Working Paper on the Role of Industrial Relations and Social Dialogue in Improving Adult Learning Outcomes and Equity

Deliverable 2.1

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Executive summary

The I SKILL research project studies how industrial relations and social dialogue can drive progress in adult learning in the EU. The current report presents empirical analyses documenting the state-of-play of adult learning in the EU27. Our analysis documents the current situation and relates observed outcomes of adult learning participation in the EU27 to indicators and characteristics of the industrial relations regimes and social dialogue at the country, firm, and individual levels.

The key finding is a statistically significant association between the intensity of social dialogue and adult learning (AL) participation outcomes, using both the individual/worker perspective (using European Labour Force Data (EU-LFS)) and the firm perspective (European Company Survey (ECS)). The more specific findings based on specific datasets are the following.

EU analysis - the individual/worker perspective (EU LFS analysis)

- AL participation outcomes at the EU level are relatively stable over time, ranging from between 9 %-12 % in the decade up to 2020. However, large cross-country differences are apparent between countries in 2020.
- Participation in formal AL, non-formal AL, as well as the average hours spent in AL are highly correlated at the country level. Countries with higher participation in formal AL also have higher non-formal participation, as well as a higher average number of hours spent in AL.
- Differences in AL participation are evident not only across countries but also within countries. To map these differences along individual-level characteristics, we measured gaps in AL participation along gender, education, employment status, type of employment, and the occupational risk of computerisation. With respect to inequalities in accessing adult learning opportunities, we find that the AL participation gap along education levels and with respect to the risk of computerisation is the most pronounced. Smaller gaps were observed on average across gender, employment status, and type of employment.
- Low-skilled individuals have consistently lower AL participation rates relative to both medium and high-skilled individuals across EU countries, including those Member States where the overall AL participation rates are high.
- Furthermore, AL participation is consistently higher for individuals working in occupations with a lower risk of being replaced by computerisation. This implies that to the extent that AL takes place, it is taken up only to a limited extent by individuals affected by the twin transition.
- We find a statistically significant, albeit fairly small, relationship between AL participation rates and the intensity of social dialogue at the EU level. More specifically, there is a positive and statistically significant relationship between union density and bargaining coverage indicators and AL participation rates, although employer association density is not statistically significant. However, an increase in union density is associated with fewer hours in AL.
- At the level of associational analysis, we find that there is no evident positive link between equity in AL and social dialogue at the EU level. We find rather an evidence that stronger

social dialogue favours employed workers over the unemployed, and those in occupations at low risk of computerisation rather than those at high risk of computerisation.

EU analysis – the firm perspective (ECS analysis)

- Using the European Company Survey (ECS) dataset, we studied the incidence of AL at the company level across the EU, while also analysing the potential impact of employee representation on AL.
- The incidence of both formal and non-formal AL differs greatly among all EU27 countries, ranging between 60 % of employees (Ireland) within a firm receiving on-the-job training from colleagues (non-formal AL) to less than 35 % (Italy). These results are even more heterogeneous when looking at the percentage of employees receiving training sessions during paid working time (formal AL). This is highest in Portugal, where just over 60 % of employees receive training sessions, while in Bulgaria that figure is less than 30 %.
- The effect of employee representation on AL differs by the type of employee representation and the type of AL. Firstly, employee representation appears to have an effect on AL: both for formal and non-formal AL, more workers in firms with employee representation receive AL than in firms without employee representation, and this is statistically significant. Preliminary summary statistics suggest a positive effect of trade union representation, a works council, and other country-specific bodies. The biggest difference between firms with and without a certain type of employee representation was observed for formal AL.
- These results are robust with respect to different types of employee representation (trade union representation, a works council, and other country-specific bodies) and for both forms of AL (formal and non-formal). We do not find any effect of non-union representation on AL incidence (formal or non-formal).
- Lastly, two specific groups within the firm were tested. A higher share of employees with a temporary contract seems to have a negative effect on training incidence. Additionally, the share of employees with matching skills had a negative effect on AL incidence, although marginally less significantly than the share of employees with a temporary contract. However, employee representation did still have a positive and significant effect on training incidence.
- In all regression analyses, we have controlled for country, sector, company size, the share of under-skilled workers, and the speed of change in needed knowledge and skills as control variables.

Introduction

I SKILL (Industrial Relations to Kick-Start Inclusive Adult Learning) is a research project that investigates how industrial relations and social dialogue may contribute to the advancement of adult learning in the European Union (EU), by identifying key mechanisms, tools, and successful factors that promote inclusive and quality adult learning. I SKILL is set in the context of the twin green and digital transitions, which have been transforming labour markets across Europe and increase the risks of labour and skills shortages or mismatches. In order to investigate these questions, the I SKILL project applies a wide range of approaches, combining qualitative and quantitative methodologies and data, while focusing on the EU level as well as respective countries covered by the project as case studies.

The aim of this working paper, which serves as Deliverable 2.1 of the project, is to empirically assess the relationship between features of industrial relations and social dialogue and adult learning participation and outcomes in the EU27. This working paper sets out to understand if stronger industrial relations and social dialogue contribute to (i) higher adult learning participation rates, and (ii) more equity in accessing adult learning opportunities by various typically disadvantaged groups.

It addresses the following research questions:

- *What is the relationship between social dialogue and industrial relations and adult learning participation outcomes in the EU?*
- *Do industrial relations succeed in fostering access to adult learning opportunities?*
- *Are those who tend to participate less (e.g., low-qualified) involved more (or less) in countries characterised by strong social dialogue?*

These questions are empirically addressed in this paper by means of descriptive and statistical analyses, using data covering two perspectives: the worker perspective (European Union Labour Force Survey, EU-LFS henceforth) and the firm perspective (European Company Survey, ECS henceforth). This data is combined with institutional data measuring industrial relations in the EU, extracted from the OECD-AIAS-ICTWSS dataset. The paper also combines macro-level analysis of broader trends with a micro-level view at the level of firms.

Importantly, using different datasets and approaches, this working paper confirms a link between the level of social dialogue and the levels of adult learning participation across the EU27. This is an important finding which enlarges the plethora of tools that could be potentially harnessed in improving access to adult learning in the lagging countries. This paper plans to uncover broader patterns between adult learning (participation) and social dialogue. Other I SKILL project tasks and activities (i.e., case studies, qualitative interviews, roundtables) are done to delve into the explanations and mechanisms of this relationship. The contribution of this paper thus lies in taking an EU-wide rather than country-specific perspective in establishing the link between social dialogue and adult learning.

The remainder of this empirical paper is structured as follows. Section II offers a brief literature review about adult learning and the twin transition. In Section III, to-date findings about social dialogue and adult learning are presented, and a conceptual and theoretical framework guiding the empirical analyses is developed. Section IV operationalises concepts and discusses complexities of adult learning inequalities. Section V motivates the choice of datasets and explains

the analytical approach in more detail. Section VI presents empirical findings, and Section VII concludes.

1. Literature review on adult learning and the twin transition

The promotion of adult learning has been part of policy discussions and policy efforts since the Lisbon agenda and has gained further importance in view of growing pressures from the twin digital and green transitions. These have been intensified by the global Covid-19 pandemic as well as by the energy crisis following the Russian invasion of Ukraine in 2022. These pressures and political shifts are expected to cause massive changes in European economies in the composition and nature of the occupations, tasks, and skills that they necessitate. Adult learning is seen as one of the key instruments able to assist firms, individuals, and countries in weathering the requirements of changing production and consumption, and in more smoothly adapting to these changes.

Research about adult learning is an expanding field of study analysing both barriers to adult learning as well as facilitators of adult learning (see Groenez et al., 2007; Nilsson and Rubenson, 2014; Desjardins, 2015; Roosmaa and Saar, 2016; Saar and Räis, 2016; Roosmaa et al., 2019). Available research suggests that individual motivations, including financial and time resources, and firm-level barriers represent major obstacles to worker participation in adult learning. Institutional features and 'ecosystems' can shape these individual and firm motivations (and barriers) towards enhanced opportunities and benefits of adult learning (Desjardins and Rubenson, 2013; Boeren, 2017b; Rubenson, 2018; Cabus et al., 2020; Holford et al., 2023).

Research dealing with adult learning can be broadly divided into prevailing approaches focused on i) individuals and their decisions to participate (or not) in adult learning, and ii) country context and macro-level factors. Cabus et al. (2020) points to a growing literature focusing on individuals and their interactions with different social contexts. Another useful distinction is to consider works which include quantitative analyses using one of the large samples (PIAAC, AES, LFS, or other national large-scale surveys) versus other approaches and datasets. A useful review of research literature on adult learning from 2000-2014, discussing the distinction between quantitative and qualitative approaches and reviewing the works with quantitative analyses, has been provided by Boeren (2017a). Representative surveys fully or partially developed to track adult skills development and learning participation offer direct measures for mapping barriers, including for example, a question for individuals and their reasons for participating, or not to participating, in learning. Desjardins (2015) points out that it might be difficult to distinguish the precise reason why some adults do, and others do not participate in adult learning; as even for clearly job-related training, individuals report varying reasons for participation. In any case, attempts to group research on adult learning by one or two criteria are likely to simplify the reality and complexity of the adult education research field. Adult education researchers recognise that the field is fragmented, and a large proportion of academic works remains disconnected from policy-related research (Elfert and Rubenson, 2015).

Literature to date has tried to map and understand the institutional or systemic characteristics which might support better access or more inclusive adult learning opportunities. This is a natural focus of policy-related research and from the policy perspective, research evidence points to the importance of the conditions which help individuals overcome barriers to participation. Studies dealing with individual barriers and putting emphasis on the interaction of individuals with different contexts address conditions from different angles. Several studies have developed frameworks of

adult learning participation around the *Bounded Agency model*, starting with different types of individual barriers developed by Cross (1981), and the concept of Bounded agency developed by Evans (2007) for young adults and their experience with exercising their personal agency passing through periods of transition in education and training, and different labour market situations. This concept of Bounded Agency is relevant for adults in general and their transitions in and out of training. From the policy perspective, the Bounded Agency model for adult learning participation explains observed country variations where the state can target and influence structural conditions which act as barriers to participation. So, the policy measures should be constructed targeting not only individually based barriers but also structural barriers (Rubenson and Desjardins, 2009). The concept of Bounded agency has been further developed in the context of workplace learning, putting more emphasis on firms. This angle stresses the importance of firms and their role, as well as their constraints, including structural barriers, in shaping the learning opportunities for adults and points to the importance of organisation of work. Hefler and Studená (2023) introduce the concept of *Organisational Agency* and its interaction with the individual agency of employees and argue that poor workplace organisation is a key barrier to increased and more equal participation in adult learning.

Some researchers have specifically focused on macro-level factors to explain differences in adult learning participation across countries. Groenez et al. (2007) reviewed and assessed macro system characteristics that could explain country variation in both participation rate and inequality in participation. They find that most variation in participation is realised in workplace learning participation. These authors also stress the importance of social dialogue for the process of adult learning policy design. According to Boeren (2009) and Boeren and Holford (2014), among other variables, the country in which participation takes place is a key explanatory component of adult learning participation. Boyadjieva and Ilieva-Trichkova (2017) focus on the issue of social justice in adult learning participation and inquire if countries differ in participation in terms of access and if there is a positive trend in countries' inequality of participation in adult learning. Boyadjieva and Ilieva-Trichkova (2018) develop research with a theoretical framework based on the capability approach and argue that lifelong learning is embedded in different social and institutional contexts and connected with societal values. The authors develop an empirical index of fairness in adult learning participation based on Adult Education Survey (AES) data. Country-specific institutions can be crucial for the observed differences in learning participation across countries, and seemingly similar institutional configurations can lead to different participation patterns (Saar et al., 2013). The role of institutions is also subject to change because institutional configurations develop over time. Saar et al. (2013) and Thelen (2014) stress that there are path dependencies related to national skills formation and work-based training.

The most comprehensive approach seems to be proposed by researchers who think of adult learning at the level of systems. In these studies, *adult learning systems* are operationalised as an ecosystem of interacting institutions beyond education and training, which are important for creating more equal and better accessible adult learning opportunities and outcomes. Desjardins and Ioannidou (2020), who point out ‘that existing typologies of welfare state regimes or skills formation systems are insufficient to explain variation in the cross-national patterns’ in adult learning participation (p. 143). While classified as different regimes, some countries show similarities in adult learning participation outcomes. The authors argue for considering Adult Learning Systems (ALS) in explaining adult learning participation, which goes beyond welfare and skills regime and considers open and flexible formal education structures, public support for education, active labour market policies, and programmes that target socially disadvantaged

adults (Desjardins and Ioannidou, 2020). Considering the issue more from the view of actors and tools, other studies claim that up- and reskilling cannot be limited to changes in school curricula or expansion of learning paths, calling for a holistic approach based on collaboration between training systems, trade unions and businesses, and experimenting with diversified, customised tools, capable of adapting to the profiles of those involved and to the skills to be trained (ETUI, Business Europe, SGI Europe, SME United, 2021).

