Report on the state-of-the-art and research gaps

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Abstract

This document presents the WeLaR project and contains an extensive literature review of the state of the art related to the research in WeLaR work packages (WPs) 3 to 7. The literature covered relates to (1) the interactions between welfare policies and labour market aspects of the four megatrends of globalisation, digitalisation, demographic change and climate change (WPs 3 to 5); and (2) literature related to shaping forward looking inclusive societies and economics (WPs 6 and 7). The report is structured into five sections, with the initial section outlining the primary objectives of the report, and the subsequent section detailing the specific goals of the WeLaR project. The third section presents an overview of the various work packages (WPs 3 to 7) and summarises the current state of the art for each. In the fourth section, each task is exhaustively described, including its current state-of-the-art, the progress made in relation to the current state-of-the-art, and the research to be done. In the end, the report culminates with a final section that offers closing remarks to wrap up the document.

1. Introduction

The purpose of this document is to provide a comprehensive overview of the WeLaR project and a thorough analysis of the current state of the art related to research in WeLaR work packages (WPs) 3 to 7. The literature examined in this document encompasses two main areas: (1) the connections between welfare policies and labour market aspects of the four major megatrends of globalisation, digitalisation, demographic change, and climate change (WPs 3 to 5); and (2) literature related to the formation of inclusive societies and economies with forward-looking perspectives (WPs 6 and 7).

To achieve this goal, the report is structured into four sections. The following section elaborates on the WeLaR project's objectives in greater detail. The third section provides an overview of the different work packages (WPs 3 to 7) and summarises the state of the art for each. In the fourth section, each task is described in detail, including its current state-of-the-art, progress made in relation to the current state-of-the-art, and future research to be done. Ultimately, the report wraps up with a final section that offers concluding remarks.

To enhance the document's readability and navigability, readers can click on various links/boxes to move between the broad task overview presented in Section 3 and the in-depth task description provided in Section 4. Our hope is that this feature allows for reading the document both in full and in parts.

2. The WeLaR project

The ongoing demographic changes, globalisation, digitalisation and climate change are causing a significant shift in the labour markets in the European Union (EU). These trends have resulted in the emergence of new opportunities and risks, creating unprecedented challenges for welfare states in the EU. The impact of these megatrends on the labour markets is far-reaching, leading to significant changes in the composition and structure of employment, wage levels, and income distribution. The shifting landscape of the labour market has a significant impact on social policies and the welfare system, leading to the need for policy reforms that can adapt to these new conditions. The WeLaR project has been established to investigate the effects of these megatrends on labour market risks and welfare state challenges and to develop policy recommendations that can help welfare states adapt to the changing conditions in the labour markets.

The WeLaR project aims to address these challenges and achieve two primary objectives. The first objective is to provide a comprehensive and comparative analysis of the impact of the four megatrends on labour market risks and challenges for welfare states. This analysis will help to identify the interactions between

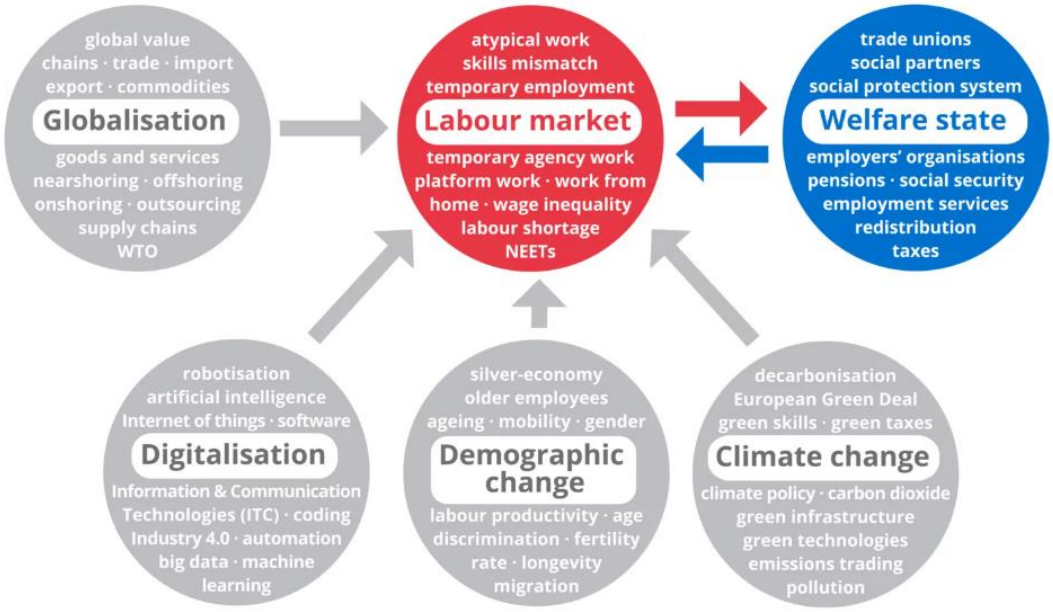
the different megatrends and how they impact labour supply, demand, and market allocations, which are shaped by institutional factors. The WeLaR project will also pay particular attention to groups that face higher labour market risks, such as women, young workers, and those in atypical jobs or in-work poverty. By understanding the effects of these megatrends on different groups and the institutions that shape them, the WeLaR project can provide valuable insights into the challenges facing welfare states.

The second objective of the WeLaR project is to develop policy recommendations to adapt welfare states to the changing conditions in the labour markets. The project will use simulations and lessons from recent welfare state interventions and social innovation experiments to develop these recommendations. Additionally, the WeLaR project will consider the political economy of reforms and engage in extensive consultations with stakeholders to ensure that the proposed policy solutions are relevant and effective. By providing concrete policy proposals, the WeLaR project can help welfare states to address the challenges posed by the megatrends and achieve inclusive growth, fair distribution of productivity gains, and economic and social resilience. WeLaR's contribution aligns with the EU's goals of promoting inclusive growth, fair distribution of productivity gains, and enhancing economic and social resilience. WeLaR measures the effects of the four megatrends while accounting for their interactions and disentangling their impacts on labour supply, demand, and market allocation, which are also influenced by institutions.

WeLaR adopts an interdisciplinary approach combining quantitative and qualitative methods to provide a cross-country perspective covering the entire EU. By doing so, the project is better able to analyse the effects of the four megatrends on the labour markets and welfare states, considering the diverse institutional settings of individual countries. Through this analysis, WeLaR aims to provide recommendations that are tailored to the unique challenges faced by the different countries, considering their specific institutional settings and socio-economic conditions. The adoption of an interdisciplinary approach, combining both quantitative and qualitative methods, helps ensure that the policy recommendations developed by WeLaR are both evidence-based and effective in addressing the challenges posed by the megatrends.

The effects of technological transformations, globalisation, climate warming, and demographic changes are intertwined and complex (Figure 1). The WeLaR project aims to disentangle these effects and provide insights into their impacts on labour markets and welfare states. It also aims to develop policy recommendations that are based on evidence, simulations, and consultations with stakeholders.

Figure 1. The WeLaR project and the four megatrends



Source: WeLaR website

The WeLaR project's interdisciplinary approach is designed to provide a comprehensive analysis of the impact of megatrends on labour markets and welfare states in the EU. By combining quantitative and qualitative methods and adopting a cross-country perspective, the project aims to understand the role of country-specific institutional settings in shaping these impacts.

To ensure that its policy recommendations are relevant and responsive to the needs of stakeholders, WeLaR engages in extensive consultations and sets up feedback loops with various groups. This approach ensures that the project's output is informed by the insights and perspectives of those who are most affected by the changes in the labour markets.

The WeLaR project's contribution to promoting inclusive growth, fair distribution of productivity gains, and boosting economic and social resilience in the EU is substantial. Its research and policy recommendations have the potential to inform and shape policy decisions at various levels, from national to regional to EU-wide. By ensuring that welfare states are adequately adapted to the changing conditions in the labour markets, the WeLaR project can help to mitigate the risks and challenges posed by the megatrends while maximising their opportunities.

The WeLaR project aims to generate a substantial amount of output, including 24 research papers, four policy briefs, and one foresight report. Additionally, WeLaR will organise several events to promote

discussion and collaboration. These events include two conferences, six workshops, six roundtables, and four open virtual café sessions.

A total of 10 partners are working on the project, KU Leuven from Belgium, LISER - Luxembourg Institute of Socio-Economic Research from Luxembourg, the Fundacja Naukowa Instytut Badan Strukturalnych (IBS) from Poland, the Wiener Institut fur Internationale Wirtschaftsvergleiche (WIIW) from Austria, the Zentrum fur Soziale Innovation GMBH (ZSI) from Austria, the Universita Degli Studi di Perugia (UNIPG) from Italy, the Leibniz Zentrum fur Europaische Wirtschaftsforschung GmbH Mannheim (ZEW) from Germany, the Aldgate Strategy Group Spolska Z Organiczona Odpowiedzialnoscia from Poland, the Ekonomski Fakultet, Univerzitet u Beogradu from Serbia and the Observatoire Social European ASBL (OSE) from Belgium. The project started in September 2022.

2.1. Recent relevant EU policies and initiatives

The EU recognises the significance of the four megatrends - climate change, globalisation, demographic changes, and digitalisation - and has implemented policies and initiatives to address their impact. This section is a brief overview of selected relevant policies and initiatives.

The EU has taken significant steps towards combating climate change through its policy initiatives. The EU's flagship policy is the European Green Deal,[1] which aims to make Europe the world's first climate-neutral continent by 2050. It sets ambitious targets for reducing greenhouse gas emissions, promoting renewable energy, and improving energy efficiency. The Green Deal focuses on promoting renewable energy sources, energy efficiency, and clean and sustainable transport systems. It also emphasises the transition to a circular economy that minimises waste and maximises resource efficiency. Biodiversity conservation and the protection of ecosystems are central to the Green Deal, as is ensuring a just transition by supporting regions and industries heavily reliant on fossil fuels. Overall, the European Green Deal aims to drive sustainable and inclusive economic growth while addressing the urgent challenges of climate change and environmental degradation. The European Commission has proposed a range of measures, such as the Carbon Border Adjustment Mechanism[2] and the EU Emissions Trading System,[3] to drive the transition

[1] For more information, see https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en
[2] For more information, see https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en
[3] For more information, see https://www.europarl.europa.eu/news/en/headlines/society/20170213STO62208/the-eu-emissions-trading-scheme-ets-and-its-reform-in-brief

towards a greener economy. The EU has also taken a leading role in international climate negotiations, including the Paris Agreement.[4] These initiatives demonstrate the EU's commitment to combating climate change and transitioning to a low-carbon economy.[5]

The EU recognises the importance of globalisation[6] and aims to address its challenges and opportunities through effective policies. The EU's initiatives in this area seek to promote fair and sustainable globalisation. The EU's trade policies aim to strike a balance between open markets and protecting European industries and workers. Additionally, the EU promotes sustainable development by supporting countries in achieving the United Nations' Sustainable Development Goals (SDGs)[7] and promoting responsible business practices globally. The EU's trade agreements include regulations that both the EU and its trade partners must adhere to. These regulations cover various requirements to promote sustainable practices[8] and uphold international labour and environmental standards. Implementing international labour conventions and environmental agreements is crucial, along with respecting the core principles of the International Labour Organisation (ILO) and the successful implementation of the Paris Agreement on Climate Change. Preserving regulatory autonomy is emphasised, allowing the EU and its partners to pursue more ambitious measures within their respective frameworks. Robust enforcement of environmental and labour laws is essential, along with active compliance monitoring. The principle of avoiding deviations from environmental or labour laws for the sake of trade or investment is crucial to prevent a 'race to the bottom' scenario where standards are lowered. Sustainable trading of natural resources, such as timber and fish, is promoted to ensure their long-term viability. Combating illegal trade in threatened and endangered species is also a priority, with measures in place to prevent trafficking and protect their existence. Trade

[4] For more information see https://climate.ec.europa.eu/eu-action/international-action-climate-change/climate-negotiations/paris-agreement_en

[5] The European Environment Agency has published many interesting reports on the topic, such as EEA (2020b), Monitoring and evaluation of national adaptation policies throughout the policy cycle, EEA Report No 6/2020, European Environment Agency ; EEA (2021b), Exploring the social challenges of low-carbon energy policies in Europe, Briefing No 11/2021, European Environment Agency or ETC/CCA (2021). Just transition in the context of adaptation to climate change, ETC/CCA Technical Paper No 2/2021, European Topic Centre on Climate Change Impacts, Vulnerability and Adaptation. The European Trade Union Confederation (ETUC) also published in 2020 on the topic, with their Guide for Trade Unions – Adaptation to Climate Change and the world of work.

[6] The World Trade Organisation (WTO) published several relevant reports on the topic, such as WTO (2011)Making globalization socially sustainable or WTO (2019) Making Globalization more inclusive – Lessons from experience with adjustment policies.

[7] https://www.undp.org/sustainable-development-goals#:~:text=The%20Sustainable%20Development%20Goals%20(SDGs)%2C%20also%20known%20as%20the,people%20enjoy%20peace%20and%20prosperity

[8] For more information, see https://policy.trade.ec.europa.eu/development-and-sustainability/sustainable-development/sustainable-development-eu-trade-agreements_en#tsd-review-2021

that contributes to addressing climate change is encouraged, and efforts to establish a circular and resource-efficient economy and deforestation-free supply chains are supported through collaboration. Promoting corporate social responsibility and responsible business conduct is integral to these trade agreements. The EU aims to ensure that companies prioritise societal and environmental considerations alongside their economic interests. By harnessing the benefits of globalisation while ensuring that it benefits all citizens, the EU seeks to create sustainable economic practices.

The EU is also facing significant demographic changes, including an ageing population and declining birth rates. To address these challenges, the EU has implemented various policy initiatives. The European Pillar of Social Rights (EPSR)[9] is a key framework that promotes equal opportunities, social protection, and access to healthcare and long-term care. The EU also supports Member States in implementing measures to improve work-life balance, promote active aging, and enhance social inclusion. Additionally, the Pan-European Personal Pension Product[10] (PEPP) can play a crucial role in supporting welfare states in the EU. As demographic changes, such as an aging population, pose significant challenges to traditional pension systems, the PEPP offers a solution to enhance retirement security and complement existing social protection mechanisms. The PEPP is designed to provide individuals with a portable, transparent, and cost-effective option to save for retirement across EU Member States. By offering a standardised framework for personal pensions, the PEPP encourages cross-border mobility and enables individuals to accumulate pension savings throughout their careers, even if they work in different EU countries. This flexibility enhances labour market mobility and helps address labour market imbalances within the EU, ultimately supporting the overall welfare of EU citizens. These initiatives aim to ensure that demographic changes do not hinder social cohesion and economic progress.[11]

[9] For more information, see https://ec.europa.eu/social/main.jsp?catId=1226&langId=en. The European Trade Union Confederation (ETUC) adopted a resolution in 2021 on implementing the EPSR: Ageing with Dignity. The document is available following this link: https://www.etuc.org/en/document/etuc-resolution-implementing-epsr-ageing-dignity

[10] For more information, see https://www.eiopa.europa.eu/browse/regulation-and-policy/pan-european-personal-pension-product-pepp_en#:~:text=The%20pan%2DEuropean%20Personal%20Pension,to%20existing%20national%20pension%20regimes

[11] The European Commission has published recent relevant reports on the topic, such as European Commission. (2020). The Impact of Demographic Change in a changing environment or European Commission (2021- The 2021 Ageing Report – Economic and Budgetary Projections for the EU Member States (2019-2070).

Recognising the transformative power of digital technologies, the EU has taken several policy initiatives to harness their potential while addressing associated challenges. The Digital Single Market Strategy[12] aims to create a harmonised digital market within the EU, fostering innovation, improving access to digital services, and protecting consumer rights. The EU also places a strong emphasis on data protection and privacy through the General Data Protection Regulation (GDPR),[13] which sets high standards for the collection and use of personal data. Furthermore, the EU invests in research and development in areas such as artificial intelligence, cybersecurity, and digital infrastructure to maintain its global competitiveness. The EU has set ambitious digital targets for 2030 as part of its vision for a digital transformation and these targets are aimed at harnessing the potential of digital technologies to drive economic growth, innovation, and social progress. The EU's Digital Decade targets[14] include ensuring that at least 80% of EU adults can use tech for everyday tasks, that the EU produces 20% of the world's semiconductors, to double the number of 'unicorn' start-ups or that key public services can be 100% accessible online by 2030. Furthermore, the EU aims to make Europe a leader in digital and data-driven innovation by increasing investment in research and development and fostering the development of European digital champions. These examples of initiatives reflect the EU's[15] commitment to ensuring a fair, secure, and inclusive digital future.

Some other specific European policies and initiatives are directly linked to the WeLaR project. For example, the EU also has taken a policy interest in social innovation since the 2000s. From ca. 2010 onwards, several European projects and programmes have either directly funded or investigated social innovations in employment and other policy fields, such as education, health and social services or housing, and social inclusion at large (www.si-drive.eu, www.socialinnovationatlas.net, www.improve-research.eu). The EaSI programme especially supports social innovations with an aim to transfer and upscale them in ESF+ programmes and priorities. Since 2021, the programme funds competence centres for social innovation in

[12] For more information, see https://eufordigital.eu/discover-eu/eu-digital-single-market/
[13] For more information, see https://eur-lex.europa.eu/EN/legal-content/summary/general-data-protection-regulation-gdpr.html
[14] For more information, see https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en
[15] The European Commission has published several reports on the topic, such as European Commission (2019) Competition policy for the digital era. The European Investment Bank published in 2021 a report on Digitalisation in Europe 2020-2021 – Evidence from the EIB investment survey. The European Trade Union Confederation (ETUC) also published different reports on the topic, such as ETUC (2018) Digitalisation and workers participation: what trade unions, company level workers and online platform workers in Europe think.

24 EU Member States.[16] The same holds true for the promotion of social entrepreneurship by EU Policies. In 2011, the EU started the Social Business Initiative, which financed social businesses and social enterprises through various funding channels and aimed at improving funding possibilities for social entrepreneurship (SE), increasing the visibility of SE and improving the legal environment for SE.

3. The different work packages

To provide a comprehensive analysis of the effects of the four megatrends on the labour markets and welfare states, the WeLaR project has been divided into nine work packages, each with a specific focus. These work packages are interlinked to provide a holistic understanding of the topic. Each work package is designed to address a specific angle of the project, providing a detailed analysis of the various factors affecting the labour markets and welfare states in the EU. By dividing the project into these work packages, the WeLaR team is better equipped to analyse the complex and multifaceted effects of the megatrends, providing a more nuanced understanding of the challenges faced by welfare states. Furthermore, the interlinking of the work packages ensures that the findings and recommendations from each package are integrated into the overall analysis, resulting in a comprehensive understanding of the topic.

3.1. The connection between the work packages

Figure 2 shows that the various work packages are interconnected and serve different purposes. There are three categories of work packages in total:

- WP1 and WP9 pertain to project management, coordination, dissemination, and communication;
- WP2 and WP8 focus on developing the project's conceptual framework, joint infrastructure, and engaging with stakeholders;
- WPs 3 to 7 encompass the work packages where the research content will be generated.

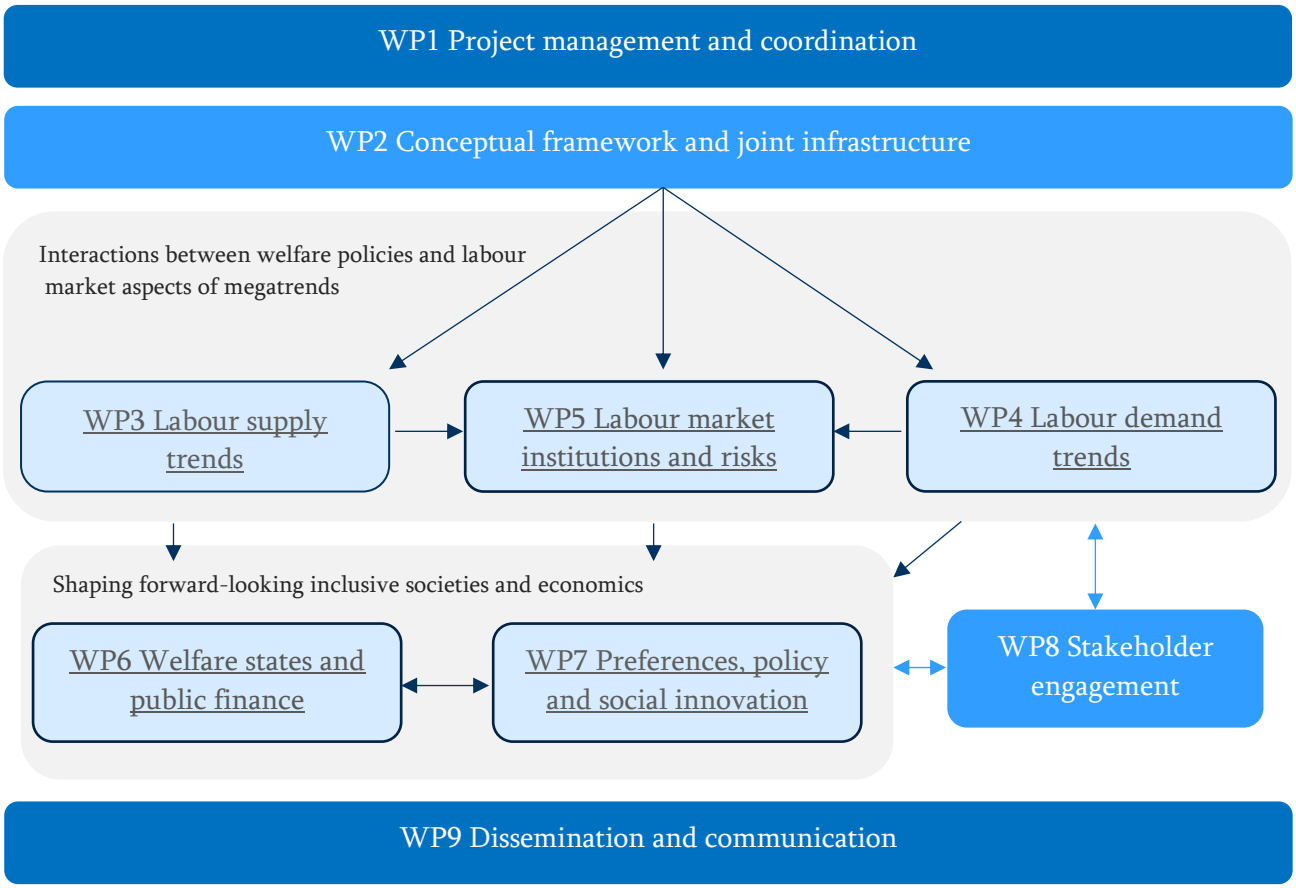
Since WP1, WP9, WP2, and WP8 do not directly relate to the research content, this report on the state-of-the-art will focus on WPs 3 to 7.

