operate.

Addressing the market-power failure in AI-related markets would require a combination of market regulation, competition policies and labour-market policies (Parker et al, 2022). Market regulation should set the basic principles of operation so that specific firms do not have an unfair competitive advantage that allows them to grow at the expense of their competitors, even if they are not more efficient in terms of production costs and quality of products and services. Competition policy should ensure that these regulatory principles are enforced, enabling antitrust authorities to intervene in a timely manner and to have access to relevant information, in order to evaluate cases of market misconduct. Labour-market policies should embrace flexibility, allowing AI talent to flow across different firms, but policies should also give workers adequate social protection.

Meanwhile, employment contracts should be adjusted to incorporate opportunities for life-long learning, because in the age of AI skills depreciate rapidly. Different jobs have different training needs in terms of keeping up to date with relevant technological developments. On-the-job training should be designed taking into consideration the occupational characteristics and how dynamically these characteristics evolve due to technology.

The results in Deming and Noray (2020) are striking. They studied the impact of changing job skills on career earnings for US college graduates. They found that college graduates in all fields experienced rapid earnings growth. Yet the relative earnings advantage for graduates in subjects such as computer science, engineering and business was highest at labour-market entry and declined rapidly over time. Flatter wage growth for technology-intensive majors coincides with their faster exit from career-specific occupations. This implies that in order to prolong technology-intensive careers, investments in human capital should not stop at the point of entry into the labour market. Continued investment in lifelong learning and training is needed, especially as digital technologies penetrate more and more sectors and occupations.

AI, as a general-purpose technology is expected to affect various aspects of our lives. Getting significant economic and social benefits from it requires a multidimensional policy toolkit to be defined. If this promotes a human-centric approach, it will result in widespread adoption of AI, increasing innovation, competitiveness and social welfare.

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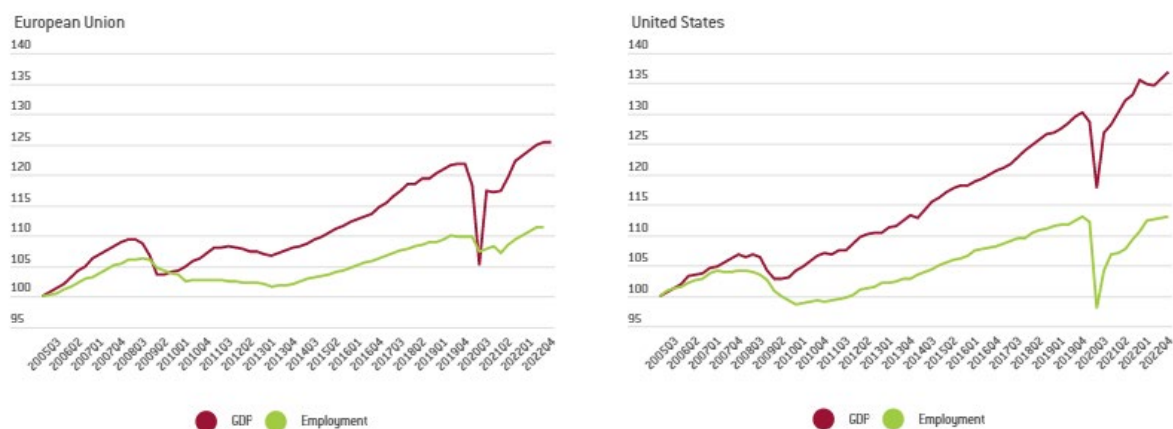
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Two crises, two continents: how the labour-market impacts have differed, Zsolt Darvas

Two once-in-a-lifetime crises have hit the global economy in the past two decades. The first was the global financial crisis (GFC), which began in financial markets in the United States in summer 2007 and intensified after the collapse of Lehman Brothers in September 2008. The second was the economic meltdown that resulted from the COVID-19 pandemic, which sunk the global economy in 2020. The two crises played out similarly in the US, but differently in Europe.

Economic contraction was sharp after the demise of Lehman Brothers in 2008. It was even sharper in 2020 when widespread lockdown measures resulted in quarterly output drops of 10% in the US and 14% in the EU in the second quarter of the year (Figure 1). In the US, employment fell more than output in both recessions. In the EU, employment fell less than output, especially during the pandemic.

Figure 1: GDP and employment in the EU and the US, 2005Q1=100



Sources: Bruegel based on OECD Quarterly National Accounts database for GDP and Short-Term Labour Market Statistics for employment. Note: EU data refers to the current 27 members in the full sample period. Chain-linked volumes for GDP, number of people for employment. Both indicators are seasonally adjusted. The last observation is 2022Q4 except for EU employment, for which the most recent data is for 2022Q3.

Contrasting bounce-backs

The US economy recovered faster than the EU from both crises. After the global financial crisis, US GDP returned to its pre-GFC level in 2010Q4 – even though the US financial system was the epicentre of that crisis. In the EU, recovery took three more years, mainly because of a second-dip recession caused by combined sovereign debt, banking and balance-of-

payments crises in several EU countries in 2010-2012. After the pandemic, US GDP exceeded its pre-pandemic level in 2021Q1, while it took two more quarters in the EU. Moreover, US output has almost returned to the pre-crisis trendline, while this is not the case (at the time of writing) for the EU.

The recovery of employment to its pre-crisis level took much longer than the recovery of output in the US after both crises: after the GFC, US GDP recovered after 2.5 years but employment only after 6.5 years. After the pandemic, output recovered after five quarters, while employment only after three years. These figures show that economic recessions can result in lasting social hardship. In the EU, employment recovery after the GFC took two more years than the lengthy output recovery. But after the pandemic, the two indicators reached their pre-crisis levels almost at the same time (the gap was just one quarter).

Figure 1 also suggests that labour productivity increased much faster in the US than in the EU. While the overall change in employment between 2005 and 2022 was almost identical in these two large economies, US GDP increased by about 10% more than EU GDP over the same period.

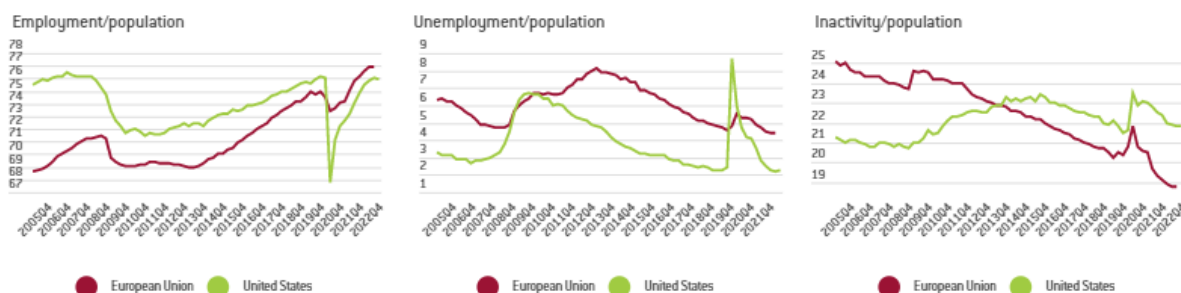
Thus, the recovery from the pandemic recession shows similarities with the recovery from the global financial crisis-induced recession in the United States, but it's rather different in the EU. The US recovered faster from both recessions and recorded faster labour productivity increases than the EU. EU labour-market recovery was painfully long after the GFC, but after the pandemic, labour-market outcomes were more benign in the EU than in the US.

The EU is also characterised by significant differences across the bloc (see Figure 3 in the Annex of the online version of this blog post). Output growth between 2005 and 2022 in central and eastern EU countries, Ireland, Luxembourg and Sweden rose faster than in the US, while Greek output is still 15% below its 2005 value, and Italian output has barely exceeded its 2005 level. The pandemic recession was deeper in southern EU countries than elsewhere in the EU.

The EU's success in creating jobs and reducing inactivity

To shed light on the components of labour-market adjustment, Figure 2 reports the share of people employed, unemployed (ie looking for work) and inactive (ie not looking for work). We focus on the 25-64 age cohort so that students under the age of 25 do not blur the picture.

Figure 2: Employment, unemployment and inactivity of the 25-64 age cohorts in the EU and the US (% of all 25-64 year-olds)



Source: Bruegel based on the OECD's Short-Term Labour Market Statistics Dataset. Note: EU data refers to the current 27 members in the full sample period. I collected data on the number of people employed/unemployed/inactive in the 25-54 and 55-64 age cohorts, which I added up to obtain values for the 25-64 age cohort. I divided all three indicators by the total population of the 25-64 age cohort so that the sum of the three ratios is 100%. The ratio of unemployment to the total population differs from the usually reported unemployment rates, which are defined as the ratio of the unemployed to the active population. All indicators are seasonally adjusted. The last observation is 2022:04 for the US and 2022:03 for the EU.

The US had a higher employment rate than the EU up to the pandemic, when US employment fell drastically, while the fall was moderate in the EU (Figure 2, Panel A). As a consequence, there was a major spike in US unemployment, but less so in the EU (Figure 2, Panel B). Since the pandemic, the EU has overtaken the US in terms of employment rate. The EU's employment rate reached a historical record level by 2022, while the US employment rate has just recovered close to its previous highs.

Another major success of European labour markets has been the growing integration of inactive people (Figure 2, Panel C). In 2005, the share of inactive people in the EU was 25%, well above the US value of 21%. From 2005 up to the GFC, EU inactivity declined steadily, while the US inactivity rate stayed flat. The GFC resulted in a short-lived and small increase in EU inactivity, which was followed by a marked decline. In contrast, an increasingly large share of US workers left the labour market up to 2014, followed by a partial reversal. The pandemic caused a sudden increase in inactivity in both economies. Yet, the subsequent return to labour markets was much more pronounced in the EU than in the US.

Again, there are big differences within the EU (see Figure 4 in the Annex). The employment rates in Italy, Romania and Spain were well below the US values during the whole time period, while in Belgium and France, the rates were somewhat below the US rate over most of the period. In contrast, the Swedish and Danish employment rates were higher than the US rate for the full period, while the same applies to the post-GFC period for Austria, Estonia, Finland, Germany and the Netherlands. Most central and eastern EU countries also overtook the US in terms of the employment rate.

What explains transatlantic differences?

The decade-long reduction in European inactivity could be explained by the various social initiatives the EU institutions and EU countries have adopted. A general explanation for the muted employment declines after crises in Europe, compared to the US, could be differences in employment protection measures, which are much more favourable to workers in Europe than in the US.

While the pattern of the US recovery from both the global financial crisis and the pandemic crisis was similar, it was rather different in the EU. The much faster EU recovery from the pandemic recession than from the global financial crisis was related to macro and micro policies, as well as differences in vulnerabilities and the institutional framework. When the global financial crisis hit the world, most southern EU countries, some eastern EU countries, and also Ireland, suffered from vulnerability in their financial sectors, external financing positions and/or public finances. This was no longer the case by the time of the pandemic. After the global financial crisis, the initial fiscal response was moderate, and was quickly followed by fiscal tightening. In contrast, fiscal stimulus was provided throughout the EU after the pandemic. The EU's institutional architecture improved considerably between the two crises, most notably through tighter banking regulation, common banking supervision in the euro area, the setup of crisis management institutions and a greater focus on macroeconomic surveillance.

A specific reason for the less-pronounced European employment decline than in the US during the pandemic is the different labour-market policies. Inspired by the German Kurzarbeit, which was successfully used after the global financial crisis (IMF, 2020), European countries adopted various short-time work schemes aimed at keeping people employed: approximately 20% of the EU workforce benefited from such a scheme during the first wave of the pandemic (Eurofound, 2021). In contrast, in the US, the focus was on increasing the generosity of unemployment benefit systems (which in normal times are much less generous than in Europe) and lump-sum payments for all individuals below a certain income threshold. Cohen-Setton and Pisani-Ferry (2020) concluded that the US job-support programmes were much less effective than the French package.

Finally, the US adopted a larger fiscal stimulus than the EU during and after the pandemic, which supported a faster US economic recovery, while monetary policy was rather expansionary on both sides of the Atlantic.

It's hard to judge whether the EU or US policy response was overall more successful: the US did better in growth and productivity, while after the pandemic, the EU did better in terms of employment. Ultimately, crisis policy choices seem to be consistent with underlying economic priorities: higher efficiency at the cost of less equity in the US, and greater social focus in Europe.

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A high-level view of the impact of AI on the workforce

J. Scott Marcus

The EU-US Trade and Technology Council (TTC), a forum established in 2021², has been seeking to achieve a positive reset of the EU-US relationship, in terms of both technology and trade policy, after the traumatic Trump years. The initial composition consisted of ten distinct working groups, none of which had more than a passing relationship with labour issues. More recently, however, the TTC has begun to address labour policy, and its relationship to digitalisation, automation, artificial intelligence and more broadly the evolution of technology. There have been two main developments: the creation of a Trade and Labor Dialogue³, which met for the first time on 20 September 2022, and the production of a joint study on *The Impact of Artificial Intelligence on the Future of Workforces in the European Union and the United States of America* (TTC, 2022), which was published on 5 December 2022.

The report does not represent a deep dive into public policy in either the EU or the US on AI as it relates to the workforce. It makes only a passing mention of the proposed EU Artificial Intelligence Act⁴, no mention at all of the algorithmic management sections of the proposed EU Platform Workers Directive⁵, and only a brief mention of the US initiative to create an AI ‘Bill of Rights’⁶. Nonetheless, the report is important in that it represents a possible transatlantic convergence of views at governmental level. It helps to establish a constructive and cooperative tone on a constellation of challenging issues. For these reasons, a close look at the report is warranted.

The stated goal of the report – produced by the European Commission and the US Council of Economic Advisers – was “to synthesize the perspectives of the US and European Union and academic work from both countries with a focus on implications relevant to policymakers”. It provides a general background on the degree of take-up of AI and machine learning (ML) in

² See https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/stronger-europe-world/eu-us-trade-and-technology-council_en.

³ See https://ec.europa.eu/commission/presscorner/detail/en/ip_22_7441.

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⁶ See <https://www.whitehouse.gov/ostp/ai-bill-of-rights/>.

the EU and the US, and reflects at length on both the potential benefits and potential threats of AI together with ML. The core of the report comprises case studies of two sectors in which AI already plays a substantial role: (1) hiring and human resources; and (2) warehousing and related logistics. Here, we summarise the report and reflect on its implications.

Adoption of AI in the US and the EU

In the US, very few firms have adopted AI; however, the proportion of workers exposed to the effects of AI is considerably greater than the number of firms would suggest, because US firms that adopt AI tend to be larger and younger (and are typically led by younger, more educated and more experienced owners). Uses include the application of AI/ML to business processes, machine vision (automated data extraction from images) and natural language processing. Adoption is higher in the information, professional services, management and finance sectors, but is also above average in retail trade, transportation and utilities.

Larger firms in the EU are also more likely to apply AI. AI is most often used to automate workflows, as a base for machine learning and to analyse written language. Chatbots are a growing application. AI is most used in finance, education, health and social work, except for robotics which is mostly used in manufacturing.

Benefits and risks from adoption of AI/ML

The benefits and the range of application of AI/ML have now become obvious. In the hiring process, to give just one example, the report notes that AI can draft job descriptions, match job requirements with applicant skills and filter out applicants who are a poor fit. It is increasingly possible to apply AI/ML to tasks that had once been thought only by humans could carry out, including in many cases tasks that have traditionally been performed by the highly skilled. New applications are being enabled by advances in natural-language processing and computer vision. Businesses seek to scale up, to lower costs, to make better decisions.

The report's authors asked the AI text and prose-writing application GPT-3 for its view on the societal risks of AI. It identified four: job losses, inequality, security risks and ethical

concerns. Many human experts would share these same concerns, but some might identify more.

An obvious risk is indeed that AI/ML might reduce the number of workers needed. Even if the total number of workers remains stable or increases, the skills required are likely to evolve because of the changes arising from AI/ML, together with other aspects of automation. The report argues that while all workers tended to benefit from technological change between 1945 and the 1980s, in subsequent decades most of the benefits went to highly skilled workers. The advent of AI/ML possibly signals a new phase in which not only jobs at low and medium skill levels are at risk from new technology (as has already been clear for many years; see Brekelmans and Petropoulos, 2020), but also the jobs of higher-skill workers.

In line with a growing body of research, the report notes a tension between the use of AI/ML for increasing the efficiency of workers (referred to in the literature of AI in the workplace as augmentation), versus the replacement of workers by means of AI/ML (referred to in the literature as automation). Even if the pace of new job creation remains in balance with the pace of job destruction – which is likely but not assured – the skills needed are sure to change in a great many professions.

Case study 1: the impact of AI/ML on hiring and human resources

Nearly every aspect of the hiring process has been dramatically influenced by the advent of AI/ML technology. AI/ML can help to draft job descriptions, screen qualifications to avoid wasted time for candidates and potential employers where there is a poor fit, conduct and score scientifically validated tests of promising candidates, and match job listings with qualifications with a rapidity that a human HR specialist could not dream of equalling.

For applicants, AI can likewise facilitate the job search, and may make the applicant aware of new and unexpected ways in which her talents might be applied.

But AI/ML has not replaced the need for human expertise. If anything, it has shifted the focus, making human skills especially important in high-value activities that are not easily

automated, such as negotiating final job offers and convincing desired candidates to accept job offers.

A huge worry is that expanded use of AI/ML *“could potentially introduce bias across nearly every stage of the hiring process. ... Machine learning algorithms [might] give the appearance of a fair and clean mathematical process while still exhibiting biases”* (TTC, 2022). Examples of this are already visible⁷. Systematic bias might be inherent in underlying training data for AI/ML. Various forms of bias might be present even where the bias is unintentional.

Case study 2: the impact of AI/ML on warehousing and logistics

With the shift to just-in-time manufacturing, equivalent modernisation of retailing and the broader shift to globalised value chains, warehousing has changed from a somewhat pedestrian activity to a core activity that plays a significant role in labour markets and in the gross value added of developed economies.

An analysis in TTC (2022) of value added and inflation-adjusted earnings in Germany, France, Italy, Spain, the Netherlands and the US demonstrates that value added has tended to increase faster than earnings – in other words, firms (and their shareholders) have appropriated more of the gains of increased productivity than have workers. Possible reasons include: (1) declining effectiveness of the representation of workers in this sector, eg in trade unions; (2) the relative fungibility of the relatively low-skilled workers who are needed in this sector today; and (3) increased ability of firms to use algorithmic surveillance to drive higher worker productivity, coupled with limited visibility into the functioning of the algorithms on the part of workers or the public.

Indeed, the report treats the growing use of intrusive algorithmic surveillance (Nurski and Hoffman, 2022) as a significant public-policy concern in its own right.

An additional factor potentially of great significance is that in this sector, there is good reason to believe that automation effects (ie replacement of workers) have been more

⁷ Jeffrey Dastin, ‘Amazon scraps secret AI recruiting tool that showed bias against women’, *Reuters*, 11 October 2018, <https://www.reuters.com/article/us-amazon-com-jobs-automation-insight-idUSKCN1MK08G>.

prevalent than augmentation effects (making workers more productive without reducing worker numbers). This inherently implies a decline in the bargaining power of workers.

Reflections on the report's conclusions

The report identifies only a small number of potential policy interventions, and these are discussed only at high level, but the recommendations are sensible as far as they go:

- Invest in training and job-transition services so that the employees most disrupted by AI can transition effectively to new positions for which their skills and experience are most applicable.
- Invest in the capacity of regulatory agencies to ensure that AI systems are transparent and fair for workers.
- Encourage development and adoption of AI that is beneficial for labour markets.

The need for modernised, flexible job training in response to all forms of automation has been obvious for some time (Petropoulos *et al*, 2019). Not stated in the report but equally obvious, is that a shift from traditional education to lifelong learning is likely to prove necessary. A challenge in both the US and the EU is that the responsibility for education is largely delegated, respectively, to state and member-state level, and is often further delegated from there, implying challenges in driving consistent, coherent and effective overall policy change. Beyond that, the pace of technological change may currently be greater than the speed at which additional education and training systems can adapt. Furthermore, the speed of change makes it difficult to know exactly what skills are likely to be needed in future.

Enhancing regulatory capabilities can be expected to be challenging. Moreover, this is the area in which EU-US differences in approach are likely to be most evident. The report's authors focus specifically on addressing bias in hiring algorithms, and on mitigating excessive electronic surveillance in the workplace, but these likely represent only the start of what must ultimately become a broader discussion. The risk appears to be substantial (Aloisi and De Stefano, 2023) of piecemeal approaches and divergent practices to automated decision-making and intrusive algorithmic surveillance between the EU and US, and for that matter within the EU and within the US.

In terms of encouraging the development and adoption of AI that is beneficial for labour markets, the report identifies three approaches: promoting research, using public procurement and adjusting incentives to encourage firms to place greater emphasis on helping workers become more productive, rather than replacing them by means of automation.

These are sensible recommendations, but they go only so far. Research is a necessary but not a sufficient condition for a satisfactory response to the many challenges that AI/ML poses to the workforce, and the same can be said for public procurement. The third approach, dealing with incentives for firms, is likely to be critical. As the report notes, challenges “... include firm business models that promote cutting costs, economic distortions in the tax and regulatory space that increase the cost to firms of using labor relative to capital, and even the ‘aspirations of researchers’ at private firms who are excited and motivated to develop branches of AI that are more suited to automation ... All these channels might push the society towards an undesirable equilibrium in terms of the balance of automation and augmentation AI technologies”.

In other words, as already visible in the warehousing sector case study, companies may be more motivated to eliminate jobs than to make workers more effective. The report’s observations on incentives for firms are broadly correct, but considerable work will be needed to turn these reflections into effective practice.

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**Collective bargaining is associated with lower income inequality (forthcoming)
Zsolt Darvas, Giulia Gotti and Kamil Sekut**

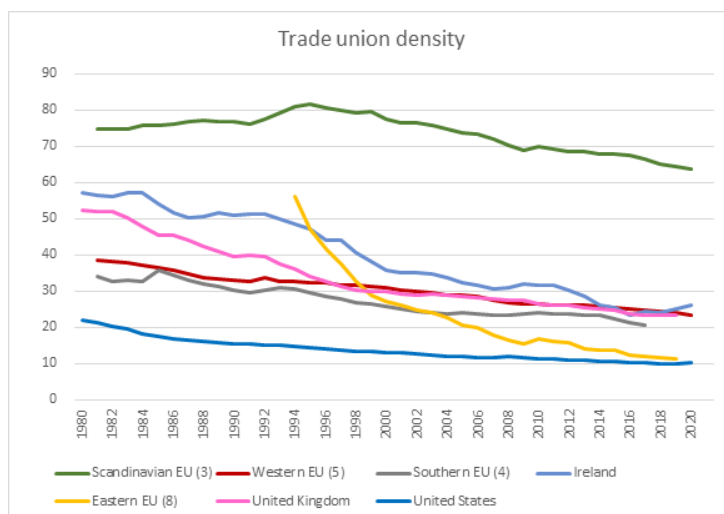
In most developed economies, wages and working conditions are set through a collective bargaining process involving various social partners, typically trade unions, employers’ organisations and the government. These arrangements are complex and vary considerably from country to country. Some economists have suggested that declining unionisation increases income inequality (Freeman and Medoff, 1984; Card et al, 2007; Stansbury and Summers, 2020). In this analysis, we explore trends in union density and collective-bargaining coverage to better understand their relationship with income inequality in Organisation for Economic Co-operation and Development countries.

De-unionisation does not always result in lower collective-bargaining coverage

In collective bargaining process with employers, the primary goal of trade unions is improving and maintaining terms and conditions of work. Employers’ associations also often participate in collective bargaining. They can be organised either at sectoral level, like the German metal and electrical industry association Gesamtmetall, or at national level, like the Italian Confindustria. In the United States, in contrast to EU countries, the bargaining happens mainly at firm level, and thus employers’ associations do not directly take part.

Trade union membership has declined over the past decades in the EU and the US, but to varying degrees (Figure 1).

Figure 1: Trade union density in the EU, United Kingdom and the US, 1980-2020 (%)

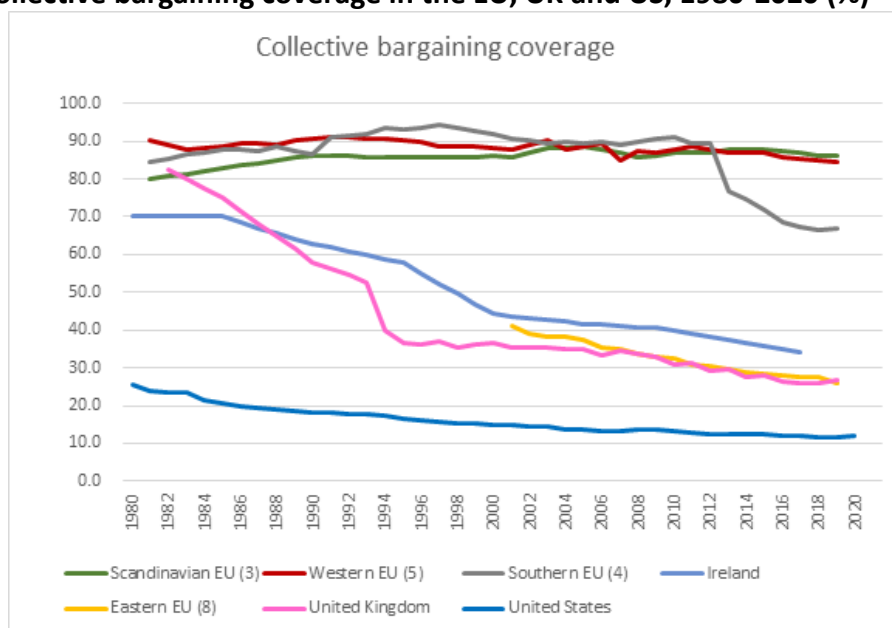


Source: OECD/AIAS database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts (ICTWSS).

Note: The trade union density is defined as the number of net union members (i.e excluding those who are not in the labour force, unemployed and self-employed) as a proportion of the number of employees. Unweighted averages are reported for the EU groups: Scandinavian EU (3): Denmark, Sweden, Finland; Western EU (5): Austria, Belgium, Netherlands, France, Germany; Southern EU (4): Greece, Italy, Spain, Portugal; Eastern EU (8): Czechia, Estonia, Hungary, Lithuania, Latvia, Poland, Slovak Republic, Slovenia. Whenever one or a few observations were missing between two available observations, we interpolated missing data with linear trends. For a few countries, missing data at the end or at the beginning of the sample period was approximated by assuming the same percent change as the average of the other countries in the same country group.

US unionisation halved from the already low rate of around 22 percent in 1980 to 10 percent by 2020. Eastern EU countries experienced the sharpest decline in unionisation in the 1990s as part of their transitions from the socialist economic system, in which union membership was a method of signalling political preferences and was seen as a prerequisite for career progression. As these countries became market economies, unionisation declined sharply, to close to 10 percent, nearing US values. The UK and Ireland went from having more than half of their labour forces represented by a union in the early 1980s, to only a quarter by 2020. Although there has been decline everywhere, the decrease in unionisation has been less pronounced in Scandinavian, Southern, and Western EU.

Figure 2: Collective bargaining coverage in the EU, UK and US, 1980-2020 (%)



Source: OECD/AIAS database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts (ICTWSS).

Note: The adjusted collective bargaining coverage rate is defined as the number of employees covered by a collective agreement in force as a proportion of the number of eligible employees equipped (i.e., the total number of employees minus the number of employees legally excluded from the right to bargain). See the definition of country groups and our interpolation technique in the note to Figure 1.

The outcome of collective bargaining is often extended beyond the union and employer association members (Eurofund, 2015)[SG1]. One of the reasons is the existence of erga omnes (towards everyone) clauses: if an agreement is signed between an employer and a trade union, under erga omnes clauses, all workers are covered by the agreement. Moreover, in Europe, there is a tradition of extending negotiated agreements to non-unionised workers within a sector, and even to companies that were not originally involved in the bargaining process. Because of these extension mechanisms, a collective bargaining coverage rate higher than unionisation density can be observed in nearly all studied countries (Figure 2).

For example, in Germany, a bargaining agreement signed between an employer association and a union covers all the firms that are part of the employer association. Moreover,

covered firms usually apply erga omnes clauses and extend the coverage to all employees, regardless of union membership (Jäger et al, 2022). In 2018, this resulted in a trade union density of 17 percent compared to a collective bargaining coverage rate of 54 percent. The sharp decline in coverage for Southern Europe at the end of the sample period is a consequence in particular of the reforms to reduce the extension mechanisms that Greece undertook after 2010 in the context of its financial assistance programme. Greece's 100 percent coverage rate in 2011 declined to 14 percent by 2017 (see the Annex [SG2] for country-specific charts).

The literature on the link between trade union density and income inequality is scant

Research on the economic consequences of either trade union density or collective bargaining processes on macroeconomic variables is relatively scarce (Bhuller et al, 2022). Only a few recent papers have studied the causal effect of trade union density on income inequality. Jaumotte and Osorio Buitron [SG3] (2020) analysed cross-country data and found a negative correlation between union density and the income share of the top 10 percent earners and the Gini coefficient. Farber et al (2021) presented time-series evidence from the US and demonstrated a negative correlation between union density and income inequality. Farber et al (2021) argued that this negative correlation resulted partially from the causal effects of increased unionisation on decreased inequality. For Germany, Dustmann et al (2009) concluded that if the unionisation rate had not declined in the 1990s, wages would have been higher, especially for workers at the bottom of the income distribution.

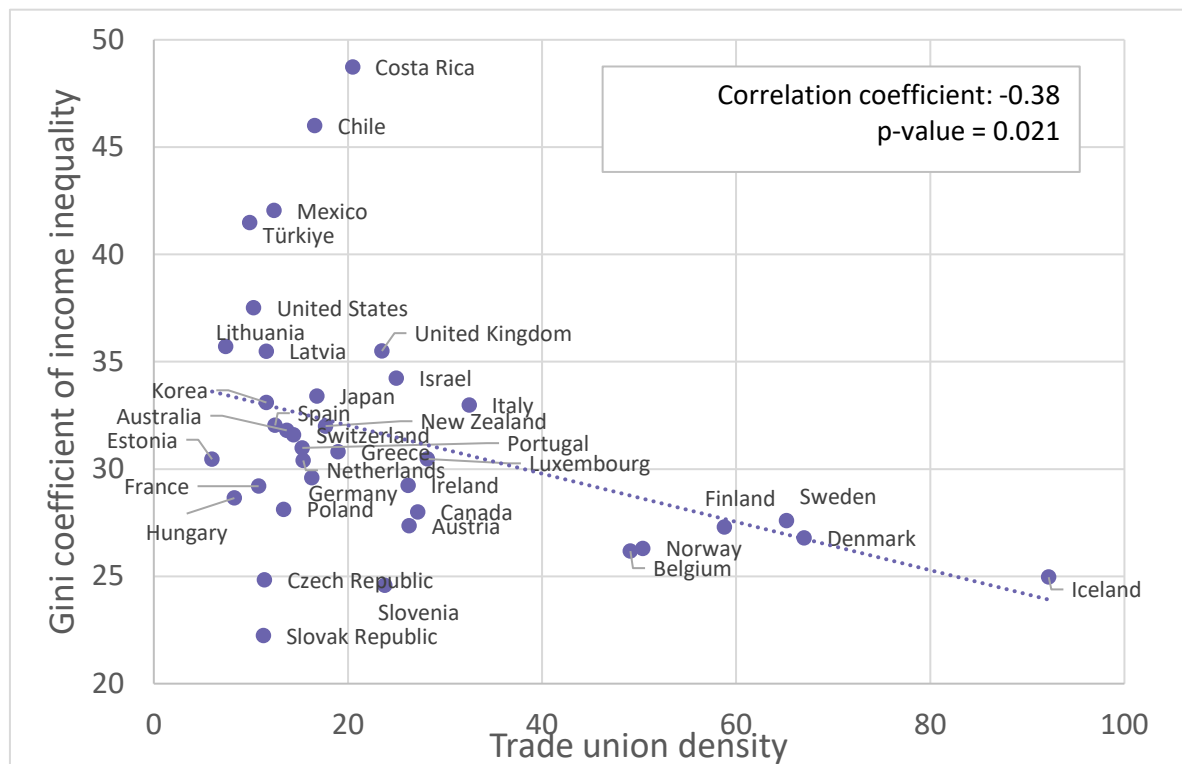
New cross-section and time-series evidence on collective bargaining and inequality

In a paper we prepared for the Transatlantic Expert Group on the Future of Work (Darvas et al, 2023), we presented new cross-section and time-series evidence on the correlation between income inequality and unionisation and collective bargaining.

Figure 3 confirms a negative correlation, -0.38, between trade union density and the Gini coefficient of income inequality for 37 countries, which is statistically significant. The correlation between trade union density and other indicators, such as the income share of the top 10 percent and top 20 percent of earners, and the income quintile share ratio (the ratio of total income received by the 20 percent of the population with the highest income to that received by the 20 percent of the population with the lowest income) is similarly negative. The correlation between trade union density and the income share of the bottom 10 percent or 20 percent of earners is positive.

Figure 3 suggests that five Nordic countries and Belgium form a separate group by having relatively high levels of union density and low income inequality. When we exclude these six countries, the correlation coefficient falls to -0.08, which is not statistically different from zero, suggesting that these six countries drive the negative correlation.