The European Commission clearly communicates that adult learning must play a key role in producing skills, ensuring the competitiveness of the EU and well-functioning labour markets, and also in relation to the twin transition. The empirical analysis developed in this paper and within the I SKILL project seeks to address the specific challenges of the twin transition in terms of adult learning policies. Twin transition implies large adjustments in skills needs. These should be accommodated by adult learning provisions to prevent job losses, which is also a priority in relation to employment and social cohesion policy objectives goals. Against this backdrop, the European Commission promotes policies for a socially just twin transition, promoting equity in access to education and training as the key principle to follow in the design of adult learning policies. The bulk of adult learning connected with the digital and green transitions is and will be taking place in the workplace. Evidence from recent research on participation in education and training at the workplace is, therefore, vital to assess the effects of adult learning policies in the process of their design. The character of the twin transition, however, opens the discussion about the range of skills that should be targeted by adult learning policies and public funding. In the past years, vocational education and training and vocational (hard) skills have been at the core of education and training measures designed to support the employability of adult individuals, available for the employed or unemployed. Transversal (soft) skills are increasingly important and demanded by a larger share of workers and employers (Kureková, Beblavý and Haita, 2016). The distinction between these two categories is one of the topics of discussion among the stakeholders of adult learning provision measures. For a more extensive overview of the aspects of adult learning and the twin transition, we kindly refer the reader to the previous outputs of the I SKILL project (Astarita et al., 2023).

2. Social dialogue and adult learning: a theoretical and conceptual discussion

This paper aims to contribute to the debate on institutional factors in adult learning by zooming in on the role of social dialogue and industrial relations in supporting accessible and inclusive adult learning systems. As outlined in D1.1. of the I SKILL project, we believe that social dialogue and industrial relations can contribute to adult learning systems in several ways (OECD, 2019a; 2019b). In more strongly organised systems, industrial relations and collective bargaining can set binding provisions and promote workers' rights to education and training (Heyes, 2007; OECD, 2019c). At the level of representative industrial relations bodies, social dialogue can contribute to shaping and enhancing policies for upskilling and reskilling, anticipating common skills needs, and establishing priorities. At the shopfloor level, trade unions can contribute to designing effective implementation of adult learning, supporting access to training, safeguarding the quality of the training offer, and raising workers' motivation to participate in learning opportunities and promoting a learning culture. The presence of a trade union can also help to better communicate workers' demands for training to the employer (Adolfsson, Baranowska-Rataj and Lundmark, 2022). Social partners can also steer private investments and engage in strategic partnerships

(e.g., with training providers or government bodies), mobilising the capacity of all actors to deliver on skills development (Koch et al., 2019; Kennedy et al., 1994).

Yet, there are many differences in the industrial relations and social dialogue models across the Member States of the European Union (OECD, 2019b; Winterton, 2000). Key differences relate to the dominant levels at which social dialogue takes place – national, regional, sectoral, or firm level. Moreover, individual countries also diverge in the extent and character of policies for adult learning (Winterton, 2007) and in the skills ecosystem and interactions across stakeholders (Hazelkorn and Edwards, 2019). For example, depending on the policy, the roles of social partners differ and can range from a very strong role in the form of management and implementation function of training funds (e.g., in Belgium), to weaker engagement via assistance and counselling in accessing individual learning accounts (ILAs) (e.g., France) (Baiocco, Westhoff and Lopez Uroz, 2020). Moreover, in Central and Eastern European countries, social partners might not be involved in adult learning at the level of representative bodies due to still being engaged in negotiating 'bread-and-butter' themes, such as wages and working conditions (Baiocco, Westhoff and Lopez Uroz, 2020; Kahancová and Martišková, 2022). Even so, cooperation in adult learning at the firm level between management and workers' representatives might exist in sectors where the pressure from the twin transition is high, and firms must respond very flexibly and rapidly to changing demand. All the above-proposed differences shape how social dialogue can act in support of adult learning and influence the mechanisms through which social dialogue can elevate adult learning access and equity.

A particular area of direct involvement of social partners in the adult learning system is skill validation and skills need anticipation systems (OECD, 2019c; Baiocco, Westhoff and Simonelli, 2020). This includes social partners' efforts to create or help improve tools to measure, recognise, validate, and certify skills. Social partners could also play a role in identifying and assisting workers who would become displaced due to the twin transition and help support mobility within and between sectors. The respective role in skill validation and forecasting, however, greatly varies and reflects stark cross-country differences regarding the involvement of social partners in the education and training system in general, and in adult learning specifically. According to recent OECD (2019c) research, this ranges from a limited role (e.g., being informed about developments, consultation on key issues) to a very extensive role (e.g., definition and management of training systems, such as programme development, monitoring and validation of learning, career guidance, fund administration, data collection, quality assurance).

To date, most research on this topic covers selected countries, especially Germany and the UK. Studies on Germany find positive effects of collective agreements and a Betriebsrat on training occurrence (Stegmaier, 2012), investments (Kriechel et al., 2014), quality (Koch et al., 2019), and on adult learning participation (Allaart et al., 2009). For the UK, Böheim and Booth (2004) find a positive association between work councils at the firm level and the training participation of employees. Likewise, Green et al. (1999) find that both the probability of receiving training and the amount of training received is higher in workplaces with a trade union presence. For other countries there is scarcer research, while results might be conflicting. Thelen (2004) found that a crucial role in skills formation and their variation across four studied countries (Germany, Britain, the US, and Japan) is played by the behaviour and strategies of leading firms in skill-intensive industries for the case machine and metalworking industries.

There is some literature pointing to sector- and company-level collective agreements as key instruments to help secure the right to high-quality training (e.g., stipulating a right to paid training

during working hours, setting standards on the type and format of the training, etc.) (Baiocco et al., 2020). Information on collective agreements, however, is typically not available in EU-wide datasets and, therefore, this angle is usually missing from empirical analyses on adult learning and social dialogue. Furthermore, provisions included in collective agreements on adult education may be difficult to implement, monitor, and enforce in practice, especially when these provisions are negotiated at a higher level but there is no trade union present at the workplace. That being said, training is often seen as an example of integrative bargaining, resulting in win-win situations for employers and workers (Cooney and Stuart, 2013).

Cross-country research on the effects of social dialogue on adult learning opportunities is rather scarce. Cutuli and Guetto (2013), using three pooled waves of the European Social Survey (ESS: 2004, 2003 and 2008), found that receiving training (courses or lectures) in knowledge or skills for work is more likely for trade union members. Adolfsson et al. (2022), using the 2015 European Working Conditions Survey (EWCS) data, found that the presence of employee representation increases the probability of receiving employer-paid training. Moreover, this probability was substantially higher for those countries with a higher level of union coverage. In addition, the probability did not depend on the employment contract of a worker (temporary or permanent), suggesting that employee representatives increase the training opportunities of all workers. These findings are in line with an earlier study by Vogtenhuber (2015) who used the first wave of the AES. This author finds a positive relationship between trade union density and collective bargaining coverage and training incidence.

With respect to the issue of access to adult learning across different groups, there is some literature that disaggregates the effect of employee participation structures, such as works councils, on training by employee background (e.g., gender, age, and level of education). Wotschack (2019) finds a clear positive effect of worker representation on the likelihood that workers with a low level of education will be offered, and participate in, training. The presence of structured employee participation coverage by collective agreement and formalised HR practices at the organisational level are mutually reinforcing, and seem more effective and more sustainable than market-driven or technical training initiatives. While some authors argue that social partners are well placed to identify groups at risk and to reach out to them (OECD, 2019c; Baiocco et al., 2020), this again might be very different across countries. Recent research about Slovakia, for example, has shown that trade unions and employer organisations do not cooperate in improving access of disadvantaged groups to the labour market, and do not organise for the interests of individuals at risk (Holubová et al., 2021).

2.1. Operationalising concepts and discussing the complexities of adult learning inequalities

Lifelong learning is understood here as a notion that encompasses composite realities and as a learning and education concept that is formed by multiple practices and activities. It embraces different types of knowledge and skills from various perspectives (Boyadjieva and Ilieva-Trichkova, 2021; Desjardins, 2020). Likewise, we define social dialogue and industrial relations as a set of practices, processes, bodies, and actors which contribute to exchanges and policymaking between employers and workers towards a more consensual type of cooperation, with the aim to improve working conditions and standards for workers in the workplace. Adult learning can and has presented one of the areas where trade unions can fruitfully cooperate with employers (Groenez et al., 2007, Astarita et al., 2023). It is important to think about the different types and

forms of learning that can be harnessed by industrial relations and social dialogue. The overall skills ecosystem and learning culture might be affected by factors beyond those linked to industrial relations and might shape adult learning opportunities and outcomes via non-formal or informal learning opportunities rather than through formal learning.

In operationalising adult learning in the quantitative analyses presented in this paper, we are limited by measures and measurements available in the chosen datasets. The most used measure for involvement in adult learning is the participation rate. Notably, participation outcomes vary depending on the data source used (Desjardins, 2015; Boeren, 2016; Boyadjieva and Ilieva-Trichkova, 2021). Aggregate participation rates might mask internal inequalities in access across different groups or in the quality of participation. For example, data shows not only that there are big differences among countries regarding the levels of participation in adult learning, but that in countries with lower levels of participation the hours spent by adults in further learning could be higher.

Previous research has developed indexes in order to better capture the inequalities in participation in adult learning. Thus, Cabus, Ilieva-Trichkova, and Stefanik (2020) have suggested an index of inequality in access to adult education. This index reflects whether adult education and training are clustered among low or high -educated and between those with low and high income among the employed. However, the index is calculated only for employed people and the influence of education and income is not controlled for by other factors such as gender, place of residence, etc. Boyadjieva and Ilieva-Trichkova (2017; 2021) developed two indexes – Index of inclusion and Index of fairness – to measure equity in adult education for four social groups – people with low and high levels of education and employed and unemployed people. Results show that countries differ in terms of the inclusiveness and fairness of adult learning for different social groups and that the most inclusive countries are not always the fairest, and vice versa.

A related issue is the aspect of inclusiveness or exclusion from adult learning as possibly shaped by social partners. Unionised workers are typically standard workers while atypical workers are often not unionised. Trade unions do not have the capacity to negotiate better working conditions, including access to upskilling and reskilling, for this fairly large group of workers. It might therefore be the case, that better-unionised countries might have better adult learning outcomes, but only for a selected group of (core, standard) workers. Furthermore, it is also well established that large firms have greater resources to provide quality training to their employees and to harness the adult learning policy framework. Large firms also tend to be more unionised. By contrast, small and medium enterprises have comparatively fewer resources and perhaps also fewer incentives to invest in employee training (Baiocco, Westhoff and Simonelli, 2020). They are also relatively less affected by social dialogue and industrial relations procedures and structures. For them, social dialogue at higher levels, for example, the sectoral level, could be more relevant.

In addition to differences in access, the content of adult learning is also relevant to consider from the point of view of twin transition. It appears that in some countries, participation rates are high due to the strong regulation of further learning in selected professions (e.g., medical personnel, teachers) or due to reporting even short and regular OSH training as further learning. From the perspective of twin transition, these trainings might be less relevant in terms of addressing digitisation and automation processes and related fast-changing skill needs that have been affecting most professions. From this perspective, it is useful to also consider the content and quality of training, which might however be limited by the granularity of available adult learning data.

In sum, empirical data and assorted studies point towards an unequal participation in adult learning of adult learners. Indeed, those categories of individuals who, in principle, need AL the most are also those who participate the least. This is a relevant and interesting observation for the present analysis as it seeks to understand whether stronger social dialogue contributes to more equitable adult learning access at national levels.

2.2. The approach and selection of datasets

Before conducting the analysis, several comparative datasets were evaluated for their suitability[1]. The topic of adult learning is covered in datasets collected with the aim of studying education and training (AES, CVTS, PIACC, etc.), but also in representative datasets with broader research objectives, such as EU-LFS, ECS, EWCS, or EU-SILC. It is clear, however, that different datasets apply different definitions and measurements of adult learning or social dialogue and vary in granularity and time coverage. Importantly, adult learning appears to be covered more extensively than social dialogue and industrial relations measures. A related issue is that in many datasets that include data on adult learning, there are few variables that allow for the potential indirect effects of social dialogue and worker participation and representation, such as an improved worker retention, a more open company culture, etc. In addition, those datasets that do cover social dialogue and industrial relations, have often operationalised these concepts with a single or a handful of variables or measures. Finally, some datasets offer a cross-sectional view only (e.g., AES 2016, CVTS), while others are available systematically across countries and over time (e.g., EU-LFS, EU-SILC). The OECD-AIAS-ICTWSS dataset, formerly known as Jelle Visser Industrial Relations data, was identified as a good source of macro-level data about industrial relations indicators over time and cross-sectional.

Considering the different advantages and setbacks of available EU-wide datasets, the selection of datasets was made based on two perspectives. The first perspective maps the relationship between adult learning participation outcomes and social dialogue from the point of view of workers, and for this the EU-LFS and OECD-AIAS-ICTWSS datasets are used. The second perspective is interested in studying the relationship from the point of view of firms, using European Company Survey (ECS) data. The chosen datasets are described comparatively across key dimensions in Table 1 below.