The research covered in WPs 3 to 7 can be categorised into two subtopics: WPs 3 to 5 examine the interplay between welfare policies and labour market aspects of megatrends, while WP6 and 7 focus on the

[16] https://ec.europa.eu/european-social-fund-plus/en/competence-centres-social-innovation

creation of inclusive societies and economies with forward-looking perspectives. WP3, which analyses labour supply trends, and WP4, which examines labour demand trends, will provide valuable input for WP5 on labour market institutions and risks. The findings of these three work packages will serve as inputs for WP6, which focuses on welfare states and public finance. Finally, WP 7 will consolidate the information gathered from various research tasks in WPs 3-6, as well as other relevant sources within and outside the project.

Figure 2. The WeLaR's work packages



Note: By clicking on the various work packages presented in Figure 2, readers can easily navigate to the corresponding detailed description of each specific work package. This interactive feature streamlines the reading process and allows readers to access the relevant information with ease.

3.2. Work package 3: Labour supply trends

Back to Figure 2

3.2.1. Description of the main goal

WP3 aims to achieve several objectives related to how megatrends impact the labour market participation, mental health, and overall well-being of individuals. The first objective is to quantify this impact, while the second objective is to zoom in on groups of workers who are particularly vulnerable to these changes. The COVID-19 pandemic has had a significant impact on teleworkers' outcomes, and WP3 aims to draw lessons from this experience as a third objective. The fourth objective is to determine the impact on individuals based on their specific characteristics as employees. Finally, WP3 will evaluate the role of different institutional and policy settings in national labour markets that contribute to the heterogeneous nature of the impact of megatrends. By meeting these objectives, WP3 will generate important insights into the complex interplay between megatrends and the labour market, which can help inform policies and interventions to support individuals' well-being and workforce participation.

3.2.2. Description of the different tasks

Task 3.1

Older workers are less at ease with the use of digital tools and may experience age-related cognitive decline or technology-related barriers that may push them out of the labour market earlier than the retirement age. This task will assess older workers' behaviours on the labour market using data from EU-LFS (2006, 2012), SHARE, EIBIS, IFR, EU-KLEMS and Employment Protection Legislation (EPL) indexes from the OECD. The differences by gender, institutional and policy settings will be highlighted.

More details

Task 3.2

This task deals with the relationship between fertility and labour supply across genders and in different institutional and family policy settings. First, we will do a descriptive analysis of intra-family heterogeneity in parenthood penalty (employment, hours worked, hourly wages and work-life balance) across genders and education groups in different institutional and policy settings, using EU-SILC and HETUS

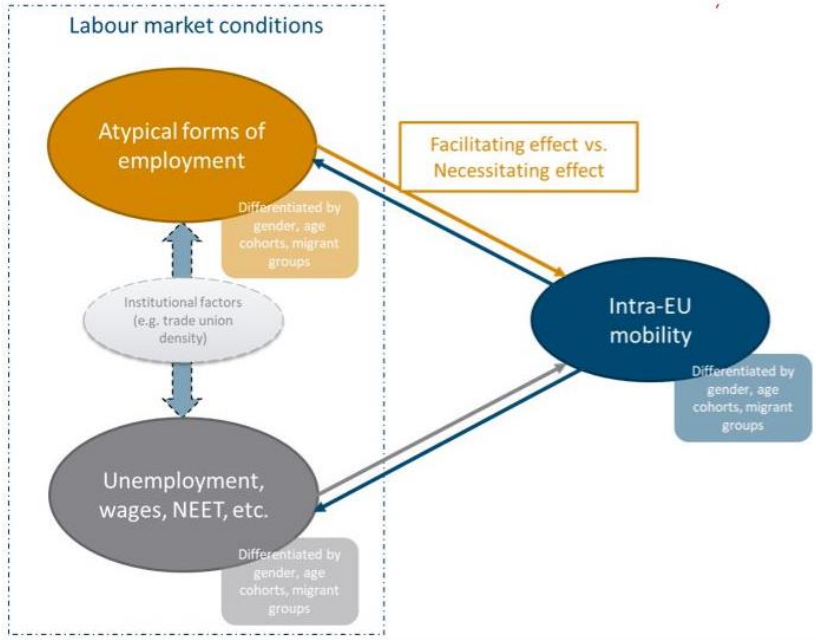
data. Then, we will investigate the causal link between fertility and labour supply using an event-study approach and multi-level regression analysis. This analysis will focus on EU countries for which longitudinal data are available and that cover policy changes (e.g. implementation of new parental leave provision), analysing moderating effects of institutional and policy settings on the extent and asymmetry of child penalty across genders.

More details

Task 3.3

Atypical forms of employment are becoming increasingly prevalent in many EU countries (incl. part-time work, temporary work, fixed-term work, casual work, seasonal work, self-employment, independent work and homework). This task analyses the labour market-specific causes for and consequences of intra-EU-27 mobility in relation to atypical work. It will study whether and how different types of work act as drivers of migration and, conversely, how migration affects the emergence and development of different types of (typical/atypical) employment while controlling for the role of institutional and policy settings. We will use data for the period 2000-2020 obtained from Eurostat, ILO, and OECD.

Figure 3. Overview of Task 3.3



More details

Task 3.4

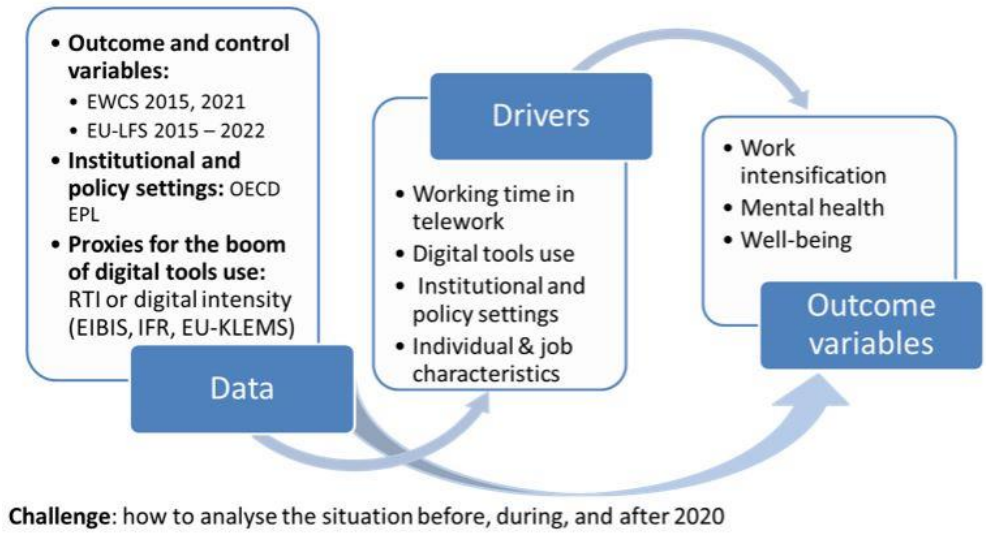
The four megatrends may be a barrier to NEETS - those not in education, employment, or training - transitioning into the labour market, as they are less likely to be graduates and more likely to have low cognitive skills. At the same time, since these young people were born in the digital age, they may be advantaged in the digital labour market. Using OECD (PIAAC) and Eurostat data, we plan to assess whether NEETs are less digitally skilled than their peers are. What are the characteristics of NEETs who are less digitally skilled? We will also explore the role of upskilling programmes targeting this group.

More details

Task 3.5

The COVID-19 pandemic has caused a surge in work from home. We plan to investigate the role played by institutional and policy settings and the boom of digital tools use on the intensification of work from home and teleworkers' mental health and wellbeing before, during, and after 2020. We will use data from EWCS, LFS, IFR, EU-KLEMS, EIBIS, O*NET as well as the Employment Protection Legislation (EPL) indexes from the OECD to capture the impact of institutional settings. We will pay attention to the heterogeneity of the effects depending on demographic characteristics, e.g., gender and age.

Figure 4. Overview of Task 3.5



More details

Task 3.6

This task develops policy recommendations that aim at supporting individuals' labour market participation, mental health and wellbeing in a context of demographic changes, globalisation, digitalisation and a green transition. Building on the WP3 outputs, we will first conduct desk research considering comprehensive overviews of policy responses (e.g. EUOSHA work from home), policy implementation plans and expert reports (e.g. ILO Youth Guarantee). Then, we will create a list of evidence-based policy recommendations derived from all WP3 tasks. Finally, we will discuss the proposed recommendations at a workshop (WP8) to co-create a reliable consensus on these recommendations, and then present them in a policy brief. As this task builds on the other tasks of this WP, we do not present its state-of-the-art

3.2.3. Beyond the state-of-the-art

WP3 of the project involves five tasks, each focusing on different aspects of the labour supply trends. Task 3.1 aims to analyse the implications of digitalisation for older workers' decision to retire in 27 European countries, considering workplace issues, private sphere, health status, and socio-demographic characteristics. The study will use a binary dependent variable of early retirement and several indicators of digitalisation at the sector/firm size/occupation level as independent variables. We will provide (one of) the first analyses assessing in an EU-wide setting, the implication of the use of digital tools for the decision to retire of older workers in 27 European countries. In Task 3.2, a comprehensive study on the relationship between fertility, labour supply, and institutional and family policy settings for EU countries will be conducted, aiming to provide evidence-based discussions to guide policy actions and promote gender equality. Task 3.3 examines how intra-EU mobility patterns are changing and how push and pull factors of mobility, including atypical forms of employment, influence it. This task is one of the first studies that examine how intra-EU mobility is reshaped considering different forms of atypical jobs that are emerging. In Task 3.4, we will provide one of the first studies assessing the proficiency in digital skills among NEETs and young people in general after the COVID-19 pandemic. Task 3.5 will provide (one of) the first analyses assessing in a EU-wide setting, how the work sphere, the private sphere, the institutional, policy settings and cultural country variation and socio-demographic differences relate to teleworkers' working time, mental health and well-being

3.3. Work package 4: Labour demand trends

Back to Figure 2

3.3.1. Description of the main goal

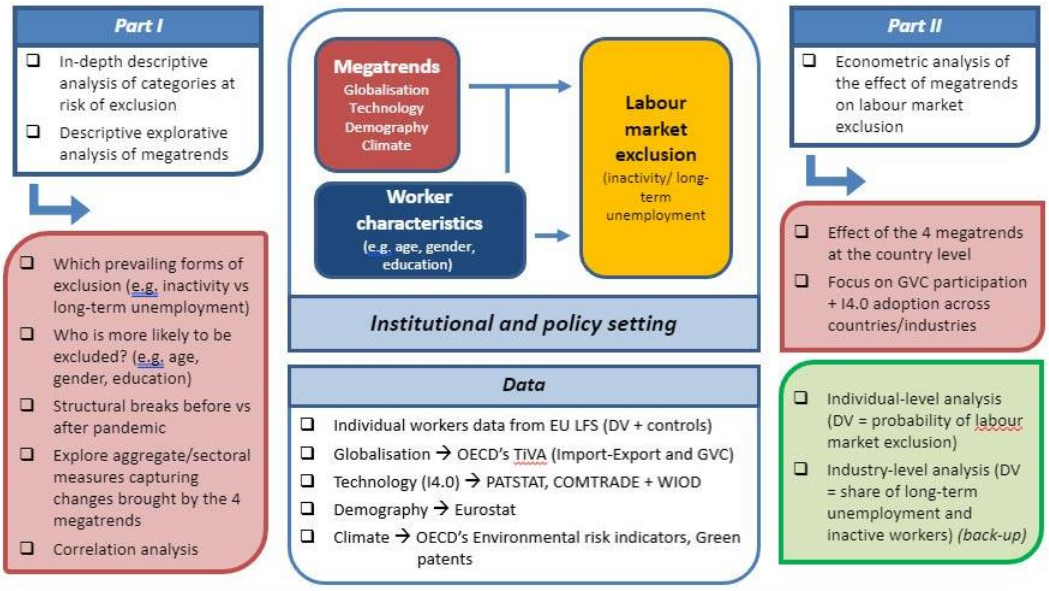
The primary objective of WP4 is to investigate the impact of key megatrends on labour demand and skills for various groups of people. This investigation includes assessing the consequences for welfare state coverage and the resulting challenges for welfare states that arise from the changing exposure to economic and social risks. A second objective is to examine the issues associated with atypical jobs and the challenges they pose to welfare states. Atypical jobs have a higher risk of job displacement due to temporary contracts, and they typically have lower coverage by safety nets such as those provided by platform work or 'bogus' self-employment compared to standard forms of employment. By investigating these objectives, WP4 aims to provide insights into the implications of megatrends on the labour market and welfare state coverage, which can inform policy decisions to address the challenges posed by these changes.

3.3.2. Description of the different tasks

Task 4.1

This task aims at identifying which groups of workers are at higher risks of labour market exclusion due to the megatrends. We will study the link between 'context' variables depicting megatrends and the probability of individuals being employed, unemployed, or out of the labour force. We will use econometric methods aimed at establishing causal relationships with observational data, e.g. IV, Diff-in-Diff, Heckman correction.

Figure 5. Overview of Task 4.1

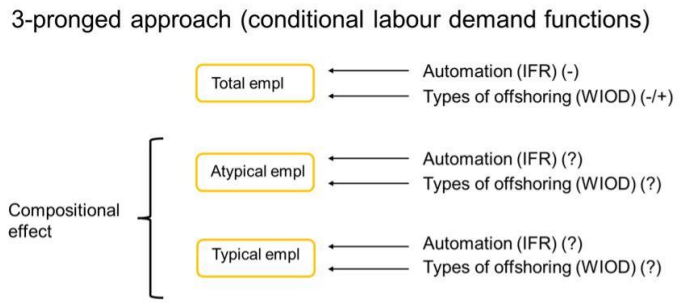


More details

Task 4.2

This task will focus on assessing the role of offshoring and automation for the demand of atypical jobs, in particular those not fully covered by the welfare state provisions. We will estimate conditional labour demand functions and determine the effect of offshoring (inter- and intra-industry, manufacturing vs. services, developed vs. developing country) and automation on labour demand for typical versus atypical jobs (if possible, differentiated by education and gender). We will also study if institutional setting (employment protection, unionisation) attenuates the impact of offshoring and automation.

Figure 6. Overview of Task 4.2



More details

Task 4.3

This task will study the effects of the COVID-19 pandemic and mitigation response on the labour market prospects of various groups of workers, paying particular attention to groups with weaker positions (young workers, female workers, migrants, persons with disabilities) and to precarious forms of work (platform work, temporary agency work, fixed-term jobs, 'bogus' self-employment). We will assess the impact of the COVID-19 crisis on the risk of labour market exclusion and precariousness, making the distinction between short- and medium-term impacts.

More details

Task 4.4

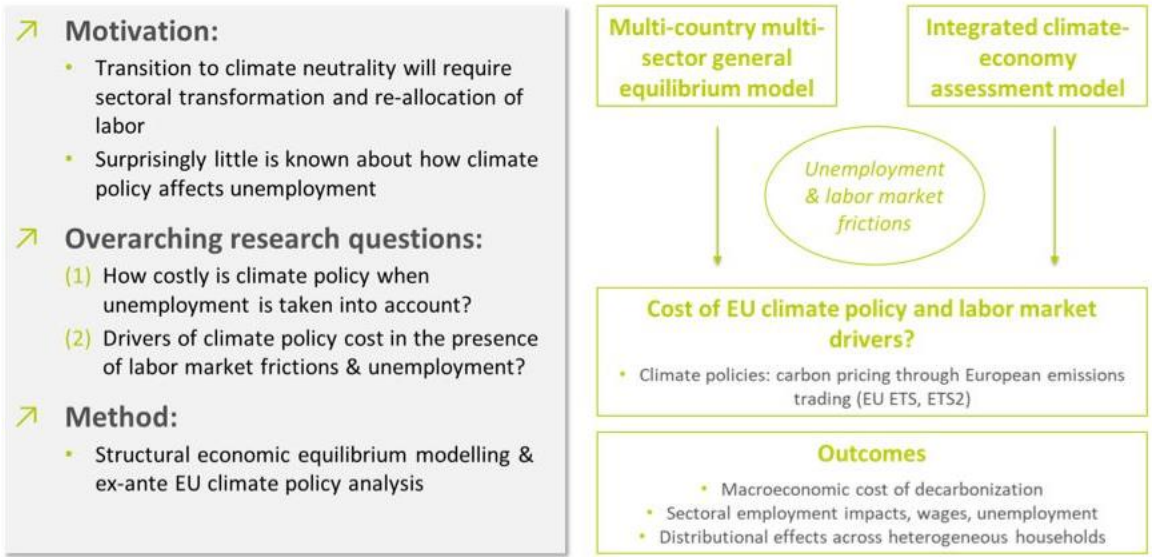
We will study if the unprecedented increase in work from home (WFH) during the COVID-19 pandemic translates into a long-term shift towards WFH, and if it triggers reallocation of labour demand towards remote workers who live in countries with lower taxes and/or social security contributions. We will also assess if countries engage in a race-to-the bottom competition trying to lure WFH jobs with lower taxes and social security contributions and assess risks and potential consequences of such phenomena.

More details

Task 4.5

We will study the employment and inequality effects of climate policy, identifying which countries, regions, and groups of workers will face the strongest labour market shocks associated with the green transition in Europe. We will use a multi-sector Computable General Equilibrium (CGE) model of the European economy (each EU Member State), combined with a micro-simulation model calibrated on EU-HBS and EU-SILC data. We will account for price reactions, income effects, and labour market adjustments (employment, wages). We design scenarios for EU climate policy and will determine their distributional effects across regions, industries, and various types of households (e.g. by income groups).

Figure 7. Overview of Task 4.5



More details

Task 4.6

The need for 'greening' the economy and its production processes, driven notably by climate policies may boost the demand for high-skilled workers. In a context of free worker mobility within the EU, migration of tertiary educated workers likely amplifies local positive externalities (e.g. technological spill overs, higher demand for cleaner environments), while increasing interregional inequality. Some regions will be capable to attract these workers, while others will lose them. This will thus create locally virtuous/vicious circles. We propose a theoretical framework and empirical analyses to explore the impact of climate policy scenarios from Task 4.5 and analyse the implications of migration on interregional income distribution.

More details

Task 4.7

This task delivers policy recommendations based on the findings of WP4, to anticipate and counteract the impact of megatrends on economic and social risks. The task will be carried out by all WP4 partners in three steps. First, additional desk research will be done, starting from comprehensive overviews of policy responses (e.g. ESPN overview on working poor), implementation plans (e.g. European Green Deal) and expert reports (e.g. ILO report precarious work). Second, we will prepare a list of evidence-based policy recommendations. Third, our proposed recommendations are discussed at a dedicated workshop (WP8) to co-create a reliable consensus on these recommendations, which will then be presented in a policy brief. As this task builds on the other tasks of this WP, we do not present its state-of-the-art.

3.3.3. Beyond the state-of-the-art

In Task 4.1, our goal is to gain a better understanding of the effects of international fragmentation of value chain activities and Industry 4.0 technologies on labour demand in different countries and sectors. We plan to achieve this by identifying the specialisation of countries and sectors in different value chain activities using detailed information on cross-border investments. Additionally, we will introduce new measures of the introduction and adoption of Industry 4.0 technologies, relying on an innovative classification of patent information and import data at a very granular product level. Task 4.2 has two main goals. First, we aim to address an important gap in the literature by studying the impact of offshoring and automation on the demand for different types of jobs, including typical and atypical employment. Second, we will pursue a joint analysis of two megatrends to establish their relative importance and identify the mega-

trend with the strongest impact on the demand for typical/atypical employment. In Task 4.3, we will contribute to the literature by comparing the medium-term impact of the COVID-19 pandemic across various socio-demographic groups and all European countries. Unlike existing literature that focuses on the short-term impact of the pandemic, we plan to use a uniform analytical framework to compare labour market effects of the COVID-19 pandemic across all the EU countries. Task 4.4 focuses on providing post-COVID evidence on the migration of professionals who can work remotely. We will also investigate the rise of self-employment and the extent of bogus self-employment among these workers. Our research will assess the role of tax incentives and other incentives provided by governments, taking a European perspective and providing findings for all EU Member States. Task 4.5 aims to answer two main questions: (1) How costly is climate policy when unemployment is taken into account? (2) What determines the cost of climate policy in the presence of unemployment? We will accomplish this by assessing the importance of unemployment for climate policy costs in two of the most prevalent modelling paradigms, a numerical GE model and an integrated assessment model. Additionally, we will provide a systematic analysis of the cost drivers of climate policy with unemployment, examining the roles of key parameters that shape the relationship between unemployment and climate policy costs. Finally, in Task 4.6, we will build a theoretical model and provide numerical simulations to explore the impact of climate policy scenarios on the interregional income distribution in a context where heterogeneous workers can sort across sectors and regions. We will analyse the implications of migration on the interregional income distribution and examine the optimal coordination within the EU given different objectives, such as minimising negative externalities from pollution or minimising income inequalities. Our study will be the first to account for the endogenous sorting of workers across countries when highly educated workers can favour technological spill over effects through adoption of cleaner technologies.

3.4. Work package 5: Labour market institutions and risks

Back to Figure 2

3.4.1. Description of the main goal

WP5 has a specific goal of analysing the impact of megatrends on labour supply and labour demand, specifically in relation to the matching mechanisms and outcomes. This analysis will explore how these mechanisms and outcomes are moderated by institutional and policy settings related to labour and product markets, as well as welfare state systems. Additionally, the WP aims to identify which institutional and policy settings are associated with specific probabilities, including the likelihood of flowing in and out of

various employment statuses, such as employed, unemployed, or out of the labour force. Another area of focus is the likelihood of flowing in and out of low-quality jobs, such as those in the low-wage segment, underemployment, or jobs that are only partially covered by the social security system, such as atypical employment. By exploring these factors, WP5 aims to provide insights into the impact of megatrends on labour markets and how institutional and policy settings can moderate these impacts.

3.4.2. Description of the different tasks

Task 5.1

This task will investigate how labour and product market regulations act as moderators of individual employment effects of megatrends on various labour market segments. As regulation indicators, we will use the OECD product market regulation (PMR) indexes and employment protection legislation (EPL) indexes. Data on individuals will come from EU-LFS and EU-SILC and is used to identify labour market segments. For each subsample of workers identified as vulnerable due to megatrends (e.g. parents, older, youth), the role of the moderating factor (PMR/EPL) will be identified by interacting the regulatory indicator and the context variable describing the megatrends (e.g. technology, globalisation).

Task 5.2

This task will analyse the role of wage bargaining models as moderators of the effects of megatrends on the quality of jobs. As in Task 5.1, the analysis will be carried out by subgroups of workers identified at higher risk and the role of the moderating factor will be identified by means of an interaction term between bargaining models indicators (at country/sector level) and megatrends measures. The task will also deal with how megatrends impact the rent-sharing capacity of employees; this will be done by interacting a rent variable (profit/value added) with the context variables of interests. This analysis will be carried out at the country/sector level (EU-KLEMS), with extensions to the firm level if possible.

