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# Evaluating the working conditions of the dependent self-employed

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## Abstract

**Purpose** - In recent years, there has been a concern that employers are falsely classifying employees as self-employed to evade collective agreements and labour laws (e.g., minimum wages, working time legislation, protection in case of redundancy), and the result is that these dependent self-employed suffer poorer working conditions. The aim of this paper is to provide an extensive evaluation of the working conditions of those in dependent self-employment compared with the genuine self-employed.

**Methodology** - To do so, data is reported from a 2015 European Working Conditions Survey of 35,765 workers in 28 European Union member states.

**Findings** - Of the 4.3 per cent of the working population found to be in dependent self-employment, the finding is that they have similar working conditions to the genuine self-employed in terms of their physical and social environment and intensity of work. However, they have poorer job prospects and less ability to use their skills and discretion than the genuine self-employed. In terms of the working time quality, meanwhile, the finding is that they have better conditions than the genuine self-employed. Therefore, this analysis uncovers the need for a more nuanced understanding of the relative working conditions of the dependent self-employed.

**Research implications/limitations** - If the working conditions of the dependent self-employed are to be tackled, evaluation is now required of whether the current policy approaches, such as developing a hybrid category of employment with legal rights attached, address the specific working conditions that are worse for the dependent self-employed.

**Originality/value** - This is one of the few papers which provides an extensive evaluation of the working conditions of those in dependent self-employment in the EU28.

**Keywords:** self-employment; job quality; precarious work; European Union.

## Introduction

Conventionally, the principal vehicle for delivering labour rights, improvements in working conditions, and social protection has been permanent full-time waged employment (the standard employment relationship). Although in many countries non-standard employees have started to have the same entitlements (Conaty *et al.*, 2016; Eichhorst *et al.*, 2013; Forde and MacKenzie, 2007; Gialis *et al.*, 2015; Hatfield, 2015; ILO, 2016; Pedersini and Coletto, 2010), the self-employed have been largely excluded. One outcome, which has been highlighted in a small but rapidly growing literature, is that many workers are being classified as self-employed by employers, despite having many of the characteristics of dependent employees, so as to evade labour laws (e.g., minimum wages, working time legislation, protection in case of redundancy), and reduce tax and other employer liabilities that apply to dependent employees (Eichhorst *et al.*, 2013; Eurofound, 2013, 2016a, 2016b; Gialis *et al.*, 2015; Hatfield, 2015). The resultant widespread belief is that these being falsely classified as self-employed suffer worse working conditions than the rest of the workforce (Fehringer, 2014; ILO, 2016; Thörnqvist, 2014). Until now, however, there have been a limited number of evaluations of the working conditions of those in dependent self-employment.

In consequence, the aim of this paper is to advance understanding of the working conditions of the dependent self-employed. Theoretically, therefore, knowledge is advanced by evaluating the dominant representation of dependent self-employment as precarious work characterised by poorer working conditions. Empirically, meanwhile, the contribution is to provide the first known extensive cross-national analysis of the quality of the working conditions of the dependent self-employed using the 2015 European Working Conditions Survey (EWCS). Third, and finally, and with this understanding of the working conditions of the dependent self-employed in hand, this paper advances understanding of what can be done about such work.

To commence, the next section defines dependent self-employment and reviews the dominant depictions of this form of work to formulate a series of hypotheses. To test these hypotheses, the third section then introduces the data used, namely the 2015 European Working Conditions Survey on the 28 member states of the European Union (EU28), along with the variables and analytical methods employed, followed in fourth section by the results. Revealing the need for a more nuanced understanding, the fifth and final section then concludes by discussing the theoretical and policy implications.

## Working conditions of the dependent self-employed: literature review and hypotheses

Traditionally, labour law has viewed employment relationships as either dependent employment or self-employment. However, in practice, rather than a binary divide, there is a continuum of employment relationships ranging from pure dependent employment to genuine self-employment. Dependent self-employment covers employment relationships existing in this “grey zone” between pure dependent employment and genuine self-employment (Ana, 2009; Böheim and Muehlberger, 2006; Eichhorst *et al.*, 2013; Jorens, 2010; Kautonen *et al.*, 2010; Pedersini and Coletto, 2010). To denote the employment relationships in this “grey zone”, various terms have been used including “dependent”, “bogus”, “fake”, “false”, “sham” or “misclassified” self-employment, or “disguised employment” (Ana, 2009; Böheim and Muehlberger, 2006; Harvey and Behling, 2008; Kautonen *et al.*, 2009, 2010; Mandrone *et al.*, 2014; Pedersini and Coletto, 2010), and some even attempt to differentiate between those employment relationship in this “grey zone” closer to genuine self-employment and those closer to pure dependent employment (see Perulli, 2003).

Here, however, we use the term dependent self-employment to capture all the employment relationships in this grey zone. At present, nevertheless, there is no consensus on

how to define dependent self-employment (Mühlberger and Bertolini, 2008). For example, the ILO (2016, p. 36) defines dependent self-employment as those cases where “workers perform service for a business under a contract different from a contract of employment but depend on one or a small number of clients for their income and receive direct guidelines regarding how the work is done”. Meanwhile, based on the most common criteria used to define genuine self-employment, Eurofound (2016a, 2016b) frame the dependent self-employed as workers who report themselves as self-employed without employees and meet two or more of the following characteristics: they do not have more than one client; they do not have the authority to hire staff, and/or do not have the authority to make important strategic decisions about how to run the business.

Neither do Member States defined it in the same way in legislation. Many European Union member states do not have well-defined criteria to define pure dependent employment, pure self-employment and/or dependent self-employment, and those European Union member states which do tend to use slightly different criteria (Heyes and Hastings, 2017). As Spasova *et al.* (2017, p.11) conclude in their review of EU countries, there is “currently no single, unambiguous definition applicable in any of the countries (except for Slovenia) drawing a clear-cut distinction.” Indeed, only a few countries (e.g., Germany, Italy, Portugal) have developed a separate hybrid legal category for the employment relationship positioned between dependent employment and self-employment and which provides dependent self-employed workers with legal rights not available for the legal status of self-employment (ILO, 2016).

Despite this lack of a consensus over how to define dependent self-employment, the widely-held view is that this employment relationship is becoming more prevalent, not least due to technological changes associated with the advent of online platforms and mobile device applications (apps), exemplified by Uber and Lyft (e.g., ILO, 2016; Taylor, 2017). It is asserted to be growing because it is cheaper for employers to hire self-employed persons to perform work than it is to hire employees. Indeed, a UK report estimates that hiring self-employed workers is at least 13.8 per cent cheaper for employers than hiring employees since employer national insurance contributions no longer need to be paid (Taylor, 2017). This, however, is not the only benefit. It also allows employers to evade minimum wage rates, holiday payments, compensation in the case of dismissal, higher wages based on seniority, and the right of an employee to be paid if sick and incapable of work.

