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# **The Intensification of Work in Europe: A Multilevel Analysis.**

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## **Abstract**

Using the most recent two waves of the European Working Conditions Survey (2010 and 2015) in a multilevel setting, the paper argues that national institutions have a significant effect on shifts in work intensity. We find that work has intensified in the aftermath of the economic crisis, but that intensification is restricted by labour market regulation and collective bargaining institutions. However, the effect of working time regulations varies across employment groups, with intensity levels for temporary agency workers increasing as regulations become more stringent. Furthermore, higher levels of unemployment intensify work for agency workers but not for workers on a fixed-term contract relative to workers on a permanent contract.

Keywords: Work intensity, labour market regulation, temporary agency work

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## **1. Introduction**

The intensity of work is at the core of the debate concerning the changing quality of jobs in developed economies (Gallie 2009; Green 2006). A key argument in this debate is that economic development has not made work less onerous but that, in the context of deregulation and technological change, the quality of work has declined. Eurofound (2015) has shown that average work intensity in the EU15 as a whole increased between 1995 and 2010, with most individual countries experiencing an increase (also see Green 2006: 58; 2011: 124). Researchers have discussed a variety of factors that might contribute to work intensification, including the use of information and computing technologies (ICT) and other new technologies (Chesley 2014; Green 2006), new forms of work organisation, methods of performance management that subject workers to evaluation against performance metrics (Danford *et al.* 2008; Tregaskis *et al.* 2013), increased job insecurity (Gallie 2005) and restructuring (Flecker and Meil 2010). The common denominator of this literature is that it draws on workplace level evidence to describe and explain patterns of work intensification.

Although there is an implicit recognition that changes in the economy (e.g. economic crises, periods of high unemployment) or institutions (e.g. labour market regulation) can drive work intensification, cross-national evidence remains scarce. With the exception of Green and McIntosh (2001), who use country level data to test the link between work effort and trade union power, and Gallie (2009), whose employment regime theory seeks to explain cross country differences in job quality, empirical analyses have little to say about how different institutional and economic factors impact on the intensification of work. Descriptive evidence also suggests that the economic and financial crisis of 2008-2009 might have renewed the trend towards work intensification across Europe, although it is not entirely evident which facet of the crisis was most relevant (Eurofound 2013; Gallie 2017).

This paper seeks to bridge the micro and macro literatures on work intensification. At the micro level, we show that productivity or piece-rate payments and restructuring events are the most important predictors of the intensification of work. Consistent with previous literature (Piasna 2018), we show that workers' lack of control over working time arrangements is a key driver of increased work effort. Furthermore, we demonstrate that low employee discretion over how they accomplish work tasks is associated with higher levels of work intensity.

We also show that while stricter regulation of working time protects core workers from work intensification, it is associated with increasing intensity for temporary agency workers,

suggesting that non-standard employment provides employers with a route to escape regulation. Furthermore, we find that trade union power has an impact on work effort, with levels of work intensity being lower in countries where automatic extensions of collective bargaining agreements are in place. These findings indicate that one of the key consequences of the decentralisation of collective bargaining has been the spread of more intensive work (Gumbrell-McCormick and Hyman 2013). Finally, we also explore how regulation of working time arrangements interacts with the type of employment contract and demonstrate that as regulation becomes more stringent, work intensifies for temporary agency workers but not for workers on a fixed-term contract. Higher levels of unemployment are also associated with an increase in work intensity for temporary agency workers, suggesting that labour market slack can be a conduit for job quality polarization.

The paper is organised as follows. The next section critically reviews the literature and evidence regarding work intensification in Europe. It makes the case for bridging the macro and the micro literatures that analyse trends and determinants of work effort. Section 3 describes our empirical strategy and our datasets. Section 4 discusses our evidence, focusing on the factors that impact on work effort in the EU. The final section discusses the policy implications of our paper and highlights the centrality of institutions as drivers and moderators of work effort.

## **2. Theorizing Work Intensification**

Work intensity is of fundamental importance to the analysis of the employment relationship, the dynamics of production and distribution and the performance of organisations. Economists have noted that work intensity might be a factor affecting the amount of ‘slack’ in the economy (Hirschman 1970: 12) and a source of ‘x-inefficiency’ (Leibenstein 1966), reflected in, for example, differences in the productivity of firms operating in the same sector and with identical technologies. For Marx (1971), the intensity of work was a determining element in the generation of surplus value (the expenditure of labour time over and above that necessary to reproduce the value of labour power) and the rate of exploitation (the relationship between necessary and surplus labour time). Marx stressed two distinct forms of exploitation, which he termed the production of absolute and relative surplus value. Absolute surplus value primarily arises through an extension of the working day or by an intensification of worker effort (Marx 1971: 520). This might be achieved by reducing in length and number periods of the working

day, such as meal breaks, which are spent in non-productive activity (periods which are sometimes referred to in terms of the 'porosity' of the working day). Alternatively, the pace of work might be increased so that a greater amount of output is produced within a given period of time. Marx stressed, however, that the rate of exploitation would be determined by the outcome of struggles between workers and employers over the duration and intensity of work performed (Marx 1975: 74). The intensity of work is, therefore, inseparable from the question of how work is extracted from workers (Bowles 1985: 19) and struggles around the effort bargain (Edwards 1986). These are fundamental concerns for labour process research (Thompson 2003; Thompson 2010; Thompson and Smith 2009) which, by examining labour 'at the point production' (Thompson and Smith 2009) has generated valuable insights into the workplace determinants of work effort.

The measurement of work effort is, however, fraught with problems. Green (2006: 48) defines work effort as the 'rate of physical and/or mental input to work tasks during the working day' but emphasises the difficulties inherent in attempting to determine these rates. He argues that the best available measures are based on workers' self-reported perceptions of their efforts (see also Guest 1990). Such measures are to be found in surveys conducted in the UK from the early 1980s onwards. These include the Workplace Industrial (later Employment) Relations Survey, Employment in Britain, Working in Britain, the Skills Surveys and the Work-life Balance survey (for an overview of the findings, see Green 2006). Taken together, the findings of these surveys provide compelling evidence of an increase in work intensity in the 1980s and 1990s.

A number of employment relations researchers have argued that increased work intensity was an important cause of the sustained productivity increases that occurred during the 1980s (Metcalf 1989; Nolan 1989) and may also have contributed to increases in injuries and fatalities in the manufacturing sector (Nichols 1991). Perceptions of increasing work pressures and time poverty in the 1980s and 1990s, coupled with increases in the participation of women in paid employment, also gave rise to a concern with the ability of workers to achieve a 'work-life balance' (Edwards and Wajcman 2005: 44–6) and increased recognition of the consequences of work intensity for stress-related health conditions (Green 2011: 124).

Explanations for the increase in work intensity have tended to focus on factors relating to the organisation of work and the diffusion of technologies. Green (2004; 2006), for example, places greatest emphasis on the role of 'effort biased' technological change, including the diffusion of information and computing technologies and 'lean' or high-performance systems

of production, which can involve the erosion of job role boundaries (Rothstein 2012) and can be associated with strong performance norms, peer pressure, increased job effort and strain (Barker 1993; Green and McIntosh 2001: 70; Ramsay *et al.* 2000). However, the available evidence suggests that the implementation of high-performance work systems has been very limited (Huselid and Becker 2011; Kaufman 2015). The diffusion of ICT, by contrast, has been extensive and has affected work intensity in a number of ways (Green 2004). ICT can enable employers to monitor employees' work efforts more closely (Belanger and Thuderoz 2010) and can be used to reduce or increase workers' autonomy and discretion. For instance, Holman and Rafferty (2018) demonstrate that technology can result in growing job polarisation as it can increase discretion in some jobs while reducing discretion in others, which depends largely on whether technology substitutes or complements job tasks. Brown *et al.* (2010) discuss how some managerial and professional roles have been effectively deskilled through a process of 'Digital Taylorism' that involves the digitisation and codification of knowledge. The potential for work intensification exists even where workers use ICT in a context of remote working. Although ICT can enable employees to work from home, it can lead to an erosion of the boundary between home life and working time and workers might feel (and be encouraged by their employer to feel) that they should be constantly available (Edwards and Wajcman 2005: 56–7; Schörpf *et al.* 2017).

