

What matters more for employees' mental health: job quality or job quantity?

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Recent debates about whether the standard full-time working week (35–40 h) can be replaced by a shorter working week have received extensive attention. Using 2015 European Working Conditions Survey data, this study contributes to these debates by exploring the relationships between job quantity, job quality and employees' mental health. Overall, we find that a job's quality matters more than its quantity as measured in hours per week. The results show that actual working hours are hardly related to employees' mental health but job quality, especially intrinsically meaningful work, less intensified work and having a favourable social environment, has positive effects on employee mental health, even in jobs with short working hours. Moreover, although working less than one prefers (under-employment) has negative effects, these negative effects become much smaller in size and non-significant in good quality jobs, especially in jobs with skill discretion and good job prospects. These findings develop the debates about a shorter standard working week by emphasising the continued and crucial importance of job quality in debates on the future of work. These results also suggest that policymakers should pay particular attention to job quality when addressing the dramatic reduction in total hours of employment in Europe following the COVID-19 crisis.

Key words: Job quantity, Job quality, Mental health, Working hours, Shorter working week

JEL classifications: J01

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1. Introduction

In recent years, rapid technological developments and labour market changes have stimulated discussions among academics and policymakers about the sustainability and desirability of the current full-time working model (35–40 h per week) and alternative ways of organising work in the future. Some recent studies predict that a substantial share of employment, especially routine and non-cognitive jobs (estimated to range from 9% in OECD countries to 47% in the USA) is at risk of being replaced by new technologies (Arntz *et al.*, 2016; Frey and Osborne, 2017). The differential impact of technology on work could exacerbate bifurcation of working hours with substantial portions of the labour force working either excessively long hours or very short hours, leading to important health consequences (Messenger, 2018). While unemployed people lack sufficient health benefits from employment (Jahoda, 1982), over-employed people often suffer from mental distress, work-life conflicts and do much unproductive work in an environmentally unsustainable way (Schor, 2005; Fremstad *et al.*, 2019).

In addition, social changes outside the labour market have also fuelled the discussions of alternative working time arrangements. Although women's labour market participation has been dramatically increased since the last century, women are still responsible for most of housework and childcare responsibilities (Hochschild, 1989; Wang, 2019; Wang and Coulter, 2019). This persistent traditional gender role division continues to cause significant challenges to employed men's and women's work-life balance and mental health (Inanc, 2018). Also, as Western developed countries have entered into post-industrialised societies, people place more importance to post-materialist values that emphasise quality of life and self-actualisation (Surkyn and Lesthaeghe, 2004). These social trends have led to increasing requests of shorter working hours arrangements, which allow people to have more time for family lives, child education or leisure activities (Balderson *et al.*, 2021).

In order to address these problems and social needs, some academics and policymakers have proposed to reduce and redistribute working time more equally across the adult population (Ciccia and Riain, 2013; Messenger, 2018; Barnes, 2020; Coote *et al.*, 2020; De Spiegelaere and Piasna, 2021). Historically, working less than full-time has often been associated with poor quality jobs that were insecure, low paid and lacking prospects, but presumably reducing the number for full-time workers (say from five to four days a week) would not increase the proportion of the workforce at risk of poor quality employment – if anything, by normalising shorter working hours it could reduce the segmentation between full-time and part-time work. This idea has been trialled in several countries and organisations (e.g., 28-hour working week in Germany, four-day trials in US government and a UK call centre, four-day week in Perpetual Guardian, New Zealand etc.) However, whether and to what extent working time reduction will lead to positive consequences to the employment rate, gender equity, environmental sustainability and health has been widely debated (Bosch and Lehnendorff, 2001; Kallis *et al.*, 2013; Coote *et al.*, 2020).