Figure 3: Cross-country correlation between trade union density and income inequality
 This interactive figure is available online at: <https://www.bruegel.org/analysis/collective-bargaining-associated-lower-income-inequality>



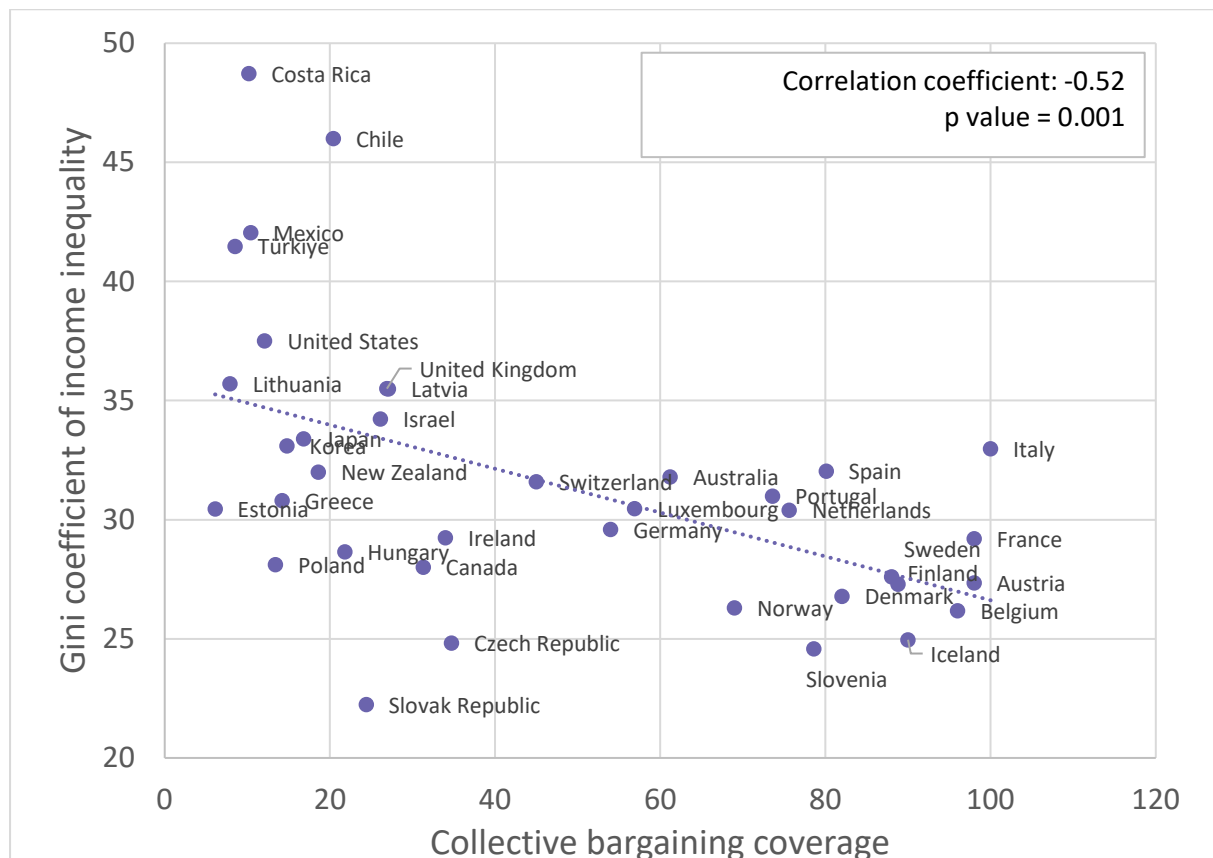
Source: OECD's OECD/AIAS database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts (ICTWSS) for trade union density, and the OECD Income Distribution Database for the Gini coefficient of disposable income inequality.

Note: The latest available observation is used for each country, which is for the year 2019 in most cases. The Gini coefficient is measured on a 0-100 scale (the higher the value, the higher income inequality), while trade union density is measured in percent.

Among all countries for which data is available, we find an even higher correlation (in absolute terms) between the share of workers covered by collective bargaining, which is -0.52 (Figure 4). This estimate is highly statistically significant. When excluding the six Nordic countries and Belgium, the correlation coefficient remains high at -0.40, which continues to be statistically significant. These findings suggest that collective bargaining coverage could be a more important factor in influencing inequality than union density. This is an intuitive result, since the conclusions of collective bargaining are extended beyond trade union and employer association members, as discussed above. If such bargaining can increase the relative wages of poorer workers and thereby reduce income inequality, then collective bargaining coverage is a more meaningful indicator than unionisation for capturing this effect.

Figure 4: Cross-country correlation between Collective bargaining coverage and income inequality

This interactive figure is available online at: <https://www.bruegel.org/analysis/collective-bargaining-associated-lower-income-inequality>



Source: OECD's OECD/AIAS database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts (ICTWSS) for trade union density and collective bargaining coverage, and the OECD Income Distribution Database for the Gini coefficient of disposable income inequality.

Note: The latest available observation is used for each country, which is for the year 2019 in most cases. The Gini coefficient is measured on a 0-100 scale (the higher the value, the higher income inequality), while trade union density and collective bargaining coverage are measured in percent.

Nevertheless, these cross-country correlation coefficients should be assessed cautiously and might not be interpreted as a causal relationship. Assessing the causal impact of trade union density and collective bargaining on income inequality is fraught with serious difficulties. Income inequality is influenced by various factors, including market forces that determine pre-redistribution (before taxes and transfers) incomes, and redistributive policies that shift income from the rich to the poor. In principle, trade unions could influence both the market distribution (for example, by increasing the gross relative wages of low-earners) and redistribution policies (for example, by lobbying the government). However, identifying the contribution of trade unions is inherently difficult, and we cannot exclude other factors from influencing both indicators. For example, in a country with a high level of social sensitivity and solidarity, voters might elect governments that pursue redistributive policies and workers might be more willing to join trade unions, resulting in a negative correlation between union density and income inequality.

Such country-wide preferences might be less of an issue for within-country temporal change in the indicators, provided these preferences are persistent. There are 12 countries in the OECD/AIAS ICTWSS dataset for which data on trade union density, collective bargaining and income inequality (which we take from the Standardised World Income Inequality dataset of Solt, 2019) is available for at least 50 years for all indicators. These 12 countries include six European Union countries, the United States, and five other countries.

We use data sampled in every fifth year for two reasons. First, trade union membership and collective bargaining might influence inequality with a time lag. Second, for several countries, data on collective bargaining coverage is available only for every fifth year in the period before 2000.

Since trade union density, collective bargaining coverage and inequality have trends in most countries, we work with differenced data. That is, we calculate the five-year changes in the indicators.

For ten of the 12 countries, both correlation coefficients are negative, and a large share of them are statistically different from zero (Table 1). These findings again highlight a negative association between bargaining and inequality. For France, the correlation coefficient is positive when trade union density is used, while for Ireland, both correlation coefficients are positive. Further research should explore the reasons behind the differing French and Irish results.

Table 1: Trade unions/collective bargaining and income inequality: correlation coefficients between five-year changes

	Correlation between the changes in trade union density and income inequality	Correlation between the changes in collective bargaining coverage and income inequality
Australia	-0.53	-0.13
Canada	-0.55	-0.67
Finland	-0.62	-0.21
France	0.35	-0.28
Germany	-0.62	-0.22
Ireland	0.19	0.41
Italy	-0.47	NA
Japan	-0.41	-0.42
Norway	-0.58	-0.25
Sweden	-0.63	-0.85
United Kingdom	-0.46	-0.61
United States	-0.49	-0.52

Source: Bruegel. Note: Data refers to five-year changes. The Gini coefficient of disposable income inequality is used. For Italy, collective bargaining coverage is 100 percent in the whole sample period, thus, lack of variation prohibits the calculation of a correlation coefficient.

We have identified a negative correlation between union density and collective wage bargaining and inequality across countries and over time. These correlations are noteworthy, even if we are uncertain whether they reflect a causal relationship. However, it is important to recognise that the collective-bargaining systems in these countries vary significantly, and therefore the details of how they affect inequality are still unknown. Further research should investigate how these different systems impact the strength and direction of the correlation between union density and inequality in each country. Additionally, it is crucial to explore the impact of collective bargaining on employment and output, as these factors also play significant roles in shaping the overall economic landscape.

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Annex

Figure 5: Trade union density, collective bargaining coverage, and income inequality in each country

This interactive figure is available online at: <https://www.bruegel.org/analysis/collective-bargaining-associated-lower-income-inequality>

Papers

COVID-19 and the accelerated shift to technology-enabled Work from Home (WFH)

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4 February 2022



Dissemination Level		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

¹ Bruegel. The authors thank all the members of the Transatlantic Expert Group on the Future of Work for valuable comments and suggestions. See <https://www.bruegel.org/eu-us-transatlantic-expert-group-on-the-future-of-work/>

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Abstract

People have been working remotely from many locations for many years, but the growth in work from home (WFH) has historically tended to be slow in both the United States and the European Union. Most of those who worked from home did so for only a portion, often small, of their working hours. COVID-19 has given a huge impetus to working from home for those jobs that can.

Work from home offers many benefits. It can be a driver of sustainability in the context of the green and digital transitions. The shift to WFH appears on balance to be positive in terms of productivity, despite the slightly negative impact at the individual level and for certain tasks. Many workers appreciate and benefit from the flexibility that work from home provides.

At the same time, this shift has significant implications for many aspects of our lives, and it raises a number of possible concerns that may need to be addressed by public policy. There is a risk that some groups (women, younger workers, and those who are less technically capable of using digital technology) may suffer from decline in wages and loss of opportunities for promotion and training. There are some indications of mental health issues due in part to the inability to separate work from private life, increased work hours, and the need to deal with children who are at home, but it is difficult to disentangle aspects that are caused by WFH in general from those that are primarily related to the pandemic. There are also some indications of a population shift from urban to suburban areas (limited so far, and mainly observed to date in the USA) which, if sustained, will need to be reflected in urban and regional planning.

By adopting a comparative approach, this research note explores these aspects and the main differences between the USA and the EU. It concludes by highlighting the key implications for public policy in terms of work-life balance, gender gaps, skill acquisition, modernisation of workflows, technology adoption, managerial culture and flexibility enhancement.

1. Introduction

People have been working remotely from many locations for many years, but the growth in work from home has historically tended to be slow in both the USA and the EU (see for instance (DeSilver, 2020) and (Eurofound, 2017)). Most of those who worked from home did so for only a portion, often a small portion, of their working hours.

In both the USA and the EU, COVID-19 gave a huge impetus to working from home for those jobs that can be performed from home (Ahrendt, Mascherini, Nivakoski, & Sándor, 2021) (Eurofound, 2020). This affected the USA differently than the EU because the nature of unemployment caused by the pandemic was different. In the USA, employment plummeted immediately after COVID-19 first appeared in early 2020. In the EU, far fewer jobs were lost outright thanks to the prompt and judicious use of temporary innovative measures to keep workers employed, albeit on reduced hours and at reduced wages (as with the German *Kurzarbeitsgeld*, an approach that had been used with success during the 2008 financial crisis). As a result, unemployment in the EU showed only a modest increase; however, the number of hours worked fell dramatically (Eurofound, 2020).

Definitions are important. For purposes of this paper, we focus on *work from home (WFH)*. There are many terms that are sometimes used as if they were interchangeable, including teleworking, remote work, and more, but not all of these are exactly identical in meaning. WFH (a form of remote work) is best understood as a sub-class of *multi-locational work* (Ojala & Pyoria, 2018). For most workers, the employer's premises play an important role; however, workers in sectors such as transportation, agriculture and fisheries, or construction have routinely worked at locations other than the premises of their employer. Those workers, and many others, were typically not in a position to benefit from a shift to WFH in response to the pandemic, and thus were at risk of loss of hours or of loss of employment altogether. The new pandemic-driven WFH was mainly available to those with higher levels of education and in higher income quantiles (see Section 4).

Our focus in this research note is on knowledge workers who have enjoyed increased freedom to work from home, many of whom are now also free to work from other locations as well. Indeed, one can argue that the real revolution that we are witnessing is that people are now discovering that they can design their jobs around their lifestyle instead of designing their lives around their jobs.

2. New technology as an enabler of work from home

Fortunately, the basic technology for a rapid and dramatic increase in WFH was already widely available in most developed countries: fast and reliable internet access, email, conferencing tools, and more (Marcus, et al., 2021); however, some Americans and Europeans had access only to rather slow broadband. The bandwidth needed to make fully effective use of online conferencing tools is greater than that available with the most basic internet services. As of 2019, 30 Mbps fixed broadband service was unavailable to an estimated 14.2% of European Union households, corresponding to 40.7% of rural households. At the same time, fixed

broadband service at 25 Mbps or more was unavailable to 5.6% of US households, corresponding to 22.3% of rural households (Marcus, 2021, p. 44).

At the beginning of the crisis, many worried that the internet might collapse under the strain of increased traffic; however, in practice the internet has continued to function reasonably well during the pandemic (OECD, 2020b). Work from home has contributed somewhat to increased load on the internet, but a far greater increase appears to have resulted from video on demand usage.

It is possible that the shift to WFH will expand the cybersecurity threat landscape in ways that are problematic. For some professions and sectors, this shift is linked to increased use of online services during the pandemic. Online conferencing tools such as Zoom were not designed with security in mind; however, as they now carry information that is sensitive to businesses and public institutions, this risk may need to be reassessed. This is an issue of growing concern (see, for instance, (Kass, 2021)). The shift to WFH may also have implications for data protection, cybersecurity, and quality of service.

Given that many of the online tools used to support WFH have around for perhaps a decade in both the USA and the EU, one might well wonder why the shift to remote work failed to materialise long ago. There appear to be a range of different factors involved. The simplest answer is that even though WFH appeared to offer some advantages, pre-WFH arrangements were not functioning badly enough to necessitate a potentially disruptive change. There are many suggestions in the literature of a lack of cultural preparedness and, in some cases, outright resistance from managers and supervisors. This is perhaps understandable – if a WFH arrangement were to fail to function well, the manager that authorised it would likely be held to account. Small and medium enterprises have been hesitant to implement WFH, and quick to withdraw the option as rapidly as possible once they were no longer compelled to offer it. This indicates a widespread reluctance to extend unsupervised autonomy (Aloisi & De Stefano, 2022 (forthcoming)).

The pandemic has also cleared away other barriers to adoption. Large segments of the population of the EU and the USA are now familiar with the conferencing tools used in support of WFH. Many of those who are able to conduct WFH have already sunk the personal or institutional investments requisite to effective WFH. A survey of workers in the USA (Barrero, Bloom, & Davis, 2021) found that the average worker invested more than 15 hours and \$561 US (about €486) in equipment and infrastructure to enable WFH. Their employers also had to invest in additional equipment and software to enable WFH, and may have reimbursed some of the worker expenses. The investments of time and money made presumably lower the cost of WFH going forward, and thus have benefits beyond the immediate pandemic crisis.

Many firms and institutions, unable to draw up work plans based on objectives, verifiable deliverables and multilateral accountability, instead increased the number of online meetings and hastened to implement surveillance software (to measure the time spent online, the

number of keystrokes on the keyboard, mouse movements, and the list of websites visited) (Aloisi & De Stefano, 2022 (forthcoming)). Among other things, the inability to modernise work patterns has slowed down the implementation of a “more trusting and more results-based” management (ILO, 2020).

What is sometimes forgotten is that the technologies that are employed to monitor workers could be used instead to improve transparency, verifiability and accountability of managerial decisions, thus advancing inclusion of underrepresented populations and reducing socio-economic gaps. Instead of contributing to replica building of previous recruits’ cohorts, data can be exploited to increase diversity by promoting the de-marginalisation of vulnerable groups (Ajunwa & Greene, 2019).

3. Work from home and productivity

There are some survey results suggesting that many workers think that they are more productive working from home; however, views among managers appear to be mixed (Barrero, Bloom, & Davis, 2021). The net effect is not altogether certain because there are few real, quantifiable measures of knowledge worker productivity.

It is widely assumed that day to day physical contact with co-workers stimulates creativity, helps to ensure alignment, and thus promotes productivity overall. In reality, the evidence for this appears to be thinner than is typically assumed (Miller, 2021).

Avoiding commuting time can improve productivity, but the home can also create more distractions (Barrero, Bloom, & Davis, 2021). There are multiple drivers in both directions. One case study found an increase in hours worked, but a reduction in productivity per hour for the firm that was studied. (Gibbs, Mengel, & Siemroth, 2021).

There are also important suggestions in the literature that WFH can bring benefits to the firms that employ it. Public companies that made substantial pre-pandemic use of WFH appear to have had significantly higher sales, net incomes, and stock returns than their peers during the pandemic. This appears to have been more the case in non-essential industries (where the adoption of WFH was indispensable to continued operation) than in essential industries, and more the case for non-high-tech industries than for high-tech industries (Bai, Brynjolfsson, Jin, Steffen, & Wan, 2020).

The pandemic has driven not only accelerated use of WFH, but has also accelerated digitalisation and automation across different sectors of the economy, which together with WFH have important implications for productivity. The combined effect appears to be synergistic. Growth in US labour productivity, which averaged only 1.3% since 2006, increased by 5.4% in the first quarter of 2021. Trends are coming together that might lead to a

productivity surge in developed countries in the coming years (Brynjolfsson & Petropoulos, 2021).

4. Likely evolution when work from home is no longer a pandemic driven requirement

It is important to bear in mind that WFH today is a crisis-driven arrangement. The impacts might look quite different in a post-pandemic world, where WFH (1) would ideally be organised so as to reflect the preferences of the worker, and (2) might be organised in most cases around a hybrid model where presence at the employer's premises alternates with WFH.

Some jobs are much more amenable to WFH than others. Some require face to face contact, for instance, while others entail control of machinery. JRC/Eurofound has looked at this for the EU (Sostero, Milasi, Hurley, Fernandez-Macías, & Bisello, 2020), while Dingel and Neiman explored this for the USA (Dingel & Neiman) (Petropoulos & Schraepen, 2021).

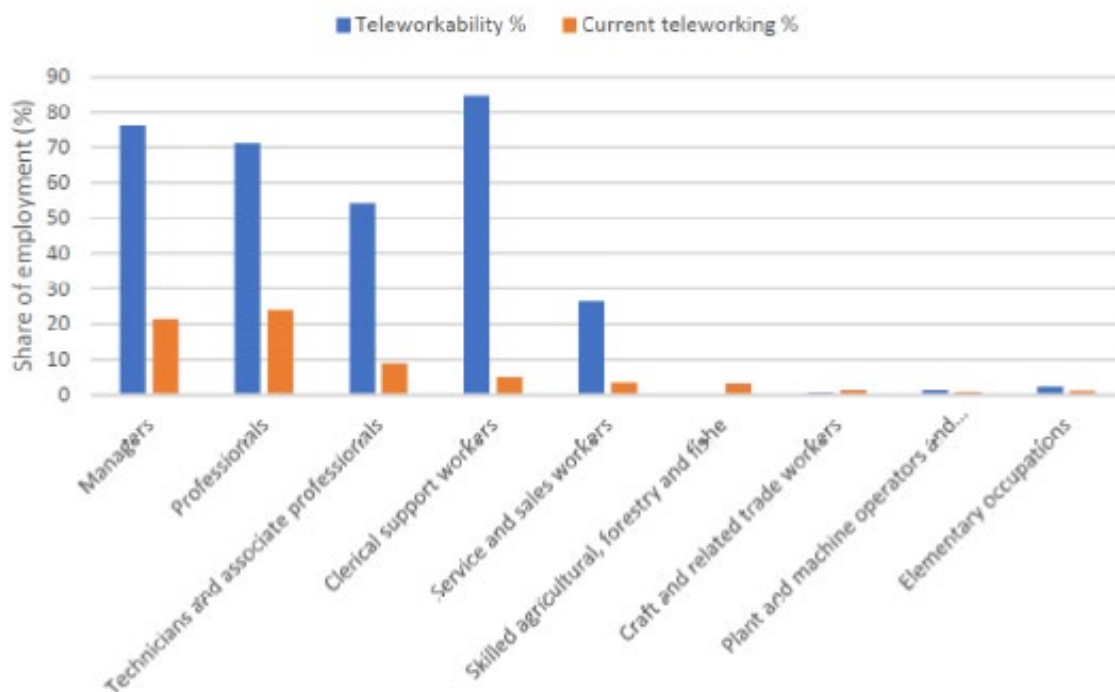
Intuitively, it seems clear that some jobs are particularly well-suited to WFT, such as software development, graphic design, creative writing, customer service, and phone banks. But a more concrete analysis requires a closer examination of available data.

The analysis in (Sostero, Milasi, Hurley, Fernandez-Macías, & Bisello, 2020) is based on a task-level analysis. Tasks are analysed in terms of their content, the execution methods employed, and the tools employed. As regards the task content, information-processing (or intellectual) tasks that operate on information or ideas are most amenable to WFH, social interaction tasks that operate on social relations are less suitable, and physical tasks that operate on things are least suitable for WFH.

On this basis, they find that the proportion of self-employed who are doing work potentially amenable to WFH is approximately the same as the proportion who were in fact doing so before the pandemic, while the proportion of employees who are doing work potentially amenable to WFH (37%) is far greater than the proportion who were in fact doing so before the pandemic (15%). This implies a huge unrealised potential to do more WFH than has historically been done: about 22% of employees, or about 32 million EU27 workers (Sostero, Milasi, Hurley, Fernandez-Macías, & Bisello, 2020).

This same analysis shows a huge unrealised potential for WFH for managers, professionals, technicians, and clerical support workers, but very little potential for (for example) agricultural, forestry, and fishery workers and for machine operators.

Figure 1: Amenability to work from home versus actual work from home among employees (2018) by broad occupation group.



Source: (Sostero, Milasi, Hurley, Fernandez-Macias, & Bisello, 2020)

The shift to WFH for those jobs that are amenable to a greater share of remote work can be expected to affect many other jobs that depend on them but that cannot be done remotely. Autor and Reynolds note: *“If telepresence displaces a meaningful fraction of professional office time and business travel, the accompanying reductions in office occupancy, daily commuting trips, and business excursions will mean steep declines in demand for building cleaning, security, and maintenance service; hotel workers and restaurant staff; taxi and ride-hailing drivers; and myriad other workers who feed, transport, clothe, entertain, and shelter people when they are not in their own homes. This is significant because these services make up a large and rising share of employment among workers without postsecondary credentials; collectively, these services account for one in four U.S. jobs. In May 2019, 9.2 percent of U.S. employment was in food preparation and serving occupations, 8.5 percent in transportation, 3.0 percent in buildings and grounds cleaning and maintenance, and another 4.6 percent in protective services and in personal care and services (Bureau of Labor Statistics 2019). A substantial, long-run demand contraction in these services will mean significant job loss—or lock-in of existing COVID-induced job losses—and a sustained period of labor market adjustment.”* (Autor & Reynolds, 2020) (Petropoulos, 2021)

McKinsey has attempted to quantify this effect (Lund, et al., 2021): over the next decade, 4.3 million jobs could disappear in customer service and food service (the expected increase in associated delivery jobs, like food delivery is estimated to be very small, and thus will not

counterbalance these losses), while business travel will drop by around 20% reducing employment in commercial aviation and airport services, and in hospitality and food service. Having established that there is a large potential for more WFH in the EU, we now consider whether workers and managers expect to make use of this potential. Survey results in the EU (Ahrendt D. , Mascherini, Nivakoski, & Sándor, 2021) and the USA (Barrero, Bloom, & Davis, 2021) suggest that many workers (not all) want to continue some remote work as conditions return to a degree of normalcy. Work totally done from home was never a major factor in either the USA or the EU, and USA survey results suggest that a majority of workers would like to continue to work remotely for a part of the week rather than every day (Barrero, Bloom, & Davis, 2021). Survey results for managers are more limited, however, and also less definitive.

The return to the office is already well under way in both the USA and the EU. Effects are complex (Scheiber, 2021). There are indications in the press of an emerging generation gap, where older and more senior workers welcome the return to physical presence, while younger and more junior workers – especially those who first joined the work force during the pandemic – consider WFH to be perfectly natural and see no need to the return to the old norms (Schwartz & Marcos, 2021).

Concern is also visible in the USA that many workers are quitting their jobs, and that surprisingly large numbers are choosing not to return to work at all, at least for now (Furman & Powell, 2021). Other workers may be quitting their jobs in order to look for better working conditions, which in some cases may include the flexibility associated with working from home (see also Section 5). The number of individuals quitting in the USA is in line with historical trends in light of the large number of job vacancies in the USA at present, but the number of individuals accepting new jobs is considerably less than historical experience would lead us to expect (Furman & Powell, 2021). This phenomenon is only now starting to raise concerns in the EU.

5. Distributional effects

Before the pandemic, the vast majority of WFH was performed by those in higher income quantiles (DeSilver, 2020). Survey data suggests that this continues to be the case. Further, the shift to WFH might well tend to favour those with strong ICTs skills. All of these raise concerns that the growth of remote work might contribute to further income polarisation and inequality (Autor & Reynolds, 2020).

In the early stages of the pandemic, this already proved to be the case in the USA. Among workers who had been employed in February 2020 (before the pandemic emerged in the USA), 34% of those without an undergraduate were not continuously employed in March,

April and May 2020,⁴ compared with 18% of those with an undergraduate degree (Stevenson, 2020).

At the same time, we see indications that workers are more willing to quit a job if they consider the pay and working conditions to be unsatisfactory. WFH is moreover making it possible for some people who were previously excluded, including those with disabilities or with caregiver responsibilities. Furthermore, to the extent that WFH becomes more widely available as a result of the pandemic, it could increase labour participation with positive societal and macroeconomic impact, and thus with benefits for all. Thus, the evidence on polarisation seems to be mixed.

In the EU, the gender employment gap between women and men⁵ showed different patterns in 2020 versus 2021. The gender employment gap actually declined slightly during the first year of the pandemic as the employment rate declined less for women than for men. The employment rate for women in the EU fell by 0.5pp to 66.8%, while it dropped by 0.9pp for men to 78.1%. On the other hand, women in the EU experienced a steeper decline in working hours (-7.2%) than men (-6.7%) in 2020 (European Commission, 2021, p. 27).

In the second year of the pandemic, however, women were somewhat more likely than men to have lost their jobs as of July 2021 (9% versus 8%, respectively). In the age 18 – 34 group, however, women were considerably more likely than men to have lost their jobs as of July 2021 (11% versus 9%, respectively) (Ahrendt, et al., 2020). In the USA, among those who had been employed in February 2020, women were more likely than men to have not been continuously employed in March, April and May 2020 (31% versus 25%); however, those with a child under 18 were not more likely than those without children to have not been continuously employed (30% versus 33%).

Caregiving responsibilities clearly play an important role, and it seems clear that women tend to be more impacted than men. In Eurofound surveys in the EU-27 in the summer of 2020 and again in the spring of 2021 (Ahrendt D. , Mascherini, Nivakoski, & Sándor, 2021), women were significantly more likely than men to report that they were “too tired after work to perform household jobs”. Women with children under 12 were more likely to report this than women without children, and women who worked from their employers’ premises were more likely to report this than women who worked from home, but challenges for women are nonetheless visible across the board (see **Figure 2**). Another Eurofound report makes clear why this should be the case: “*The 2016 European Quality of Life Survey (EQLS) found ... that women spent 39 hours a week on average taking care of their*

⁴ This analysis is based on *nonemployment* as reported in the Current Population Survey (CPS) of the US Bureau of Labor Statistics (BLS) because conventional unemployment statistics typically do not adequately reflect all of the forms of disruptions caused by the pandemic. “*As people left jobs they held in February, some transitioned to unemployment, others exited the labor force, and still others were employed but absent from work.*” (Stevenson, 2020) In Europe, the tendency has been instead to deal with this limitation in data collected by measuring the reduction in hours worked.

⁵ We recognise that gender is neither binary nor fixed, but available statistics are in terms of men and women.

children, against 21 hours spent by men. Women devoted an average of 17 hours a week to cooking and housework, compared with 10 hours for men.” (Mascherini & Bisello, 2020)

Figure 2: Proportion of parents stating that they are “too tired after work to do household jobs” (EU-27)

			Summer 2020	Spring 2021
Men	No children under 12	Worked from employer’s premises	25	26
		Worked only from home	23	23
	Children under 12	Worked from employer’s premises	27	20
		Worked only from home	24	24
Women	No children under 12	Worked from employer’s premises	30	36
		Worked only from home	30	30
	Children under 12	Worked from employer’s premises	38	44
		Worked only from home	31	39

Notes: Green = lowest value, red = highest value.

Source: (Ahrendt D. , Mascherini, Nivakoski, & Sándor, 2021)

Eurofound survey data also indicate that women with children aged 0 through 11 years are far more likely than similarly situated men to experience work-life conflicts (Mascherini & Bisello, 2020). Women are more likely than men to have no savings to fall back on, and less likely to have savings sufficient to cover twelve months; once again, women with young children are disadvantaged even more than those without (Mascherini & Bisello, 2020). When it comes to feeling tense, lonely, or depressed, there is negligible difference between women and men without children. Among those with children zero through 11 years however, women seem to be at a substantial disadvantage compared to men. Interestingly, among those with children 12 - 17 years old, women seem to be much more likely to feel stressed, but not more likely to be lonely or depressed (Mascherini & Bisello, 2020).

Some data ((Fana, Tolan, Torrejón, Urzi Brancati, & Fernández-Macías, 2020), (Sostero, Milasi, Hurley, Fernandez-Macías, & Bisello, 2020)) suggests that women are slightly more likely than men to work in jobs that are amenable to remote work. At the same time, many sources suggest that women have been disadvantaged in terms of their career prospects by the pandemic – notably, they have often had primary responsibility for caring for children whose schooling took place from home (Ahrendt D. , Mascherini, Nivakoski, & Sándor, 2021). Furthermore, to the extent that they do more remote work in the future, they may risk being passed over for promotion and for training opportunities.

The young were also disproportionately impacted (Wolff, 2020). Prior to the pandemic, most young people worked in sectors that were heavily impacted by COVID-19, such as accommodation and food services (13%), wholesale and retail (11%), and health and social work (11%). As a result, this age cohort experienced greater increases in unemployment (of 1.4%, to 13.3%) and a greater increase in the *not in employment, education or training (NEET)* rate (of 1.2%, to 13.6%) than older groups (Eurofound, 2021).

There are also indications of disproportionate adverse impacts on Hispanic and Black workers in the USA (Stevenson, 2020).

These challenges must be viewed in the context of the many other challenges that the pandemic has exacerbated for women, including an increase in domestic violence (Wenham, et al., 2020).

6. Health and wellbeing of those working from home

Workers benefit from avoiding the commute to work, but surveys suggest that much of the time saved goes into working about an hour more per day. Those working from home appear to *“devote most of their savings in commuting time to non-leisure activities – work for pay, but also chores, home improvement, and childcare”* (Barrero, Bloom, & Davis, 2021). There are indications that WFH workers have difficulty distinguishing between work time and private time, and also that managers may not fully respect time that in some sense ought to be private (Yeung, 2021).

There are also some suggestions of increased stress due to pandemic-induced WFH. Some survey results suggest a decline in mental well-being (Ahrendt D. , Mascherini, Nivakoski, & Sándor, 2021). This might well be exacerbated if children are at home.

7. Implications for urban areas

During the early months of the pandemic, there was a strong expectation in the USA that the pandemic would lead to a hollowing out of major cities. People would abandon cities both because of the risk of contagion, and also because it was no longer necessary to endure the high costs, congestion and pollution of the city in order to work. This concern seems to have been less prominent in the EU.

Preliminary indications are that there has indeed been some migration out of major US cities, notably New York City and San Francisco, but the numbers involved are far less than had been feared. By in large, US cities that had been losing population before the pandemic continued to lose population during the pandemic (Kolko, Badger, & Bui, 2021). *“For the most part, big pandemic shifts were confined to people moving out of the urban parts of a few large metros at higher rates, and more people moving into smaller metros in New York State, New England and other vacation and seasonal-home destinations. Metro New York and the Bay Area had net outflows in 2020 at twice the rate of 2019. [...] But the larger pattern among metros [...] has been the stability of pre-pandemic trends. Sun Belt metros have continued to draw new residents, while those in upstate New York and the Midwest have not.”* (Kolko, Badger, & Bui, 2021)

Using Federal Reserve Bank of New York/Equifax Consumer Credit Panel (CCP) data,⁶ (Whitaker, 2021) found that there had indeed been net migration away from major US cities. The net flow of people out of US urban neighbourhoods averaged nearly 28,000 people per month in March through September from 2017 to 2019, versus 56,000 people per month in 2020 after the pandemic hit. This is a huge change in percentage terms, a doubling; however, in a country of some 330 million individuals, the shift can hardly be said to be earth-shaking. It is also noteworthy that this shift in net migration was, in almost all cases, driven more by a decrease in in-migration than an increase in out-migration. In other words, *“hundreds of thousands of people who would have moved into an urban neighborhood in a typical year were unwilling or unable to do so in 2020”* (Whitaker, 2021).

The moves in 2020 typically involved short distances. Using data on changes of address from the US Postal Service, (Wichter, 2021) found that the great majority of moves out of US cities were within the same US state or county.

The shift from urban areas to suburban areas in the USA has been smaller than expected to date, but might well prove to be important if it grows or is sustained over time. There could be major implications for municipal and regional planning in terms of the availability of schools, health services, transport, and other public services. Even a small shift might have large impact on vehicular traffic in some US urban areas.

The same migration trends that slow or reverse the growth of cities may have the positive effect of strengthening countries and regions that have historically suffered from a brain drain.⁷ Several countries have witnessed an increase in the number of returnees reversing the brain drain. It is already clear that many workers appreciate the opportunity to work from less developed provinces, towns, and even small villages (Ghiglione & V Romei, 2021). For hybrid workers, the trends already noted above that this is likely to mainly benefit towns and regions close to where the employers are located; however, workers who shift fully to WFH could in principle locate anywhere where power and internet are available.

8. Implications for public policy

Relatively little seems to have been done so far to promote WFH, or to ease the burdens that it places on workers.

WFH has some obvious advantages for governments that seek to foster sustainability and a green and digital transition. WFH reduces needless travel, thus reducing emissions. It reduces traffic congestion in central cities. With that said, one can nonetheless debate the degree to which public policy needs to actively encourage WFH; however, there seems to be a clear need to modernise existing business practices, work arrangements, and social protection policy. Public policy thus has an important potential role to play.

