Working paper – Deliverable 2.1

At-risk groups in the labour market

A comprehensive overview of relevant theoretical and methodological literature, political measures, and existing data across Europe and national surveys and register data.

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PATHS2INCLUDE

PATHS 2 INCLUDE

European Labour Markets Under Pressure – New knowledge on pathways to include persons in vulnerable situations

Title: At-risk groups in the labour market

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1. Introduction

This working paper is a part of PATHS2INCLUDE, a research project that has received funding from European Union's Horizon Europe (101094626). The overall objective of PATHS2INCLUDE is to disentangle the dimensions of discrimination and unequal opportunities in the labour market to gain knowledge on how to develop inclusive labour markets for persons in vulnerable situations. An overarching goal is to discover how context disproportionally exposes certain groups to risk and vulnerability over the life course and at crucial transitions. This working paper is a part of Work Package 2, which emphasises the importance of availability and quality of data that would be necessary to test theoretical assumptions and effects of policy measures to monitor vulnerability in employment.

The aim of this working paper is twofold: first, to explore the concept of vulnerability within the labour market based on a selection of prominent theories. Second, to highlight critical gaps in international and national data sources (Germany, Italy, Luxembourg, Norway, Poland, and Spain), that affect our ability to monitor the effects of employment policies targeting vulnerability in employment. The theoretical aspects and policies covered may indicate a narrow understanding of the complexities related to vulnerability in labour market attachment. However, this working paper is part of a wider overview of at-risk groups conducted within WP2 and focus on the intersection of vulnerability in hiring (WP3), career (WP4), exit (WP5), the future of work (WP6), and key determinants and plausible scenarios (WP7).

Aligning with the established policy discourse in Europe, we propose that vulnerability is context-dependent rather than inherent to specific social groups. This rejects the idea that certain groups are perpetually vulnerable, and instead, posits vulnerability as arising from situational factors, thus underlining its dynamic nature across different social standings and contexts. Rather than focusing on a particular group, our approach advocates a nuanced examination of vulnerability by considering its fluctuating nature throughout different stages of individuals' working lives, recognising the evolving risks during crucial transitions. However, to delimit the scope of this working paper, we will focus on certain groups that are at risk (hereafter referred to as at-risk groups) to a greater extent depending on the context and are defined by gender, ethnicity, presence of disability, and care responsibilities among others.

In line with the ecosystemic approaches to vulnerability, the key to decipher dynamics of vulnerability is to take a broader perspective by focusing on the contexts people live in and on the interaction between individuals and the context. One of the most significant is the Capability Approach, proposed by Nobel prize winner Amartya Sen in 1974 (Sen, 1974, 1979). According to Sen's Capability Approach, what influence one's possibility to convert personal resources into functionings (i.e., what a person can be or do) are the so-called conversion factors, that highly depend on social, economic, political, organisational, and cultural contexts where individuals live. For example, states usually guarantee full gender equality in the labour market by law. However, chances to career advancing might not be equally guaranteed if men and women have different conversion factors, such as the presence of gender-discriminating norms or imbalance in care burdens, even if they start with the same level of education or experience (Nussbaum, 2002). Another example is how context may shape barriers in labour market attachment among persons with disabilities. Due to the Capability Approach, barriers arise because of several

coinciding factors related to the nature of an impairment and other personal characteristics (e.g., age, gender, race), and the resources available to the individual, and the environment (Mitra, 2006). For example, a hearing impairment becomes a disability lowering one's employability if the person is not offered specialised training, or not provided with the necessary auxiliaries or lives in an environment permeated by disability stigma. All in all, the main added value of the Capability Approach is that it pushes us to consider functionings not as a static label but as result of a multi-level and multi-actor social process. To reinforce the idea that vulnerability is context dependent, it is crucial to examining the interactions between individuals and their environments to gain insights into the complexities of vulnerability and its dynamic nature across different contexts.

With this as a backdrop, the terms *discrimination* and *poor inclusion* cover multifaceted challenges that individuals in vulnerable situations may face within the labour market. *Discrimination*, in its narrow sense[1], is difficult to measure due to its often subtle and subjective manifestations, such as unequal treatment, biased decision-making, or systemic barriers to equal opportunities (e.g., Pager & Shepherd, 2008; Petersen & Saporta, 2004). At-risk groups may encounter discrimination at different stages of their employment career, impacting hiring processes, career advancement, and the workplace environment itself. The covert nature of discrimination poses a considerable challenge to identifying and quantifying instances of it.

Poor inclusion further amplifies the adverse impact on individuals in vulnerable situations, hindering access to employment opportunities and limiting full participation in various areas of professional life. This lack of inclusion perpetuates cycles of disadvantage, reinforces vulnerabilities and impedes individuals from realizing their full potential within the labour market. *Inclusion*, as a broader term, extends beyond mere employment and encompasses dimensions that define individuals' experiences within the labour market including equitable access to opportunities, resources, and career advancement. A comprehensive understanding of inclusion involves factors such as equal pay, access to professional development, a supportive work environment, and the dismantling of systemic barriers to career progression (e.g., Moriconi & Rodríguez-Planas, 2021).

Employment protection legislation and policies aim to prevent discrimination and facilitate the inclusion of at-risk groups in the labour market. However, assessing the effectiveness of these policies and understanding the situation of at-risk groups are challenging as relevant data often lacks. By examining international and national available data sources from Germany, Italy, Luxembourg, Norway, Poland, Romania, and Spain, we aim to find measures to identify at-risk groups. After identifying the gaps in data availability, we propose variables and data sources essential for monitoring the labour market positions of at-risk groups and assessing the effectiveness of employment policies in mitigating vulnerability.

The outline of this working paper is as follow, we first summarise established and recent research to understand the contexts that affect individuals in vulnerable situations in the labour market and the three phases of contextual vulnerability: hiring, establishment/career and work exit. An overview of policies aiming to prevent discrimination and facilitate inclusion of at-risk groups within these three phases can be found in an online attachment (A1). Moreover, we discuss the availability of relevant data to identify at-risk groups in each of the three main labour

[1] Discrimination understood as a disadvantageous unequal treatment of a social group based on ascriptive distinction.

market processes. Second, we collect recent research on digitalisation and automation as a new vulnerability in labour market attachment. Third, we discuss the results of our exploration regarding data availability for identifying at-risk groups, highlighting the deficiencies in available data. Finally, we present concluding remarks and suggestions of recommendations.

2. Three phases of contextual vulnerability

2.1. Hiring

In the context of hiring, there are two prominent economic theories that underpin the phenomenon of discrimination. Taste-based discrimination stems from a direct dislike of certain groups (Becker, 1957). This form of discrimination may be driven by the personal preferences of employers, co-workers or customers and does not consider the perceived productivity of individuals. In contrast, statistical discrimination involves employers using imperfect signals to assess the productivity of job applicants in the face of limited information (Arrow 1973; Phelps, 1972). Statistical discrimination is related to the concept of stereotyping. This can include beliefs about group-specific skills (e.g., social skills for women, leadership skills for men, poor host-country language skills for immigrants) or stereotypes concerning typical social roles, e.g., women's limited work availability. This latter process is often described through the role congruity model (del Carmen Triana et al., 2023).

Both gender and ethnicity have been confirmed as a basis for hiring discrimination in correspondence tests (i.e., field experiments in which pairs of identical CVs, differing only in the nationality/ethnicity or gender of the candidates, are sent to employers). For example, recent meta-analyses of such studies have found discrimination in recruitment based on race, ethnicity and nationality, although the magnitude of this varies between ethnic groups (Lippens et al., 2023). Furthermore, this is strongly sector dependent. Women are discriminated against in male-dominated sectors and vice versa (Galos & Coppock, 2023). Interestingly, there is evidence that ethnic minority women are not doubly discriminated against (multiple burdens or additive jeopardies hypothesis), but rather negative stereotypes on ethnicity concern mostly men (outgroup male target hypothesis) (Bursell, 2014; Dahl & Krog, 2018).

Discrimination in hiring is contextual and moderated by various factors at the country level (e.g., employment policy, family policy, economic conditions), sectoral level (e.g., level of competitiveness) or organisational level. The latter group of factors is related to the concept of the opportunity structure of discrimination, coined by Petersen and Saporta (2004), which refers to the ease of detecting and proving discriminatory practices within an organisation. In a broader sense and considering that productivity might not be fully understood by conceiving it an individual quality of workers, this theoretical framework can be applied to all organisational features or policies that reduce the scope or propensity for discrimination, such as: formalisation and organization of recruitment procedures, variety of information sources used in recruitment, diversity management practices, social accountability (e.g., transparency in recruitment and diversity monitoring), diversity training.

Research on the impact of organisational policies and practices on discrimination is scarce and often based on indirect measures. For instance, large companies and the public sector more often follow *formalised hiring procedures* and have adopted *diversity management practices*, including *accountability* structures (e.g., Dobbin, 2011; Edelman, 1992; Midtbøen, 2015).