First, the EU Labour Force Data was chosen in order to map EU-wide longitudinal trends, as it covers adult learning participation, and – most importantly – is available for a longer timeframe. This enabled us to also explore the time dimension to better understand how industrial relations might be helping to respond to the twin transition through the promotion of adult learning. We merged the EU-LFS microdata with the OECD-AIAS-ICTWSS datasets to get an overview of trends across the EU, and to investigate key relationships of interest. In the descriptive analysis, using EU-LFS and OECD-AIAS-ICTWSS, the aim is to find macro-level trends and characteristics across countries and over time at the national level. Although the importance of individual-level factors in shaping barriers and opportunities in adult learning is fully acknowledged (see Cross, 1981, Roosmaa and Saar, 2016), the descriptive analysis focuses on the national level. The analysis is exploratory, with the aim of identifying the relationship between industrial relations and social dialogue characteristics and adult learning participation outcomes in terms of outcomes

[1] A systematic review of these datasets along a number of dimensions (adult learning variables, social dialogue variables, time and country coverage, and variables referring to various aspects of social status and inequalities) is available upon request.

and equity. The robustness of key relationships is then, estimated with statistical tools, and the importance of social dialogue for explaining adult learning outcomes (controlling for individual and country-level characteristics) is evaluated.

Second, to gain insight into the firm-level perspective, the 2019 European Company Survey (ECS) is used[2]. The ECS is a very rich large-scale and cross-national establishment survey, covering variables on both adult learning and social dialogue. The ECS gives insights into firm-level characteristics, allowing for an analysis of the effect of different types of social dialogue on firm-level learning opportunities. Management respondents of establishments with 10 or more employees in all 27 EU Member States and the UK are invited complete an online survey over the telephone[3]. Where present, an employee representative was subsequently asked to fill in the questionnaire. In total 21 869 human resources managers filled in the questionnaire in 2019. In contrast, only 3 073 employee representatives filled out the survey. The latter is partly attributed to privacy laws (in particular, the General Data Protection Regulation, which was introduced around the same time), which made management respondents reluctant to share their contact information. Given the very limited number of observations of employee representatives, only the responses of management respondents in this study are reported.

[2] The European Working Conditions Survey (EWCS) was also considered for this study. However, while the EWCS is a rich dataset, the ECS-data was preferable due to data availability. The EWCS 2020 data collection was burdened by the Covid-19 pandemic. The EWCS 2021 data, on the other hand, is only available as of late 2022. The ECS, conducted in 2019, thus provided the most recent data.

[3] Sweden, Malta, and Cyprus are omitted from the analyses presented in Part II as the ECS does not contain information on the social dialogue indicators for these three countries.

Table 1: Overview of key indicators in the selected datasets

Dataset	Time coverage	Focus	Adult learning measures	Social dialogue measures	Skills focus	Work quality/Atypical work
EU-LFS	2010-2020	households	Participation in adult learning in past 4 weeks (formal – EDUCSTAT; non-formal – COURATT) , Hours of adult learning (COURLEN)	Not available	Not available	Full-time/Part-time (FTPT) Permanency of the job (TEMP) Number of hours per week usually worked (HWUSUAL) Shift work (SHIFTWK) Evening work (EVENWK) Night work (NIGHTWK) Saturday work (SATWK) Sunday work (SUNWK)
OECD-AIAS-ICTWSS	2010-2020	countries	Not available	Union density Employer density Bargaining coverage	Not available	
European Company Survey (ECS)	2013, 2019, 2020	enterprises	TRAINLEARN: most important ways of learning (formal, informal, non-formal) PAIDTRAIN: % employees participating in paid training in past year ONJOB: % employees participating in on-the-job training in past year TRAINATALL: organisation of training by company in past year WPSUPP: participation in training depending on workload or work schedules? TR: is training important for 1) skills match to job; 2) allow job rotation or career advancement; 3) ideas to improve establishment; 4) improve morale	CA: wages of employees set by collective agreement MMERCONFIRM: employee representation MMERINTRAIN: influence of employee representatives in decisions on training	CONTR/ % employees who require continuous training SKILLCH: how quickly change skills needed	EMPPERM: % open-ended contracts EMPPART: % part-time

Source: Authors

Box 1: Description of key datasets

European Union Labour Force Survey: One of the key data sources on adult learning (AL) participation and its link to labour market outcomes is the European Union Labour Force Survey (EU-LFS). EU-LFS is a representative household survey with the most extensive sample among the surveys conducted in the EU. It includes questions about AL participation during a four-week long reference period, and asks about participation in formal and non-formal learning activities, and hours of learning in the respective reference period. Its questionnaire distinguished between participation in formal and informal learning activities. To distinguish the information on AL from initial education, we restrict our attention to the employed population between 25-64 years old.

OECD-AIAS-ICTWSS: Released for the first time in 2007 by Prof. Jelle Visser, the database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts (ICTWSS) combined data from different sources and projects to give an overview of trade unions in EU and OECD countries. The database has been updated every second or third year to keep track of developments and to expand the selection of countries and variables. In 2021, after Prof Visser's retirement, the database was rebranded as the OECD/AIAS ICTWSS database as a continued effort by both organizations to keep providing the extensive database. Today, there are more than 100 variables on 56 countries/territories over a period of 60 years.

The European Company Survey (ECS) has been carried out four times starting at its inception in 2004-2005 and later in 2009, 2013, and 2019 by Eurofound (the latest version is in collaboration with Cedefop). The survey consists of a questionnaire distributed among a representative survey of businesses with at least 10 employees in all EU member states and different other countries depending on the specific wave. The focus of each wave differs slightly, with the third wave focussing on workplace organisation and innovation, employee participation and social dialogue. The latest wave in 2019 also included these topics, also adding questions on skills use, skills strategies, and digitalisation.

Source: Authors.

3. Empirical Analysis

3.1. EU Labour Force Survey

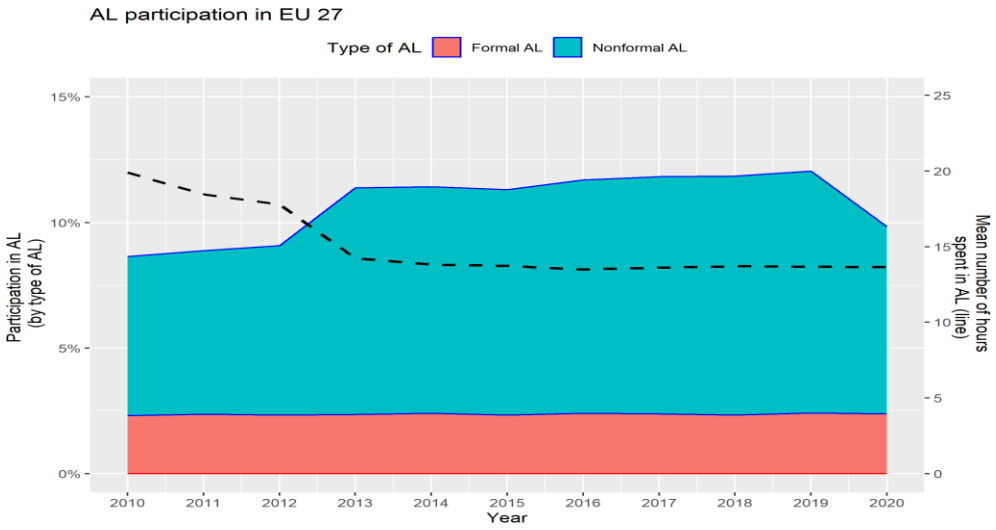
3.1.1. Descriptive analysis

3.1.1.1. Adult learning participation in European countries

In this section, we present descriptive statistics for the participation of adults between the age of 25 and 64 years old[4] in education or training and social dialogue indicators. We look at some key associations between the participation of adults in education and training and social dialogue and we also consider inequalities in accessing learning opportunities. Adult learning (further AL) is understood here as learning which includes education and training activities which are either formal or non-formal in the measurement period of the past four weeks. Formal education refers to participation in education or apprenticeship at the respective level of education (ISCED). Non-formal learning activities might include any courses, seminars, conferences or private lessons or instructions outside the regular education system.

In Figure 1 we present the aggregate average AL participation rate for EU27. We observe very stable participation in formal AL, slightly under three percent, during 2010-2020. A less stable picture is observable in participation in non-formal AL. Total AL participation oscillated between 9 % and 12 %, with a peak in 2019. The average hours spent in AL (right axis) declined during 2010-2013 to stabilise afterwards around the level of 14 hours of adult learning during four weeks[5].

Figure 1: AL Participation in EU 27



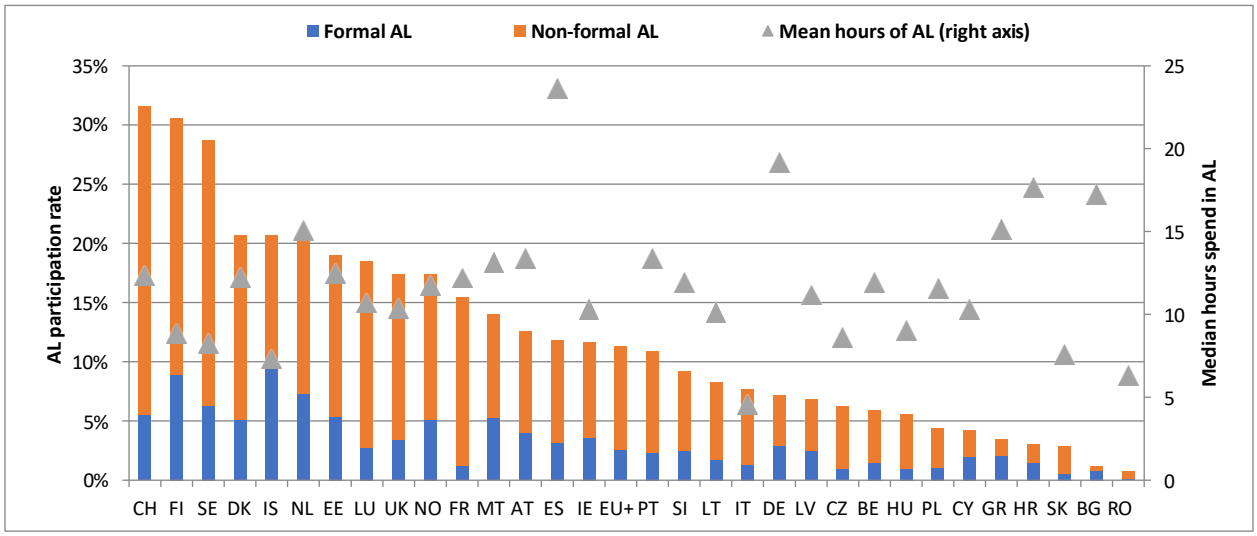
Source: EU-LFS.

[4] The cut-off age of 25 years is applied to exclude 'traditional students' who are continuously following the initial education track. Roughly speaking, in most EU countries a majority of young people finish their initial formal education by the age of 25, however, there are country differences in the distribution of students in higher education after the age of 25.

[5] Based on the number of hours spent on all taught learning activities within the last 4 weeks (Variable COURLEN in the EU-LFS).

The between-country differences in AL participation in 2020 reveals significant differences. The highest AL participation rates (above 15 %) are observable in the Scandinavian countries, Switzerland, the Netherlands, and the United Kingdom. In these countries, non-formal AL activities dominate over formal AL. In contrast are the countries of South-east and Eastern Europe with the lowest levels of AL (under 5 percent). Formal learning comprises a relatively higher share of AL activities in these countries. The median number of hours spent in AL during a four-week period is concentrated around ten hours. Participation in formal AL, non-formal AL, as well as the average hours spent in AL are highly correlated at the country level (coeff. >0.95). Countries with a higher participation in formal AL also have a higher non-formal participation, as well as a higher average number of hours spent in AL.

Figure 2: AL participation in European countries (in 2020)



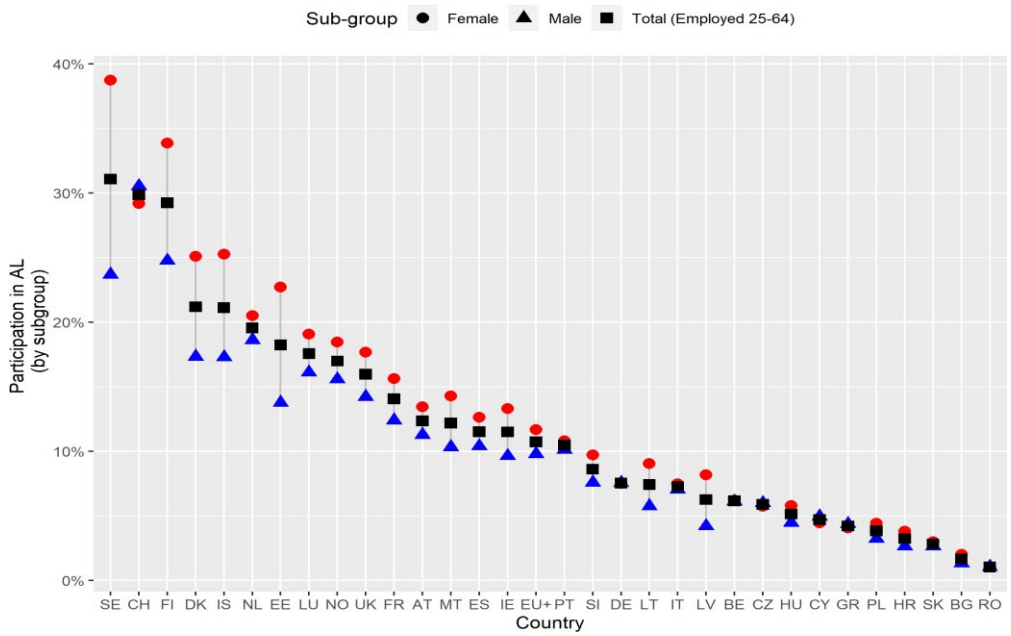
Source: EU-LFS.