Task 5.3

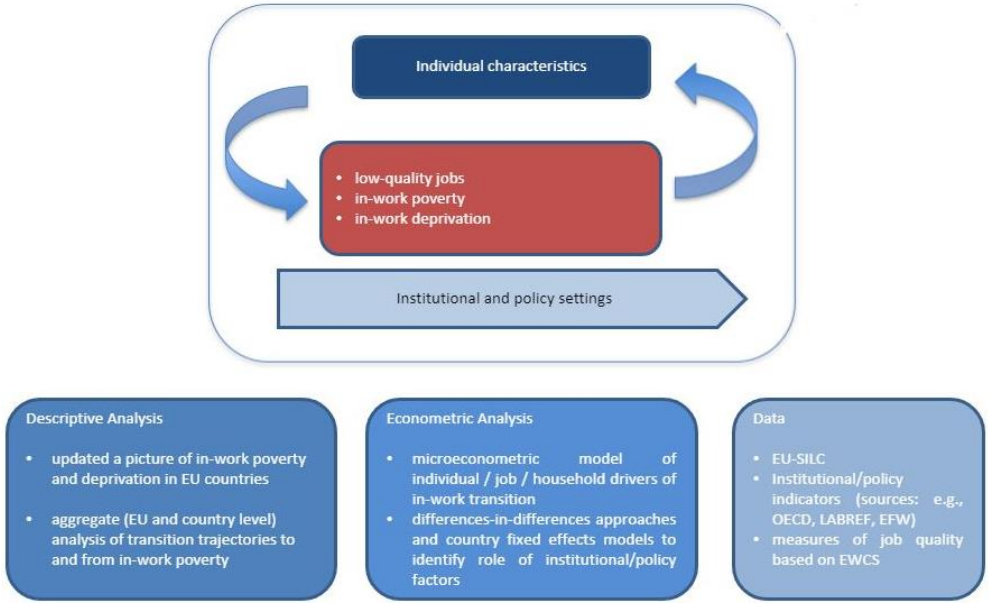
This task will study the effects of unions as moderators of the effects of megatrends on the quality of work. Quality of work (job type: typical/atypical jobs; job quality: skills mismatch) and trade union representation will be captured at the individual level, while the megatrends will be captured at the industry level. Data sourced include EWCS, WIOD, IFR, LFS. As in the previous tasks, the methodological approaches will be based on mixed effect multilevel model with cross-level interaction terms and addressing identification issues as mentioned in previous tasks. Depending on data availability, firm-level analysis will be done, interacting with union representation and firm-level technological variables.

More details

Task 5.4

This task aims to identify which labour market groups, despite participating in employment, are at higher risks of entering into and persisting in low-quality jobs, in-work poverty and in-work deprivation. We will explore the individual and household determinants of flows into and out of poor employment positions and in-work poverty and deprivation and how they are moderated by national institutional and policy settings, which directly or indirectly affect the labour market (e.g. family policies, unemployment benefits, basic income schemes). The analysis, using the same methodology as before, will be comparative (focusing on EU and associate countries), and will be extended to single countries when possible.

Figure 8. Overview of Task 5.4



Task 5.5

This task will study the effects of increased migration on receiving EU labour markets. First, we seek to understand which groups of workers are at risk of job loss or wage reduction due to increased migration. Second, we will identify which migrants are able to transition to gainful employment, and which groups will rely on welfare benefits. We focus on policies governing migration and labour market integration. These questions are studied in the context of refugee migration and working migration in light of EU eastern enlargements. Such labour supply shocks are likely to negatively affect the labour market opportunities of competing natives and 'old migrants', but positively affect those of complementary workers.

Task 5.6

This task such as Tasks 3.6 and 4.7, aims to formulate policy recommendations on labour market matching and institutional 'moderators', such as labour and product market regulations, wage bargaining systems, trade unions and income support policies. This task builds on joint work by the WP5 partners, starting from additional desk research (existing comprehensive overviews of policy responses (e.g. ESPN report rights at work), EU implementation plans and expert reports (e.g. JRC report digitalisation and job quality). These inputs are used to derive evidenced-based policy recommendations, which are then discussed with experts and stakeholders in a workshop (WP8) and presented in a policy brief. As this task builds on the other tasks of this WP, we do not present its state-of-the-art.

3.4.3. Beyond the state-of-the-art

Task 5.1 aims to fill the research gaps by investigating first whether the exposure to automation technologies in the last years (robots and investments in database and software) differently affected (1) employment, (2) unemployment, (3) inactivity and (4) temporary employment rates over different demographic groups and different EU countries. It will also analyse whether and how country level PMR and EPL exert heterogeneous mitigating effects over demographic-country groups. Task 5.2 will focus on how labour wage bargaining models moderate the effects of technological change on job quality and the ability of

workers to benefit from their work. This task will examine how the latest wave of technology development impacts labour demand, especially for atypical jobs, such as part-time and temporary work, and how this trend differs according to the wage bargaining model in each country. The study will also explore how technological change affects rent-sharing between workers and entrepreneurs, and whether wage responsiveness to firm profits or value added is affected by the bargaining model. Task 5.3 aims to provide evidence on how unions moderate the impact of megatrends on labour market outcomes, such as the prevalence of typical/atypical jobs and self-evaluated skills mismatch. The study will focus on the impact of unionisation on labour market outcomes, particularly in a period of declining union membership and density. Task 5.4 will investigate how changes in institutional/policy settings affect the individual dynamics of in-work poverty in EU countries. Unlike the analysis of individual-level factors, this study will focus on policy/institutional drivers at the aggregate (country) level, aiming to spot macrolevel regularities across countries or over time. Task 5.5 aims to provide additional evidence on EU enlargement effects on natives and 'old' migrants in terms of wages and employment, as well as insights on refugee migration into the EU. This study will take into account that labour supply shocks from migration may adversely affect different parts of the wage distribution and provide valuable lessons for future EU extensions, such as Serbia in 2025, and the governance of refugee migration.

3.5. Work package 6: Welfare states and public finance

Back to Figure 2

3.5.1. Description of the main goal

WP6 builds on the results of WPs 3-5 by identifying which megatrends create challenges for the welfare state and public finances. The WP has several objectives, including quantifying how key megatrends affect public finances by examining changes in social security contributions, tax revenue, and social security system coverage, as well as projecting these changes for the future. Another objective is to assess the demand for and necessity of new forms of social security. Additionally, WP6 aims to evaluate the fiscal and distributional effects of welfare state adjustments due to key megatrends, with a focus on increasing coverage of new forms of employment and vulnerable groups. Finally, WP6 aims to provide evidence-based policy recommendations on welfare states, informed by the findings of the previous WPs. Through these objectives, WP6 aims to provide a comprehensive understanding of the impact of megatrends on public finances and social security systems, and how policy adjustments can be made to address the challenges posed by these trends.

3.5.2. Description of the different tasks

Task 6.1

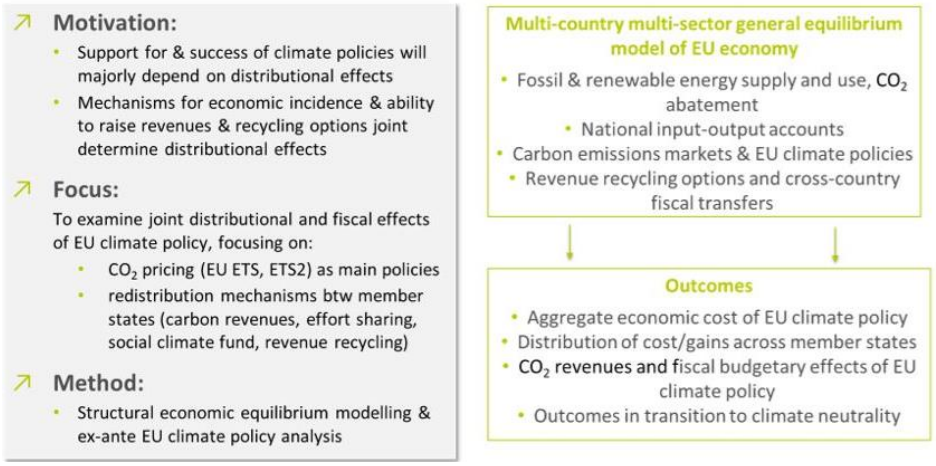
The rise of non-standard work and the increasing mobility of workers across countries challenge the future old age security of workers. This task will study a recent policy (March 2022) designed to facilitate personal and fully portable pension savings in Europe, regardless of country of residence: the pan-European personal pension product (PEPP). PEPP will provide private pension plans, not linked to labour conditions, to all residents in the EU. We will gauge the potential demand for this policy and map which sectors, occupations and countries could benefit more from PEPP. We will also apply experiments in some countries to study the individual willingness to participate in and the attitudes towards the PEPP among standard and atypical workers.

More details

Task 6.2

This task will analyse the interaction of the welfare state and climate policy design through the public budget. Carbon pricing policies create income, technology standards are revenue neutral, and policies involving subsidies need to be refinanced. We use a multi-sector computable general equilibrium of the EU developed under Task 4.6 to study the impacts of climate policies on the public budget. We are particularly interested in the role of income from carbon pricing to counteract unintended distributional consequences of climate policy. For this, we simulate and analyse different revenue recycling schemes including reduction of labour taxes and lumpsum per-capita transfers.

Figure 9. Overview of Task 6.2



More details

Task 6.3

Migration increased strongly within as well as into the EU in the last 20 years. In this task, we plan an analysis on EU and national levels of the fiscal contributions of refugee and working migration since 2000. First, we will look at specific episodes, such as refugees from Balkan wars and Syria/Iraq/Afghanistan as well as EU eastern enlargement. Second, we will identify personal as well as institutional conditions that lead to favourable fiscal balances of migrants by labour market integration. This task will provide new arguments for future discussions on migration e.g. in light of EU enlargements.

More details

Task 6.4

Due to megatrends, some categories of workers are more likely to be working poor and to less protected by social protection systems. This task will therefore study how the income distribution and overall welfare may evolve in different European countries under a range of potential scenarios for the future changes in job structure and policy measures, e.g. universal basic income (UBI). We will use tax-benefit microsimulation models (e.g. EUROMOD) to assess the impact of taxes and transfers scenario as well as new labour demand scenario individually and simultaneously and discuss how much tax and transfer policy would need to be reformed in the face of changes in the structure of jobs.

More details

Task 6.5

This task aims to propose policy recommendations that support public finances and increase the efficiency of the welfare state, by drawing lessons from Tasks 6.1-6.4. We will not focus on single trends and measures, but instead assess trade-offs and synergies between mechanisms that address each of the megatrends: e.g. social security adjustments, and CO_2 prices. This task will involve additional desk research, building on existing overviews of policy responses (e.g. developed by the Social Protection Committee),

implementation plans (e.g. Green Deal, economy that works for people) and expert reports. From this, we develop evidence-based policy recommendations, which are validated in a dedicated workshop (WP8). We aim to reach a consensus on the proposed recommendations, which will be presented in a policy brief. As this task builds on the other tasks of this WP, we do not present its state-of-the-art.

3.5.3. Beyond the state-of-the-art

Task 6.1 aims to assess the willingness of individuals to participate in PEEP (pan-European pension) in relation to the emergence of non-standard jobs. While EC (2018) provides some analysis of social protection participation across non-standard jobs in ten EU countries, it does not consider personal pensions. Task 6.2 will be the first study to use ex-ante policy analysis to examine the fiscal revenues raised under EU carbon pricing and the joint distributional effects across and within EU Member States under alternative revenue recycling options. We will investigate how the level of tax revenues will evolve as policy stringency increases in the transition to carbon neutrality and how this will affect the ability of public policy to offset unintended distributional consequences. In Task 6.3, we aim to improve the Net Fiscal Impact formula by including the opportunity cost of not having an additional worker and expanding the current literature on a cross-country analysis of the fiscal effects of migration. Task 6.4 will investigate how income distribution may evolve in different European countries under a range of potential scenarios for future changes in job structure resulting from automation and digitalisation effects. We will then test the implementation of new tax-transfer policies, including different designs of universal basic income, to determine how taxes and transfer policy parameters should be set to optimise social welfare in different future scenarios for the workforce, and what would be the labour market effects of UBI proposals.

3.6. Work package 7: Preferences, policy and social innovation

Back to Figure 2

3.6.1. Description of the main goal

WP7 is a critical part of the research project that aims to bring together knowledge from different sources and integrate it into a coherent whole. The primary objective of WP7 is to merge the information generated from the various research tasks in WPs 3-6 and other relevant sources, both inside and outside the project.

To achieve this, WP7 has six key goals. Firstly, it aims to synthesise the results of the quantitative and qualitative research conducted in WPs 3-6. Secondly, it will review existing and emerging policy fields

and identify best practices, including social innovation, that can inform policy recommendations. Thirdly, WP7 will assess the preferences for redistribution among the general public and platform workers to understand the perceptions of different groups on welfare and employment policies. Fourthly, WP7 will explore the long-term impacts of megatrends through a scenario-building exercise with stakeholders. This exercise will help understand the potential effects of the megatrends in the future, and how policy measures can be taken to mitigate them. Fifthly, WP7 will formulate and validate policy conclusions and recommendations based on project research.

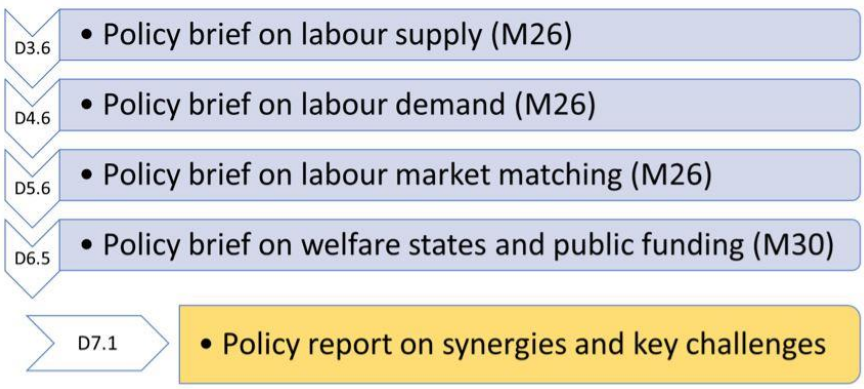
Finally, WP7 will explore and propose relevant areas and opportunities for capacity building. This involves identifying training and educational programs that can help policymakers and stakeholders better understand and address the challenges posed by megatrends. Overall, WP7 plays a crucial role in the research project by bringing together knowledge, generating insights, and proposing policy recommendations to address the challenges of the changing world of work.

3.6.2. Description of the different tasks

Task 7.1

This task will provide a policy report on 'synergies and key challenges', which builds bridges between the policy recommendations proposed under WPs 3-6, and is further completed with a literature review (starting from Task 2.1 and updating its results). The policy report will identify synergies and mutually reinforcing actions and will highlight the diverse challenges and difficulties that may hinder the implementation of potential policies identified in the WPs 3-6 analyses (see Tasks 3.7; 4.6; 5.6 and 6.5). A draft version of this policy report will be discussed during a policy roundtable, organised as part of the second foresight workshop planned in Task 7.5.

Figure 10. Overview of Task 7.1

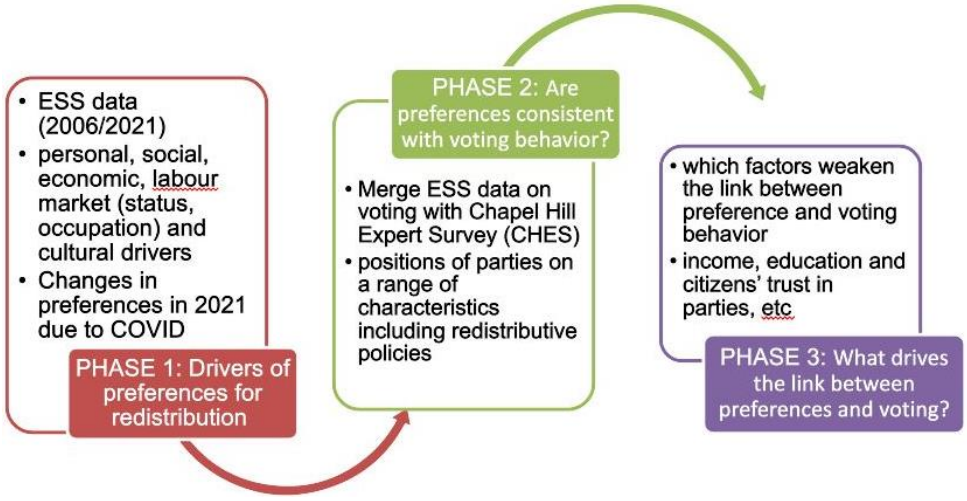


More details

Task 7.2

This task aims at analysing the demand for redistributive policies by European citizens, in order to assess their political sustainability. We will link micro-data from ESS, EVS and WWS data on preferences for redistribution and self-reported voting behaviour of European citizens to the characteristics of the parties as described by the Chapel Hill experts survey. First, we investigate the individual personal, social, economic, labour market (status, occupation) and cultural drivers of preferences for redistribution. Second, we analyse to what extent such preferences are consistent with voting behaviour for parties supporting redistribution and for which the topic is most salient. Finally, we analyse which factors weaken the link between preference and voting behaviour, focusing on income, education and citizens' trust in parties.

Figure 11. Overview of Task 7.2



More details

Task 7.3

Digital technologies contribute to the growth of new forms of work such as platform jobs and gig economy, which are often performed by workers who lack safety nets that cover traditional jobs. We will study which welfare state provisions and which facets of social security are most valued by these workers. To this aim, we will conduct stated-preference (willingness-to-pay) field experiments in four countries with

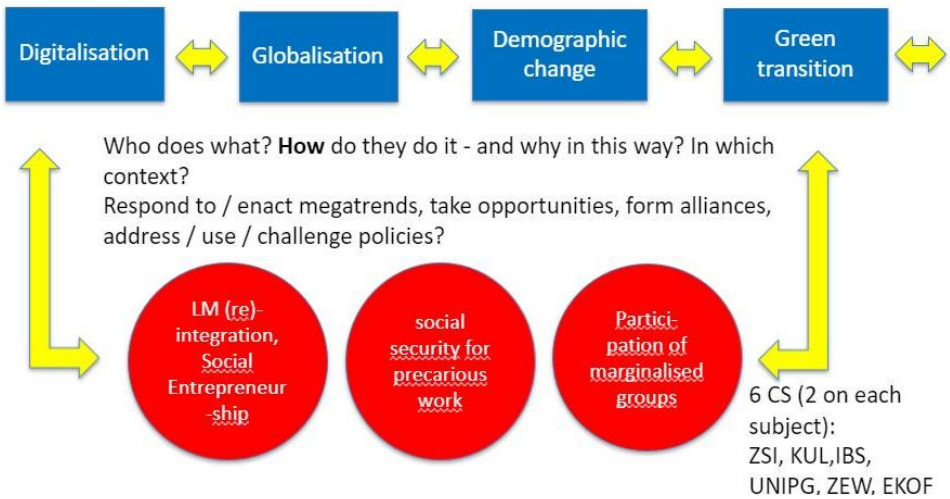
different institutional settings - Poland, Italy, Germany, Belgium - to understand which provisions are the most valued but not available currently.

More details

Task 7.4

Task 7.4 conducts follow-up case studies of documented local or regional social innovations on (1) labour market (re-)integration and social entrepreneurship, (2) social security for atypical and precarious forms of work, (3) interest representation and participation of vulnerable and marginalised groups. Cases are selected to cover different welfare state regimes (Austria, Belgium, Germany, Italy, Poland, Serbia), and conducted through desk research, interviews with 4-6 innovators and stakeholders, and presentations of these initiatives in WeLaR events. Through direct interactions of related social innovation initiatives and a comparative analysis, long-term impacts, prerequisites and obstacles will be revealed. This work complements, validates and also challenges our insights from WPs 3-6 and inspires peer learning.

Figure 12. Overview of Task 7.4



More details

Task 7.5

This task entails a foresight exercise that aims at understanding the long-term implications of the mega-trends on the labour market and welfare states. Building on WPs 2-6, scenarios are developed in co-

creation with experts and stakeholders at two workshops, where we assess the respective weight of drivers and trends and their interrelations, and explore their future economic, social, cultural and ethical implications. Scenarios are validated and amended using Delphi surveys. The results of the first survey round will be discussed during the second workshop and are communicated back to participants, to deepen insights and identify areas of convergence in a second survey round. The final foresight report will present the scenarios, conclusions and recommendations on how to adjust welfare states to foster social and economic resilience and promote inclusive growth. As this task builds on the other WPs, we do not present its state-of-the-art.

3.6.3. Beyond the state-of-the-art

Task 7.1 aims to provide policy recommendations at various levels to adapt welfare systems towards reducing socioeconomic inequalities and poverty, protecting people from hardship, and providing options for atypical workers and the self-employed to transition towards more stable work relationships, while also acting as a catalyst for economic prosperity. In Task 7.2, the focus is on studying the relationship between PFR and income inequality, with a particular emphasis on the 2008 economic crisis and the COVID pandemic period. The aim is to investigate whether and how these economic challenges have affected PFR and its determinants, and whether higher PFR translates into voting behaviour for pro-redistribution parties. The study will also explore if and how fiscal policy reactions during major economic crises impact voting behaviour. Task 7.3 aims to assess which welfare state provisions and facets of social security are most valued by platform workers in European Union Member States. The study will compare findings between different states and assess the country-specific role of the institutional setting, labour market policies, and cultural norms and values.

In Task 7.4, the focus is on studying documented and established social innovations and exploring their development in the context of changing labour market conditions. The study will aim to participate in the process of embedding and networking social innovation in the labour market by involving expert respondents from the case studies in the knowledge exchanges of WeLaR, which is foreseen in WP8. This task recognises the institutional limitation in evaluation and impact assessment, as most social innovation evaluations only cover their assigned time period, while wider impacts tend to materialise over a longer time.

4. The different tasks in detail from WP3 to WP7

Back to the general description of Task 3.1

4.1. Task 3.1: Effects of technological progress on the decision to retire

Task leader: LISER; Contributors: EKOF, KU Leuven

Background/setting

In the context of aging population, there is an increasing need to extend the work time through reforms of the pension system or early retirement and improve the employment participation of higher working age people in order to sustain the pension insurance system and to moderate the potentially adverse effects of demographic change on economic growth.

State-of-the-art

Digitalisation in the workplaces change the way tasks are carried out and may affect the employability of older workers. While several papers focus on the link between early retirement and automation (Casas & Román, 2023), referring to the capacity of the new technology to do tasks previously assumed by humans, there is a lack of the effects on early retirement of digital tools (automatic systems, technological devices, electronic tools and resources that generate, process, or store information) (Komp-Leukkunen, 2022). Some existing studies on this topic highlighted however mixed results. Indeed, while some studies stress that the lack of skills in using digital technologies may lower older workers' employability and lead them to retire earlier (Hudomiet & Willis, 2021), others suggest that digital technologies can help older workers to extent their working lives by reducing the physical job demands and helping them to better manage their health (**Error! Hyperlink reference not valid.**). Considering these mixed results, more research is needed to better understand the early retirement's behaviour of older workers in digitalising workplaces.

Advancement compared to the state-of-the-art

We will provide (one of) the first analyses assessing in an EU-wide setting, the implication of the use of digital tools for the decision to retire of older workers in 27 European countries.

The analysis will be at the individual level, taking into account the workplace issues, the private sphere, the health status as well as the socio-demographic characteristics of older workers.