Moreover, field experimental evidence suggests that large and public companies discriminate less (e.g., Barnerjee, Reitz & Oreopoulos, 2018; Cahuc et al., 2019; Carlsson & Rooth, 2007; Midtbøen, 2015; Zschirnt & Ruedin, 2016). Interviews with employers indicate that this is related to the degree to which hiring procedures are formalised, including the degree to which requirements are specified (Midtbøen 2015). Formalisation has also been shown to reduce discrimination in laboratory experiments in which participants were asked to perform a selection task and randomly assigned to use tools for systematizing information about job applicants or no such tools (Wolgast, Bäckström & Björklund, 2017). Other studies show that discrimination in hiring (identified through correspondence tests) was less prevalent in companies which had centralized HR departments (Berson et al., 2020). Overall, these results are consistent with the assumption that hiring discrimination can be reduced by following formalized recruitment procedures, transparency and accountability in efforts to increase diversity (Quillian & Midtbøen, 2021).

In several studies, Dobbin, Kalev, and colleagues (2006) analyse the impact of *diversity initiatives* on workforce composition among more than 800 US companies from 1971 to 2002. They find that the most effective reforms establish *managerial responsibility* and engage managers in *promoting diversity*, and those that advance accountability through *transparency in recruitment* and *monitoring of diversity* (Dobbin, Schrage, & Kalev, 2015; Kalev, Dobbin, & Kelly, 2006; Castilla, 2015). When initiatives aimed at reducing managerial discretion, such as implementing skill tests for job candidates, lead to a decline in diversity, this may indicate resistance to these initiatives (Dobbin, Schrage & Kalev, 2015; Autor & Scarborough, 2008). Similarly, Hoffman, Kahn and Li (2018) find that firms that rely less on human judgment and more on job test results in recruitment end up with better hires, but also that managers often seem to overrule test recommendations due to bias or mistakes.

As for *diversity training* which is hypothesized to affect discrimination by reducing managerial bias, it varies in content and context, making it challenging to evaluate (McGinnity et al., 2021). Kalev, Dobbin and Kelly (2006) find no aggregate effect of diversity training on workforce diversity, but modest positive effects when responsibility structures are also in place. Otherwise, training may have a negative effect, perhaps due to generating backlash. Studies also suggest that voluntary training leads to better results (Dobbin & Kalev, 2016), but that it may only benefit participants who appreciate diversity at the onset (Devine & Ash, 2022). Overall, reviews of the literature on diversity training suggest that more research is needed to determine which prejudice-reducing technique(s) are successful, its persistence, and most importantly, whether the intervention changes discriminatory behaviour beyond self-reported attitudes (Devine & Ash, 2022; Paluck et al., 2021; Valfort, 2018).

The *organisation of the recruitment process* has the potential to reduce the scope for discrimination (at least at the initial stages of the recruitment process), which has been known at least since the publication of the seminal paper by Goldin and Rouse (2000). The authors showed that the introduction of blinded auditions in symphony orchestras significantly increased women's chances of being hired. Results from field experiments with *anonymised application procedures* (AAPs) (which mask characteristics that identify applicants) are mixed. There is evidence that such solutions moderately reduce (ethnic) discrimination (Blommaert et al., 2023), but the opposite has also been reported (Behaghel et al., 2015). There is evidence that even with anonymised CVs, recruiters still try to infer gender, based on other available information (Foley & Williamson, 2018). However, quasi-experimental studies provide evidence that gender-neutral job advertisements reduce gender discrimination in hiring (Card et al., 2021; Kuhn & Shen, 2023).

More detailed individual information about applicants has been suggested as an explanation for the tendency that hiring discrimination tend to be lower in German-speaking countries than in the rest of Europe (Quillian & Midtbøen, 2021; Zschirnt & Ruedin, 2016). In German-speaking countries, applications are more extensive than elsewhere, requiring detailed documentation about job candidates. A field experiment study in the German labour market show that ethnic discrimination disappears when the analysis is restricted to applications including reference letters with favourable information about the candidates (Kaas & Manger, 2012). By contrast, findings from the cross-national GEMM field experiment[2] did not support the hypothesis that increasing personal information about applicants reduced discrimination (Thijssen et al., 2020, 2021).

Finally, *antidiscrimination legislation* aims to prevent discrimination, yet evidence on its impact on hiring discrimination is limited. In a meta-analysis of field experiments conducted in OECD countries between 1990 and 2015, Zschirnt and Ruedin (2016) did not find any reduction in the level of ethnic discrimination after the implementation of two EU directives that mandated antidiscrimination measures to be adopted by all member states in 2000. However, studies show that the introduction of antidiscrimination laws can shape social norms and attitudes towards groups at risk of discrimination (Valfort, 2018; Tankard & Paluck, 2017). Moreover, the impact of antidiscrimination law is likely to depend on its implementation and enforcement (Reskin, 2003). In the US, for instance, employers responded to antidiscrimination laws by implementing diversity initiatives (Dobbin, 2011; Hirsh, 2009).

Two primary theories underpin much of the research on hiring discrimination. Taste-based discrimination stems from direct prejudice, while statistical discrimination arises from stereotypes and evaluations made under imperfect information. While these studies have significantly advanced our understanding of discrimination, they offer few starting points for developing effective policies and interventions at the company level. Evidence for gender and ethnic discrimination in hiring is well-established. The prevalence of hiring discrimination is influenced by factors at the country, sectoral, organizational, and individual levels. Organizational factors, such as the structure of the recruitment process, inclusiveness measures (e.g., gender-neutral job advertisements, blinded recruitment, hiring channels), diversity training, and workplace diversity practices, as well as the gender and ethnic composition of the workplace remain understudied. This also applies to organisational structures and procedures necessary for successfully and sustainably integrating minority workers after they are hired. Given the central role of hiring in perpetuating social inequalities, advancing our understanding of these factors contributing to discrimination is crucial for informing effective policies.

2.2. Establishment / Career

2.2.1. Gender gap

Recent methodologies emerging from pioneering research aims to provide alternative reasons for the remaining gender gap (Eurostat, 2024). In the following, we will delve into the impact of

[2] Data from the GEMM project are available: The GEMM Study: A Cross-National Harmonized Field Experiment on Hiring Discrimination - DANS Data Station Social Sciences and Humanities. DOI: 10.3030/649255) DOI: 10.3030/649255))

psychological characteristics, the recent trends on household family specialization, and the effects of societal norms linked to childbearing on women's careers.

Firstly, recent hypotheses propose that gender discrepancies in psychological traits such as risk propensity, competitive attitudes, social inclinations, and bargaining can influence women's professional trajectories. On the one hand, risk-averse individuals, which are predominantly women, tend to gravitate towards roles with steadier incomes, albeit with lower pay rates due to compensatory differentials. Experimental evidence suggests that women exhibit higher levels of risk aversion compared to men (Borghans et al., 2010). On the other hand, regarding competitiveness, women may underperform in that type of settings, as evidenced by studies like those conducted by Niederle and Vesterlund (2007) or Gneezy et al. (2003), which demonstrate that women perform less effectively in competitive environments. However, women perform on par with men in single-sex competitive scenarios. Lastly, gender disparities in negotiation tactics directly impact earnings: according to Exley et al. (2020), women engage in wage negotiation much less often than men, resulting in a difference in terms of remuneration between males and females. Besides, even if women seem to know when to negotiate, they obtain worse overall outcomes when they are forced to do it.

Secondly, the benefits of household specialization are diminishing over time, coinciding with the decline of the traditional breadwinner-homemaker family model. With higher wages and evolving career preferences among women, their amount of time spent on household duties has decreased (Sofer & Thibout, 2019). However, despite this trend, patterns of internal specialization persist (Eurostat, 2019). One of the main reasons for that could be the remaining gender norms in terms of housework use of time. Concretely, the work of Farré et al. (2021) studied how the pandemic impacted the employment of both males and females, and how in the lack of it, the household division was set. They concluded that while men slightly increased their participation in home production, the burden continued to be borne by women, irrespective of their labour market situation. Hence, the continuity of these gender-specific trends in household specialisation aligns with the forecasts of recent models that emphasize the significance of social norms in accounting for the persisting gender disparities in the labour market.

Finally, compelling evidence suggests that a significant portion of the current gender gaps in labour market outcomes stem from parenthood. Studies by Kleven et al. (2019), Lundborg et al. (2017), and Angelov et al. (2016) point to a negative association between having children and women's wages. This implies a causal link where motherhood impacts work experience, which leads to part-time employment, and influences productivity due to those constraints. Despite policy interventions like parental leave and subsidized childcare, disparities persist, partly due to entrenched social norms. Recent research indicates that deviating from traditional gender roles can incur costs for women, affecting both their career and marital prospects. Bursztyn et al. (2017) suggest that women may conceal professional ambitions to enhance marriage prospects, while Folke and Rickne (2020) propose that promotions may adversely affect women's likelihood of divorce, hinting at societal aversion towards female breadwinners.