Dependent self-employment thus allows employers to circumvent collective agreements, evade employment tax, labour laws, and other employer liabilities that would otherwise apply (Román *et al.*, 2011). Indeed, liberalisation and de-regulation have led to an increase in such atypical forms of work, including the situation where employers force workers to operate as self-employed instead of waged employees in order to reduce their labour costs but gain flexibility. This leads to a deterioration in employment conditions and an increase in contractual insecurity for workers (Avdikos and Kalogerisis, 2016; Gialis and Karnavou, 2009; Moore and Newsome, 2018; Thörnquist, 2013). The free movement of workers and the large differences in wages and working conditions across European Union member states further facilitates such abuse of the self-employment status. Indeed, according to Spasova *et al.* (2017), in Belgium, Czech Republic, Denmark, Norway and Sweden, dependent self-employment is strongly associated with migrants from Central and Eastern European countries and non-EU countries. The result is that liberalisation through the increase in atypical forms of work and subcontracting/ outsourcing leads to weakened collective power and a decline in working conditions (Haake, 2017; Joynt and Webster, 2016; Peck, 1996).

In consequence, much of the literature on dependent self-employment has adopted a view that this is “precarious” work. This is because by employing somebody as self-employed, employers evade employment rights and entitlements (e.g., holiday and sickness pay) attached to the employment of an employee, as well as taxes (Böheim and Mühlberger, 2009; Fehringer,

2014). Referring to precarious work as those types of employment which “involves instability, a lack of labour protection, insecurity, and social and economic vulnerability”, Eichhorst *et al.* (2013, p. 14) conclude that even if dependent self-employment is not precarious work *per se*, in most instances this tends to be the case. Indeed, a survey of employment experts in twelve EU Member States for the project, *Precarious Work and Social Rights*, shows that 82 per cent of these experts consider that the dependent self-employed are at risk of precarious work (Mckay *et al.*, 2012).

There is therefore a widespread perception that the dependent self-employed suffer poorer working conditions. Reviewing the literature on working conditions of those in dependent self-employment, the first finding is that in general, those in self-employment, regardless of whether they are genuine or dependent, have poorer working conditions than the dependent employees. For instance, self-employment is associated with diminished employment rights (e.g. sick and holiday pay, unfair dismissal etc.), diminished social security entitlement and lower investments in training as well as increased levels of risk, insecurity, long working hours and atypical working times (Broughton *et al.*, 2016; OECD, 2018; Social Security Advisory Committee, 2014). However, those in dependent self-employment are perceived to have even poorer working conditions than the genuine self-employed. For example, using longitudinal data from 1994 to 2001 at the EU15 level, Millán *et al.* (2018) compare the job satisfaction of dependent self-employed workers with the satisfaction of those in genuine self-employment and conclude that the dependent self-employed workers are less satisfied than those in genuine self-employment on four out of the seven analysed dimensions, namely the type of work, the number of hours and the working times as well as their working conditions and environment (Millán *et al.*, 2018).

Summarizing the studies on the working conditions of the dependent self-employed, the finding is that firstly, those in dependent self-employment work are viewed as relatively more likely to be working in a poor physical environment such as noisy, dangerous or high/low temperature workplaces (Eurofound, 2013; Millán *et al.*, 2018) or to feel that they are less informed about the health and safety risks related to their job compared with other employment types (ILO, 2013). Secondly, there is a view that work intensification is greater for dependent self-employment in terms of working to tight deadlines, the pace of work not being controllable, and emotional demands (Eichhorst *et al.*, 2013; Jansen, 2017). Thirdly, there is a perception that their working time is poorer in terms of the duration of work (e.g., long working hours or days), atypical working times (e.g., shift or weekend work), flexibility (e.g., working in free time to meet work demands) and/or their control over working time arrangements (Cruz *et al.*, 2017; Eichhorst *et al.*, 2013; Eurofound, 2013; ILO, 2016; Jansen, 2017; Millán *et al.*, 2018; Walby, 2009). Fourthly, there is a consensus that the social environment in the workplace is poorer for the dependent self-employed, in the sense that they are more likely to confront adverse social behaviour (e.g., verbal abuse, threats, sexual harassment, physical violence), and are less likely to receive help and social support from colleagues (Cruz *et al.*, 2017; Eurofound 2018a, 2018b; Williams and Lepeyre, 2017). Indeed, mental well-being is found to be lowest amongst the dependent self-employed (Eurofound, 2013). Fifthly, there is a perception that they suffer poorer working conditions in terms of the use of skills and their discretion, including a poorer cognitive dimension (e.g., solving unforeseen problems, conducting complex tasks, learning new things), less latitude for taking decisions (e.g., the ability to choose or change the order of tasks, speed of work, choice of work colleagues), organisational participation (e.g., consultation regarding objectives, involvement in decision-making about work organisation and processes, ability to influence decisions) and lack of training (Eichhorst *et al.*, 2013; Eurofound, 2013; Eurofound, 2018a, 2018b; ILO, 2016). And sixth and finally, there is a perception that the job prospects of the self-employed in the grey zone are poor relative to the

rest of the workforce in terms of their career prospects, job security and the solvency of the businesses in which they are employed (Eurofound, 2013; Fehringer, 2014).

However, these perceptions regarding the working conditions of those in dependent self-employment are based largely on either vignettes of individual cases or sector-specific case studies, rather than extensive evidence. To evaluate whether these working conditions are significantly more likely to prevail among the dependent self-employed compared with the rest of the workforce, therefore, the following hypotheses will be tested:

*Poorer physical environment hypothesis (H1):* the physical working environment is poorer for the dependent self-employed than for the genuine self-employed.

*Higher intensity of work hypothesis (H2):* the intensity of work is higher for the dependent self-employed than for the genuine self-employed.

*Poorer working time quality hypothesis (H3):* the quality of working time is poorer for the dependent self-employed than for the genuine self-employed.

*Poorer social environment hypothesis (H4):* the social environment in the workplace is poorer for the dependent self-employed than for the genuine self-employed.

*Poorer skills and discretion hypothesis (H5):* the ability to use skills and discretion is poorer for the dependent self-employed than for the genuine self-employed.

*Poorer job prospects hypothesis (H6):* the prospects are poorer for the dependent self-employed than for the genuine self-employed.

## **Methodology: data, variables and analytical methods**

### *Data*

To evaluate these hypotheses regarding the working conditions of the dependent self-employed, data from the 2015 European Working Conditions Survey (EWCS) is here reported. This survey is based on face-to-face interviews with those aged 15 and over (16 and over in Bulgaria, Norway, Spain and the UK) living in private households and in employment who did at least one hour of work for pay or profit during the week prior to the interview. In each country, a representative sample is surveyed stratified by region (NUTS 2 or equivalent) and the level of urbanisation. Although the sixth EWCS in 2015 surveyed the 28 EU Member States and seven other countries (Albania, FYR Macedonia, Montenegro, Norway, Serbia, Switzerland and Turkey), analysis is here confined to the 35,765 interviews conducted in the EU28.

### *Variables*

To identify the dependent variable of dependent self-employment, five questions in the EWCS are analysed:

- Are you working as an employee or are you self-employed?
- Regarding your business, do you have employees (working for you)?
- Regarding your business, do you generally have more than one client or customer?
- Regarding your business, do you have the authority to hire or dismiss employees?
- To what extent do you agree or disagree with the following statement? I make the most important decisions on how the business is run.