Regarding the health consequences, some researchers argue that reducing the standard working week and redistributing the spare working hours, could reduce unemployment and increase leisure time for full-time workers, thus leading to better mental health and work-life balance (Wood and Burchell, 2018; Kamerāde *et al.*, 2019). However, there is also a concern that substantial working time reduction could

make people feel under-employed, which can be detrimental to their mental health (Angrave and Charlwood, 2015). Moreover, the debate is further complicated by the fact that the health benefits of working time reduction may depend on how the shorter working hours policy is implemented, to what extent employees have control over their schedules and can negotiate with employers and whether there are complementary policies such as labour right protection and child care arrangements to ensure that the time reduced will be directed to benefit employees (Fagnani and Letablier, 2004; Piasna, 2018).

The debate on shorter working hours thus highlights the continuing importance of job quality for employees' mental health. There is a rich literature from various academic disciplines concerning how job characteristics affect employees' mental health (Muñoz de Bustillo *et al.*, 2011). The job quality literature highlights a number of important job characteristics (e.g., earnings, skill use, employment prospects etc.) that are related to employees' mental health, and each of these job characteristics has a clear and distinct theoretical origin (Muñoz de Bustillo *et al.*, 2011). As a result, given the importance of both job quantity and job quality, this article contributes to the literature by integrating both areas of research and systematically examining the independent and interactive roles of both job quantity and job quality in shaping employees' mental health.

This article aims to combine job quantity and job quality literature into one theoretical and empirical framework. This article has two objectives: (i) to investigate the relative importance of job quantity (work hours and work hour match) and job quality for employees' mental health; (ii) to explore the extent to which the effects of job quality depend on job quantity, or more specifically, whether the impact of job quality interacts with the mental health effects of working shorter hours or feeling under-employed.

The rest of the article is structured as follows. We begin by reviewing the literature on effects of job quantity and job quality on employees' mental health. Then we propose our own research questions. Next, we introduce the data, measures and analytic strategy, before reporting and discussing the results. The study concludes by reflecting on what the findings suggest for future research and policy-making.

2. Theoretical background

It is well established that employment plays a pivotal role in individuals' mental health. Jahoda's (1982) Latent Deprivation Theory argues that paid employment could provide a number of manifest (i.e., income) and latent functions (i.e., time structure, enforced activity, social contact, collective purpose and status and identity), which are essential to people's mental health (Jahoda, 1982); unemployed people who are deprived of these benefits tend to have much worse mental health than employees (Wood and Burchell, 2018). Based on Jahoda's framework, two research streams can be identified to explore how employment differentiated by job quantity and job quality affects employees' mental health.

2.1 *Effects of job quantity on mental health*

The amount of time we spend in work has been shown to be crucial to our mental health. In the job quantity literature, there is a longstanding research strand

demonstrating how over-employment (working much longer than one would prefer) and excessively long working time negatively affects employees' health and mental health (Bannai and Tamakoshi, 2014). A large number of studies show that working excessively long hours could not only lead to occupational stress, burnout, exhaustion, depression and other mental health problems, but can also have negative spill-over effects on family lives, leisure time, work-life balance and community engagement (Bannai and Tamakoshi, 2014; Angrave and Charlwood, 2015; Dinh *et al.*, 2017; Virtanen *et al.*, 2018). Given the damaging effects of over-employment, the European Working Time Directive has stipulated that the total number of working hours including overtime should not normally exceed 48 hours per week (European Union, 2003).

In contrast, another strand of research demonstrates that under-employment (working fewer hours than one would prefer) also negatively affects employees' mental health and well-being. A number of studies show that involuntary part-time working has negative effects on employees', especially women's, mental health and well-being (Angrave and Charlwood, 2015; Heyes *et al.*, 2017; Kamerāde and Richardson, 2018). This is assumed working fewer hours than one prefers does not allow employees to fully access the various financial and social benefits of employment such as social status, social identity and social contact, which can be a source of mental health problems (Jahoda, 1982; Angrave and Charlwood, 2015). Moreover, part-time working is not only associated with economic insecurity and so called part-time wage penalty, but also related to poor quality of work such as unpredictable and precarious work schedules, limited access to training and lower chances of being promoted compared with full-time workers (Connolly and Gregory, 2009; Hoque and Kirkpatrick, 2016). This can undermine employees' mental health through exacerbating work-life conflicts (Schneider and Harknett, 2019).