Research on influences on work intensity at the organisational level has therefore highlighted the importance of employers' attempts to exert tighter control over workers' efforts. A limitation of much of this research, however, is that it neglects the potential importance of broader institutional and economic factors in creating pressure for change at the organisational level and in shaping the context within which organisational changes take place. The wider employment relations context is important in this regard. In many countries, trade union membership and collective bargaining coverage diminished in the 1980s and 1990s. In the UK and elsewhere, the weakening of trade unions was partly a consequence of policies enacted by governments that were hostile to trade unions. A shift in the balance of workplace power in management's favour during the 1980s may have contributed to a 'fear' effect (Metcalf 1989) that encouraged workers to work harder. In both the public and private sectors, the application of performance-rating systems to individuals and teams and the introduction of performance-related pay represented further means by which employers sought to increase work effort (Friedman 1977; Ramsay *et al.* 2000). In addition, the growing role of financial capital in the real economy has influenced the priorities of employers, encouraging a greater concern with

short term-results and shareholder value, which has in turn led to more frequent reorganisation of work and effort intensification (Clark 2009; Prosser 2014). Clark (2013) has shown how financial controls exerted by private equity investors may lead to organisational down-sizing, job losses, union avoidance and a more intensive monitoring of short-term performance. More generally, Thompson (2013: 479) has emphasised that ‘taking labour out and squeezing extra performance from those who remain is a central mechanism for achieving shareholder value goals in the process of asset management’ and that financialisation has further encouraged the surveillance of employees by employers, excessive working hours and negative spill-overs of work into home life.

An important consideration is how the limits to management’s ability to intensify work effort are set, beyond the ‘physical bounds of labour-power’ (Marx 1971: 215). One counter-vailing force is the agency of workers. Studies of the workplace have, over a long period of time, revealed means by which workers individually and collectively act to create space in the working day and exert control over working time (Burawoy 1982; Heyes 1997; Roy 1952; Roy 1960). Trade union presence within the workplace and collective bargaining institutions might also serve to reduce management’s scope to intensify work effort. Green and McIntosh (2001) argue that there is tendency towards growing work intensification in contexts with weak collective bargaining institutions and declining trade unions. Strong collective bargaining institutions and collective organisation may endow trade unions with the power to negotiate more favourable agreements at the local level while also ensuring that monitoring mechanisms are in place that reduce the capacity of employers to evade regulations (Lee and McCann 2011:53). For example, Berg *et al.* (2004) show that in countries with more powerful trade unions, management has less power in setting terms and conditions and in driving changes in working time practices. Since changes in working time are an important source of work intensity (Piasna 2018), more powerful trade unions will also limit the extent to which employers will be able to pursue changes that intensify work. Since the introduction of the EU Working Time Directive in 1993, trade unions in countries with strong traditions of representation and collective bargaining have negotiated with employers on hours of work and flexibility in working time in ways that protect and even promote the interests of workers (Lee and McCann 2011).

The other channel through which collective bargaining institutions could limit work effort is by extending protection to more vulnerable groups of workers. More inclusive collective bargaining systems are better equipped to establish norms that are universally applicable,

irrespective of job characteristics (Gallie 2009). Stronger collective bargaining institutions are also linked with more inclusive trade union strategies that aim to represent and organize labour market outsiders. It is therefore possible that collective bargaining may serve to prevent work intensification by limiting the degree of labour market segmentation (Doellgast *et al.* 2018). In Europe, the Nordic countries are the most notable examples of inclusive labour markets. In contrast, the Continental and the Mediterranean countries are dualist regimes<sup>1</sup> that guarantee strong employment rights to the core workers at the expense of low security for those at the periphery (Gallie 2007: 17).

Work intensity can also be influenced by direct labour market regulation. One potential, yet unresearched, influence is employment protection legislation (EPL), which imposes constraints on employers' ability to dismiss workers and regulates the use of temporary employment contracts. The bulk of econometric studies which analyse the effects of EPL are focused on a few indicators: employment and unemployment levels, employment elasticities for various groups of workers and job flows (Adăscăliței and Pignatti-Morano 2016; Addison and Teixeira 2003; Avdagic 2015; Barbieri and Cutuli 2016). The scarce evidence on the effects of EPL on work intensification, however, suggests that deregulation is linked with higher levels of effort. For example, Green (2004) argues that deregulation promotes higher levels of work effort by increasing the levels of perceived insecurity experienced by workers. Faced with a higher probability of job loss, workers may discretionally increase their effort to reduce the chances of being dismissed. Furthermore, Gallie (2005) finds evidence that labour market insecurity contributes to work pressure, although most of the variation between countries is explained by individual level variables. His analysis also suggests that work intensification is 'contingent on broader economic conditions' (Gallie 2005: 373) and on political compromises regarding the regulation of working time.

A final consideration is the wider macroeconomic context and, in particular, the health of the labour market. Where unemployment is high or increasing, it is plausible that fear of job loss will encourage an increase in work effort on the part of those who remain in employment, particularly in sectors that are most affected by job losses and where firms are experiencing financial difficulty and reducing staffing (Gallie and Zhou 2013a: 135). However, the fact that substantial increases in unemployment are likely to be associated with a reduction in consumer



demand, may serve to limit increases in work intensification or even lead to a reduction in work intensity in some part of the economy where, for example, employers choose to hoard labour and reduce hours of work rather than dismiss workers. Furthermore, average work intensity may fall if jobs associated with relatively high work intensity are disproportionately lost compared to jobs associated with lower intensity. It is also plausible that fear of job loss will depend on the financial consequences for workers and that it will tend to be less where workers are entitled to unemployment benefits at a relatively high replacement rate, where the risks of falling into poverty are low and where unemployment spells tend to be relatively short (Steiber 2013: 223).

### **3. Variables and Empirical Approach**

#### *3.1. Data description*

To analyse the determinants of work intensity in Europe, we use data from the fifth and sixth waves of the European Working Conditions Survey (EWCS) conducted in 2010 and 2015 respectively by the European Foundation for the Improvement of Living and Working Conditions (Eurofound 2020).<sup>2</sup> The EWCS is the most comprehensive comparative dataset that captures changes in the organisation of work in Europe. For our country-level variables we use three additional datasets: Eurostat for our unemployment level and unemployment expenditure variables (Eurostat 2020b), the ICTWSS dataset (Visser 2019) for the variables which capture the characteristics of industrial relation systems and the CBR Leximetric Dataset (Armour *et al.* 2016) for the variables that operationalise the dimensions of employment protection legislation (EPL). Compared to the traditional measures of EPL such as the commonly used OECD index of EPL (OECD 2019), the CBR has a better temporal and geographical coverage.

Following Piasna (2018) we operationalize our dependent variable based on two items from the EWCS which capture the quantitative demands of work: the self-reported frequency of working at very high speed and whether workers work to tight deadlines. The answers to the two questions were reversed and used to create an index, so that higher levels of the index represent higher levels of work effort. Although the index does not cover all the dimensions of work intensity captured in the Eurofound index (Eurofound 2017), it is highly correlated with it. More details on the construction and reliability of the index can be found in Appendix 1.

At the individual level we include a range of predictors which have been found to be associated with work intensity. The first one is *gender*, which is a dummy variable, taking the value of 1 if the respondent is female and 0 otherwise. Based on the previous literature (Burchell and Fagan 2004; Floro and Pichetpongsa 2010; Hogan *et al.* 2014), we expect women to experience higher levels of work effort. We also include *age*, *education*, and *tenure* to control for worker characteristics (Gallie and Zhou 2013a; Green and McIntosh 2001). We further include the *size of the workplace* and the *sector of activity* to account for differences across firms and sectors<sup>3</sup>. Workplace reform can also translate into work intensification as tasks and role are reorganised, departments are downsized and resources are reallocated across the workplace (Harney *et al.* 2018). To account for the potential effects of restructuring on work intensity, we include a dummy variable that takes the value of 1 if a restructuring has taken place in the organisation in the past three years and 0 otherwise.