Our dependent variable is early retirement, taking value 1 when retiring before the statutory retirement age and 0 otherwise when remaining working. The main explicative variables are several indicators of digitalisation at the sector/firm size/occupation level. Other determinants of early retirement will be taken into account, such as institutional and social protection policy settings (Wilson *et al.*, 2020).

We will pay attention to the heterogeneity of the effects depending on demographic characteristics, e.g., gender and age.

Research to be done

For this task, we will use:

- individual survey data collected in, primarily, SHARE, and we will explore if EU-LFS and EWCS data can be useful;
- surveys to capture the intensity of digital tools use across occupations and firms characteristics (business sector and size): primarily EIBIS, and we will explore if IFR, EU-KLEMS data can be useful;
- employment Protection Legislation (EPL) indexes from the OECD, MISSOC, PENSREF to capture the institutional and policy settings, social protection systems.

Methodology

We will use statistical descriptive analysis to describe differences in older workers' employment status across occupations, sectors, and countries.

We will use regression analysis to identify the relationship between older workers' decision to retire and digitalisation in the workplaces, as well as other drivers that comes from work sphere, health status, private sphere.

Data sources

- Data at the employee level:
    - Survey of Health, Ageing and Retirement in Europe (SHARE);
    - European Working Conditions Survey (2015, 2021);
    - EU-Labour Force Survey (2019, 2020, 2021.
- Data at the firm*sector*country level:
    - EIBIS: European Investment Bank Investment Survey;
    - (IFR: International Federation of Robotics);
    - (EU-KLEMS: capital, labour, energy, materials and service data);
- Data at the country level:
    - Employment Protection Legislation (EPL) indexes from the OECD;
    - Mutual Information System on Social Protection (MISSOC);
    - Pension systems in the EU (PENSREF).

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Back to the general description of Task 3.2

4.2. Task 3.2: Fertility, household models and labour supply

Leader: UNIPG, Contributors: wiiw, IBS

Task description

This task deals with the relationship between fertility and labour supply across genders and in different institutional and family policy settings. First, we will do a descriptive analysis of intra-family heterogeneity in parenthood penalty (employment, hours worked, hourly wages and worklife balance) across genders and education groups in different institutional and policy settings, using EU-SILC and HETUS data. Then, we will investigate the causal link between fertility and labour supply using an event-study approach and multi-level regression analysis. This analysis will focus on EU countries for which longitudinal data are available and that cover policy changes (e.g. implementation of new parental leave provision), analysing moderating effects of institutional and policy settings on the extent and asymmetry of child penalty across genders.

Background/setting

Understanding labour supply is a key part of the assessment of labour markets performance and of evaluating policy reforms. Labour supply choices are not made in isolation of other decisions, however; besides strictly economic factors, the events affecting the family structure are of a crucial importance. Particularly, the arrival and rearing of children are deeply interlinked with labour market behaviour. As such interlinks are not symmetric across genders, the interest in these factors extends well beyond the labour market spheres, reaching the domain of gender economic and social inequality. In the EU, the still large and persistent gender imbalances in formal and informal work and the heterogenous (across countries) dynamics of fertility represent key areas of debate and policy intervention. This calls for a comprehensive effort to analyse how fertility shapes labour supply decisions and which policy/institutional settings moderate the link.

State-of-the-art

The effect of fertility on labour supply is among the oldest and most interesting issues in labour economics. This interlink appears especially strong for women, and children are today seen as one of the main drivers of labour market gender inequality (see Juhn & McCue, 2017; Vladisavljević *et al.*, 2023). Numerous studies have explored the link between fertility and labour supply, highlighting that the relationship between the two is complex and depends on a variety of factors. In particular, various methods have been used to address the key challenge that fertility decisions and parents' (especially mothers') labour supply are jointly and simultaneously determined. Examples include twin birth analysis (Aaronson *et al.*, 2021) or event-study approaches (Kleven *et al.*, 2019). The majority of studies suggest that high fertility rates can lead to a decrease in women's labour force participation, especially in countries with inadequate childcare support (e.g., Herbst, 2010). In contrast, family-friendly work policies, such as paid parental leave and flexible working hours, have been shown to support the labour force participation of individuals with children and positively impact fertility rates (Del Boca, 2015). As for the EU context, recent empirical evidence on single countries about fertility and labour supply suggests that there is a negative relationship between fertility and women's labour force participation, particularly those with lower levels of gender equality and a more generous infrastructure of childcare and family policy provision (see Fehr & Ujhelyiova, 2013; Neyer, 2006). In some countries, access to high-quality, affordable childcare has been associated with higher levels of labour force participation among women with children (e.g., Gehringer & Klasen, 2017. Further studies are needed to understand the interplay between changing gender roles, family policies, and labour market outcomes in the presence of children (Blau & Winkler, 2017).

Advancement compared to the state-of-the-art

A comprehensive study on the relationship between fertility and labour supply and of the moderating role of institutional and family policy settings for EU countries is not available. Empirical evidence is so far limited to single EU countries and to specific demographic groups and years. This task aims to fill this research gap and to provide evidence-based discussion able to guide policy actions, also with the aim of promoting gender equality.

Research to be done

The first step of the work will be a descriptive analysis on the association between parenthood and labour market outcomes (employment, hours worked, hourly wages) across genders and education groups in EU countries, using EU-SILC and HETUS data. We will then use individual survey data collected in SES and EU-LFS (and/or EU-SILC and HETUS) to construct a demographic group level database on fertility rates, household composition and labour supply (at the extensive and intensive margin) for the EU countries over the medium-long run. This dataset will constitute the basis to estimate the relationship between fertility and labour supply. Changes over time in institutional and policy indicators will then be used to assess which settings are able to affect the link between fertility and labour supply for different demographic groups and in different household models/structure.

Methodology

The unit of analysis is a demographic group defined by gender, education and age (Doorley *et al.*, 2023). At this cell level we calculate (1) fertility rates, (2) household model/composition indicators (3) labour supply indicators. In the first step, we explain the changes in labour supply due to changes in fertility, assessing the mediating role of household composition/characteristics. In the second step we study the different mediating effect of changes occurred in institutional settings (on the labour market and in terms of family policy settings) on the relationship previously identified.

Data sources

- EU-LFS: European Union Labour Force Survey, EU-SES: European Union Structure of Earnings Survey, EU-SILC: European Union Statistics on Income and Living Conditions, HETUS: Harmonised European Time Use Survey.
- Institutional/policy indicators (sources: e.g., OECD, LABREF, EFW) and/or measures of job quality based on EWCS at the occupational x sectoral x country level (e.g. : job security, unionisation).

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4.3. Task 3.3: Atypical work and intra-EU mobility patterns

Leader: wiiw; Contributors: LISER, UNIPG, KU Leuven

Task description

Atypical forms of employment are becoming increasingly prevalent in many EU countries (incl. part-time work, temporary work, fixed-term work, casual work, seasonal work, self-employment, independent work and homework). This task analyses the labour market specific causes for and consequences of intra EU-27 mobility in relation to atypical work. It will study whether and how different types of work act as drivers of migration and, conversely, how migration affects the emergence and development of different types of (typical/atypical) employment, while controlling for the role of institutional and policy settings. We will use data for the period 2000-2020 obtained from Eurostat, ILO, and OECD.

Background/setting

Since 2010, more and more Europeans find themselves engaged in atypical forms of employment and of a wider variety (Eurofound, 2015). Especially, younger age cohorts, but also older workers, women and migrants are disproportionately represented in atypical forms of employment (Eurofound, 2015; OECD, 2020). Besides, with the COVID-19 pandemic, atypical forms of employment are becoming more frequent thanks to remote work (Eurofound, 2022). The number of cross-border teleworkers is rising rapidly and has reached almost 11% during the pandemic, and expectations are that this form of employment will continue to expand (Hoffman *et al.*, 2022). This atypical form of employment is likely to discourage outward mobility - especially in those EU countries and regions where employment and earning opportunities are less advantageous than in others. While there is a growing body of literature on remote work, atypical forms of employment and the changing world of work, (see, e.g., ILO, 2016; WEF, 2021), very little is known about how these transformations will affect mobility patterns in the EU. In view of this, this study aims at is filling this gap and shedding light on atypical forms of employment and determine how (1) they are affecting different social groups differently (e.g., women, young and older age cohorts, but also migrants) and how (2) intra-EU mobility patterns are changing due to such transformations in the world of work.

State-of-the-art

The literature on atypical forms of employment and intra-EU labour mobility is very scarce, despite the relevance of the topic. One of the very few papers which looks at atypical forms of employment and intra-EU mobility - Monastiriotis and Sakkas (2021) - found quite a diverse picture across EU countries. Specifically, employment flexibility (atypical form of employment) might be negatively associated with outward mobility especially in the southern EU countries, such as Italy, Greece, Spain and Portugal, indicating that effects can be quite diverse depending on the level of flexibility, economic performance and cross-regional adjustments. However, the study mainly focused on flexibility and the response of outward migration to regional unemployment, leaving aside a few other drivers of intra-EU labour mobility, such as earnings gaps and other labour market features.

Advancement compared to the state-of-the-art

Migration and intra-EU labour mobility depend on labour market conditions (such as employment opportunities, wages differences, skills utilisation and returns to education, and other institutional arrangements which affect mobility). Therefore, in this study, we will move the research frontier a step further and examine how intra-EU mobility patterns are changing and how push and pull factors of mobility - not only unemployment - including atypical forms of employment influence it. This will be one of first studies which will look at how intra-EU mobility is re-shaped taking into account different forms of atypical jobs that are emerging (e.g. remote work and freelancing is facilitating the match between potential workers and employers as such avoiding the need to move or being transferred to other locations and countries for many workers). Furthermore, in addition, in this setting, other determinants that capture the impact of institutional arrangements on labour mobility - such as trade unions - will be tested and analysed.

Research to be done

The analysis will examine the mobility patterns and labour market adjustments at pair country level for the EU-27. Methodologically, a panel Vector-Autoregression (pVAR) model of push and pull factor of mobility for different forms of atypical forms of employment will be analysed. Mobility and labour market adjustment will be jointly determined through a set of simultaneous equations where each of the variables is assumed to be endogenous and dependent on each other. Depending on data availability, we aim to identify different migrant groups such as permanent, short term or young age cohorts, men, and women and determine how labour market conditions and different employment opportunities affects their mobility patterns in the EU.

Methodology

We will use descriptive analysis to identify and present the most frequent forms of atypical employment and trends over the 2000-2021 period, or the latest year available.

We will test econometrically the drivers of mobility and how atypical forms of employment affect migration.

We will run different specifications to examine the effects for different social groups, differentiating by age, gender, and migration background, if the data will allow.

Data sources

The pVAR approach requires a long-term series and the purpose here is to cover the period 2000-2020. The matrix of intra EU-27 mobility (pair country level net mobility) can be attained from Eurostat. This data series allow distinguishing by gender and different age groups. Also, different labour market indicators, such as activity rate, atypical employment shares are attained from Eurostat. Other labour market indicators such as wages, unemployment rates, statistics on young people neither in employment nor in education or training (NEETS), but also labour underutilisation rates by age and gender can be attained from Eurostat and ILO, while trade union density can be attained from the OECD. A database about teleworking, with information in part about individuals with migration background made available by European Centre for the Development of Vocational Training (CEDEFOP), will allow to analyse the effects of remote work for different social groups including migrants.

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4.4. Task 3.4: NEETs in the digital age

Leader: IBS; Contributors: LISER, EKOF, ZSI

Task description

The four megatrends may be a barrier to NEETS - those not in education, employment, or training - transitioning into the labour market, as they are less likely to be graduates and more likely to have low cognitive skills. At the same time, since these young people were born in the digital age, they may be advantaged in the digital labour market. Using OECD (PIAAC) and Eurostat data, we plan to assess whether NEETs are less digitally skilled than their peers are. What are the characteristics of NEETs who are less digitally skilled? We will also explore the role of upskilling programmes targeting this group.

Background/setting

The four megatrends may be a barrier to NEETS - those not in education, employment, or training - transitioning into the labour market, as they are less likely to be graduates and more likely to have low cognitive skills. At the same time, since these young people were born in the digital age, they may be advantaged in the digital labour market.

State-of-the-art

Digitalisation assists many work processes and increases labour productivity (Bloom *et al.*, 2014). Still, vulnerable populations like the NEETs might be unable to keep pace with it and may face labour market exclusion. Data from the OECD countries show that young people with low skills are four times more prone to becoming NEETs than their highly skilled peers (OECD, 2016). Nevertheless, the green transition can create new job opportunities (Markandya *et al.*, 2016). NEETs are an economically and socially vulnerable population. Assisting them was of the objectives of the Youth Guarantee and is the objective of the Bridge to Jobs - Reinforcing the Youth Guarantee programme (Council of the European Union, 2020). However, the COVID-19 crisis turned many people into NEETs (European Commission, 2021) and affected the labour market situation of the age cohort of 25-29 year-olds whose labour market entry was already harmed by the aftermath of the financial crisis (Koller *et al.*, 2022). NEETs are a heterogeneous and evolving population (Eurofound, 2016). The extent to which they manage to improve their situation, become trapped, or excluded from the labour market is largely unknown.

Advancement compared to the state-of-the-art

We will provide one of the first studies assessing the proficiency in digital skills among NEETs and young people in general after the COVID-19 pandemic.

Research to be done

For this task, we will use individual data from the latest surveys collected by Eurostat (LFS - ad hoc module on Job skills) and OECD (PIAAC). Both surveys were collected in 2022, and the datasets will be available in 2023 and 2024, respectively. They provide information on proficiency in literacy, numeracy, problem-solving, and digital skills. They also gather data on how people use their skills at home, at work and in the wider community. Using this survey, we plan to assess whether NEETs are less digitally skilled than their peers. What are the characteristics of NEETs who are less digitally skilled? We will also explore the role of upskilling programmes targeting this group to see which policies help them master skills to reduce the risk of becoming NEET. Thanks to the latest versions of the surveys, we will be able to take into account the effect of the COVID-19 pandemic.

Methodology

- We will use statistical descriptive analysis to identify proficiency in digital skills among NEETs.
- We will use regression analysis to identify the characteristics of less digitally skilled NEETs. We will take into account heterogeneity by various NEET subgroups.

Data sources

- Eurostat: Labour Force Survey – ad hoc module on Job skills.
- OECD: Programme for the International Assessment of Adult Competencies (PIAAC).

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4.5. Task 3.5: Consequences of the expansion of work from home and digital tools use on teleworkers' work intensification, mental health and wellbeing

Task leader: LISER; Contributor: IBS

Task description

The COVID-19 pandemic has caused a surge in work from home. We plan to investigate the role played by institutional and policy settings and the boom of digital tools use on the intensification of work from home and teleworkers' mental health and wellbeing before, during, and after 2020. We will use data from EWCS, LFS, IFR, EU-KLEMS, EIBIS, O*NET as well as the Employment Protection Legislation (EPL) indexes from the OECD to capture the impact of institutional settings. We will pay attention to the heterogeneity of the effects depending on demographic characteristics, e.g., gender and age.

Background/setting

The COVID-19 pandemic has led to widespread experimentation with telework. Adrjan *et al.* (2021) and Aksoy *et al.* (2022) underline that telework has become a popular choice among employees and companies. While employees have shown a preference for this work arrangement, and companies are ramping up their telework offerings, the impact of telework on employees' working time, mental health and well-being remain a topic of debate in the literature.

State-of-the-art

Most of the existing evidence on the effects of telework on employees' work intensification, mental health and well-being was conducted during the pre-pandemic or pandemic periods, with limited post-pandemic evidence available.

Literature on the impact of telework on mental health or well-being has produced mixed results. Some studies underline that several moderators help to explain this heterogeneity. Ferrara *et al.* (2022), Lunde *et al.* (2022), Oakman *et al.* (2020) meta-analyses highlight that both the work and private spheres influence teleworker's mental health and well-being. For instance, in the work sphere, less time pressure, fewer meetings, better participation in decision-making, and greater autonomy (Maruyama *et al.*, 2009; Rubin *et al.*, 2020; Sardeshmukh *et al.*, 2012; Vander Elst *et al.*, 2017) improve teleworker's mental health and well-being. A reasonable used of digital tools during worktime and after regular work hours that prevents information overload appears necessary for teleworkers to feel well (Martin, Hauret, *et al.*, 2022; Martin, Pénard, *et al.*, 2022). In the private sphere, a reduced commuting time and a good work-life balance is necessary in promoting positive mental health and well-being (Barrero *et al.*, 2021; Bertoni *et al.*, 2021; Deole *et al.*, 2023). The national context, as for example the pandemic control rules, also influences teleworkers' mental health (Bertoni *et al.*, 2021).

Regarding teleworkers' work intensification generally measured via the number of hours worked, no consensus emerges. Some authors indeed, conclude that, on average, employees work the same number of hours while teleworking or on site, while other find a decrease or an increase when at home (Giménez-Nadal & Velilla, 2020; Kifor *et al.*, 2021; Pabilonia & Vernon, 2022).

Differences between gender, age groups and teleworkers with or without children are underlined (Bertoni *et al.*, 2021; Deole *et al.*, 2023; Martin, Hauret, *et al.*, 2022). Differences between countries due to institutional and policy settings as well as cultural factors may appear as it influences the level of autonomy in the workplace and the opportunity to telework for each occupation due to differences in the trust and delegating authority of employers and managers (Milasi *et al.*, 2020).

Advancement compared to the state-of-the-art

We will provide (one of) the first analyses assessing in an EU-wide setting, how the work sphere, the private sphere, the institutional, policy settings and cultural country variation and socio-demographic differences relate to teleworkers' working time, mental health and well-being remain a topic of debate in the literature.

Our analysis will be among the first to evaluate, on a European-wide scale, the relationship, before, during, and after 2020, between teleworkers' working time, mental health, and well-being, and drivers coming from both the work environment and the private environment as well as country and socio-demographic differences. The role played by institutional and policy settings and the boom of digital tools use will be

central in our analyses. We will pay attention to the heterogeneity of the effects depending on demographic characteristics, e.g., gender and age.

Research to be done

For this task, we will use individual survey data collected in EWCS, LFS complemented by IFR, EU-KLEMS, EIBIS, O*NET to capture the intensity of digital tools use across occupations and firms characteristics (business sector and size). We will use Employment Protection Legislation (EPL) indexes from the OECD to capture the institutional and policy settings.

Methodology

We will use statistical descriptive analysis to describe differences in teleworkers' work intensification, mental health and well-being across occupations, sectors, and countries.

We will use regression analysis to identify the relationship between teleworkers' work intensification, mental health and well-being and drivers that comes from the work sphere, the private sphere, country and socio-demographic differences.

Data sources

- Data at the employee level:
  - European Working Conditions Survey (2015, 2021);
  - Labour Force Survey (2019, 2020, 2021).
- Data at the occupational level:
  - O*NET: Occupational Information Network.
- Data at the firm*sector*country level:
  - EIBIS: European Investment Bank Investment Survey;
  - IFR: International Federation of Robotics;
  - EU-KLEMS: capital, labour, energy, materials and service data.
- Data at the country level:
  - Employment Protection Legislation (EPL) indexes from the OECD.

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4.6. Task 4.1: Demand megatrends and risks of labour market exclusion

Leader: UNIPG; Contributor: ZEW

Background/setting

The European working population is undergoing structural and compositional changes hitting across different demographic groups, i.e. from younger to elder workers, across gender and between workers possessing different educational attainment. These changes have been exacerbated by various megatrends. First, technological change, with special reference to the diffusion of automation, artificial intelligence and, in general, advanced manufacturing technologies of the Industry 4.0 (I4.0)

pushed through by the advent of the fourth industrial revolution (4IR) have fostered a renewed interest in the effect of technological transformations on the labour market. Second, trends in globalisation, with the emergence of Global Value Chains (GVCs) in late 80s - and the resulting international division of labour across value chain activities - have profoundly changed the structure and concentration of trade, related productive tasks, hence labour. Third, the challenges introduces by climate change and the recent commitment to shift towards a green economy and the revived ambition to reduce greenhouse gas emis-

sions - signalled for example by the European Green Deal and the Inflation Reduction Act - are pushing through further structural changes across economies, ranging from subsidies to the development of green technologies to investments in the production of clean energy, which can have significant effect on the labour market. Fourth, changes in the long-run demographic trends characterising EU economies (e.g. aging, mobility, immigration, etc.) may play a role in either directly affect employment dynamics or indirectly boost or slow down the effects of other megatrends.

All these changes are creating winner and losers, and creating the condition for a rising number of workers to face the risk of labour market exclusion - i.e. those not in employment, education and training (NEETs) or, more generally, those facing long term unemployment, periods of inactivity, temporary employment. Thus, further contributing to increasing inequality.

State-of-the-art

The exclusion phenomenon has increasingly gathered attention given the profound implications that a worker's exclusion from the labour market has from an economic point of view - first and foremost, a higher risk of facing poverty - and, more generally, from a social and psychological perspective, being associated with self-worth issues, vulnerability, poor motivation or scarce social links (Fang & Gunderson, 2015). Furthermore, labour market exclusion becomes prominent in times of rising inequality (Fortin *et al.*, 2012), this being exacerbated by overall demographic changes, and structural shifts in the labour market, such as the emergence of skill mismatch.

Vulnerable workers at risk of poverty, labour market exclusion and/or limited participation may lack the skills and education to suit effectively in the new digital, green, and ever global economy. Indeed, returns to education remain high and the shortcomings associated with dropping out of school are substantial (Gunderson & Oreopoulos, 2010). Specifically, NEET individuals are one of the categories more exposed to such risk - being a heterogeneous group (Eurofound, 2016), but including many young people (Chung *et al.*, 2012) - although the recent COVID-19 pandemic has resulted in an enlargement of the NEET category well beyond youths (European Commission, 2021).

Beyond this, vulnerable workers may be permanently and involuntarily trapped in low-quality jobs, often involving non-standard employment, preventing them from finding higher-quality jobs (Fang & Gunderson, 2015; Jackson, 2004). While these aspects of labour market exclusion are important per se, the intersection of these dimensions with major changes brought by the four megatrends discussed earlier remains under investigated.

Looking at the four megatrends under investigation, a wide empirical literature investigates the relationship between technological change and employment at different levels of aggregation (i.e. individual, firm, industry, and country level), using different sources of information to proxy technological progress (i.e. survey data, R&D or investment expenditures, patent and/or import data). More recently, a stream of this literature has focused on the diffusion (looking at either the production, the adoption or both) of specific capital-embodied innovations such as ICT, automation processes, and other I4.0 technologies. The empirical evidence is inconclusive when looking at the effect on total employment, while results are quite robust in showing a labour market polarisation effect of these technologies (Autor *et al.*, 2013; Michaels *et al.*, 2014; Dauth *et al.* 2021; Graetz & Michaels 2018; Acemoglu & Restrepo 2020; Felice *et al.*, 2022; Mann & Püttmann, 2021). In turn, the skill-biased technological change triggered by these new digital technologies may contribute to further reinforce the mechanism behind the exclusion from the labour market of individuals not endowed with the right competencies and not able to keep up with the underlying adjustment processes.