More recently, based on both over- and under-employment literature another study further explored the minimum and optimum working hours that are required to obtain mental health benefits from employment (Kamerāde *et al.*, 2019). Using large-scale panel data in the UK and controlling for household size and income and a range of other socio-demographic and work-related characteristics, this study showed that for many previously unemployed or inactive people the minimum amount of work leading to significant boost in mental health and mental health is just one day per week; the level of employees' mental health was similar for all working time categories from eight hours to forty hours per week (Kamerāde *et al.*, 2019). This is the first empirical study that directly engages with and provides some support to the current shorter working week policies in terms of employees' mental health.

Although there is a longstanding theoretical tradition highlighting the importance of job quantity for employees' mental health, most empirical studies tended to only include one or few job quality characteristics such as broad categories of occupational status or job security. Because working time is associated with many job quality characteristics, studies without controlling for a wide range of job quality indicators are unable to disentangle the net effect of working time from the effect of job quality. For example, many part-time jobs usually lack career advancement opportunities compared with full-time jobs. Therefore, the existing job quantity literature without considering more specific measures of job quality provides an incomplete view of

Table 1. Dimensions of job quality suggested by different theoretical perspectives

Theoretical perspectives	Dimensions of job quality
The economic approach (Keywords: Compensating wage differential theory)	Earnings
The radical and behavioural economic approach (Keywords: Power relations, exploitation, group membership in workplace)	Industrial democracy, participation in work organisations.
The traditional sociological approach (Keywords: Alienation and intrinsic quality of work.)	(1) Objective strand: Skill use, autonomy etc. (2) Subjective strand: Meaninglessness, social isolation etc.
The institutional approach (Keywords: Segmentation and employment relations)	(1) Contract status and stability of employment etc. (2) Opportunity for skills development and career progression etc.
The occupational medicine approach (Keywords: Health risks and safety in workplace)	(1) Physical risks e.g. noise, smoke etc. (2) Psychosocial risks e.g. harassment, violence etc.
The work-life balance approach (Keywords: Working time, intensity)	(1) Working time quality: Working time scheduling and flexibility etc. (2) Work intensity: Workload, work demands etc.

future-of-work discussions about the possible implications of working time reduction and harmonisation for a whole labour market. In other words, if working, say, 25 h per week becomes the new normal for both men and women, we would not expect to see those jobs being subject to the same problems as are associated with part-time working for today's employees.

2.2 *Effects of job quality on mental health*

In the labour market literature, there is a rich research tradition investigating how various job characteristics influence employees' mental health. The discussions on the impact of job characteristics on mental health and psychological mental health can be traced back to early sociologists such as Marx's alienation theory (Marx, [1894] 1991), Fryer's agency restriction theory (Fryer, 1986) and Warr's vitamin model (Warr, 1999). These theories have identified a number of specific job characteristics that are crucial to employees' mental health in workplace such as income, skill use and social contact (Warr, 1999).

More recently, various job quality models attempted to construct more systematic job quality indexes drawing on literature from a wide range of social science disciplines. Although there are many different job quality indexes constructed for different purposes, there is a number of important dimensions of job quality that repeatedly appear in different models (Muñoz de Bustillo *et al.*, 2011). Table 1 summarises each dimension of job quality important to mental health and its theoretical origin.