Next, we include a set of worker observables that operationalise job security and job quality. The type of *employment contract* captures the objective dimension of job security and is a categorical variable that takes the value of 0 if the worker has a permanent contract, 1 if the contract is fixed-term and 2 if the worker is employed through an agency. Job insecurity has been found to be associated with work effort, with people in more precarious, non-standard contracts being more vulnerable to employer pressure and demands for intensification (Gallie 2005). We also add a dummy variable that captures subjective job insecurity which is measured through the following survey item ‘*If I were to lose or quit my job, it would be easy for me to find a job of similar salary?*’. We also include a dummy variable for the subjective evaluation of job quality that is coded as 1 if the worker is satisfied with working conditions at the workplace and 0 otherwise.

Following previous literature (Piasna 2018), we also include a set of variables that capture working time arrangements. The first is a categorical variable that measures the number of hours usually spent at work. This variable takes the value 0 if the respondent works between 0 and 19 hours per week, 1 if she works between 20 and 34 hours, 2 if she works between 35 and 40 hours and 3 for values larger than 40. The second is a variable that captures whether workers have control over setting their working time arrangements and takes the value of 0 if the worker has no control, 1 if the firm allows some individual flexibility in setting working time arrangements and 2 if the worker has full flexibility in organizing their working time. Since change in working time has been one of the main mechanisms through which firms have adjusted to the economic crisis and an important driver of work effort (Piasna 2018), we expect

both variables to be significant. Finally, we also include a variable that captures the difference between actual and preferred number of working hours, given workers' need to earn a living. The variable takes the value of 0 if there is no difference between actual and preferred number of hours, 1 if the number of working hours is smaller than the preferred number of working hours (hours underemployment) and 2 if the number of working hours is higher than the preferred number of working hours (hours overemployment). We include this variable so as to take into account the possibility that work intensity may to a degree reflect the choices made by individual workers concerning the amount of labour that they wish to supply (Gallie and Zhou 2013a: 132).

Work intensity has also been linked to whether employees are able to exert control over how their work is performed (task discretion) and participate in decision making related to the organisation of work, which Gallie and Zhou (2013b: 18) refer to as two dimensions of 'employee involvement'. Their study indicated that work intensity tends to be lowest where there is significant task discretion, although for women substantial involvement in decision making also appears to be important. To capture employee involvement in our own analysis, we follow Gallie and Zhou (2013b) and create a composite variable that captures the two dimensions of employee involvement: *task discretion* and *organisational participation*. We operationalize task discretion based on three variables that measure whether workers are able to choose the order of tasks they need to perform, the methods of work, and the speed at which they perform the tasks. To generate the index of organisational participation, we also use three items that capture whether workers are consulted before objectives are set for their work, whether they are involved in improving the organisation or organisational processes, and whether they can influence decisions that are important for their work. These two dimensions were combined to generate a categorical variable that takes the value of 0 in the case of a *low involvement organisation* (low task discretion and low organisational participation), 1 for a *consultative organisation* (low task discretion and high organisational participation), 2 for a *discretionary organisation* (high task discretion and low organisational participation), and 3 for a *high involvement organisation* (high task discretion and high organisational participation).<sup>4</sup> The methodology used in the construction of the variable can be consulted in Appendix 1.

The final set of individual level variables aims to test the effects of technology, skills and payment systems on work effort. To test the effect of technology on work intensity we use a question that asks respondents how often they use computers or other technology in their main

job. This is a categorical variable that takes the value of 0 if the respondent does not use technology, 1 if she uses technology rarely and 2 if work involves the frequent use of technology. Next, we add an occupation variable as a proxy for skill levels. We use the ILO ISCO methodology to map occupational categories into skill levels (ILO 2016). The variable takes the value of 0 for unskilled workers (ISCO category for ‘elementary occupations’), 1 for semi-skilled workers (ISCO categories for ‘plant and machine operators’, ‘craft and related trades workers’, ‘skilled agricultural, forestry and fishery workers’, ‘service and sales workers’, and ‘clerical support workers’), 2 for skilled workers (ISCO category for ‘technicians and associate professionals’ and 3 for managers (ISCO categories for ‘professionals’ and ‘managers’). Workers in the armed forces were excluded from the analysis. The occupational classification is the best available proxy for skill levels as the EWCS does not include detailed measures of skills. The effect of skills on work effort remains debated, with more recent literature arguing that intensification is a process that cuts across occupations (Grugulis and Lloyd 2010) while older versions of labour process theory argue that work intensity impacts primarily low-skilled workers through the process of de-skilling (Braverman 1974). If the de-skilling/intensification hypothesis is valid, we expect to see a significant effect for the less skill intensive occupations. In contrast, if the more recent version of the skill hypothesis is true, we expect to find that intensification impacts both unskilled and skilled workers. We also include a dummy variable that captures whether the reward system at work is based on a productivity or piece rate system.

At the country level we include several variables which code economic and institutional differences between European countries. The first one is the year of the survey, which describes the average change in work intensity between 2010 and 2015. The second country level variable is the unemployment rate, which captures the extent of labour market insecurity. Higher levels of unemployment might signal workers that jobs are scarce and can feed into their subjective feelings of insecurity. Additionally, to account for the potential negative effects of welfare generosity on work effort (Steiber 2013), we include the gross expenditure on unemployment benefits in purchasing power parity.

To capture the power of trade unions, we include two variables that measure the dominant level at which collective bargaining takes place and whether collective bargaining agreements are extended to non-organised employers. Both are categorical variables, with higher levels denoting more powerful trade unions. We use these variables as opposed to the traditional measures of union density because of data limitations. We expect that peak level collective

bargaining and automatic extension rules to be negatively associated with work intensity. More powerful trade unions can reduce work demands through various channels, including the negotiation of more favourable terms and conditions that limit the freedom of employers to increase pressures on workers, additional protections to those included in legislation that take into account the specific working conditions of different sectors in the economy, or through directly negotiating with governments and signing of tripartite collective bargaining agreements (Green and McIntosh 2001; Gumbrell-McCormick and Hyman 2013).

Finally, we include two continuous variables that capture the impact of employment protection legislation on work intensity: regulation of working time and dismissal protection rules. The working time variable is a composite index that measures whether national legislation contains provisions regarding: annual leave entitlements, public holiday entitlements, overtime premia, limits on overtime working, duration of normal working week and maximum daily working time (for details on coding methodology see Armour *et al.* 2016). The dismissal protection variable is an index that captures whether the law imposes substantive and procedural constraints on dismissal, whether it provides for remedies in instances of unfair dismissal and whether there are strict requirements regarding notification periods (Armour *et al.* 2016). For both variables, higher levels are equivalent with stricter levels of protection for workers. We expect that more stringent levels of protection will be associated with lower levels of work intensity. In the case of working time regulation, stricter regulation means that employers have less freedom in using changes in working time arrangements as a vehicle for increasing work effort. In comparison, more stringent dismissal protection legislation, reduces the ‘fear’ effect (Metcalf 1989) that contributes to the intensification of work. To facilitate the interpretation and comparability of the effects, all continuous predictors in the model have been centred around the grand mean and standardised so that coefficients represent the change in the predictor associated with a move of one standard deviation away from the mean. A full summary of the variables can be found in Appendix 1.

### *3.2. Empirical approach*

Our empirical strategy is to leverage the hierarchical structure of our dataset which includes individuals (level 1 units) clustered within countries (level 2 units).<sup>5</sup> At the individual level we have 58 053 observations which are nested in 27 level 2 units. We specify two-level mixed-effects linear models with random intercepts. Formally, our models are specified as follows:

$$y_{ij} = \beta_0 + \beta_1 x_{ij} + \beta_2 X_j + \beta_3 x_{ij}X_j + \epsilon_{ij} + u_j \quad (1)$$

$$\epsilon_{ij} \sim N(0, \sigma_\epsilon^2) \quad (2)$$

$$u_j \sim N(0, \tau_\epsilon^2) \quad (3)$$

Where equation (1) serves to predict the individual-level outcome, equation (2) describes the variance of the random term at the individual level and equation (3) is a vector of country-level errors. Furthermore,  $\beta_0$  is the intercept for the whole sample,  $x_{ij}$  is the set of level 1 variables, including gender, age, education, contract type, firm size, sector, restructuring, occupation, working time, control over working time, desired working time, use of computers, use of productivity payments, type of organisation, and job satisfaction;  $X_j$  is a matrix of level-2 variables that includes the level of unemployment, unemployment expenditure, dominant level of collective bargaining, whether collective bargaining agreements are automatically extended, regulation of working time, and dismissal protection; and  $x_{ij}X_j$  denotes a cross-level interaction term between the type of contract and several of the level-2 variables. Theoretically, we do not expect that present levels of level-2 variables immediately impact on present values of level-1 variables. Rather, changes in the economy or institutional reforms take time to take effect. For this reason, all the values for level-2 variables are included in the regression with a one-year lag.