At the same time, in a world that has become more and more integrated, witnessing the upsurge of different types of supply chain trade - mostly, but not only, importing-to-produce, importing-to-export and value-added trade (Baldwin & Lopez-Gonzalez, 2015) - the role of advanced economies in the production of ever more 'global' goods has drastically changed. With that, the relative composition of employment in both advanced and developing countries, for instance, by potentially triggering an upskilling of the labour force - and a shift towards higher value-adding production - in advanced economies (e.g. Grossman & Rossi-Hansberg, 2008). The empirical evidence seems to suggest that more advanced countries participating in GVCs do not experience a reduction in overall employment levels and become more high-skill oriented, while finding on developing economies are mixed (e.g. Ma *et al.*, 2019; Banga, 2016). Thus, labour market polarisation effects seem to emerge (Crinò, 2012). Furthermore, traditional statistics may not reveal the full extent of global linkages (e.g. consumption of goods and labour demand, backward-forward industrial interdependencies) and how they relate to employment (Horvát *et al.*, 2020), thus calling for further analysis on how such dynamics may affect the labour market exclusion of more vulnerable groups.

Finally, more vulnerable individuals - already exposed to the above-mentioned megatrends - are also likely to further suffer from a higher risk of exclusion resulting from demographic changes. For instance, empirical evidence suggests that an aging population trend, like that observed in more advanced European economies, is likely to induced further automation (Acemoglu & Restrepo, 2022). Similarly, exogenous shocks hitting the European labour market such as immigration - and, to a lesser extent, mobility within

and across countries - is likely to lower chances of future employability for inactive or unemployed individuals, exacerbating their risk of exclusion from the labour market. Yet, such mechanisms may be conditional to the motives behind international migration (Dustmann *et al.*, 2017) as well as policy responses, thus far from being clear and left for empirical assessment.

One potential 'compensation' mechanism could lie in the economic boost associated with the green transition, and the related potential for job creation (Markandya *et al.*, 2016). The large effort required to reduce the environmental impact of economic activities (e.g. emissions of CO_2 and other greenhouse gasses) has recently gathered attention, especially in the aftermath of the COVID-19 pandemic and the related EU recovery plan, i.e. the European Green Deal (European Commission, 2023). This huge commitment of economic resources is expected to contribute positively to European labour markets thanks to large investments in energy, transport and mobility infrastructures, potentially creating new opportunities also for those individuals more exposed to other structural shifts.

Advancement compared to the state-of-the-art

We will provide a novel and nuanced understanding of the effect of the megatrends on labour market exclusion across countries and sectors. Key advancement on the state of the art will be:

1. the joint effect of megatrends ranging from technology, globalisation, demographic changes and climate change on the categories of workers featuring the higher risk of labour market exclusion;
2. the identification of the effect of specialisation of countries and sectors in global value chain activities on labour market exclusion of different categories of workers;
3. the introduction new measures of introduction and adoption of Industry 4.0 technologies, relying on an innovative classification of patent information and import data at a very granular product level.

Research to be done

We will estimate the probability of labour market exclusion for different categories of workers at risk, by investigating *long term unemployment* and *inactivity* by gender, age and education as a function of proxies of megatrends, including globalisation (as measured by trade and GVC participation) technology, (as measured by innovation and adoption of I4.0 technologies), demographic changes (as measured by long run changes in the age composition of the workforce) and climate change (as measured by environmental risk indicators).

Methodology

We will produce in-depth descriptive analysis of the evolution of megatrends and their correlation with long term unemployment and inactivity.

We will employ regression analysis to estimate the probability of labour market exclusion. Ideally, we will try and exploit individual level information from the EU Labour Force Survey as a function of country-sector proxies of megatrends. This would allow to control for a range of worker-level characteristics. Alternatively, we will utilise information on the share of long-term unemployment and inactive workers (for different categories of workers at risk) at the country-sector.

Data sources

- Dependent variables:
  - EU LFS data on long-term unemployment and inactive workers.
- Independent variables:
  - patent data (automation and green technologies) from PATSTAT and OECD's Regpat;
  - international trade data from COMTRADE;
  - cross-country/cross-sector trade in intermediates data from WIOD;
  - trade in Value Added data from OECD's TIVA;
  - employment, labour costs, gross output, R&D and other country-sector variables data from OECD STAN and EU KLEMS;
  - OECD's Environmental risk indicators.

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4.7. Task 4.2: Offshoring and automation and their impact on the demand for typical and atypical jobs

Leader: wiiw; Contributors: IBS, UNIPG

Task description

This task will focus on assessing the role of offshoring and automation for the demand of atypical jobs, in particular those not fully covered by the welfare state provisions. We will estimate conditional labour demand functions and determine the effect of offshoring (inter- and intra-industry, manufacturing vs. services, developed vs. developing country) and automation on labour demand for typical versus atypical jobs (if possible, differentiated by education and gender). We will also study if institutional setting (employment protection, unionisation) attenuates the impact of offshoring and automation.

Background/setting

In many parts of the world - particularly in many industrialised countries - atypical, non-standard forms of employment (i.e. temporary employment, marginal employment, part-time employment, temporary agency work or any other form of multi-party employment relationship, bogus or dependent self-employment) have proliferated in sectors and occupations where they did not previously exist (ILO, 2016). The reasons for this proliferation are multifaceted and vary substantially across countries. The expansion of

global supply chains and the internationalisation of the world's production system or the advent and diffusion of new technologies are among the key reasons for this proliferation. The need/call for employment flexibilisation is seen as a key driving force.

State-of-the-art

A rich strand of literature looks at the labour market effects of globalisation or technical change (including digitalisation and automation) (see, e.g., Crinò, 2012; Hijzen & Swaim, 2007; Ornaghi *et al.*, 2017; Autor & Salomons, 2018; Carbonero *et al.*, 2020) but focuses on total employment (or further differentiates by level of education or type of occupation to tease out which type of workers/occupations are affected the most) while the type/quality of employment has received little attention so far. Some notable exceptions either look at the risk of automation or offshorability - such as Nedelkoska and Quintini (2018) or Malo and Cueto (2019) - or provide direct estimates of the relationship between non-standard types of work and exposure to trade and automation - such as Rutledge *et al.* (2019).

As concerns the former, Nedelkoska and Quintini (2018) compare the median risk of automation by contract type and show that temporary agency contracts and training contracts have the highest risk of automation while open-ended contracts, similar to fixed-term contracts, show the lowest risk of automation. Relatedly, Malo and Cueto (2019) focus on the Spanish labour market and show that while the offshorability risk is higher among workers in standard employment, automation risk is unrelated to non-standard work arrangements.

Concerning the latter, Rutledge *et al.* (2019) examine for the US over the period 1998-2012 whether workers in areas more exposed to trade and automation are more likely to be in non-traditional arrangements, or transition from traditional to non-traditional work. Their findings suggest that globalisation does not have a major effect, while automation does: a 1-standard deviation increase in the use of industrial robots is associated with an 11% increase in non-traditional employment.

Advancement compared to the state-of-the-art

The novelty of the task is twofold: (1) it studies the impact of offshoring and automation for the demand for different types of jobs: typical and atypical employment. It therefore addresses an important gap in the literature; (2) it pursues a *joint* analysis of two megatrends which helps to establish their relative importance and to identify the megatrend with the relative strongest impact on the demand for typical/atypical employment

Research to be done

The analysis will be conducted at the detailed 2-digit industry-level. In view of the limited coverage of robotisation beyond manufacturing, the analysis will focus on the manufacturing sector only. Unconditional and conditional labour demand functions will be calculated which help to establish the total effect of offshoring and automation, as well as the underlying substitution and scale effects, on the demand for total employment, typical as well as atypical employment, differentiated by education and gender. In this context, the role of the institutional setting (employment protection, unionisation) as moderator will also be addressed.

Methodology

Descriptive analysis of how the demand for typical/atypical jobs has changed over time, by country and industry; similar analysis for offshoring and automation

Econometric analysis of the role played by offshoring (narrow/broad, manufacturing, from developed/ developing countries) and automation (robotisation) for the demand of typical and atypical jobs; methodological approach: unconditional and conditional labour demand functions (OLS & SUR); IV estimates to address endogeneity issues

Data sources

- EU-SILC: from selected NSOs (AT, BE, FR, ES, etc.) which is available at the more detailed NACE-level (while the one available at Eurostat is too crude, particularly when it comes to the manufacturing sector); indicators to be extracted: typical/atypical employment, wages.
- EU-KLEMS: output, capital stock, intermediate input prices.
- WIOD: World Input Output Dataset – to calculate different offshoring measures.
- IFR: Robots data from the International Federation of Robotics – for the robot density indicator.
- EU-LFS: Labour Force Survey – complementary.

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4.8. Task 4.3: The heterogenous impact of the COVID-19 crisis on labour market outcomes in the EU

Leader: IBS; Contributors: EKOF, KU Leuven

Task description

This task will study the effects of the COVID-19 pandemic and mitigation response on the labour market prospects of various groups of workers, paying particular attention to groups with weaker positions (young workers, female workers, migrants, persons with disabilities) and to precarious forms of work (platform work, temporary agency work, fixed-term jobs, 'bogus' self-employment). We will assess the impact of the COVID-19 crisis on the risk of labour market exclusion and precariousness, making the distinction between short- and medium-term impacts.

Background/setting

The outburst of the COVID-19 pandemic in February 2020 forced many countries across Europe and the entire OECD area to introduce containment measures limiting the spread of the Sars-Cov-2 virus. These included social distancing and the closing down of many spheres of social life, which impacted the economic performance of numerous industry sectors. While the services deemed 'essential' to the functioning

of societies continued their operations, even at a higher rate than prior to the pandemic, other sectors saw their activities significantly curtailed or shut down. Services sectors, such as accommodation & food service activities, arts & entertainment or wholesale & retail trade, were amongst the hardest hit by country-wide lockdowns. The accommodation and food services sector experienced the highest loss of hours worked, which fell by 50% during the first wave of the pandemic (OECD, 2021). The unemployment rate in the EU returned to the pre-pandemic levels by mid-2021. However, labour market situation varies by country, and aggregate numbers may mask heterogeneities relevant from the social policy perspective.

State-of-the-art

The impact of the COVID-19 crisis on unemployment has already been studied in a number of papers (Gallant *et al.*, 2020; Gros & Ounnas, 2021; Hall & Kudlyak, 2022; OECD, 2021;), including the heterogenous impact on different demographic groups (Bluedorn *et al.*, 2023; Lee *et al.*, 2021) and on persons with disabilities (Ameri *et al.*, 2022; Bryan *et al.*, 2022; Emerson *et al.*, 2021; Jones, 2022; Wong *et al.*, 2022). However, most of the research has been focused on the US and the UK. There is also evidence of the limited impact of the COVID-19 pandemic on the employment opportunities for labour market entrants in the Netherlands (Bussink *et al.*, 2022) and Mexico (Osuna-Gomez, 2023).

A related strand of the literature analyses the impact on reallocations in labour market (Aaronson *et al.*, 2021; Blanas & Oikonomou, 2023; Carrillo-Tudela *et al.* 2023; Consolo & Petroulakis, 2022; Pizzinelli & Shibata, 2023) including also the impact on the exit from the labour force (Gregory, 2022; Forsythe *et al.*, 2022). Again, the evidence comes from the US and the UK, rather than from the EU Member States. It points to a minor role of occupational and sectoral mobility in explaining labour market patterns.

Advancement compared to the state-of-the-art

The proposed research will contribute to the literature by comparing the medium-term impact of the COVID-19 pandemic across various socio-demographic groups and across all European countries. Existing literature focuses on the short-term impact of the pandemic. Furthermore, there is a scarcity of studies that would use a uniform analytical framework to compare labour market effects of the COVID-19 pandemic across all the EU countries.

Research to be done

For this task, we will use individual survey data collected in the EU-LFS and the EU-SILC. We will analyse how the COVID-19 pandemic changed the risks of unemployment, long-term unemployment, and inactivity for the following socio-demographic groups in all EU countries:

- people younger than 30 with and without tertiary education;
- women with and without tertiary education;
- persons with disabilities.

We will also analyse the impact of the COVID-19 pandemic on the use of precarious employment contracts.

Methodology

We will use statistical descriptive analysis to examine the trends in labour market activity of various socio-demographic groups in all the EU countries.

We will use regression analysis to investigate whether the COVID-19 pandemic altered the risks of unemployment/long-term unemployment/inactivity of various socio-demographic groups in the EU countries.

Data sources

- EU-LFS: European Union Labour Force Survey.
- EU-SILC: European Survey of Income and Living Conditions.

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4.9. Task 4.4: The COVID-19 pandemic, work from home, 'bogus' self-employment, and tax competition in the EU

Leader: IBS; Contributor: LISER

Task description

We will study if the unprecedented increase in work from home (WFH) during the COVID-19 pandemic translates into a long-term shift towards WFH, and if it triggers reallocation of labour demand towards remote workers who live in countries with lower taxes and/or social security contributions. We will also assess if countries engage in a race-to-the bottom competition trying to lure WFH jobs with lower taxes and social security contributions and assess risks and potential consequences of such phenomena.

Background/setting

The COVID-19 pandemic has contributed to an unprecedented increase in work from home, enabling work from anywhere. This development has given rise to professionals who combine remote working with travelling, termed digital nomads. Perceived as high earners, such workers have been an object of international competition aimed at attracting remote workers to bolster local economies, particularly those stricken by the COVID-19 pandemic (OECD, 2022). Incentives include digital nomad visa schemes, accompanied by income tax and social security contributions breaks. The increase in teleworking has also been conducive to the growth of self-employment. There has been observed an increase in freelancing enabled by the possibility of delivering professional services using internet labour platforms or ICT equipment. The solo-employed freelancers tend to appreciate a high level of autonomy and mobility. Such a preference can also align smoothly with the digital nomad lifestyle.

Governments attracting digital nomads may engage in a race to the bottom, resulting in negative social effects (Aggraval & Stirk, 2022). Furthermore, the influx of remote workers may have a negative impact on the local housing market. The expansion of property rentals using such services as Airbnb may increase prices, making housing unaffordable to local residents. Furthermore, the expansion of self-employment may impact the availability of standard, protected employment in sectors traditionally dominated by safe jobs. Moreover, self-employment may also serve as an avoidance of labour costs. Formally self-employed persons may be hired to perform the same work as regular full-time employees, which constitutes bogus self-employed.

State-of-the-art

Theoretical studies indicate that migrations and working from home alter the optimal tax policies to be pursued by the governments (Agrawal & Brueckner, 2022). In particular, the possibility of levying different taxes on natives and migrants may result in very attractive schemes for immigrants (Guerreiro *et al.*, 2020).

Indeed, European countries have started to compete for high-income migrants. Estonia was the first EU country to provide a visa programme for digital nomads in June 2020. Since then, subsequent European countries have been introducing the scheme, making up 11 EU countries with fully implemented digital nomad work permits as of February 2023, with another two countries (Greece and Italy) being set to start fully operating the scheme soon in 2023. Tax incentives are important ingredients of these schemes, with some countries fully exempting digital nomads from income taxes.

Evidence from the decade preceding the COVID-19 pandemic shows that tax incentives may be effective in attracting high-income migrants (Bassetto & Ipedico, 2023; Timm *et al.*, 2022). So far, there is no evidence on the effectiveness of tax incentives in the post-COVID era. However, given the sharp growth of workers who declare to make a permanent move to remote working (Eurofound, 2022), this topic is going to be researched intensively in the coming years.

Advancement compared to the state-of-the-art

We will contribute to the literature by providing post-COVID evidence on the migration of professionals who can work remotely. We will also investigate the rise of self-employment and the extent of bogus self-employment among these workers. We will assess the role of tax incentives and other incentives provided by governments. Our research will take a European perspective, providing findings for all EU Member States.

Research to be done

First, we will analyse whether the introduction of special incentives for digital nomads resulted in noticeable inflows of high-income migrants. Second, we will examine whether the labour force of native professionals shrank noticeably in any of the EU countries. Third, we will investigate whether an increase in working from home is associated with an increase in self-employment. For this task, we will use European survey data collected in EU-LFS and EWCS.

Methodology

We will use descriptive statistical analysis to identify the trends in the share of remote workers and self-employed workers across the EU.

We will conduct desk research on tax incentives addressed to remote workers across the EU, as well as data on digital nomad visa holders.

We will use regression analysis to detect the impact of the remote work possibilities on migrations and self-employment.

Data sources

- EU-LFS: European Union Labour Force Survey.
- EWCS: European Working Condition Survey.

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Back to the general description of Task 4.5

4.10. Task 4.5: The effect of energy and climate policy on employment, wages, and income inequality

Leader: ZEW; Contributor: IBS

Task description

We will study the employment and inequality effects of climate policy, identifying which countries, regions, and groups of workers will face the strongest labour market shocks associated with the green transition in Europe. We will use a multi-sector Computable General Equilibrium (CGE) model of the European economy (each EU Member State), combined with a micro-simulation model calibrated on EU-HBS and EU-SILC data. We will account for price reactions, income effects, and labour market adjustments (employment, wages). We design scenarios for EU climate policy and will determine their distributional effects across regions, industries, and various types of households (e.g. by income groups).

Background/setting

Cost assessments are important for climate policy design and evaluation. Most studies modelling climate policy costs assume full employment and abstract away from labour market imperfections. A drawback of this approach is that it neglects any interactions between climate policy and unemployment. Failing to account for employment effects might alter the perceived efficiency of a given policy. It is therefore important to understand whether economic outcomes change if the impact on unemployment is considered. This would shed light on how unemployment interacts with climate policy costs. It would also provide an indication of how well models without unemployment describe the economic performance of climate policy.

State-of-the-art

The literature on labour markets and climate policy is still sparse but emerging. A major strand of this literature has examined the impact of environmental regulation on unemployment using empirical methods (Yip, 2018; Curtis, 2018; Greenstone, 2002; Morgenstern, Pizer & Shih, 2002) and GE models (Hafstead & Williams, 2018; Hafstead, Williams & Chen, 2022; Castellanos & Heutel, 2019; Heutel & Zhang, 2021). These studies focus on the employment consequences of environmental regulation. Surprisingly little is known on how unemployment affects the cost of environmental regulation. In this project, we aim to fill this gap and propose a different approach from the studies using general equilibrium (GE)

modelling, i.e. which have traditionally been used to assess the economic cost and benefits of climate policy. While in previous studies unemployment is a permanent model feature, it is important to understand how welfare of a carbon emissions reduction policy depends on whether unemployment is included or not. A study most similar to our planned project is Guivarch *et al.* (2011). Using a dynamic GE framework, they model unemployment with a wage curve and assess various carbon pricing scenarios with and without unemployment. They find that the inclusion of unemployment in their model exacerbates welfare losses from carbon pricing. A similar result is shown by Babiker and Eckaus (2007) who represent unemployment with a minimum wage in the EPPA general equilibrium model. They find that accounting for unemployment increases the cost of aligning emissions with the Kyoto Protocol.

Advancement compared to the state-of-the-art and research to be done

We make two contributions relative to the existing literature. First, we assess the importance of unemployment for climate policy costs in two of the most prevalent modelling paradigms: a numerical GE model and an Integrated Assessment Model (see Nordhaus DICE model). While several studies have incorporated unemployment in numerical GE models, few have added unemployment to IAMs. We aim to fill this important research gap by showing how the cost of climate policy in DICE is impacted by unemployment. Second, we provide a systematic analysis of the cost drivers of climate policy with unemployment. In particular, we examine the roles of key parameters that shape the relationship between unemployment and climate policy costs. We thereby build on the analysis of Guivarch *et al.* (2011) who assess the impact of changing the wage curve elasticity. We also show the effects of varying the benchmark unemployment rate, the emissions reduction target and the determinants of the endogenous real wage.

This project aims to answer two main questions: (1) How costly is climate policy when unemployment is taken into account, and (2) What determines the cost of climate policy in the presence of unemployment? Besides these main questions, our analytical framework will enable to examine how wage and income inequality (between labour and capital income, and potentially heterogeneous households) is affects by climate policy and through the 'unemployment' channel. We design scenarios for EU climate policy and will determine their distributional effects across regions, industries, and various types of households (e.g. by income groups).

Methodology

We will develop and apply ex-ante simulation analysis based on two modelling paradigms to conduct positive and normative welfare analyses of the effects of unemployment for the cost and benefits of climate policy in a system of interconnected markets for output, intermediate inputs, and factors markets. First,

we will develop and apply a multi-country multi-sector general equilibrium models which is calibrated to the EU economy. Second, we develop a novel version of Bill Nordhaus' DICE model, a dynamic integrated assessment general equilibrium where we re-formulate the conventional optimisation model as a decentralised equilibrium problem and introduce unemployment.

Data sources

GTAP: National income and product accounts for EU countries and 'Rest of the World' based on data from the *Global Trade Analysis Data Project.*

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4.11. Task 4.6: The effect of climate policy on migration and its consequences on income inequality

Leader: LISER; Contributor: ZEW

Task description

The need for 'greening' the economy and its production processes, driven notably by climate policies may boost the demand for high-skilled workers. In a context of free worker mobility within the EU, migration of tertiary educated workers likely amplifies local positive externalities (e.g. technological spillovers, higher demand for cleaner environments), while increasing inter-regional inequality. Some regions will be capable to attract these workers, while others will lose them. This will thus create locally virtuous/vicious circles. We propose a theoretical framework and empirical analyses to explore the impact of climate policy scenarios from Task 4.5 and analyse the implications of migration on interregional income distribution.

Background/setting

The need for 'greening' the economy and its production processes, driven notably by climate policies is likely to boost the demand for high-skilled workers. In a context of free worker mobility within the EU, migration of tertiary educated workers amplifies local positive externalities (e.g. technological spillovers, higher demand for cleaner environments). Some regions will be capable to attract these workers, while others will lose them. This will create locally virtuous/vicious circles and amplify interregional inequalities. Policies can be designed to alleviate these effects and redistribute the gains from green tech across European regions.

State-of-the-art

A growing literature in economics analyses the impact of climate change on migration and inequality within and across countries (Burzynski *et al.*, 2022). Conte *et al.* (2022) build a multisector dynamic spatial integrated assessment model to study the effects of a unilateral carbon tax on population and welfare, accounting for the endogenous location of economic activity and population. The cost of an environmental tax is local, while the CO_2 reduction it generates and the subsequent reduction of global warming is global.

There is hence a trade-off between local effects (a fiscal cost in this paper) and global effects (a climate externality), which might be unfavourable to local policies (a unilateral tax). However, endogenous sorting of heterogeneous workers (across occupations and/or geographic locations) might reinforce local externalities from technology and pollution, and hence affect the regional distribution of activity and income (Burzynski & Peri, 2023).

Advancement compared to the state-of-the-art

We build a theoretical model and provide numerical simulations to explore the impact of climate policy scenarios in a context where heterogeneous workers can sort across sectors and regions and high-skilled workers foster the adoption of green tech. We analyse the implications of migration on the interregional income distribution. To the best of our knowledge, our study will be the first to account for endogenous sorting of worker across countries when highly-educated workers can favour technological spillover effects through adoption of cleaner technologies. The model can also be extended to compare the optimal coordination within the EU given different objectives, such as minimising negative externalities from pollution or minimising income inequalities.