From an economic perspective, scholars emphasise the importance of earnings as a means to avoid poverty and satisfy material needs. (Muñoz de Bustillo *et al.*, 2011). Consistent with this view, occupational psychologists also argue that loss of income and financial strain could constrain people's ability to control their life, which could in turn undermine their mental health (Fryer, 1986). In contrast, heterodox and sociological approaches casts doubt on the pure instrumental motivation of work suggested by neoclassical economists, but instead argue that work itself is of intrinsic values for human beings (Braverman, 1998). This is because through skill use and doing creative and meaningful tasks employees are able to acquire a sense of self-actualisation and collective purpose, which are essential to their mental health and well-being (Green, 2006). Also, the institutional approach highlights the importance of employment relations such as stability of employment and career prospects for employees' mental health (Doeringer and Piore, 1970). In addition, the occupational medicine approach highlights how exposure to various physical and psychosocial risks factors affects employees' physical and mental health (Rom and Markowitz, 2007; Butterworth *et al.*, 2011). Finally, the work-life balance approach argues that work intensity and control over working time and working time flexibility are important for employees' mental health and work-life balance (Kalliath and Brough, 2008).

These theoretical propositions are generally supported by empirical evidence, which shows that poor job characteristics such as high work intensity and low job security, pay or autonomy are associated with poor mental and physical health of employees (Butterworth *et al.*, 2011; Chandola and Zhang, 2018; Inanc, 2018; Chandola *et al.*, 2019). Overall, the job quality literature highlights how various job characteristics play an important role for employees' mental health.

2.3 *Interaction effects between job quantity and job quality on mental health*

Job quantity and job quality not only exert independent impacts on, but also could interact to jointly influence employees' mental health. Peter Warr's vitamin model may be the first theoretical framework, which systematically explores how the impacts of various job quality characteristics on employees' mental health and well-being depend on the 'dosage' of work (Warr, 1987). Specifically, the vitamin model proposes 12 different workplace determinants of employees' mental health and well-being (e.g., opportunity for control, opportunity for skill use, interpersonal contact, externally generated goals etc.) and argues that 12 workplace characteristics can affect our mental health and well-being in a non-linear way that is analogous to how different doses of vitamins influence our physical health (Warr 1987, 1999).

For example, when employees are deprived of these 'vitamins', they will suffer from mental health problems, and thus it is beneficial to increase the intake of any or all of them. However, for some workplace 'vitamins' (such as those relating to money, social position and physical security) when the optimal dosage is reached, further intake will have constant effects, neither improving nor undermining our mental health. In contrast, for other workplace 'vitamins' (e.g., job control, skill use and interpersonal contact etc.) too high intake will damage our mental health. Although Warr's vitamin model did not explicitly mention the role of working time and not use it to measure job quantity, it inspires an idea that if different 'dosages' of job quality affect mental health, then different dosages of job quality in a combination of different dosages of work quantity (that is working hours), could jointly affect employees' mental health. For example, if a too high dosage of interpersonal contact or too low dosage of skill use could cause more damage for mental health if working 40 h a week than working only 20 h a week.

Apart from under-employment and zero hours contracts studies, there is very little research on the link between job quantity and job quality. Some studies suggest that the relationship between working hours and some job quality aspects is not straightforward and linear. We can thus speculate that the interaction between them could lead to diverse consequences. For example, Piasna's (2018) research shows that when employees have control over their schedules shorter working hours lead to lower work intensity (i.e., working at high speed and to tight deadlines), whereas employer-led shorter working hours are often associated with higher work intensity (Piasna, 2018). Also, Fagnani and Letablier (2004) found that in France employees who worked in family-friendly companies and had control over their schedules benefited from the working time reduction to 35 hours, whereas those without schedule control had to work unsocial hours in exchange of working time reduction (Fagnani and Letablier, 2004). In addition, Askenazy (2004) also found that working time reduction led by employers implies greater difficulties for employees to achieve work-life balance, leading to high work intensity and adverse health outcomes (Askenazy, 2004).