⁶ This is a nationally representative anonymous random sample of 5 percent of US consumers with a credit file, resulting in a sample of more than 10 million adults.

⁷ See for instance <https://southworking.org>.

We anticipate that, in a stable post-pandemic world, WFH would ideally be organised so as to (1) reflect the preferences of the worker, and (2) organised in most cases around a hybrid model where presence at the employer's premises alternates with WFH. WFH provides the opportunity to enable authentic spatial, temporal and decision-making autonomy for all, thus allowing businesses and workers to reap the full benefits. Public policy should support this evolution of WFH.

Ensuring *universal* broadband access at sufficient speeds to support WFH tools including online conferencing is a clear need. Plans are already in place in the USA (in the form of the Infrastructure Investment and Jobs Act) and in the EU (in the form of the "2030 Digital Compass: the European way for the Digital Decade" strategy) to achieve this in the coming years, but prompt and effective execution of these plans is called for.

Care for the emotional and mental well-being of workers in this brave new world is likely to require attention from policymakers. As noted earlier, for instance, WFH can lead to difficulty in distinguishing between work time and private time, which can in turn lead to overwork and stress.⁸ Public policy will need to help workers set boundaries. There are serious calls in Europe to implement a "right to disconnect". France, Spain, Belgium, Italy and Portugal have already proposed or enacted rules, and the European Parliament has called on the Commission to propose legislation to this effect (Yeung, 2021). The degree to which this should be regulatory versus recommended business practice is however not yet clear.

Women, especially women with caregiving responsibilities for young children, appear to have been especially disadvantaged by the pandemic, and continue to be at risk going forward. Measures to counteract this are needed, including a renewed focus on ensuring the availability of full day child care (including during a pandemic) (Stevenson, 2020).

As WFH becomes widespread, there are likely to be implications for education and training. The technology-driven changes that already suggest the need for a shift to lifelong learning (Petropoulos, Marcus, Moës, & Bergamini, 2019) are relevant here as well. There was already a need to ensure that workers who were displaced by technologies such as artificial intelligence have a chance to re-enter the work force, but lower skilled workers who are unable to benefit from WFH are likely to pose a related challenge that might perhaps be addressed with largely the same modernisation of systems for education and training. There may also be scope for education and training specifically geared towards helping those who were thrown out of work by the pandemic to enter the job market, for instance by targeting workers in sectors that were especially impacted such as air transport, food services, and accommodation. Low to medium skilled workers, including in particular workers displaced in those sectors, may have a particularly strong need for training in the digital skills that would

⁸ See also Directive (EU) 2019/1158 of the European Parliament and of the Council of 20 June 2019 on work-life balance for parents and carers and repealing Council Directive 2010/18/EU.

enable them to participate in higher-paying jobs that require the ability to operate on a WFH basis.

At the same time, the need for a shift to lifelong learning is not limited to those in low skill jobs. In the USA, college graduates in all fields experience rapid earnings growth after entering the job force, but earnings growth for graduates majoring in applied subjects such as computer science, engineering, and business subsequently declines rapidly over time, once again implying a need for a shift to lifelong learning (Deming & Noray, 2020).

The implications for the EU might be somewhat different than for the USA in these respects – EU education and training arrangements are less flexible or adaptable than those of the USA, but on the other hand vocational training in some of the EU Member States is advanced and effective. Aside from that, different measures may be needed because the USA is experiencing a shortage of workers as of early 2022.

Digital tools are another consideration. Workers and their employers have already invested time and money in online tools to facilitate remote interaction in a WFH setting (Barrero, Bloom, & Davis, 2021). These digital tools can potentially improve the health and safety of WFH workers if aptly designed, deployed and developed.

At the same time, network and information security for work performed at home is likely to need increased attention from employers, workers, and policymakers.

The use of these digital tools can also lead to a growing risk of surveillance of WFH workers, already increasingly visible with gig workers such as ride-hailing drivers (Petropoulos, Marcus, Moës, & Bergamini, 2019). As noted earlier, the AI technologies that have proliferated with WFH policies raise serious surveillance and privacy concerns (Aloisi & De Stefano, 2022 (forthcoming)). This is particularly true for lower wage workers who are more likely to have their productivity algorithmically measured. For WFH workers, this potentially invasive surveillance reaches into the home, a normally private domain. There is also the risk of discriminatory practices stemming from, or embedded in, algorithmic management and AI systems. There is thus an apparent role for public policy in setting guidelines and guardrails so as to protect workers not only from inappropriate loss of privacy and agency, but also from discrimination.

Social partners (employer organisations and trade unions) also have an important individual and collective role to play in contributing to a successful digital transformation that takes account of the needs of both employers and workers, and that thus represents a key enabler for WFH. This is at the heart of the 2020 EU framework agreement on digitalisation (ETUC, Business Europe, SME United, and CEEP, 2020), which seeks to provide a human-oriented and productivity-enhancing approach to integrating digital technology into the workplace. The parties to the agreement (Business Europe, SME United, CEEP and ETUC) have agreed that it should be implemented at national level by 2024. The European social partners have also addressed the issue of telework in a 2002 agreement.

In a world where WFH becomes more routine, companies will need to review their HR policies to make sure that training and promotion opportunities do not inappropriately disadvantage those who choose to work from home.

Most of the literature focuses on WFH performed by employees; however, largely the same issues also apply to the self-employed. There has been an active discussion in the EU on the need to strengthen social protection for the self-employed (or at least, for self-employed who do not have their own employees) that has now been embodied in a European Pillar of Social Rights, and more specifically in a Council Recommendation that seeks to strengthen social protection for non-traditional employees and for the self-employed. If these measures were fully implemented by the Member States – which is far from being the case today – they would likely go a long way toward solving the most serious social protection challenges that self-employed WFH workers face today.

Businesses likely need to re-think their processes to cope with a work force where hybrid work is common. Social partners likewise need to consider how to organise and preserve worker rights when workers are less frequently in contact with one another than was historically the case (Grzegorzczuk, Mariniello, Nurski, & Schraepen, 2021). For both businesses and social partners, they may have to adapt their practices and their thinking for a world where hybrid or total WFH is the preferred norm rather than a rare exception.

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Changing labor markets, changing social protection: The status of social protection policy

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1. Introduction

Globalisation, technological, and demographic change have profoundly affected labor markets in the United States and in Europe. Since the 1980s and 1990s, these changes have occurred as policymakers tried to reduce high unemployment and increase economic growth by making labor markets more flexible. Keeping labor costs down was seen as essential to remaining competitive and preventing the transfer of production elsewhere. There is evidence to suggest that this movement towards greater labor market flexibility, in part through increased deregulation, has contributed to a rise in nonstandard forms of work. Workers in nonstandard work arrangements tend to have fewer social protections. Their jobs are not predictable in terms of income and working hours, which has made securing economic and social security a major challenge.

Social protection is the mechanism that addresses amongst other issues, poverty reduction, education, health, social inclusion, and empowerment¹. In the United States and in Europe social protections were initially designed between 1880 and 1945 with the full-time, dependent employee in mind.² Today, the standard employment relationship remains a critical, but not the only, mechanism through which social protections are provided to the employee by the employer (as is often the case with healthcare coverage in the U.S.) and/or through contributions made by both the employer and the employee into national social insurance funds designed to manage the risk of unemployment, ill health and disability, and retirement.³ In all European countries, but not the United States, risk management includes paid leave for caregiving. The challenge that confronts the United States and Europe is that in the context of a changing labor market and the increase in nonstandard work, the classical mechanism through which social protections are provided is diminished.

This paper will consider the degree of change from standard to nonstandard work arrangements in the U.S. and in Europe and the implication this change has for social protection. This question is relevant because if we tie important social protections to our worker status, then any increase in nonstandard work will imply a loss of social (and labor) protections for a proportion of the working age population engaged in nonstandard work in the U.S. and in Europe. It then becomes a question of who manages the risk of unprotected (or less protected) workers—the individual, the state, or the private sector (i.e., the company) or a mixture? New forms of work that have ensued and/or increased in the last fifty years

¹ Despite the diversity of social protection definitions, they nevertheless should contain common features that involve all private and public initiatives that seek to reducing economic and social vulnerability. To achieve this, the International Labour Organization's (ILO) concept of social protection floors suggests that systems should comprise of at least the following social security guarantees, as defined at the national level: access to essential health care, including maternity care; basic income security for children, providing access to nutrition, education, care and any other necessary goods and services; basic income security for persons in active age who are unable to earn sufficient income, in particular in cases of sickness, unemployment, maternity and disability; and basic income security for older persons.

² National social protection systems have primarily been developed using insurance-based schemes (those based on social contributions from the employee and the employer); benefits and services financed by taxes (i.e., family allowances, some forms of healthcare and long-term care); and means-tested benefits (i.e., social assistance and minimum income provisions for older people).

³ In the case of retirement, there is an expectation in the United States and many EU countries that employees should also make private provisions to supplement their retirement income by using some of their disposable income to place in pension funds in order to supplement their state retirement benefit. But individuals with very little or erratic disposable income are vulnerable here as they are less (or are not) able to supplement their state pensions and as a result, they may face economic difficulties later in life. Due to an inability to supplement state pensions, this group, when retired, often becomes dependent on other benefits such as housing benefits to reduce rental costs and supplementary pension income.

have brought the incomplete protection of workers in nonstandard employment to the forefront of international policy debates. But the adverse effect of incomplete protection of individuals has never been made plainer than during the coronavirus pandemic where—especially in the US but also to varying degrees in European countries—coverage, the amount and the duration of benefits as well as sick and care leave were simply not adequate and as a result, had to be bolstered through emergency stimulus legislation.⁴ Moreover, those in the least protected, most precarious employment were disproportionately women and people of color—exacerbating already long-standing gender, ethnic and racial inequalities in the United States and to varying degrees in Europe. The Covid-19 pandemic is the most traumatic and widespread public health crisis faced in modern times. The ‘extraordinary’ of the Covid-19 pandemic revealed the cracks in the ‘ordinary’ forms of social protection in both Europe and the United States. When social protection systems work well, they can have a stabilizing effect on the economy and promote socio-economic equality and stability. By contrast, lack of protection coupled with inadequate or ineffective systems can exacerbate income insecurity, poverty and economic inequality, which has broader implications for democracy.

But just how much is nonstandard work on the rise in the U.S. and in the EU? This paper will explore the status of nonstandard employment in the U.S. and the EU, especially the groups affected. This paper will then discuss three shared challenges—choice, motivation and costs—that the U.S. and the EU face to address the incomplete protection of workers through the prism of the employment relationship.

2. Two different systems with common challenges

The European Union is a political and economic union between 27 countries, otherwise known as ‘the member states.’ The development goals and the recommendations of the EU commission are important aspects for bringing member states in line with overall policy and values. Nevertheless, the difference in social protection legislation and levels of economic support provided at the national level is evident.

Most member states have social protection schemes that can also cover nonstandard employees but exclude certain categories of employees such as casual and seasonal work, on-call workers and temporary agency contracts. The self-employed may be completely excluded from social protection. The coverage available to nonstandard employees is fragile as they often do not meet eligibility criteria in the form of duration of employment and/or number of working hours.⁵

⁴ In the United States, see for example the Coronavirus Aid, Relief, and Economic Security Act (CARES Act) of 2020 and the American Rescue Plan Act of 2021.

⁵ Many member states have introduced reforms to cover nonstandard workers and the self-employed between 2017 -2019. For example, Ireland extended social protection for the self-employed in some key areas: dental and optical care, invalidity benefits (in 2017) and unemployment benefits (in 2019). In Spain, as of January 2019, unemployment and accidents at work are covered on a mandatory basis, not only on a voluntary basis. In Denmark, the new unemployment scheme, which entered into force in 2018, includes all forms of earned income and allows for the protection of those who combine several types of activities. In 2017-2019, Belgium took a series of measures to improve or create family-related leave for the self-employed (maternity leaves, paternity leaves, foster parent leaves) and shortened or abolished waiting periods in other domains (sickness benefits, pensions). European Commission, Directorate-General for Employment, Social Affairs and Inclusion, *Access to social protection for workers and the self-employed*, October 2020.

Despite this progress, it is evident that significant gaps remained in March 2020 when the COVID-19 pandemic revealed failings in the system. “21 Member States lack formal coverage for at least one group of non-standard workers in at least one branch of social protection that fall under the material scope of the Recommendation on access to social protection for workers and the self-employed.”⁶ It is still the case that the highest level of protection is available for full-time employees with permanent contracts. In Europe increased attention has been given to nonstandard employment over the last few decades particularly the self-employed, and an increasing number of member states are bringing these categories in line with standard work. But it is important to consider that the degree of social protection is also affected by the various rules which differ from country to country. These rules include qualifying periods; waiting periods; duration of benefits; and replacement rates.

The European Pillar of Social Rights (EPSR) is the ambitious structure used to promote social rights and social protection, on the one hand, and as a political compass used to set the course for member states to provide adequate social protection for all workers, on the other. The preliminary background documents recognized the changes in the labor market and the emergence of gaps in social protection resulting from these changes. The Pillar consists of 20 principles which are organized under three headings: equal opportunities and access to the labor market; fair working conditions; and social protection and inclusion. The initiative was adopted by the European Parliament, The European Commission, and the Council in 2017. All EU countries agreed to implement the 20 principles.

The Pillar itself is not legally binding and does not give the EU more power but aims to be a tool to promote social rights in collaboration with Member States, civil society, social actors, and social partners. A fundamental problem with implementation is that the EU has a weak legal basis for social protection and inclusion because most of the policies are at the core of national welfare states.

As part of the implementation of the European Pillar of Social Rights, the European Commission adopted in November 2019 a council recommendation aimed at further strengthening the support for people in nonstandard employment and self-employment that included allowing nonstandard workers and the self-employed to adhere to social security schemes (closing formal coverage gaps). The proposal covers social security schemes for unemployment, sickness and healthcare, maternity or paternity leave, accidents at work and occupational diseases, disability, and old age. Member States were recommended to implement the principles of the recommendation and to submit a plan setting out the corresponding measures to be taken at national level in May 2021. The Commission will review the progress made in the implementation of this recommendation and a follow-up report is due to be made to the Council by in November 2022. On the basis of the results of this review, the Commission may consider making further proposals.

⁶ Ibid.

The United States is a federation of states where national legislation provides a framework, but states have great discretion in deciding the rules, regulations, administration, eligibility and much more as it pertains to healthcare, unemployment benefit, cash benefits like TANF and SNAP. This results in fifty very different systems of protection—with those states in the South being notorious for excessively stingy benefit systems (states with high African American populations tend to have shorter benefit durations and less generous benefits).⁷ The unemployment system, for example, is jointly financed by states and the federal government through payroll taxes paid by employers. But the states decide, with few exceptions, eligibility, benefit levels and benefit duration. During normal economic times, state tax funds pay for the benefits their workers receive and federal tax funds underwrite the cost of administering the program. The federal government finances 50 percent of the Extended Benefit program.

As in Europe, the coronavirus shone a spotlight in the United States on an aging, crumbling federal-state unemployment insurance system. It fails to serve many workers through strict eligibility criteria that proves exclusionary, it ramps up too slowly and unevenly to stabilize the economy during recessions and it sets perverse incentives for states and employers to undermine program integrity, for example through misclassification of workers. Temporary programs were first enacted as part of the CARES Act at the start of COVID-19 that sought to address some of these long-standing and well-known deficiencies in U.S. social protection systems. Some of these included bolstered unemployment insurance programs (including extending eligibility, benefit amount and duration) through the Pandemic Unemployment Compensation (PUC) program. The creation of a Pandemic Unemployment Assistance (PUA) program that brought jobless aid to workers ineligible for traditional unemployment insurance (the U.S. does not have a social assistance program for those not eligible for unemployment insurance). Moreover, the CARES Act extended the amount, duration and eligibility criteria for Food Stamps and suspended the requirement that recipients of Temporary Assistance for Needy Families (TANF) demonstrate they are seeking work as a criterion for benefit receipt. While these changes bolstered these systems, they nevertheless have proven ultimately inadequate forcing a much needed and long-overdue call in the United States for universal minimum standards for benefit eligibility, duration and levels that address both the immediate needs arising out of the pandemic, but also the long-term needs of a changing labor market.

3. Is there evidence for a rise in nonstandard work?

Abraham and colleagues point out that in the United States, the current discussion about alternative work arrangements is similar to earlier discussions that arose in the late 1980s and 1990s.⁸ The concern then, as now, is whether there was a dramatic growth in the number of

⁷ Floyd, I., Pavetti, L., Meyer, L., Safawi, A., Schott, L., Bellew, E. and Magnus, A. *TANF Policies Reflect Racist Legacy of Cash Assistance*, Center on Budget and Policy Priorities, 2021.

⁸ Abraham, K., Haltiwanger, J., Sandusky, K., Spletzer, J., “Measuring the Gig Economy: Current Knowledge and Open Issues,” NBER Working Papers 24950, National Bureau of Economic Research, Inc August 2018. See also for example Abraham, K. “Flexing Staffing

people working in jobs that were contingent or precarious, defined as jobs where workers no longer had a connection to a particular business, but were employed to complete a specific task for an agreed to period of time. “The recent resurgence of interest in non-traditional work arrangements reflects the perception that new technology, along with the restructuring of business enterprises made possible by this technology, is producing an accelerated pace of change in the organization of work that is having important effects on both workers and firms.”⁹

But how much are changes in the labor market indicative of a larger trend in the rise in nonstandard work today? One of the biggest challenges to answering this question rests with national data sources in the United States that are not consistent—at times conflicting—if not outright limited in what they can tell us about the nature and breadth of nonstandard work.¹⁰ Different sources sometimes provide conflicting information on incidence and trends or differ in comprehensiveness of their measures. This is especially true as it pertains to understanding the size and significance in the United States of the platform economy, both locally and nationally. Moreover, another challenge is that there are different categories of workers, and these are not necessarily mutually exclusive, and, in some cases, a job might fall into more than one category. In addition, any one person may have multiple jobs and work under multiple arrangements. “The current system of economic measurement is designed for a world in which workers have a traditional employment relationship or operate a formal business.”¹¹ Understanding the breadth is critical in determining whether a trend is indicative of a wider shift that needs to be addressed through policy change. Moreover, limited government data means it is difficult to understand the demographics of the workforce and the challenges different groups of people may face. And finally, any growth in nonstandard work matters for the measurement of economic activity.

In Europe, researchers face a similar set of data challenges. But in addition to these, the institutional arrangements as well as the prevalence of nonstandard work varies across countries and makes it difficult to make comparisons and reliable generalizations. That all being said, below is a brief review of what the available evidence suggests on changes in employment relationships.

Arrangements and Employers’ Short-term Adjustment Strategies,” in R.A. Hart, ed., *Employment, Unemployment and Labour Utilization*, London: Unwin Hyman, 288-311, 1988; Abraham, K. “Restructuring the Employment Relationship: The Growth of Market-Mediated Work Arrangements,” in K.G. Abraham and R.B. McKersie, eds., *New Developments in the Labor Market: Toward an Institutional Paradigm*, Cambridge, MA: MIT Press, 85-119, 1990; Baker, K. and Christensen, K. *Contingent Work: American Employment Relations in Transition*, Ithaca, New York: Cornell University Press, 1998.

⁹Abraham, K., Haltiwanger, J., Sandusky, K., Spletzer, J., “Measuring the Gig Economy: Current Knowledge and Open Issues,” 2018: p. 1.

¹⁰ Non-employee work may not be fully captured in existing data sources. Each month, for example, the Current Population Survey (CPS) collects information from households about work that done for pay or profit. Like the questions asked on other household surveys, the CPS employment questions may not always cue respondents to report work outside of a conventional job or business and are not designed to probe the nature of the arrangements under which work occurs. Further, they focus primarily on the main job a person holds, with a more limited set of questions asked about additional work activity. Other surveys collect information from businesses on the number of people they employ and the hours those employees work, but do not attempt to measure the labor input of people who are not on those businesses’ payrolls. *Ibid.*, p. 2-3. The consensus panel of National Academies of Sciences, Engineering, and Medicine recently recommended major revisions to Contingent Worker Supplement (CWS) of Current Population Survey to address these problems and gaps.

¹¹ *Ibid.*, p. 2.

4. Standard employment relationship

Despite ongoing changes in the U.S. labor market, standard employment still accounts for the largest share of work in the labor market. These are jobs where a worker is paid a wage or salary, receives a paycheck issued by the organization or company for which work is performed and has a regular, predetermined work scheduled with predictable hours and earnings.¹² This means that those working who receive a wage or salary in the U.S. are covered by unemployment insurance, workers compensation, the Fair Labor Standards Act, and other labor market laws and regulations that are applicable to employees but generally not those who are in nonstandard work arrangements.¹³

In the European context, legally defined contract types governing standard versus nonstandard work are of crucial importance. Social protection is affected by factors such as the legal definition of type of contract, social insurance coverage, remuneration/contributions, and the duration of employment. Employees who have a standard work relationship represents roughly 60 percent of the workforce in Europe.¹⁴

5. Nonstandard employment relationship

In Europe there are five main types of nonstandard work that include fixed-term contracts, temporary agency work, solo self-employment, platform-based work, and (marginal) part-time. While recent legislation has extended access to social protection to groups previously not protected, some forms of nonstandard workers and self-employed still face some gaps in social protection. But as with contradicting findings that have emerged from an analysis of different sources of data in the United States, so too have contradictory findings emerged from different sources of data in Europe. Analysis of the Labor Force Survey suggests that nonstandard work and self-employment made up 41 percent of the EU-27 workforce in 2019.¹⁵ But analysis from the OECD suggests that about 22 percent of all workers in Europe are employed in nonstandard employment. Significantly, more than two-thirds of those who became unemployed were in nonstandard employment prior to their unemployment.¹⁶ The truth may lie somewhere in between, but nevertheless in Europe these numbers represent a non-negligible part of the labor market.

¹² This construct has been used by the Bureau of Labor Statistics (BLS) as the basis of its definition of contingent work. In the published BLS statistics from the Contingent Worker Supplement to the Current Population Survey (CPS), a contingent worker is anyone for whom no implicit or explicit contract for a continuing work relationship exists. Polivka, A. "Contingent and alternative work arrangements, defined," *Monthly Labor Review*, October 3-9, 1996.

¹³ Abraham and colleagues point out that the application of these laws and regulations to the owners of incorporated businesses who pay themselves a wage or salary is complicated, but in many states business owners are permitted to opt in to coverage under the employment insurance and workers compensation systems. Abraham, K., Haltiwanger, J., Sandusky, K., Spletzer, J., "Measuring the Gig Economy: Current Knowledge and Open Issues," 2018.

¹⁴ European Union, "Social Protection in the EU: State of play, challenges and options," 2018.

¹⁵ European Commission, *Access to social protection for all forms of employment*, p.9, 2018.

¹⁶ OECD Employment Outlook 2020.

5.1. Independent contractors

In the United States, workers who work on a contractual basis are defined as those who are not W-2 employees (they are ‘1099 workers’) but who also do not own a business or have significant capital investment. Important here is that in the United States most online platform workers (also referred to as ‘gig’ workers) are considered independent contractors. In the United States, recent estimates suggest a range from seven to 15 percent of those employed are independent contractors. That said, the findings are contradictory. Analysis of U.S. tax data suggest significant growth, but not in government surveys. Evidence from tax data and special household surveys indicate that main government household surveys (Contingent Worker Supplement, Current Population Survey) significantly understate prevalence of independent contracting. They miss non-employee informal work. They are prone to coding workers who are employed by an organization but who are not W-2 employees. And crucially, they miss a lot, or they do not measure at all, independent contracting on secondary jobs. This is a heterogeneous group that includes a range of workers—from those in professional positions to those engaged in low-wage work who are disadvantaged in the labor market, with evidence suggesting that there is more growth in contractual work among disadvantaged workers in recent years.¹⁷

Platform work, as defined in government surveys, is work obtained through an online platform or mobile device and where the payment for the work or task performed is mediated by the platform company. Again, a challenge in understanding the trend is the limitation in data sources. But what the data does suggest is that the incidence of platform work is small but rapidly growing. Recent estimates suggests that between 1 and 3 percent of the U.S. workforce work for online platforms in the week prior. The incidence was higher among younger workers and African American men and women. Analysis of national datasets suggest that platform work is often intermittent and used to supplement income, for example during a spell of unemployment.¹⁸ But smaller studies suggest that the ability of the platform companies to provide their services depends on a smaller number of people who work full time (or more) and depend on that work as their primary source of income. For example, in a study of delivery and ride-hailing work in San Francisco, which was specifically designed to obtain a representative sample of the work being done in the city, more than 50 percent of the delivery workers in the sample worked more than 40 hours a week, with 28 percent working more than 50 hours a week. Some 76 percent of respondents said that platform work accounted for more than half of their monthly income, with 50 percent saying it was their only source of income.¹⁹ A study of Seattle ride-hailing drivers found that a third of drivers account for 55 percent of all trips, and nearly three-fourths rely on driving as their sole source

¹⁷ Abraham, K. and Houseman, S., *What Do We Know about Alternative Work Arrangements in the United States? A Synthesis of Research Evidence from Household Surveys, Employer Surveys, and Administrative Data*, U.S. Department of Labor, 2021.

¹⁸ Ibid.

¹⁹ Brenner, C., Johansson, E., Feng, K., Witt, H. *On-demand and on-the-edge: Ride hailing and Delivery workers in San Francisco*, Institute for Social Transformation, U.C. Santa Cruz, 2020.

of income.²⁰ It was concluded that the platform companies could not provide the services they provide without this core full-time workforce.

In Europe, there are data issues with this category which can be considered as a category of self-employment. One to two percent are employed with platform work as their main income source. However, as many as 10 percent have at some point in time worked for a platform.²¹ These findings suggests that this type of work appears to be a source of temporary employment for a certain group but a main source of employment for a few. Young people, those who are seeking temporary income and those who are seeking to bolster their income through a second job who can be both low- and high-skilled are those most likely to work for the platform economy. The legal concerns are in the definition of the type of contract which opens the window for use of legal grey zones that build on the current diverse definitions of employment and self-employment at the national level.

5.2. Contract company workers

Contract company employees can include temporary agency workers.²² A direct-hire temporary worker is someone who is employed for a limited term. Direct hire temporary workers include seasonal employees such as lifeguards for the summer or salesclerks hired for the winter holiday season. An alternative to using workers hired directly onto a firm's payroll is to use contract company workers on either a short- or long-term basis. Temporary help agencies supply labor to businesses with intermittent, seasonal, or other temporary demands for labor; professional employer organizations (PEO) provide workers or services on a more permanent basis; and other contract firms may provide services on either a short- or long-term basis. Individuals in these arrangements are employees, but the firm on whose behalf work is being performed (the client) is a different entity than the firm issuing the worker's paycheck (the temp agency, the PEO or other contract firm). Recent estimates in the United States suggest that 1.6 percent to 2.0 percent of wage and salary workers work in this capacity which is ultimately a small subset of all contract work. The Incidence is higher among older, minority, and low-educated workers.²³ Business-to-business contracting is where a company outsources work to another company. There is some evidence that it has grown in recent years in the United States, but this is not well measured. The challenge is that outsourcing of work may be a mechanism to lower compensation. That in fact outsourcing

²⁰ Parrott, J. and Reich, M., *A Minimum Compensation Standard for Seattle TNC Drivers*, The New School, Center for New York City Affairs, 2020.

²¹ Eurofound, *Labour market change: Trends and policy approaches towards flexibilisation*, Challenges and prospects in the EU series, Publications Office of the European Union, Luxembourg, 2020.

²² This characteristic is associated with what is referred to as fissioning in the labor market that has been identified by some scholars as having weakened the opportunities and protections for workers who previously would have been employed directly by the firm for which they provide services but now are employed by a different company. See Weil, D. *The Fissured Workplace*, Cambridge MA: Harvard University Press, 2014.

²³ Abraham, K. and Houseman, S., *What Do We Know about Alternative Work Arrangements in the United States? A Synthesis of Research Evidence from Household Surveys, Employer Surveys, and Administrative Data*, 2021.

may be used by firms to avoid employment and labor regulations and lower legal liability for workers in the U.S.²⁴

In Europe, short-term contracts are referred to as fixed-term contracts and can include temporary agency help. There are significant differences across countries and the business cycle as to the use of fixed-term contracts but in the EU, the average is about 12 to 13 percent of workers are on fixed-term contracts. Younger individuals (15-24 years of age) make up a significantly higher proportion of people in this type of contract (46 percent) and consist of youth who are first entering the labor market both without education and training as well as those with university degrees. Fixed-term contract work in Europe therefore runs the gamut from positions requiring highly skilled to those requiring low-skilled workers. Moreover, temporary work can act as an important steppingstone into the regular labor market. But there is also a high proportion of cases in which individuals find themselves in repeated spells or a succession of short-term contracts with little chance of obtaining permanent employment contracts. But if these short-term contracts are linked to vocational training, there is a greater chance of the work serving a steppingstone function to permanent employment.

There are major differences in the scope of temporary agency work across countries and business cycles in Europe. That said, temporary agency work comprises of 8 percent who are full-time and 4 percent of the European workforce who are part-time temporary employees.²⁵ The main groups who participate in this type of employment are primarily blue-collar and low- to medium-skilled workers. Temporary agency work is typically found in the service sector and manufacturing. In Europe, the main factors evident in this category are a lower degree of employment protection in relation to regular and fixed-term workers and differences in collective agreements and business policies regarding the outsourcing of certain tasks especially in the context of deregulation of temporary agency work which has enabled companies to take on temporary agency help for longer periods of time. There is a high incidence of recurrent spells of unemployment for this category of work. Moreover, as we saw with COVID-19, in times of economic downturn, it is temporary employment which is at a higher risk of being immediately eliminated. In the end, this category takes on a large share of the flexibility in the labor market. Efforts are also being made in this industry to improve agency workers' access to social protection.

5.3. Unpredictable work schedules

On-call workers and other direct-hire workers with varying schedules also appear on the payroll of the firm where they are employed, but their hours change depending on the needs of the firm and there may be days or weeks when they do not work at all (for example, waitstaff in the restaurant industry).

²⁴ Ibid.

²⁵ Milotay, N., *Social protection in the EU: State of play, challenges and options*, European Parliamentary Research Service, 2018.

People with unpredictable work schedules include those performing on-call work and those who receive short notice of their work schedules (i.e., less than 1 week). In the narrowest measure, on-call workers have no guaranteed hours and comprise of 0.8 percent of wage and salary workers in the United States. In the United States, those workers who received their work schedule less than a week out range from 5.3 percent to 9.3 percent of wage and salary workers. There is a higher incidence among older, minority, and low-educated workers who are in these jobs. It is well documented that this group of workers suffer especially adverse health effects of unpredictable schedules—e.g., conflict, stress, and sleep problems.²⁶

5.4. Self-employed

There is considerable diversity among the various categories of self-employment. The self-employed include business owners who may have a well-established clientele and a relatively predictable flow of work. In the United States, such businesses may be incorporated, organized as partnerships or operate as unincorporated sole proprietorships. But the self-employed also include independent contractors or freelancers who earn money by performing one-off tasks for which they are paid an agreed sum. Such workers may not be able to count on steady work and their hours and earnings may be volatile. In the U.S. Current Population Survey (CPS) and other household surveys the percentage of the workforce that is self-employed has shown no upward trend and in fact has been drifting downwards since at least the mid-1990s. But this could be due to misclassification of workers in the household surveys.²⁷ In contrast, administrative data derived from tax filings suggests that self-employment is growing.²⁸

In Europe, the self-employed averages about 10 percent of the workforce. Self-employed is a diverse group covering high-, medium- and low-skilled workers. Also diverse in terms of remuneration and economic development. Coverage by social insurance is more limited in many countries given that only a few countries provide mandatory unemployment insurance or voluntary unemployment insurance for the self-employed. This also has long lasting consequences like low public pension claims or if you are in a vulnerable type of self-employment those workers cannot accumulate a significant amount of private savings if this is done for a prolonged period of time. This causes volatility which has triggered some national reforms notably to improve social protection coverage of the self-employed, in the context of the 2019 Council recommendation on access to social protection.

²⁶Some efforts have been made to address the lack of protection for on-call work through legislation. For example, eight states and Washington, DC require that workers who must report to work but are sent home be compensated. Several cities and Oregon regulate work scheduling practices, including typically good faith estimate of schedule 2 weeks in advance. In Europe, the 2019 directive on transparent and predictable working conditions established rules aiming to improve working conditions by promoting more transparent and predictable employment while ensuring labor market adaptability. This includes some provisions specifically targeted at improving the working conditions of on-call workers and at improving the predictability of work.

²⁷ Abraham, K., Haltiwanger, J., Sandusky, K., Spletzer, J., "Measuring the Gig Economy: Current Knowledge and Open Issues," 2018.

²⁸ Katz, L. and Kruegar, A. "The Rise and Nature of Alternative Work Arrangements in the United States, 1995–2015", NBER Working Paper 22667, 2016.

5.5. (Marginal) part time work

In Europe part-time work is considered nonstandard. But there is a wide variation in scope of part-time work. In the EU, 18 percent of the workforce is on average part-time, comprising primarily of women who are also mothers (29 percent female/ 8 percent male). Part-time work is considered the least precarious type of work within the nonstandard work category except for marginal part-time work that has low weekly hours, lacks full unemployment insurance, pension, and sickness rights because of specific exemptions. The challenge with marginal part-time work is the significant lack of or reduced level of benefit entitlements, e.g., unemployment benefits, low pension claims (especially for single parents or after a divorce). As we have seen during Covid-19, marginal part-time jobs have been shed much more quickly and in much greater numbers than regular part-time work or full-time work in an open-ended contract.²⁹

6. Common challenges with nonstandard work

Without question, the standard employment relationship remains a significant share of the workforce in the U.S. and European labor market. But nonstandard work, while not a new phenomenon, nevertheless is as the data suggests increasing. This increase though varies greatly from country to country and depends on the type of nonstandard employment, as this paper illustrates. The challenge that nonstandard work poses for the U.S. and the EU is that so long as nations tie most (but not necessarily all) social protections to one's status in the labor market—the standard employment relationship remaining for many, but certainly not everyone, the 'gold standard' for protection—those who are in nonstandard employment relationships lack the social (and labor) protections that, in turn, undermine individuals' and families' immediate and long-term economic security.