3.1.1.2. Inequality in accessing adult learning

AL participation differences are evident not only across countries, but also within countries. To map these differences along individual-level characteristics, we next present gaps in AL participation along gender, education, employment status, type of employment, and the occupational risk of automation.

The gender AL participation gap presents the difference in female and male participation rates. Figure 3 displays gender AL participation gaps observable across European countries. Female AL participation is higher than male universally across European countries. At first glance, visible gaps are driven by the total AL participation rate, with higher gender gaps in countries with higher overall AL participation, but exemptions are observable. For example, Switzerland maintains a high AL participation with a relatively small gender gap, successfully attracting males to AL.

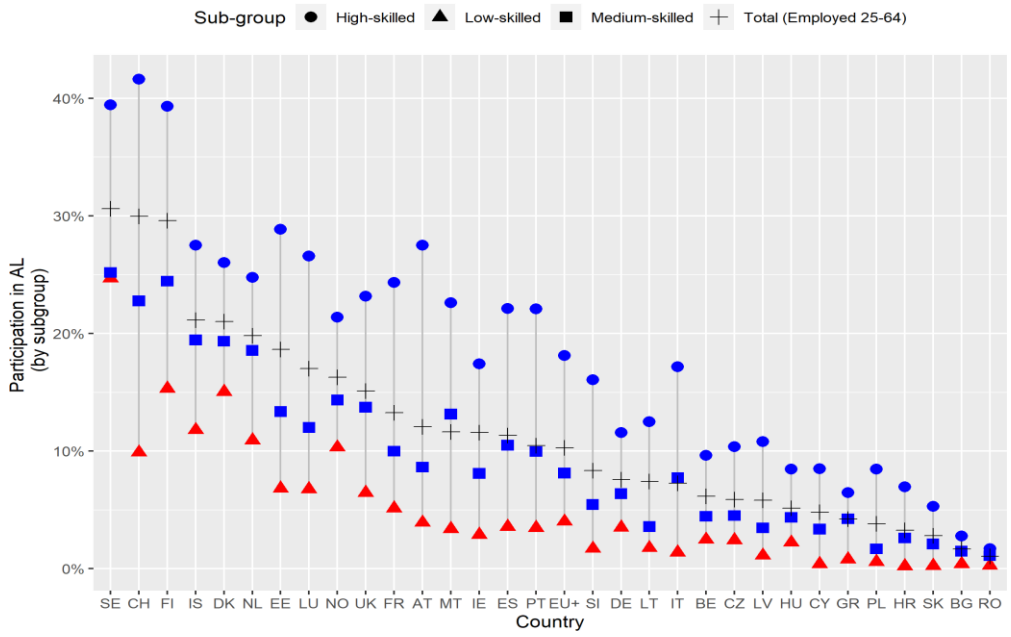
Figure 3: Gender gap in AL participation



Note: Total AL participation rate is calculated from observations with non-missing values on the grouping variable.
Source: EU-LFS.

Figure 4 presents AL participation gap between high, medium, and low-skilled individuals. **The AL participation gap along education levels is the most pronounced out of the gaps here**. This is true across European countries regardless of their total AL participation level.

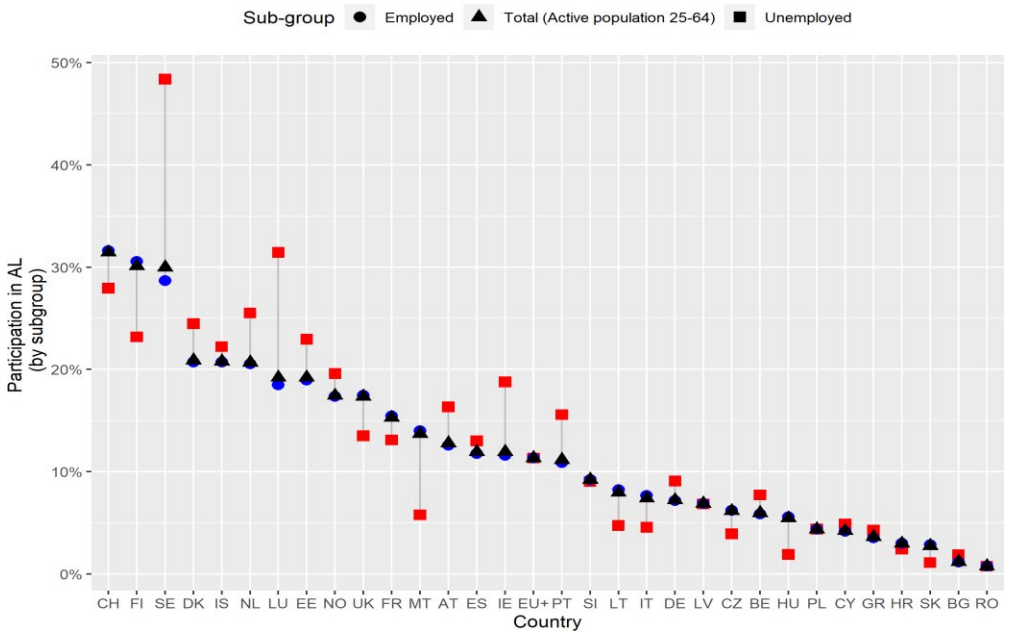
Figure 4: Educational gap in AL participation



Note: Low-skilled ISCED 0-2; Medium-skilled ISCED 3-4; High-skilled ISCED 5 and higher. The total AL participation rate is calculated from observations with non-missing values on the grouping variable.
Source: EU-LFS.

Next we calculated inequality in adult learning based on labour market status. Interestingly, the gaps in AL participation observable for employed and unemployed reveal a heterogenous picture across the European countries. In the majority of countries (16 versus 11), unemployed individuals have clearly higher AL participation rates, which signals a strong activity of governments to provide training to facilitate job placement and job transitions. For example, in Sweden, almost every second unemployed declares to be participating in learning activities. A higher AL participation of the unemployed, is observable in multiple European countries (e.g., DK, IS, NL, LU, EE, NO, AT, ES, IE, PT, DE, BE, PL, CY, GR, BG). In contrast, an opposite pattern of the unemployed having lower AL participation than employed can be observed in a numerous group of countries (e.g., CH, FI, UK, FR, MT, LT, IT, CZ, HU, HR, SK); with the highest gap in Malta, Lithuania, Italy, Hungary, Czechia, or Slovakia.

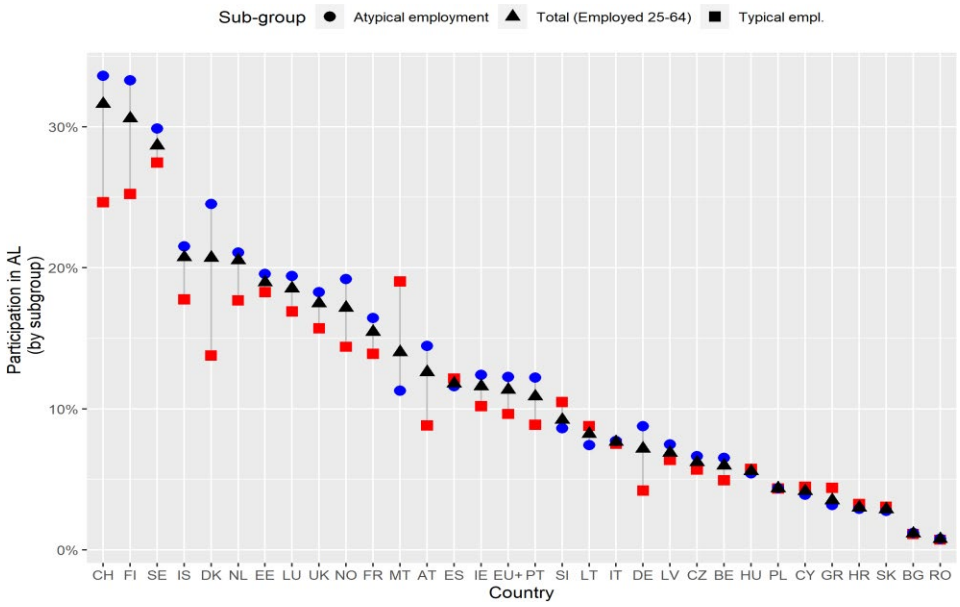
Figure 5: Employed to unemployed gap in AL participation



Note: Total AL participation rate is calculated from observations with non-missing values on the grouping variable.
Source: EU-LFS.

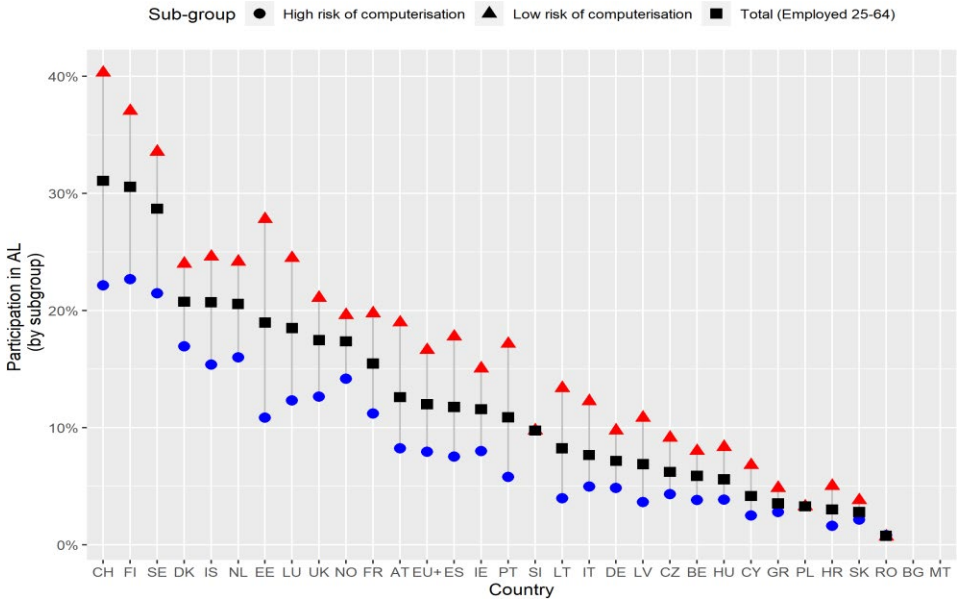
Next, we look at gaps based on the type of employment contract, defining typical/standard employment as full-time, permanent contract employment, and all other forms of employment, i.e. part-time, temporary contract and/or work outside of usual working hours (evenings, shifts, weekend work) as atypical employment. Interestingly, under such rigid division along employment types, we find that employment type does not associate with a substantial gap in AL participation (Figure 6). However, exemptions with a relatively higher difference are also observable (AT, DE, DK, MT).

Figure 6: AL participation gap for individuals in typical and atypical employment



Note: Atypical employment is either outside the usual working time (shifts, evenings, or weekends), part-time or temporary employment. Total AL participation rate is calculated from observations with non-missing values on the grouping variable.
Source: EU-LFS.

Figure 7: Risk of computerisation gap in AL participation



Note: Risk of computerisation calculated based on the probabilities estimated by Frey and Osborne (2016). Total AL participation rate is calculated from observations with non-missing values on the grouping variable.
Source: EU-LFS.