According to Eurofound (2013, 2016a, 2016b), to estimate whether the self-employed without employees are genuine self-employed or dependent self-employed three criteria are used: (1) they should have more than one client, (2) they should have the authority to hire or dismiss

staff, and/or (3) they should agree that they make important decisions on how the business is run. As such, those self-employed without employees complying with all three criteria are considered genuine self-employed without employees, whilst those complying with two or fewer of these three criteria are considered dependent self-employed. The dependent variable is coded 1 for those in dependent self-employment and zero otherwise. Moreover, and following previous research, a distinction is made between ‘pure’ dependent self-employed who comply with one or fewer of these criteria and ‘grey’ dependent self-employed who comply with any two of the criteria (Eurofound, 2016b; Williams and Lapeyre, 2017; Williams and Horodnic, 2018).

The individual-level socio-demographic and socio-economic control variables, moreover, such as gender, age, educational level, birthplace, household size, ability of their household to make ends meet, occupation and firm size, are those which previous studies have shown are significantly correlated with dependent self-employment (e.g., ILO, 2016; Williams and Horodnic, 2017, 2018). In addition, we added a variable related to whether participation in self-employment was a necessity decision to further investigate the precariousness of those in dependent self-employment (Böheim and Mühlberger, 2009).

To evaluate the working conditions of the dependent self-employed relative to the genuine self-employed, six job quality indices and 11 additional sub-indices developed by Eurofound (2012, 2016b) were used. These are: the physical working environment index which assesses physical risks in the workplace; the work intensity index and three sub-indices which measure the quantitative demands in terms of work intensity, autonomy over the pace of work, and emotional demands; the working time quality index and its four sub-indices which measure the duration of working hours, atypical working times, changes and control over working time arrangements, and flexibility in working times; the social environment index which measure the extent to which workers experience supportive social relationships as well as adverse social behaviour, such as bullying and harassment; the skills and discretion index and its four sub-indices which measure cognitive dimensions, their decision latitude, organisational participation and training opportunities in the job; and the job prospects index which measure prospects for career advancement, and their perceived job security on a personal and organisational level.

Each of the six indices and 11 sub-indices are measured on a scale from 0 to 1. The higher the index score, the better the job quality. Therefore, the variables were normalised and rescaled with value 0 for the lowest level of the variable (the worst working conditions for a worker) and gradually increased to 1 for the highest level of the variable (the best conditions for a worker). The exception is the work intensity index and its three sub-indices, where the opposite is the case; the higher the index score, the lower the job quality. Therefore, the values were set in the opposite manner. All indicators comprising each sub-index and index were given equal weight when calculating the mean for each index and sub-index. Table A1 in Appendix provides a detailed description of the indicators (and how they were measured) in each index and sub-index.

### *Analytical methods*

For the descriptive statistics, all cases available were used for every variable analysed (do not know and refusal were excluded). However, in the regression analysis, only the individuals were kept for whom data on every independent variable was available. For both the descriptive statistics and regression analysis, nevertheless, the weighting schemes were used which were recommended in the EWCS 2015 technical report (Eurofound, 2016b). When carrying out analysis on the aggregate EU28 level, a weighting scheme has been therefore used which takes the relative size of the workforce in each of the countries into account.

To evaluate the working conditions of the dependent self-employed relative to the genuine self-employed, a logistic regression analysis is conducted across the individual-level variables. Below, the results are reported.

## Findings

Using the EWCS data, and akin to previous studies (Williams and Horodnic, 2018; Williams and Lapeyre, 2017), the prevalence of dependent self-employment is measured by examining whether a self-employed person without employees possesses all of the following characteristics: they have more than one client, they have authority to hire or dismiss staff, and/or they have authority to make important strategic decisions. If they do not, they are considered dependent self-employed.

The finding is that in 2015, 4.3 per cent of the total EU28 workforce (1 in 23 jobs) are in dependent self-employment. Some 1.4 per cent of the total EU28 workforce are “pure” dependent self-employed complying with only one or less of the three criteria and a further 2.9 per cent are “grey” dependent self-employed complying with any two of the three criteria. Of all the self-employed without employees in the EU28, 53 per cent were “genuine” self-employed, while 47 per cent were dependent self-employed (with 15 per cent being “pure” and 32 per cent “grey” dependent self-employed). When the self-employed with employees are included, 31 per cent of all self-employed in the EU28 are dependent self-employed.

Similar estimates of about 4 per cent of the workforce in dependent self-employment are revealed in previous studies using EWCS data (Williams and Horodnic, 2018; Williams and Lapeyre, 2017). Burchell *et al.* (1999), meanwhile, examining only the UK and using a different dataset, also estimate a similar figure of 5 per cent. In Romania, Ghinara and Mladen (2016) also similarly estimate that the share of self-employed persons who are dependent on a single employer as between one third to half of the self-employed. A transport sector study covering the EU27, furthermore, estimates that in 2009, 15.5 per cent of drivers in the transport sector were dependent upon a single employer in the EU27 (Lodovici *et al.*, 2009). Using the EWCS data but a more restrictive definition of dependent self-employment, Eurofound (2016b) similarly highlights that some 30 per cent of the self-employed without employees cannot be considered truly independent.

If looking solely at the number of clients or customers, the finding is that 14 per cent of all self-employed and 21 per cent of self-employed without employees in EU28 do not have more than one client or customer. However, newer estimates provided by Eurostat (2017) measure the economic dependency taking into account not only the cases where the self-employed have solely one client or customer but also those cases where one or more client is dominant and provide at least 75% of the self-employed person’s income. The finding is that in 2017, 18 per cent of the self-employed and 20 per cent of the self-employed without employees had one client or a dominant client.

Dependent self-employment, however, is not evenly distributed across the European Union. As Table 1 reveals, the share of the total workforce who are dependent self-employed is highest in Portugal where 9 per cent are dependent self-employed, followed by Greece (8 per cent), Italy (8 per cent) and Romania (8 per cent). The share of the total workforce in dependent self-employment is lowest in Belgium, Estonia, France, Germany (where 2 per cent are dependent self-employed) and Denmark and Sweden (1 per cent). A very tentative North-South and West-East divide can be thus identified in the EU28 with the share of the total workforce in dependent self-employment being higher in the Southern and Eastern European member states and lower in Northern and Western European countries. Using the EWCS 2010 wave, a previous study (Eurofound, 2013) arrived at the same conclusion, underlining a higher

prevalence of dependent self-employment in Southern and Central and Eastern European countries.

[INSERT TABLE 1 ABOUT HERE]

Turning to dependent self-employment as a share of total self-employment, meanwhile, cross-national variations again exist. The proportion of all self-reported self-employed who are dependent self-employed is highest in Romania (63 per cent), Slovakia (52 per cent), Austria and the UK (43 per cent), Lithuania and Poland (42 per cent) and Slovenia and Portugal (41 per cent), and lowest in Belgium and Germany (18 per cent) Sweden (12 per cent) and Denmark (11 per cent). Although the proportion of self-employed in dependent self-employment is generally lower in Western and Northern European nations, and generally higher in Eastern and Southern European nations, there are exceptions such as Austria and the UK. Indeed, 38.8 per cent of all dependent self-employment in the EU28 is concentrated in just two member states, namely the United Kingdom (with 20.6 per cent of all dependent self-employed in the EU28) and Italy (18.2 per cent).