Accompanying those emerging gender theories with public policies is paramount to fostering societal progress and equality. By integrating these new approaches into policy frameworks, governments can address entrenched gender disparities and promote inclusivity. Policies informed by these theories can tackle systemic issues such as wage gaps, workplace discrimination, and gender-based violence. Consequently, this practice may allow to better understand the gender dynamics, leading to more effective and equitable outcomes for all

members of society. In the following, we give a brief description of three different policies that give different results regarding gender equality.

The first policy in focus is paternity leave, a policy aimed at increasing fathers' involvement in childcare, which in turn may promote gender equality. A recent study by Farré et al. (2023) indicates a positive effect of paternity leave on gender norms and its long-term effects on the next generation. The authors leveraged the *implementation of paternity leave* in Spain as an external stimulus that notably increased fathers' involvement in childcare and household duties over time. The researchers contrasted children (within the same school cohort) born around the date of paternity leave initiation on March 24, 2007, with the preceding cohort (children born in 2006) serving as a control group. Their findings reveal that children whose fathers were eligible for paternity leave exhibit notably more egalitarian attitudes and behaviours concerning gender roles at ages 11-13. Moreover, offspring born post-reform tend to hold less stereotypical assumptions regarding their own employment prospects following parenthood.

A second relevant study of that Spanish reform is the one conducted by González and Zoabi (2021). Alternatively, this time the authors aimed to explore the effects of the policy on the take up of paternity leave, employment, time use, fertility, and divorce. They focused on low, intermediate, and high wage gap couples, and how their household specialization changed. The researchers didn't find significant effects of paternity leave on low or high wage gap couples. However, they concluded that, among intermediate gap couples, the two-week paternity leave led to a 3 percentage-point drop in the fraction having another child, a 4 percentage-point increase in the divorce rate, a persistent increase in fathers' housework and childcare time of more than an hour per day each, and an increase of 8 percentage points in maternal employment two years after childbirth.

The second policy is related to a change from collective bargaining agreements to flexible wage determination by individual negotiation. The study by Biasi and Sarsons (2022) give an example of a public policy that worsened the labour salary equality. The authors aimed to study the impact of psychological traits, concretely the *bargaining power of women*, to access to better or more equal salaries compared to their male counterparts. The researchers examined the assessment of salaries for public-school educators in Wisconsin, where a reform in 2011 permitted school districts to establish teachers' salaries more flexibly and partake in individual negotiations. They demonstrated that adaptable pay decreased the salaries of females compared to males with equivalent qualifications. Survey data indicated that the difference was partially influenced by women participating less frequently in negotiations overcompensation, particularly when dealing with a male counterpart, suggesting that *salary discretion* and *wage bargaining* are significant factors contributing to the gender pay gap.

Finally, the last policy chosen is the pay transparency law, which requires employers to disclose salary information to job candidates and current employees, making workplaces more transparent and equitable. Here we present two studies with similar findings for the case of Austria. Gulyas et al. (2023) examine the impact of the 2011 Austrian Pay Transparency Law, which states that firms above a size threshold are obliged to publish internal reports on the gender pay gap. The authors concluded that the policy neither affected male and female wages nor did it narrow the gender wage gap. Similarly, Böheim and Gust (2021), who estimated the impact of the law on men's wages, women's wages, and the gender pay gap for the same policy, also concluded that the policy did not change wages or the gender wage gap. Indeed, for larger firms, they estimate that the transparency law led to a lower share of women in treated firms.

In conclusion, the presented emerging theories on discrimination in career trajectories and labour market inclusion shed light on pervasive inequities. Pairing these theories with targeted public policies is essential for fostering inclusive workplaces and dismantling barriers to success. The examples provided demonstrate the potential impact of such policies but must be aligned with the evidence collected in the academic literature. By aligning theory with action, societies can move closer to realizing equitable opportunities for women in the labour market.

2.3. Ageing Workforce and Work Exit

Retirement patterns reflect societal values and context circumstances. Restrictive conditions and unsupportive contexts can trigger early exits, leading to increased risks of poverty and social isolation (Dropkin et al., 2016), while enabling environments can help expand working lives. At individual level, retirement can be accompanied by a loss of purpose and social connections, ultimately impacting on identity and well-being (Sullivan & Al Ariss, 2021). Several established and emerging theories are relevant for explaining the dynamics of late working life of older adults.

Disengagement Theory, foundational in the field of gerontology, posits that ageing naturally leads to withdrawal. This in turn leads to fewer social interactions at individual level and to a general societal push for older individuals to step back from prior roles, theoretically benefitting both the individual and society (Cumming et al., 1960; Cumming & Henry, 1961; Markson, 1975). Continuity Theory, in contrast, highlights the role of maintaining continuity in older age through personal history and life roles that are connected to earlier experiences (Atchley, 1971, 1989). Focusing on individual factors, the theory provides valuable perspectives on how older adults manage work and identity transitions (Kim & Kang, 2017; Sewdas et al., 2017). While the first two theories tend to place social factors in the background, Human Capital Theory emphasises their importance. Human Capital Theory focuses on the individual worker value and highlights the importance of education and training for older workers, in order to address challenges such as skills obsolescence and age biases. The theory envisages skills and knowledge as (ageless) economic assets, and aims to improve worker employability (Becker, 1964; Mincer, 1958; Schultz, 1972).

Beyond these fundamental theories, there are some emerging theories that primarily address recent developments in welfare states, migration, and technological innovation. Some examples are the "Early and Traditional Late Exit Regimes," the "Ageing-in-Tech Job Vulnerability Framework," and "Transnational Aging." “Early exit regimes” and “traditional late exit regimes” theories (Ebbinghaus, 2006; Hofäcker et al., 2015; Solem & Øverbye, 2017) are theories focusing on policies integrated in types of welfare states. Overall, these policies focus on care, labour market attachment and family support according to different degrees of decommodification and defamilization, which can affect the general tendencies of different countries towards early or late exit. "Ageing-in-Tech Job Vulnerability Framework" (Alcover et al., 2021) explores older workers' adjustment to digitization and employers' perceptions of their digital adaptability, this theory builds on technological acceptance and socio-ecological models (Fasbender, Gerpott & Rinker 2022; Chang, Xu, & Xie 2023), highlighting organizational strategies for an aging workforce. Older workers are unevenly being pushed out or maintained in the workforce based

on the intersection of technological change in organisations and gender, education level (Casas & Román 2023), occupations, skill level (Acemoglu & Restrepo, 2022, Aisa, Cabeza & Martin 2023), the extent to which job content incorporates technology (Casas & Román, 2024) and personal aging experiences rather than chronological age (Drazic & Schermuly, 2021; Casas & Román, 2023). Another set of emerging theories incorporating changes in ageing due to new mobilities and changing family relations are the Transnational Ageing Theories (Horn et al., 2013, 2015, 2017). These explore how retirees with migrant backgrounds seek transnational post-retirement mobility to reunite with their families (Hunter, 2018; Nedelcu et al., 2023). European policies still lack adequate social security schemes that could provide lifelong income for returning migrants, who face unique barriers that lead to greater self-employment and divergent career paths compared to non-migrants (Böcker & Hunter, 2017; Clark, Drinkwater & Robinson, 2017).

Several policies aim to prolong working life by facilitating occupational health, working environment and institutional factors, a brief description of some relevant policies and factors are provided below.

Addressing the challenges that aging populations face in the workforce requires a stronger focus of occupational health policies for older workers. Policies that promote the extended participation of older workers such as health screenings, active living and ergonomic approaches can help keep aging workforces healthy and engaged (Söderbacka, Nyholm & Fagerström, 2020). Health is crucial, as pre- and post-retirement stages, as well as successful aging and transitioning out of the labour market is heavily influenced by health, while at the same time it affects post-retirement employment and overall well-being (Scharn et al., 2018, Wallenius, 2022; Stiemke & Heß, 2022; Montizaan et a., 2016). An example of a policy model for health management is the Occupational Health Services (OHS) in Europe who, particularly in Finland, have been shown to improve workplace health outcomes for aging populations (Hämäläinen, 2020). This is achieved by integrating traditional health risks - physical, chemical, and biological hazards commonly found in work environments - and non-traditional risk factors, such as stress, mental health, and work-life balance (Magnavita, 2017). EU Directive 89/391/EEC harmonizes OHS across EU member states, for better health and safety standards, though implementation varies at a national level (Hämäläinen, 2020). In the case of Finland, for example, OHS have chosen a multidisciplinary approach, going beyond conventional measures and including extensive health promotion, disease prevention as well as broader public health, labour, and social welfare policies (Hämäläinen, 2020). The model focuses on engaging stakeholders on a dual funding strategy, involving employers and employees both (Sakowski & Marcinkiewicz, 2019). It seeks to reduce lifestyle-related diseases through healthier choices for an aging workforce. This proactive approach mitigates existing workplace risks while enhancing long-term workforce well-being and serves as a benchmark for occupational public health integration (Sakowski & Marcinkiewicz, 2019, Magnavita, 2017).