Nonstandard employment can be a matter of choice—it may suit one's current schedule and lifestyle—or it can be a matter of necessity—if given the choice, one would not choose nonstandard employment, but is confronted with either doing a particular job or not working at all. For example, someone, like a student, pensioner or family member who wishes to supplement the "regular" wage or household income is different from the person whose income from a nonstandard/precarious/low-wage job is the main source of income for them and/or their family. Nonstandard work can be both a steppingstone and a frustrating dead end. Young workers, older workers, women, people with migrant/immigrant/refugee backgrounds, the low-wage worker and those who have previously experienced long-term unemployment are at risk of remaining in involuntary nonstandard work. But young people first entering the labor market may see it as a steppingstone to a permanent contract and

²⁹ Monthly Labor Review, "Employment recovery in the wake of the COVID-19 pandemic", Bureau of Labor Statistics, December 2020; Congressional Research Service, "Unemployment Rates During the COVID-19 Pandemic", August 2021; *OECD Employment Outlook 2021: Navigating the COVID-19 Crisis and Recovery*, Paris: OECD.

therefore willingly choose employment in a nonstandard job. Nonstandard work may also be a useful short-term tool to help (re)integrate individuals into the labor market.

In fact, one argument often heard is that the main appeal of, for example, online platform work is the flexibility—both to the worker and the employer. For the worker, it allows them to set their own hours and work part-time to earn money on the side. Hurst and Pugsley argue that self-employed workers enjoy substantial non-monetary benefits such as being their own boss, being able to set their own schedule and they appreciate the flexibility to better match their skills to work projects.³⁰ Yet while the increased opportunities for flexible work could be a benefit for both workers and employers, it could have other ramifications too. First, the evidence suggests that increasingly many [New Yorkers] seem to rely on app-based jobs to make ends meet.³¹ That in fact, the idea of part-time, supplemental, schedule-your-own-hours is increasingly replaced by those who rely on this type of work as full-time. Indeed, some of those performing ‘gig work’ are not doing so by ‘choice’.

But what is less explored is whether one chooses to voluntarily go without adequate social protection, whatever the job may be. And here the problem is two-fold. On the one hand, it is a question of the ‘motivations’ of employers for hiring nonstandard workers (or advocating for its use or crafting regulations that incentivize a move towards nonstandard employment). The motivations may well be that nonstandard work means lowering the firm’s financial compensation for work done, avoiding more costly labor regulation and costs for occupational safety and health, avoiding employer-based wage or social-protection related benefits. For the employer, use of nonstandard forms of work allows them to adjust their labor costs easily to supply and demand swings. On the other hand, workers, whether doing work mediated by online platforms, or working on-call or in a fixed-term contract, lack the type of labor market participation and working hours that provide income security. The worker therefore incurs a double risk.³² The worker can be dismissed if demand drops, *and* they cannot rely on the insurance function of the standard employment contract as the first line of defense against demand fluctuations because they are ineligible based on their status as nonstandard workers. They therefore have less access to some form of income replacement when demand for their work drops. Firms, on the other hand, have the dual advantage of avoiding social insurance payments and taxes while also not having to pay employees during down-times.³³

This leads to the final challenge for the United States and for Europe: What is the implication of non-standard work over the long-term? What does voluntary or involuntary nonstandard employment mean for externalizing costs to society? If workers are not covered now, they will need coverage later, and these costs will not be borne by the employers but by the taxpayers. There is the issue of tax ramifications for the employers who avoid paying payroll

³⁰ Hurst, E. and Pugsley, B. “What Do Small Businesses Do?” *Brookings Papers on Economic Activity*, 73-118, 2011.

³¹ Figueroa, M., Guallpa, L., Wolf, A., Tsitouras, G., and Hernández, H. “Essential but Unprotected: App-based Food Couriers in New York City” ILR Worker Institute, 2021.

³² OECD *The Future of Social Protection. What Works for Non-Standard Workers?*, OECD Publishing, Paris, 2018.

³³ *Ibid.*

tax and contributions to national insurance systems. But there is also the issue of who pays for healthcare coverage, retirement plans, sick or caregiving leave when those are not provided through work? Those who rely periodically, principally or even exclusively on nonstandard work are decidedly less likely to have health insurance or to have a retirement plan and have hours and earnings that are substantially more variable and less predictable.³⁴ Most pension systems are built on the assumption that employment is linear and stable so the effect on future generations of nonstandard workers causes concern. There is therefore the risk that pension schemes which do not consider nonstandard employees will lead to increased poverty for retirees which in turn will result in the need for more supplementary benefits and income support from the state.

Moreover, what happens when protections like job-protected paid sick leave,³⁵ the guaranteed right to a workplace free from health and safety hazards, and in the U.S. possible access to employer-provided health care are absent?³⁶ Or when, in the United States, as individual states enact progressive labor standards like statewide paid family leave or the expansion of paid sick days, those expansions include only the regular workforce, a sizable swath of the workforce will be excluded. These exclusions have cost implications both in the immediate and the long-term and not only for the individual worker, but their families as well. For example, evidence shows that money has a causal impact on children's outcomes. Children growing up in lower income households do less well than their peers on a range of wider outcomes, including measures of health and education. Poorer children have worse cognitive, social-behavioral and health outcomes in part because they are poorer, and not just because poverty is correlated with other household and parental characteristics.³⁷ Thus, an essential question is whose responsibility is it to bear these costs?

7. Conclusion

Europe and in the United States are confronted with the same challenge: to organize diverse forms of employment in a way that is suited to real economic conditions, while ensuring adequate security for workers in all forms of employment. Wage gaps and insufficient worker protections are persistent because of changes to job type and quality vis-à-vis the rise of nonstandard forms of employment. These are especially apparent when it comes to race, ethnicity, gender and immigration status. This has larger implications for the health and wellbeing of individuals and families across the United States and Europe. Given the changing

³⁴ Jackson, E., Looney, A., Ramnath, S. "The Rise of Alternative Work Arrangements: Evidence and Implications for Tax Filing and Benefit Coverage," Office of Tax Analysis Working Paper 114. January 2017.

³⁵ In the United States and on account of the Corona Virus, in 2020 Congress created a temporary Pandemic Unemployment Assistance program that extended unemployment benefits to those not eligible for unemployment insurance (independent contractors being one such category of workers).

³⁶ In the United States, it is important to point out that healthcare is not a right (it is a right in that if a person goes to the hospital and does not have insurance, the hospital must nevertheless treat the person), and workplaces do not have to provide healthcare to their workers, no matter their status.

³⁷ Cooper, K. and Stewart, K. "Does money affect children's outcomes? An update," CASEpapers (203), Centre for Analysis of Social Exclusion, The London School of Economics and Political Science, London, UK, 2017.

nature of the labor market in the U.S. and the EU, reforms to social protection policies are needed in order to close the gap between those well protected and those less so (or not at all) protected. And while there are obvious differences between all 28 countries in terms of the institutional structure, financing and administration, among other differences, the objective of this working group is to establish the underlining principles that should inform the design of social protection going forward. Should social protection be a human right? Should social protections be universal? How do we best include those outside of traditional employment relationships in social protection systems and critically, who will pay? What responsibility do firms who profit from flexible labor markets have to cover the cost of protecting workers? Using key principles as our guide, this working group will explore in the next series of meetings how best to shore up national systems taking into account labor market change and differences in institutional arrangements—highlighting best practices, discussing how to apply lessons learned while exploring barriers (and how to overcome these) to policy changes needed.

The changing nature of work and inequality

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Abstract

Labour markets and occupations have gone through profound changes as a result of technological progress, globalisation and changes to labour market institutions, among many other factors. A result is the reduction of labour's share in income, while inequality has increased across countries. This paper presents descriptive evidence on the labour share and inequality on both sides of the Atlantic, and offers a view of the main differences between the European Union and the United States. In some EU countries, the decline in the labour share has slowed and seems to have started to increase earlier than in the United States. Some trends in inequality were less pronounced in the EU than in the US. We then discuss the factors that might have contributed to these distributional outcomes, focusing on the role of technology and, in particular, automation, and the abrupt changes brought by the COVID-19 pandemic. We also offer some policy reflections that the US might take into account when tackling declining labour shares, issues of job quality and wage inequality.

1. Introduction

There is a burgeoning literature on the ‘Future of Work’ that examines the effects of technological change – particularly the latest wave of digital and non-digital (robot-related) automation – on unemployment and the reshuffling of occupations (see Ciarli *et al*, 2022 for a systematic literature review on the role of different technologies).

The changing composition of jobs over the last few decades has also resulted from a variety of interrelated phenomena, including globalisation and the emergence of global value chains (GVCs) (Bontadini *et al*, 2021), which have affected the international division of labour and countries’ trade specialisations in particular sectors and jobs. Other drivers have been deep changes in migration flows and profound changes in the structural composition of economies. The role of skills, in the form of technological upgrading of skills, the trends of deskilling and the hollowing out of medium-level skills, is a connected phenomenon and is perhaps the main determinant of changes in earnings across categories of workers. It has in some instances led to patterns of increasing income inequality, both within and across countries.

This paper focuses on the influence of technology, in particular digital automation, on these trends, both in the European Union and the United States. We present a novel descriptive picture of the transatlantic comparison of labour share, income and earnings inequality developments. We also survey selected relevant literature. Post-pandemic patterns of working from home (WFH) are also touched upon, with evidence that they have exacerbated some of the job and earning patterns.

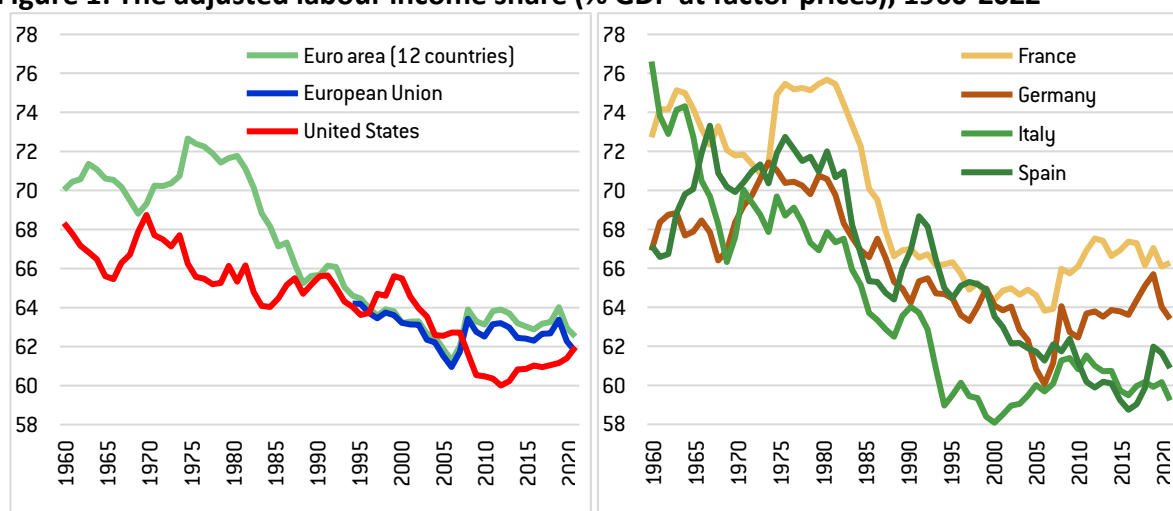
We also highlight the main policy challenges that emerge from the changing nature of jobs and the issue of earning inequality and inclusion. It is important that prognosis follows diagnosis, particularly on in the realm of the Future of Work, and, most importantly, the Future of Inclusion.

2. Labour shares, income inequality and occupational earnings: A glance at EU/US trends

One of the profound changes in the world of work has been **the reduction of the share of labour in total income**, which has characterised labour markets on both sides of the Atlantic (Figure 1). Autor *et al* (2020) attributed this to what they call the “*rise in superstar firms*” which typically show lower labour shares of value added, operate in industries with higher market concentration and drive increases in firm and sector markups. It seems therefore that these changes are (and most likely will continue to be) responsible for a more polarised income distribution (Autor *et al*, 2020).

Notwithstanding the long-term declining trend, there are significant transatlantic differences, as well as differences between EU countries (Figure 1). For example, the labour share started to recover in France and Germany in the late 2000s, while in Italy the recovery started from a comparatively low level at the turn of the millennium. In France, Germany and Spain, one reason for the temporary spike in the labour share in 2020 was the much greater drop in GDP than labour income during the COVID-19 recession, which was corrected as GDP recovered. It is also notable that a gradual increase in the labour share started in the United States in the mid-2010s.

Figure 1: The adjusted labour income share (% GDP at factor prices), 1960-2022



Source: AMECO dataset May 2022. Note: The adjusted labour share corrects the unadjusted share (total labour compensation over GDP) with the impact of self-employed. We report ratios to GDP at factor costs and not at market prices, because the gap between the two, taxes on production and imports (minus subsidies), represent neither any kind of return to capital nor to labour, and therefore should not be counted, as argued by Guerriero (2019). Values for 2022 are European Commission forecasts.

Labour shares have fallen because of a complex set of determinants. It is beyond the scope of this paper to analyse all of the potential causes, so we aim to summarise the main ones based on the literature.

According to OECD (2015) and IMF (2017), factors underpinning the declining labour share include:

- Technological change (the role of capital accumulation and capital-augmenting technical change, a decline in the relative price of investment goods);
- Globalisation (the intensification of competition, the entry of labour-abundant countries into the global economy, offshoring production from advanced to emerging and developing countries);
- The above-mentioned “*rise of superstar firms*” (Autor *et al*, 2020);
- A compositional shift in employment from labour-intensive to more capital-intensive sectors, since the labour share in capital-intensive sectors tends to be lower;

- Financial deepening might increase pressures on businesses to maximise profits, increase shareholder value and pay dividends, rather than share with workers; it may also incentivise firms to focus on their core activities while subcontracting labour-intensive activities;
- Reduction of minimum wages relative to median wages was found to increase inequality, and to lead to the emergence of less-secure employment types, including part-time, casual and temporary employment;
- Declining union density and the bargaining power of labour, which reduces the influence of organised workers on policymakers to adopt more redistributive policies;
- The privatisation of state-owned enterprises in network industries has been found to contribute to the labour-share decline in these industries.

2.2 Income inequality

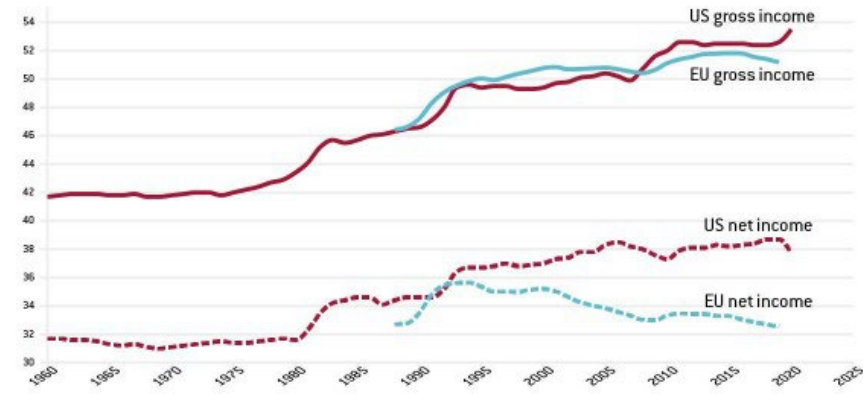
Another salient feature is the general **trend of increasing income inequality**, though with notable transatlantic differences. Gross income inequality (that is, the dispersion of income before taxes and redistribution) increased faster in the US than in the EU in the past three decades. Yet it is interesting to note that the level of gross income inequality is rather similar in the EU and the US, while there is a sizeable difference in net (after-tax and subsidies) inequality, which has been on a downward trend in the EU since the mid-1990s but has continued to grow in the United States (Figure 2, Panel A). Income inequality declined in some EU countries in the past decades (Figure 2, Panel B), but it increased in almost all US states (Figure 2, Panel C).

Explanations for growing income inequality within advanced countries often include the same factors as explanations for the labour income share decline, as surveyed by Fröster and Tóth (2015). Since the distribution of capital income is very unequal in society, **a rise in the capital share is bound to widen income inequality**. Moreover, within labour income, in some countries, the top earners have captured a bigger piece, while the middle class and the poorest segments of society have experienced little if any real income growth.

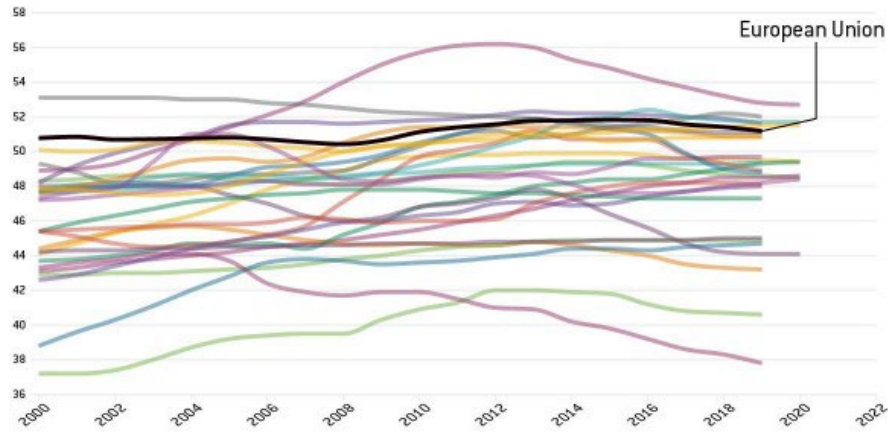
Similar levels of gross income inequality, and different levels of net income inequality, across the Atlantic suggest that redistributive policies in Europe are more effective in altering the income distribution resulting from market forces. Another conclusion based on this transatlantic comparison is that technological change, globalisation and the many other factors identified in the literature could increase inequality throughout advanced countries, but cannot explain the transatlantic differences in net inequality developments.

Figure 2: Gini coefficient of income inequality: EU and US

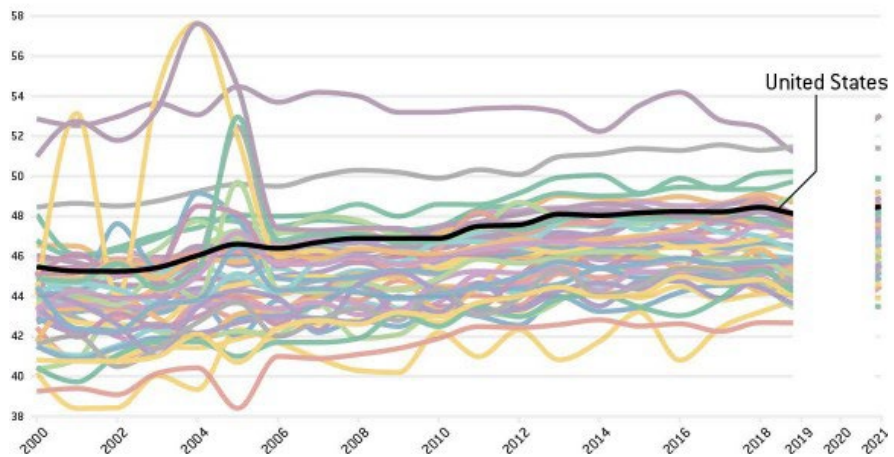
A) EU and US
 comparison: gross
 and net income
 Gini (comparable
 data based on
 SWIID)



B) EU countries:
 gross income Gini
 (SWIID data)



C) US states:
 gross income Gini
 (Census Bureau
 data)



Source: Bruegel based on Standardized World Income Inequality Database (SWIID; Solt, 2020, version 9.3) for US data on panel A and 27 EU member states' data on panel B; updated calculations by Darvas (2019) for the European Union on panels A and B, which are consistent with SWIID data; US Census Bureau data for US data on panel C (series: B19083, 1-year estimates).

Note: The Gini index is expressed on a 0-100 scale. SWIID data for the US is on average 4.3 Gini points higher than Census Bureau data; that is, a value of 36 in panel B roughly corresponds to a value of 32 in panel C. European Union data includes the current 27 members in the full sample period. The 2020 1-year Gini coefficient estimates are not available from the Census Bureau, due to the impacts of the COVID-19 pandemic on data collection. The three most equal countries (in terms of gross income inequality) in the EU in 2019 were Slovakia, Slovenia and Czechia, and the three least equal countries were Ireland, France and Italy. In the US, the three most equal states in 2021 were New Hampshire, Alaska and Utah,

2.3 From jobs to earnings: Differences between EU and US trends

The literature has demonstrated **growing earnings inequality in the United States**, where highly-qualified high-earners reaped most of the benefits of economic growth, while low-qualified (typically low-earner) workers did not benefit much, if at all, from real income growth over the past decades. Only a subset of European countries shares such developments. However, in a number of European countries, we **do not observe relative wage declines for workers with lower qualification levels** (Figure 3).

Eurostat publishes earnings data for twelve occupational categories, of which we selected six: managers and professionals are the highest earners (indicated with circles in Figure 3); technicians and clerical support workers typically have middle qualifications and are in the middle of the income distribution (denoted with solid lines without symbols in Figure 3); while workers in sales and elementary occupations usually have low-level qualifications and low earnings (indicated with triangles in Figure 3).

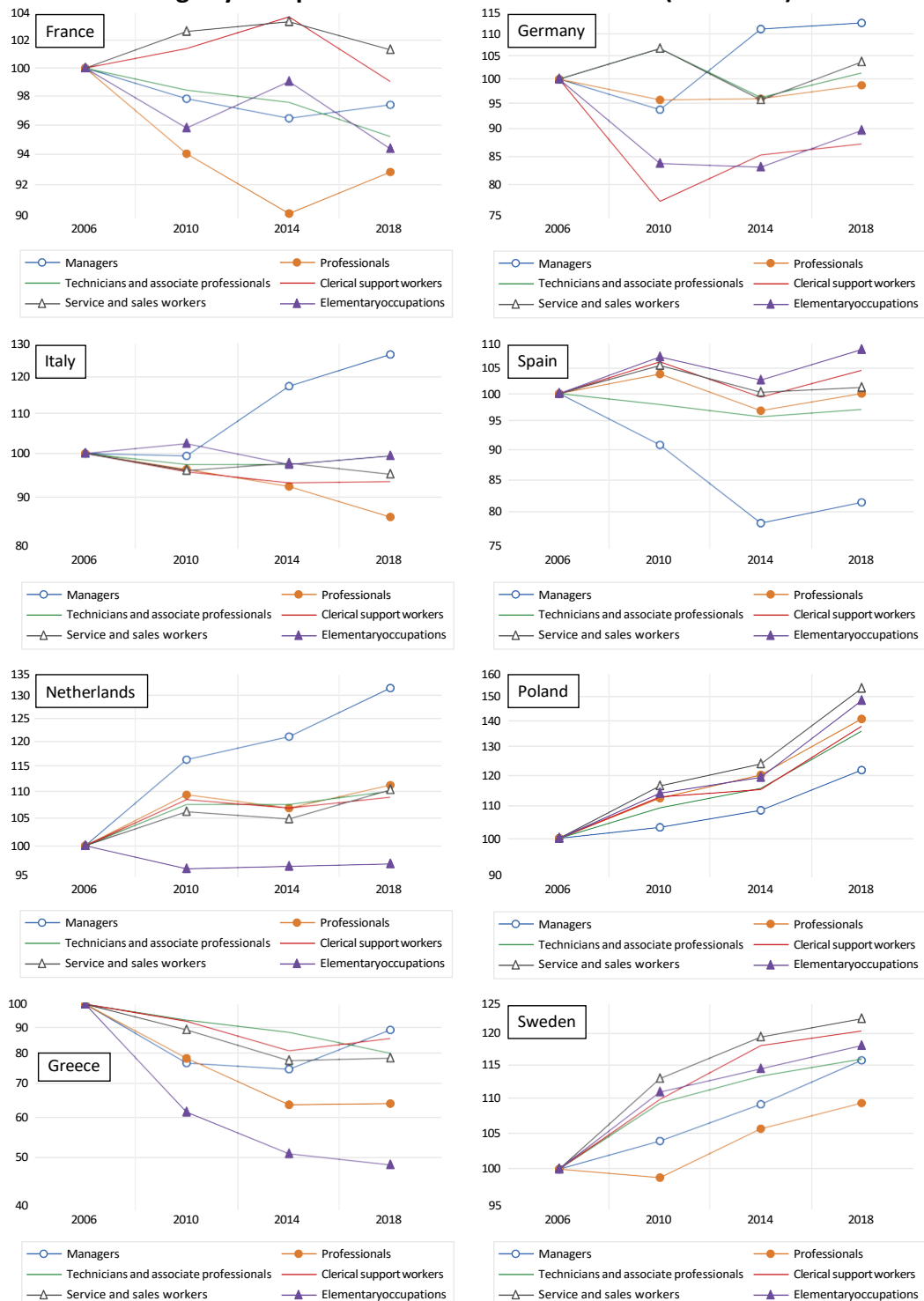
Among the eight countries reported in Figure 1, **earning developments in the Netherlands followed the US pattern**, with managers and professionals obtaining the fastest earning growth. In Germany, managers became even richer, yet the earnings growth of professionals was lower in the 2006-2018 period than for service and sales workers and technicians. In Italy, only managers benefited from positive real income growth; professionals, another well-paid group, suffered from a larger real income decline than all other occupations reported in Figure 3. Greece is a special case where real earnings of all occupation groups have declined, because of the harsh macroeconomic adjustment after 2009. The smallest decline in Greece from 2006-2018 is observed for managers.

The experiences of France, Poland, Spain and Sweden, meanwhile, are rather the contrary to US developments because both well-paid managers and professionals are typically at the lower scale of income growth among the various occupations.

To sum up, while earnings developments in some EU countries are also characterised by weaker growth for the less-qualified and lower-paid, compared to the US, there are several EU countries in which this was not the case from 2006-2018³.

³ To check nominal wage convergence in the EU, we estimated a simple regression for wage growth from 2006-2018 on the 2006 level of wages (all variables are measured in euros). We found strong wage convergence in all occupations when including all EU countries, a result likely driven by the income convergence of poorer central and eastern European countries. When restricting the sample to eight high-income euro-area countries (Austria, Belgium, Finland, France, Germany, Ireland, Luxembourg and the Netherlands) we did not find statistically significant impacts anymore, though the parameter estimates have a negative sign and the coefficient of determination (R²) is largest for (a) technicians and associate professionals, (b) craft and related trades workers, and (c) clerical support workers, suggesting some weak wage convergence in these occupations across countries. The R² is the lowest for (a) plant and machine operators and assemblers, (b) service and sales workers, and (c) skilled manual workers, suggesting the lowest convergence of wages in these occupations across countries.

Figure 3: Real earnings by occupation in selected EU countries (2006=100)



Source: Bruegel using Eurostat's 'Structure of earnings survey: annual earnings [earn_ses_annual]', 'HICP - annual data (average index and rate of change) [prc_hicp_aind]' and 'Euro/EUR exchange rates - annual data [ert_bil_eur_a]' datasets. Note: Nominal earnings are deflated with the harmonised index of consumer prices (HICP). Eurostat reports earnings data in euros. For non-euro area countries (Poland and Sweden), we first converted euro values to the national currency and then deflated that with the HICP.

3. Digital and non-digital automation and occupations: Selected evidence

The deep transformation of economies arising from technical change has been going on for a long time. Automation, which involves in general the decrease of the involvement of human labour in production processes, is as old as the industrial revolution. For instance, mechanisation led to **the decline in demand for routine manual tasks** performed by agricultural and industrial workers in the nineteenth and twentieth centuries (Nedelkoska and Quintini, 2018).

Information technology (IT) and artificial intelligence (AI) have brought a new form of automation over the past 40 years. The adoption of digital technologies at the end of the twentieth century extended the set of tasks that can be done by a machine. Over the past decade, technology has affected the replacement of humans in **routine cognitive tasks** (Autor *et al*, 2001) and will likely **replace humans in non-routine and manual cognitive tasks in the medium- to long-term** (Brynjolfsson and Mitchell, 2017). While it is hard to predict precisely which jobs will be automated (Frey and Osborne, 2017; Brynjolfsson *et al*, 2018), AI, robotics and automation are only a few possible technology disruptions with a potentially substantial impact. In sum, digital transformation has profoundly modified the structure of jobs and skills (see, among others, Goos and Manning, 2007; Mokyr *et al*, 2015).

Hence, automation (robotisation and digital automation) could be an important driver of the fall in the labour share of income and the increase in income inequality, depending on whether:

- Automation substitutes capital for labour or automation complements labour and creates new tasks,
- Automation changes the relative wages for different tasks,
- Automation changes the composition of employment,
- Automation in a particular sector creates jobs in other sectors.

A large body of recent research has concluded that the substitution effect dominates. For example, Lankisch *et al* (2019) developed a growth model with automation to explain the observed decline in the real wages of low-skilled workers and the increased *per-capita* output and wages of high-skilled workers in the US. The model of Prettner and Strulik (2020) assumed that high-skilled workers are complements to machines and low-skilled workers are substitutes for machines, leading to the finding that automation leads to an increasing share of college graduates, increasing income and wealth inequality, and causing a declining labour share.

Acemoglu and Restrepo (2020) showed that the impact of robots is distinct from other capital and technologies. They estimated that one more robot per thousand workers reduces the employment-to-population ratio by 0.2 percentage points and wages by 0.42 percent in the US. In turn, Acemoglu and Restrepo (2021) documented that between 50 percent and 70

percent of changes in the US wage structure over the last four decades is accounted for by the relative wage declines of worker groups specialised in routine tasks in industries experiencing rapid automation. They developed a conceptual framework to explain this development, in which automation technologies expand the set of tasks performed by capital, displacing certain worker groups from employment opportunities.

Focusing on inequality, Moll *et al* (2021) explored how technology affects wealth inequality and overall income inequality (not just wages). They concluded that automation not only **benefits high-skilled labour but also increases inequality via increased returns to wealth**. The flipside of such return movements is that automation is more likely to lead to stagnant wages and therefore stagnant incomes at the bottom of the distribution.

By considering age, Battisti and Gravina (2021) found evidence of greater complementarity between robots and older workers (aged 50 and over), and greater substitutability among robots and younger cohorts of the labour market, based on data from 13 advanced countries (including the US and 8 EU countries) from 1994-2005.

However, some works highlight that some technologies create more jobs than they destroy. Gregory *et al* (2021) concluded that routine-replacing technologies destroyed 9 million jobs in Europe in 1999-2010, but created about 14-19 million jobs over the same period, resulting from lower product prices, which improve regions' terms of trade, raising their tradable output and employment, as well as from growing local incomes and positive demand spillovers to the non-tradable sector. Furthermore, Gregory *et al* (2021) showed that employment would have grown substantially more had firm mark-ups not increased, in line with the argument and evidence put forward by Autor *et al* (2020).

Most recently, Ciarli *et al* (2022) emphasised that in many cases, deploying labour-saving devices results in the **reconfiguration rather than elimination of jobs** – with some net loss of employment and often an increase in output or productivity (which can then be reflected in lower prices that increase the size of a market or market share). In addition, digital automation might routinise and replace segments of tasks, rather than entire tasks within occupations, and might affect also the degree of use of codified versus tacit knowledge, which requires different skills from workers.

In line with the above, Baldwin (2019) argued that **artificial intelligence (reflecting automation) and remote intelligence (ie hiring people from other countries who can work from home for lower salaries – reflecting globalisation) will mostly affect people working in the service sector, who faced little displacement so far from globalisation and automation**. The sectors most exposed to such a risk are office and administration, retail, construction jobs, food preparation, transportation, medical jobs, pharmacies, journalism, legal work and finances. He expects that in the years to come, the number of jobs displaced by white-collar robots will be somewhere between one in ten (“big”) and six in ten (“enormous”). However, Baldwin (2019) also expects that new jobs will be created and in the long run, everyone will

benefit. But the transformation period is expected to be disruptive for many people. Nevertheless, Autor (2015) expressed a hopeful prediction: **a significant stratum of middle-skill jobs combining specific vocational skills with foundational middle-skill levels of literacy, numeracy, adaptability, problem-solving and common sense will persist in the coming decades.**

4. The shock of the pandemic: essential and digital workers

More recently, all these trends have been further affected by COVID-19. Bloom and Pretzner (2020) argued that the COVID-19 pandemic, as well precautions against future pandemics, will likely accelerate automation and the displacement of certain workers exposed to close interactions, some of whom are low-wage earners. Remote work increased massively during the pandemic and will likely be more frequent after the pandemic than before (Marcus *et al*, 2022). Occupations that can be done remotely are typically for better-educated higher earners. These developments will likely widen inequalities.

Savona (2021) highlighted the role of ‘essential’ services: the opportunities for remote working are to a great degree specific to occupations and sectors (Dingel and Neiman, 2020; Del Rio-Chanona *et al*, 2020). Some anecdotal evidence seems to suggest that remote working is either for privileged, highly skilled and well-paid workers, or for precarious, self-employed gig workers. The global lockdowns have accelerated the pace of remote working and exacerbated these differences (Adams-Prassl *et al*, 2021; Haldane, 2020; Darvas, 2021; Marcus *et al*, 2022).

Stuck in the middle are all the ‘essential services’ that are unsuited to remote working. Wholesale and retail services, including delivery services, transport and services auxiliary to transport, personal care, social services and healthcare, are the essential services that have played a crucial role during the pandemic and are likely to do the same in the next ones. Essential service occupations cannot be carried out from home ‘by design’, and yet are indispensable if the economy is to retain a minimum level of functioning when most economic activities are shut down.