2.3 *Research gaps and questions*

So far, it is well established in previous research in terms of how job quantity and job quality independently influence employees' mental health. Although some studies also discuss the potential interactions of job quantity and job quality, they are either

theoretical speculations or only focus on one specific job quality indicator such as schedule control or work intensity. No previous research has examined a wide range of job quality and quantity indicators, and how their interaction affects workers' health. Therefore, it is important to integrate both job quantity and job quality into one theoretical framework and systematically examine their independent and interactive roles in shaping employees' mental health.

Previous research has shown that the benefits of shorter working hours may depend on employees' control over their schedules (Fagnani and Letablier, 2004). It is also possible that health effects of shorter working time may depend on the social environment. For example, those working shorter hours may derive more of their sense of purpose in life from their non-work activities (e.g., sports, childcare) and therefore be less dependent on a good job to provide that sense of purpose. For example, shorter working time may be more likely to benefit employees who are treated with dignity and respected by employers, otherwise employees using shorter working time arrangements may suffer discrimination. The health effects of shorter working time may be also contingent on the type of contract. Employees working in permanent contract jobs with better company welfare benefits may be more likely to benefit from shorter working hours, whereas those working in non-standard and precarious jobs may suffer due to insufficient social protection (Wang *et al.*, 2021). These arguments may also apply to other job quality indicators as well. Taken together, job quantity and job quality could have both independent and interactive impacts on employees' mental health, as shown in Figure 1.

Therefore, to understand the independent and interactive effects of job quality and job quantity on mental health, this study asks two main questions:

1. What is the relative importance of job quantity (work hours and work hours match) and job quality indicators for employees' mental health?
2. To what extent do effects of job quality depend on job quantity? More specifically, is the impact of job quality reduced for employees working shorter hours, as they experience less exposure to those beneficial or harmful working conditions?

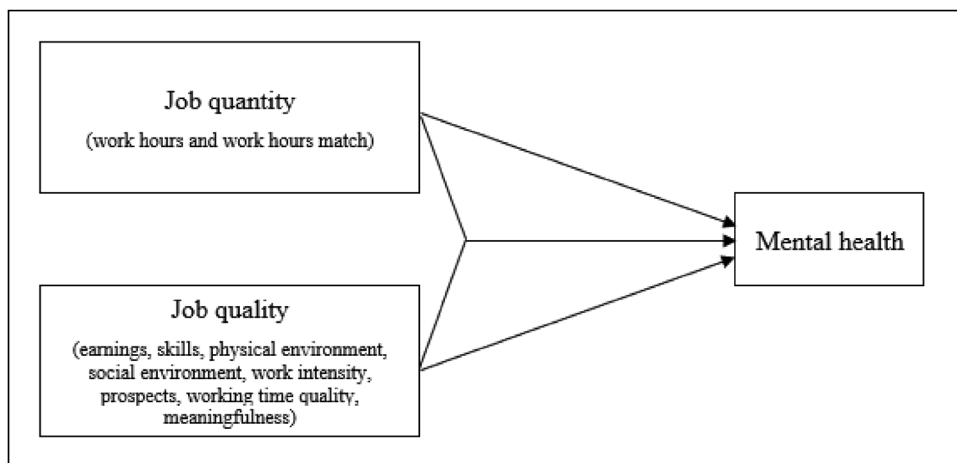


Fig. 1. Theoretical framework.

3. Method

3.1 Data, sample and missing values

This study used the sixth wave (2015) of the European Working Condition Survey (EWCS6), which has a nationally representative sample of employed people in 34 European countries and the most comprehensive measures of job characteristics compared to its previous waves (Eurofound, 2017) and many other national and international labour market surveys. The EWCS6 used a multi-stage, stratified clustered sampling procedure by randomly selecting primary sampling units (PSU) in each country according to the principle of probability proportional to size, and then sampling households in each PSU (Eurofound, 2017). Cross-national weights provided by EWCS were used in all analyses to ensure that the sample was representative of the in-work population (Eurofound, 2017).