Another example of policy aimed to retain aging workers is flexible work arrangements (FWAs), such as time and task flexibility, number of work hours, or location of work. The empirical evidence on their efficacy is mixed (Chen & Gardiner, 2019). Reviews and studies indicate that organizational barriers and regional variations influence the effectiveness of FWAs, with some regions showing positive outcomes like delayed retirement, reduced stress, and enhanced well-being (Boyle, 2020; König et al., 2016; Sanders & McCready, 2010). As a downside, however,

these arrangements can sometimes decrease earnings, pointing at the need for balanced policies (Hermansen, 2015). Further complicating the matter, precarious employment can question the idea whether there is a “choice” to working post-retirement. Retirement can transform from a "social right" to a "social risk" as older workers face financial insecurity on one hand and limited job opportunities on the other (Philipson, 2020).

Subsidies for hiring older workers are policies aimed at supporting companies in hiring and retaining older workers, often aimed at those aged 50 or more. These subsidies can take various forms, including hiring subsidies, reimbursement of social security contributions and wage subsidies, which can cover up to 80% of the minimum wage for employing older workers (OECD, 2019). The primary goal of these subsidies is to address the challenges older workers face in finding new jobs and to promote longer working lives by offering older workers good employment opportunities. The effectiveness of wage subsidies is in some instances poor (Graf, Hofer & Winter-Ebmer 2011, Brown & Koettl 2015) and can be hindered by various demonstrated effects like deadweight (giving subsidies for workers who would have been employed without them), displacement (of other workers), and substitution effects (replacement of regular workers with subsidised workers, which can lead to a reduction in the employment of non-subsidized workers) (Brown & Koettl, 2015) and could, overall, induce stigma and discrimination (Boockmann, 2015; Dalle, Verhofsdadt & Baert, 2024). At the same time, wage subsidies have been proven to have effects not on long-term retainment, but only on the retainment of older workers who are at risk of early retirement (Albanese & Cokx 2019). Therefore, subsidies for employers that could reduce costs of hiring older workers could have a better efficiency when combined with removing early retirement incentives and increasing older workers’ employability (Konle-Seidl, 2018). In the context of the COVID-19 crisis, while many countries focused on protective measures for older persons, a smaller share of countries have implemented various measures targeted specifically towards the retainment of older workers. For example, Spain enabled temporary subsidies to encourage the hiring of older workers, particularly those aged 55 or more who, once unemployed, may have difficulties finding a new job (Eurofound, 2022).

While subsidies for organisations hiring older workers seem to have minor effects on extending working lives and promoting retainment of older workers, workplace policies focused on digitalisation can have a major contribution to the working life span of older workers (Komp-Leukkunen, 2023). While organisational and country contexts matter, we have evidence that low-skilled ageing workers are more vulnerable to change involving technology than high skilled ones (Aisa Cabeza & Martin, 2023), while older workers who perform routine tasks perform worse than younger employees when technology is involved (Yashiro et al., 2020; Lakomý, 2023; Nguyen-Thi et al., 2024). The introduction of computers and robots in the workplace can displace older workers, leading to early retirement, especially for those with shorter remaining working lives (Yashiro et al., 2020), however digital technologies can lighten the workload of older workers, making their work tasks less physically demanding and for some specific jobs allowing them to work from home instead of traveling (Komp-Leukkunen et al., 2022). The effects of technological change on early retirement can increase under specific policy measures such as unemployment or disability benefits, with older workers who are eligible for these benefits being more likely to exit early when they are compelled to deal with digital technologies in the workplace (Yashiro et al., 2020). While responses to these effects may vary, some measures can have positive impact on maintaining employment, like compensation policies of

older workers labour, investment policies that prepare and upskill workers, and steering policies that redirects groups of older workers to specific jobs (Bürgisser, 2023).

There are at least four different types of connected institutional and structural factors that influence older workers' decisions and possibilities of when to exit the labour market. The first two, *pull- and push factors*, seek to explain early exit. Pull factors are institutional arrangements for specific welfare state regimes that include social safety incentives, such as generous disability- and pension benefits, related to financial opportunities that give incentives for (voluntarily) early work exit (Hofäcker & Radl, 2016). Push factors, on the other hand, are related to structural labour market constraints that drive older workers involuntarily out of work (Ebbinghaus & Hofäcker, 2013). Labour demand shocks with subsequent high unemployment rates that may reduce the employment opportunities of older workers, and in combination with strict employment protection legislation (EPL) can increase the likelihood of an early exit as firms induce early retirement as a shedding strategy (De Preter et al., 2013; Ebbinghaus & Radl, 2015). The other two, *maintain- and need factors*, seek to explain stay factors that will influence late exit (Ebbinghaus & Hofäcker, 2013; Hofäcker & Radl, 2016). Maintain factors at the institutional level are policies that postpone retirement (Kuitto & Helmdag, 2021), like active ageing policies, financial incentives for late retirement; at the organisational level, they include good working environments promoting adjustments and training for older members of the workforce (van Dalen & Henkens, 2020), and a prevalence of age-equality norms (Mulders et al., 2020). Need factors are related to policy measures that increase the financial need to remain in work, by restricting or closing pathways of early exit through reducing the replacement rate of disability or retirement benefits and unemployment insurance (Hofäcker & Radl, 2016). Furthermore, according to Ekerdt (2010), the family is an important social structural context that can explain work exit among spouses. How spouses coordinate their effort in the work force or joint work exit, depends on institutional factors and will vary among different social groups, between men and women, and across countries.

In conclusion, theories, research, and policies presented in this section highlight that context is an important dimension in which different access to and control of resources creates vulnerable situations for different at-risk group. According to the above-mentioned types of institutional and structural factors, neither early nor late exit will necessarily predict vulnerability. Policies aiming to extend working lives may exacerbate social inequalities and shape vulnerability. Low-skilled older workers are more vulnerable to technological change than high skilled and their younger counterparts. Vulnerability can depend on resources such as financial resources (own and partner's income, transfers, living costs), own or relatives' health, care responsibilities or care support (family members or public service), and ability to adapt to technological changes (low-skilled older workers are more vulnerable to technological change). As such resources are not equally distributed in society, different groups leave the labour market at different ages and for different reasons.

3. Digitalisation and automation: new vulnerability in labour market attachment?

Digitalisation and automation have significantly reshaped the labour market, prompting a shift in the demanded skills. Technological advancements hold promises of increased efficiency and productivity, but they also present challenges for at-risk groups in the workforce, who may struggle to adapt. It has been observed that digital technologies have unequal impact as it is highly complementary to more skilled and higher educated workers (Autor, Levy & Murnane, 2003; Goldin & Katz, 2009), and have been used to automate less skilled work (Autor, Levy & Murnane, 2003; Acemoglu & Restrepo, 2022).

Two main theories are crucial for understanding and addressing the challenges faced by at-risk groups and mitigating disparities in the evolving labour market affected by digitalisation and automation: Skill-Biased Technological Change (SBTC) and Routine-Biased Technological Change (RBTC). The SBTC theory suggests that when technology advances, it disproportionately rewards workers with higher skills and education, as these individuals can complement new technologies effectively (e.g., Krueger, 1993; Autor, Katz & Krueger, 1998). This results in higher wages for high-skilled workers at the cost of less-educated low- and middle-skill workers, leading to wage inequality. The SBTC hypothesis is evidenced by a robust connection between the use of computer-based technologies and the increasing demand for college graduates. Recent literature views technological change as routine-biased rather than skill-biased. The RBTC theory links digitalisation and automation to the level of routineness of jobs. It suggests that modern technologies are designed for handling routine and easily codified tasks, leading to the replacement of workers in routine-intensive jobs, often found in the middle-income range (Autor, Levy, and Murnane 2003). The RBTC hypothesis accounts for the phenomenon of job polarisation, where both high-education and low-education jobs grow simultaneously while middle-skilled employment opportunities decline (Autor & Dorn, 2013; Acemoglu & Autor, 2011; Goos, Manning & Salomons, 2014; Acemoglu & Restrepo, 2017).

In the following, we will focus on women, persons with disabilities, older workers and immigrants as possible at-risk groups in the future of work.

Women generally face a slightly higher risk of job displacement due to automation than men (OECD, 2018a; Genz & Schnabel, 2021; ILO, 2022). Recent studies often analyse occupational and task-level data to discern gender differences in labour market outcomes. The documented higher risk of automation for women potentially relates to differences in work content by gender. Women are found to be somewhat more likely than males to undertake routine tasks (most prone to automation) and less likely to undertake complex tasks across different occupational categories (Autor & Handel, 2013; Piasna & Drahokoupil, 2017; Brussevich, Dabla-Norris & Khalid, 2019). However, at the same time, women are more likely than men to be employed in occupations requiring greater cognitive and interpersonal skills (Cortes, Jaimovich & Siu, 2018; Genz & Schnabel, 2021), which are less prone to automation. Thus, studies also link a narrowing gender wage gap to the relative increase in the returns to skills characteristic of occupations performed by women. Black and Spitz-Oener (2010) show that the performance of different non-routine tasks converged between men and women while the performance of routine tasks diverged. They conclude that these relative task changes account for about half of the wage gap's narrowing during the analysed period in West Germany. Similarly, more and

more studies suggest that women have a comparative advantage at tasks that involve intellectual abilities ("brains") as opposed to physical labour ("brawn"). Consequently, the narrowing gender pay gap is linked to decreased relative demand for physical tasks (Beaudry & Lewis, 2014; Bhalotra, Fernández Sierra & Venkataramani, 2015; Rendall, 2017; Yamaguchi, 2018).