Research to be done

For this task, we will first develop a general equilibrium model that allows for endogenous migration and technology spillover effects from high-skilled migration. The model will then be calibrated on observed activity and population distributions. Counterfactual policies, such as region-specific technological developments, will be simulated. We will study the consequences of these policies on regional human capital and income distributions, which will allow to study different types of inequalities. We will also analyse the impact of different coordination policies within the EU.

Methodology

We will build a general equilibrium model accounting for positive externalities of high-skilled workers on technical change accounting for multiple production sectors and multiple regions in Europe. Given the heterogeneous distribution of production sectors across European regions, the benefits from cleaner energy are likely to have divergent impacts. On the one hand, the most polluted regions would benefit most from clean energy adaptations. On the other hand, for highly educated workers, these regions might provide less professional opportunities. The possibility for workers to endogenously sort across sectors and

locations might reinforce the dynamics between migration and climate change. Finally, the model can be used to reflect on the optimal coordination policies at the level of the European Union.

The model will be calibrated using regional macro-economic population statistics and individual level data provided by the EU-LFS and OECD DIOC to calibrate correlations among individual characteristics (e.g. skills, wages, …). The model can be enriched in different dimensions, which might require additional data sources.

Data sources

- EU-SILC: European Union Statistics on Income and Living Conditions.
- EU-LFS: European Union Labour Force Survey.
- OECD-DIOC: OECD Database on Migration.

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4.12. Task 5.1: Labour and product market regulations and vulnerability

Leader: UNIPG, Contributor: IBS

Task description

This task will investigate how labour and product market regulations act as moderators of individual employment effects of megatrends on various labour market segments. As regulation indicators, we will use the OECD product market regulation (PMR) indexes and employment protection legislation (EPL) indexes. Data on individuals will come from EU-LFS and EU-SILC and is used to identify labour market segments. For each subsample of workers identified as vulnerable due to megatrends (e.g. parents, older, youth), the role of the moderating factor (PMR/EPL) will be identified by interacting the regulatory indicator and the context variable describing the megatrends (e.g. technology, globalisation).

Background/setting

In the latest years, an increasing anxiety over potential huge negative effects of the last wave of automation technologies on employment, added to concerns for globalisation, demographic and climate changes, and contributed to raise a demand for new research in these fields. The point of view of United Nations on the impact of these megatrends on employment and inequality, is less pessimistic than that reported by media, and supported by the awareness that different kind of institutions may act in mitigating the negative effects (UN, 2020). For example, the available empirical studies focusing on those countries that experienced a massive introduction of robots and ICT technologies, show very different results in terms of employment losses, depending on the production specialisation and institutional context of the country analysed. In the European Union, the concerns for technological unemployment are closely tied to the emergence of other phenomena allegedly related to the technological transformation, such as in-work poverty risks, poor career perspectives of temporary workers, young people not in education, employment or training (European Commission, 2020). This calls for studies analysing the role paid by institutions in avoiding extreme cases of labour market exclusion or atypical jobs.

State-of-the-art

Technological transformation, globalisation, demographic and climate changes are rarely jointly analysed in literature. Robert Gordon (2012; 2017) emphasised the risk that, through enlarging income inequality, these forces may work as headwinds curbing economic growth in the US. An increasing number of studies is focusing on the relationship between climate shocks and income inequality, providing evidence about how environmental deterioration may undermine the eradication poverty efforts made in some countries (Cevik & Jalles, 2022; Burzyński *et al.*, 2022). Much larger is the literature analysing the effects of globalisation (measured as offshoring and import penetration), technological transformation and ageing on labour demand (see for recent reviews Landesmann & Leitner, 2022; Stehrer & Tverdostup, 2022; Albinowski & Lewandowski, 2022).

The most recent studies on the impact of automation technologies on employment, also control for globalisation and demographic change, and disclose remarkable differences about size and direction of this impact. For the US, Acemoglu and Restrepo (2020) have found a clear negative influence of robot adoption on employment, whereas no significant reduction of hours worked has been found for 17 EU countries by Graetz and Michaels (2018). The latter results for the EU countries have been only partially confirmed by Doorley *et al.* (2023), as these authors pointed out that robots have not been harmful for employment rates only in Eastern Europe. In any case, besides the effects of automation on total employment, three further

questions remain unanswered. The first one pertains the flexibility (and quality) of employment in those workplaces more exposed to robots and ICT. There are very few studies that touch at this question and highlight increasing share of workers with shorter average tenure after introducing automation (Bessen *et al.*, 2019; Humlum *et al.*, 2019; Damiani *et al.*, 2023), even though, no specific focus is dedicated therein to the demographic groups more susceptible to be hired as temporary workers. The second question relates to the investigation of the impact of robots/ICT on employment, by taking into account whether changes in employment rate are associated with changes in unemployment and/or changes in the inactivity rate of working age population. Bachmann *et al.*, (2022) only partially answer this question by analysing job findings and separations induced by robot exposure in 16 European countries, however, they do not take into account the effects of automation on the inactivity rate. The third question sheds light on the potential mediating role that product market regulation (PMR) and employment protection legislation (EPL) may exert on the effects of automation technologies on employment. This is still an underexplored aspect, as apart from the consolidated literature upon the effects of regulation on employment, productivity and wages (Bassanini *et al.*, 2009; Cingano *et al.*, 2010; Damiani *et al.*, 2016; Pompei & Perugini, 2017), we find more studies from the perspective of EPL inhibiting robot adoption than investigations upon the mitigating role of labour market institutions on the negative effects of automation technologies (Traverso *et al.*, 2022).

Advancement compared to the state-of-the-art

This study aims first to provide new descriptive evidence on the potential association between the four megatrends described above and the labour market outcomes. We especially pay attention to the technological change conditioned by climate change (green patents) and investigate whether it contributes together with other automation technologies, globalisation and demographic changes to depict different patterns in the evolution of employment rates over countries and industries. In doing so, we take into account the interactions with different regimes of employment and product market regulation we find across countries.

In the second part of the study, we focus on automation technologies and employment, controlling for demographic characteristics of individuals and globalisation. To fill the research gaps discussed above we investigate whether the exposure to automation technologies in the last years (robots and investments in database and software) differently affected (1) employment, (2) unemployment, (3) inactivity and (4) temporary employment rates over different demographic groups and EU countries exposed to different levels of offshoring and import penetration. Next, we analyse whether and how country level PMR and EPL exert heterogeneous mitigating effects over the demographic-country groups.

Research to be done

In the first part of the study, we conduct a descriptive analysis and use both aggregated statistics on the four megatrends (Eurostat and OECD databases) and cell level information (gender, education and age groups) for employment status used in second part of the study, to explore their interactions with labour and product market institutions. In this second part of the study, we use individual survey data collected in SES and EU-LFS (and/or EU-SILC), industry level data on robots (IFR statistics) and intangible investments (EUKLEMS). We will map this information at the demographic group level and study the effect of robot and ICT exposure on the four labour outcomes above. Right after, we will use the country level OECD indicators for PMR and EPL to study the mediating effect of these institutions.

Methodology

Besides the statistical descriptive analysis conducted on the four megatrends, employment and institutions at the country-industry level (first part), we perform an econometric analysis in the second part of the study. Here, the unit of analysis is a demographic group defined by gender, education and age (Doorley *et al.*, 2023). At this cell level we calculate (1) employment rate, (2) unemployment rate, (3) inactivity rate, (4) temporary employment share.

In the first step of the econometric analysis, we explain the changes in the employment statuses above by means of an indicator of task displacement (TDA) induced by robots and ICT (Acemoglu & Restrepo, 2022; Doorley *et al.*,2023).

In the second step we study the different mediating effect of changes occurred in product market regulation (PMR) and employment protection legislation (EPL) on the demographic groups, by interacting our variable of interest TDA with the OECD indicators of these institutions.

Due to potential endogeneity of TDA we build an instrument for robot and ICT penetration in a set of countries more advanced in these technologies and not included in our sample (Acemoglu & Restrepo, 2020; Doorley *et al.*, 2023). An additional robustness check may be set out by following the approach of Rajan and Zingales (1998) and its extension to the labour economics empirical studies (Bassanini *et al.*, 2009; Damiani *et al.*, 2016; 2020; Jerbashian, 2019). Here, we perform a diff-in-diff estimation, by assuming that the effect of country level institutions on employment outcomes will be more binding for those demographic groups experiencing relevant task displacement due to robots/ICT exposure.

Data sources

- EU-LFS: European Union Labour Force Survey.

- EU-SES: European Union Structure of Earnings Survey.
- EU-SILC: European Union Statistics on Income and Living Conditions.
- IFR: International Federation of Robotics Statistics.
- EUKLEMS & INTAN_Prod Statistics (Luiss Lab).
- OECD PMR & EPL: OECD indicators for product market regulation and employment protection legislation.
- OECD patent statistics.
- OECD TiVA indicators: statistics for import penetration and offshoring.

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4.13. Task 5.2: Bargaining models, the quality of work and rent-sharing

Leader: UNIPG, Contributors: IBS, KU Leuven

Task description

This task will analyse the role of wage bargaining models as moderators of the effects of megatrends on the quality of jobs. As in Task 5.1, the analysis will be carried out by subgroups of workers identified at higher risk and the role of the moderating factor will be identified by means of an interaction term between bargaining models indicators (at country/ sector level) and megatrends measures. The task will also deal with how megatrends impact the rent-sharing capacity of employees; this will be done by interacting a rent variable (profit/value added) with the context variables of interests. This analysis will be carried out at country/sector level (EU-KLEMS), with extensions to the firm level if possible.

Background/setting

The recent surge of technological advancements related to the digitalisation has had varying impacts on the labour market, influencing employment and wages across different dimensions and for diverse groups of workers (Anzolin, 2021). However, what remains less explored is the effect of technological change on job quality, including part-time work, temporary work, seasonal work, self-employment, and home-workers, and how this affects the distribution of economic rents among workers.

As digitalisation continues to evolve, it is crucial to understand its impact on the labour market beyond just employment and wages. The quality of jobs is equally important, as it affects workers' well-being and their ability to share in the economic benefits of technological progress. By examining the effects of technological change on job quality, we can better understand how to create a more equitable and sustainable labour market for all workers.

State-of-the-art

The impact of automation and digital technologies on the labour market has been extensively studied from various angles (see Dauch, 2018). In Europe, automation has led to a decrease in job separations, particularly in economies with lower labour costs (Bachmann *et al.*, 2023). Similarly, evidence suggests that the use of artificial intelligence (AI) has resulted in faster employment growth in occupations that heavily rely on computers and are more exposed to this new technology (Georgieff & Hyee, 2021).

Innovation and technological advancements have also influenced how workers benefit from economic rents (Van Reenen, 1996). However, recent studies have shown that wages are becoming less responsive to rent creation (Bell *et al.*, 2023), and economic rents are increasingly being accrued by top executives and workers at the upper end of the wage distribution (Kline *et al.*, 2019).

Regular workers in particular appropriate a larger share of rents in sectors with higher growth rates in total factor productivity, and investment in ICT (Fukao *et al.* 2022). Rent-sharing are however influenced by labour market regimes. In Japan, a higher proportion of the rents accrue to regular workers in industries with a lower share of non-regular contracts, stronger union density and in productions where the accumulation of knowledge occurs through experience and seniority. Conversely, in Germany, individual wages are less responsive to rents in industries with stronger union and in presence of industry-wide wage contracts (Guertzgen 2009). In Belgium, in decentralised industries where contract conditions are renegotiated at company-level, firms and workers always share production rents. In contrast, centralised industries only see wages positively correlated with firm profits when there is a complementary collective agreement at the company level (Rusinek & Rycx 2013). In Italy, female workers who switch from full-time to part-time contract regimes are found to earn more, likely due to the relatively higher protection accorded by unions and sectoral collective agreements (Devincienti *et al.* 2020).

The impact of digital transformation inter-plays with that of demographic change. Research suggests that an aging population and subsequent labour shortages have driven the adoption of automation in industrial processes (Acemoglu & Restrepo 2018; Abeliansky & Prettner, 2023). As the population ages, there is a growing demand for personal service and healthcare, sectors which typically employ more non-traditional workers and offer fewer opportunities for workers to negotiate better wages, due to a lower bargaining power of workers. Additionally, an aging workforce leads to decreased job mobility, prompting companies to favour non-traditional contracts to maintain flexibility. This trend is likely to affect various sectors and could be particularly detrimental to younger workers (OECD 2019).

Another key force behind the transformation of the labour market is globalisation whose deepening has been strongly facilitated by the massive diffusion of new digital technologies and the rise of digital markets. Among the complex forces of globalisation, two of them are relevant for understanding the job quality, job security and the opportunities of rent-sharing: global value chain and migration.

Globalisation is a significant driving force behind the transformation of the labour market. Its deepening has been greatly facilitated by the widespread diffusion of new digital technologies and the rise of digital markets. Among the complex forces of globalisation, two stand out as particularly relevant for understanding job quality, job security, and opportunities for rent-sharing: global value chains and migration. The increasing international fragmentation of production and outsourcing practices has resulted in a significant increase in intermediate goods trade. This has led to intense competition among suppliers to reduce costs and ensure timely production. Consequently, local suppliers are under immense pressure to

outsource and subcontract labour, often hiring workers for short periods of time on short-term contracts (Barriantes, 2013; ILO 2016). On average, firms exposed to offshoring tend to have higher job separation, except than for young workers and those with tertiary education (El-Sahli *et al.* 2022). Krentz *et al.* (2021) study the interplay between production fragmentation and technological change, finding evidence reshoring in most OECD countries that is induced by automation. Reshoring is also found to be positively related to wages and employment for workers in professional occupations but not for workers with elementary-routine jobs. The impact of migration on job quality and worker gains is less clear, as natives and migrants cannot be often seen as substitute as they aim to respond to different types of labour demand (EIB 2016).

The impact of climate change on employment has become a topic of increasing importance in both policy and academic circles (EC 2014; ILO 2018). Climate change has a range of effects on the labour market, with extremely adverse atmospheric events reducing working hours and outdoor leisure (Graff Zivin & Neidell, 2014). Pollution has also been found to reduce worker productivity, both in jobs exposed to natural events such as agriculture (Graff Zivin & Neidell, 2012) and in jobs that are not, such as white-collar and service workers (Chang *et al.* 2019).

However, adaptation policies to climate change, developed after the signing of the Kyoto Protocol, are believed to have significant positive effects on employment and working conditions. These policies can help to mitigate the negative effects of climate change on the labour market and create new opportunities for workers in emerging industries (EC 2019).

Advancement compared to the state-of-the-art

We will study how the labour wage bargaining models do moderate the effects of technological change on the quality of jobs and the capacity of workers to appropriate rents. In particular, we will investigate how the latest wave of technology development affects the labour demand, by rising the employment of atypical job (mainly part-time and temporary workers) and how this trend differs in relation to the wage bargaining model in force at country level. We will also look at how rent-sharing between workers and entrepreneurs is affected by technological change and whether wage responsiveness to firm profits or value added is exacerbated or mitigated by the bargaining model.

Research to be done

This analysis will be carried out at country/sector level matching data from EU-LFS and EUKLEMS. We will consider various subgroups of atypical workers and assess their exposure to the adoption of the new technology and how this has affected their job opportunities. To measure rent-sharing we will relate wage

dynamics of regular atypical workers to measures of industry profits or value added and technology adoption/exposure.

Technology will be measured in terms of task displacement of robot (TDA in Doorley *et al.* 2023). As an alternative, a similar procedure will be adopted to compute the exposure to computer software and database (source: EUKLEMS) and to AI adoption (source: data for a benchmark country available from German CIS 2018).

Methodology

Panel regression analysis, based on country-by-industry data, using a difference-in-difference (interaction variables) approach to identify how the advent of disruptive technologies shapes atypical employment (temporary/part time contract, etc.) and rent-sharing mechanisms in relation to the wage bargaining models in force.

The analytical framework that may be used considers the employment share of atypical workers as a function of industry-by-country fixed effects (α_{ic}), time dummies (α_t), a proxy for the technological threat (T) varying across industries, countries and time, the country-specific (time-varying) model of bargaining and the interaction between the latter two variables. The interaction term would capture whether the employment effect of technology is mitigated ($\alpha_3 < 0$) or exacerbated ($\alpha_3 > 0$) by the bargaining model and, if any, this effect of shows up above or below a given threshold in the diffusion of the new technology.

$$s_{ict} = \alpha_{ic} + \alpha_t + \alpha_1 T_{ict} + \alpha_2 BM_{ct} + \alpha_3 T_{ict} \times BM_{ct} + \mathcal{E}_{gict}$$

A similar specification could be easily adapted to identify the effect of rent-sharing.

Data sources

- EUROSTAT SES and LFS with a focus on the employment status (individual level).
- EUKLEMS/ OECD STAN/ OECD REGPAT/IFR for data on national accounts and megatrends with a focus on technology (country/industry-level data).
- OECD/AIAS ICTWSS database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts (country-level data).

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4.14. Task 5.3: Unions and the quality of work

Leader: wiiw, Contributors: UNIPG, LISER, ZSI

Task description

Task 5.3 will study the effects of unions as moderators of the effects of megatrends on the quality of work. Quality of work (job type: typical/atypical jobs; job quality: skills mismatch) and trade union representation will be captured at the individual level, while the megatrends will be captured at the industry level. Data sourced include EWCS, WIOD, IFR, LFS. As in the previous tasks, the methodological approaches will be based on mixed effect multilevel model with cross-level interaction terms and addressing identification issues as mentioned in previous tasks. Depending on data availability, firm level analysis will be done, interacting union representation and firm level technological variables.

Background/Setting

Some of the current megatrends, particularly digitalisation/automation and the expansion of global supply chains and the internationalisation of the world's production system, are considered important drivers

behind the proliferation of atypical, non-standard forms of employment, such as temporary employment, marginal employment, part-time employment, temporary agency work or any other form of multi-party employment relationship, bogus or dependent self-employment in sectors and occupations where they did not previously exist (ILO, 2016). This is a concern as workers in non-standard employment often have low job tenure and are more likely to transit in and out of the labour market with respective high risk of low pay, (in-work) poverty, unemployment, which erodes employability and exacerbates the likelihood of precarious employment careers over their life course. As these workers are more likely than 'standard workers' to have interrupted or even no social insurance contribution records, their entitlement to benefits in case of unemployment, illness, maternity, disability and old age are also negatively affected (Schmid & Wagner, 2017). Hence, unions and employee representations become of utmost importance, potentially mitigating - or even avoiding altogether - negative effects on the type of jobs.

State-of-the-art

Generally, trade unions have an important role to play for labour market outcomes, that are, however, not always positive. For instance, on the positive side, despite declining bargaining power, unions - whose main attention is on pay bargaining - continue to generate a wage premium, which has declined though over the last decades (Blanchflower & Bryson, 2003; 2010). The benefits of unionisation also extend to fringe benefits such as holiday entitlements, pension provision, and extra-statutory sick pay (and Millward, 2000; Green & Potepan, 1988).

On the negative side, however, if successful in raising wages, unions tend to depress employment levels by making labour costly relative to capital which encourages employers to substitute capital for labour (Millward *et al.*, 2001). Similarly, unions tend to be negatively associated with different job quality indicators which, in view of unclear causality, is, however, taken as evidence that unionisation is partly a reflection of poor working conditions (Bryson & Green, 2015). However, other evidence suggests that union presence in companies, especially in co-ordinated market economies, improves job quality in call centres (Doellgast *et al.*, 2009) and low-wage occupations (Lehndorff, 2015)

Little is known about the role of trade unions for the type of job and the emergence and proliferation of non-standard forms of employment, and evidence is often in terms of case studies (see, e.g., Mailand & Larsen, 2011 on selected EU countries).

Moreover, to the best of our knowledge, no empirical analysis exists which studies the moderating role of unions on the effects of megatrends on non-standard employment, particularly in view of the decline in union membership and density as well as in the scope of union bargaining over the past decades.

Advancement compared to the state-of-the-art

Extensive existing literature focuses on the impact of unionisation on labour market outcomes; the original contribution of this task is to provide evidence on how unions moderate the impact of megatrends on labour market outcomes, specifically the prevalence of typical/atypical jobs as well as self-evaluated skills mismatch, particularly in a period of declining union membership and density.

Research to be done

For this task, we will use worker-level data (EWCS) combined with industry-level data (WIOD, IFR, EU-LFS) - to be merged at the detailed 2-digit industry level through a worker's industry affiliation - and establish if and to what extend unions (i.e. 'the presence of a union, works council or a similar committee representing employees' - from the EWCS) moderate the effect of different megatrends (i.e. globalisation/ offshoring, automation) on labour market outcomes, specifically on the type of work (typical/atypical jobs, (self-evaluated) skills mismatch).

Methodology

Descriptive analysis to show the prevalence of typical/atypical jobs and skills mismatch, by country, industry, and occupations

Econometric analysis to determine the role of union membership (at the company level) as moderator of the effects of megatrends (i.e. automation/robotisation, offshoring) on the quality of work; methodological approaches to be used: split sample analysis, threshold regressions, identification issues related to endogeneity and self-selection biases will be duly accounted for by means of usual approaches (including IV, DiD, Heckman selection correction), simultaneous equations systems, mixed effect multilevel model with cross-level interaction terms

Data sources

- EWCS: European Working Conditions Survey (Eurofound); 6th EWCS and potentially also the EWCS Extraordinary 2021 as far as useful (previous waves do provide information on unionisation/ employee representation); union/employee representation will be captured by the following question: '*Does the following exist at your company or organisation ...?*
  A - Trade union, works council or a similar committee representing employees?'; skills mismatch as follows: '*Which of the following statements would best describe your skills in your own work*? (1) I need further training to cope well with my duties, (2) My present skills correspond well with my

duties, (3) I have the skills to cope with more demanding duties.' An employee is considered under-skilled in the first case, well-matched in the second case, and over-skilled in the third case.

- WIOD: World Input Output Dataset.
- IFR: Robots data from the International Federation of Robotics.
- EU-LFS: Labour Force Survey.

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4.15. Tasks 5.4. Welfare policy, labour market transitions and the quality of work

Leader: UNIPG, Contributors: KU Leuven, LISER, wiiw, ZSI

Task description

Task 5.4 aims to identify which labour market groups, despite participating in employment, are at higher risks of entering into and persisting in low-quality jobs, in-work poverty and in-work deprivation. We will explore the individual and household determinants of flows into and out of poor employment positions and in-work poverty and deprivation and how they are moderated by national institutional and policy settings, which directly or indirectly affect the labour market (e.g. family policies, unemployment benefits, basic income schemes). The analysis, using the same methodology as before, will be comparative (focusing on EU and associate countries), and will be extended to single countries when possible.

Background/setting

Participation in employment shelters the majority of those living in the EU from economic hardship. However, a substantial and growing share of workers are in-work poor or in-work deprived, despite advanced economic development and social protection systems implemented by European countries (Peña-Casas *et al.*, 2019). The latest Eurostat figures available indicate that around 10% of European workers are at risk of poverty, compared to around 8% reported at the end of the 2000s. Understanding the dynamics of in-work poverty and the transition trajectories has been growingly identified as a priority in the EU policy framework (Eurofound, 2017), as it is crucial to guide policy actions aimed at maximising the probability of exiting (or preventing) poverty without exiting (or staying out of) employment. The empirical literature on such transition dynamics, although growing, is still limited. The main purpose of this task is to map the drivers of risk of in-work poverty and its dynamics across EU countries and to investigate how they are moderated by national-level institutional and policy settings which directly or indirectly impact labour market settings.