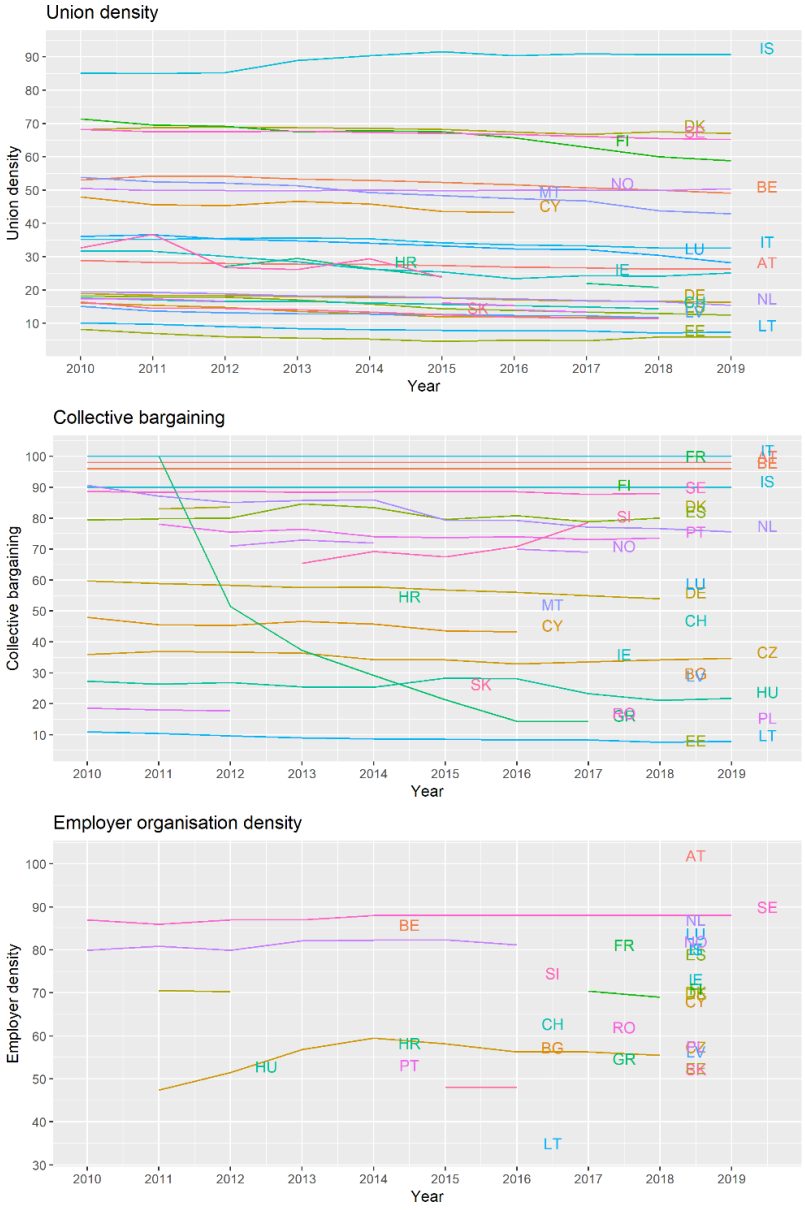
Finally, given the focus on the ISKILL project on the role of the twin transition, we also map AL participation in sectors with different degrees of exposure to computerisation/automation. We calculate the risk of automation estimated for occupations based on the methodology presented

in Frey and Osborne (2016) (Figure 7)[6]. The risk of computerisation is relatively higher in occupations performed by low-skilled individuals. The AL participation gap observable between high and low-skilled also translates into a gap visible for high and low risk of computerisation. **AL participation is consistently higher for individuals working in occupations with a lower risk of being replaced by computerisation**. This is in line with previous studies (Nedelkoska and Quintini 2018; Cabus et al. 2020).

3.1.1.3. Social dialogue indicators in European countries

Trends in key social dialogue indicators – union density, bargaining coverage, and employer organisation density – in European countries are relatively stable across time (Figure 8), which is not surprising given that these are institutional characteristics where erratic changes are unlikely. For this reason, in the associational analysis which follows we average their values over a ten-year period to acquire sufficient observations necessary to explore the association between social dialogue and AL participation.

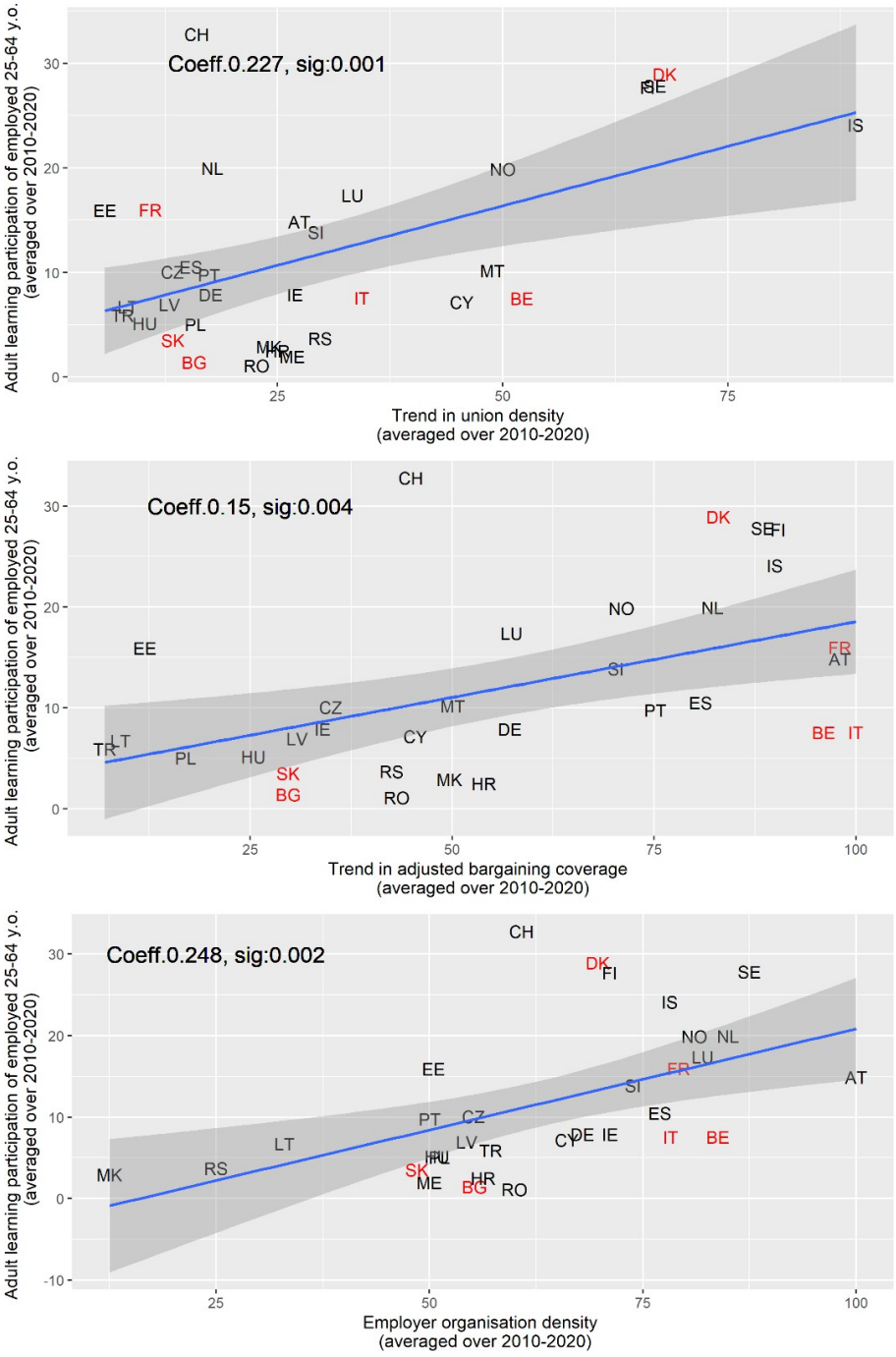
Figure 8 : Trends in social dialogue in EU countries



Source: OECD/AIAS ICTWSS database.

[6] Frey and Osborne (2016) report the probabilities of computerization for occupations c by the SOC classification used in the U.S. We used the SOC ISCO crosswalk published by the Bureau of Labour Statistics (published in August 2012, updated in June 2015). Median probabilities were used in cases aggregation to ISCO 3-digit codes was necessary.

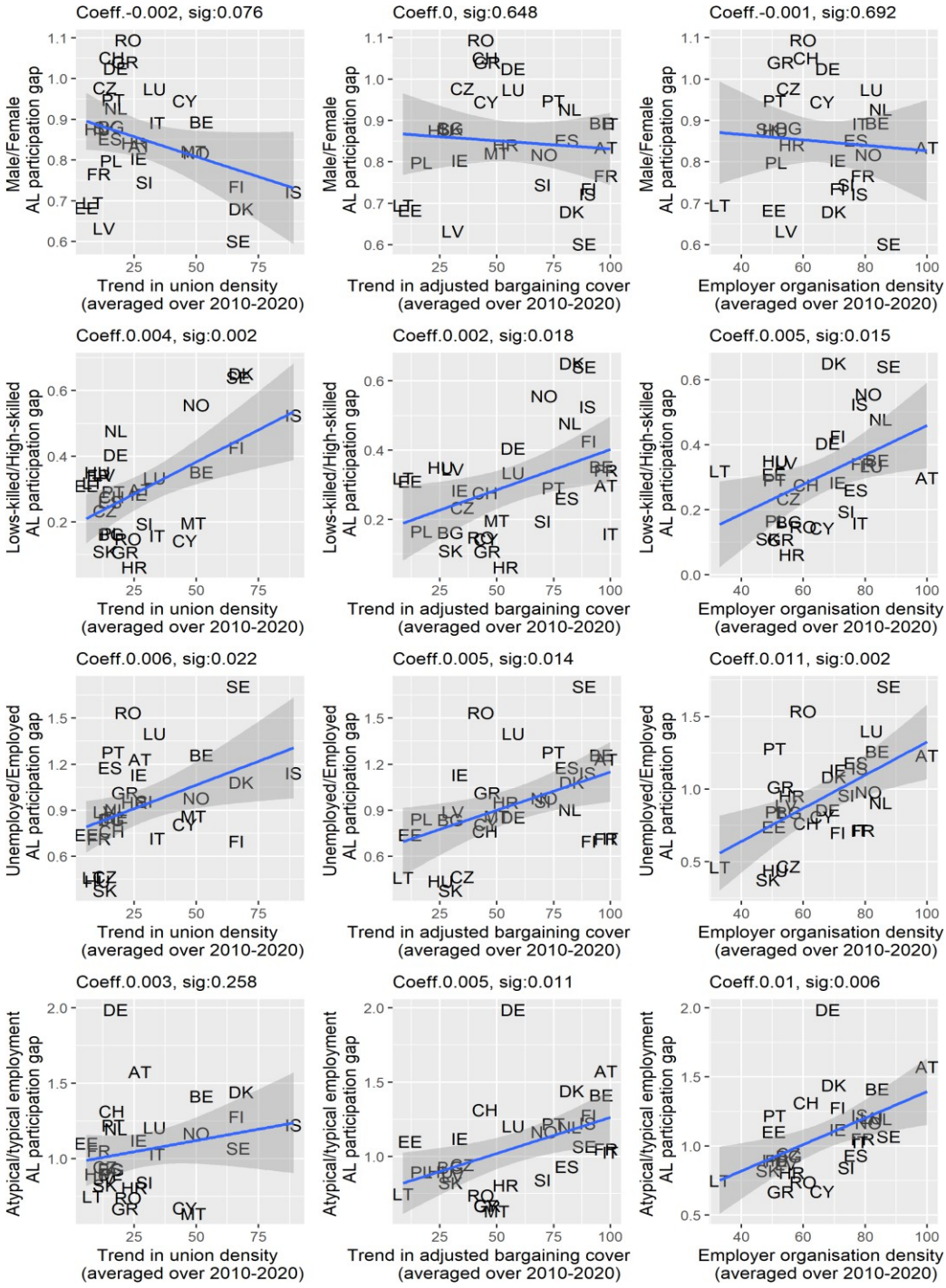
Figure 9: Associations between social dialogue and AL participation



Source: EU-LFS and the OECD/AIAS ICTWSS database.
Note: Project country case studies marked in red.

Figure 9 presents the association between AL participation (total) and social dialogue indicators. We find a statistically significant, albeit fairly small, relationship between AL outcomes and the intensity of social dialogue. We investigate these relationships further in regression analyses in the next section.

Figure 10: Associations between social dialogue and AL participation gaps



Source: EU-LFS and the OECD/AIAS ICTWSS database.

Finally, we looked at the possible link between inequalities in accessing AL (measured as gaps along several dimensions) and social dialogue indicators. Most relationships are insignificant, but a few do stand out. A general observation is that stronger social dialogue is associated with larger inequalities, rather than greater equity in AL participation. For example, there is a positive

relationship between the low-skilled -high-skilled AL participation gap and union density, implying that more unionized countries facilitate AL among for high-skilled workers more than low-skilled workers. Due to low significance levels and the weak effect of the size of the coefficient, an associational analysis concludes that there is no evident positive link between equity/inequality in AL and social dialogue at the EU level. We further investigate these relationships statistically in the following sub-sections.

3.1.2. Regression analyses

In the following subsections, we present results of a number of regression analyses in which we seek to estimate the above-presented relationships statistically, controlling for possible co-variates or colliding variables at the individual and country level. Our sample is based on the EU-LFS data for the 31 countries[7] used in the hitherto analysis. We have pooled the annual EU-LFS datasets provided by Eurostat for the period 2010-2020. Out of this pooled dataset, we have filtered employed individuals aged 25-64 and sampled a 5 % random sample out of this subpopulation. These steps left us with approximately 919 000 observations, a sufficient sample for the intended regression.

3.1.2.1. Adult learning participation and social dialogue

First, we have estimated a set of probit models on the probability of participating in both formal as well as non-formal learning during the reference period of four weeks. We find positive and statistically significant effects of union density and bargaining coverage on AL participation outcomes, but the role of employer association density is not statistically significant. Most marked is the effect of union density, whereby an increase in the union density in the country associates with a 3.1 percentage point increase in the probability of participation in AL. Interestingly, the association increases after including country and time dummies into the model; model fit also grows considerably. Thus, Model 4 shows that after accounting for time and country-level differences, the association between union density and AL participation becomes even more pronounced.

Table 2: Probit model: AL participation and union density

Union density				
	Model 1	Model 2	Model 3	Model 4
Coeff.	0.012	0.012	0.011	0.031
Std. Error	0.000	0.000	0.000	0.002
p-value	0.000	0.000	0.000	0.000
Pseudo-R2	0.026	0.076	0.099	0.152
N	912 416	907 757	907 757	907 757
Individual characteristics	No	Yes	Yes	Yes
Job characteristics	No	No	Yes	Yes
Country and time dummies	No	No	No	Yes

Note: Individual characteristics include: gender, age, and level of education; Job characteristics include: firm size, sector of activity (NACE), and the risk of computerisation.
Source: Authors' calculations using the EU-LFS data.