Reviewing who engages in dependent self-employment and in which organisations and occupations, regression models in Table 2 report the results of a logistic regression analysis which reveals the distribution of dependent self-employment when the other variables are held constant. Dependent self-employment is not significantly associated with specific characteristics of individuals compared with genuine self-employment (e.g., gender, years in education, or whether they find it difficult to make ends meet). Moreover, younger age groups are more likely to be dependent self-employed, as are those who themselves or their parents were not born in the country. Meanwhile dependent self-employment is more prevalent among those who say that they are self-employed because they had no other choice, reinforcing previous studies (Böheim and Mühlberger, 2009). Similarly, dependent self-employment is significantly associated with various types of work organisation. Those self-employed in the industry sector, construction, wholesale, retail trade and repair of motors, accommodation and food service activities, and professional, scientific and administrative activities, are significantly less likely to be dependent self-employed than those in agriculture, forestry and fishing.

To evaluate whether the dependent self-employed have worse working conditions than the genuine self-employed, all six job quality indices (i.e., the physical environment index, work intensity index, working time quality, social environment index, skills and discretion index, job prospects index) are evaluated in model 1 of Table 2. Regarding working time quality, the finding is that those in dependent self-employment have significantly better working time conditions than the genuine self-employed (refuting H3). Turning to skills and discretion, the opposite is the case. The ability to use skills and discretion is poorer for the dependent self-employed than for the genuine self-employed (confirming H5). Finally, the job prospects are poorer for the dependent self-employed compared with genuine self-employed (confirming H6). However, there is no significant association between dependent self-employment and the working conditions captured in the other three indices, namely physical environment index, work intensity index and social environment index (refuting H1, H2 and H4).

[INSERT TABLE 2 ABOUT HERE]

This, however, does not continue when a finer-grained analysis is undertaken of their working conditions using the 11 sub-indices in models 2-4. Model 2 breaks down the work intensity

index, model 3 the working time quality index and model 4 the skills and discretion index (See Table A1 in Appendix for the indicators used to formulate each index and sub-index).

The physical working environment index is not here broken down. It examines 13 physical environment indicators on exposure to vibrations, noise, low/high temperatures, tobacco smoke, smoke, fumes dust and vapours, chemical substances, and dangerous materials and substances, as well as whether the job requires tiring or painful positions, lifting or moving people, carrying or moving heavy loads and repetitive hand or arm movements. The finding is that the physical working environment of the dependent self-employed is not significantly worse than for the genuine self-employed (refuting H1), which contests the assertions of some previous studies (Eurofound, 2013; ILO, 2013; Millán *et al.*, 2018). Yet, in line with our results, an extensive study (Eurofound, 2013), using the data for 27 European member states, showed that the scores for ergonomic risk, biochemical risk and ambient risk are not the highest amongst the dependent self-employed. The scores placed the dependent self-employed between employees and the self-employed with employees. However, the study does not provide any test of significance regarding the small differences identified.

Model 2, however, breaks down the work intensity index, which revealed that overall the intensity of work of the dependent self-employment is not higher than for the genuine self-employed (refuting H2). Examining the three sub-indices, and unlike previous studies (Eichhorst *et al.*, 2013; Jansen, 2017), the finding is that the dependent self-employed do not face higher quantitative demands in their jobs, such as working at a high speed, working to tight deadlines, having little time to get the job done and having frequent disruptive interruptions, than the genuine-self-employed. Similar results are found at EU27 level using data from a survey undertaken in 2010 (Eurofound, 2013). The dependent self-employed also do not have lower autonomy over the pace of their work (more direct commands from people such as customers, passengers, pupils; higher production targets; automatic speed of a machine, and less direct control of their work) compared with genuine self-employed. However, and contrary to previous studies, the dependent self-employed do not suffer significantly higher emotional demands (e.g., handling of angry clients, customers; being in emotionally disturbing situations; the job demanding that they hide their feelings) than the genuine self-employed.

Turning to whether the quality of working time is poorer for the dependent self-employed than for the genuine self-employed, model 3 examines four sub-indices, namely the duration of working time, atypical working times, control over working time arrangements, and the flexibility in arranging working time. The finding is that the duration of their working time (e.g., long hours, no recovery period, long working days) is significantly better compared with the genuine self-employed. As for atypical working time and control over working time, those in dependent self-employment are not significantly different than the genuine self-employed. In terms of flexibility in arranging work times (e.g., easy to arrange an hour off, work in free time to meet work demands), those in dependent self-employment are weakly different to the genuine self-employed, having higher flexibility. Thus, when evaluating the working conditions of the dependent self-employed relative to the genuine self-employed, the results do not confirm the findings of previous studies (Cruz *et al.*, 2017; Eichhorst *et al.*, 2013; Eurofound, 2013; ILO, 2016; Jansen, 2017; Millán *et al.*, 2018; Walby, 2009). For instance, and in contradiction to this study, Eurofound (2013) conclude that although the number of hours worked by the dependent self-employed (i.e., 36 hours) is closer to that of an employee (i.e., 37 hours), and lower than the hours worked by the self-employed with or without employees (48 and 42 hours, respectively), those in dependent self-employment have more atypical working hours.

Turning to the social environment, the finding is that the dependent self-employed are not significantly different than the genuine self-employed in terms of suffering adverse social

behaviour in the workplace (e.g., exposure to verbal abuse, unwanted sexual attention, and threats, than the rest of the workforce) and receiving social support from colleagues.

Model 4 examines whether the ability to use skills and discretion is poorer for the dependent self-employed than for the genuine self-employed. To do so, four sub-indices are analysed. The finding is that compared with the genuine self-employed, the dependent self-employed have fewer opportunities to use their skills and discretion, with poorer conditions for all four sub-indices, namely the cognitive dimension of work, decision latitude, organisational participation and training. In the use of cognitive skills in their job (solving unforeseen problems, carrying out complex tasks, learning new things, working with computers, smartphones and laptops, ability to apply their own ideas at work), the dependent self-employed face worsen conditions than genuine self-employed. Similarly, in terms of their latitude for taking decisions, namely the ability to choose or change tasks, methods or speed of work, having a say in choice of work colleagues and their organisational participation, the dependent self-employed have poorer conditions than genuine self-employed. They are significantly less likely than genuine self-employed to be consulted before objectives are set for their work, to be involved in improving the work organisation and/or the work processes of their own department or organisation, and to feel they can influence decisions important to their work. Finally, they benefit from less paid training than the genuine self-employed. This is in line with the study conducted by Eurofound (2013) which placed the dependent self-employed in the middle, between the self-employed who have a high decision latitude and higher involvement in the decision process, and employees who have the lowest decision latitude and the lowest ability to influence decisions which are important for their work. Similarly, in line with previous studies (Eichhorst *et al.*, 2013; Eurofound, 2013, 2018a, 2018b; ILO, 2016), the training of the dependent self-employed is significantly poorer than for the genuine self-employed.

Finally, and on the issue of whether they perceive their job prospects as poorer, the finding is that the dependent self-employed view themselves as having poorer job prospects in terms of career prospects, job security or the probability of the organisations downsizing in which they work. This confirms the results of a previous study (Eurofound, 2013) which concluded that the dependent self-employed are rather less optimistic than other categories of worker with respect to their prospects for career development.