State-of-the-art

The empirical literature developed in the last 10-15 years has provided a thoughtful debate on the manyfold measurement issues associated with the concept of in-work poverty (e.g., Crettaz, 2013; Ratti *et al.*, 2022). For the EU context, Eurostat provides statistics on *in-work at-risk-of-poverty rate* for various demographic and working population groups. The drivers of the dynamics of in-work poverty identified

by the empirical literature can be grouped into three main domains. The first two pertain to individual/household factors (see, e.g., Hick & Lanau, 2018; Vandecasteele & Giesselmann, 2018; Crettaz, 2015): (1) workers/job attributes (age, gender, education and job characteristics - particularly, temporary/ permanent contract and full-time/part-time jobs); and (2) household characteristics (size, composition, number of income earners and work intensity). Guio *et al.* (2021) provide the most updated comprehensive mapping of in-work poverty levels, dynamics and drivers of individual transition trajectories for EU countries, based on EU-SILC cross-section and longitudinal data. The third domain pertains to institutional/policy factors influencing directly or indirectly in-work poverty. The available literature has analysed, either on a qualitative basis or using aggregate trends, a wide array of settings that include: wage decentralisation/coordination, minimum wage legislation, employment protection legislation, tax structure and incentives, access to services such as childcare and training (see Eurofound, 2017; Peña-Casas *et al.*, 2019 and 2021; Marchal *et al.* 2017; Lohmann & Marx, 2008; Lohmann, 2009).

Advancement compared to the state-of-the-art

Contrary to the analysis of individual-level factors, the investigation of policy/institutional drivers has been mainly carried out at the aggregate (country) level, in an attempt to spot macro-level regularities (across countries or over time). We will provide (one of) the first study on how changes in institution/ policy settings affect the individual dynamics of in-work poverty in EU countries.

Research to be done

For this task, we will use individual- and household-level EU-SILC data, both for descriptive and econometric analysis. The cross-sectional section of the dataset will be used to provide an up-to-date picture of in-work poverty and deprivation in EU countries; the longitudinal component will be used to identify the year-to-year transition trajectories to and from in-work poverty/ deprivation at the aggregate EU and at the country level.

The longitudinal component will then be used to map the individual- and household-level drivers of transition probabilities to and from in-work poverty/ deprivation. Once the most important drivers have been identified, we will investigate which policy/institutional changes have reduced or magnified this probability in the EU. To this aim, based on the available literature (Peña-Casas *et al.*, 2019; 2021), we will identify a set of relevant institutional/policy changes (employment protection, minimum wage, guaranteed minimum income, family policies) with significant variability across countries and over the period considered for the analysis. The metrics of institutional/policy features will be collected from existing sources (e.g., OECD, LABREF, EFW)

Methodology

As far as the descriptive analysis is concerned, we will provide un updated a picture of in-work poverty and deprivation in EU countries, along with an aggregate (EU and country level) analysis of transition trajectories to and from in-work poverty.

As for the econometric analysis, we will first estimate a model of individual/job/household drivers of in-work transition (as in Guio *et al.*, 2021). To assess the role of institutional/policy factors, we will then follow the empirical strategy of Perugini *et al.* (2018), which is a combination of differences-in-differences approaches and country fixed effects models. In the first case, we will identify a treatment group (i.e., individuals employed in countries which underwent a relevant institutional/policy change in a given interval - one EU-SILC longitudinal wave) or subperiod) and a control group (individuals employed in countries which did not undergo a similar institutional/policy change). We will then estimate the difference between the two groups of the impact of individual/job/household on the probability of in-work poverty transition.

The differences-in-differences approach naturally allows only a limited coverage of the analysis due to data constraints, in terms of both individuals and countries. To extend the empirical analysis to all EU countries, we will complement it with multilevel analysis or country fixed effect model in which we simply interact the individual variables with metrics of policy/institutional settings (see Snijders & Bosker, 1999 and Bryan & Jenkins, 2013).

Data sources

- EU-SILC cross-section and longitudinal data.
- Institutional/policy indicators (sources: e.g., OECD, LABREF, EFW) and/or measures of job quality based on EWCS at the occupational x sectoral x country level (e.g. : job security, unionisation).

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4.16. Task 5.5: Migration, labour market transition, and policies

Leader: ZEW, Contributors: UNIPG, LISER, ZSI

Task description

This task will study the effects of increased migration on receiving EU labour markets. First, we seek to understand which groups of workers are at risk of job loss or wage reduction due to increased migration. Second, we will identify which migrants are able to transition to gainful employment, and which groups will rely on welfare benefits. We focus on policies governing migration and labour market integration. These questions are studied in a context of refugee migration and working migration in light of EU eastern enlargements. Such labour supply shocks are likely to negatively affect the labour market opportunities of competing natives and 'old migrants', but positively affect those of complementary workers.

Background/ setting

Thanks to the free movement of workers within the European Union (EU) and several rounds of EU Enlargement, the mobility of workers within the EU has increased substantially over the past two decades. Immigrant workers contribute to the well-functioning of labour markets in host countries, however, they might potentially threaten employment or wages of some groups of natives. From simple theory one would expect domestic workers in similar jobs or education groups as the immigrants to be at risk of substitution, which may reduce jobs or employment (i.e. increase job loss). On the other hand, domestic workers in complementary jobs or education groups may benefit from complementarities with immigrants leading to higher wages or employment. Effects on employment and wages should be considered jointly because where effects show up depends on labour market regulation.

State-of-the-art

The general literature on labour market effects of migration is large but not conclusive, see Borjas (2014) as well as Card and Peri (2016). At the same time, labour market integration of migrants is highly dependent on the reason of migration (refugee vs. working migration) and the governance of migration flows (Dustmann *et al.* ,2017a; de la Rica *et al.*, 2015). Advancing upon the above stated simplistic model, the literature has pointed to more refined complementary relationships between domestic and immigrant workers. In Denmark, low-skilled native workers have benefitted from the arrival of refugees working in low-skilled jobs as the former have been 'pushed' into more communication intense and less manual intense jobs which also pay higher wages (Foged & Peri, 2016). Turning to high-skilled immigrants, the opening of the Swiss border to foreign workers increased the number of high skilled cross-border commuters (Beerli *et al.*, 2021). In response, high skilled domestic workers saw career progressions towards more managerial positions and firms increased their innovations (ibid.). Studying the border openings from the Czech Republic to Germany after the fall of the Iron Curtain, Dustmann *et al.* (2017b) point to important dynamics especially among labour market entrants who then move more frequently to other regions and/or obtain additional education.

Until now, there exists very little evidence on migration following EU eastern enlargement. Becker and Fetzer (2018) study EU migrants in the UK and find that migrants from the EU tend to settle in areas with little pre-existing migration. These areas experience smaller wage growth at the lower end of the wage distribution and increased pressure on the welfare state. Kuosmanen and Meriläinen (2020) study the case of the construction sector in Finland and find substantial wage effects but only small employment effects, which is in contrast to previous findings of border openings within the EU. Stiglbauer (2020) finds a slight

increase in the unemployment risk for domestic workers in Austria following EU eastern enlargement, which, however, is higher for manual workers and service and sales occupations. We therefore need to gain a deeper understanding of how EU migration affects labour markets.

Advancement compared to the state-of-the-art

The literature on migration within and into the EU is still inconclusive. Therefore, we provide additional evidence on the effects from EU enlargement on natives and 'old' migrants in terms of wages and employment/ job loss. In order to shed more light on potential winners and losers from EU migration, this task will focus on distributional effects from EU immigration along the entire distribution of skills. To assure reliability of the lessons learned, causal evidence will be provided based on individual-level data joint with a causal empirical identification strategy based on instrumental variables

Research to be done

This task will first provide an overview of what is known from the literature about effects from border openings on different labour market outcomes focusing on employment and wage effects. The empirical analysis provides empirical evidence on the effect of increased immigration from Eastern European Member States. Germany is taken as a case study for constituting the largest economy and the largest single-country labour market in the EU as well as receiving the largest share of within-EU immigration on the European main land. We will describe empirically to what extent EU immigration was predominantly into low-wage groups. This is why - as a novel contribution - the share of Eastern EU migrants will be measured separately by wage groups (of the native wage distribution). The empirical analysis starts by describing the development of domestic employment after EU Enlargement. This task then turns to measuring the causal impact on individual native workers. If data availability allows, we will put a special emphasis on former migrants who may be at special risk from immigration. This way, the analysis contributes to understanding which groups of employees face the highest risk of experiencing wage losses or gains from EU immigration.

Methodology

We start by describing empirically where Eastern European immigrants work in the native wage distribution and how this distribution has developed over time.

We then describe empirically the trends of domestic workers' employment rate after EU Enlargement to find hints for job losses or gains along the skill distribution.

In the regressions we take account of regional sorting of immigrants by employing a past settlement shift-share instrumental variable (IV) approach.

To measure the microeconometric effect of immigration along the wage distribution we will check the feasibility of employing either quantile or distributional regressions.

Data sources

- Integrated Labour Market Biographies, i.e. 100% full sample of the labour force to measure immigration in wage groups.
- Sample of Integrated Labour Market Biographies (SIAB), i.e. 2% random sample of the labour force for native wage response.

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4.17. Task 6.1: Pan-European pension plans as a way to cope with the risks of ageing, automation and new forms of work

Leader: LISER, Contributors: EKOF, KU Leuven

Task description

The rise of non-standard work and the increasing mobility of workers across countries challenge the future old age security of workers. This task will study a recent policy (March 2022) designed to facilitate personal and fully portable pension savings in Europe, regardless of country of residence: the pan-European personal pension product (PEPP). PEPP will provide private pension plans, not linked to labour conditions, to all residents in the EU. We will gauge the potential demand for this policy and map which sectors, occupations and countries could benefit more from PEPP. We will also apply experiments in some countries to study the individual willingness to participate in and the attitudes towards the PEPP among standard and atypical workers.

Background/setting

The rise of non-standard jobs (e.g. part-time work, temporary work, seasonal work, self-employment, homeworkers) and the increasing mobility of workers across countries pose a challenge to the future old age security of some workers. In such jobs, pension contributions tend to be infrequent and/or low, and the portability of pension rights (including private pension plans and corresponding tax treatment) is limited. A framework for a pan-European personal pension (PEPP) plan came into effect in March 2022. The PEPP will provide private pension plans, not linked to labour condition, to all residents in EU. The PEPP may also boost capital markets of long-term investments in EU countries with limited personal pension markets. However, little is known about individual willingness to participate in and the attitudes towards the PEPP. The main purpose of this task is to analyse potential demand and impact of the PEPP.

State-of-the-art

Recent pension reforms in Europe were designed to address the risks that ageing pose on fiscal sustainability (Castellino *et al.* 2020, Ebbinghaus 2021), but it has been noted that they are insufficient to cope with the threat of rising importance of non-standard and highly mobile jobs (Hinrichs 2021). The reports

by EC (2017) and OECD (2019) argue in favour of new pension plans tailored to the needs of these workers. The PEEP is such a product.

To our knowledge, no previous studies exist that assess worker's interest in such a product.

Advancement compared to the state-of-the-art

We will provide (one of) the first studies assessing *ex-ante* the willingness to participate in PEEP (a unique pan-European pension) in relation with the emergence of non-standard jobs. Although EC (2018) analyses the willingness to participate in social protection across non-standard jobs in 10 EU countries, its scope in general and do not assess personal pensions.

Research to be done

For this task, we will use individual survey data collected in EU-SILC, SHARE and HFCS to gauge the potential demand for this policy; i.e., we jointly assess the participation in public and private pensions and the type of work performed by the individual to map which sectors and countries could benefit more from PEPP. In addition, we will apply online surveys in a selection of countries (same as in Task 4.4) to study the individual willingness to participate in and the attitudes towards the PEPP among people with standard and atypical jobs.

Methodology

We will use statistical descriptive analysis to identify the incidence of having personal pensions across occupations, sectors, and countries.

We will use regression analysis to identify the relationship between lack of pension plans and job types conditional on socio-economic characteristics, including income and wealth (the latter are measured in HFCS and SHARE).

We will collect online survey data to capture the willingness-to-pay for and attitudes towards the PEEP. For this, we will exploit vignettes randomising information about the characteristics of the PEEP (contribution rate, retirement age, withdrawals, etc.)

Data sources

- EU-SILC: European Union Statistics on Income and Living Conditions.
- HFCS: Household, Finance, and Consumption Survey.
- SHARE: Survey of Health, Ageing and Retirement in Europe.

- Specific online survey data (to be collected in at least 4 countries as in Task 4.4). The same survey can include questions on attitudes and willingness to pay for social protection (including EU private pensions, UBI, and other policies studied in the Project), and (perhaps) preferences for redistribution.

References

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4.18. Task 6.2: Fiscal and distributional effects of climate policy

Leader: ZEW, Contributor: IBS

Background/setting

Decarbonising European economies in line with the now binding climate targets agreed by the European Parliament and EU Member States under the European Grean Deal- reducing greenhouse gas emissions by at least 55% from 1990 levels by 2030 and achieving a net-zero emission by the mid-century - will require unprecedented structural change, fundamentally altering the way energy services are supplied and demanded. Reducing and largely eliminating the dependence on fossil fuels will therefore have profound impacts on the entire economic system and on a wide range of different actors (e.g., consumers, households, firms, sectors, countries). The support for and success of public climate policies that underpin the

transition to climate neutrality will depend critically on how the costs and benefits of decarbonisation will be distributed among these various actors (Deryugina *et al.*, 2019).

Importantly, the overall economic incidence of different climate policy instruments is also shaped by their fiscal effects. For example, price-based climate policies such as carbon taxes or emissions trading (i.e., the leading policy instrument for decarbonisation in the EU) raise substantial fiscal revenues which can be used to address unintended distributional consequences, finance green investments or other government programs. In contrast, technology policies such as emissions standards, energy efficiency standards, renewable energy subsidies, which are important regulatory measures in the EU climate policy mix, tend to be revenue-neutral or involve (explicit or implicit) subsidies which create costs for the public budget.

It is thus important to understand the joint fiscal and distributional effects in EU climate policy to identify politically viable, economically efficient, and socially equitable policy measures that promote deep decarbonisation.

State-of-the-art

Our current understanding of the distributional effects of climate action stems predominantly from analyses that focus narrowly on 'direct' impact channels and do not consider the 'system-wide' or 'indirect' impacts. Prominent examples include sectoral case studies, single-country assessments, or work that focuses on the expenditure side of households ('price effects') and ignores capital and labour income and cross-market effects. Clearly, to the extent that the transition to climate neutrality will transform large parts of Europe's highly interconnected, multi-sectoral economies, these 'indirect' distributional effects are of first-order importance to obtain a comprehensive assessment on which future policy actions can be based. Examples include for carbon pricing or emissions trading policies (Poterba; 1989; Rausch and Schwarz, 2016), for technology policy (Davis & Knittel, 2019), or other climate-related public policy interventions (Reguant, 2019). The revenue usage option, including the shadow costs of public funds, and the broader fiscal dimension of climate policies, however, is often ignored (Barrage, 2017).

Advancement compared to the state-of-the-art and research to be done

We will provide the first study which uses ex-ante policy analysis to examine (1) the fiscal revenues raised under EU carbon pricing including the existing EU Emissions Trading System (ETS) and the new emission trading system for buildings and transportation (ETS2) while (2) considering the joint distributional effects across and with-in EU Member states under alternative revenue recycling options which (i) either closely represent current legislation (i.e., redistribution rules under EU ETS, ETS2, the effort sharing agreement,

and the Social Climate Fund) or (ii) consider alternative revenue recycling options through lowering (distortionary) labour and capital income taxes ('green tax reform').

We will pay close attention to how the level of tax revenues will evolve as policy stringency increases in the transition to carbon neutrality. The hypothesis is that carbon revenues will initially rise to a certain point, after which the 'tax base,' i.e., carbon emissions, will shrink too quickly to sustain growing tax revenues from carbon pricing (similar to the 'Laffer Curve' argument). These dynamics on the fiscal side will critically affect the ability of public policy to offset unintended distributional consequences.

Methodology

We will develop and apply ex-ante simulation analysis based on general equilibrium modelling to conduct positive and normative welfare analyses of the effects of EU climate policy in a system of interconnected markets for output, intermediate inputs, and factors markets. Our analytical framework will account for the (fragmented) regulation of carbon emissions in the EU economy (EU ETS vs. ETS2), fossil and renewable energy supply and use, heterogeneous greenhouse gas abatement technologies, as well as behavioural responses to climate regulation by firms and households.

We use scenario-based counterfactual analysis to compare the fiscal and distributional effects of alternative policy designs of the future EU carbon pricing architecture (EU ETS, ETS2) and various revenue recycling options.

Data sources

- GTAP: National income and product accounts for EU countries and 'Rest of the World' based on data from the Global Trade Analysis Data Project.
- EU-SILC: European Union Statistics on Income and Living Conditions.
- HBS: Household Budget Survey.

References

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4.19. Task 6.3: Fiscal effects of migration

Leader: ZEW, Contributor: EKOF

Task description

Migration increased strongly within as well as into the EU in the last 20 years. In this task, we plan an analysis on EU and national levels of the fiscal contributions of refugee and working migration since 2000. First, we will look at specific episodes, such as refugees from Balkan wars and Syria/Iraq/Afghanistan as well as EU eastern enlargement. Second, we will identify personal as well as institutional conditions that lead to favourable fiscal balances of migrants by labour market integration. This task will provide new arguments for future discussions on migration e.g. in light of EU enlargements.

Background/setting

The long-lasting low economic growth combined with the persistent ageing of the population has conducted most of the EU countries to question the sustainability of their welfare system. As a result, unpopular solutions such as reforms of the retirement age, reduction of social protections or increase of taxation, are discussed. In this context, immigration could be seen by some as part of the answer to save the Euro-

pean welfare systems. Immigrants could at the same time compensate for the decline of the population and stimulate economic activity. However, the long-term net fiscal impact of immigration is ambiguous and the scientific literature on the topic is inconclusive, with estimates of the fiscal contribution of migrants of around +- 1 % of GDP. Up to now, little evidence exists on the real net fiscal effect of migrants and what explains the difference in fiscal contribution between the EU countries. These gaps have to be filled.

State-of-the-art

So far, the literature on the fiscal effects of migration have been based on two main approaches, a static approach and a dynamic approaches. The static approach consists of calculating the Net Fiscal Impact (i.e., the difference between the benefits received and the financial participation) distinctly for the migrants and the native population and comparing them (see Dustmann *et al.*, 2014; Boeri, 2010). The calculations are usually set over a short period of time (in general one year).

The dynamic approaches attempt to expand the Net Fiscal Impact calculation over the entire life cycle of the migrants. Three main methodologies are used: a Net Present Value (NPV) approach (see Ekberg, 2011; Storesletten, 2000), a Generational Accounting Analysis (GA) and a Dynamic Applied General Equilibrium Model (DAGEM).

Additionally, most of the studies have focused on the fiscal effects of migration within a country. Only a handful have looked at it from a cross-country perspective (see Christl *et al.*, 2021).

Advancement compared to the state-of-the-art

We see two potential contributions to our work. The first one would be a methodological improvement of the Net Fiscal Impact formula. An active migrant does not only contribute to the society through his tax payment but also by providing adding value to his employer. Hence, one element which seems to be missing in the literature is the opportunity cost of not having this additional worker, translated through the cost of having a shortage of workforce.

Building on Christl *et al.* (2021), the second contribution would be to expand the current literature on cross-country analysis of the fiscal effects of migration.

Research to be done

For this task, we will first use the German microcensus, SOEP and Consumer Expenditure Survey to come up with our innovative calculation of the Net Fiscal Impact of migrants for Germany.
We will then build on the European Union Statistics on Income and Living Conditions to calculate the Net Fiscal Impact of migrants over the different European Union countries.
Finally, we will compare our results for the different countries and try to understand the disparities. We will distinguish different groups/waves of immigrants.

Methodology

We will provide innovative improvements to the Net Fiscal Impact formula used in the literature.

We will then apply this formula to precise German-level data in order to obtain a detailed estimation of the Net Fiscal Impact of migrants in Germany, in function of different criteria such as their age, area of origin and education level.

We will build over existing work to develop the young literature on cross-country differences of migrants' contribution.

Data sources

- CES: Consumer Expenditure Survey.
- German SOEP: Socio-Economic Panel.
- German microcensus.
- EU-SILC: European Union Statistics on Income and Living Conditions.
- MIGR: Asylum and managed migration database.

References

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4.20. Task 6.4: Adjusting social security systems to digitalisation and new forms of employment

Task leader: EKOF; Contributors: LISER , ZEW, KU Leuven, IBS

Task description

Due to megatrends, some categories of workers are more likely to be working poor and to less protected by social protection systems. This task will therefore study how the income distribution and overall welfare may evolve in different European countries under a range of potential scenarios for the future changes in job structure and policy measures, e.g. universal basic income (UBI). We will use tax-benefit microsimulation models (e.g. EUROMOD) to assess the impact of taxes and transfers scenario as well as new labour demand scenario individually and simultaneously and discuss how much tax and transfer policy would need to be reformed in the face of changes in the structure of jobs.

Background/setting

Do existing tax and benefit systems throughout Europe offer adequate protection in the situation of growing inequality, increases of the new forms of employment associated with the digitalisation and the risk of job losses due to automatisation? Using microsimulation and econometric tools, this task studies how income distribution and overall welfare may evolve in different European countries under a range of potential reform scenarios in the tax and social transfer systems.

State-of-the-art

Due to megatrends, some categories of workers are more likely to be working poor, to work lower hours or be completely out of work, and less protected by the social protection systems. Universal Basic Income (UBI) has been widely debated in recent years as a potential policy response to the challenges of income inequality, the uptick in non-traditional work arrangements facilitated by technological advancements or

the looming possibility of unemployment resulting from automation. Various studies have found that UBI has the potential to reduce poverty and inequality, but its fiscal and distributional effects depend on the design and financing options (Browne & Immervoll, 2018; Colombino, 2019; OECD, 2017a; 2017b).

Advancement compared to the state-of-the-art

We will study how the income distribution may evolve in different European countries under a range of potential scenarios for future changes in job structure. Scenarios are based on the assumptions of the employment and income trends resulting from automatisation/digitalisation effects. Different scenarios: current economy and hypothetical (digitalised) economy will then serve as a baseline for testing the implementation of new tax-transfer policies including different designs of universal basic income. Our main goal is to determine how taxes and transfer policy parameters should be set to optimise social welfare in case of different scenarios for future of work and what would be the labour market effects of UBI proposals.

Research to be done

We plan to divide the research into three phases. In the first phase, we will assume changes in employment probability/income based on the expected changes in the labour market due to automatisation, following approach similar to one presented in the Colombino and Islam (2022) paper, and analyse how these changes affect income distribution and inequality indicators. We will then propose new policies (e.g. universal basic income) that can best tackle inequality and poverty consequences resulting from labour market changes assumed in the previous phase. Finally, we will analyse labour supply elasticity and the labour market response of specific income groups in the case of the introduction of UBI policy. We will then compare labour market effect of the introduced policies in the current economy and hypothetical(digitalised) economy.