#### **4. Findings**

Before describing the results of our model, we present a descriptive analysis. Figure 1 plots the average values of work intensity across the EU between 2010 and 2015. To facilitate interpretation, the variable was rescaled between 0 and 1, with lower values corresponding to lower levels of intensity. Several patterns are worth noting. First, the average levels of work intensity are relatively high in Europe and have slightly increased between 2010 and 2015. Second, separate clusters of countries can be identified based on changes in the average levels of work effort. In countries such as Sweden, Slovakia, Luxembourg and Hungary, average levels of work intensity remained relatively stable across time. In these countries, the crisis does not seem to have had a major impact on intensity levels. In a second group, comprising countries such as Slovenia, Germany, Finland and Czechia, the average level of work effort declined in the aftermath of the crisis, continuing a trend of decline that started before the crisis. In a third group of countries which includes Bulgaria, Romania, United Kingdom, Portugal,

Spain and Greece, work effort has intensified in the aftermath of the crisis. It is worth noting that changes in work intensity levels cut across groups of countries which are traditionally clustered together in the ‘varieties of capitalism’ (Hall and Soskice 2001) or welfare regime (Esping-Andersen 1990) frameworks. Rather, the largest increases in work effort have taken place in countries that have deregulated their labour markets and decentralized their systems of industrial relations in response to the crisis.

{Figure 1. Average levels of self-reported work intensity in EU27 countries, 2010-2015. Source: Own calculations based on the EWCS data.}

#### *4.1. Individual-level predictors.*

Table 1 presents the results of our multilevel models. The empty model (Model 1) estimates the amount of variance in work intensity that is explained by differences across countries. The model shows that the intraclass correlation coefficient (ICC) is 0.0529, meaning that 5.3 percent of the variance in the dependent variable is explained by between country differences. This is a small to medium effect (LeBreton and Senter 2008) which suggests that country level differences do indeed impact work effort.

Before interpreting the results, Figure 2 below plots the random effects from Model 3, which is the model with all the individual level predictors. The figure shows that for any given level of our level 2 predictors, work intensity is almost 1 point lower in Bulgaria compared to Italy. In contrast, work intensity is highest in Cyprus, Finland and Sweden.

{Figure 2. Random intercepts by country.}

Looking at our individual-level variables, the first thing to note is that, after controlling for job characteristics and work patterns, gender and age are significant predictors of work effort. Work intensity is higher for women, while older workers report lower levels of work intensity. However, both effects are small. The effect of gender is explained by how men and women experience work and organizational changes. Prior research has shown that women may feel that they need to work harder than men in order to demonstrate a ‘commitment’ to their employer while also being more constrained in terms of their ability to achieve a decent work-life balance patterns, mainly due to their disproportionate involvement in domestic labour and caring tasks (Collinson and Collinson 1997). Furthermore, bias stemming from gender

stereotypes related to negative expectations about performance or individual attributes necessary for success generates normative standards that penalize women and is linked to an increase in effort (Heilman 2012).

More educated workers also report lower levels of work intensity while tenure is not a significant predictor of work effort. The next two individual level predictors, the sector of activity and the size of the workplace are both significantly associated with work intensity. Working in the private sector as opposed to the public sector is associated with a marked increase in work intensity while working in a larger organisation is also associated with more intensive work.

Our next individual level predictor, contract type, shows that that contractual arrangements do impact on work intensity, although their effect varies across non-standard forms of work. Compared to permanent workers, workers on a temporary contract report lower levels of work intensity. By comparison, temporary agency work is associated with higher work intensity a finding that confirms previous research on the nature of non-standard jobs (Strauss-Raats 2019). Relative to standard workers, temporary agency workers tend to be employed in lower quality and more insecure jobs (Kalleberg *et al.* 2000), be assigned short-term tasks that follow strict deadlines, have lower levels of pay and poorer career prospects (Forde and Slater 2005) while also escaping regulatory oversight in relation to issues of health and safety (Strauss-Raats 2019).

{Table 1. Results of Multilevel Regression Models for Work Intensity in EU27<sup>6</sup>.}

In line with previous findings (Green 2004; Green 2006), we find that the use of technology at work has a positive effect on work intensity. Qualitative accounts of the use of technology at work show that automation reduces the amount of control that workers have over the labour process and changes the how work is performed. In describing the changes brought by automation in a denim factory, Green (2006: 70) shows that technology enabled managers to increase control over the labour process and intensify work by optimising workflows in the factory. Moore and Newsome (2018) also find that in the parcel delivery industry, technology is used to remove ‘unproductive’ time by increasing monitoring and surveillance of work. Importantly, they found that the use of technology intensified work for all workers, independently of their contractual status with local unions being unable to fight the intensification of effort (Moore and Newsome 2018).



Working time and control over working time are also key drivers of work effort. Importantly, the coefficients for working long hours (41+ /week) are large, indicating that working long hours is one of the main drivers of intensity. In comparison, work intensity is lower for workers who work less than 35 hours per week. Lack of control over working time also increases work intensity. Our models show that compared to workers who have no control over their working time, both workers who can exercise some control and those who enjoy full flexibility in setting their working time arrangements experience lower levels of work intensification. By comparison, time under-employment and overemployment are associated with higher levels of work intensity.

Looking at the effect of occupation, we find that work is less intense for all occupational groups relative to unskilled workers. This is an important finding that provides evidence for the ongoing degradation in the quality of work at the bottom of the skill distribution. We also find that firm restructuring has a significant and large effect on work intensity, a finding that confirms insights from the labour process literature that link restructuring with organisational processes (e.g. delayering, performance monitoring, changing roles and tasks) that lead workers to work harder (McCann *et al.* 2008).

Job quality and job security are both associated with lower levels of work intensity. This suggests that better and more secure jobs reduce the disciplining effect that the potential loss of job may have on workers (Green and Weisskopf 1990). By comparison, working in an organisation that uses productivity or piece rate payments is associated with an increase in work intensity.

Finally, we also find that compared to ‘low involvement’ organisations, work is less intensive in both ‘discretionary’ and ‘high involvement’ organisations. However, working in a consultative organisation does not have a significant effect on work intensity. The finding confirms recent descriptive evidence from the 2017 Skills and Employment Survey in Britain, which shows that low task discretion jobs tend to be associated with high levels of work effort (Green *et al.* 2018).

#### 4.2. Country-level predictors.

Moving to the country level predictors, we find that compared to 2010, average levels of work effort have increased in Europe. This effect might be driven by the economic recovery that has taken place in the aftermath of the economic crisis, the labour market reforms that have been implemented across Europe after 2010 or by changes in systems in industrial relations. It is to these variables that we turn next.

The first aspect to note is that higher levels on unemployment are associated with an increase in the intensity of work. This provides evidence for the ‘worker discipline effect’ that is theorized in both Marxist and neoclassical accounts (Green and Weisskopf 1990): as macroeconomic conditions change the threat of dismissal can be used by employers as a mechanism for eliciting higher work effort. By contrast, the level of expenditure on unemployment benefits does not have a significant effect on work intensity.

Secondly, we do not find evidence that the dominant level of collective bargaining limits work intensity. The effect of national level collective bargaining is significant only at a 10 percent level and should be interpreted with caution.<sup>7</sup> By comparison, the presence of automatic extension mechanisms of collective bargaining agreements to beyond the contracting parties has a sizeable negative effect on work intensity. This suggests that automatic extension rules establish common working conditions across workplaces that reduce the power of employers to gain a competitive advantage by demanding higher levels of work effort. In this sense, automatic extension rules reduce the insider/outsider divide in work intensity.