## **Discussion and Conclusions**

Reporting the 2015 EWCS, the finding is that 4.3 per cent of total employment in the EU28 (1 in 23 jobs) is dependent self-employment, 47 per cent of all self-employed workers without employees are dependent self-employed, and 31 per cent of all the self-employed when the self-employed with employees are included. However, the share of the total workforce in dependent self-employment is higher in Southern and Eastern European member states. Dependent self-employment is not significantly associated with specific socio-economic characteristics compared with genuine self-employment (e.g., gender, educational levels, or whether they find it difficult to make ends meet). In other words, the dependent self-employed and genuine self-employed do not differ from each other in terms of gender, education and financial status. This reinforces previous studies, such as Eurofound (2013) and Williams and Lapeyre (2017), who reveal that there is no significant difference between the likelihood of being in dependent self-employment and such socio-economic characteristics (e.g., gender). Meanwhile this study does reveal that younger age groups are more likely to be dependent self-employed, as are those being self-employed out of necessity (they are self-employed because they had no other choice) and those who themselves or their parents were not born in the country. Similarly, dependent self-employment is significantly associated with various types

of work organisation. The self-employed in the industry sector, construction, wholesale, retail trade and repair of motors, accommodation and food service activities, and professional, scientific and administrative activities, are significantly less likely to be dependent self-employed than those in agriculture, forestry and fishing. These findings therefore allow the identification of specific socio-economic groups of the self-employed and sectors where dependent self-employment is more prevalent that need targeting by enforcement authorities seeking to tackle dependent self-employment.

Examining the working conditions of the dependent self-employed compared with the genuine self-employed, the finding is that their working conditions are similar in terms of their physical and social environment and intensity of work. Regarding the quality of working time, those in dependent self-employment have significantly better conditions than the genuine self-employed. Indeed, the duration of their working time (e.g., long hours, no recovery period, long working days) is significantly better compared with the genuine self-employed. However, this might reflect a lack of assignments. Turning to their ability to use their skills and discretion, the opposite is the case; it is significantly lower for the dependent self-employed than for the genuine self-employed. Indeed, compared with the genuine self-employed, those in dependent self-employment have less ability to use their skills and discretion in terms of the cognitive dimension of work, decision latitude, organisational participation and training. Similarly, their job prospects are significantly poorer compared with the genuine self-employed.

This paper therefore has revealed that those in dependent self-employment have poorer working conditions for only two out of six analysed indices (skills and discretion, and job prospects) and better working conditions in relation to one index (working time quality). As such, policy-makers should consider strengthening their rights and benefits in order to increase their chances to use their skills and discretion and to improve their job prospects. However, to assert that the dependent self-employed have worse working conditions than the genuine self-employed is a simplification. Tackling dependent self-employment, nevertheless, is important. This is because the working conditions discussed are not comprehensive and represent just one reason for tackling this phenomenon. It is not only due to these working conditions of the dependent self-employed that there is a need to tackle this employment relationship. The dependent self-employed also suffer from the absence of labour law protection on issues such as minimum wage rates, dismissal, holiday pay and sick leave, and are not covered by collective bargaining.

There are also negative implications for governments and the wider society, including the loss of tax revenue which could be used for providing public goods and services (Eichhorst *et al.*, 2013; Thörnqvist, 2014). Legitimate business, furthermore, suffer from unfair competition from enterprises that disguise their employees under the status of self-employed to reduce their labour costs (Fehringer, 2014; Jorens, 2010; Seeley, 2010; Thörnqvist, 2014).

How, therefore, can dependent self-employment be tackled? Several approaches have been used. Most countries have maintained the binary divide between employment and self-employment and their approach towards the dependent self-employed has variously included: (i) presumptions that they are dependent employees and included in employment protection legislation (e.g., France, Greece, Luxembourg); (ii) reversal of the burden of proving employee status (e.g., Belgium); and (iii) developing criteria to classify these workers as either employees or self-employed (e.g., Austria, Belgium, Germany, Ireland). In practice, the presumption that certain self-employed are dependent self-employed, and therefore fall under the protection of employment contracts, often uses occupations as a criterion, such as: sales representatives in Austria and France (Eichhorst *et al.*, 2013; ILO, 2016), sportspeople and pharmacists in Austria (Eichhorst *et al.*, 2013), models in fashion industry, professional journalists and some artists in France (ILO, 2016).

Other countries have developed a hybrid legal category between dependent employment and self-employment and attached legal rights to this hybrid category that do not exist for the legal status of self-employment (e.g., Germany, Italy, Netherlands, Portugal), as is also proposed in the UK in the recent proposal for a “dependent contractor” employment status (Taylor, 2017). However, there has been less progress by countries so far in pursuing the extension of labour rights beyond dependent employees to all the self-employed. One exception is Italy, where under the Status of Autonomous Work Law 81/ 2017, the social protection of the self-employed has been extended by ensuring parental and sickness leave as well as maternity allowances (Borghi *et al.*, 2018).

However, there are large differences across Europe in terms of the level of social protection for those in self-employment, making them highly vulnerable in some countries. Indeed, Spasova *et al.* (2017) grouped European Union member states into four clusters, namely: i) a “full to high access” cluster, where the self-employed are required to be insured under all the insurance-based schemes (e.g., Croatia, Hungary, Luxembourg, and Slovenia); ii) a “high to medium access” cluster, where the self-employed are not required to be insured for one or more of the insurance-based schemes but have the possibility to voluntarily opt-into the schemes (Austria, Czech Republic, Denmark, Spain, Finland, Poland, Romania, and Sweden); iii) a “patchwork of medium to low access” cluster, where the self-employed are not required to be insured for one or more of the insurance-based schemes but have the possibility to opt-into only some schemes whilst they are completely excluded from others (Bulgaria, Germany, Estonia, Ireland, the Netherlands, Portugal, and the United Kingdom), and iv) a “low to no access” cluster, where the self-employed do not have the possibility to opt-into all the insurance-based schemes, unlike wage employees who are mandatory insured on all the schemes (Belgium, Cyprus, Greece, France, Italy, Lithuania, Latvia, Malta, and Slovakia).

What more might be done by governments, therefore, to provide better working conditions for the dependent self-employed? One further step might be to identify the motives for the existence of dependent self-employment. Different policies need to be implemented for tackling the various motives that drive dependent self-employment by evaluating whether this is purely a monetary cost/benefit calculation and, whether it is a choice or necessity for workers. Where the driving force is financial gain and the worker is involuntarily engaged in dependent self-employment, governments can increase the costs of misclassifying workers (i.e., ranging from requalification of the employment relationship into a dependent employment contract to criminal sanctions). As an alternative, they can equalise the financial costs of employers using dependent employment compared with contracting to self-employed persons. This has been recently implemented in Romania (Williams and Horodnic, 2017) and proposed in the UK (Taylor, 2017). Furthermore, incentives for employers can be used. For example, in Italy (Decree No. 81/2015), an amnesty was introduced for those employers who transformed existing self-employed contracts (i.e., suspected of being bogus self-employed) into a dependent employment contract (Eurofound, 2016a, 2016b).

As for those voluntarily in dependent self-employment, besides the recognition of a third hybrid category which has started to be adopted by some countries (e.g., Germany, Italy, Netherlands, Portugal), measures aiming to extend their limited rights can be pursued. As a comparative study on self-employed professionals in Italy, Germany and UK concluded, there is a need for a more universal social protection system to reduce the gap between those in self-employment and those in dependent employment (Borghi *et al.*, 2018).

In this paper, despite developing a more nuanced understanding of where the working conditions of the dependent self-employed are worse, there are nevertheless limitations to the conclusions that can be drawn, and caveats required. On the one hand, this survey uncovers some aspects of the working conditions of the dependent self-employed, but does not enumerate their wage rates, or their experiences in taking holidays and sick leave for instance.