While some 50 percent of information and communication service workers, 45 percent of professional and scientific service workers, and 40 percent of finance and real-estate service workers could turn to home working during the pandemic in the United Kingdom, for instance (Haldane, 2020; Del Rio-Chanona *et al*, 2020), essential services are structurally unsuited to remote working.

More generally, the COVID-19 pandemic has had an impact on remote working and on the challenges of managing the effects of digital transformations on working conditions in two major ways. First is the long-term consequences of the global shift towards smart (remote) working, from which, as argued here, essential services are most likely to be excluded. The second aspect is the extent to which digital home working, in both its traditional and emerging

forms, are to become the 'new normal' (Alipour *et al*, 2021), and if they can be made more inclusive.

Haldane (2020) suggested two interesting potential long-term negative effects of home working. First, the lack of face-to-face interaction might lead to the loss of a fertile environment for the creative and novel ideas that are at the very core of innovation. Second, the loss of social networks and the opportunity to exchange ideas informally might lead to a loss of social capital as existing social capital is eroded and new social capital does not get formed: *"Whether it is creative sparks being dampened, existing social capital being depleted or new social capital being lost, these are real costs and costs which would be expected to grow, silently but steadily, over time. They weigh on the other side of the ledger when it comes to assessing the case for home working. They cast doubt on whether it will lead to the promised land of improved productivity and greater happiness"* (Haldane, 2020).

This is all very plausible and applies to non-essential but highly valued services. Services which are essential but for which a low value is set will most likely be immune to the risks of creative sparks being dampened or social capital lost, simply because they did not enjoy these things in the first place. Acknowledging the costs of home working is undoubtedly forward-looking, but recognising that the value of essential services is not reflected in their wages would be revolutionary.

5. Technology and labour markets: main policy challenges

The evidence we have set out above is crucial but is a moving target: transformational change due to the joint effects of technology, market structure, the skills gap and the impact of the pandemic is still ongoing and it is hard to pinpoint what the future holds.

Remote working and digital jobs are only a symptom of a much deeper and longer-standing transformation of occupations and working models, long pre-dating (but accelerated by) the COVID-19 pandemic and the restrictions imposed on some occupations by governments.

For the purpose of this work, it is important to raise a selected number of questions that require bold policies in order to address the challenges of the changing nature of jobs arising from automation and digitalisation, and the side effects that these phenomena have on workers.

- **What can explain the different labour share, inequality and earnings developments in the US and in some EU member states?**
- What are the possible effects of the changes brought about by *technology*, and the *COVID-19 pandemic* and the *fall in labour shares* by age, gender, race, ethnicity, geography and educational attainment?
- Which occupations or tasks are at greatest risk of being automated? What are the socio-economic characteristics of workers currently performing these tasks? Would this lead to the further polarisation of labour markets and income?

- **How can technical change be steered to ensure social mobility and to offer new opportunities to young people from disadvantaged backgrounds?**
- What policies are needed to ensure that automation does not just displace jobs, but creates new occupational opportunities that displaced workers can take?
- What is the role of the public sector in offering opportunities to experiment in novel inclusive trajectories of technical change that are facilitated by purported policies of training, education and learning on the job?

These questions require a substantial research effort, of which we have only scratched the surface in this paper. Solid evidence to underpin policy solutions is also needed. The High Level Group Report on the Impact of Digital Transformations on EU Labour Markets (European Commission, 2019) unpacked the effects of digitalisation trends on several occupations. While the literature dealing with the effects of digitalisation on occupations and tasks has produced robust findings, what is missing is a systematic effort to devise policies that tackle potential side effects. The policy recommendations offered in the report have proved to be somewhat prophetic in the context of the COVID-19 crisis. We summarise them below, and refer the interested reader to the full report (European Commission, 2019):

A skilled workforce

The abrupt shift to home working and the need to shield at-risk categories, including those with hidden disabilities, have shown that one of the most important requirements for workers to survive in current labour markets is the acquisition of digital literacy and updated digital skills. Workers might not be aware of the need or might not have the opportunities and access to invest in their digital skills. If so, policymakers can organise digital skills personal-learning accounts that belong to workers and are portable from job to job. Details such as contributions, the number of hours per year, top-ups, eligible expenses, withdrawal processes and taxation schemes are important, and not much is known yet about their effectiveness.

New labour relations and a new social contract

The combination of the abrupt shift mentioned above and the effects of lockdown have put a dramatic strain on workers' mental health. The European Commission (2019) recommendations emphasised the need to avert occupational safety and health risks like mental health and stress-related issues resulting from digitalisation and increased volatility in today's world of work. What is needed is to increase the focus on prevention in employee assistance programmes, and to improve uptake by increasing social acceptance of mental health issues through informed discourse. The COVID-19 crisis is an unprecedented opportunity to increase public expenditure in the health sector, and governments should plan a substantial expansion of mental health programmes.

Remote working has accelerated the pace of growth in platform working and alternative work arrangements, a trend which started before the COVID-19 crisis (Ciarli *et al*, 2020; Bell and Blanchflower, 2021). One of the most inclusive steps that governments could and should take in the wake of the crisis is to equalise the (administrative) treatment of standard and non-

standard work arrangements. This could be done, for example, by providing equal access to government services and credit lines and transferability of benefits regardless of employment status.

Along the same lines, it is important to ensure neutral social protection against unemployment, sickness and other life circumstances, independent of employment status. The increasing number of workers with non-standard employment should have access to social protection, eg through portable benefits attached to the worker rather than the job, or the establishment of an 'underemployment insurance' scheme to smooth out fluctuating incomes in the gig economy.

These structural, forward-looking actions could well be spillovers from government spending on furlough schemes to tackle the COVID-19 crisis. European Commission (2019) advocated a combination of context-specific and structural interventions that not only cover the emergency but ensure long-term inclusivity in labour markets.

Digitalisation, worker wellbeing and work-life balance

Workers, employers and policymakers play key roles in determining the trade-offs related to new workplace technologies for worker physical and mental health and overall wellbeing. Policies should help build worker wellbeing into the company culture. Examples are offering preventative medical check-ups (eg to prevent 'tech-neck injuries') and training staff to recognise and address stress in colleagues (due to 'organisation-change fatigue' and 'learned helplessness' from workplace digitalisation). A focus on mental health issues seems particularly important because, unlike many physical conditions, mental health conditions can be denied for a long time by the individual, both to themselves and to those around them. These policies can be based on recent experiences with employee assistance programmes (EAPs) offered to help employees navigate challenges at work and in their personal lives. Many employees can access early support related to topics like personal relationship challenges, anxiety and stress – thus providing an early-stage prevention approach that has proven to be cost-effective for employers. As well as improving morale within firms, studies show that, through investments in EAPs, companies can increase worker productivity and reduce absenteeism costs.

In sum, occupational safety and health risks are rising in part because of digitalisation. Although more evidence **is needed to determine the emerging trade-offs for worker health and wellbeing from new workplace technologies, policies** should focus on prevention through EPA-type programmes and improve uptake by increasing social acceptance through informed discourse and the delivery of personalised, cost-effective solutions enabled by technology.

All these proposed policy measures help the most vulnerable segments of society and thus have the potential to lessen the adverse distributional impacts of digitalisation.

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Artificial intelligence: increasing labour productivity in a responsible way¹

24 November 2022

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PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
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Abstract

In the last decade, labour productivity growth has slowed down despite the fast development of new efficient general-purpose digital technologies, including machine learning and artificial intelligence. This productivity slowdown is a big paradox. Does this mean there were false hopes about the potential of these technologies to transform societies and improve people's lives? This paper has two objectives. First, it provides and evaluates alternative explanations for this paradox and proposes specific policy recommendations in order to resolve it and increase productivity. Second, as these recommendations point towards the larger-scale adoption and diffusion of artificial intelligence technologies, it provides a framework that ensures that the ways AI systems are designed, built and scaled up are ethical and responsible by design.

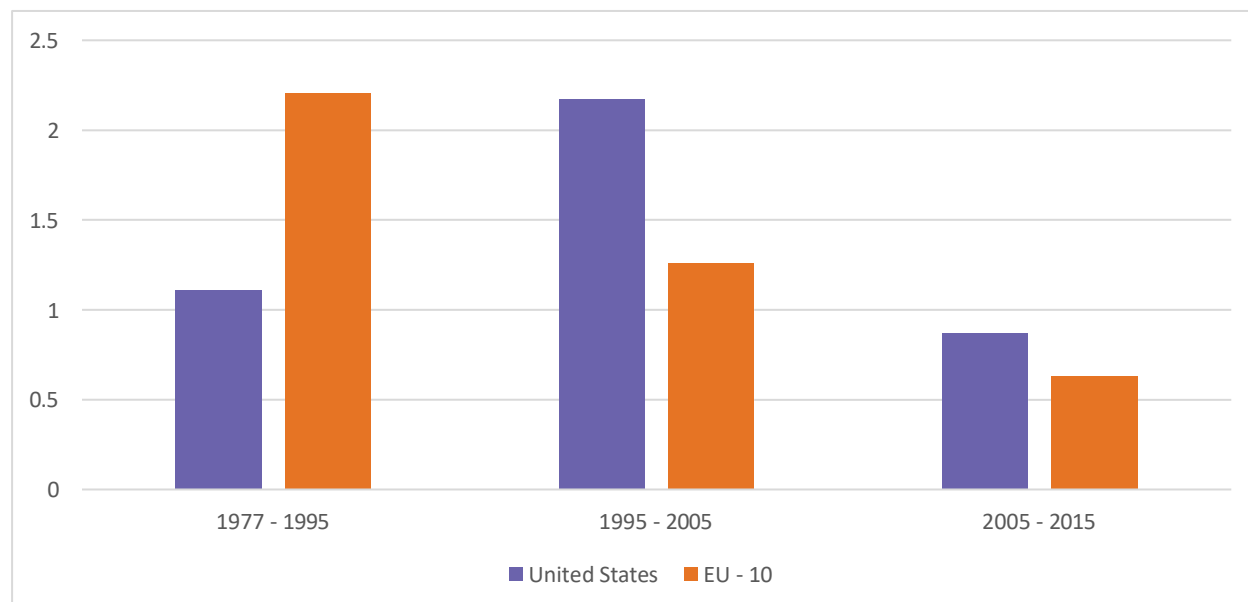
1. The productivity paradox

Following the Second World War, the United States, Soviet Union and Western European and East Asian countries witnessed phenomenal productivity growth and high employment rates. This lasted until the 1970s, when economic recession occurred in the Western world, with the high inflation and unemployment. In the 1970s a new industrial revolution took place, based on personal computers and information and communication technologies (ICT). It signalled the beginning of a new era in which the rise and systematic adoption of electronics, telecommunications and computers exerted disruptive forces on business and economic models, providing more efficiency gains in the production process and new possibilities and modes of communications. Many experts call this period the fourth industrial revolution (Schwab, 2017, Perez, 2002). The continuous advances in ICT technologies have led to a digital new reality in which new sectors, products and services have been developed in a process of rapid digitization of the world economy, and in which high-level automation has become a popular industrial and business practice.

Despite the large scale of ICT deployment in the 1970s and 1980s, substantial benefits in productivity statistics have not been evident, as reflected by the famous quote by Nobel Laureate Robert Solow: *“You can see the computer age everywhere but in the productivity statistics”*⁴. In fact, some productivity growth benefits have been observed, but they took some time to arrive, were US-specific and did not last for long. The US economy experienced a productivity growth revival between 1995 and 2004, which was not observed in other major economies, such as European countries (Figure 1).

⁴ ‘We’d better watch out’, *New York Times Book Review*, 12 July 1987, page 36.

Figure 1: Labour productivity growth rates for US and EU10⁵



Source: Gordon and Sayed (2020).

Gordon and Sayed (2020) found that US productivity revival was driven by intense investments in ICT, which led to additional productivity growth in: i) ICT-intensive service producing industries, and ii) the electric machinery industry that produces computer hardware. In contrast, European countries did not invest heavily in computer hardware, and ICT-producing industries have been of much less importance (O'Mahony *et al*, 2008). As a result, Europe failed to reap the productivity benefits of the ICT revolution.

Within those years of substantial productivity growth, US ICT-intensive industries experienced a productivity growth revival of roughly 2 percentage points, compared to non-ICT intensive industries in which productivity growth remained at the same low levels as before (Stiroth, 2002). In addition to heavy ICT investments, structural market changes, such as the

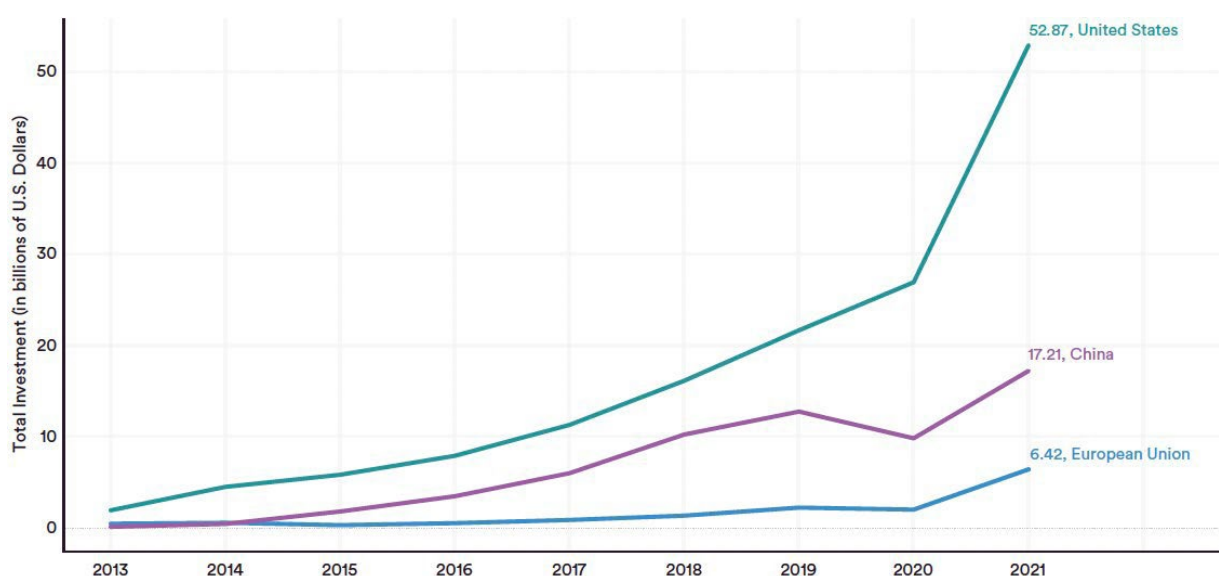
⁵ EU10 include: Austria, Belgium, Denmark, France, Germany, Italy, the Netherlands, Spain, Sweden, and the United Kingdom.

emergence of more flexible labour markets, increases in dynamic competition and reallocation effects, also helped the US productivity revival (Jorgenson *et al*, 2008).

Since 2010, the rise of AI has been experienced, which is the next important step in the ICT revolution. AI can be defined as the use of machines and software developed with specific techniques and approaches, for a given set of human-defined objectives, to generate outputs such as content, predictions, recommendations or decisions, influencing the environments they interact with. The most frequently-used techniques and approaches in AI are: machine learning (supervised, reinforcement and unsupervised learning), logic- and knowledge-based approaches (eg inductive logic programming with the use of deductive engines), statistical approaches (like Bayesian estimation), search and optimisation methods.

In 2021, global private investment in AI totalled about \$93.5 billion, which is more than double the total private investment in 2020 (Figure 2). This is the greatest year-over-year increase since 2013-2014. The AI investment gap between the US and the EU (without considering the UK) increased in the last few years.

Figure 2: Private investment in AI in the EU, US and China between 2013 and 2021 (billion \$)



Source: Zhang *et al* (2022).

A key characteristic of AI systems is that they incorporate a learning-by-doing function that makes them more and more efficient through the execution of their tasks and their experimentation with relevant training data. As a result, AI systems can substantially improve the efficiency of production processes of goods and services if they are 'fed' good quality, relevant (training) data.

AI is considered to be a general-purpose technology (like the steam engine, electricity and computers) with a large variety of applications in many industries and sectors⁶. The fastest growing type of AI technologies is related to deep-learning applications. AI-related patent filings have particularly increased in the field of computer vision, including character recognition, biometrics, scene understanding, image and video segmentation, object tracking and augmented reality (WIPO, 2019).

There have been tremendous improvements in the ability of AI systems to perform given tasks. For example, AI systems managed to outperform humans in image recognition in the frame of the ImageNet Large Scale Visual Recognition Challenge.⁷ This challenge evaluates algorithms for their capabilities in object detection and image classification at large scale. For any given word, ImageNet contains several hundred images. In the annual ImageNet contest, several research groups compete to get their AI computers to recognise and label images automatically. Humans on average label an image correctly 95 percent of the time. The respective number for the winning AI system in 2010 was 72 percent, but over the next couple of years the error rate fell sharply. In 2015, machines managed to achieve 96 percent accuracy, reducing the error rate below the human average level for the first time.

Another indicative example is the General Language Understanding Evaluation Benchmark (GLUE):⁸ GLUE tests single AI systems on nine distinct tasks in an attempt to measure the general natural language understanding of AI systems, and compares it with the respective

⁶ Due to the wide variety of applications, general purpose technologies have a large aggregate impact on the economy (Jovanovic and Rousseau, 2005).

⁷ <https://image-net.org/challenges/LSVRC/>.

⁸ <https://gluebenchmark.com/>.

understanding of humans. Tremendous progress has been made in the accuracy of these systems. Though the benchmark was only released in May 2018, the performance of these AI systems surpassed non-expert human performance in June 2019, and continues to improve further.

AI systems have also improved a lot in other tasks including speech recognition, (visual and verbal) question answering, translation from one language to another, language understanding and inference, summarising texts, sentiment analysis and so on.

Given the increasing efficiency of AI systems, it is not surprising that they improve productivity at the firm level. Damioli *et al* (2021) found that more AI patent applications generate a positive effect on companies' labour productivity, especially for SMEs and in service sectors. In a similar spirit, Babina *et al* (2020) used data from online job postings and employment profiles to find that firms that invest in AI experience faster growth in both sales and employment. However, this effect is most significant for the largest firms in each industry. Alekseeva *et al* (2020) illustrated the importance of managers' AI skills in connection with AI adoption increasing firms' market capitalisation, while Brynjolfsson *et al* (2021) focused on AI prediction systems and showed that the firms that adopt them have higher productivity.

Despite i) the increasing investment in AI technologies in the EU and the US; ii) the tremendous improvements in AI machines (which reached efficiency levels equal to or even greater than humans in specific cognitive tasks) and; iii) the AI firm-level positive productivity effects, AI's contribution to the production process has not been captured by aggregate productivity statistics. Since 2005, US labour productivity has grown at an average annual rate of just 1.3 percent. The slow growth observed since 2010 has been even more striking: labour productivity grew just 0.8 percent from 2010 to 2018. Figure 3 presents labour productivity growth rates up to 2019 for France, Germany and the US. In the first decade since the systematic introduction of AI, no striking increases have been seen in labour productivity growth.

Figure 3: Labour productivity annual growth rate for France, Germany and US between 1971 and 2019



Source: OECD Statistics.

The rest of this paper explains this AI productivity paradox and provides some policy recommendations on how to make labour in US and EU economies more productive based on these new efficient technologies.

2. Potential explanations for the AI productivity paradox

Several explanations have been put forward to answer this question (Brynjolfsson *et al*, 2019). The most pessimistic is that high average productivity gains from AI will not be observed in the long-run. As with the ICT revolution that started in the late 1970s but only paid off temporarily in terms of productivity statistics between 1995 and 2005, AI is not expected to have any major impact on the aggregate economy. A main proponent of this explanation,

Robert Gordon (Gordon, 2015, 2018) believes that AI is nothing new and will not change people's lives fundamentally⁹.

The second explanation has to do with the fact that AI is in many cases associated with intangible capital that is not so easily measured by official statistics. In order to capture its contribution to productivity new methodologies are needed that will help better measure intangible capital and assess its contribution to the production process and online users' well-being (Brynjolfsson *et al*, 2019).

The chief economist of Google illustrated why intangible capital is difficult to measure with the following example¹⁰:

"In 2000, there were 80 billion photos produced. We know that because there were only three companies that produced film. And fast-forward to 2015, there are about 1.6 trillion photos produced. Back in 2000, photos cost about 50 cents apiece. Now they cost zero a piece essentially. So, any ordinary person would say, wow, what a fantastic increase in productivity, because we've got a huge amount of more output and we've got a much, much lower cost. But if we go look at that from the GDP lens, it doesn't show up in GDP for the most part because those photos are typically traded among friends and put in albums and things like that. They're not sold on the market. GDP is the market value of transactions out there, and anything that's not sold or has a zero price isn't going to show up in GDP."

In addition, the implications of AI for the transformation of work can introduce additional measurement issues. Bachmann *et al* (2022) showed that people working in occupations that are more exposed to AI are more likely to move to self-employment. AI technologies facilitate some new forms of service work for self-employed individuals, such as platform work, which have not yet been captured by official labour statistics.

⁹ <https://www.irishtimes.com/business/technology/third-industrial-revolution-will-not-transform-our-lives-1.3545650>.

¹⁰ <https://www.aei.org/economics/googlenomics-a-long-read-qa-with-chief-economist-hal-varian/>.

The third explanation is based on the observation that AI and intangible capital investments are concentrated in a few firms (Kaus *et al*, 2020; Altomonte *et al*, 2020). As a result, only a small portion of firms capture most of the benefits from AI technologies and advance their positions in the markets in which they operate. With only few winners from AI, average productivity growth remains low, even if AI technologies are highly productive. De Loecker *et al* (2020) found that market power has significantly increased in the last 15 years in all major economies. In fact, the market power empirical trends are particularly prominent for digital markets, according to Calligaris *et al* (2018), who followed a similar methodology in computing them. In particular, they assigned an index of digital intensity to each sector based on sectoral tangible and intangible ICT investment, purchases of intermediate ICT goods and services, and use of robots. They found that the increase in markups from 2001–2003 to 2013–2014 was greater for the average firm in a digital-intensive sector than for the average firm in the pool of non-digital-intensive sectors¹¹.

The fourth explanation has to do with the time that needs to pass so that a breakthrough technology to contribute to productivity, and is based on the J-curve (Brynjolfsson *et al*, 2019). The productivity J-curve describes the historical pattern of initially slow productivity growth after the introduction of a breakthrough technology, followed years later by a sharp take-off. For instance, after the introduction of electricity to American factories, productivity was stagnant for over two decades. It was only after managers re-invented their production lines using distributed machinery, a technique made possible by electricity, that productivity belatedly surged. And it's not just electricity that requires such a reinvention of work.

¹¹ However, such findings should be viewed with some caution. First, how to measure markups is a topic of current debate. For example, Philippon (2019) did not find an increase in markups and concentration in the EU. He only pointed out a sharp increase of concentration in US markets. At the same time, Traina (2018) criticised the way that markups are measured in the literature. Hall (2018) found no evidence that mega-firm-intensive sectors have higher price/marginal-cost markups, but reported some evidence that markups grew in sectors with rising mega-firm intensity. The implications of increasing markups are also debated. One implication is that this trend captures the increase in market concentration. But it may instead refer to higher production efficiency: namely, declining marginal costs, especially in technology-related or information-intensive markets, which lead to increasing markups without necessarily any increase in prices. Nevertheless, the increasing concentration has also been reported by numerous other studies, which implies, even if methodologies are under debate, their qualitative conclusion of rising market concentration depicts reality.

Brynjolfsson *et al* (2021) found that complementary investments in intangible capital are virtually always needed before big technology breakthroughs as diverse as the steam engine or computers ultimately boost productivity. Firms need to rethink their business models, managers need to develop expertise for the digital age, workers need to be retrained to interact with these new technologies, complementary web applications and software need to be designed. Without these complementary innovations it is hard for AI to pay off in terms of aggregate productivity statistics. As a result, over time, there are two distinct phases in the impact of new general-purpose technologies on growth: an initial phase when intangible capital is created and accumulated, followed by a productivity boom.

Consulting the members of the expert group, it became evident that the vast majority believe that a combination of the above reasons explain the AI productivity paradox. First, we can expect the productivity J-curve to be a valid explanation of the paradox. AI requires complementary innovations to take place in order to pay off in aggregate statistics: managers need to get to know what the practical implications of AI are for their business, hiring and training of highly specialised AI talent needs to happen, adopting a more collaborative model of production with the active involvement of both humans and machines can help in arriving to the productivity boom phase.

There are also the measurement issues, but they are not expected to be so important in order to explain the AI productivity paradox alone (Ahmad *et al*, 2017). They may affect the exact shape of the J-curve, namely, they can contribute to the delay until the AI impact is captured in productivity statistics. At times of intangible capital accumulation, because of mismeasurement, it may seem that productivity is smaller than it actually is. But the arrival of the productivity boom phase, with the maturity of such capital investments, will eventually be captured in productivity statistics.

Market power may not have an impact only on the shape, but can also delay the arrival of the productivity boom phase at the J-curve because it limits AI adoption to the top firms in the economy.

The COVID-19 shock, on the other hand, has accelerated the accumulation of intangible capital in the economy (Brynjolfsson and Petropoulos, 2021). The emergence of remote work revealed new efficient ways to produce output even if inputs are restricted (Marcus *et al*, 2022). For example, restrictions on business travel led firms and university researchers to develop new communication and collaboration models to keep output production as high as possible. That effectively can lead to a significant increase in total factor productivity growth in the short-run, at least in sectors in which remote work is possible. However, the biggest impact of the pandemic is expected to be realised in the longer-run. The social distancing restrictions led to a new reality in which investment in digital technologies and digital literacy became necessary. Work and production have been rapidly reorganised through the digital channel. This fundamental shift has had two effects. First, it has allowed the accumulation of intangible capital that is important for arriving at the productivity boom point of the J-curve. Second, it has helped firms and workers understand where the benefits and costs of digital technologies can be found. As the learning curve for these technologies progresses, the COVID-19 shock is more likely to leave a permanent footprint in the organisation of economic relationships and productivity.

3. Policy recommendations for increasing labour productivity

Looking ahead, it is not sufficient to only explain the AI productivity paradox and then assume a passive role, waiting for the productivity boom phase to arrive. Specific policies should be prioritised to maximise knowledge spillovers without impeding innovators' incentives, and to adopt new frameworks that are more suitable for measuring the contribution of AI to productivity.

Knowledge spillovers have traditionally been a central objective of government policy interventions. Under a strong intellectual property regime that keeps the value of innovation high, policies that aim at the better and wider diffusion of AI technologies can be beneficial in building the intangible capital needed to arrive at the productivity boom phase. Becker (2015) and Bloom *et al* (2019) illustrated how R&D tax credits on AI investments can work

well towards this goal. In fact, many countries provide additional fiscal incentives for R&D, such as allowing an additional deduction to be made against tax liabilities. However, country measures differ in terms of their generosity. An overall estimation by Bloom *et al* (2019) on these policy measures concluded that a 10 percent fall in the tax price of R&D leads to at least a 10 percent increase in R&D in the long run. Hence, AI tax credits can prompt the better diffusion of these technologies and could allow for a significant accumulation of intangible capital in order to reach a critical mass, putting the economy on the productivity boom path.

Policies are also needed that focus on the supply of human capital and especially the supply of AI talent. One of the major obstacles for the diffusion of AI technologies is the lack of AI talent. Adjusting educational and training policies in order to facilitate a greater supply and variety of AI talent can be very beneficial for improving the technology frontier in industrial production. Managers should become more familiar with the practical implications of AI in order to contribute to the reorganisation of work, towards a model in which AI machines and labour act as complements.

As Elon Musk put it: *“Yes, excessive automation at Tesla was a mistake. To be precise, my mistake. Humans are underrated”*¹². There is a risk that managers choose to overinvest in automated technologies that do not add much in terms of productivity, while neglecting the productivity boost of combining labour and AI capital in a harmonious way. Parallel to investment in AI, managers should fundamentally change their perspectives on how their firms should adjust their work environments so that workers can become more efficient by using AI machines. A human-centric approach is needed in industrial production and the provision of tasks, in order to grasp the full benefits of technology.

Acquiring AI talent is an important part of this. In fact, AI talent is very concentrated in few superstar firms. Jin *et al* (2021) used US online job posting data from Burning Glass Technologies from January 2010 to June 2020, and found that the top employers account for a large percentage of the total demand for frontier technology skills, including AI, machine

¹² <https://twitter.com/elonmusk/status/984882630947753984?lang=en>.

learning, natural language processing, cloud computing and big data. More than 26 percent of all job vacancies in the last decade that required AI skills were posted by the top 10 firms that employed people with AI skills. The respective concentration percentage of more 'traditional' information technology skills is only 6.9 percent. Wide adoption of AI in order to maximise its knowledge spillovers, and therefore the social benefits from AI, would require smaller firms to be able to hire AI experts, which will help them make complementary investments in intangible capital in order to grasp a fair share of these benefits.

More AI-related productivity would also require the market-power failure to be addressed. Market power can explain why AI and intangible capital investments are concentrated in only a few firms. As a result, only a small portion of firms capture most of the benefits from AI technologies, and advance their positions in the markets in which they operate.

Addressing the market-power failure in AI-related markets would require a combination of market regulation, competition policies and labour-market policies (Parker *et al*, 2022). Market regulation should set the basic principles of operation so that specific firms do not have an unfair competitive advantage that allows them to grow at the expense of their competitors, even if they are not more efficient in terms of production costs and quality of products and services. Competition policy should ensure that these regulatory principles are adequately enforced, giving to antitrust authorities the ability to intervene in a timely manner and have access to relevant information, in order to evaluate cases of market misconduct. Labour-market policies should embrace flexibility, allowing the AI talent to flow across different firms, but policies should also give workers adequate social protection.

It is therefore a combination of tax, education, labour and competition policies that could speed up the arrival of the productivity boom (revival) phase of the J-curve. Parallel to that, new ways need to be found to better measure productivity in the digital age and with respect to AI (Brynjolfsson and Petropoulos, 2022). Current measurements, such as GDP, are insufficient when they only factor in tangible goods and services that are offered at positive prices. In the digital economy, many intangible goods and services are provided at no financial

cost to consumers. These still increase consumer welfare, create jobs and generate profit. Moreover, advancements in AI decision-making and prediction could generate new opportunities for economic growth that have never previously been realised.

4. A framework for building a responsible AI approach by design

Ensuring greater AI adoption and diffusion can bring major opportunities, from increasing efficiencies and improving outcomes, to reimagining industries altogether. AI can transform the relationship between people and technology. However, as AI decisions increasingly influence and impact people's lives at scale, there has also been a rising level of discussion and questions have been raised around AI ethics, data governance, trust, legality and responsibility issues. In particular, bias, discrimination and fairness have emerged as areas of paramount concern, alongside explainability of decisions taken based on AI.

It would therefore be a mistake when implementing policies that seek to more widely diffuse AI technologies, not to also build a framework of ethical rules that guarantees AI's responsible deployment by all shareholders. Rules should cover both the creation of AI technologies and their use.

If unaddressed, the ethical concerns surrounding AI could lead to poor AI performance, resulting in limited to no value from the investment made; regulatory implications, resulting in an inability to use the existing AI solutions; employee resistance to AI, affecting adoption rates; reputational risks, affecting company brands and putting the survival of companies at risk; unintentional infringements of the law, legal actions, fines and settlements and lack of trust among stakeholders. The question then arises: how can ethical and responsible AI systems be designed, built and scaled up?

Trust in AI is key to realising value from this technology. With trust comes great responsibility, but also a great opportunity, because trust triggers the loyalty and engagement that will drive business innovation and growth. To achieve trust, as organisations start scaling up their use

of AI, adhering to laws, regulations and ethical norms is critical to building a sound data and AI foundation. This can be done by implementing **Responsible AI**.

Responsible AI is the practice of designing, building and deploying AI in a manner that empowers employees and businesses and impacts customers and society fairly. At its core, Responsible AI is about considering the impact the use of AI will have on people. Responsible AI builds trust and lays the foundation for successful scaling by taking a ‘human first’ approach – using technology to help people make better decisions, while keeping them accountable through the right governance processes and technical steps.

Regulation – both imposed by governments and self-imposed by organisations – will be a key part of this equation. Organisations need to be transparent in their use of AI to maintain trust and avoid bias (both in the algorithms created and the datasets used to train them). Organisations should also offer a right of appeal against decisions taken by algorithm, accounting for security concerns, and considering how humans will take back control from an algorithm when necessary. Governments and regulators are considering how to supervise and set standards for the responsible development and use of AI. Countries including the United Kingdom, Brazil and China are already taking action, either by developing existing requirements related to AI (for example, in regulation such as the EU’s general data protection regulation), or through the development of new regulatory policy. The EU’s draft AI Act, proposed in April 2021, is the best-known example: once ratified, anyone who wants to use, build or sell AI products and services within the EU will have to comply with the requirements of the legislation, depending on the category under which their AI systems fall under i.e. unacceptable-risk AI systems, high-risk AI systems, and limited- and minimal-risk AI systems (European Commission, 2022). The draft EU AI regulations should serve as a reality check for the organisations to ensure they have robust processes and governance systems in place to manage to AI risks and comply with the regulations. Instead of getting discouraged from pursuing the development and use of AI systems, future-ready organizations will take this opportunity to create a robust governance system and risk management framework that will allow their organisation to innovate and deploy AI in a responsible manner.