Consistent with our expectations regarding the impact of institutions on work intensity, we find that employment protection legislation has a negative and large effect on effort. While stricter regulations on dismissal protection reduce the ‘discipline effect’ by reducing the threat of dismissal (Green and Weisskopf 1990), legal protections for standard hours, maximum duration of working week, holiday pay or premia rates, are key to limiting the flexibility that employers have in using irregular hours as a means for intensifying work. Indeed, poor working time regulations, give employers the power to use flexible arrangements in ways that intensify work.

Still, the impact of both economic and institutional factors can vary across groups of workers. To explore whether this is indeed the case, we present below a series of models in which we interact the employment contract variable with the year, unemployment and working time variables. Table 2 summarizes our results.

{Table 2. Results of interaction models for work intensity in EU27.}

Looking at the main effects in the interaction models above, the first thing to note is that the effects for year and working time regulation remain significant while the main effect of unemployment disappears. Second, the interaction term between temporary work and year as well as between temporary work and unemployment are both significant. Furthermore, the interaction between working time regulations and temporary agency work is also significant, although only at a 10 percent level. To make sense of these effects, in Figure 3 we plot the marginal effects of contract status against levels of our three level 1 variables.

{Figure 3. Marginal effect of being employed in fixed-term contract and temporary agency contract vs. permanent contract by year, unemployment level and regulation of working time with 95 percent confidence intervals.}

The first aspect worth noting is that both in 2010 and 2015, temporary agency workers experienced significantly higher levels of work intensity in comparison to employees with permanent contracts. The finding provides further evidence for the segmentation of the European labour markets, showing that temporary agency work is associated with high levels of work intensity independently of the business cycle. By comparison, in 2010 work intensity was lower for workers with a fixed-term contract relative to those with a permanent contract while in 2015 there was no significant difference between the two groups in terms in levels of intensity. Looking at the second panel in Figure 3, the distinction between workers on a fixed-term contract and temporary agency workers relative to workers with a permanent contract is maintained. At low to mean levels of unemployment, work is more intensive for temporary agency workers than for workers with a permanent employment contract while work intensity is lower for workers with a fixed-term contract when compared to those with permanent contract. Taken together, these findings suggest that the business cycle does not explain the level of work intensity for employees with temporary contracts as some of the previous literature suggests (Aleksynska 2018).

Finally, the third panel in Figure 3 shows that while at low levels of regulation there is no difference in work intensity levels between workers on a fixed-term contract, temporary agency workers and workers with a permanent contract, as regulation becomes more stringent, agency workers experience more intensive work. At the same time, regulation does not impact on the

levels of work intensity of workers on a fixed-term contract. The finding suggests that temporary agency work is a core channel for the intensification of work in countries where the working time is more strictly regulated. It also shows that employment protection legislation can impact on work intensity through different and contrasting channels and that, in the context of flexible forms of employment, working time regulations can further contribute to labour market segmentation.

## 5. Conclusions

Research on the determinants of work intensity have predominantly focused on influences that relate directly to jobs, such as the organization of work and the use of technology. Many of these studies have focused on specific countries, such as the UK. Although our paper has shed further light on relationships between job characteristics and worker effort, it has also highlighted the importance of economic and institutional influences, such as collective bargaining and labour law, which hitherto have been largely overlooked. In so doing, it has pointed to some of the ways in which micro and macro influences might interact.

Our findings concerning influences on work intensity that relate directly to jobs and workplaces indicate the importance of worker vulnerability, management control over the labour process and the use of technology in this regard. Much of the recent debate on new technology has focused on artificial intelligence (AI) and robotics and the supposed labour-saving potential of technology. Our findings, by contrast, highlight the labour *extraction* potential of new technology: workers who make frequent use of computers and related technologies in their jobs are likely to work at a higher intensity than those whose jobs do not require frequent use of computers. Our findings in this regard echo those of Green (2006), who emphasizes the importance of ‘effort-biased technological change’. It is also clear that workers who are unable to exert control over their working time and have little task discretion tend to work at a higher intensity than those who can exert at least some control over their working time arrangements and the execution of tasks. For at least some of these workers, technology will be a factor limiting their ability to exert control. In addition, there is a strong positive relationship between work intensity and hours worked. The findings also show that high levels of subjective job insecurity are associated with intensified work effort, presumably because workers fear that lower levels of work intensity would lead them to lose their job.

Our findings relating to institutional influences on work intensity point to the importance of forces that might limit the ability of employers to intensify the efforts of their employees. Trade unions and collective bargaining are of substantial importance in this regard. Levels of work intensity are lower in countries where automatic extension mechanisms are present. As Visser(2018:51) notes, extension ‘has a stabilizing effect on the institution of collective bargaining’ while also creating a minimum floor for wages and working conditions.

Statutory protections also have important consequences for work intensity. The level of work intensity is inversely related to the strength of regulations relating to working time. Employment protection legislation also appears to influence work intensity. One interpretation of this finding is that EPL reduces risks to employees from ‘shirking’. This would be consistent with the views of economists such as Ichino and Riphahn (2005), who have suggested that employment protections encourage higher rates of employee absenteeism. Such accounts imply that an optimal level of work effort exists and that deviations below this optimal level reflect ‘opportunistic’ behaviour on the part of workers. Our own interpretation is that EPL reduces the potential disciplining effect of the fear of dismissal and makes workers feel more confident about resisting attempts to intensify their efforts. The dilution of employment protections and decentralisation of collective bargaining that have occurred in some countries since the crisis imply that the scope for employers to seek increases in work effort has increased. Rules regarding maximum overtime limits, overtime pay, setting irregular hours or the setting of reference periods for calculating working time have been relaxed in various countries (for a review see Clauwaert and Schömann 2012), giving employers more control over the determination of working time. Overall, work intensity is increasing in contexts where workers feel insecure and have little job autonomy and where protections stemming from collective bargaining and statutory regulations are weak. Taken together, our findings point to the urgent need for a re-calibration of the balance of power at the workplace.