Digitalisation can help balance paid employment with caregiving responsibilities (e.g., OECD, 2017), primarily by women (OECD, 2018b). Recent evidence suggests that while remote work reduces the gender gap in working hours and monthly earnings among parents, mothers do not experience an increase in hourly wages, unlike fathers (Arntz, Sarra & Berlingieri, 2019). While social norms may become more progressive as fathers spend more time on childcare and housework due to remote work (Alon et al., 2020), there is also a risk of feminisation of remote work and the reinforcement of traditional gender roles in the workplace (Arntz, Yahmed & Berlingieri 2020; ILO, 2022).

The impact of technology on the labour market attachment of *persons with disabilities* is complex. Predominantly, studies emphasise positive effects as technology facilitates flexibility, diminishes barriers, and improves communicability, particularly for individuals with sensory and physical impairments (UNESCO, 2013; Schur et al., 2017; Weller, 2019). A recent study in Germany found that computer technology has a similar impact on the tasks of employees with and without disabilities. The technology complements routine tasks and replaces non-routine tasks for employees with disabilities (Weller, 2019). However, counterarguments point to the increasing complexity of technology applications, leading to higher skill requirements and potential difficulties for individuals with disabilities (van Holstein et al., 2021). Moreover, research suggests a higher substitutability potential for employees with disabilities, particularly among low-skilled workers, in the context of diminishing unqualified jobs (Weller, 2020).

Older workers are less likely to use and more likely to struggle with digital technologies (Koning & Gelderblom, 2006; Schleife, 2006), as they can be less incentivised to invest in human capital. Older workers have been found to be more likely to retire early (Bessen et al., 2023) and experience the negative consequences of work intensification due to technological advances (Mauno et al., 2019; Alcover et al., 2021; Tams et al., 2022). Computerisation also negatively affects the wages of older workers, particularly women and workers in occupations easily replaceable by computers, such as office workers (Hudomiet & Willis, 2022). Additionally, adopting new technologies has been found to decrease firms' demand for older workers (Behaghel, Caroli & Roger, 2014) and reduce their role as mentors or knowledge transmitters in the workplace (Greenan & Messe, 2018). The gig economy may offer flexibility and a choice of work intensity but also lowers earnings among older workers. Whereas earnings for people in traditional jobs increase steeply with age, Uber earnings are found to be declining in older age due to their based-on-productivity nature (Cook, Diamond & Oyer, 2019).

Basso, Peri, and Rahman (2020) show that computerisation disproportionately increases employment in manual and service jobs for *immigrants* compared to native-born individuals in the US. However, in Germany, Giesing and Rude (2023) show contrasting findings, where natives benefit from technological change while migrants experience adverse effects, such as a widening wage gap across skill groups and reduced job mobility due to automation. This underscores the productivity and complementarity effects for natives and the displacement effects for migrants (a replacement of certain tasks traditionally performed by labour by technology).

Digitalisation and automation's impacts on the labour market have been increasingly discussed among policymakers, but this has not translated into concrete policy action (Baranes, 2020; Spencer et al., 2021; Bürgisser, 2023). Most pressingly, digitalisation and automation led to job displacement and a proliferation of non-standard work arrangements, which circumvent worker protection laws. Three primary types of policies have been proposed to address the negative effects of technological advancements: skills and training provision, measures to extend social protection coverage, and digital work-life balance initiatives (e.g., establishing a European-level 'right to disconnect'). Empirical studies that explicitly study technology-induced labour market risks and the impact of these policies, including at-risk groups, are very rare (Hynes et al., 2020; Bürgisser, 2023).

Research on *skills and training provision* and educational adaptation to recent technological changes remains limited (Bürgisser, 2023). Existing studies highlight the cumulative disadvantage in adult education, where workers at risk of automation are less likely to receive job training (Nedelkoska & Quintini, 2018). This indicates that while training programs are beneficial, they may not reach those who most need them. At the same time, education's critical role has long been pointed out (Goldin & Katz, 2007; Bührer & Hagist, 2017), with evidence suggesting that some models of educational systems are associated with reduced negative impacts of technological change on labour force participation (Grigoli et al., 2020).

In conclusion, while digitalisation offers opportunities for flexibility and accessibility, it also introduces barriers and exacerbates existing inequalities for at-risk groups. First, growing skills disparities driven by digitisation and automation threaten to exacerbate existing wage inequalities, disproportionately affecting less educated and medium-skilled workers. Second, some gender disparities persist, with women facing a higher risk of job displacement due to automation. Third, the impact on carers, people with disabilities, older workers and migrant workers underlines the need for targeted policy responses.

4. Availability of data to monitor the situation of at-risk groups in the labour market

The second aim of this working paper is to highlight critical gaps in international and national data sources that affect our ability to monitor the effects of employment policies targeting vulnerability in employment. To achieve this aim, a review of the available European, international and national databases of the countries that are part of the PATHS2INCLUDE project (i.e., Germany, Italy, Luxembourg, Norway Poland, Romania and Spain) was carried out. Specifically, 18 European/International and 38 national databases were reviewed (see 9. Online appendix for a complete list). The main selection criterion was that the databases provided information on employment and the labour market. Once the databases were selected, the relevant information from each of them was collected using a detailed template. The information collected was: 1) basic data of the database (e.g., coverage, time period covered, survey method, sampling); 2) target population; 3) description; 4) identification of at risk groups (questions/variables that allowed the identification of certain at-risk groups); 5) relevant information/variables (e.g., socio-demographic, labour market data); 6) strengths and weaknesses; 7) potential improvement. The complete templates for each of the databases can be found in the Appendix.

The information we reviewed in the databases to identify at-risk groups are persons with disabilities, low socioeconomic status (SES), low educational level, gender identity, sexual orientation, mothers or lone parents, carers, physical appearance, older persons (+60), young people (below 30), migration background, race or ethnicity, religious affiliation and citizenship. Furthermore, even though they are not among the at-risk groups selected for our review, it is essential to acknowledge that there are often other categories systematically excluded from standard statistical surveys. These include, for example, homeless people, illegal migrants, and institutionalized individuals and the exclusion occurs primarily due to the significant challenges associated with collecting data from these groups using standard methods.

4.1 Individual data to identify at-risk groups

European and International databases

This section gives an overview of our review of available European and international databases that include employment and labour market information. Table 1 shows all the European and international databases included in the review and are divided into which at-risk groups that can be fully identified, partially identified, and cannot be identified. The first five databases in Table 1 are from EUROSTAT (i.e., EU Statistics on Income and Living Conditions, EU Labour Force Survey, Adult Education Survey, European Health Interview Survey, Household Budget Survey).

Our review shows clearly that these databases have limitations in identifying at-risk groups. Based on EU-SILC and EU-LFS data, which are one of the most comprehensive labour market surveys at European level, there are four conditions that we in particular want to emphasise. First, there are no specific questions on the presence of disabilities. It is only general questions

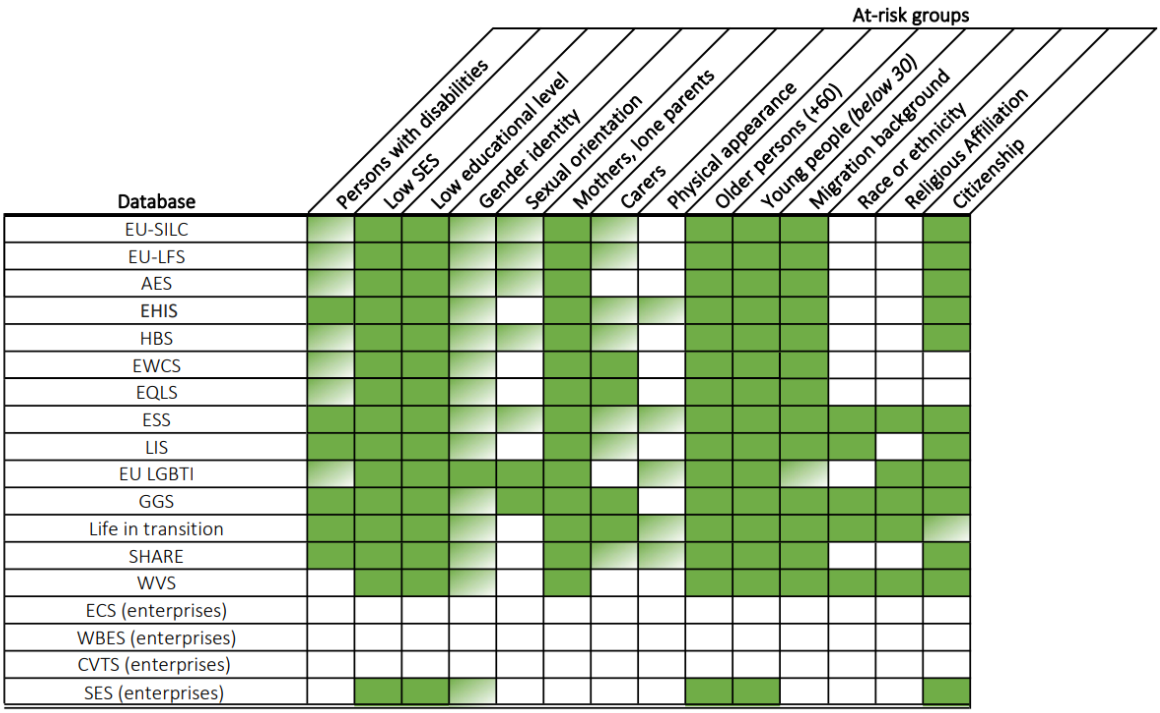
on health or long-lasting illness. Second, detailed information to identify the respondent's gender identity or sexual orientation is scarce. Third, information on physical appearance, race or ethnicity, or religious affiliation is missing. Fourth, questions to measure or identify care responsibilities for own children, parent or other relatives is scarce. The same shortcomings are found in the other databases from EUROSTAT.