A 2021 Accenture study of 850 C-suite executives across 17 geographies and 20 industries sought to understand organisations' attitudes toward AI regulation and assess their readiness to embrace it. Nearly all (97 percent) respondents believed that regulation will impact them to some extent, and 77 percent indicated that compliance is a company-wide priority. More than 80 percent said they would commit 10 percent or more of their total AI budget to meeting regulatory requirements by 2024. However, most organisations have yet to turn these attitudes and intentions into action. Only 6 percent of organisations have built their Responsible AI foundation and put their principles into practice, while the majority (94 percent) are struggling to operationalise across all key elements of Responsible AI (Accenture, 2021).

With Responsible AI, organisations can shape key objectives and establish their governance strategies, creating systems that enable AI. Important benefits from responsible AI are:

- **Minimise unintended bias:** Build responsibility into AI to ensure that the algorithms – and underlying data – are as unbiased and representative as possible. This entails ensuring the policies, processes, governance systems and the organizational culture are built with ethics and fairness principles at the core.
- **Ensure AI transparency:** To build trust among employees and customers, develop explainable AI that is transparent across processes and functions.
- **Create opportunities for employees:** Empower employees to raise doubts or concerns with AI systems and effectively govern technology, without stifling innovation.
- **Protect the privacy and security of data:** Leverage a privacy and security-first approach to ensure personal and/or sensitive data is never used unethically.
- **Benefit all stakeholders:** By creating an ethical underpinning for AI, one can mitigate risk and establish systems that benefit all stakeholders, including shareholders, employees and society at large.

There is an urgent need to establish flexible guiding principles to govern AI that are general enough to evolve with a rapidly changing technological environment, but are also specific enough to be useful for applications. Clearly articulated and established guiding principles can help enable a cohesive stance on ethics and AI that remains consistent with long-term technological advancements. The guiding principles will also help create a culture within an organisation that allows for ethically responsible attitudes and behaviours from top to bottom.

A strong, existing compliance structure within an organisation is the greatest starting point for implementing an ethical governance process around AI – employees who feel that they can confidently raise personal problems at a company without actions taken against them will similarly be emboldened to raise ethical issues they identify in technology. By leveraging existing structures within the organisation, a stronger ethical culture can be created around responsible AI.

For organisations, the upside of being responsible by design is an improved ability to meet future requirements, better mitigate risks and create sustainable value for themselves and their stakeholders. Being responsible by design will become more beneficial over time, especially as governments and regulators consider new standards for the development and use of AI.

Organisations can build a Responsible AI foundation supported by these four key pillars:

- **Organisational:** Strong leadership is pivotal to empower employees and elevate Responsible AI as a business imperative. To democratise this way of working, successful organisations recognise the need for new roles, and actively upskill, re-skill or hire. Organisations should nurture cultures that empower individuals to raise concerns over AI systems, without stifling innovation. Clear success criteria, incentives and training are all critical requirements.

- **Operational:** Organisations need to ensure considerations for AI are built into their core values and robust compliance processes. They need to establish transparent, cross-domain, governance structures, including systems, measures and controls that enable AI to flourish. These build internal confidence and trust in AI technologies by identifying roles, expectations and accountabilities.
- **Technical:** Leading organisations deploy AI models, systems and platforms that are trustworthy and explainable by design. Technology tools should support fairness, explainability, robustness, accountability and privacy. Organisations can leverage proven qualitative and quantitative techniques for assessing potential risks to reach cross-domain consensus on mitigation.
- **Reputational:** Leading organisations clearly articulate their responsible business mission, anchored in their values. Ongoing measurement and monitoring of key Responsible AI metrics ensures they're managing risk and communicating with transparency.

Being responsible by design means that organisations understand the importance of incorporating Responsible AI into their data and AI strategies from the start. They operate a responsible data and AI approach across the complete lifecycle of all of their models, enabling the organisation to engender trust and scale AI with confidence. With the foundations in place to support the responsible use of AI across the enterprise, it becomes easier to adapt as new regulations emerge. That way, businesses can focus more on performance and competitive advantage.

Organisations can become responsible by design by taking the following steps:

1. **Articulate clear principles and governance structures for AI.** Organisations need to review their existing business values and evaluate how Responsible AI fits into their overall mission. They need to define and communicate their Responsible AI mission and principles, as well as key objectives and key performance indicators (KPIs), across

the organisation. Establish an AI-specific governance framework that includes roles/responsibilities required to support key initiatives. Use C-Suite to drive broad Responsible AI awareness across the organisation, positioning Responsible AI as critical to the business strategy and risk-management decision making. Operationalise the Responsible AI governance model across the organisation and include incentives to accelerate adoption.

2. **Develop a risk management framework that monitors and operationalises current and future policies.** Organisations need to review their existing risk management models and conduct a gap analysis of all risk processes against all potential AI risks (data protection, human rights, ethical risks, accuracy, legal, etc). They need to document their Responsible AI risk management strategy and update the company-wide risk management framework to incorporate the new considerations for AI. Operationalise the updated risk management framework across the enterprise, leveraging new procedures and checkpoints throughout the data and AI lifecycle. Establish traceability/auditability processes to monitor decisions and changes, and measure key KPIs across the data and AI lifecycle.
3. **Invest in technology tools that support fairness, explainability, robustness, accountability and privacy, and build these into AI systems and platforms.** Organisations need to review existing tools and techniques that support responsible data and AI (ie tools that monitor bias, fairness, explainability). Review the model development and lifecycle management process to understand how AI tools/systems are developed and maintained. Define measurable performance metrics and establish techniques for continuous monitoring, control and re-assessment of data and AI systems. Establish and communicate clear roles and responsibilities for those managing every stage of the AI development lifecycle.
4. **Building a culture of Responsible AI.** It is important that every employee has a sufficient understanding of, and confidence in, the approach the organisation is taking

to ensure the responsible use of AI. With AI talent already scarce, organisations must consider how to attract or develop the specialist skills required for Responsible AI roles – keeping in mind that teams responsible for AI systems should also reflect a diversity of geography, backgrounds and ‘lived experience’. The different perspectives that they bring are essential to spot potential bias and unfairness, and to minimise unconscious bias in product design, build and testing. When it comes to AI, culture is essential to uniting the whole organisation around responsible principles and practices. It is critical for organisations to establish a system for continuous review of roles, skills and training to match advances in AI and address new risks. Consider where roles need to be augmented or added to support the responsible development and use of AI at scale. Specify new roles, skills and learning agendas required to support Responsible AI across the organisation.

All of these elements are part of an innovation-friendly blueprint for Responsible AI that can be applied across functions and projects, allowing the ethical implications of AI to be understood and managed and ensuring the organisation has the foundations in place to adapt as new regulations and guidance emerge. That way, organisations can focus more on performance and competitive advantage.

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Disrupting the labour market: Policy changes in worker classification to support the growth of the solo self- employed

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Abstract

This paper discusses the current two-category worker classification systems in the European Union and the United States and explores how changes in the way we work – as independent contractors, self-employed, freelancers and on-demand workers – have rendered the current worker classification system outdated and ineffective. The paper reviews possible options for updating and redesigning the classification system to better reflect and accommodate the changing nature of work and the workforce.

1. Introduction

The transformation of work has exposed a fundamental policy problem for the existing labour market structure: current labour laws and regulations in both the United States and the European Union prevent independent contractors, the self-employed, freelancers and on-demand workers from receiving the basic rights, protections and benefits awarded to full-time employees. This is because workers are classified as either employees who have access to all worker rights, benefits and protections, or as independent workers who have access to none.

The result is an inequitable labour market that penalises workers who choose to – or must – work independently.

The current worker classification system is designed to support and protect only employees in traditional jobs for a single employer, an approach that makes less and less sense as the options about how to work increase and self-employment becomes more common. If policymakers were designing a labour market today, from scratch, it's unlikely they would replicate current policies that award rights, protections and benefits only to employees. Instead, it's more likely that they would create a labour market that includes, supports, and protects all workers (Mulcahy, 2018).

This paper provides an overview of the current labour market structure and policies that only support employees. It discusses the rise of self-employment and the drivers of that growth. It then reviews both the benefits and challenges of self-employment, and how the changes in the structure and preferences of today's workforce have rendered the current employee classification system outdated and ineffective. The paper concludes with policy recommendations for updating and redesigning the employee classification system to better reflect and support all workers.

1.1 The rise of self-employment

The workforce of full-time employees in traditional jobs with a single employer is declining in both the US and the EU. In its place is the rapid growth of alternative work arrangements including project work, side gigs, independent and freelance assignments, and on-demand and platform work, collectively referred to as the gig economy.

The gig economy is made up of solo self-employed individuals. 'Solo' means that they are independent contractors without employees. Independent workers who do have employees are small businesses, and those are beyond the scope of this discussion. Solo self-employed workers include independent contractors, freelancers, consultants, advisors and on-demand and platform workers. In this paper, the terms self-employed, independent workers, and gig workers are used interchangeably and refer to the solo self-employed. X`

The number of solo self-employed has increased steadily and rapidly over the past half decade, and their growth only accelerated during the pandemic (World Economic Forum, 2021). McKinsey Global Institute (2016) estimated that about a third of the workforce work independently either all or some of the time. MBO's *State of Independence* report (2021) found that, in the US, the number of people who work independently more than 15 hours per week rose 25%, from 13.6 million to 17 million, during 2020. An even larger group who work independently fewer than 15 hours per week, increased by 39 percent from 24.6 million to 34.1 million.

McKinsey's report on the future of work in Europe (2020) found that part-time working increased substantially in 22 of the 29 European countries surveyed, and that independent work – including freelancers, workers for temporary staffing agencies and gig economy workers – is projected to make up 20-30 percent of the workforce.

Working independently offers a much-needed alternative model of work that can either supplement or substitute for traditional jobs. McKinsey (2016) found that the vast majority (70 percent) of independent workers choose to work independently either some or all of the time. The remaining minority (30 percent) do so out of economic necessity, either because they can't obtain a full-time job, or because they need to generate additional income.

For those who choose it, an important driver of the growth of self-employment is the desire to create a different work life. Being an employee in a traditional job doesn't work well for everyone. Gallup (2022) reported that over 85 percent of European employees aren't engaged in their jobs, and other studies reveal high levels of stress and dissatisfaction among employees.

There is anecdotal evidence that during the pandemic, workers freed from the office, commuting and business travel, as well as those that lost their jobs completely, turned to solo self-employment in record numbers, either to build a full-time portfolio of gigs, or to quickly replace missing income from former full-time jobs. Taking on gig work can help insulate workers from economic volatility by providing an accessible way to earn income on a customised schedule.

2. Drivers of the growth of self-employment

Most of the growth in self-employment is driven by several trends: the increased security that can be realised from self-employment, the ability to generate more income from self-employment than traditional employment, and the better quality of life that workers can realise from working independently. Finally, this section includes a discussion of the massive and sudden shift to remote work, which has disrupted traditional work and facilitated the growth of independent work and side gigs.

2.1 A new view of the security of self-employment

The long-held perception is that full-time employment is secure and stable, both financially, and professionally. The emergence of the gig economy, along with the pandemic, has upended that view. The sudden layoffs, furloughs, and elimination of millions of jobs during 2020, and more recently during the 2022 economic downturn, have exposed the underlying insecurity, instability, and unpredictability of traditional full-time jobs that seemed secure. It's a precarious position to know that your income could go from 100 percent to zero based on a single email or Zoom call from your company initiating a round of layoffs (Kaonga, 2021).

Perhaps as a result, about two-thirds (68 percent) of the self-employed now say that they feel more secure working independently than having a traditional job (MBO, 2021). Those feelings of security come from having control over how much they earn and work, and from having (or being able to have) multiple streams of incomes from either different work activities, or multiple clients. About 70 percent of independent workers feel confident about their project pipeline, up significantly from about 60 percent in 2020.

A McKinsey Global Institute survey (2016) of nearly 8,000 independent workers in the US and EU-15 found that, compared to employees, people who choose to work independently are more satisfied with their income security and level of empowerment, and that more than two-thirds (67 percent) say they feel better prepared to cope with uncertainty around the pandemic. During the pandemic, short-term gigs and flexible work contributed income security to people who had been laid off, had their hours reduced, or were furloughed (Shrikant, 2019).

The greater optionality and income protection that self-employment offers has also fundamentally changed the employer-employee relationship in a way that is empowering to workers. Employers have less power because they no longer have the same level of control over their employees. More employees have started working for themselves through side gigs, and no longer rely on their employers for 100 percent of their income. They're earning money outside their full-time job, and that shifts the power dynamic with their employer.

2.2 The potential for higher earnings

The primary reason people work is to make money, and a significant driver of the growth of self-employment and independent work is the opportunity to make more money than one would working just as an employee, or to supplement an existing salary. The majority of workers who are self-employed by choice, and who have in-demand skills and expertise, earn more than they do as an employee (McKinsey, 2016).

MBO found that in 2021, 58 percent of independent workers made more money than they did when they were employed. In fact, the high-earning self-employed is one of the fastest growing segments of independent workers and nearly doubled between 2011 and 2021. Independent workers earning \$100,000 or more annually increased nearly 30 percent, from 3 million to 3.8 million. In Upwork's survey of independent workers, 75 percent of respondents who left full-time jobs to work independently reported earning the same or more as when they were employees (Upwork 2021).

In Europe, a study using EU Statistics on Income and Living Conditions data found that self-employed workers earned more than employees if they were "*at the top of the earnings distribution*" (Pantea, 2022). This might seem like a surprising statistic, but on reflection it makes sense that the workers most likely to strike out on their own and work independently are those with the skills, experience and expertise to make a good living doing so.

The other side to this data is the minority of workers who are forced into working for themselves by necessity, or who are lower skilled and lower paid, are less likely to achieve the goal of being better compensated than employees. In the US, workers who are forced into self-employment are less satisfied with their income levels and income security than employees (McKinsey, 2016). In Europe self-employed workers who fall below the median income levels make less than their fully employed counterparts, in part due to the lack of protective rights for the self-employed (Pantea, 2020).

2.3 The quality of self-employed life

The pandemic has profoundly impacted people's views about how work affects their quality of life. As low-wage workers were forced out of jobs by closures and layoffs, and as professional workers were sent home, everyone was forced to feel what it was like to step out of their normal work routines.

Many workers are not stepping back in. Instead, they are seeking better working conditions – higher pay, shorter commutes, more flexibility and autonomy, and greater control over when, where, how much and how they work.

In the US, the Bureau of Labor Statistics reported that the percentage of people who left their jobs voluntarily each month increased from 1.6 percent in April 2020 to 6.4 percent in August 2021. It is the highest 'Quits Rate' in two decades. The jobs that people quit are not being filled. In July 2021, there were a record 11 million open jobs in the US. At the same time, the rate of business formations, particularly the limited liability companies that self-employed workers form, grew rapidly during the pandemic, indicating a surge in independent work. Upwork (2021) found that the share of individuals working independently full time increased 8 percent since 2019, to 36 percent of all workers.

2.4 The end of the office

The most significant trend in work has been the shift to remote work². In general, companies cannot require independent workers to come to their offices since they are not allowed to control where the individual works (Mulcahy, 2017). Before the pandemic, it could be difficult to find companies comfortable working with someone physically remote. As the connection between work and the office was severed during the pandemic, employees and companies became more comfortable with remote work, as well as working with distributed teams and colleagues. This directly impacted self-employment. As remote work continues to be the norm, the physical location of all workers becomes less relevant, which creates more client opportunities for independent workers.

That said, the implications of this massive shift to remote work have yet to be felt fully. After two years of successfully working remotely, companies are now in the position of having to justify returning to the office full-time, or at all. It can be challenging to make a compelling case in the face of strong results for 2020 and 2021. In fact, the performance of most companies, and their share prices, during the pandemic raise the question of why a return to the office is needed at all. So far, a good answer has not emerged.

The most common rationale has been around the need to maintain culture. The reasoning goes that companies have worked hard to create a positive or productive corporate culture, and a return to in-person office time is needed to maintain it. Implicit in this argument is the idea that culture degenerates or disappears in the absence of face-to-face interactions.

Studying remote-first companies, however, shows that a physical office is not necessary – or even sufficient – to create a strong, successful, and productive company culture. There are many examples of office-based companies with dysfunctional or even toxic company cultures. Micromanaging, sabotage, and politics can easily infiltrate a physical office, and persist among in-person interactions. Why? Because culture is behavioural. The evidence suggests that trust and effective teams are built primarily through interpersonal behaviour and communication, not constant proximity from working in the same office space every day (O’Hara, 2014; Haas, 2016). These behaviours matter and impact culture whether they take place physically or digitally.

Employees are increasingly convinced that the opposition to remote work is rooted more in management control, trust, and ego than business performance (Mulcahy, 2019). They are showing early signs of being unwilling to address those management issues by returning to the office. There is a general unwillingness to relinquish the control, convenience, and flexibility of work from home that is shifting the power dynamic in the workplace and permanently disrupting the norms of both traditional and independent work.

² For a broader discussion on remote work, listen to the podcast ‘Making remote work, work’ (Bruegel, 2022), available at <https://wordpress.bruegel.org/2022/04/making-remote-work-work/>.

3. Benefits of the growth of self-employment

As noted above, growth in solo self-employment is driven predominantly by people who work independently by choice. In the best cases self-employment can be a ‘win-win’ for both the self-employed and the companies they work with. This section discusses the benefits of self-employment and independent work for both workers and companies, while the next section spends time on the challenges.

3.1 Benefits for the self-employed

Surveys of the self-employed indicate that their working life is better on many important dimensions compared to employees. Nearly nine out of ten (87 percent) say they’re happier working on their own, and 77 percent report being very satisfied with their work (MBO, 2021). Self-employment is better for their health, say 78 percent, and nearly the same number (76 percent) say they are optimistic about the future of their career. Upwork survey respondents agree, with 73 percent indicating that working for themselves has made them more productive, and 86 percent believing that the ‘best days are ahead’ for working independently. Perhaps most compelling, 60 percent of independent workers say that *“there is no amount of money”* that would convince them to return to working as a full-time employee in a traditional job.

McKinsey’s survey of independent workers in both the US and EU validates these results. People who choose to work for themselves reported higher satisfaction with their opportunities, empowerment, creativity, recognitions, flexible hours, flexible location, hours worked and overall work life than employees (McKinsey Global Institute, 2016). Similar surveys from the ADP Research Institute and FlexJobs reached the same conclusions: on average, self-employed workers are more satisfied, engaged and productive than employees (ADP, 2019; Flexjobs, 2019) .

It’s worth highlighting that one of the biggest groups of beneficiaries of the growth in self-employment are workers who have been stuck on the margins of the traditional jobs economy. People with disabilities, the chronically ill, stay-at-home parents and other caregivers, retirees, and students now have more options to work when, where, and how much they want (or are able) to generate income, develop skills, become more engaged with others or pursue a passion. Because it is now so much easier to work and earn income from home, part-time, and on a flexible schedule, self-employment can provide choice, dignity, and a measure of financial control and opportunity to those workers who previously had too little of each.

3.2 Benefits for companies

Hiring self-employed workers can help companies be more flexible and resilient, and to adapt quickly to changing economic and market conditions.

Independent workers give companies the agility to adapt quickly to changing business environments. They are faster to onboard than employees and are available on-demand. They can execute short-term tasks and projects to meet specific, immediate needs. The result is a more flexible and resilient workforce that can respond to market changes, such as a pandemic, or an economic downturn (WEF, 2020).

Independent workers add flexibility to help companies scale up and down to meet variations in demand, particularly in industries including distribution, logistics and retail, which experience seasonal spikes in demand. Adding the self-employed into the workforce directly, or using labour platforms to access them indirectly, makes it possible to hire the right skills at the right time to meet the varying demands on the business. Companies can scale up and down as needed, and add or reduce workers in tandem with changes in business and market cycles.

Finally, in a challenging environment and competitive market for talent, companies can broaden their talent pools by considering self-employed workers. This offers two benefits. First, the self-employed can be candidates for companies to fill hard-to-recruit-for positions, staff critical vacancies, or offer the skills or expertise unavailable among employees locally. Second, by no longer being restricted to employees locally, companies can hire from a broader slate of candidates nationally or globally, resulting in a more diverse workforce.

No discussion on the benefits to companies of hiring independent workers is complete without addressing the perception that the primary benefit to companies is to save on labour costs. Since companies aren't required to pay benefits or social protection costs for independent workers, they are able to save those overhead payments, resulting in cheaper labour costs. This may be true in some cases, particularly in lower skilled, lower paid positions. In those cases, companies may decide to hire self-employed workers instead of employees, or they may misclassify employees as independent contractors.

As discussed earlier in the earnings section, however, realising lower labour costs is less likely to be a successful strategy for companies seeking workers who have in-demand skills and experience, and are in a position to negotiate high compensation and fully loaded rates. From a policy perspective, then, governments that are concerned about companies arbitraging the difference in labour costs or misclassifying workers should focus on policies that limit their ability to do so, as well as protection and enforcement efforts on lower paid, lower skilled workers.

4. Challenges of a self-employed workforce

Notwithstanding all the benefits described so far, solo self-employment also brings challenges. For the self-employed, the biggest challenge of working independently is the reduced access to the benefits, rights, and protections only awarded to traditional employees. In the US, this looks like the inability to access company benefits like subsidised health, disability, and life insurance, unemployment insurance, and sick leave, as well as the lack of protections against, for example, discrimination and harassment. In Europe, the self-employed lose access to company social protection payments including unemployment and pensions, and also lose protection against discrimination and harassment.

For companies, by far the greatest challenge related to hiring independent workers is compliance with current worker classification systems. This is an issue in both the US and the EU. This section discusses each of these challenges in turn and offers possible policies to reduce or eliminate these challenges.

The policy discussions around the changing workforce and ways of working are in the early stages, and the most common recommendations for change are incremental and involve minor tweaks to the current labour market structure and policies. This paper focuses on describing more comprehensive and disruptive policy recommendations to restructure labour markets.

4.1 Challenge for the self-employed: access to employee benefits

If policymakers were designing a labour market from scratch today, it's unlikely they would decide to create one that rewards and supports only full-time employees. This wouldn't make sense given the growth of self-employed workers within companies and on labour platforms, and the increasing number of workers who work outside of the traditional full-time job structure. If policymakers were designing a labour market today, it would more likely be a system that supports everyone who works (Mulcahy 2019).

Yet, in the US and generally in the EU (where there are exceptions for specific countries and specific benefits), labour policies reward full-time employees in full-time jobs, and penalise all other workers by limiting their access to benefits, rights and protections that are awarded only to employees.

Creating a labour market that supports everyone who works requires extending the benefits and protections awarded to full-time employees to all workers. It's a monumental undertaking, but a necessary one if the goal is to create an equitable labour market and to ensure the long-term functioning and sustainability of social safety nets. A fully comprehensive re-design of the entire labour market is beyond the scope of this paper, but

to illustrate, described below are three examples of important employee benefits and protections that could be extended to self-employed workers.

4.1.1 Sick leave

As part of their ‘all-in’ compensation for employees, companies allocate and pay for sick leave. Companies currently do not make any provision for the sick leave of independent workers. One way that could change would be for companies to pay that same overhead payment that they pay for employees, but on a pro-rata basis for self-employed independent workers. That would allow the self-employed worker to accumulate sick-time savings based on their total hours worked. These payments could go directly to the workers for them to save and allocate, or could be paid through a third party such as, for example, a benefits platform for self-employed workers³.

4.1.2 Income insurance

Unemployment insurance protects the income of an employee who loses their job. As seen during the pandemic, unemployment insurance works when everyone has a traditional job with a single employer. It falls apart in an economy where ‘employment’ consists of a portfolio of gigs, projects, on-demand work, and assignments conducted for multiple clients. The self-employed don’t need unemployment insurance if they lose a job, because they don’t have a traditional job. They need income insurance if they lose a significant amount of work.

The basic idea of income insurance is the same as unemployment insurance: to provide a minimum level of financial stability without creating incentives to stop working. Traditionally, when an employer terminates an employee through no fault of the employee – due to a layoff or merger or downsizing – the employee’s financial stability is protected by unemployment insurance, which pay employees a percentage of their prior income for a period of time (usually about six months). Employers pay the costs of unemployment insurance through regular payments to their state’s unemployment insurance fund.

During the pandemic, US and EU governments stepped in and provided income protection to the self-employed, proving that this policy change can be decided on and implemented quickly and effectively (US Department of Labor, 2020; CEPR, 2021). Rather than have governments bear these costs, one approach going forward would be to require companies to pay pro-rata income protection payments for all of their workers, not just their employees. In the US, employers in many states already pay unemployment insurance on a pro-rata basis for part-time employees. Under this option, they would be required to extend their pro-rata payments to cover all their workers.

³ Such as Stride Health, for example; see: <https://www.stridehealth.com/>.

4.1.3 Protection against discrimination and harassment

Current labour laws in both the US and the EU protect employees from harassment and discrimination at work. This right to work in an environment free from harassment and discrimination is not currently extended to independent workers. It is a relatively straightforward

change in policy to extend discrimination and harassment protections to all workers. In a promising first step towards covering all workers in the US, Congresswoman Eleanor Holmes Norton, the chair of the US Equal Employment Opportunity Commission, introduced a bill, which still has not been adopted, to apply federal anti-discrimination protections to independent contractors. This, or similar legislation, is needed in both the US and the EU to extend basic employee protections to all workers (Norton, 2018).

As this section discusses, labour policies and regulations that support only employees in traditional jobs make less and less sense in a workforce that is increasingly made up of independent and alternative workers. Creating a labour market that supports everyone who works requires extending the benefits and protections awarded to full-time employees to all workers. This is a significant undertaking that will disrupt the fundamental structure of the labour market, but it is a necessary step to preserve the integrity of government social protection and safety nets, and to maximise the potential of the increasingly independent workforce.

4.2 Challenge for companies: worker classification

As the self-employed and independent workforce has grown in size and significance, start-up and traditional companies alike have struggled most with issues related to the current worker classification system. The labour market is built on a two-category system that classifies workers as either employees or independent contractors. For the reasons discussed in this section, however, the system is unclear, subjective and not working for either workers or companies.

In both the US and the EU there are numerous examples of lawsuits at various stages of the legal process attempting to both clarify and enforce the current classification system, to little avail. These lawsuits, and the unworkable classification system that underlies them, are a persistent problem. The key problems with the two-category classification system are described below:

- The classification system is outdated and fails to reflect the realities of how people work: The most significant problem with worker classification is that it attempts to fit the square peg of today's varied and changing workforce into the round hole of two categories. Many workers today are both employees and independent contractors, or are working in ways – remotely, using technology platforms, or on a project basis – that

are difficult to clearly classify using traditional criteria and definitions, which indicates that the system needs to be updated.

- The current system is unclear, subjective and vague: The criteria used to determine if a worker is an employee or contractor lacks clear and quantifiable definitions, rules or tests of what makes someone an employee or an independent contractor (Mulcahy, 2019). This is the underlying cause of the many legal disputes over worker classification. The most commonly used ABC test in the US, or the proposed EU Commission five criteria are qualitative and not clearly defined, which means they are subjective and open to varying interpretations⁴ (California LWDA, 2022; Lomas, 2021). For example, under the ABC test, key terms and criteria, such as ‘control,’ ‘usual course’ and ‘customarily engaged’ are undefined and subject to varying legal interpretations. So far, governments have been unwilling to introduce or pass criteria that are clear and objective.
- The current classification system relies on legal review and enforcement. This means that enforcement is slow and uncertain. The lawsuits can take years to wind their ways through the courts. For example, labour platforms like Uber and Deliveroo have been a party to numerous lawsuits in several jurisdictions over much of the last decade. In California, the state’s AB5 legislation took a decade to litigate, and is still in dispute (California Legislative Info, 2019). This leaves both companies and workers in uncertain positions regarding their employment status, and exposes companies to the risks and penalties of employee misclassification.
- Worker classification doesn’t reflect the realities of the current workforce: The current system regularly attempts to force workers who are self-employed and independent by choice to be classified as employees. The rationale for this forced classification is to give self-employed workers access to rights, benefits, and protections currently only available to employees. But this same goal could also be accomplished by allowing workers to choose how they work and extending those employee benefits to all workers. The data available on independent workers consistently shows that more than 75 percent are working independently by choice (Upwork, 2018, McKinsey, 2016). Data about workers on platforms, and data from the platform companies themselves, shows that most independent workers are working part-time or on the side to supplement their regular work and income (MBO, 2019).
- It distorts the labour market by creating a ‘classification kink;’ The classification system distorts the behaviour of companies and workers because it introduces what economists call a ‘kink’ in the labour market (Hausman, 1983). Think of a kink as an economic inflection point created by policies. The main problem with kinks is that people try to game them. Behavioural economists have found that people ‘bunch,’ or cluster, at kinks

in order to maximise their economic benefit (Mortenson, 2020; Saez, 2010). The most familiar example of kinks is income tax brackets. The point at which one tax bracket ends and the other begins is the kink. People who have discretion over their income (or over reporting of their income) will bunch at the upper limit of a lower tax bracket, in order to avoid moving into the next higher bracket.

Current worker classification creates a kink in the labour market. This kink causes both companies and workers to bunch around it to attempt to maximise their economics. A change in policy that removes this artificial kink would eliminate the inefficiencies and distortions it causes in the labour market.

- The classification system creates a two-tier workforce: It leads to excess demand and reduced supply for full-time jobs. Even if they would prefer to work independently, the classification system encourages workers to seek traditional jobs, or initiate misclassification lawsuits to gain employee status, in order to access the lower taxes, subsidised benefits and labour protections only available to employees.

It also provides incentives for employers to reduce both the supply of full-time jobs and the demand for full-time employees. Workers in the US classified as employees cost 30-40 percent more than independent contractors because companies must pay federal income, Social Security and Medicare taxes for each employee, as well as unemployment insurance, and the cost of benefits, such as health insurance (McKinsey, 2016). Not unexpectedly, some employers are actively arbitraging the cost disparity between the two types of workers by reducing their numbers of employees and increasing their hiring of independent contractors. Even if companies would prefer more full-time, dedicated staff, the classification system provides incentives to hire more short-term, less expensive, contract labour than they otherwise would. We can see this phenomenon occurring in companies where employees are a declining portion of the workforce (Wakabayashi, 2019).

5. Policy Recommendations

The system of classifying workers as either employees or independent contractors is ambiguous, outdated and in need of reform. Reforming employee classification is clearly a significant undertaking, but one that is necessary to create a more economically efficient labour market and eliminate the inequity and ambiguity of the existing two-tier system. The growth of independent work is fundamentally changing the nature of work and the workforce. It is up to policymakers to respond with a classification system and labour market policies that reflect and support those changes is needed.

The most common proposal to fix the worker-classification system is to add a third category of workers called “*independent worker*,” or “*dependent contractor*” (Harris, 2015; Cherry,

2017). The new category of worker would get more benefits than an independent contractor, but fewer than those offered to traditional employees. This option is an incremental change that would create a more complex three-tier workforce. It would also introduce an additional kink into the labour market and continue to distort the behaviour of companies and workers. The same problems of unclear classification criteria and reliance on the legal process for enforcement would persist.

A more comprehensive (and disruptive) option that would resolve the inefficiencies and inequities created by categories would be to eliminate classification entirely and simply have a single category that includes all workers. The first principle of such a system is to treat workers equitably regardless of how they choose to work.

The fundamental belief underlying this solution is that the labour market should support everyone who works, not just traditional employees. It would require extending to all workers the benefits, subsidies and protections that are now only available to employees. Under this system, companies and governments would provide all workers access to social protections and social safety nets, and companies would pay on a pro-rated basis for all the workers they hire, regardless of status (Mulcahy, 2019).

6. Conclusion

The transformation of work during the past two years have been abrupt, urgent and unexpected. Both the pandemic and the growth in self-employment and independent work have brought about a profound shift in how, when and where people work. The new way of working is agile, blended, flexible, and more autonomous, remote, and geographically distributed.

Work looks less like a physical office full of full-time employees and more like a diverse and dispersed cloud of labour – one that could offer efficiency and flexibility to companies and put autonomy and control in the hands of workers.

Labour markets must be updated to accommodate and support the variety of ways that work is structured and accomplished. This requires levelling the playing field between employees and the self-employed so that each has access to basic employee rights, protections, and benefits. The employee classification systems in both the US and the EU stand in the way of this level playing field by artificially dividing the workforce into employees who have access to all worker rights, benefits and protections, and independent workers who have access to none. It creates an inequitable labour market that penalizes workers who choose to – or are forced to – work independently. The necessary solution is to remove this artificial kink in the labour market and extend rights, benefits and protections to all workers.

The creative destruction necessary to create a labour market that supports the entire workforce is both painful and full of possibility. But the potential rewards are great: providing access to labour rights, protections and benefits to all workers, not just employees.

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The precedent has been set: de-dualising social protection in the United States and Europe

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Abstract

This paper discusses how automation and digitalisation has the potential to reinforce dualism in the United States and in Europe. While automation and digitalisation have always been key components of the labour market, the last 20 years have witnessed an unprecedented increase in automation and digitalisation, bringing back into focus the relevance of the notion of dualism – or dual labour markets – and specifically, the degree to which the digital transition affects the ability of workers to access appropriate social protections through work. This paper explores whether the construction of decent work need be the determining factor in deciding who gets what social protections – rewarding one group of workers with a suite of benefits distinct and different from another group of workers, merely because of their status in the labour market. As the government response to COVID-19 in the United States and in Europe has shown, we need not rely solely on decent work as entry point to full social protection. Political solutions can be found to the question of de-dualising social protection for all workers, irrespective of labor market status.

1. Introduction

Work has always been at the centre of the configuration of the welfare state in the United States and in Europe – now more commonly referred to as social protection. It is through their employment relationships that individuals have access to social insurance. With the advent of activation in the 1990s and 2000s, social assistance for the long-term unemployed leveraged ‘work’ – especially one’s ability to work – as the means through which rights to benefits were acquired. Indeed, one’s ability to work became an eligibility requirement for receipt of other benefits in the United States, including Temporary Assistance for Needy Families (TANF), Food Stamps and Medicaid, and for unemployment assistance in Europe. While ‘decent work’ is not a principle of social protection, it is an important issue as it is commonly understood that having a ‘decent’ job is a mechanism through which individuals can access social insurance programmes – programmes that manage important risks throughout the life course. This as opposed to flat-rate, often means-tested, social assistance for those individuals ineligible for social insurance.