[7] The complete list overlaps with the list of countries displayed in Figures 2-7. Namely: AT, BE, BG ,CY, CZ, DE, DK, EE, ES, FI, FR, GR, HR, HU, CH, IE, IS, IT, LT, LU, LV, MT, NL, NO, PL, PT, RO, SE, SI, SK, UK.

This is not confirmed for the association between AL participation and collective bargaining. The moderate but statistically significant coefficient estimated for the first three model specifications (Model 1-Model 3) shrinks to a one-third size and becomes not statistically significant at the 0.01 level in the case of Model 4.

Table 3: Probit model: AL participation and collective bargaining

Collective bargaining				
	Model 1	Model 2	Model 3	Model 4
Coeff.	0.006	0.007	0.007	0.001
Std. Error	0.000	0.000	0.000	0.000
p-value	0.000	0.000	0.000	0.019
Pseudo-R2	0.019	0.074	0.095	0.151
N	912 416	907 757	907 757	907 757
Individual characteristics	No	Yes	Yes	Yes
Job characteristics	No	No	Yes	Yes
Country and time dummies	No	No	No	Yes

Note: Individual characteristics include: gender, age and level of education; Job characteristics include: firm size, sector of activity (NACE) and the risk of computerisation.
Source: Authors' calculations using the EU-LFS data.

In contrast to the evidence on the association of union density with AL participation, in the case of employer participation density, the coefficients turn statistically insignificant after including time and country dummies in the model specification (Model 4). Employers' organisation density, therefore, appears to be the least associated with the probability of AL participation observed for the employed population.

Table 4: Probit model: AL participation and employer organisation density

Employer participation density				
Employer participation density	Model 1	Model 2	Model 3	Model 4
Coeff.	0.015	0.015	0.014	-0.001
Std. Error	0.000	0.000	0.000	0.003
p-value	0.000	0.000	0.000	0.191
Pseudo-R2	0.026	0.076	0.097	0.151
N	907 757	907 757	907 757	907 757
Individual characteristics	No	Yes	Yes	Yes
Job characteristics	No	No	Yes	Yes
Country and time dummies	No	No	No	Yes

Note: Individual characteristics include: gender, age, and level of education; Job characteristics include: firm size, sector of activity (NACE), and the risk of computerisation.
Source: Authors' calculations using the EU-LFS data.

In sum, we find mixed evidence about the association between AL participation and social dialogue indicators, which is specific to the type of social dialogue indicator used. Higher union density is positively associated with adult learning participation in the EU, but bargaining coverage and employer density are not. This might indicate that the actual channel of social dialogue link on AL outcomes matters. Social dialogue shapes AL participation through actual membership of workers in the union, which we interpret as direct contact. The influence of social dialogue is exhibited less via the extension of collective agreements, i.e., bargaining coverage, or via employer association rates.

3.1.2.2. Hours of learning and social dialogue

Besides the extent of AL participation in the population, we also observed the intensity of participation (measured in hours) in all learning activities during the four weeks. In the next section we explore the association of social dialogue variables with the intensity of AL participation, measured as hour of adult learning attended in the past four weeks. Our analysis copies the approach adopted in exploring AL participation as much as possible. The only difference to the model specifications reported in this section is that the dependent variable switched from a dummy to a continuous variable capturing the number of hours spent in AL during the previous four weeks. Since the number of hours spent in AL appears to be distributed in the shape of the Poisson distribution, we assume this distribution in a generalized linear regression model.

Similarly, as in the case of AL participation, union density shows the strongest association also with the hours spent in AL. In contrast to AL participation, the estimated coefficients turned from positive to negative. A one-percentage-point increase in union density is associated with 0.053 fewer hours in AL.

Table 5: Linear regression model: Hours spent in AL and union density

Union density				
	Model 1	Model 2	Model 3	Model 4
Coeff.	-0.006	-0.006	-0.007	-0.053
Std. Error	0.000	0.000	0.000	0.001
p-value	0.000	0.000	0.000	0.000
Pseudo-R2	0.016	0.034	0.050	0.092
N	80 863	80 863	80 863	80 863
Individual characteristics	No	Yes	Yes	Yes
Job characteristics	No	No	Yes	Yes
Country and time dummies	No	No	No	Yes

Note: Individual characteristics include: gender, age, and level of education; Job characteristics include: firm size, sector of activity (NACE), and the risk of computerisation.
Source: Authors' calculations using the EU-LFS data.

Additionally, collective bargaining is shown to be negatively associated with hours in AL, but the magnitude of estimated coefficients is smaller than in the case of union density (0.004 versus 0.053). The power of all three social dialogue variables to explain hours in AL is only marginal. This can be observed from the close-to-zero values of the Pseudo-R2 of model 1, where only the social dialogue variable is used. Union density explains only 1.6 percent of the total variability

observed in hours spent in AL. For collective bargaining and employer participation density the share is even smaller (0.001).

Table 6: Linear regression model: Hours spent in AL and collective bargaining

Collective bargaining				
	Model 1	Model 2	Model 3	Model 4
Coeff.	-0.001	-0.001	-0.001	-0.004
Std. Error	0.000	0.000	0.000	0.000
p-value	0.000	0.000	0.000	0.000
Pseudo-R2	0.001	0.021	0.034	0.090
N	80 863	80 863	80 863	80 863
Individual characteristics	No	Yes	Yes	Yes
Job characteristics	No	No	Yes	Yes
Country and time dummies	No	No	No	Yes

Note: Individual characteristics include: gender, age and level of education; Job characteristics include: firm size, sector of activity (NACE) and the risk of computerisation.
Source: Authors' calculations using the EU-LFS data.

Employer participation density is the only of the three social dialogue indicators showing a positive association with hours spent in AL. A one percentage point increase of the employer participation density index is associated with a 0.022 increase in the number of hours spent in AL. Interestingly, the positive association appears only after we control for country and time differences, which means that important other country-specific (e.g., institutional) characteristics and time characteristics intervene in the role of social dialogue with respect to AL intensity across the European Union.

Table 7: Linear regression model: Hours spent in AL and employer participation density

Employer participation density				
	Model 1	Model 2	Model 3	Model 4
Coeff.	-0.003	-0.003	-0.003	0.022
Std. Error	0.000	0.000	0.000	0.002
p-value	0.000	0.000	0.000	0.000
Pseudo-R2	0.001	0.021	0.035	0.090
N	80 863	80 863	80 863	80 863
Individual characteristics	No	Yes	Yes	Yes
Job characteristics	No	No	Yes	Yes
Country and time dummies	No	No	No	Yes

Note: Individual characteristics include: gender, age, and level of education; Job characteristics include: firm size, sector of activity (NACE), and the risk of computerisation.

3.1.2.3. AL participation and social dialogue by sub-populations

In this section, we specifically explore the differences in the association of social dialogue variables and AL participation observed in sub-populations of interest, defined as:

- Level of education;

- Gender;
- Risk of computerisation;
- Type of employment;
- Employment status.

This section reports on estimates from above-referenced Model 4. This specification includes control variables on individual characteristics (gender, age, and level of education); job characteristics (size of employer, economic sector, and the risk of computerisation) complemented by dummy variables capturing country and time effects. The evidence presented earlier shows that some of the associations were revealed after the set of dummy variables is included in the model.

Based on the earlier evidence provided, we know that level of education is the strongest predictor of AL participation. Despite its predictive strength, the association of social dialogue variables and AL participation does not change significantly between particular levels of education. Given the large gaps in AL participation across the education levels identified earlier, this result indicates that social dialogue is not a tool for equalizing differential access to AL across different education/skill groups.

Table 8: Probit model: AL participation and social dialogue variables by level of education

Union density			
	Low-skilled	Medium skilled	High skilled
Coeff.	0.034	0.029	0.033
Std. Error	0.006	0.003	0.003
p-value	0.000	0.000	0.000
Pseudo-R2	0.130	0.132	0.100
N	163 653	448 766	292 661
Collective bargaining			
	Low-skilled	Medium-skilled	High-skilled
Coeff.	0.001	0.001	0.001
Std. Error	0.001	0.001	0.001
p-value	0.568	0.087	0.310
Pseudo-R2	0.129	0.131	0.100
N	163 653	448 766	292 661
Employer participation density			
	Low-skilled	Medium-skilled	High-skilled
Coeff.	-0.003	-0.013	-0.005
Std. Error	0.015	0.005	0.005
p-value	0.832	0.004	0.314
Pseudo-R2	0.129	0.131	0.100
N	163 653	448 766	292 661

Note: Low-skilled includes ISCED 0-2; Medium-skilled includes ISCED 3-4; High-skilled includes ISCED 5-8. Model specification equals to Model 4, controlling for individual and job characteristics complemented by a set of country and time dummies.
Source: Authors' calculations using the EU-LFS data.

Again, the most telling evidence is observed on union density, where the association of social dialogue and AL participation is clear and robust across educational subgroups. Therefore, in the following analysis, we only report evidence on the association of union density and AL participation. For example, when splitting the population into males and females, the association between union density and AL participation remains robust and without significant differences.

Table 9: Probit model: AL participation and social dialogue variables by gender

	Union density	
	Males	Females
Coeff.	0.030	0.033
Std. Error	0.003	0.003
p-value	0.000	0.000
Pseudo-R2	0.140	0.157
N	479 499	428 258

Note: Model specification equals to Model 4, controlling for individual and job characteristics complemented by a set of country and time dummies.
Source: Authors' calculations using the EU-LFS data.

A significant difference between sub-populations is first observed in the case of individuals working in occupations with high and low risk of computerisation. Our estimates show that union density is associated with the AL participation of individuals working in occupations with a low risk of computerisation. For these individuals, one percentage point increase in union density is associated with an increase in the probability of AL participation of 3.5 percent. For those at high risk of computerisation, higher union density associates with only 2 percent increase in the probability of AL participation. Linking this to our findings about the gaps in AL participation, this result indicates that social dialogue might further increase inequalities in AL outcomes, rather than mitigate it. Our models however do not control for personal motivation and resources which are important intervening factors in individual-level AL participation.

Table 10: Probit model: AL participation and social dialogue variables by the risk of computerisation

Union density by the risk of computerisation		
	High-risk	Low-risk
Coeff.	0.020	0.035
Std. Error	0.004	0.002
p-value	0.000	0.000
Pseudo-R2	0.138	0.142
N	433 588	474 169

Note: Risk of computerisation assigned based on Frey and Osborne (2016). Model specification equals to Model 4, controlling for individual and job characteristics complemented by a set of country and time dummies.
Source: Authors' calculations using the EU-LFS data.

For the type of employment contract, we observe a homogenous pattern across those who work a regular-working time under an open-ended contract and those working in shifts, evenings, weekends, or under a temporary contract.

Table 11: Probit model: AL participation and social dialogue variables by the type of employment contract

	Typical empl.	Atypical empl.
Coeff.	0.031	0.030
Std. Error	0.004	0.002
p-value	0.000	0.000
Pseudo-R2	0.138	0.166
N	278 307	602 420
Individual characteristics	Yes	Yes
Job characteristics	Yes	Yes
Country and time dummies	Yes	Yes

Note: Risk of computerisation assigned based on Frey and Osborne (2016). Model specification equals to Model 4, controlling for individual and job characteristics complemented by a set of country and time dummies.
Source: Authors' calculations using the EU-LFS data.

So far, we have explored the association between union density and AL participation on the employed population. Now we compare how union density affects the AL participation of the unemployed. Because we do not observe job characteristics for the unemployed, we have to drop this set of control variables from the model. This restricted specification reveals a significant difference in the magnitude of the association of union density and AL participation. While a one percentage point increase in the union density index results in a 3 percent increase in the probability of AL participation of the employed, the increase is only 1.5 percent for the unemployed. This is in line with a general expectation that unionized workers are reached and associated with at the workplace, with limited opportunities of the unions to work with the unemployed (but some country exceptions do exist). In those countries where a higher rate of AL participation among unemployed than the employed was found in the gaps analysis, we can assume that channels other than social dialogue improve the access of the unemployed to skills development. This could be, for example, effective active labour market policies and a more extensive role of public and private employment services in upskilling and reskilling workers at risk of unemployment.

Table 12: Probit model: AL participation and social dialogue variables by employment status

	Employed	Unemployed
Coeff.	0.031	0.015
Std. Error	0.002	0.002
p-value	0.000	0.000
Pseudo-R2	0.138	0.178
N	907 757	751 643
Individual characteristics	Yes	Yes
Job characteristics	No	No
Country fixed-effects	Yes	Yes

Note: Model specification is controlling for individual characteristics complemented by a set of country and time dummies.
Source: Authors' calculations using the EU-LFS data.