Two other relevant databases reviewed are European Working Conditions Survey and European Quality of Life Survey from EUROFOUD. In these two databases, we observe the same limitations of possibilities to identify impairment and disabilities, gender identity, sexual orientation, physical appearance, race or ethnicity and religious affiliation. Another limitation is that they do not include information on citizenship. However, a strength is that these databases include relevant information that allows us to identify persons with care responsibilities.

There are other relevant databases (i.e., European Social Survey, Luxembourg Income Study Database, EU LGBTI, Gender and Generations Survey, Life in transition Survey, Survey of Health, Ageing and Retirement in Europe, World Values Survey) that include information to identify at-risk groups that are missing or scarce in the EUROSTAT and EUROFOUND databases. For example, most of them include specific questions on disabilities, race or ethnicity or religious affiliation. Furthermore, the EU LGBTI, Gender and Generations Survey also include specific questions on sexual orientation. However, these databases have limitations such as limited country coverage, limited information on labour market, small sample sizes or low periodicity in publishing data.

Finally, some surveys responded by managers, that focusing on enterprises were included in the review (i.e., European Company survey, World Bank Enterprise Survey, Continuing Vocational Training Survey, Structure of Earnings Survey). The main limitation of these databases is that they do not include information on their employees' characteristics. However, the Structure and Earning Survey from EUROSTAT includes information on socioeconomic status, educational level, age and citizenship of their employees.

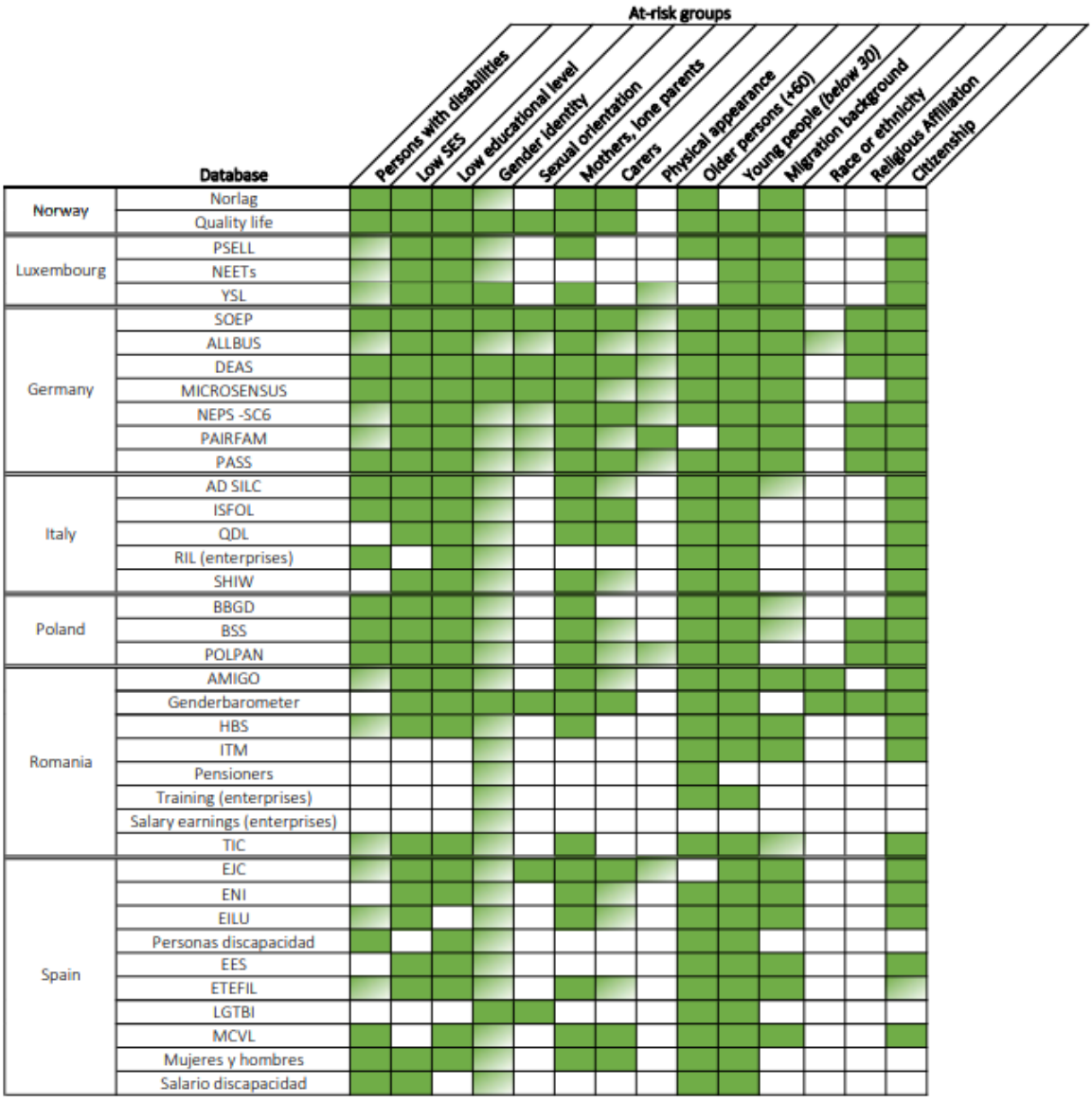
Table 1. Summary of at-risk groups that can be identified in European and international databases



National databases

A review of the available national databases in Germany, Italy, Luxembourg, Norway Poland, Romania and Spain can be found in Table 2 and shows the summary of at-risk groups that can be fully, partially or not identified in each of the databases. As shown in the table, the number of available databases within the countries varies from two in Norway to ten in Spain. The low number of databases in Norway may partly be due to access to register data. We decided not to include register data as there are strict restrictions to access and not available to researchers outside Norway, this apply for other countries where register data is available for research purposes. Based on our review, there are certain at-risk groups that are difficult or impossible to identify in most countries due to lack of information on physical appearance, race or ethnicity, or religious affiliation. Regarding the identification of the at-risk groups there are differences between the country with more comprehensive information in the databases, such as in Germany, while Romania is the country where less at-risk groups can be identified.

Table 2. Summary of at-risk groups that can be identified in national databases



	The at risk-group can be identified
	The at-risk group can be partially identified
	The at-risk group cannot be identified

Contextual data and cross-country comparability

PATHS2INCLUDE looks at how context expose certain groups to risk and vulnerability in labour market over the life course. Therefore, as vulnerability is understood as context-dependent rather than inherent to specific social groups it is essential to look at the availability of contextual variables in the reviewed databases. As mentioned above, there are certain databases that allow for cross-country comparisons, with certain limitations.

Some of the most comprehensive and comparable databases are those from EUROSTAT, EUROFOUND and the database SHARE. These databases have a good coverage of countries. However, cross-country comparison has also some limitations in these cases, for example, in EUROSTAT surveys even there is a standardise questionnaire and harmonised questions for all the countries, there is freedom for each country to translate the questions into its own language and context. This may represent small changes in the meaning or interpretation of the questions and therefore limitations in the comparability of certain variables.

Questions related to stigma or sensitive information such as health or disabilities can have different interpretations depending on country contexts and culture. For example, as shown in table 3, there are huge differences in the percentage of people who report having a long-standing illness or health problem, ranging from 33.8% in Germany to 6.8% in Romania. These differences are difficult to interpret as we do not have information on how the respondents understand or interpret the question, or what they consider long-lasting illness or health problem.

Table 3. Percentage of people having a long-standing illness or health problem. 16 years and above, excluding retired persons.