## 6. References

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Table 1. Results of multilevel regression models for work intensity in EU27.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Gender: women		0.0779*** (0.022)	0.0790*** (0.022)	0.0778*** (0.022)	0.0777*** (0.022)	0.0778*** (0.022)	0.0778*** (0.022)	0.0776*** (0.022)	0.0785*** (0.022)
Age		-0.0103*** (0.001)	-0.0107*** (0.001)	-0.0104*** (0.001)	-0.0103*** (0.001)	-0.0104*** (0.001)	-0.0104*** (0.001)	-0.0104*** (0.001)	-0.0104*** (0.001)
Education (ref: primary)									
Secondary		-0.0384 (0.032)	-0.0506 (0.032)	-0.0387 (0.032)	-0.0392 (0.032)	-0.0390 (0.032)	-0.0530+ (0.032)	-0.0389 (0.032)	-0.0378 (0.032)
Tertiary		-0.0988** (0.038)	-0.115** (0.038)	-0.101** (0.038)	-0.0999** (0.038)	-0.0994** (0.038)	-0.111** (0.038)	-0.0993** (0.038)	-0.0990** (0.038)
Tenure		0.00909 (0.013)	0.00835 (0.013)	0.00847 (0.013)	0.00885 (0.013)	0.00914 (0.013)	0.00828 (0.013)	0.00891 (0.013)	0.00923 (0.013)
Private sector		0.367*** (0.024)	0.362*** (0.024)	0.367*** (0.024)	0.366*** (0.024)	0.366*** (0.024)	0.365*** (0.024)	0.367*** (0.024)	0.367*** (0.024)
Workplace size (ref: 1-9)									
10-49		0.267*** (0.028)	0.260*** (0.028)	0.265*** (0.028)	0.266*** (0.028)	0.266*** (0.028)	0.260*** (0.028)	0.266*** (0.028)	0.265*** (0.028)
50-249		0.354*** (0.030)	0.339*** (0.030)	0.351*** (0.030)	0.352*** (0.030)	0.353*** (0.030)	0.344*** (0.030)	0.353*** (0.030)	0.350*** (0.030)
250+		0.408*** (0.035)	0.387*** (0.035)	0.406*** (0.035)	0.407*** (0.035)	0.407*** (0.035)	0.397*** (0.035)	0.407*** (0.035)	0.403*** (0.035)
Contract (ref: permanent)									
Temporary		-0.0685+ (0.035)	-0.0744* (0.035)	-0.0702* (0.035)	-0.0696* (0.035)	-0.0697* (0.035)	-0.0749* (0.035)	-0.0687+ (0.035)	-0.0688+ (0.035)
Agency		0.326*** (0.094)	0.319*** (0.094)	0.328*** (0.094)	0.327*** (0.094)	0.326*** (0.094)	0.331*** (0.094)	0.326*** (0.094)	0.328*** (0.094)
Computer use (ref: no)									
Rarely		-0.0946** (0.032)	-0.104** (0.032)	-0.0961** (0.032)	-0.0958** (0.032)	-0.0964** (0.032)	-0.104** (0.032)	-0.0951** (0.032)	-0.0963** (0.032)
Frequently		0.265*** (0.028)	0.253*** (0.028)	0.264*** (0.028)	0.265*** (0.028)	0.264*** (0.028)	0.257*** (0.028)	0.265*** (0.028)	0.264*** (0.028)
Working time (ref: 35-40)									
1-19 hr/week		-0.306*** (0.051)	-0.312*** (0.051)	-0.307*** (0.051)	-0.306*** (0.051)	-0.306*** (0.051)	-0.310*** (0.051)	-0.307*** (0.051)	-0.309*** (0.051)
20-34 hr/week		-0.250*** (0.032)	-0.252*** (0.032)	-0.250*** (0.032)	-0.250*** (0.032)	-0.250*** (0.032)	-0.249*** (0.032)	-0.250*** (0.032)	-0.251*** (0.032)
41+ hr/week		0.404*** (0.029)	0.399*** (0.029)	0.404*** (0.029)	0.404*** (0.029)	0.404*** (0.029)	0.403*** (0.029)	0.403*** (0.029)	0.405*** (0.029)
Control over wt. (ref: none)									
Some Control		-0.0861*** (0.026)	-0.0960*** (0.026)	-0.0864*** (0.026)	-0.0858*** (0.026)	-0.0862*** (0.026)	-0.0932*** (0.026)	-0.0866*** (0.026)	-0.0880*** (0.026)
Full Flexibility		-0.178*** (0.051)	-0.184*** (0.051)	-0.178*** (0.051)	-0.178*** (0.051)	-0.178*** (0.051)	-0.180*** (0.051)	-0.177*** (0.051)	-0.179*** (0.051)
Hours mismatch (ref: match)									
Over-employment		0.192*** (0.026)	0.191*** (0.026)	0.193*** (0.026)	0.193*** (0.026)	0.192*** (0.026)	0.192*** (0.026)	0.193*** (0.026)	0.191*** (0.026)
Under-employment		0.214*** (0.034)	0.218*** (0.034)	0.213*** (0.034)	0.214*** (0.034)	0.214*** (0.034)	0.214*** (0.034)	0.215*** (0.034)	0.215*** (0.034)
Occupation (ref: unskilled)									
Semi-skilled workers		-0.0641+ (0.038)	-0.0574 (0.038)	-0.0634+ (0.038)	-0.0634+ (0.038)	-0.0634+ (0.038)	-0.0550 (0.038)	-0.0646+ (0.038)	-0.0639+ (0.038)
Skilled workers		-0.139** (0.047)	-0.124** (0.047)	-0.137** (0.047)	-0.137** (0.047)	-0.137** (0.047)	-0.122** (0.047)	-0.139** (0.047)	-0.136** (0.047)
Managers and professionals		-0.0994* (0.047)	-0.0885+ (0.047)	-0.0980* (0.047)	-0.0980* (0.047)	-0.0988* (0.047)	-0.0887+ (0.047)	-0.0994* (0.047)	-0.0984* (0.047)
Restructuring		0.367*** (0.023)	0.375*** (0.023)	0.367*** (0.023)	0.366*** (0.023)	0.367*** (0.023)	0.371*** (0.023)	0.368*** (0.023)	0.367*** (0.023)
Job quality: high		-0.642*** (0.029)	-0.642*** (0.029)	-0.643*** (0.029)	-0.643*** (0.029)	-0.643*** (0.029)	-0.647*** (0.029)	-0.643*** (0.029)	-0.644*** (0.029)
Secure job		-0.177*** (0.024)	-0.185*** (0.024)	-0.175*** (0.024)	-0.176*** (0.024)	-0.178*** (0.024)	-0.182*** (0.024)	-0.176*** (0.024)	-0.179*** (0.024)
Productivity payments		0.264*** (0.040)	0.258*** (0.040)	0.264*** (0.040)	0.264*** (0.040)	0.263*** (0.040)	0.260*** (0.040)	0.264*** (0.040)	0.264*** (0.040)
Consultative org.		0.0125 (0.032)	0.0172 (0.032)	0.0124 (0.032)	0.0122 (0.032)	0.0126 (0.032)	0.0130 (0.032)	0.0134 (0.032)	0.0123 (0.032)
Discretionary org.		-0.338*** (0.029)	-0.333*** (0.029)	-0.338*** (0.029)	-0.338*** (0.029)	-0.338*** (0.029)	-0.335*** (0.029)	-0.337*** (0.029)	-0.336*** (0.029)
High involvement org.		-0.320*** (0.029)	-0.314*** (0.029)	-0.320*** (0.029)	-0.320*** (0.029)	-0.319*** (0.029)	-0.316*** (0.029)	-0.319*** (0.029)	-0.320*** (0.029)

Year: 2015				0.144***	(0.023)													
Unemployment rate						0.0506*	(0.025)											
Unemployment expenditure										-0.120*	(0.071)							
Collective bargaining: (ref: local)																		
Sectoral																		
National																		
Extension of CB: (ref: none)																		
Widespread																		
Automatic																		
Working time regulation																		
Dismissal protection																		
Constant	3.575***	(0.08	3.704***	(0.101)	3.681***	(0.101)	3.709***	(0.103)	3.691***	(0.108)	3.741***	(0.141)	3.826***	(0.129)	3.704***	(0.101)	3.716***	(0.095)
		3)																
Observations	57903		27517		27517		27517		27517		27517		27517		27517		27517	
AIC	233191.0		107352.7		107315.6		107350.7		107352.3		107352.4		107294.6		107348.7		107331.5	
BIC	233217.9		107624.0		107595.2		107630.3		107631.9		107640.2		107582.3		107628.3		107611.1	
ICC	0.0529		0.0600		0.0592		0.0629		0.0720		0.0651		0.0785		0.0599		0.0498	
ll	-116592.5		-53643.3		-53623.8		-53641.3		-53642.1		-53641.2		-53612.3		-53640.4		-53631.7	

Standard errors in parentheses \*  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$



Table 2. Results of interaction models for work intensity in EU27.

	Model 10		Model 11		Model 12	
Year: 2015	0.125***	(0.024)				
Temporary	-0.126**	(0.042)	-0.0425*	(0.019)	-0.0377*	(0.019)
Agency	0.289*	(0.113)	0.170***	(0.051)	0.167***	(0.051)
2015 # Temporary	0.157*	(0.070)				
2015 # Agency	0.0991	(0.197)				
Unemployment			0.0218	(0.014)		
Unemployment # Temporary			0.0315*	(0.016)		
Unemployment # Agency			-0.0556	(0.062)		
Working time regulation (WTR)					-0.0759*	(0.032)
WTR # Temporary					-0.0207	(0.018)
WTR # Agency					0.0894+	(0.048)
Constant	3.686***	(0.100)	0.0611	(0.055)	0.0605	(0.054)
Observations	27517		27517		27517	
Individual controls	Yes		Yes		Yes	
<i>AIC</i>	107314.4		73118.9		73117.0	
<i>BIC</i>	107610.4		73414.9		73413.0	
ICC	0.0590		0.0623		0.0599	
ll	-53621.2		-36523.5		-36522.5	

Standard errors in parentheses +  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Figure 1. Average levels of self-reported work intensity in EU27 countries, 2010-2015. Source: Own calculations based on the EWCS data.