3.2. European Company Survey

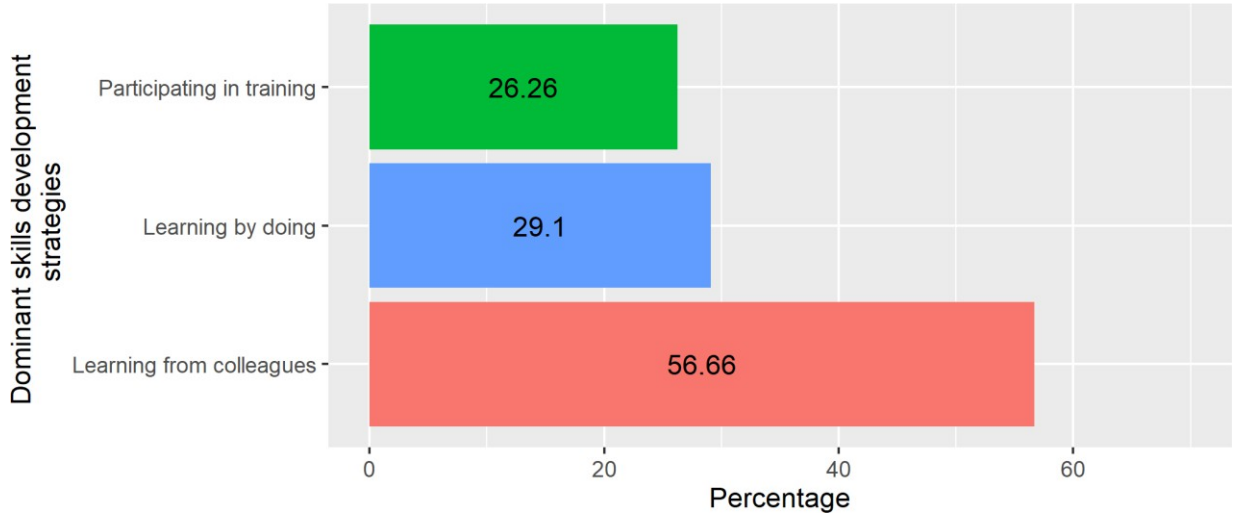
3.2.1. Descriptive statistics

3.2.1.1. Adult learning participation in European countries

In this study, adult learning is measured using three questions in the ECS[8]. The first question identifies the most important ways through which employees can become more skilled within the establishment. Here, respondents rank three types of adult learning (1) participation in training (2) learning from colleagues and supervisors (3) learning by doing. The second and third questions, in turn, further investigate training participation during paid working time (formal learning) and non-formal learning through more experienced colleagues, each time indicating the share of employees that participated in this training form within the establishment.

First, we find that most respondents (57 %) indicate learning from colleagues as the most important way through which employees acquire new skills, see Figure 11. Learning by doing and training participation were ranked first by 29 % and 26 % of the respondents respectively.

Figure 11. Percentage of firms indicating each type of skill obtainment as the most important within their establishment



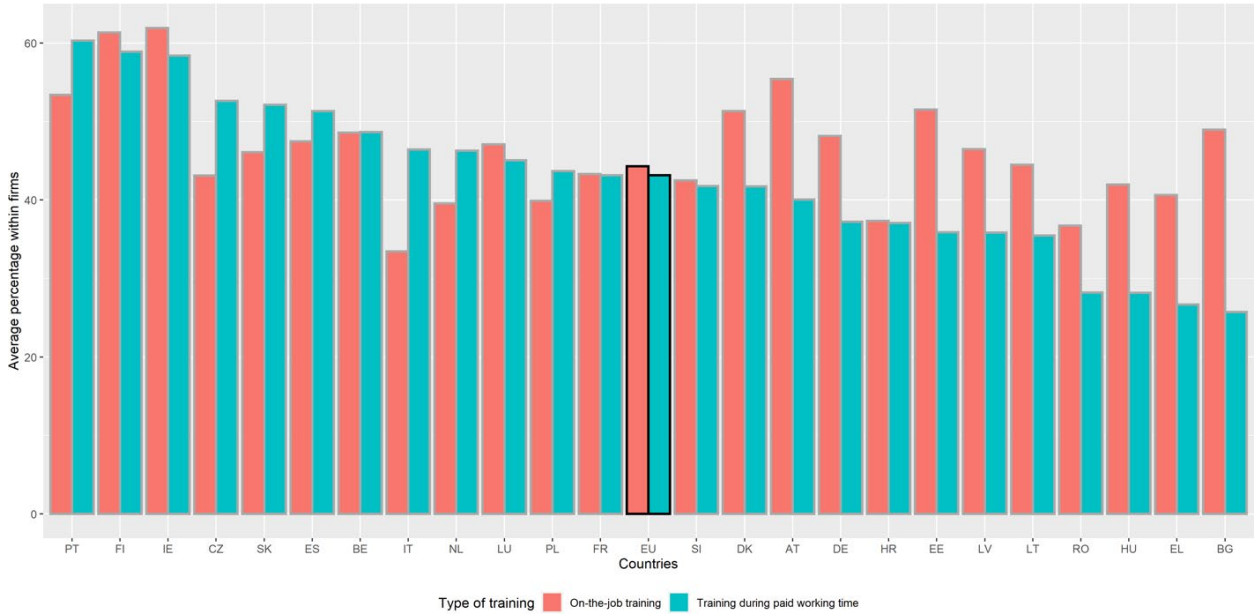
Notes: All data are weighted.
Source: European Company Survey 2019 [Dataset].

Secondly, focusing on the two types of adult learning in Figure 12, 44 % of workers participated on average in formal AL and 45 % of workers participated in non-formal AL in EU establishments. Interestingly, 4 % of companies indicated none of the employees to participate in any of the two types of learning. Figure 12 shows the share of workers within the EU establishments that participate in formal and non-formal AL per country. Considering non-formal AL, all countries rank between 62 % (Ireland) and 33 % (Italy). In Ireland, on average, almost two-thirds of employees receive non-formal AL, while in Italy, only one in three employees does. When looking at formal AL, employees in Portugal receive the most: on average, 60 % of employees receive training

[8] Additionally, management respondents were asked if their establishment provided any training to any of its employees since the beginning of 2016 (with the questionnaire being open between January and July 2019). However, due to a high number of 'missing' on this indicator, we are unable to report on this indicator.

during paid working time. Bulgaria, by contrast, reports the lowest percentage with only one in four employees (26 %) participating in training sessions during paid hours. These results clearly differ from the EU-LFS-results reported above, where no more than 10 % of employees received formal AL. However, this difference can be explained through both the measure of formal training participation adopted in the EU-LFS (only including participation in regular education) and the time covered by this measure in the EU-LFS (only covering a four-week period as opposed to the entire year in the ECS).

Figure 12. Incidence of AL in the EU27 in 2019 by country, based on ECS

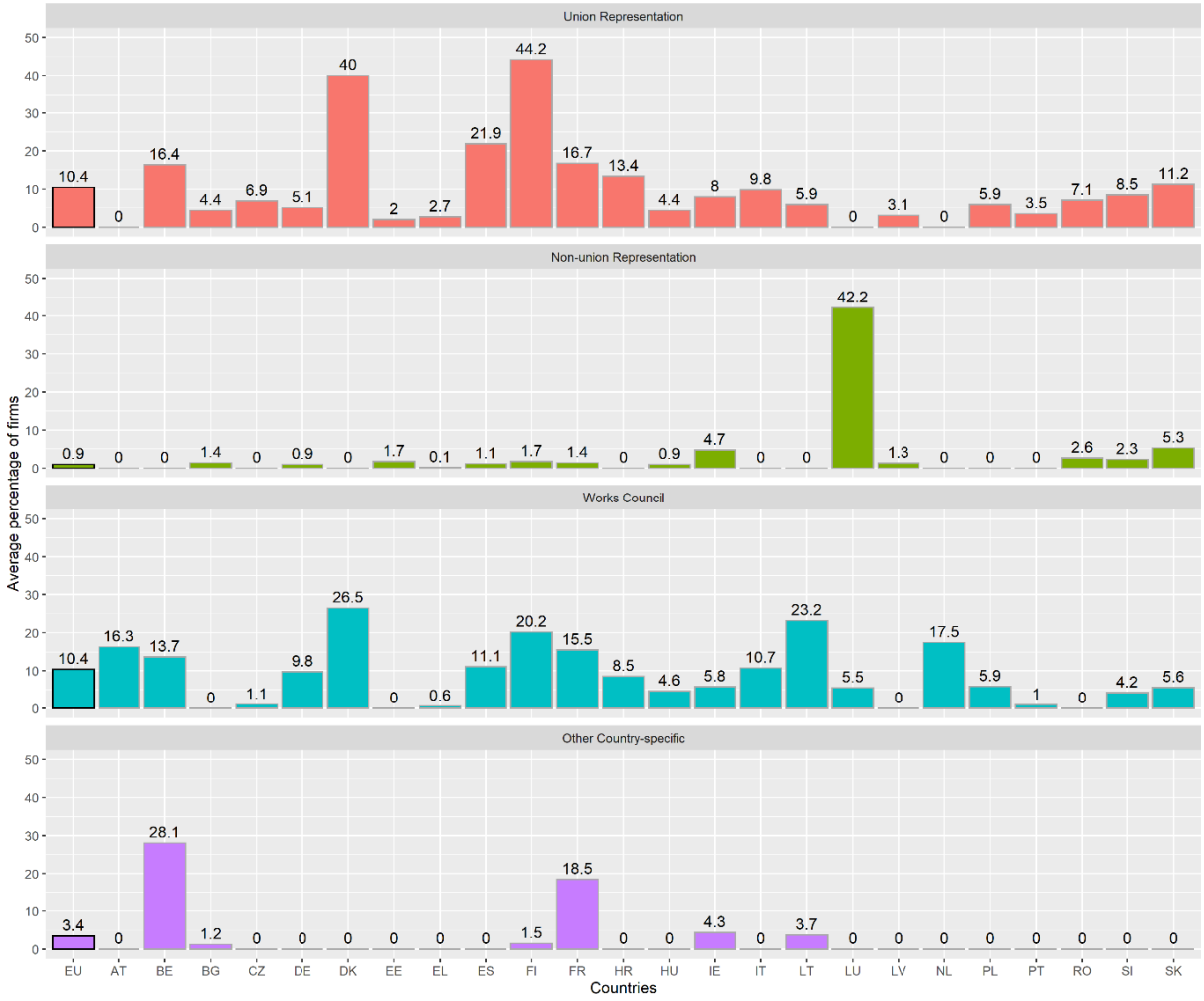


Notes: All data are weighted.
Source: European Company Survey 2019 [Dataset].

3.2.1.2. Social dialogue indicators in the EU27

Included in the ECS are four indicators on social dialogue at the company level. Respondents indicated which employee representation forms are present in their establishment on a country-specific list. Most companies (81 %) did not have any form of employee representation. Of the employee representation types used in the ECS, the four most prevalent types are trade union representation, non-union representation, a works council, and other country-specific bodies. Figure 13 plots the prevalence of each type (the percentage of firms in the ECS) for every country. Both the works council and union representation are most prevalent, each appearing in 1 % of European companies. Union representation is prevalent in all countries except Austria, Lithuania, and Poland. In the other countries, its prevalence varies between 44 % (Finland) and 2 % (Estland) of companies. Works councils are present to varying degrees in all countries. Denmark has the highest percentage of firms with a works council (27 %). The country with the lowest percentage is Greece with just under 1 % companies having a works council. The only countries without works councils are Bulgaria, Estland, Latvia and Romania. Non-union representation is mostly prevalent in Lithuania, where 42 % of firms have this type of employee representation. For the other countries, the prevalence varies between complete absence and 5 %. Lastly, only six countries have other country-specific forms of employee representation, most prevalent in Belgium (28 %) and France (19 %).

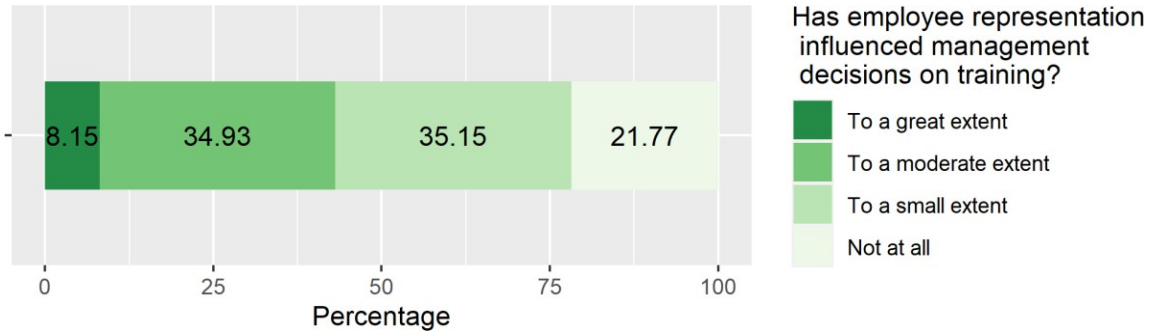
Figure 13. Incidence of employee representation in the EU27 in 2019 by country, based on ECS



Notes: All data are weighted.
Source: European Company Survey 2019 [Dataset].

Management respondents were further queried on whether employee representation influenced managerial decisions on training and skill development. 75 % of respondents indicated that no such decisions had been made in the last years. Of the firms where managerial decisions on training were made, 22 % indicated no influence of employee representation (as shown in Figure 14). 43 % of firms expressed that such decisions were influenced ‘to a great extent’ or ‘to a moderate extent’ by employee representation. Given the prevalence of employee representation forms and 78 % of firms indicating an influence of employee representation on managerial decisions concerning training, further exploration into the effect of social dialogue at the firm level on AL is warranted.