To develop a fuller understanding of the working conditions of the dependent self-employed, therefore, there is a need for not only more in-depth qualitative understandings of workers' experiences in relation to these issues but also further country-level and sector-specific studies. On the other hand, there is need to evaluate whether the different policy approaches and measures for tackling dependent self-employment, such as creating a hybrid legal category, tackle the working conditions here shown to be significantly worse among the dependent self-employed (e.g., poorer job prospects, less training). So far, this is unknown.

In sum, this paper has uncovered the need for a more nuanced understanding of the precise working conditions which are worse for the dependent self-employed. If this paper therefore encourages research to further advance such a finer-grained understanding, then it will have fulfilled one of its intentions. If there is also greater evaluation of whether the current policy approaches being used address the specific working conditions that are worse for the dependent self-employed, then it will have fulfilled its wider intention.

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**Table 1.** Participation in dependent self-employment: by country

Country	Dependent self-employed		
	Percent of:		% of all dependent self-employment:
	All employment	Self-employed	
EU-28	4	31	100
Austria	5	43	2.2
Belgium	2	18	1.1
Bulgaria	4	26	1.1
Croatia	4	39	0.6
Cyprus	5	26	0.2
Czech Republic	5	37	2.7
Denmark	1	11	0.2
Estonia	2	24	0.1
Finland	5	29	1.2
France	2	26	6.1
Germany	2	18	7.4
Greece	8	21	2.8
Hungary	4	30	1.6
Ireland	5	28	1.0
Italy	8	32	18.2
Latvia	4	35	0.4
Lithuania	5	42	0.7
Luxembourg	3	34	0.1
Malta	4	35	0.1
Netherlands	3	23	2.6
Poland	5	42	8.7
Portugal	9	41	4.3
Romania	8	63	7.2
Slovakia	6	52	1.5
Slovenia	6	41	0.5
Spain	3	20	6.4
Sweden	1	12	0.4
United Kingdom	6	43	20.6

Source: EWCS 2015 (own calculations)

**Table 2.** Logistic regressions of the likelihood of dependent self-employment

Variables	Model 1			Model 2			Model 3			Model 4		
	$\beta$	se( $\beta$ )	Exp( $\beta$ )	$\beta$	se( $\beta$ )	Exp( $\beta$ )	$\beta$	se( $\beta$ )	Exp( $\beta$ )	$\beta$	se( $\beta$ )	Exp( $\beta$ )
<i>Gender (Female)</i>												
Male	0.064	0.141	1.066	0.057	0.142	1.059	0.072	0.143	1.075	0.096	0.146	1.101
<i>Age</i>	-0.091 ***	0.028	0.913	-0.091 ***	0.028	0.913	-0.083 ***	0.029	0.920	-0.079 ***	0.028	0.924
<i>Age squared</i>	0.001 ***	0.001	1.001	0.001 ***	0.001	1.001	0.001 **	0.001	1.001	0.001 **	0.001	1.001
<i>Education (Early childhood education/ Primary education)</i>												
Lower secondary education	-0.287	0.241	0.750	-0.285	0.240	0.752	-0.299	0.242	0.742	-0.341	0.255	0.711
Upper secondary education	-0.019	0.244	0.981	-0.023	0.243	0.977	-0.028	0.245	0.973	-0.107	0.257	0.898
Post-secondary non-tertiary education/ Short-cycle tertiary education	-0.029	0.272	0.971	-0.023	0.272	0.977	-0.039	0.275	0.962	-0.150	0.286	0.860
Bachelor or equivalent	0.353	0.303	1.423	0.353	0.303	1.423	0.367	0.302	1.443	0.267	0.314	1.306
Master/ Doctorate or equivalent	0.233	0.318	1.262	0.247	0.318	1.280	0.242	0.319	1.274	0.066	0.331	1.068
<i>Respondents and their parents born in the country (No)</i>												
Yes	-0.561 ***	0.198	0.571	-0.556 ***	0.198	0.574	-0.559 ***	0.197	0.572	-0.587 ***	0.205	0.556
<i>Household size (1 person)</i>												
2 persons	-0.362 **	0.175	0.696	-0.364 **	0.175	0.695	-0.312 *	0.176	0.732	-0.328 *	0.182	0.720
3 persons	-0.505 **	0.197	0.603	-0.505 **	0.196	0.603	-0.455 **	0.198	0.635	-0.452 **	0.202	0.636
4 and more persons	-0.519 ***	0.187	0.595	-0.517 ***	0.187	0.596	-0.473 **	0.187	0.623	-0.456 **	0.193	0.634
<i>Household ability to make ends meet (Very easily/ easily / fairly easily)</i>												
With some difficulty	0.073	0.148	1.075	0.067	0.149	1.069	0.074	0.149	1.077	0.086	0.152	1.090
With difficulty/ great difficulty	0.170	0.185	1.185	0.168	0.185	1.183	0.167	0.187	1.181	0.258	0.192	1.294
<i>The person who contributes the most to the household income (The respondent)</i>												
Other person	0.911 ***	0.163	2.486	0.914 ***	0.163	2.495	0.876 ***	0.165	2.401	0.925 ***	0.165	2.522
All equally	0.431 **	0.204	1.539	0.436 **	0.205	1.547	0.447 **	0.204	1.563	0.414 *	0.212	1.513
<i>Sector (The private sector)</i>												
The public sector	0.266	0.331	1.304	0.267	0.332	1.307	0.229	0.332	1.257	0.255	0.336	1.291
A joint private-public	0.092	0.486	1.096	0.078	0.483	1.081	0.066	0.462	1.068	0.057	0.494	1.059
The not-for-profit sector/ NGO/ Other	0.553 **	0.267	1.739	0.538 **	0.266	1.712	0.542 **	0.271	1.720	0.555 *	0.284	1.742
<i>Economic activities, NACE rev. 2 (Agriculture, forestry and fishing)</i>												
Industry (except construction)	-1.079 ***	0.247	0.340	-1.081 ***	0.247	0.339	-1.082 ***	0.248	0.339	-1.113 ***	0.257	0.329
Construction	-0.886 ***	0.248	0.412	-0.885 ***	0.248	0.413	-0.864 ***	0.254	0.421	-0.895 ***	0.258	0.409
Wholesale, retail trade; repair of motors	-1.278 ***	0.222	0.279	-1.294 ***	0.225	0.274	-1.237 ***	0.225	0.290	-1.261 ***	0.231	0.283
Transportation and storage	-0.436	0.316	0.647	-0.465	0.319	0.628	-0.530 *	0.318	0.589	-0.463	0.326	0.629
Accommodation, food service activities	-2.069 ***	0.353	0.126	-2.076 ***	0.352	0.125	-2.072 ***	0.352	0.126	-1.946 ***	0.358	0.143