	Germany	Spain	Italy	Luxembourg	Poland	Romania	Norway
2021	33.8	32.7	14.1	20.9	26.2	6.8	38.9*

** Norway's percentage does not exclude retired persons.*

Source: Own elaboration. EU-SILC 2021.

As economic, social, and environmental vulnerability have a specific territorial dimension, in addition to providing more precise information on how to identify groups at risk of marginalization and vulnerability within individual-level datasets, greater efforts should be made at the EU level to link individual-level data with contextual data (i.e., data that describe territories where people live). This needs to be achieved through two channels. The first channel involves providing individual-level data that includes more detailed geographic location of the individual's residence. For instance, the EU-SILC data offers information on the individual's residence disaggregated at the NUTS2 (regional) level only for the Czech Republic, Spain, France, and Portugal, while for all other countries, information is available only at the NUTS1 (macro-regional) or NUTS0 (national) level.

Moreover, besides more geo-referenced information at the individual level, more work is needed on the collection and harmonization of data for contextual information. For example, EUROSTAT does not provide harmonized regional data on the presence of childcare infrastructure (e.g., the number of public kindergartens, coverage of places over the total number of children present) for all 27 EU countries, nor data on the ratio of pupils and students to teachers and academic staff at NUTS2 level. In the same way, no harmonised information is available on public expenditure in the various sectors such as education, health and social protection disaggregated by region.

When looking at the cross-country comparability using the database SHARE, another challenge for PATHS2INCLUDE is that Norway is not a part of SHARE. Although, Norway has a similar data source, The Norwegian Life Course, Ageing and Generation panel study (NorLAG), comparative analyses will be difficult. Three rounds of data collection have been carried out (2002, 2007 and 2017) and the fourth will be in 2024. Similar to SHARE, NorLAG includes important variables that enables to identify at-risk-groups, physical and mental health, immigration background/country of birth, educational attainment, and care responsibilities, additional to merged variables from register data from 2002 until 2017.

Data to analyse the situation of at-risk groups at different stages of the labour market.

Data on hiring are difficult to collect for two reasons. First, the phenomenon of discrimination itself is difficult to identify - differences between men and women or ethnic groups (e.g., in employment rates) that can be calculated from descriptive statistics are not necessarily due to discrimination. Second, discrimination in hiring is particularly difficult to measure because there is usually no data on unsuccessful applicants. For this reason, the most reliable source of data on discrimination in recruitment is the results of correspondence studies (i.e., field experiments in which pairs of identical CVs, differing only in one parameter such as the nationality/ethnicity or gender of the applicants, are sent to employers). Some outcome measure is then compared - usually the call-back rate. Several large meta-analyses of correspondence studies have been published recently (Galos & Coppock, 2023; Lippens et al., 2023). However, it is difficult to extract accurate and comparable measures from such studies because of lack of harmonization, differences in methodology or in time or geographical scope. To the best of our knowledge, the most relevant harmonised field experiment was conducted as a part of the H2020 Project GEMM study[1]. In the period from October 2016 to July 2017 they conducted field experiments with follow-up interviews with employers who were part of the field experiment in five countries (Britain, Germany, the Netherlands, Norway, and Spain), focusing on ethnicity and gender, additional to productivity-related information and religious affiliation.

Factorial or vignette survey experiments is also a method used for studying intentions, preferences and attitudes in hiring. In this type of experiment, respondents are asked to evaluate different descriptions of fictional candidates or different vignettes which includes a combination of jobseeker attributes (Auspurg & Hinz, 2015; Jasso, 2006; Wallander, 2009). Fossati and colleagues (2022), conducted an employer-survey experiment, including vignettes, in Austria, Germany, and Sweden, to study how recruiters evaluated refugee job applicants related to attributes such as gender, family status, and different origin countries (Afghanistan, Syria, or Turkey)[3]. The H2020 Project NEGOTIATE – Overcoming early job-insecurity in Europe, fielded a harmonized employer-survey with an integrated multidimensional vignette experiment in 2016 in Bulgaria, Greece, Norway and Switzerland. This project focused on how previous unemployment and other signals of early job insecurity affect employers' evaluation of

[3] Data available at: https://zenodo.org/records/4312838HYPERLINK "https://journals.sagepub.com/doi/10.1177/01979183221134274"https://journals.sagepub.com/doi/10.1177/01979183221134274,

job candidates[4]. PATHS2INCLUDE will contribute to this literature by conducting harmonized survey experiment (vignettes) in Germany, Poland, Norway, and Romania, with a focus on immigration, gender and care responsibilities, and organizational context on recruiters' preferences and attitudes in hiring.

Data on retirement. A persistent problem when studying the importance of context on older workers' decisions and possibilities of when, why, and how to exit the labour market, is the lack of comparative data with large enough samples and variables that can capture. Few data include longitudinal information about health, preferences for work or timing for retirement, working condition and care responsibilities for the member of the family. To the best of our knowledge, SHARE is the best available international data source that partly can study these objectives. On the one hand, SHARE includes important variables that enables to identify at-risk-groups among elderly with e.g., poor physical and mental health, immigration background/country of birth, educational attainment among respondents and current partner regardless of their age, and care responsibilities. The main strength is that most of the variables are longitudinal and comparable with other countries (28 European countries are included). On the other hand, SHARE has some limitations. First, the number of respondents within some of the countries are too few to identify how context affects older workers' timing of exit, the reasons behind and the consequences. Second, policies for managing age diversity in the workplace, such as measures targeting re-skilling and up-skilling of older workers, and workplace accommodations and adaptations, such as ergonomic changes, flexible hours, or reduced workload, are missing. Third, lack of information on perceived age discrimination in the workplace, awareness of age-related employment policies or legislation, and retirement planning, intentions, and transitions, including part-time work or phased retirement options, could provide deeper insights into their impact on employment decisions.

Finally, *data on digitalisation and automation* is in high demand, yet it is still scarce. EUROSTAT provides aggregated statistics on digitalisation such as the adoption and utilisation of information and communication technologies (ICT), digital skills of individuals, the degree of digitalisation of businesses (digital intensity index), the size and economic impact of the ICT sector, and broadband internet coverage at a national level[5, 6].

Summary of data limitations

Some of the limitations encountered in our review have been mentioned throughout this section. Here we would like to summarise these limitations.

[4] Data from the NEGOTIATE project are available: NEGOTIATE (2020). NEGOTIATE Employer Survey. Scientific Use File. Data Documentation (2nd version). Oslo: OsloMet. https://doi.org/10.18712/NSD-NSD2644-V3

[5] https://ec.europa.eu/eurostat/web/interactive-publications/digitalisation-2023

[6] https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Towards_Digital_Decade_targets_for_Europe#Digitally_skilled_citizens_and_professionals

First, from the summary tables 1 and 2 we can observe that there are certain characteristics of individuals that are difficult to identify in the databases, such as:

1) *Persons with disabilities*. Although there are some databases where specific information on disabilities is included, many of them do not include information or the information refers to current health status or similar.
2) *Gender identity*. Although there is a huge social and political discussion on multiple gender identities, the available databases only collect binary information on the perceived sex of individuals.
3) *Sexual orientation*. There is only information in very specific and targeted databases on this topic. In some databases it can be (partly) derived from questions on household composition.
4) *Carers*. In most of the databases it can be (partly) derived from questions on household composition, or related questions. In addition, it is even more difficult to refer information on carers of older people.
5) *Physical appearance*. The only information we can find in some very specific databases is information on the weight and height of individuals.
6) *Race or ethnicity*. This information is included in very few databases and none in Eurostat.
7) *Religious affiliation*. The same applies as in the previous case.

Therefore, at the individual level, there is a lack of harmonised information to help identify some of the most vulnerable groups. In addition, when some groups can be identified there are small sample sizes which makes it difficult to analyse their situation in the labour market.

Second, there is a lack of comparative data. On the one hand, there is a need of collection and harmonization of data for contextual information. Furthermore, some questions can have different interpretations depending on country contexts and culture what makes it difficult to compare information for example on health or disabilities. On the other hand, information at different levels (country, macro-regional or regional) should be provided for all the countries. Finally, some harmonised regional data is missing, such as, childcare infrastructure or public expenditure in the various sectors such as education, health and social protection disaggregated by region.

Third, when looking at data to analyse the situation of at-risk groups in the different stages of the labour market, there are specific limitations: 1) when looking at hiring there is a lack of data on unsuccessful applicants and of comparative data. In addition, EU and international databases are limited to information on perceived discrimination and attitudinal aspects. 2) when looking at the stages of career and work exit, there is a lack of specific questions on disability, ethnicity or sexual orientation. Furthermore, cross-country comparison has some limitations in some EU/international databases and small sample sizes when identifying at-risk groups limit the analyses. Moreover, there is an absence of longitudinal data on health, work preferences and caregiving responsibilities.

In conclusion, addressing these limitations and gaps in international and national data sources requires concerted efforts to enhance data collection methods, improve harmonization across

studies, and expand the scope of variables to better capture the experiences of at-risk groups in the labour market. Only through these improvements we can monitor the effects of employment policies targeting at-risk groups and develop more effective employment policies that promote inclusivity and equity.