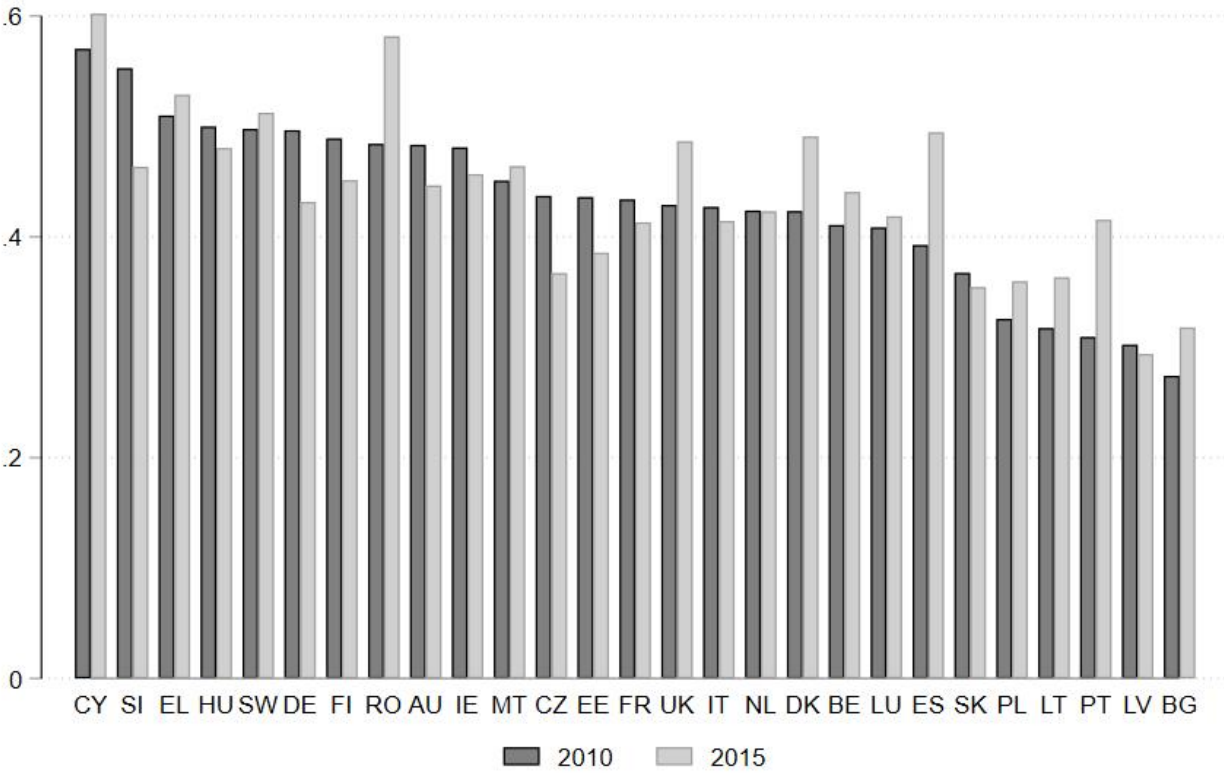


Figure 2. Random intercepts from Model 2.

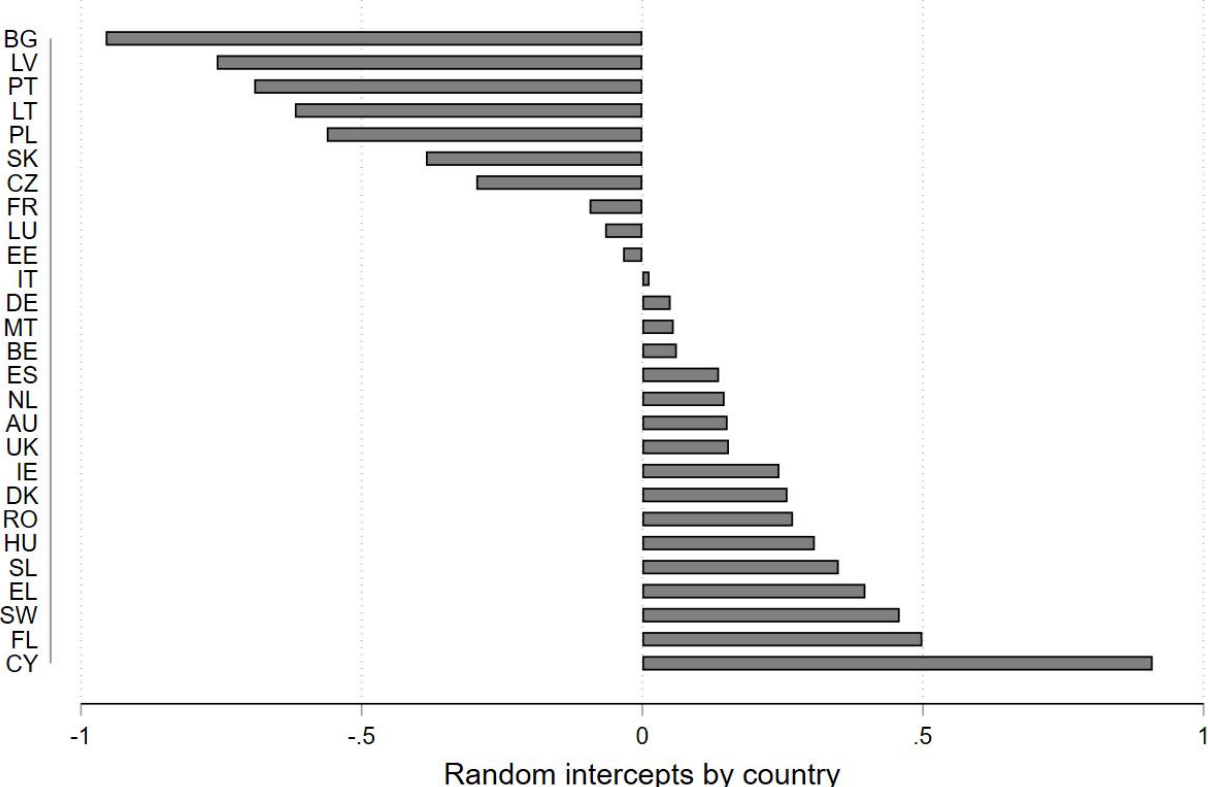
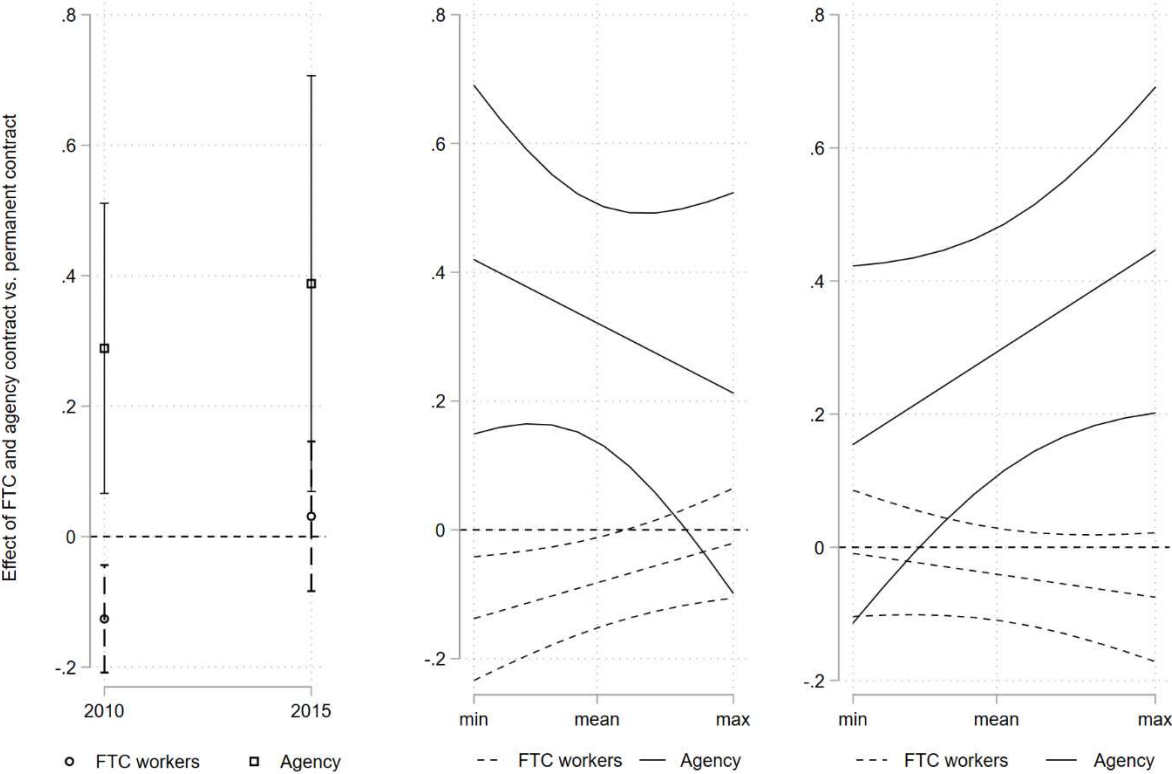