Information and communication	-0.533	0.385	0.587	-0.504	0.378	0.604	-0.571	0.385	0.565	-0.528	0.391	0.590
Financial and insurance/ real estate	-0.766 *	0.397	0.465	-0.778 *	0.405	0.459	-0.712 *	0.408	0.491	-0.803 **	0.400	0.448
Professional, scientific and administrative activities	-0.941 ***	0.257	0.390	-0.923 ***	0.262	0.397	-0.942 ***	0.261	0.390	-0.976 ***	0.265	0.377
Public administration, education, human health and social work	-0.515 *	0.281	0.597	-0.541 *	0.291	0.582	-0.509 *	0.284	0.601	-0.622 **	0.292	0.537
Arts, entertainment, recreation and other service activities	-0.237	0.227	0.789	-0.248	0.231	0.780	-0.262	0.227	0.769	-0.208	0.240	0.812
<i>Necessity entrepreneurs</i> (No)												
Yes	0.564 ***	0.146	1.758	0.563 ***	0.147	1.756	0.542 ***	0.147	1.720	0.547 ***	0.151	1.728
<i>JOB QUALITY INDICES</i>												
<i>I1. Physical environment index</i>	-0.674	0.535	0.510	-0.739	0.541	0.478	-0.696	0.543	0.499	-0.627	0.531	0.534
<i>I2. Work intensity index</i>	-0.224	0.477	0.799				-0.168	0.477	0.845	-0.277	0.488	0.758
I2a. Quantitative demands				-0.492	0.351	0.611						
I2b. Pace determinants and interdependency				0.166	0.253	1.180						
I2c. Emotional demands				-0.012	0.326	0.988						
<i>I3. Work time quality index</i>	1.402 ***	0.371	4.065	1.281 ***	0.384	3.601				1.547 ***	0.386	4.698
I3a. Duration							0.657 ***	0.191	1.930			
I3b. Atypical working time							-0.077	0.286	0.926			
I3c. Working time arrangements							-0.446	0.406	0.640			
I3d. Flexibility							0.559 *	0.305	1.748			
<i>I4. Social environment index</i>	-0.636 *	0.356	0.529	-0.667 *	0.359	0.513	-0.568	0.361	0.566	-0.284	0.372	0.753
<i>I5. Skills and discretion index</i>	-4.191 ***	0.456	0.015	-4.230 ***	0.457	0.015	-4.123 ***	0.463	0.016			
I5a. Cognitive dimension										-0.782 **	0.322	0.457
I5b. Decision latitude										-1.198 ***	0.246	0.302
I5c. Organisational participation										-1.676 ***	0.284	0.187
I5d. Training										-0.654 ***	0.240	0.520
<i>I6. Prospects index</i>	-1.011 ***	0.345	0.364	-1.022 ***	0.345	0.360	-1.033 ***	0.344	0.356	-1.025 ***	0.357	0.359
Constant	6.618 ***	1.041		6.880 ***	1.050		7.006 ***	1.051		6.305 ***	1.051	
Observations		4,864			4,862			4,836			4,691	
F		7.44			7.33			7.10			7.11	
p>		0.000			0.000			0.000			0.000	

*Notes:* Dependent variable - Dependent self-employed (1 = Yes; 0 = No); Significant at \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . All coefficients are compared to the benchmark category, shown in brackets. We kept in the analysis the individuals for which data on each and every independent variable is available. For the job quality indices we used the normalized values. The models control for country dummies.

*Source:* EWCS 2015 (own calculations)

## Appendix

**Table A1.** Variables used in the analysis

Variable	Description	Mode/Mean
<i>Dependent variable</i>		
Dependent self-employed	1 = Yes; 0 = Otherwise	No (69%)
<i>Independent variables</i>		
Gender	1 = Male; 0 = Female	Male (64%)
Age	Respondent exact age. Age squared is also included in the regression analysis	48 years old
Education	1= Early childhood education/ Primary education; 2 = Lower secondary education; 3 = Upper secondary education; 4 = Post-secondary non-tertiary education/ Short-cycle tertiary education; 5 = Bachelor or equivalent; 6 = Master/ Doctorate or equivalent	Upper secondary education (40%)
Respondent and their parents born in the country	1 = Yes; 0= No	Yes (89%)
Household size	1 = 1 person; 2 = 2 persons; 3 = 3 persons; 4 = 4 persons or more	4 persons or more (33%)
Household ability to make ends meet	1 = Very easily/ easily/ fairly easy; 2 = With some difficulty; 3 = With difficulty/ great difficulty	Very easily/ easily/ fairly easy (67%)
The person who contributes the most to the household income	1 = The respondent; 2 = Other person; 3 = All equally	The respondent (65%)
Sector	1 = The private sector; 2 = The public sector; 3 = A joint private-public organisation/company; 4 = The not-for-profit sector or an NGO/ Other	The private sector (90%)
Economic activities, NACE rev. 2	1 = Agriculture, forestry and fishing; 2 = Industry (except construction); 3 = Construction; 4 = Wholesale, retail trade; repair of motors; 5 = Transportation and storage; 6 = Accommodation, food service activities; 7 = Information and communication; 8 = Financial and insurance/ real estate; 9 = Professional, scientific and administrative activities; 10 = Public administration, education, human health and social work; 11 = Arts, entertainment, recreation and other service activities	Wholesale, retail trade; repair of motors (17%)
Necessity entrepreneurs	1 = Yes; 0 = No	No (82%)
Physical environment index	Mean of the 13 indicators listed below. Indicators were measured on a 7-point scale, from 1 for “all the time” to 7 for “never”. The means were rescaled/ <b>normalised</b> from 0 to 1, where 1 was attributed for the highest value of the mean and 0 was attributed for the lowest value of the mean. The higher the value of the index, the better working conditions for the worker. Are you exposed at work to...? - Vibrations from hand tools, machinery - Noise so loud that you would have to raise your voice to talk to people - High temperatures which make you perspire even when not working - Low temperatures whether indoors or outdoors - Breathing in smoke, fumes (such as welding or exhaust fumes), powder or dust (such as wood dust or mineral dust) - Breathing in vapours, such as solvents and thinners	0.83

	<ul style="list-style-type: none"> <li>- Handling or being in skin contact with chemical products or substances</li> <li>- Tobacco smoke from other people</li> <li>- Handling or being in direct contact with materials which could be infectious, such as waste, bodily fluids, laboratory materials, etc.</li> </ul> <p>Does your main paid job involve:</p> <ul style="list-style-type: none"> <li>- Tiring or painful positions</li> <li>- Lifting or moving people</li> <li>- Carrying or moving heavy loads</li> <li>- Repetitive hand or arm movements</li> </ul>	
Work intensity index	<p>Mean of three dimensions: quantitative demands (4 indicators), pace determinants and interdependency (6 indicators) and emotional demands (3 indicators). Because indicators were measured in different scales, each indicator was rescaled from 0 to 1, where 0 was attributed to the best condition for the worker and 1 for the worst. For some of the indicators, therefore the initial scale has been reversed, as mentioned in the brackets. Once the indicators were recorded in the same scale, for each dimension a mean has been computed, as well as a mean of the dimensions for obtaining the index (ranging between 0 and 1). The lower the value of the index, the better working conditions for the worker.</p> <p>Quantitative demands:</p> <ul style="list-style-type: none"> <li>- Working at very high speed (7-point scale from 1 for “all the time” to 7 for “never”, reversed)</li> <li>- Working to tight deadlines (7-point scale from 1 for “all the time” to 7 for “never”, reversed)</li> <li>- Enough time to get the job done (5-point scale from 1 for “always” to 5 for “never”)</li> <li>- Frequent disruptive interruptions (4-point scale from 1 for “very often” to 4 for “never”, reversed)</li> </ul> <p>Pace determinants and interdependency:</p> <ul style="list-style-type: none"> <li>- Work pace dependent on: The work done by colleagues; Direct demands from people such as customers, passengers, pupils, patients, etc.; Numerical production targets or performance targets; Automatic speed of a machine or movement of a product; The direct control of your boss (dummy, 1 for “yes”, 0 for “no”)</li> <li>- Interdependency: three or more pace determinants (computed as dummy, 1 for “yes”, 0 for “no”)</li> </ul> <p>Emotional demands:</p> <ul style="list-style-type: none"> <li>- Does your main paid job involved: handling angry clients, customers, patients, pupils, etc.; being in situations that are emotionally disturbing (7-point scale from 1 for “all the time” to 7 for “never”, reversed)</li> <li>- Your job requires that you hide your feelings (5-point scale from 1 for “always” to 5 for “rarely”, reversed)</li> </ul>	0.31
Work time quality	<p>Mean of four dimensions: duration (3 indicators), atypical working time (4 indicators), working time arrangements (2 indicators) and flexibility (2 indicators). Because indicators were measured in different scales, each indicator was rescaled from 0 to 1, where 1 was attributed to the best condition for the worker and 0 for the worst. For some of the indicators, therefore the initial scale has been reversed, as mentioned in the brackets. Once the indicators were recorded in the same scale, for each dimension a mean has been computed, as well as a mean of the dimensions for obtaining the index (ranging between 0 and 1). The higher the value of the index, the better working conditions for the worker.</p> <p>Duration:</p>	0.71