Methodology

- Tax and benefit microsimulation model for the European Union (EUROMOD).
- Discrete choice model: standard labour supply model (Van Soest, 1995)/Random Utility random opportunity (RURO) model.
- Numerical optimisation (optimised tax benefit parameters through maximising welfare function).

Data sources

- EU-SILC (available EUROMOD EMSD data from EUROSTAT)

References

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4.21. Task 7.1: Synergies and key challenges

Leader: OSE, Contributor: KU Leuven

Task description

This task will provide a policy report on 'synergies and key challenges', which builds bridges between the policy recommendations proposed under WPs 3-6, and is further completed with a literature review (starting from Task 2.1 and updating its results). The policy report will identify synergies and mutually reinforcing actions, and will highlight the diverse challenges and difficulties that may hinder the implementation of potential policies identified in the WPs 3-6 analyses (see Tasks 3.7; 4.6; 5.6 and 6.5). A draft version of this policy report will be discussed during a policy roundtable, organised as part of the second foresight workshop planned in Task 7.5.

Background/setting

The task will provide a policy report on 'synergies and key challenges', which builds bridges between the policy recommendations proposed under WPs 3-6, and is further completed with a literature review (starting from Task 2.1 and updating its results).

The policy report will identify synergies and mutually reinforcing actions, and will highlight the diverse challenges and difficulties that may hinder the implementation of potential policies identified in the WPs 3-6 analyses. To this respect, the policy report will fundamentally build on the deliverables of several tasks dedicated to the formulation of policy recommendations in each of the analytical WPs (see Tasks 3.6; 4.7; 5.6 and 6.5).

State-of-the-art

Difficult to make a state of the art regarding policy recommendations. The task will start in M13 with a deliverable expected in M32 (D7.1).

Advancement compared to the state-of-the-art

Policy recommendations aim at the adoption of policy measures, at different levels, to adapt welfare systems to (1) reducing socioeconomic inequalities and poverty, (2) protecting people from hardship and (3) providing options for atypical workers and the self-employed to transition towards more stable work relationships if desired, while acting as a catalyst for economic prosperity *(economic, societal)*

Research to be done

- Desktop research on policy recommendations in literature and other EU projects.
- Analytical comparison of WPs 3-6 outputs in terms of recommendations.

Methodology

- Desktop research and analytical comparison of WPs 3-6 outputs in terms of recommendations.

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4.22. Task 7.2: Preferences for redistribution and demand for redistributive policies

Task leader: EKOF; Contributors: UNIPG, LISER

Task description

This task aims at analysing the demand for redistributive policies by European citizens, in order to assess their political sustainability. We will link micro-data from ESS, EVS and WWS data on preferences for redistribution and self-reported voting behaviour of European citizens to the characteristics of the parties as described by the Chapel Hill experts survey. First, we investigate the individual personal, social, economic, labour market (status, occupation) and cultural drivers of preferences for redistribution. Second,

we analyse to what extent such preferences are consistent with voting behaviour for parties supporting redistribution and for which the topic is most salient. Finally, we analyse which factors weaken the link between preference and voting behaviour, focusing on income, education and citizens' trust in parties.

Background/setting

During the COVID-19 crisis, the issue of redistribution has been put back as the main focus of academics and the general public. Extensive redistribution measures have been, almost without exception, implemented in almost all European countries, regardless of the political orientation of the party in power, however, they were met with different enthusiasm and support. This reaction is a significant contrast to the previous 2008 economic crisis, where the dominant dogma was austerity.

Key megatrends - demographic changes, globalisation, technological transformations and climate change are bringing changes to European labour markets, many of which have the potential to increase income inequality. Analysis within WPs 3 to 6 are expected to yield numerous policy proposals and interventions (including redistributive actions) aimed at keeping the levels of inequality under control and at preventing the consolidation of old, and the emergence of new, forms of social and economic marginalisation. This task aims to analyse European citizens' current demand for redistributive policies and the changes that the COVID-19 crisis could have caused. We will also link redistributive policies with voting behaviour, to assess their political sustainability.

State-of-the-art

A vast amount of literature has identified the number of micro and macro socio-economic characteristics associated with stronger/weaker preferences for redistribution (PFR). Previous research has indicated increasing preferences for redistribution in Europe in times of increasing inequalities, particularly in the times of the 2008 economic crisis (e.g. Olivera, 2014; 2015), However, other contributions provide opposite results (e.g., Roth & Wohlfart, 2018). Empirical evidence also confirms that more unequal countries redistribute relatively more (Aristei & Perugini, 2010). On the micro level, Melzer and Richards's median voter model (1981) suggests that individuals at the bottom of the income distribution would prefer more redistribution as they would gain from it. The evidence is still inconclusive (Piketty, 1995; Benabou & Ok, 2001; Alesina & Guiliano, 2009; Haggard *et al.*, 2013; Olivera, 2014; 2015).

However, support for such measures in different countries can depend on the political orientation of the party in power, i.e. the political orientation of their voters. The question of whether and how much the governments should redistribute is one of the main dividing issues between the political left and the political right, at least on the economic issues (Alesina & Giuliano, 2009). For persons who vote for left

parties, preferences for redistribution are also connected with pessimistic views about intergenerational mobility, while the same is not true for right-leaning individuals (Alesina *et al.*, 2018). Boeri *et al.* (2021) suggest that with the collapse of social-democratic parties across Europe, people felt more open to voting for new parties arising from civil associations.

Advancement compared to the state-of-the-art

We will study how PFR are connected to income inequality and especially focus on the 2008 economic crisis and the COVID pandemic period, to investigate how and if the new economic challenges changed the level of PFR and its determinants. We will also investigate if and to what extent higher PFR translates into voting behaviour for pro-redistribution parties, and if this has changed significantly between the recent major economic crises, when the fiscal policy reactions were opposite (restrictive in 2008 vs expansionary in COVID years).

Research to be done

We will link micro-data from ESS, data on preferences for redistribution and self-reported voting behaviour of European citizens to the characteristics of the parties described by the Chapel Hill experts survey. First, we investigate the individual personal, social, economic, labour market (status, occupation) and cultural drivers of preferences for redistribution. Second, we analyse to what extent such preferences are consistent with voting behaviour for parties supporting redistribution. Finally, we analyse which factors weaken the link between preference and voting behaviour, focusing on income, education and citizens' trust in parties.

Methodology

- Econometric methods.
- Multilevel regressions.

Data sources

We use data from the European Social Survey (ESS). ESS is a biannual survey measuring a diverse set of attitudes, beliefs and behaviour patterns (including voting), as well as a wide range of socio-demographic and economic variables. The latest, tenth wave of ESS was conducted in 2021, therefore enabling us to see how the COVID crisis has impacted redistribution preferences. Preferences for redistribution are defined with a question '*Using this card, please say to what extent you agree or disagree with each of the following statements.: the government should take measures to reduce differences in income levels*'. (*1 - Agree strongly -5 Disagree strongly).'*

Chapel Hill Expert Survey (CHES) uses expert ratings on positions of parties on a range of characteristics such as support for traditional values, liberal lifestyles and multiculturalism, including economic characteristics such as the state of the economy and market deregulation. We will merge individual-level data on voting behaviour from ESS to CHES ratings of political parties and assess the link between PFR and voting behaviour.

References

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4.23. Task 7.3.: New forms of work and workers' demand for security and stability

Leader: IBS, Contributors: KU Leuven, UNIPG, ZEW

Task description

Digital technologies contribute to the growth of new forms of work such as platform jobs and gig economy, which are often performed by workers who lack safety nets that cover traditional jobs. We will study which welfare state provisions and which facets of social security are most valued by these workers. To this aim, we will conduct stated-preference (willingness-to-pay) field experiments in four countries with different institutional settings - Poland, Italy, Germany, Belgium - to understand which provisions are the most valued but not available currently.

Background/setting

The rise of digital technologies has brought about new forms of employment, such as platform jobs and the gig economy. Unlike traditional full-time employment, platform work offers greater flexibility in working hours, but often lacks the safety nets that cover traditional jobs. There is an ongoing debate about how platform work should be regulated and whether platform workers should receive more social protection. The lack of social protection for platform workers has been a cause for concern among policymakers, as it can lead to financial insecurity, lack of access to health care, and other social benefits. At the same time, some argue that the flexibility of platform work is a benefit that workers value.

State-of-the-art

Digital labour platforms constitute a specific form of atypical work as they assign to individuals specific tasks ordered by clients. The most popular examples are rapidly growing ride-hailing and delivery platforms (such as Uber or Deliveroo). Platform workers who provide their on-demand services through apps often have non-standard forms of employment or are classified as independent contractors (Urzi *et al.*, 2020). Usually, their working conditions differ from those in open-ended, full-time employment (De Stefano, 2015). First, platform workers are classified as independent contractors rather than employees. This means that most institutions of labour protection (social insurance, 40-hour workweek, minimum wages, and right to organise), are not available to them (Mandl *et al.*, 2015). Second, platform work is often characterised by irregular and unpredictable income, which might cause financial strains, especially for those who rely solely on platform work (Berg, 2016). Third, although platform workers are most often considered independent contractors, they usually have little control over their working conditions, such as their pay rates (Wood *et al.*, 2018). Although platform work is not widespread yet (about 5% of employment in countries with available data (Piasna *et al.*, 2022), the risks of the platform-mediated shift from traditional employment status towards (often bogus) self-employment are large. A growing body of research stresses the prevalence of the aforementioned problems and calls for the need to regulate platform

work (Altenried, 2021; Dunn, 2020; Scholz, 2016; van Doorn *et al.*, 2022). However, there are several challenges associated with regulating platform work: lack of clarity of the legal status of platform workers (Piasna *et al.*, 2022), difficulty in establishing a level playing field, as platform companies are subject to different rules and regulations in different countries (Mazur & Serafin, 2022), and the need for balancing flexibility (for which many choose platform work) and social protection. Piasna and Drahokoupil (2021) found that most workers preferred employee status to self-employment, but their preferences for working hour flexibility were heterogeneous and depended highly on their economic attachment to the platform. Therefore, the benefits of the flexibility of platform work are not evenly spread (Forde *et al.*, 2017)

Advancement compared to the state-of-the-art

We will provide one of the first studies assessing which welfare state provisions and which facets of social security are most valued by platform workers. Our research will take a European perspective, providing findings for all EU Member States. We will compare findings between different states and assess the country-specific role of the institutional setting, labour market policies, and cultural norms and values.

Research to be done

To this aim, we will conduct stated-preference (willingness-to-pay) field experiments in four countries with different institutional settings - Poland, Italy, Germany, and Belgium - to understand which provisions are the most valued but not available currently. We will recruit platform workers working for online and geographically-tethered platforms. Then, we will present to participants a series of realistic job offers. They will vary regarding job amenities such as a type of contract, access to social security benefits, working time flexibility, and wages. Participants will be asked to select between competing offers which will allow estimation of their preferences. We will also explore the role of demographic characteristics of workers, such as education, age or migration background.

Methodology

- Discrete choice experiments are widely used in economics for measuring individuals' preferences regarding work.
- We will use regression analysis to identify the willingness-to-pay of workers.
- We will take into account heterogeneity by various subgroups of platform workers.

Data sources

- Self-gathered data.

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Back to the general description of Task 7.4

4.24. Task 7.4: (Re)assessing social innovations in social policy.

Leader: ZSI, Contributors: KU Leuven, IBS, UNIPG, ZEW, EKOF

Task description

Task 7.4 conducts follow-up case studies of documented local or regional social innovations on (1) labour market (re-) integration and social entrepreneurship, (2) social security for atypical and precarious forms of work, (3) interest representation and participation of vulnerable and marginalised groups. Cases are selected to cover different welfare state regimes (Austria, Belgium, Germany, Italy, Poland, Serbia), and conducted through desk research, interviews with 4-6 innovators and stakeholders, and presentations of these initiatives in WeLaR events. Through direct interactions of related social innovation initiatives and a comparative analysis, long-term impacts, prerequisites and obstacles will be revealed. This work complements, validates and also challenges our insights from WPs 3-6 and inspires peer learning.

Background/setting

Welfare systems need to adapt themselves to render societies more resilient, reduce inequalities and afford citizens and inhabitants effective protection from changing risks (such as job losses and reskilling needs due to technological change, the Green transition, or restructuring of economic sectors due to the COVID-19 pandemic). In this context, not just institutional change and social policies, but also social innovations have been shown to play a part. They are initiated and developed by various alliances of innovators: municipalities or regions, labour market services, social entrepreneurs, established or new NGOs, groups of people with a particular need or challenge and their advocates, and so on. Achieving social impacts is the very point of social innovation (Howaldt, 2019), and external or self-evaluation has increasingly become common practice. Indeed, there has been considerable professionalisation and institutionalisation of social innovation especially since the 2008 financial crises, up to the development of 'ecosystems' of social innovation and especially social entrepreneurship (Anheier, Krlev & Mildenberger, 2019).

Social enterprises are active in wide range of fields. Nevertheless, they concentrate in social and health services, work integration, local development, other challenges (Borzaga *et al.* 2021).

However, the labour market is a specifically institutionalised field with a strong role of public authorities, established actors and rules, both through legal regulation and social partners' agreements (Oeij & van der Torre, 2015). Hence, in the labour market social innovation is found in a continuum ranging from dedicated social innovation approaches to public-private partnerships, public-sector innovation (for example innovations within labour market services) or the incremental development of new approaches by established actors. This was shaped by labour market reforms and moves towards liberalisation and/or decentralisation after 2000, but recently inclusive and holistic approaches are also gaining ground (Clasen & Clegg, 2022). Labour market social innovations need to embed themselves with national labour market regimes, top-down policies, public sector innovation and reform initiatives, and institutionalised conflict and negotiation of the interests of employers and workers.

State-of-the-art

Social innovation covers a range of practices, aspirations and schools of thought - but there are ample social innovations that do not identify with that terminology. A frequently used definition has been developed by the FP7-SI-DRIVE project:

> *'a new combination or figuration of practices in areas of social action, prompted by certain actors or constellations of actors with the goal of better coping with needs and problems than is possible by using existing practices. An innovation is therefore social to the extent that it varies social action and is socially accepted and diffused in society.'* (si-drive.eu)

Aspirations of SI initiatives range from 'repairing' unintended and disadvantageous consequences of societal or economic change, through the 'modernising' of social practices, to 'transformation' of social systems. However, social innovation may also simply 'coexist' with other social practices (Howaldt, 2017). Still, the majority of social innovations were found to remain small, localised, and modest in terms of their aspirations for upscaling and systemic change by, for example, the SI-DRIVE project (Howaldt, 2019; Howaldt *et al.*, 2016; Millard, Holtgrewe & Hochgerner, 2017). Research on social innovation has moved from the empirical and descriptive to more theoretical approaches in recent years (Howaldt *et al.*, 2014; Moulaert *et al.*, 2022; 2014). Research paradigms mostly integrate practice theories, and also draw on theories of technological and business innovation, and on institutional approaches. Recent 'transformative' approaches also connect with political economy (Moulaert, *et al.*, 2022), theories of power (Avelino, 2021) and systems theories (Satalkina & Steiner, 2022).

As it is the case with social innovation, many conceptualisations exist for social entrepreneurship and social enterprises as well. Social entrepreneurship can be understood 'as an entrepreneurial process or activity that creates social value' (Saebi *et al.*), social enterprises as hybrid organisations that achieve social objectives through economic activities. The EU-level reports also regard the dimension of inclusive ownership-governance of an integral part of social enterprises (Bozarga *et al.*, 2021). The current lines of research on SE comprise (1) the role of the social entrepreneur with regards to their social mission, pro-social behaviour and other personality traits (Waddock & Steckler, 2016); (2) conflicts due to the dual aims of social enterprises (Smith, Gonin & Besharov, 2013); (3) the institutional settings that enable SE or that SE can change through its activities (Phillips *et al.*, 2015); (4) assessing and measuring the impact created by social-entrepreneurial endeavours (Grieco *et al.*, 2015). Additionally, research from EU[17] and the OECD[18] map and compare national social enterprise ecosystems (Bozarga *et al.*, 2021).

Labour-market related social innovation has mostly been institutionalised in the context of social entrepreneurship. Increasingly, this includes financing infrastructures across a start-up lifecycle and also targeting private capital, various awards, training and support facilities, incubators, etc. Social investment approaches are central here, and are being reinvigorated in European social policy (Vanhercke, Sabato & Spasova, 2023). Other approaches with a focus on the social economy, solidarity economy or more recently, the economy of proximity address public, private and non-profit goods and services and aspire to reshape labour markets around social value, human needs and their interplay (Moulaert *et al.*, 2022).

Depending on the structure of labour markets and LM policies and actors in each country, established social enterprises such as the large Continental European welfare providers, co-operatives in Southern Europe, charities and NGOs, both for-profit and non-profit training and learning providers, and start-up companies play a part in labour-market-related social innovation. Their best-documented fields of activity are in labour market inclusion for varied vulnerable and marginalised groups, providing jobs and training, often in combination with personal and business services or with sustainable products, for example with regard to the circular economy (OECD/European Union, 2022). Recently, digital platforms and apps to store CVs, receive job offers and career guidance for various vulnerable groups are also being developed

[17] https://ec.europa.eu/social/main.jsp?advSearchKey=socentercountryreports&mode=advancedSubmit&catId=1307&doc_submit=&policyArea=0&policyAreaSub=0&country=0&year=0
[18] https://www.oecd.org/cfe/leed/social-economy/social-entrepreneurship.htm

in partnerships of public institutions, NGOs and IT companies (for example, jobiri.com), although this is also a field of private-sector enterprises.

Other social innovations address changes in the labour market beyond conventional employment although the value of atypical and precarious forms of work is somewhat controversial in both social policy and social innovation contexts. For example, around 2017, the 'platform economy' was sometimes still considered a socially innovative provider of jobs and labour market access to people with difficulties in the conventional labour market (Addarii & Lipparini, 2017) while researchers already found that platforms offered precarious and low-wage work and in Europe were often used for second jobs (Huws *et al.*, 2017; Zysman *et al.*, 2017). Increasingly, for-profit platforms appear to exacerbate rather than improve employment insecurity. They often hire vulnerable workers who lack more stable alternatives (Kaczmarczyk, Kowalik & Lewandowski, 2022; van Doorn, 2020).

However, initiatives organising platform workers are gaining ground, both in cooperation with established trade unions and through worker self-organisation (Cini, 2023; Lamannis, 2023). Indeed, such cooperations may offer unions an inroad to shaping new and atypical forms of work in favour of workers. Other organising initiatives address new and atypical workers such as home-carers in often precarious employment/freelance contracts (for example, the IG24 initiative organising (bogus) self-employed home-carers in Austria). Some initiatives that react to the challenges of atypical work to social security of workers and the welfare state follow more of a co-operative than an organising model. For example, the originally Belgian SMART co-operative aims to act as a virtual employer/support infrastructure to freelancers in the creative industries and has expanded to several European countries.

Advancement compared to the state-of-the-art

Much research on social innovations, either large-scale mapping exercises (such as socialinnovationatlas.net), case studies or comparative analyses are restricted to snapshots at one particular point in time. Case studies generally describe some genesis and history of the case in question, but observations over a longer period of time are rare in the field of social innovation. This is also an institutional limitation in evaluation and impact assessment. As many social innovations, especially those funded through public programmes, take the shape of projects, their evaluation procedures only cover their assigned time period. However, wider impacts, ranging from an innovation's sustainability to its uptake, upscaling in its various forms, or institutionalisation (e.g. in social services or policies) tend to materialise over a longer time, and there is little known about these longer-term impacts. For this reason, we focus on documented and somewhat established social innovations and explore their development in the light

of changing labour market conditions. Not least, we aim to participate in the process of embedding and networking social innovation in the labour market by involving expert respondents from the case study in the knowledge exchanges of WeLaR foreseen in WP8.

Research to be done

To address the important subject of social innovation in social policy and welfare systems with limited resources in this project and widen the perspectives on the possibilities of improvements in welfare policies and systems, Task 7.4 conducts follow-up case studies of documented social innovations in the fields of

1. labour market (re-)integration and social entrepreneurship (for example, social enterprises also supporting Green initiatives such as waste avoidance or recycling);
2. social security for atypical and precarious forms of work (such as the originally Belgian SMART cooperative providing artists with social security);
3. and interest representation and participation of vulnerable and marginalised groups in policies addressing these issues (such as various union and company-level initiatives organising workers in the gig economy, but also workers in the informal or semi-formal sector).

Methodology

Cases and selection criteria are identified on the national and European level by each partner with support from ZSI, and innovators and other actors in these initiatives included in the stakeholder community in such a way that each subject is covered in a range of welfare regimes.

Six case studies are conducted (following a co-created reporting guideline) through desk research, expert interviews with 4-6 innovators and stakeholders per case (if possible, representing several cohorts of participants), and also live or virtual presentations of initiatives at dedicated project and stakeholder workshops. Cases that are successfully internationalising (such as the SMART cooperative) can be explored by several partners. Through direct interactions of related initiatives, case-specific and comparative analysis, a picture of longer-term impacts and their prerequisites and obstacles will be developed to complement, validate and also challenge the project's insights and engage and inspire peer learning across domains among stakeholders. Comparative analysis within each subject area is conducted by the task leader, and again discussed and validated by stakeholders. Insights may be validated and refined by live or virtual presentations of initiatives at dedicated project and stakeholder workshops that may also involve interviewees if appropriate.

Data sources

Data sources are documents of the respective initiatives and interviews with some 4-6 innovators, promotors, stakeholders, clients or users (where possible) in the respective case that cover the cases' respective histories and contexts, from ideation to upscaling, mobilisation of resources, learning processes within and beyond the organisation/initiatives embeddedness in local, regional, national and possibly international 'ecosystems', and ways of addressing ongoing societal and policy changes.

These interviews will be recorded and transcribed in line with project partners' usual practice.

Social enterprises and their ecosystems in Europe. Comparative synthesis report

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5. Concluding remarks

The report presents a detailed summary of the WeLaR project, along with a comprehensive evaluation of the ongoing research in WPs 3 to 7. The literature surveyed in this document covers two primary domains: firstly, the interplay between welfare policies and labour market dynamics in the context of four major megatrends, namely globalisation, digitalisation, demographic change, and climate change (WPs 3 to 5);

and secondly, the literature on building inclusive societies and economies with a future-oriented outlook (WPs 6 and 7).

There are two ways in which the gaps in the literature that need to be addressed are presented. Firstly, Section 3 gives a general summary of the progress made in relation to the existing state of the art at the work package level. Secondly, Section 4 provides a more detailed description of the progress made in relation to the existing state of the art for each task.

The report serves a dual purpose: firstly, to provide stakeholders or policymakers with a general overview of the project, and secondly, to assist project partners in recalling the 'big picture' and the interconnections between tasks while working on the different deliverables.

List of Figures

WeLaR is Horizon Europe research project examining the impact of digitalisation, globalisation, climate change and demographic shifts on labour markets and welfare states in Europe. It aims to improve the understanding of the individual and combined effects of these trends and to develop policy proposals fostering economic growth that is distributed fairly across society and generates opportunities for all.

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