Figure 3. Marginal effect of being employed in fixed-term contract and temporary agency contract vs. permanent contract by year, unemployment level and regulation of working time, with 95 percent confidence intervals.



## **Appendix 1. Indexes, Variables and Summary Statistics.**

### **Work intensity index**

The work intensity variable is an index based on two variables which measure the quantitative demands of work: whether a worker works at high speed [y15\_Q49a] and whether work involves working to tight deadlines [y15\_q49b]. The answers to the questions were reversed so that higher values indicate more intensive work. The scale reliability coefficient (Eigenvalue) is .7786. The intensity index correlates strongly with the Eurofound (2017) work intensity index (0.9479,  $p < 0.001$ ).

### **Organisation type**

The organisation type variable was built based on the methodology used by Gallie and Zhou (2013). Two separate indexes were used for creating the variable: task discretion and organisational participation. Task discretion captures to what extent employees are able to choose the order [y15\_Q54a], methods [y15\_Q54b], and speed [y15\_Q54c] of work. The reliability coefficient for the task discretion scale is 0.7692. Organisational participation measures whether employees are consulted about work objectives [y15\_Q61c], whether they are involved in improving organisational outcomes [y15\_Q61d], and whether they can influence decisions which are relevant for their work [y15\_Q61n]. The reliability coefficient for the task discretion scale is 0.7545. The cut-off point for low/high levels of task discretion and organisational participation the median with organisations which score below the median being assigned low task discretion and organisational participation.

### **Country-level variables**

We used Eurostat data for two indicators: the unemployment rate (online code: [tps00203]) and the average expenditure on unemployment-related benefits, in PPS per unemployed person (online codes: Eurostat [spr\_exp\_sum] and [une\_rt\_a]). The expenditure item was constructed based on the Eurostat methodology (Eurostat 2020a).

We used the Database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts, 1960-2018 (ICTWSS, version 6.1) for the two indicators that capture the power of organized labour: the predominant level at which collective bargaining

takes place [Level] and extension of collective agreements to non-organised employers [Ext]. For the employment protection legislation indicators, we use the CBR Labour Regulation Index Dataset (Adams *et al.* 2016). The dataset consists of 40 indicators that code labour market regulations and aspects of collective bargaining and industrial relations systems. Both the working time regulation and dismissal protection indexes are averages of the items listed below. The Working Time Regulation variable is an average of the following variables in the dataset: annual leave entitlements; public holiday entitlements; overtime premia; weekend working; limits to overtime working; duration of the normal working week and maximum daily working time. The Dismissal Protection variable is an average of the following variables in the dataset: law imposes procedural constraints on dismissal; law imposes substantive constraints on dismissal; reinstatement normal remedy for unfair dismissal and notification of dismissal. For both variables higher values indicate more stringent regulations. Both variables have been centred around the grand mean and standardized.

Table A1. Descriptive Statistics.

Statistic	N	mean	sd	min	max
Work Intensity	57903	3.581	1.851	1	7
Gender	58053	0.528	0.499	0	1
Age	57814	0.458	11.911	-26.691	49.309
Contract	53387	0.158	0.407	0	2
Establishment size	40580	1.263	1.035	0	3
Tenure	57021	0.011	1.003	-0.929	3.268
Sector	53833	0.69	0.463	0	1
Education	55990	1.143	0.702	0	2
Hours	57003	1.881	0.789	0	3
Working time control	57781	0.363	0.581	0	2
Hours mismatch	55286	0.881	0.624	0	2
Skill	57478	1.469	0.965	0	3
Productivity payments	57229	0.074	0.262	0	1
Restructuring	55651	0.304	0.46	0	1
Computer use	57944	0.913	0.905	0	2
Job insecurity	53498	0.646	0.478	0	1
High involvement	57044	1.42	1.229	0	3
Job quality	57681	0.839	0.367	0	1
Unemployment rate	58060	0.056	1.055	-1.137	3.781
Unemployment expenditure	58060	0	1	-0.988	3.193
Bargaining level	58060	0.815	0.624	0	2
Extension	58060	1.091	0.753	0	2
Working time regulation	58060	-0.055	0.993	-2.569	1.363
Dismissal protection	58060	-0.042	1.015	-1.45	1.556

Table A2. Number of observations at the individual level by country and year.

Year	2010	2015	Total
BE	3,343	2,169	5,512
BG	890	880	1,770
CZ	795	834	1,629
DK	958	938	1,896
DE	1,863	1,833	3,696
EE	908	895	1,803
EL	651	637	1,288
ES	870	2,748	3,618
FR	2,557	1,391	3,948
IE	811	828	1,639
IT	1,102	935	2,037
CY	782	819	1,601
LV	933	837	1,770
LT	882	857	1,739
LU	845	895	1,740
HU	846	837	1,683
MT	851	880	1,731
NL	820	863	1,683
AU	819	859	1,678
PL	1,128	983	2,111
PT	777	724	1,501
RO	764	848	1,612
SL	1,162	1,325	2,487
SK	820	870	1,690
FL	906	790	1,696
SW	880	925	1,805
UK	1,333	1,364	2,697
Total	29,296	28,764	58,060



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<sup>1</sup> Some authors have argued that Mediterranean economies form their own distinctive ‘Mediterranean regime’ (Ferragina *et al.* 2013; Ferrera 1996).

<sup>2</sup> Tables A1 and A2 in the Appendix provide further information on the choice of variables, sample size and number of observations per country.

<sup>3</sup> The EWCS allows for a fine-grained operationalisation of the sector variable, based on NACE categories. However, using the NACE approach introduces multicollinearity in our model. To avoid this issue, we opted for coding the variable as a dummy that takes the value of 1 for the private sector and 0 for the public sector.

<sup>4</sup> The practices that Gallie and Zhou associate with ‘high involvement organisations’ are far more limited in number than those typically referred to in discussions of high involvement management systems in the HRM literature (see, for example, Wood *et al.* 2012) and the two concepts should not be conflated.

<sup>5</sup> Following Rabe-Hesketh and Skrondal (2012), we use a Durbin-Wu-Hausmann endogeneity test to assess whether our models are correctly specified and decide between a random intercept and a fixed effects model. The Hausmann test statistic is 8.43 with 23 degrees of freedom and it is not significant. An insignificant Hausmann test indicates that a random-intercept model should be preferred to a fixed effects model that uses only within-country variation. vi We used Stata 15.1 software with the mixed command to estimate our models.

<sup>6</sup> We used Stata 15.1 software with the mixed command to estimate our models.

<sup>7</sup> To ensure the reliability of our estimates we also transform our dependent variable into a categorical variable with four levels and re-estimate our models using a multilevel ordered logistic model. Except for the effect of the dominant collective bargaining level on work intensity which disappears, all the other effects hold.