	<ul style="list-style-type: none"> <li>- Long working hours (48 hours or more a week) (recoded as dummy, 0 for “yes”, 1 for “no”)</li> <li>- No recovery period (less than 11 hours between two working days) (recoded as dummy, 0 for “yes”, 1 for “no”)</li> <li>- Long working days (10 hours or more a day) (recoded as dummy, 0 for “yes”, 1 for “no”)</li> </ul> <p>Atypical working time:</p> <ul style="list-style-type: none"> <li>- Night work (recoded as dummy, 0 for “yes”, 1 for “no”)</li> <li>- Saturday work (recoded as dummy, 0 for “yes”, 1 for “no”)</li> <li>- Sunday work (recoded as dummy, 0 for “yes”, 1 for “no”)</li> <li>- Shift work (Daily split shift, Permanent shift; Alternating/rotating shifts; Other type of shift work) (no shift scores 1, permanent shifts scores 0.66, alternating shifts scores 0.33 and daily split shifts scores 0)</li> </ul> <p>Working time arrangements:</p> <ul style="list-style-type: none"> <li>- Control over working time arrangements (Set by the company; Can choose between different schedules; Can adapt working hours; Entirely determined by self) and change in working time arrangements (No regular change; Change the same day; Change the day before; Change several days in advance; Change several weeks in advance) (Scores 1 if working time arrangement is not set by the company or set by the company but no changes in arrangements occur, 0.75 if set by the company and changes occur several weeks in advance, 0.5 if several days in advance, 0.25 if the day before, 0 if on the same day).</li> <li>- Requested to come to work at short notice (5-point scale from 1 for “daily” to 5 for “never”)</li> </ul> <p>Flexibility:</p> <ul style="list-style-type: none"> <li>- Very easy to arrange to take an hour off during working hours to take care of personal or family matters (4-point scale from 1 for “very easy” to 4 for “very difficult”, reversed)</li> <li>- Work in free time to meet work demands (5-point scale from 1 for “daily” to 5 for “never”)</li> </ul>	
Social environment index	<p>Mean (ranging between 0 and 1) of adverse social behaviour (7 indicators) and social support (1 indicator). Same approach as for Work Time Quality Index. The higher the value of the index, the better working conditions for the worker.</p> <p>Adverse social behaviour:</p> <ul style="list-style-type: none"> <li>- In the last month: Exposure to verbal abuse; Exposure to unwanted sexual attention; Exposure to threats; Exposure to humiliating behaviours and (dummy, 0 for “yes”, 1 for “no”) and over the last 12 months: Exposure to physical violence; Exposure to sexual harassment; Exposure to bullying /harassment (dummy, 0 for “yes”, 1 for “no”)</li> </ul> <p>Social support: Help and support from colleagues (5-point scale from 1 for “always” to 5 for “never”, reversed)</p>	0.89
Skills and discretion index	<p>Mean (ranges between 0 and 1) of four dimensions: cognitive dimension (5 indicators), decision latitude (4 indicators), organisational participation (3 indicators) and training (2 indicators). Same approach as for Work Time Quality Index. The higher the value of the index, the better working conditions for the worker.</p> <p>Cognitive Dimension:</p> <ul style="list-style-type: none"> <li>- Solving unforeseen problems (dummy, 1 for “yes”, 0 for “no”)</li> <li>- Carrying out complex tasks (dummy, 1 for “yes”, 0 for “no”)</li> <li>- Learning new things (dummy, 1 for “yes”, 0 for “no”)</li> </ul>	0.64

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	<ul style="list-style-type: none"> <li>- Working with computers, smartphones and laptops, etc. (7-point scale from 1 for “all of the time” to 7 for “never”, reversed)</li> <li>- Ability to apply your own ideas in work (5-point scale from 1 for “always” to 5 for “never”, reversed)</li> </ul>	
	Decision latitude: <ul style="list-style-type: none"> <li>- Ability to choose or change order of tasks (dummy, 1 for “yes”, 0 for “no”)</li> <li>- Ability to choose or change speed or rate of work (dummy, 1 for “yes”, 0 for “no”)</li> <li>- Ability to choose or change methods of work (dummy, 1 for “yes”, 0 for “no”)</li> <li>- Having a say in choice of work colleagues (5-point scale from 1 for “always” to 5 for “never”, reversed)</li> </ul>	
	Organisational participation: <ul style="list-style-type: none"> <li>- Consulted before objectives are set for own work (5-point scale from 1 for “always” to 5 for “never”, reversed)</li> <li>- Involved in improving the work organisation or work processes of own department or organisation (5-point scale from 1 for “always” to 5 for “never”, reversed)</li> <li>- Ability to influence decisions that are important for your work (5-point scale from 1 for “always” to 5 for “never”, reversed)</li> </ul>	
	Training: <ul style="list-style-type: none"> <li>- Training paid for or provided by employer over the past 12 months (or paid by oneself if self-employed) (dummy, 1 for “yes”, 0 for “no”)</li> <li>- On-the-job training over the past 12 months (dummy, 1 for “yes”, 0 for “no”)</li> </ul>	
Prospects index	<p>Mean (ranges between 0 and 1) of career prospects (1 indicator), job security (1 indicator) and downsizing (1 indicator). Same approach as for Work Time Quality Index. The higher the value of the index, the better working conditions for the worker.</p> <p>Career prospects: My job offers good prospects for career advancement (5-point scale from 1 for “strongly agree” to 5 for “strongly disagree”, reversed)</p> <p>Job security: I might lose my job in the next six months 5-point scale from 1 for “strongly agree” to 5 for “strongly disagree”, reversed)</p> <p>Downsizing: During the last three years (or last year according to seniority in the company), has the number of employees at your workplace increased, stayed the same or decreased (5-point scale from 1 for “increased a lot” to 5 for “decreased a lot”, reversed)</p>	0.58

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