Figure 14. Influence of employee representation on management decisions on training.



Notes: All data are weighted.
Source: European Company Survey 2019 [Dataset].

3.2.1.3. The link between employee representation and AL

In this section, we link the prevalence of employee representation and AL. Table 4 shows that there is a small but significant difference in the incidence rate of both forms of AL when there is some form of employee representation present or not. In companies with employee representation, there is on average 9.13 percentage points (a 22 % increase) more training during paid working time and 2.37 percentage points (a 16 % increase) for on-the-job training. Both increases are statistically significant. Also, when considering the overall training indicator[9], we find companies with some form of employee representation to have a significantly higher share of workers receiving training, as compared to those without employee representation.

When subdividing between the different types of employee representation (see Table 4), it is clear that both trade union representation and a works council have, on average, a positive impact on training for employees: around 6 percentage points difference, meaning an increase of 15 %. Of all companies, among those that have a works council or trade union representation 15 % more appear to provide training to their employees than companies without those forms of employee representation[10]. By contrast, for non-union staff representation a significant difference in training participation was not observed.

[9] This training variable is, for each company, the average of the percentage of workers receiving training during paid working time and of those receiving on-the-job training. If a large share of workers only received one type of training, the overall training variable would underestimate the percentage of workers who receive any form of training than in reality. Studying the individual indicators, however, suggests that there is a substantial overlap with workers participating in both types of training.

[10] Also for other country specific bodies, we find companies with this form of employee representation to have a significantly higher share of workers receiving training, as compared to those without employee representation. It is, however, difficult to assess this type of representation, as it entails multiple country-specific types of representation.

Table 13: Share of employees in AL by employee representation

Indicator	Employee representation		
	Yes	No	Difference
Training: during paid working time & on-the-job training (N= 19410)	48.42	42.73	5.687***
• **Training during paid working time** (N=19631)	50.54	41.42	9.125***
• **On-the-job training** (N=19501)	46.35	43.98	2.367***
Trade union representation			
• **Training** (N=19410)	49.66	43.13	6.524***
• **Training during paid working time** (N=19,631)	52.19	42.1	10.086***
• **On-the-job training** (N=19,501)	47.14	44.11	3.024***
Non-union staff representation			
• **Training** (N=19410)	44.94	43.81	1.13
• **Training during paid working time** (N=19,631)	43.97	43.15	0.822
• **On-the-job training** (N=19,501)	45.83	44.42	1.416
Works council (or equivalent)			
• **Training** (N=19410)	49.58	43.15	6.433***
• **Training during paid working time** (N=19,631)	51.21	42.23	8.984***
• **On-the-job training** (N=19,501)	48.07	44.01	4.062***
Other country specific bodies			
• **Training** (N=19410)	53.03	43.49	9.542***
• **Training during paid working time** (N=19,631)	57.45	42.65	14.805***
• **On-the-job training** (N=19,501)	48.63	44.28	4.347***

*Notes: All data are weighted. *** (**) ((*)) indicates significance at the 1 % (5 %) ((10 %)) significance level.*
Source: European Company Survey 2019 [Dataset].

3.2.2. Regression analyses

The descriptive analyses highlight the importance of employee representation for employee learning opportunities. This notwithstanding, the analysis does not control for other potentially confounding factors such as company size. To better isolate the relationship between employee representation and AL, we ran a regression analysis controlling for these confounding variables. First, we studied the impact of different forms of social dialogue at the firm level on training opportunities within that firm. Second, we assessed the heterogeneity of the relationship between employee representation and AL.

3.2.2.1. Adult learning participation and social dialogue

Table 5 depicts the results of a regression analysis with the percentage of workers receiving formal and/or non-formal AL within the firm as the dependent variable. The first column considers the dummy variable 'Indirect representation', which is equal to 1 if within the firm trade union

representation, non-union staff representation, a works council or another country-specific body exists, and 0 otherwise. Included as control variables for all regressions in Table 5 are country, sector, company size, the share of under-skilled workers, and the speed of changes in needed knowledge and skills.

Results suggest that 'Indirect representation' is positively and significantly associated with the share of workers receiving training, meaning that firms where there is a form of employee representation offer more training opportunities to their employees. Columns 2 to 5 further break down these results across different employee representation types. Trade union representation, a works council, and other country-specific bodies are positively and significantly associated with training participation. Non-union staff representation, however, is not significantly linked to AL and therefore does not seem to impact AL. Lastly, column 6 includes all four representation types at the same time, to control for potential confounding effects of other representation types. In this analysis, the conclusion stays the same: only non-union staff representation is not significant, the other types are both significant and positive, pointing towards a positive effect of employee representation on AL opportunities[11].

Table 14: Type of employee representation and share of employees in training at the firm level: regression analyses

Training [0-100]; N=18892	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Indirect representation	4.369*** (0.548)					
Trade union representation		4.499*** (0.681)				2.807*** (0.709)
Non-union staff representation			-1.776 (2.122)			-1.524 (2.116)
Works council (or equivalent)				5.309*** (0.687)		4.164*** (0.711)
Other country-specific bodies/individuals					8.824*** (1.170)	7.433*** (1.183)
Controls						
Country	x	x	x	x	x	x
Sector	x	x	x	x	x	x
Company size	x	x	x	x	x	x
Share of under-skilled workers	x	x	x	x	x	x
Speed of change in needed knowledge & skills	x	x	x	x	x	x
R^2	0.108	0.107	0.105	0.107	0.107	0.11

*Notes: All data are weighted. The dependent variable is the average percentage of workers receiving formal and/or non-formal AL within the firm. *** (**) ((*)) indicates significance at the 1 % (5 %) ((10 %)) significance level.*
Source: European Company Survey 2019 [Dataset].

[11] Please note that non-union representation is mostly prevalent in Luxemburg (see Figure 12). The results in Table 5 are likely not impacted by this, as Luxembourg only represents 0.35 % of the entire sample.

Further investigating the relation between employee representation and AL, we consider both types of AL individually in Table 6. Column 1 has training in general as the dependent variable, which is, as in Table 5 Column 6, the average percentage of workers receiving formal and/or non-formal AL within the firm. Column 2 reports the regression results for the share of employees in formal AL. This entails all training sessions during paid working time. Similar to previous results, trade union representation, works council and other country-specific bodies are positively and significantly associated with AL participation in firms. Remarkably, the effect sizes are larger as compared to the overall training indicator (column 1): the presence of trade union representation increases the share of employees who received formal AL by 4.27 percentage points instead of 2.81 percentage points when we consider the average share who receives any training. Also, the coefficients of a works council and other country-specific bodies increase. When studying non-formal AL, the effect sizes of the three employee representation types decrease compared to column 1, with the coefficient of union representation even becoming statistically insignificant.

Overall, results suggest employee representation to be positively linked to AL within firms. This is especially true for works council, trade union representation, and other country-specific bodies. Additionally, using the ECS, we find that these types of representation seem to have the largest impact on formal AL compared to non-formal AL.

Table 15: Type of employee representation and share of employees in different types of training at the firm level: regression analyses

	(1) Training	**(2) Formal AL**	**(3) Non-formal AL**
Trade union representation	2.807*** (0.709)	4.267*** (0.858)	1.156 (0.841)
Non-union staff representation	-1.524 (2.116)	1.066 (2.561)	-3.847 (2.507)
Works council (or equivalent)	4.164*** (0.711)	5.797*** (0.860)	2.745*** (0.843)
Other country-specific bodies/individuals	7.433*** (1.183)	11.934*** (1.433)	2.897** (1.403)
R^2	0.110	0.129	0.087
N	18892	19055	18960

*Notes: All data are weighted. *** (**) ((*)) indicates significance at the 1 % (5 %) ((10 %)) significance level. The dependent variable is the average percentage of workers receiving formal and/or non-formal AL within the firm. All regressions control for country, sector, company size, share of under-skilled workers, and speed of change in needed knowledge and skills.*
Source: European Company Survey 2019 [Dataset].

3.2.2.2. Temporary workers and workers with matching skills

In this section, we assess the heterogeneity of the relationship between employee representation and AL. First, following Adolfsson et al. (2022), the effect of temporary contracts on AL is analysed, see Table 7 Column 1 and 2. We again find indirect employee representation to increase training participation. Additionally, and in line with the results of Adolfsson et al. (2022), we find temporary work to negatively impact AL in firms, meaning that an increase in the share of temporary workers decreases the percentage of employees receiving training. This notwithstanding, the share of temporary workers does not seem to impact the relation between indirect representation and AL, as the interaction term between indirect representation and the share of temporary workers is not significant (see Column 2).

Second, we study the heterogeneity of the relationship between employee representation and AL dependent on the skills present within the firms' employees, see Column 3 and 4. We again find employee representation to increase training participation. Additionally, the share employees with matching skills seem to negatively impact AL in firms, meaning that if the share of employees whose skills match their job requirements increases, training incidence decreases. However, we do not observe a heterogeneous effect of employee representation based on the skill match of workers, Column 4.

Table 16: Heterogeneity in the relation between type of employee representation and share of employees in training at the firm level, by temporary employment and skill (mis)match: regression analyses

Training [0-100]	**(1)**	**(2)**	**(3)**	**(4)**
Indirect representation	4.215*** (0.548)	3.744*** (0.632)	4.363*** (0.548)	4.248*** (1.599)
Share of employees with temporary contract	-0.059*** (0.008)	-0.064*** (0.009)		
Indirect representation × share of employees with temporary contract		0.031 -0.02		
Share of employees with matching skills			-0.021*** -0.008	-0.017* -0.01
Indirect representation × share of employees with matching skills				0.002 -0.021
N	18772	18772	18892	18892
R^2	0.1115	0.1116	0.1076	0.1076
Controls	Country, sector, company size, share of under-skilled workers and speed of change in needed knowledge & skills		Country, sector, company size, and speed of change in needed knowledge & skills	

*Notes: All data are weighted. *** (**) ((*)) indicates significance at the 1% (5%) ((10%)) significance level.*
Source: European Company Survey 2019 [Dataset].

4. Summary of findings and conclusion

The purpose of this empirical paper was to investigate whether industrial relations and social dialogue have an influence on AL outcomes within the EU27 and, if so, how and in what direction. Looking at previous research done on the topic, one could argue that industrial relations have a positive influence on AL. At the national level, trade unions can advocate AL policies with policymakers or negotiate on the topic with employers' organisations. At the firm level, trade unions can support employees in their requests for AL opportunities, bring the subject to the attention of the employer themselves or even pressure the employer to give employees more access to training opportunities.

Literature on the subject finds overall positive effects of social dialogue on AL outcomes. Social dialogue results, for example, in higher training occurrence, better quality of training, higher participation in training, higher amount of training etc. (Allaart et al., 2009; Böheim and Booth, 2004; Koch et al., 2019; Stegmaier, 2012). In the literature, special attention goes to AL access for groups in more challenging working conditions. Workers with a low level of education, for example, would also benefit from the positive effects of social dialogue on training (Wotschack, 2019).

When looking at the relationship between social dialogue and industrial relations and adult learning participation outcomes in the EU, we find a statistically significant association between the intensity of social dialogue and AL participation outcomes using both the individual/worker perspective (EU-LFS) and the firm perspective (ECS). At the firm level, the presence of employee representation bodies is positively linked to the percentage of employees receiving both formal and non-formal AL. This is especially true for trade union representation, a works council, and other country-specific bodies. Non-union staff representation does not seem to have an effect on AL incidence. Furthermore, employee representation seems to have the largest impact on formal AL incidence. Non-formal AL incidence is also positively associated with employee representation but not with the same gravity.

Using EU-LFS data in the EU countries, we find a statistically significant, albeit fairly small, relationship between AL participation rates and intensity of social dialogue at the EU level. More specifically, there is a positive and statistically significant relationship between the union density and bargaining coverage indicators and AL participation rates, but the role of employer association density is not statistically significant. However, an increase in trade union density is associated with fewer hours in AL, but the magnitude of social dialogue indicators in explaining AL outcomes is fairly small. Moreover, using ECS data, firm-level employee representation does seem to increase the percentage of employees receiving training.

Considering AL outcomes for different groups on the labour market, some of them more vulnerable, the results are mixed. While social dialogue increases participation in AL, it does not seem to contribute to greater equity in accessing AL. We rather find some evidence that stronger social dialogue favours employed workers over unemployed and those in occupation at low risk of computerisation rather than those in occupations at high risk of computerisation. The effect for males and females, however, seems to be the same. At firm level, a higher number of temporary workers within the firm is negatively associated with the share of workers receiving AL. Notwithstanding this result, the positive relationship between employee representation and AL within the firm does not seem to alter depending on the share of temporary workers. A high share of workers with matching skills within the firm is negatively linked to training incidence. Again, the

relation between employee representation and AL within the firm does not seem to alter depending on the former share.

All things considered, employee representation does seem to have a positive and significant effect on AL incidence, both at the national and firm level. While the addition of control variables was limited by the EU-LFS and ECS questionnaires, these results seem to be robust to the multiple controls that were used. In fostering AL access to workers across the EU, industrial relations and social dialogue do seem to have an impact which should not be neglected.

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