As has been much discussed, increased automation and digitalisation present new challenges for the economy and for employment in the United States and in Europe (Ford, 2015). Automation and digitalisation have impacted job dynamics and job creation with far-reaching consequences for income and employment stability, especially for those most vulnerable in the labour market (Pasi and Misuraca, 2020). But these changes also have significant consequences for the established social protection framework in Europe and the United States that continues to define the type, amount and quality of social protection based on job status – and here ‘decent’ work becomes the yardstick against which to determine access to social insurance, as opposed to assistant-based benefit – or no benefit at all.

While automation and digitalisation have always been key components of the labour market, the last 20 years has witnessed an unprecedented increase in automation and digitalisation that has brought back into focus the relevance of the notion of dualism – or dual labour markets – as it pertains to the degree to which this digital transition affects

workers ability to access appropriate social protections through work, and therefore contributes to increased labour-market polarisation (Eichhorst and Peressoni, 2021). Moreover, Eichhorst, Hemerijck and Scalise (2020) note that the concern is that automation and digitalisation will put pressure on societal segmentation, potentially resulting in acute labour market polarisation through the erosion of middle-classes workers.

This paper will therefore discuss how automation and digitalisation have the potential to reinforce dualism in the United States and in Europe. This paper will then explore whether the construction of decent work (and ergo who gets what benefits) needs be the determining factor in deciding who gets what social protections. Should one group of workers be rewarded with a suite of benefits distinct and different from another group of workers, merely because of their status in the labour market? Or – as the pandemic has shown – are there political solutions that have been applied during the pandemic that could be expanded and made universal? Ultimately, this paper will argue that US and European governments' responses to the COVID-19 pandemic, and the bolstering of subsequent social protections to manage the massive public health risk, suggests that social protection systems can be de-dualised, if we want to.

2. Dualism in Europe and in the United States

Since its inception in the late nineteenth and early to mid-twentieth centuries, social insurance programmes – a core component of social protection – have always been both solidaristic in that they are about sharing risk, but premised on individual contributions which identified, separated and rewarded the 'worker' from the non-worker. Social insurance has thus from the start been a mixture of Bismarck and Beveridge, rewarding those who 'worked' ie the core worker, while preventing the low-wage, periodically workless worker from falling into abject poverty with a flat-rate, often means-tested benefit provided through social assistance. This system worked, by and large, so long as the robust economy of the post-Second World War years fostered near-full employment where this

separate system of unemployment benefits – and principles – functioned well in that the majority of jobseekers received social insurance. But this system started to falter after the oil crisis of the 1970s that caused a global recession that resulted in persistent mass unemployment and declining levels of overall employment in the 1980s and 1990s². It was no longer those on the margins of the labour market who needed social assistance; rather mass unemployment impacted those from typical risk categories who were turning to social assistance for help.

To stem this high unemployment (conversely, low employment), it was argued that European countries needed to liberalise and deregulate their overly rigid labour markets. Liberalisation and deregulation came to be seen as the only way out of an impossible situation³. However, as Eichhorst and Peressoni (2021) argued, from a political perspective, deregulating permanent employment relationships would have been politically impossible and too costly in terms of political capital expended for a fight that would not be have been won. Therefore, policymakers liberalised only those contract types that deviated from open-ended full-time employment. Temporary employment therefore emerged as a second-best solution to provide employers with the flexibility they demanded, but was also perceived as the best way to reduce mass unemployment. Dualism – or dual labour markets – can therefore be understood *“as a political strategy to create labor markets with institutionally distinct segments, thereby avoiding to dismantle protections for core workers, the most powerful constituency, and ultimately creating a segment (or multiple sub-segments) that is governed by different rules”* (Eichhorst and Peressoni, 2021: 10). Thus, while there has always been a core, protected worker with recourse to status-preserving social insurance, it has been argued that the post-1970s strategy of institutional reform created a secondary institutional arrangement that came about because of changes in the rules and interaction

²In addition to the economic crisis of the 1970s, other structural changes took place during this time, including deindustrialisation and increased global market competition, that, it was argued, coupled with highly regulated labour markets, contributed to, if not outright caused, barriers to employment.

³ It should be noted that the argument for liberalisation and deregulation coincided with an ideological turn – from Keynesian to neo-liberal – that argued for such changes as the only way to address high unemployment.

between employees and employers in specific parts of the labour market (Emmenegger *et al*, 2012). This exacerbated the division between the 'insider' and the 'outsider', ie the low-wage, periodically workless worker whose recourse to any benefit was through social assistance, as opposed to workers with recourse to social insurance.

In the United States, dual labour market theory first emerged in the late 1960s from Doeringer and Piore's (1971) work on firm internal labour markets. They argued that the American labour market was sharply divided between good jobs and bad jobs. Their thesis received support from critics of human capital and marginal productivity theory who argued that the War on Poverty manpower workforce development programmes had failed to produce a substantial reduction in poverty and underemployment, especially among African Americans and migrant groups (Hudson, 2007). The critics argued these programmes failed to address the structural deficiencies in the creation and allocation of jobs (Reich *et al*, 1973). Over the last three decades, academics have argued that three events have increased the level of segmentation in the American labour market. First, deindustrialisation and the decline in union membership (Freeman, 1999): historically the guarantor of good wages and benefits for workers, this decline has contributed to the wage and benefit bifurcation between protected and non-protected sectors, like the service sector (Harrison and Bluestone 1988). Second, substantial increase in the relative size of the immigrant workforce since the 1980s has caused the labour market to become increasingly stratified on the basis of national citizenship (Phillips and Massey, 1999). And third, the growing prevalence of non-standard work arrangements that are more likely than traditional work arrangements to pay low wages and less likely to provide health insurance and pensions (Kalleberg *et al*, 2000). Labour market dualism in the United States, like in Europe, has re-emerged with the rise in the new economy that has been explicitly linked to corporate restructuring and the use of contingent and non-standard work arrangements (Kalleberg *et al*, 2000). Annette Bernhardt and colleagues (1995) argued that these forces have combined to dramatically increase the level of income inequality in the United States, and that this

increase in income inequality has been accompanied by an increase in the level of dualism in the labour market.

3. A spectrum of dualism

Labour markets can be understood as dualised if one group of workers is systematically excluded from long-term employment while other groups are protected from the consequences of market fluctuation. At the heart of this duality is the desire to allow firms to be more 'flexible' so that they can respond to market fluctuation by hiring and firing as demand ebbs and flows. Since labour law in Europe (less so in America) typically makes it more difficult to lay off full-time permanent workers, hiring people on contracts was seen as a workaround. Thus, the distinction between groups of workers manifests itself through labour market reforms and corresponding regulatory gaps that created a better protected standard employment relationship and a less protected, less formal contract that deviates from standard employment in terms of duration, schedule and working time, direct employment, temporary or fixed-terms contracts, temporary agency work, self-employment and marginal part-time or on-call work (Eichhorst and Peressoni, 2021)⁴.

But it is important to acknowledge a spectrum within this duality. While it is easy to fall back on a definition of dual labour markets as a worker is either 'in' (ie in standard employment and ergo, has a 'decent' job with the relevant social protections) or 'out' (ie in non-standard employment or unemployment and ergo does not have a 'decent' job and thus has little to no access to social protections), the reality is that there is a broad spectrum on which workers fall. Indeed, where one falls on the spectrum depends on different, sometimes competing, factors. For example, in the United States, one can be in a standard employment relationship, ie full-time, permanent position, that does not provide healthcare or dental coverage, is low-wage and does not provide extra benefits, such as a 401K retirement plan.

⁴ Furthermore, Eichhorst and Peressoni pointed out that differences in coverage by collective agreements can create dualisms even within the category of permanent full-time employment, creating a dividing line between sectors (or regions) with high and low coverage and related differences, eg in pay and working-time standards.

Nevertheless, because the worker receives a 'W-2' tax form, that worker contributes to social insurance (and therefore has recourse to disability, unemployment and retirement benefits when needed). It would therefore be misleading to automatically identify 'good' jobs with standard (open-ended full-time) contracts, and to consider all non-standard contracts as 'bad' or inferior in terms of job quality. Job quality, as an empirical question, can be measured by considering multiple aspects: pay levels, perceived or actual job stability and the probability of promotion to a standard contract (Eichhorst and Peressoni, 2021). And yet, the type of employment contract nevertheless remains an important metric against which to distinguish labour market segments⁵.

4. De-dualising social protection: lessons from COVID-19

How can dualism compounded by digitalisation and automation be countered? It is nevertheless important not to neglect the role of good jobs or decent work in the labour market as a pillar of social protection. While decent work is not a principle of social protection, decent work is the basis of social protection because social insurance systems are a function of employment. It is therefore important to both improve job quality through the labour market, and to also provide the pathways to quality jobs through education and skills training.

The rapid increase in technology-facilitated forms of work, such as crowd work and on-demand work through apps and platforms has led to more flexibility, on the one hand, but higher inequalities in education and learning opportunities on the other. Evidence suggests that workers with lower educational attainment have, on average, a lower probability of participating in training and developing their professional skills, thus struggling to adapt to new job transformation and labour market dynamics (Eichhorst and Peressoni, 2021). The second group affected by employment polarisation is jobs with mid-level pay and

⁵ For Eichhorst and Peressoni, the important division lies between open-ended full-time contracts, identified as "*standard employment*", as the primary part of the labour market, and all other types of contracts such as fixed-term contracts, (marginal) part-time, temporary agency work or self-employment.

educational attainment. Studies exploring employment effects of digitalisation and automation show a negative effect for workers with mid-level educational attainment, followed by subsequent downward pressure on their wages (Özkiziltan and Hassel, 2020). While a lot has already been written in the United States and in Europe on the need to bolster life-long learnings systems, while ensuring pathways to education and training for all levels of educational attainment, this nevertheless remains an important component to closing the gap between workers with mid-and high-level educational and training attainment, while also ensuring that there are pathways to education and training for those with low educational attainment. Evidence repeatedly shows a relationship between education/training and earnings – the higher the education and training, the higher the wages. Which comes back to the first point: pathways to education and training create an essential pathway to quality of work, with the accompanying quality wages and social protection (Özkiziltan and Hassel, 2020).

Considering the longstanding but accelerating trend towards digitalisation and automation, while developing human capital through education and adult learning is a critical component, the discussion cannot nevertheless be restricted in terms of what is needed to de-dualise the labour market and social protection to education and training alone – even though these are very important elements. What is also needed is proper income protection through social policies as well as less-dualistic models of employment protection (Eichhorst and Peressoni, 2021). And this requires rethinking of how to frame social risks and the subsequent management of risk through social insurance. In addition to the classic risks – unemployment, disability/poor health, and old age – there are new risks that are managed to varying degrees and to varying levels of success through social protection. For example, age can be a risk; in some countries, young people have higher risk of poverty and are disproportionately unemployed, underemployed or in low-wage work. The risk of poverty and social exclusion is high among migrant communities. And women still bear the brunt of childcare with too little support – especially in the United States – which affects their employment and earnings. But here we could also view non-standard work as a new social

risk. To manage this risk, we have to better regulate or fill gaps in regulation where needed. For example, individuals in temporary work or fix-term contracts are, in principle, protected. But their jobs are short-term, which makes their position precarious because of the high potential for uncertainty after the temporary position or fix-term contract ends. The degree of protection for self-employment, platform work and part-time work varies by category and sector. Some jobs are partly covered – like some part-time work – whereas platform work in most countries is not. Marginal part-time work is usually low-paid work that affects entitlements to pension and healthcare (Spasova *et al*, 2019).

How do we respond to these new risks associated with non-standard employment? First, countries can institute change through labour legislation to address the risk of non-standard employment. European labour markets use temporary contracts far more frequently than American. The primary causes of these differences are Europe's less flexible dismissal policies and more generous health and benefit regimes compared to US labour market and benefit policies. In Europe, the policy response in some countries to fixed-term contracts and temporary agency work has focused on regulating labour laws more tightly, including legislating for better working conditions, increased pay and limiting the use and duration of temporary contracts.

Second, expanding social protection coverage for self-employment, online platform work and part-time work through our social policies is possible, as the European and American government responses to the COVID-19 pandemic have shown. De-dualisation of European labour markets would be facilitated by the removal of gaps in social protection between different contractual arrangements and related rules on social contributions. In most European countries and in the United States, the self-employed, and workers who are independent contractors (ie online platform workers) are not (fully) covered by social insurance, especially unemployment insurance and old-age or disability pensions (Spasova *et al*, 2019). Universal coverage by social insurance, and income protection that is based on contributions, needs to cover the different types of income generated from work,

irrespective of the contractual nature of the work – including online platform workers and the self-employed, as well as marginal part-time workers. Importantly, Eichhorst and Peressoni (2021) argued that mandating all workers must be covered, irrespective of their labour market status, would remove the incentive for employers to use labour cost arbitrage that appeals when there is a cost difference between social insurance dependent employment and independent self-employment or independent contractor status. Second, inclusive social insurance would greatly reduce the increasing reliance on social assistance to provide income protection to the self-employed, independent contractors and marginal part-time workers. Finally, the mobility between, and the combination of, different contracts would become easier. Allowing contributions to be raised on all type of income would allow for easier mobility between, and the combination of, different contracts, while providing income-related cash transfers in case of unemployment or retirement. These important steps would go a long way in de-dualising social insurance.

One could dismiss out of hand these recommendations to de-dualise social protections in the United States and in Europe. One could even argue that, given the multiple and competing interests of the many stakeholders involved, not to mention that the political power of some of the largest and wealthiest corporations would be affected by such reforms, that there is in fact no chance of such ideas being made universal and put into law. But government responses to the COVID-19 pandemic showed a way – and in doing so set an important precedent.

The United States is a good case study. The CARES Act, signed into law on 27 March 2020, included several unemployment benefit programmes that were widely hailed as a success (Isaacs and Whittaker, 2020). Pandemic Unemployment Assistance (PUA) expanded eligibility for individuals who have traditionally been ineligible for unemployment compensation benefits (eg self-employed workers, independent contractors and gig workers) and provided half of the usual unemployment funds available to employees. The Federal Pandemic Unemployment Compensation (FPUC) expanded coverage to workers not

typically included and provided unemployed workers with an additional \$600 a week supplement, and increased the duration of benefits.

Moreover, there have been efforts to challenge the misclassification of workers as independent contractors rather than as employees. Seattle and New York City have created municipal-level minimum wages, paid sick days and other protections that apply broadly for gig workers. California has enacted a law (Assembly Bill 5) that, for purposes of the State's labour code, deems people providing labour or services for remuneration, such as self-directed gig workers, to be employees rather than independent contractors. In terms of enforcing laws, Seattle's Office of Labor Standards has brought several actions enforcing the city's gig worker paid sick and safe time law, passed in June 2020. While these initiatives are at city and state level, these city and state legislative initiatives set a precedent for other cities and states, while putting pressure on the federal government to act.

5. Conclusion

Dualism in the United States and in Europe took shape in the wake of profound structural changes to corporate regulations and labour market reforms after the 1970s. The effect has been the construction of rules that, through deregulation and liberalisation, have exacerbated which workers have access to social protections based in part on status in the labour market. This social protection dualism undermines social cohesion, impacts individual and family wellbeing generally, but especially in times of crisis, and contributes to widening economic inequality. And yet, from a policy perspective, the most recent experiences with the COVID-19 crisis – designing policies to make labour markets and social protection less dual – provide a path forward.

To be sure, in an effort to make labour markets and social protection less dual, there are a number of employment-based social protection policies and principles to address. As discussed in this paper, decent work or good jobs are the basis through which we access social-insurance-based social protection, which manage important risks throughout the life

course. It is therefore important to improve the number of 'good jobs' available in the labour market. In the context of the digital transition, the pathway to 'good jobs', as the evidence suggests, is through life-long learning, education and training, because jobs requiring advanced educational attainment are linked to high-paying jobs with good social protection. People who have the necessary educational and training attainment have better access to 'decent work', and are therefore better protected than people with low educational and training attainment. Moreover, creating the appropriate pathways and pipelines will go a long way to improving access to labour markets for those typically excluded, especially young people, lone parents and migrant communities.

But the focus on 'decent work' as the route to important social protections cannot be the definitive factor. The gap between the artificial construction of standard and non-standard employment must be reduced, if not eliminated. In theory, this is not difficult to do as it requires making changes to employment regulation. This includes extending social protection coverage to the self-employed, part-time worker and independent contractor. Important here is improving access to social insurance for this group of workers. A precedent has been set by some European countries and some American states that have extended access to all workers, irrespective of employment status. But barriers remain to making social protection coverage universal to all workers. There are issues of cost – and here the question of who pays is especially relevant with the gig economy – as well as the administrative and regulatory changes needed. But these are not insurmountable changes, as the US response to COVID-19 has shown. Indeed, CARES Act legislation expanded nationwide the amount, duration and, importantly in this context, coverage to groups typically excluded from social insurance, for example. While these measures have since expired, the opportunity to make these changes universal and permanent – while not without its challenges – nevertheless is at hand.

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Trade unions, collective bargaining and income inequality: a transatlantic comparative analysis

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Abstract

This paper studies the collective bargaining systems in European Union countries and the United States and evaluates their possible impacts on income inequality by summarising the literature and presenting novel cross-section and time series evidence. We highlight the importance of extension mechanisms that expand the outcome of the bargaining to workers who are not members of a trade union, resulting in a much higher collective bargaining coverage than trade union density. We find that collective bargaining systems in Western and Nordic EU are much more centralised and coordinated than those in Anglo-Saxon economies and in Eastern EU countries. We argue that the union membership wage premium (ie higher wages for workers that are members of a trade union) is an inadequate measure of the impact of trade unions on wages where extension mechanisms are widespread. We find a negative correlation between income inequality and either trade union density or collective bargaining coverage both across countries at a point in time, and across time for several countries. Impulse response functions from vector autoregressions indicate declining inequality after an increase in trade union density and collective bargaining coverage.

1. Introduction

In most developed economies, wages and working conditions are set through a collective bargaining process involving several social partners, such as trade unions¹, employers' organisations, and the government. The specifics of these arrangements vary considerably across countries and are the result of different labour laws and labour institutions.

In this essay, we present data on the main trends in trade union density and collective bargaining coverage, review the literature to understand how differences in collective bargaining processes affect wages and inequality, and present novel cross-section and time series evidence on the association between collective bargaining and income inequality. We focus on European Union countries and the United States (US), while also using data from the United Kingdom (UK) and some other countries to broaden the comparison. We discuss the differences in bargaining processes, as well as highlight considerable heterogeneity within the EU.

In the second section, we set up the background for a comparison of collective bargaining systems in European countries and the US. We particularly focus on two important indicators: trade union density and collective bargaining coverage. These indicators are used to evaluate the bargaining power of trade unions, which is a critical factor in the collective bargaining process and the focus of most research in this field. In the third section, we explore the centralisation of negotiation levels (vertical coordination of the bargaining process) and the coordination of trade unions across firms (horizontal coordination), which play a crucial role in determining the outcome of collective bargaining.

Building upon our discussion in these sections, the fourth section investigates the impact of collective bargaining on wages and income inequality, by reviewing the scarce literature on this topic and presenting some novel evidence. We report cross-section correlations

¹ The expressions 'trade union' (UK English) and 'labor union' (US English) are synonyms; they refer to an organisation that represents a set of workers, protects their rights, and discusses their pay and working conditions with employers and the government.

between the levels of collective bargaining/trade union density and inequality, and correlations of within-country temporal changes of the indicators. We discuss possible interpretations of these correlation coefficients – which may not necessarily imply causality – and complement the analysis with estimated impulse response functions from vector autoregressions.

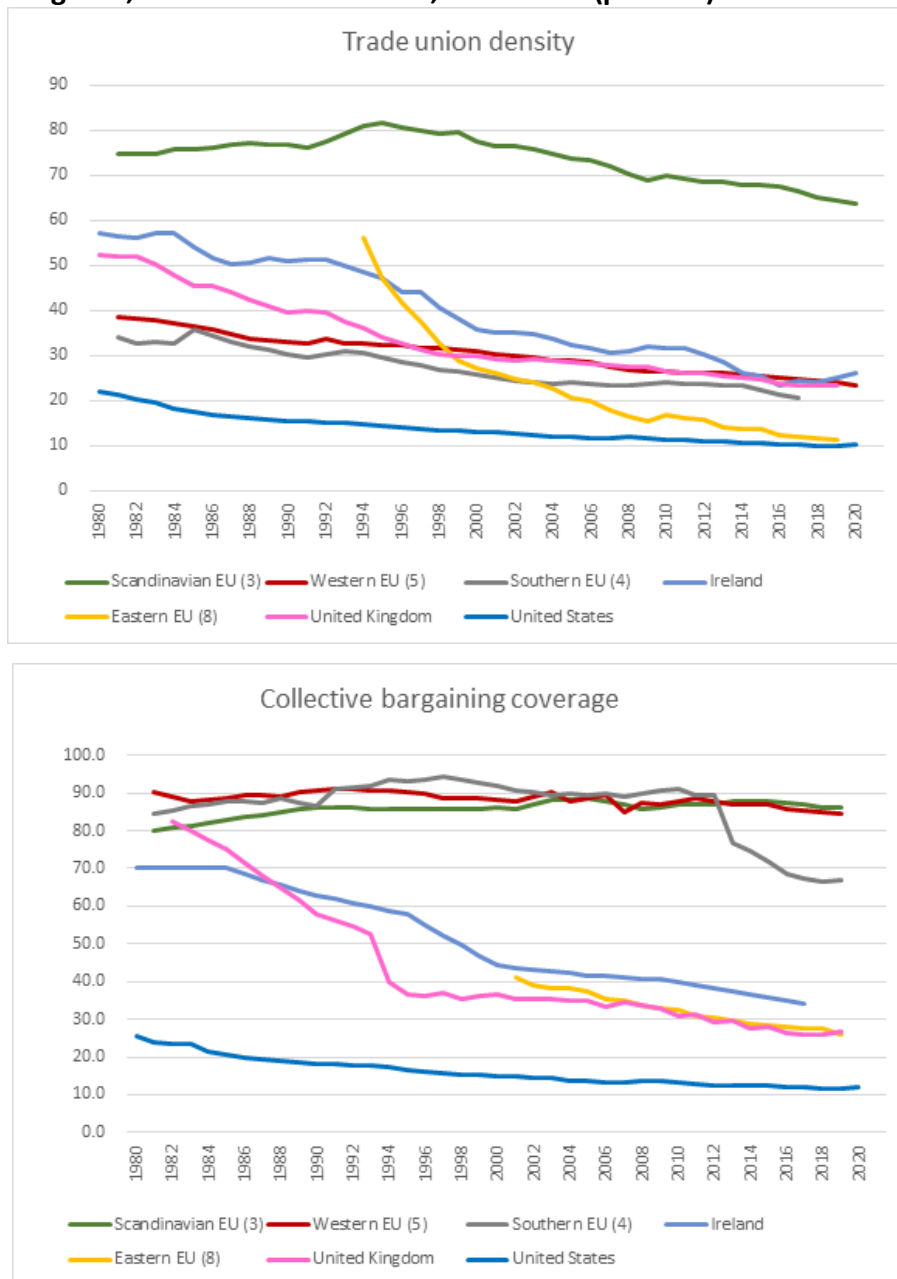
We draw our conclusions in the last section, summarising the main findings of our analysis and identifying potential avenues for future research.

2. Trends of trade union density and collective bargaining coverage

To assess the bargaining power of workers across countries, we begin by exploring trends in trade union density. Trade unions are arguably the most important actors in the collective bargaining process. Those are voluntary organisations based on membership with the primary goal of improving and maintaining terms and conditions of work through collective bargaining with employers. The share of workers who join unions as a percentage of the labour force, also known as trade union density, may serve as an indicator of the bargaining power of unions.

Panel A of Figure 1 shows the evolution of trade union density over time for four EU main country groups, the United Kingdom and the United States. We include data for Ireland separately, because this country differs from the four main EU country groups and has a union density similar to the UK. There is a great degree of heterogeneity across countries in our sample. The Scandinavian EU shows the highest level of unionisation (between 82 and 64 percent over time) whilst on the opposite side of the spectrum we find the US with a unionisation rate between 22 percent and 10 percent. Other EU countries and the UK are in between.

Figure 1: Trade union density and collective bargaining coverage in the European Union, the United Kingdom, and the United States, 1980-2020 (percent)



Source: OECD/AIAS database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts (ICTWSS). Note: The trade union density is defined as the number of net union members (ie excluding those who are not in the labour force, unemployed and self-employed) as a proportion of the number of employees. The adjusted collective bargaining coverage rate is defined as the number of employees covered by a collective agreement in force as a proportion of the number of eligible employees equipped (ie the total number of employees minus the number of employees legally excluded from the right to bargain). Unweighted averages are reported for the EU groups: Scandinavian EU (3): Denmark, Sweden, Finland; Western EU (5): Austria, Belgium, Netherlands, France, Germany; Southern EU (4): Greece, Italy, Spain, Portugal; Eastern EU (8): Czechia, Estonia, Hungary, Lithuania, Latvia, Poland, Slovak Republic, Slovenia. Whenever one or a few observations were missing between two available observations, we interpolated missing data with linear trends. For a few countries, missing data at the end or at the beginning of the sample period was approximated by assuming the same percent change as the average of the other countries in the same country group.

The de-unionisation process occurred in all countries but with varying strengths. US unionisation halved over the past 40 years from the already low rate of around 22 percent in 1980 to 10 percent by 2020. Eastern EU countries experienced the sharpest decline in unionisation in the 1990s as part of the transition from the socialist economic system, where union membership was a method of signalling political preferences and was seen as a prerequisite for career-progression. As these countries moved to a market economy, unionisation declined sharply. The dataset we use includes values for most eastern EU countries starting from the mid-1990s when the average rate was close to 60 percent. Since then, unionisation in Eastern EU declined to close to 10 percent, nearing US values. The UK and Ireland went from having more than half of their labour force represented by a union in the early 80's, to only a fourth by 2020. Although there has been a shared declining trend, the decrease in unionisation has been less pronounced in Scandinavian, Southern and Western EU.

As a counterpart to unions, another actor involved in the collective bargaining process are employers' associations. Similar to unions, they have the primary function of engaging in coordinated collective bargaining (Jäger *et al*, 2022). They can either be organised at the sectorial level like the German metal and electrical industry association *Gesamtmetall* or at the national level, like the Italian *Confindustria*. While in many European countries the role of employers' associations is institutionalised in the collective bargaining process, in the US, where the bargaining happens mainly at the firm level, employers' associations do not directly partake in the bargaining process and have more of a lobbying role (OECD, 2019). The outcome of collective bargaining is often extended beyond the union and employer association members (Eurofound, 2015). One of the reasons is the existence of *erga omnes* (towards everyone) clauses that extend the terms set in collective agreements not only to the signatory parties but to all workers. That is, if an agreement is signed between an employer and a trade union, under *erga omnes* clauses, all workers are covered by the agreement. Moreover, in Europe, there is a tradition of extending negotiated agreements to non-unionised workers within a sector and even companies that were not originally involved

in the bargaining process. Several European countries, including Austria, Belgium, France, Germany, Spain, Finland and the Netherlands have automatic or common sector-level extension practices (Breda, 2015; Eurofound, 2015), though such sector-wide extensions are not a legal mechanism in Cyprus, Denmark, Malta, Sweden, and the United Kingdom (Eurofound, 2015). For this reason, collective bargaining coverage is a measure complementary to union density if the aim is to assess the potential impact of the whole bargaining process.

For example, in Germany, a bargaining agreement signed between an employer association and a union covers all the firms which are part of the employer association. Moreover, covered firms usually apply *erga omnes* clauses and extend the coverage to all employees, regardless of union membership (Jäger *et al*, 2022). This results in a trade union density of 17 percent vis-a-vis a collective bargaining coverage rate of 54 percent in 2018.

Due to the extension mechanism, a collective bargaining coverage rate higher than unionisation density can be observed in nearly all studied countries, although differences are apparent. In Scandinavian, Southern and Western EU, coverage is between 90 percent and 60 percent (Panel B of Figure 1) and it shows a certain stability despite the moderate trend in de-unionisation. The sharp decline in coverage for Southern Europe at the end of the sample period is particularly due to the reforms to reduce the extension mechanisms that Greece undertook after 2010 in the context of the financial assistance programme, where the 100 percent coverage rate in 2011 declined to 14 percent by 2017. In contrast, unionisation and collective bargaining coverage have relatively similar values in the US, UK and Ireland. In the Eastern EU, collective bargaining covers about 28 percent of the workforce, which is more than twice the percentage of workers who are members of trade unions. Yet, compared to other EU countries, collective bargaining coverage in Eastern Europe remains the lowest.

Taken together, trade union density and collective bargaining constitute a measure of the bargaining power of unions, which as we have seen, is drastically different across countries.

The US has consistently experienced low levels of unionisation and collective coverage since the 1980s, and a similar trend is observed in Anglo-Saxon and Eastern EU countries, despite higher initial levels. However, in most EU countries, although unionisation rates have decreased, collective coverage has remained relatively high and stable thanks to the presence of extension mechanisms and *erga omnes* clauses mentioned above. This resulted in a large gap between bargaining coverage and union density in many European countries.

Two facts are cited in the literature as reasons for relative persistency of union membership in the Nordic and Western EU: Ghent-system and sectoral character of European unions (Boeri and van Ours, 2013; Naidu, 2019; 2022). The role of unions in the welfare system is different in many European countries and in the US. In Nordic EU countries as well as in Belgium, big cross-industry unions are responsible for the administration of unemployment benefits, the system known as the Ghent-style benefits². The union density has also remained high in countries where unions operate on a sectoral level (such as Nordic EU, Germany and Italy). The inclusion of unions within the welfare state system and the sector-specific nature of European unions may have prevented their decline in Europe and contributed to the persistence of large, well-established unions there.

It also must be noted that the de-unionisation process did not affect all collective bargaining systems in the same way. Jäger *et al* (2022) stress that membership is crucial for unions in the US, as their influence strongly relies on the legitimisation and is a direct function of the share of workers who have joined them.

² For example, in Belgium, the National Employment Office (NEO), a public body, disburses unemployment benefits, which are funded by compulsory contributions from both employees and employers as well as from contributions from the federal budget. There are four payment agencies: three trade unions and the Auxiliary Fund for the Payment of Unemployment Benefits (AFPUB), a public agency to deal with workers who do not wish to join a trade union. The unemployed can decide whether to request the payment via a trade union or the AFPUB. The three trade unions handle 85 percent of cases. Trade union staff help the jobless to prepare her/his claim and then forward the claim to the NEO for verification. Once the NEO verified the claim, it transfers the amount of benefit to the trade union, plus some extra to cover the costs incurred by the trade union in providing services to the unemployed, and then the trade union transfers the benefit to the jobless. For further details, see Faniel (2020)

3. Vertical and horizontal orientation of wage bargaining process

The collective bargaining process is the outcome of labour regulations and characteristics of unions and employer organisations. The literature builds a taxonomy of collective bargaining systems around two dimensions: 1) the level of union density and bargaining coverage, explained previously and 2) the extent of vertical and horizontal coordination of social partners on which we focus now (Calmfors, 1993; Bhuller *et al*, 2022).

Collective bargaining systems vary in their degree of centralisation of the bargaining level. This concept, known also as vertical coordination, determines the level at which wage negotiations occur, which could be within a specific company (a decentralised system), industry, sector, or across the entire nation (a highly centralised system). For example, in Germany, most of wage bargaining agreements are reached on industry-regional level (Jäger *et al*, 2022), whereas in the US this mostly happens on the firm-level (see Table 1). An example of the centralised bargaining is provided by Sweden between 1930s and 1980s that consisted of agreements reached by the main trade union of the country and nation-wide employers' association that set the frame for additional agreements on lower levels (Freeman and Gibbons, 1995). The OECD/AIAS database suggests that there were four countries (Denmark, Israel, Spain, and Sweden) in 1980 with a centralised level of bargaining at the national level. Data for 2019 shows none (Table 1), suggesting a move towards more decentralised bargaining processes.

Trade unions that engage in the bargaining process vary in the degree of coordination of different types of workers or units, which is known as horizontal coordination. An example of high horizontal coordination can be the export-led pattern bargaining present in Germany, Sweden and Norway, where unions in the chemical or the metalworking sectors set the path for sequential wages negotiation in other industries (Bhuller *et al*, 2022). On the opposite side, the UK, where several unions for different professions bargaining separately may coexist in the same workplace, is a case of horizontal decentralisation (Calmfors, 1993).

Following these two categories and building on the analysis of Bhuller *et al* (2022), in Table 1 we present a classification of the EU countries, the US, and the UK based off the levels of

vertical and horizontal coordination. The US, where bargaining happens at the firm level and where horizontal decentralisation is strong, lies in the bottom left corner of the grid. The same applies for several Eastern EU countries, with a decentralised collective bargaining taking place mainly at the firm level and with little horizontal coordination across crafts (Magda 2017).

The Scandinavian EU countries and some of the Western EU countries are found at the opposite side of the chart. Germany and Sweden were previously identified as countries where horizontal coordination is strong and this is corroborated in Table 1. It is important to stress that the OECD database used to construct Table 1 introduces a certain degree of simplification, as it categorises the predominant bargaining level. For instance, Germany has a sectoral-regional collective bargaining system (Jäger *et al*, 2022) which is arguably not as centralised as the Italian one - a fact to which we return later. Similarly, while the predominant bargaining in some countries (Sweden, Denmark, Germany, Belgium) is at the sectoral level, these countries also utilise a two-tier framework that incorporates additional local wage bargaining at the firm level.