5. Concluding remarks and recommendations

The main aims of this working paper are to explore the concept of vulnerability within the labour market, and to highlight critical gaps in international and national data sources that affect our ability to monitor the effects of employment policies targeting at-risk groups. To shed some light on the challenges inherent in this endeavour, this working paper has two main parts. The first part provided a brief overview of selected theoretical and methodological literature on discrimination and labour market inclusion, of policies targeting at-risk groups, and whether they have been proven effective (or not). The second part gives a review of available data sources; in total 17 European and 38 national databases from Germany, Italy, Luxembourg, Norway, Poland, Romania, and Spain with relevance for labour market inclusion of at-risk groups have been reviewed.

The difficulty in identifying at-risk groups and how they may be discriminated against and their poor integration in the labour market in existing data is due to several factors such as limited sample sizes or lack of specific questions. For example, discrimination in *hiring* is inherently difficult to measure due to the lack of data on unsuccessful applicants. Correspondence surveys provide valuable information on discrimination in recruitment, but their scope and applicability may vary, limiting their effectiveness as a comprehensive data source. Moreover, while measures of perceived discrimination and attitudinal surveys can provide complementary information, their reliability may be limited, particularly in higher-income countries where awareness of discrimination is higher. Recent research measuring the effect of legislations or organisational conditions on discrimination are scarce, this may be due to shortcomings in data as mentioned above. Some studies indicate that antidiscrimination legislation can shape social norms and attitudes towards groups in risk of discrimination (Valfort, 2018; Tankard & Paluck, 2017) and further impact employers to implement diversity initiatives (Dobbin, 2011; Hirsh, 2009). Organisational conditions, such as formalised and transparent hiring procedures, are assumed to reduce discrimination by easing possibilities of detecting and providing discriminatory practises, thereby making employers and recruiters more aware of the choices they take (Quillian & Midtbøen, 2021).

Regarding *career paths* and *work exit*, there is a problem with existing surveys, as they often lack specific questions on disability, migration background or sexual orientation, which makes it difficult to accurately identify and monitor at-risk groups. In addition, the absence of longitudinal data on health, work preferences and caregiving responsibilities, makes it difficult to understand the choices and possibilities of older workers in relation to labour market participation. Available and reliable data is equally important to predict vulnerability in the future. The future of work will be shaped by digitalisation and automation, which presents both opportunities and challenges for workers with various socio-demographic characteristics. Recent research shows that growing skills disparities driven by digitisation and automation threaten to exacerbate existing wage inequalities, disproportionately affecting less educated and medium-skilled workers (Weller, 2020). Further, gender disparities related to differences in work content persist. Women, more than men, experience a higher risk as they more often have jobs with routine tasks that are more exposed to automation (OECD, 2018a; Genz & Schnabel, 2021; ILO,

2022). At the same time, women are more likely than men to work in occupations less exposed to automation, such as health and care professions that require greater cognitive and interpersonal skills (Cortes, Jaimovich & Siu, 2018; Genz & Schnabel, 2021). The impact on carers, people with disabilities, older workers and migrant workers underlines the need for targeted policy responses. While digitalisation offers opportunities for flexibility and accessibility, it also introduces barriers and exacerbates existing inequalities for at-risk groups.

One of the central issues highlighted in this working paper is the difficulty of identifying and monitoring at-risk groups within both national and international databases. While some surveys incorporate questions designed to capture data on at-risk groups or phases of life, the scope and generalisability of the results is often limited. This lack of comprehensive data poses a major challenge in accurately assessing the impact of employment policies on at-risk groups. Addressing the mismatch between the need for evaluating policies and lack of comparative data sources, is essential to advance evidence-based policymaking aimed at improving employment outcomes for at-risk groups. By investing in comprehensive and representative data sources, policy makers can better understand the challenges faced by at-risk groups and effectively tailor interventions to promote inclusive and equitable employment opportunities across different stages of the working life and preparing policies to reduce vulnerability in the future of work. The overview in this working paper shows some challenges related to vulnerability that require the attention of policy makers and stakeholder. To address this mismatch between monitoring of policies aimed at supporting at-risk groups and data, we suggest three policy recommendations.

First, it should be a priority to invest in comprehensive data collection to capture the employment dynamics and experiences of at-risk groups. This may involve expanding existing surveys to include more detailed information on socio-demographic characteristics, health and disabilities, and migration trajectories, additional to factors that may influence employment outcomes such as care responsibilities, division of labour, job tasks, job training, organisational support structures or working environment. Furthermore, such information is important to include in longitudinal studies with larger sample sizes as this is crucial for monitoring the effectiveness of policies over time and understanding the complex interactions between the various factors that influence employment decisions and outcomes in the present and the future of work.

Second, there exist very few available data sources with information from an employers' perspective. Data, such as field experiments and surveys experiments, with the purpose of uncovering discrimination and employers' preferences in hiring are essential for monitoring labour market inclusion of at-risk groups and the effectiveness of implementation of employment policies. Field experiments may be the best solution for monitoring discrimination in the initial phase of recruitment, however, such studies are expensive and time-consuming to implement. As such, conducting regular harmonised employer-survey experiments could be a better option to carry out in several European countries, where topic and at-risk groups can vary between years.

Third, in addition to improving data collection efforts, it is essential to focus on improving the accessibility and usability of existing data sources. This may involve the development of user-

friendly data dashboards or interactive tools that allow policy makers, researchers and other stakeholders to easily access and analyse relevant data. By democratising access to employment data, policy makers can work on evidence-based policy making and monitor the impact of interventions.

To address the vulnerabilities of at-risk groups in the labour market, a comprehensive set of policy measures is essential. This includes investing in skills and training programmes tailored to the needs of vulnerable populations, expanding social protection coverage to mitigate job displacement, and implementing policies to promote a healthy work-life balance in the digital age. In addition, there is a need to empirically evaluate existing and proposed policies to ensure their effectiveness in addressing the challenges posed by digitalisation and automation, as well as shortage of skilled labour. Innovative policy measures, such as universal basic income and employment guarantee schemes, offer potential avenues to mitigate inequalities and provide a safety net for those affected by changing forms of work.

To conclude, addressing barriers in labour market attachment of at-risk groups and vulnerabilities in the future of work requires a holistic approach that prioritises inclusiveness, equity and social justice. An important prerequisite to find good solutions and best practises is to improve access to data to monitor barriers to labour market attachment and the vulnerabilities of at-risk groups in the future for work, as outlined in this working paper.

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7. Appendix - Databases reviews

International and European Databases

1. EU Statistics on Income and Living Conditions
2. EU Labour Force Survey
3. Adult Education Survey
4. European Health Interview Survey
5. Household Budget Survey
6. European Working Conditions Survey
7. European Quality of Life Survey
8. European Social Survey
9. Luxembourg Income Study Database
10. EU LGBTI
11. Gender and Generations Survey
12. Life in transition Survey
13. Survey of Health, Ageing and Retirement in Europe
14. World Values Survey

15. European Company survey
16. World Bank Enterprise Survey
17. Continuing Vocational Training Survey
18. Structure of Earnings Survey

National Databases

1. **Germany**
    a. The German Socio-Economic Panel
    b. German General Social Survey (ALLBUS – Allgemeine Bevölkerungs-umfrage der Sozial-wissenschaften)
    c. German Ageing Survey
    d. Microcensus
    e. National Educational Panel Study (NEPS), Starting Cohort 6 (SC6) survey
    f. German Family Panel
    g. Panel Study Labour Market and Social Security

2. **Italy**
    a. AD-SILC
    b. PLUS - Participation, Labour, Unemployment, Survey
    c. Quality of Work
    d. Rilevazione Imprese Lavoro
    e. Survey of household income and wealth

3. **Luxembourg**
    a. Youth Survey Luxembourg

4. **Norway**
    a. The Norwegian Life Course, Ageing and Generation Study
    b. Quality of Life Survey

5. **Poland**
    a. Household budget survey
    b. Social Cohesion Survey
    c. The Polish Panel Survey

6. **Romania**
    a. Household Labour Force Survey
    b. Gender Barometer Romania 2018
    c. Household Budgets Survey
    d. ITM – Romanian National Employment Agency Database
    e. Number of pensioners and the monthly average pension
    f. Professional training in enterprises
    g. Salary earnings and labour cost
    h. Survey on information and communication technology in households

7. **Spain**
    a. Youth Survey of Catalonia
    b. National Immigrant Survey
    c. Labour Insertion Survey of University Graduates
    d. Employment of People with Disabilities
    e. Salary Structure Survey
    f. Educational-Training Transition and Labour Integration Survey
    g. Discrimination Against Trans and LGTBI People in the Workplace in Spain 2023. Challenges and Solutions
    h. Continuous Sample of Working Lives
    i. Women and Men in Spain
    j. Salary of people with disabilities

8. Appendix - Employment policies

PATHS2INCLUDE

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