Table 1: Wage setting coordination in the EU, UK and US, 2019

Vertical coordination	<i>Centralised national</i>					
	<i>Centralised sectoral</i>					Belgium
	<i>Sectoral</i>		Portugal Slovenia	Finland Italy Spain	Austria Denmark Germany Netherlands Sweden	
	<i>Some sectoral</i>	Greece Romania	Croatia Cyprus Ireland Luxembourg Slovakia	France		
	<i>Fully decentralised (firm level)</i>	Hungary Latvia Lithuania Malta Poland US	Czechia Estonia UK			
		<i>Little to none</i>	<i>Some</i>	<i>Moderate</i>	<i>High</i>	<i>Very high</i>
		Horizontal coordination				

Source: updated from Figure 2 of Bhuller *et al* (2022) using the [OECD/ICTWSS database](#). Note: Vertical coordination considers the predominant bargaining level. A level is 'predominant' if it accounts for more than two-thirds of the total bargaining coverage rate (code 1, 3 or 5). If it accounts for less, but more than one-third of the coverage rate, there is a mixed or intermediate situation, between two levels (code 2). A mixed situation also occurs when bargaining levels alternate and/or it is impossible to assess which of the two contributes more to the actual coverage of agreements (code 4).

4. How does collective bargaining affect wages and income inequality?

Research on the economic consequences of collective bargaining processes on macroeconomic variables is relatively scarce (Bhuller *et al*, 2022). This is partly because of difficulties in cross-country comparisons which are subject to the criticism of omitted variables and other endogeneity issues (Naidu *et al*, 2022) and partly due to data availability issues (Ahlquist, 2017). Instead, recent research in labour economics has focused to understand the relative importance of individual determinants of wages, including wage premiums associated with unionised status ('union membership wage premium'). This exercise is simpler, as focusing on one economy enables researchers to condition the calculation on domestic wage-setting practices. Unfortunately, research of effects of unions on employment is scarce. For this reason, we focus on the effect of trade unions on the wage distribution, reporting findings on employment whenever it is possible.

Trade unions and wages

Bryson (2014) analysed household surveys to compute union membership wage premium across a sample of OECD countries. The findings are reproduced in Table 2. Although this study relies on simple econometric methods, we found that in most cases, the estimated effects are quite similar to studies employing more complicated identification strategies (for a literature review, see Fang and Hartley, 2022). For example, Fang and Hartley (2022) reported a consensus on positive union wage premia for the US, with estimates that tend to hover between 10 percent and 20 percent, which is 17 percent in Bryson's (2014) data.

An intuitive relation between the union membership premium and collective bargaining coverage emerges in the data. Namely, in presence of effective extension mechanisms that can widen the coverage of collective agreement irrespective of individual worker's union membership, premiums are expected to be compressed. Indeed, this conjecture finds support in our data. As can be verified in Table 2, the union wage premium in France, Germany, Italy, the Netherlands, and Sweden is zero or not significantly different from zero (which we mark as 'ns'). All these countries also have a very high collective bargaining coverage (Figure 1). This contrasts with Anglo-Saxon economies (especially the US), which have some of the highest

union premiums in Table 2 but were previously identified as countries with weak collective bargaining coverage. Therefore, for Anglo-Saxon countries the empirical literature focuses on the effect of union membership on wages, while for Continental Europe the central question should revolve around the role of collective bargaining (Gürtzgen, 2016).

Table 2: Union membership wage premia in selected European countries and the United States

Country	Years	Union % increase
Austria	1994, 1995, 1998, 1999	12
Cyprus	1996-1998	14
Denmark	1997-1998	16
France	1996-1998	3 (ns)
Germany	1994-1999	4 (ns)
Italy	1994, 1998	0
Netherlands	1994, 1995	0
Norway	1994-1999	7
Portugal	1998-1999	18
Spain	1995, 1997-1999	7
Sweden	1994-1999	0
UK	1993-2002	10
US	1973-2002	17

Source: Bryson (2014). Note: the estimates control for age, its square, years of schooling, private sector, hours worked, and union status.

Contrary to high union premiums found in the US and other economies, research trying to uncover causal effects of union formation found negative effects on wages and employment in the US setting. Those studies compare unions that barely won the National Labour Relations Board (NLRB) elections to those that barely lost (Dinardo and Lee, 2004; Frandsen,

2022; Wang and Young, 2022). In the US, a worker who wants to form a union typically needs to gather signatures from at least 30 percent of their co-workers to trigger a union election supervised by NLRB and then win a majority of the votes in that election to gain recognition. Frandsen (2022) reports that union creation led to decrease in average wages of workers and establishment employment. The wage impact was mostly driven by changes in workforce composition (high-paid workers leaving and young, lower-paid workers coming to replace them). However, there is a major problem related to this method: the causal impact applies only to establishments close to the margin of victory and thus considers only a small subset of trade unions. This is especially problematic given that unions efficacy depends on their legitimisation which is gained through favourable election results (Cahuc *et al*, 2014). Interestingly, Wang and Young (2022) provided some evidence that the negative employment effects of unionisations are driven by managerial opposition to the unionisation process. According to Naidu (2019), this strand of literature highlights the problems with union creation laws present in the US and not unions themselves.

But even for countries with limited collective bargaining coverage like the US, there is another obstacle in establishing a conclusive link between unions and wages. Activities of unions have a potential to influence not only unionised employees but also their non-unionised counterparts (Ahlquist, 2017). For example, employers who would like to discourage unionisation would be prone to offer better conditions and wages to their employees, mimicking the benefits of covered workers. This mechanism, called the threat of unionisation, would therefore reduce the wage differentials in the covered and non-covered sectors. In this regard, Fortin *et al* (2021) showed that the direct effects of unions on wages and spill-over effects are similar in magnitude. They estimate that by accounting for both, the total effect of unionisation amounts to 29 percent of the increase in log wages between 1979 and 2017 in the US. Unfortunately, we lack similar research for other countries with low collective bargaining coverage, like the UK and eastern EU countries.

To overcome the problem of understanding the impact of unions (or wage bargaining) on wages in countries with extension mechanisms, Card and Cardoso (2021) explore the relationship between collectively negotiated wage floors and actual wages in Portugal. Collective bargaining in Portugal follows a system in which agreements specify a set of wage floors for different occupation groups. Employers can, and often do, pay idiosyncratic wage premiums on top of the floors. As argued by the authors, this system of sectoral bargaining is broadly similar to systems present in Spain, Italy, Belgium, the Netherlands and France. Card and Cardoso (2021) found that increases in wage floors have a positive effect on the actual wages of Portuguese workers, but the effect is smaller than the associated increase in wage floors. This is because employers offset the increase in wage floors by reducing wage premiums. The authors estimate that the average passthrough rate of wage floor increases is around 50 percent. The authors find that in Portugal, non-unionised workers have higher wages than unionised workers³. Upward adjustments in wage floors have a positive effect on employment, contradicting theories predicting that union pressure to increase wages would lead to a reduction in employment. This is less surprising in Portuguese setting, where majority of workers earn some premia above the wage floors. However, due to inflation, the purchasing power of wages declined despite increases in nominal wages. Between 2010 and 2016, the average Portuguese worker lost 1.7 percent of mean log wages in real terms, with 24 percent of the between-skill group variation in real wages being explained by declines in real wage floors.

Boeri *et al* (2021) provide a case-study showing the importance of vertical coordination on the impact of the collective bargaining on wages in Germany and Italy. According to Boeri *et al*'s (2021) research, the German system maintains high employment rates throughout the country, even in lower-productivity areas, particularly East Germany. This is due to several

³ This stands in sharp contrast to the 18 percent Portuguese union membership premium estimate we reported in Table 2 based on Bryson (2014). The differences could be attributed to different sample periods (1998-1999 in Bryson (2014) and 2008-2018 in Card and Cardoso (2021)) and different coverage (Bryson (2014) used an ISSP survey data with relatively small sample size, while Card and Cardoso (2021) used the census data covering nearly the universe of Portuguese workers).

factors, including non-mandatory employer participation and the regionalisation of sectoral bargaining, which allow wages to vary based on firm (and by extension, regional) productivity. In contrast, the Italian system imposes uniform wage floors across all firms within a sector, leading to flat relation between wages and regional productivity, and subsequently depressing employment in low-productivity regions, such as Southern Italy.

Trade unions and inequality

Even though collective bargaining system vary widely across advanced economies, union density is negatively correlated with inequality. Jaumotte and Osorio Buitron (2020) analysed cross-country data and found a negative correlation between union density and the income share of the top 10 percent earners as well as the Gini coefficient. Time series evidence from the US also shows a negative correlation between union density and income inequality. Farber *et al* (2021) presented a dataset of US unionisation at the household level going back to 1936 and argued that the negative correlation partially resulted from causal effects of increased unionisation on decreased inequality. First, the authors establish that the union wage premium stayed high throughout the twentieth century and amounted to 10 percent to 20 percent. Second, they document that during peak union density years (1940s through 1960s), unionised households were composed from disadvantaged groups (less educated, non-white) which did not happen before or after. Those effects accelerated inequality-reducing effect of unions. The authors find that the rise unionisation, even accounting for spillover effects, explains more than a fourth of the decline in the Gini coefficient between 1938 and 1968 and, conversely, its decline after 1968 leads to over one tenth of the rise in Gini coefficient after 1968. To account for the macroeconomic effects of unions in the non-union sector, which might lead to an underestimation of the overall impact on inequality, the authors develop a second analysis. Using two policies of union liberalisation in the 1930's that led to a negative exogenous shock in the cost of organising as exogenous variation, they show that the policies increased permanently state-level unionisation while decreasing state-level inequality.

Looking at European evidence, Dustmann *et al* (2009) investigated the effects of collective bargaining on wage distribution for Germany using a linked employee-employer dataset over the period 1995-2004. They find that if the unionisation rate had not declined in the 1990s, wages would have been higher at the end of the sample especially for workers at the bottom of the income distribution. More precisely, between 1995 and 2004 wage inequality in the upper tail (50-85 quantile) of the distribution would have decreased by 13 percent whereas in the lower tail (50-15 quantile) by 28 percent.

New cross-section and time series evidence on collective bargaining and inequality

We extend the analysis of Jaumotte and Osorio-Buitron (2020) to more countries and also consider collective bargaining coverage. Figure 2 Panel A confirms a negative correlation, -0.38, between trade union density and the Gini coefficient of income inequality for 37 countries, which is statistically different from zero at the 2 percent significance level. The correlation between trade union density and other indicators, such as the income share of the top 10 percent and top 20 percent earners and the income quintile share ratio (the ratio of total income received by the 20 percent of the population with the highest income to that received by the 20 percent of the population with the lowest income – usually abbreviated as S80/S20) is similarly negative. The correlation between trade union density and the income share of the bottom 10 percent or 20 percent earners is positive.

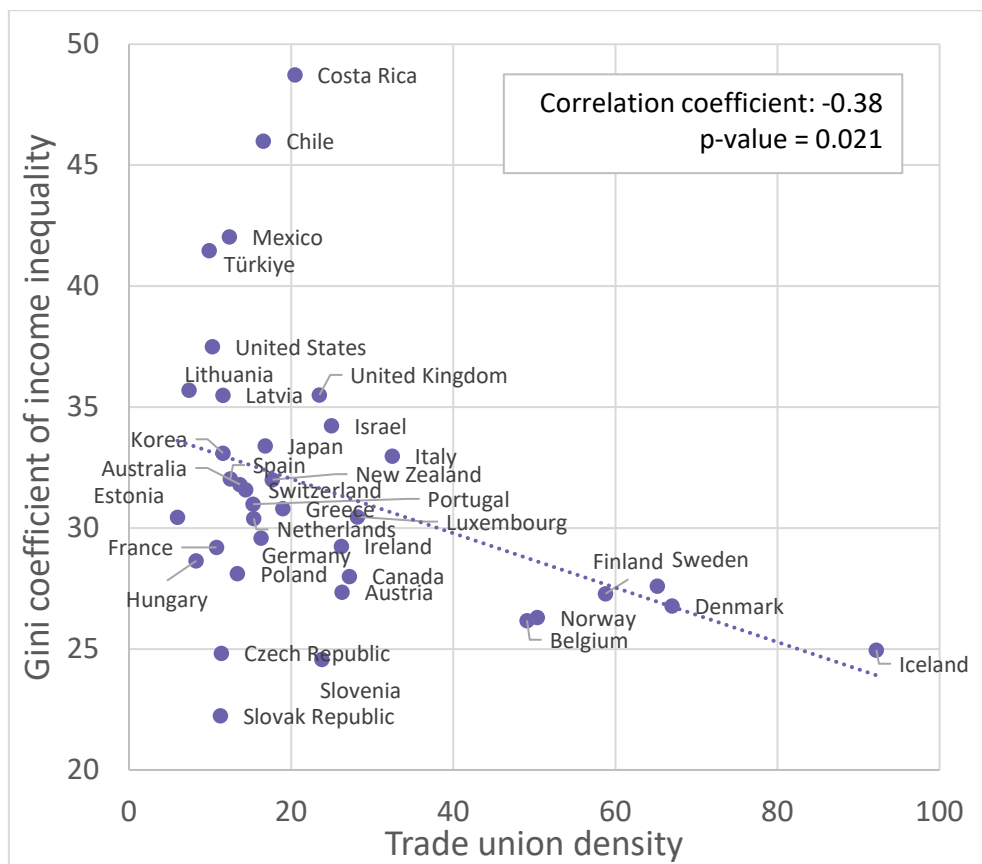
Figure 2 Panel A suggests that five Nordic countries and Belgium form a separate group by having relatively high levels of union density and low income inequality. When we exclude these six countries, the correlation coefficient falls to -0.08, which is not statistically different from zero, suggesting that these six countries drive the negative correlation.

Among all countries for which data is available, we find an even higher correlation (in absolute terms) between the share of workers covered by collective bargaining, which is -0.52 (Figure 2 Panel B). This estimate is highly statistically significant (p value= 0.001). When excluding the six Nordic countries and Belgium, the correlation coefficient remains high at -0.40, which continues to be statistically significant (p value = 0.025). These findings suggest that collective bargaining coverage could be a more important factor in influencing inequality than union

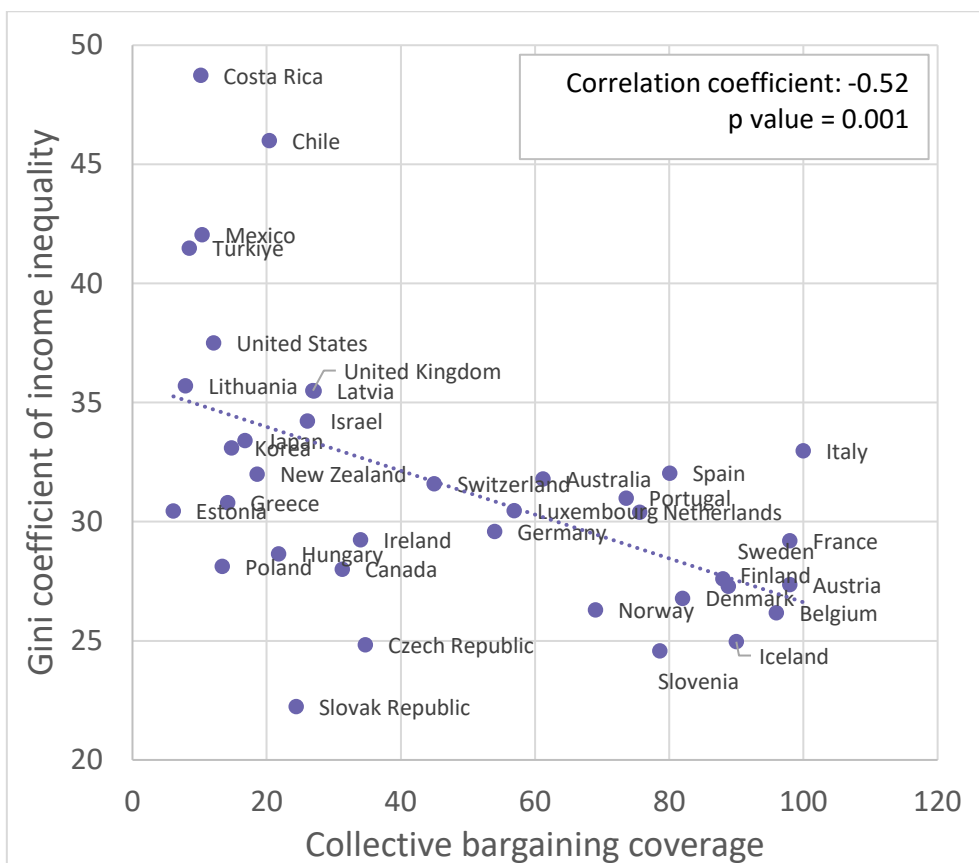
density, which is an intuitive result, since the conclusions of collective bargaining are extended beyond trade union and employer association members, as discussed above.

Figure 2: Cross-country correlation of income inequality with trade union density and collective bargaining coverage

A) Trade union density and income inequality



B) Collective bargaining coverage and income inequality



Source: OECD's OECD/AIAS database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts (ICTWSS) for trade union density and collective bargaining coverage, and the OECD Income Distribution Database for the Gini coefficient of disposable income inequality. Note: The latest available observation is used for each country, which is for the year 2019 in most cases. The Gini coefficient is measured on a 0-100 scale (the higher the value, the higher income inequality), while trade union density and collective bargaining coverage are measured in percent.

Still, these cross-country correlation coefficients should be assessed cautiously and might not be interpreted as a causal relationship. Assessing the causal impact of trade union density and collective bargaining on income inequality is burdened with serious difficulties. Income inequality is influenced by various factors, including market forces that determine the pre-redistribution (before taxes and transfers) incomes, and redistributive policies which reallocate income from the rich to the poor. In principle, trade unions could influence both the market distribution (for example, via increasing the gross relative wages of low earners) and redistribution policies (for example, by lobbying the government). However, identifying the contribution of trade unions is inherently difficult, and we cannot exclude that other

factors influence both indicators. For example, in a country with a high level of social sensitivity and solidarity, the electorate might elect governments that pursue redistributive policies and workers might be more willing to join trade unions, resulting in a negative correlation between union density and income inequality.

Such country-wide preferences might be less of an issue for within-country temporal change in the indicators, provided these preferences are persistent. There are twelve countries in the OECD/AIAS ICTWSS dataset for which data on trade union density, collective bargaining, and income inequality (which we take from the Standardised World Income Inequality dataset of Solt, 2019) is available for at least 50 years for all indicators. These twelve countries comprise of six European Union countries, the United States and five other countries.

We use data sampled in every fifth year for two reasons. First, trade union membership and collective bargaining might influence inequality with a time lag. Second, for several countries, data on collective bargaining coverage is available only for every fifth year in the period before 2000.

Since trade union density, collective bargaining coverage, and inequality have trends in most countries, we work with differenced data, that is, we calculate the 5-year changes in the indicators. The requirement of 50 years of data and 5-year differencing implies that we have at least ten observations for each country.

For ten of twelve countries, all correlation coefficients are negative, and a large share of these correlation coefficients are statistically different from zero. These findings again highlight a negative association between bargaining and inequality. For France, the correlation coefficients are positive when trade union density is used, while for Ireland, all four correlation coefficients are positive. Further research should explore the reasons behind the differing French and Irish results.

Table 3: Trade unions/collective bargaining and income inequality: correlation coefficients between 5-year changes

	cor(dTUD,dGiniNet)	cor(dCBC,dGiniNet)	cor(dTUD,dGiniMkt)	cor(dCBC,dGiniMkt)
Australia	-0.53	-0.13	-0.63	-0.44
Canada	-0.55	-0.67	-0.71	-0.73
Finland	-0.62	-0.21	-0.30	-0.20
France	0.35	-0.28	0.19	-0.18
Germany	-0.62	-0.22	-0.38	-0.43
Ireland	0.19	0.41	0.38	0.58
Italy	-0.47	NA	-0.34	NA
Japan	-0.41	-0.42	-0.43	-0.44
Norway	-0.58	-0.25	-0.49	-0.31
Sweden	-0.63	-0.85	-0.40	-0.66
United Kingdom	-0.46	-0.61	-0.43	-0.71
United States	-0.49	-0.52	-0.27	-0.04

Source: Bruegel. Note: Data refer to 5-year changes. dTUD: change in trade union density; dCBC: change in collective bargaining coverage; dGiniNet: change in the Gini coefficient of disposable income inequality; dGiniMkt: change in the Gini coefficient of market income inequality. For Italy, collective bargaining coverage is 100 percent in the whole sample period, thus, lack of variation prohibits the calculation of a correlation coefficient.

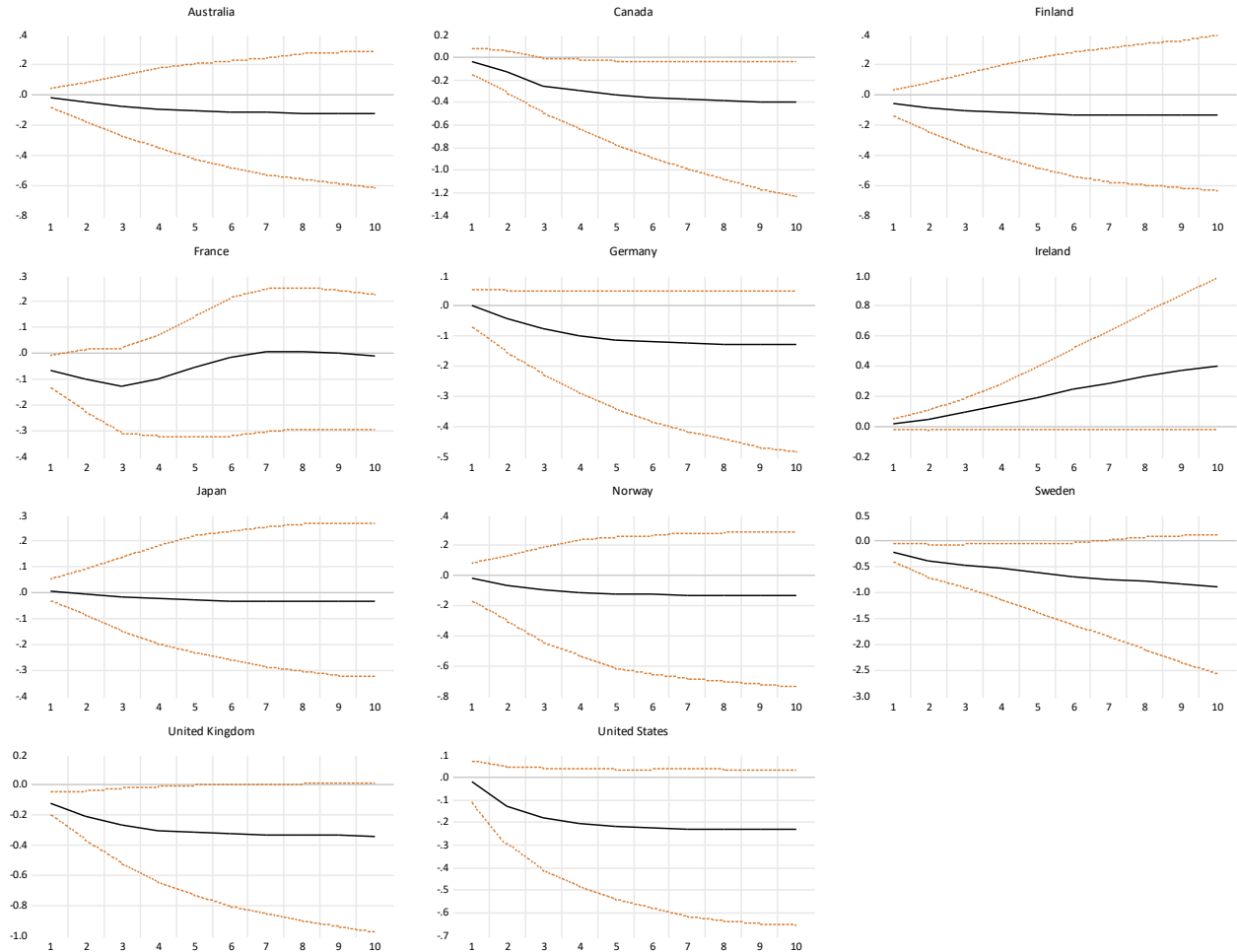
To explore the dynamic impacts of changes in trade union membership on income inequality, we use annual data to estimate vector autoregressions (VARs) and to calculate impulse response functions. We estimate the generalised impulse response function derived by Pesaran and Shin (1998), which achieves orthogonalised residuals irrespective of the ordering of the variables, in contrast to the frequently used Cholesky decomposition. Shocks identified by the Pesaran and Shin (1998) methodology can be interpreted as shocks to the variables of the VAR, but these shocks are not structurally identified in the sense of being derived from a particular theoretical framework. We estimate the confidence intervals for the impulse response functions with the bias-corrected bootstrap-after-bootstrap method of Kilian

(1998), which tends to be more accurate than traditional asymptotic intervals in small samples.

We find that the point estimates of disposable income inequality response to a shock in collective bargaining are negative for ten of the eleven countries (the model cannot be estimated for Italy due to unchanged collective bargaining coverage), though zero is not included in the confidence interval only for Canada, Sweden and the United Kingdom (Figure 3). In line with the positive correlation reported in Table 3 for Ireland, the point estimates of the impulse response function for Ireland are also positive.

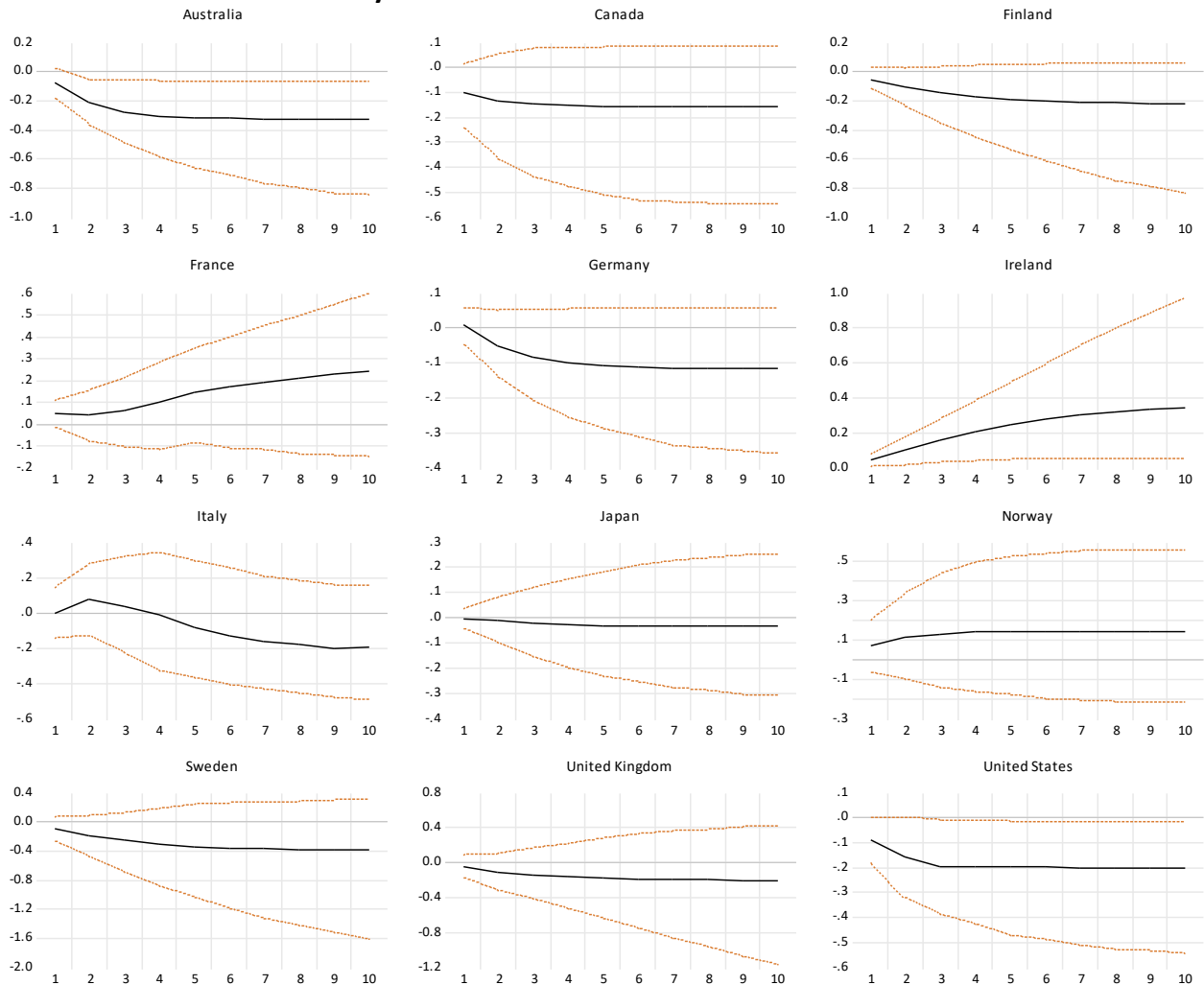
When studying the impact of trade union density, the point estimates are negative for nine of the twelve countries, but statistically significant only for Australia and the United States (Figure 4). The point estimates are positive for three countries: France, Ireland and Norway. The French and the Irish results are in line with the positive correlation coefficients reported in Table 3, but contrasts with the negative coefficient for Norway. The French and Norwegian estimates are statistically not different from zero.

Figure 3: Response of the Gini coefficient of income inequality to a generalised one standard deviation collective bargaining coverage innovation



Source: Bruegel. Note: The vector autoregressions were estimated for differences of the variables, while the impulse response functions show the accumulated impacts, that is, the impacts on the level of the Gini coefficient. The horizontal axis shows the years after the shock, with the shock occurring in year 1. The generalised impulse response function of Pesaran and Shin (1998) was used. The 95 percent confidence intervals (indicated as red dashed lines) were calculated using the bias-corrected bootstrap-after-bootstrap method of Kilian (1998) with 999 bootstrap repetitions and 499 double bootstrap repetitions.

Figure 4: Response of the Gini coefficient of income inequality to a generalised one standard deviation trade union density innovation



Source: Bruegel. Note: The vector autoregressions were estimated for differences of the variables, while the impulse response functions show the accumulated impacts, that is, the impacts on the level of the Gini coefficient. The horizontal axis shows the years after the shock, with the shock occurring in year 1. The generalised impulse response function of Pesaran and Shin (1998) was used. The 95 percent confidence intervals (indicated as red dashed lines) were calculated using the bias-corrected bootstrap-after-bootstrap method of Kilian (1998) with 999 bootstrap repetitions and 499 double bootstrap repetitions.

5. Conclusions

This essay has provided an overview of collective bargaining systems in European Union countries and the United States, by presenting data on the main trends and drawing on the literature studying the impacts of collective bargaining processes on wages and inequality. Several main conclusions arise from our study.

First, the potential of unions to influence wages and employment vary considerably across countries. The union density rates differ significantly across the studied countries, with Scandinavian EU countries having the highest unionisation rate and the United States having the lowest. In all studied countries, union density has declined over the past decades. This trend did not hurt Western and Nordic EU unions as much as their US and UK counterparts, because extension mechanisms expand the outcome of the bargaining to workers who are not members of a trade union, resulting in a much higher collective bargaining coverage than trade union density. Thus, a major transatlantic divide is the gap between collective bargaining coverage and union density.

Second, by distinguishing between vertical coordination (whether there is coordination at the country level, or industry level, or there is decentralised bargaining at the firm level) and horizontal coordination (the extent to which there is coordination between different firms in an industry or between different industries), we found that collective bargaining systems in Western and Nordic EU are much more centralised and coordinated than those in Anglo-Saxon economies and in Eastern EU countries. Most eastern EU countries have bargaining processes similar to that of the United States.

Third, we show that the consequences of alternative collective bargaining systems are an under-studied issue even though some articles have identified important consequences of differences in those processes. For example, Boeri *et al's* (2021) analysis indicate that the German economy has a stronger link between productivity and wages than Italian economy, because of the differences in the level of bargaining negotiation.

Fourth, research on the impact of trade unions on wages has focused on identifying union membership premium (ie higher wages for workers that are members of a trade union). However, this measure is not useful for analysing many European countries, where collective bargaining coverage is much higher than trade union density due to extension mechanisms. Consequently, close to zero estimated union wage premia should not be interpreted as unions having no impact on wages. In the US and other countries with low trade union membership and low collective bargaining coverage, the 'threat of unionisation' might complicate the analysis of the impact of trade unions on the wage premium: employers who would like to discourage unionisation would be prone to offer better conditions and wages to their employees, mimicking the benefits of covered workers. Further research should develop methods for identifying the impacts of trade unions on overall wage developments.

Finally, we reported a negative correlation between income inequality and either trade union density or collective bargaining coverage both across countries at a point in time, and across time for several countries. The cross-country correlation coefficient is higher (in absolute terms) between inequality and collective bargaining coverage than between inequality and trade union density, and the latter correlation is primarily driven by five Nordic countries and Belgium, while the former correlation remains strong even when excluding these six countries. Although the causal relation between those variables is difficult to establish and the correlation might arise from a common cause, the degree of social preferences of the electorate, literature we investigated suggested that rising inequality in the twentieth century's US and in Germany since 1975 can be attributed to falling unionization among other factors. Our estimated impulse response functions from bivariate vector autoregressions suggested a statistically significant negative impact of an increase in collective bargaining coverage on income inequality for Canada, Sweden and the United Kingdom. For Australia and the United States, a positive shock to trade union density is found to reduce income inequality in a statistically significant way. For most other countries, the impacts were similarly negative but statistically not significant. Further

research using richer models, including other determinants of income inequality, should elaborate on the possible impacts of trade union density and collective bargaining coverage on income inequality.

While in this essay we focused on wages and inequality, the possible impacts of trade unions and collective bargaining on employment and output are equally important. These issues are also left for future research.

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