To construct the analytic sample, we first excluded the self-employed whose working hours are hard to define and are usually chosen or determined by the person themselves and then restricted the sample to employees aged between 18 and 65. We also restricted our sample to those whose weekly working hours did not exceed 48 hours (The European Working Time Directive maximum) because people who opt out of the 48 working hours per week restriction are often those who work in unusual occupations such as armed forces where the actual working hours are hard to define (European Union, 2003). After deleting missing cases (list wise deletion), our final analytic sample contained 11,066 men and 13,416 women.

The share of missing values was around 16%. The Little's MCAR (Missing Completely at Random) test indicated that the missing values are not missing completely at random ($p < 0.001$). As a robustness check, we used multiple imputations by chain equations to create 20 datasets to impute the missing values in the main dataset (White *et al.*, 2011). Reassuringly, using multiple imputations did not change the main findings (results available upon request).

3.2 Variables

3.2.1 Dependent variable

In this study, mental health was the dependent variable and was measured using the World Health Organization five items (WHO-5). The WHO-5 consisted of five statements relating to feelings over the past two weeks (I have felt cheerful and in good spirits; I have felt calm and relaxed; I have felt active and vigorous; I woke up feeling fresh and rested; My daily life has been filled with things that interest me) which respondents rate according to the following scale: 0(at no time), 1(some of the time), 2(less than half the time), 3(more than half of the time), 4(most of the time), 5(all of the time). Following the guidance of the WHO, the answers were summed and multiplied by four to obtain a percentage score ($\alpha = 0.88$) ranging from 0 to 100, with a higher score indicating better mental health (WHO, 1998).

3.2.2 Independent variables

We used two sets of independent variables to measure job quantity and job quality. Job quantity was measured by three variables. First, work hours refer to number of hours

actually worked per week including both overtime and second job. In order to capture a possible non-linearity in the relationships between working hours and mental health, we divided work hours into four categories: '1–16', '17–34', '35–40', '41–48'. The first two categories measure short work hours; the third category approximates full-time work and the last category measures long working hours. Second, work hour match was constructed from the question 'Provided that you could make a free choice regarding your working hours and taking into account the need to earn a living: how many hours per week would you prefer to work at present?' to include three categories: 'Over-employed (work hours are longer than preferred work hours)', 'Matched (work hours are equal to preferred work hours)' and 'Under-employed (work hours are shorter than preferred work hours)'. Third, we created a variable to combine the information of work hours and work hour match to include six categories: 'Full-time match', 'Part-time match', 'Full-time over-employed', 'Part-time over-employed', 'Full-time under-employed' and 'Part-time under-employed'. Consistent with the previous definition, here the full-time job requires employees to work at least 35 hours per week.

Job quality was measured by eight different job quality indexes, which is a standard way to conceptualise job quality as first proposed by [Green et al. \(2013\)](#) and now adopted and widely used in Eurofound and others ([Burchell et al., 2014](#); [Felstead et al., 2019](#); [Eurofound, 2020](#)). These indexes include skills and discretion index, physical environment index, social environment index, work intensity index, prospects index, working time quality index, earnings index and meaningful work index. The first seven indexes were constructed by EWCS ([Eurofound, 2017](#)), whereas the last was constructed by the authors of this article. The earnings index was measured by logged net *monthly* income (standardised in Euros). The skills and discretion index measured the levels of skills requirement and use and the possibilities to develop skills in a job, comprising 14 items related to the dimensions such as the skill content of the job, decision latitude and participation in the organisation. The physical environment index consisted of 13 items measuring the exposure to specific physical hazards such as noise, smoke and high temperature etc. The social environment index comprised 15 items to measure the extent to which employees experience social support from colleagues and leaders and adverse social behaviours such as harassment and violence at the workplace.

The work intensity index comprised 13 items to measure various work demands in the job such as quantitative demands (e.g., having tight deadlines), pace determinants and interdependency (e.g., work pace dependent on other colleagues), and emotional demands (e.g., hiding feelings at the workplace). The prospects index measured the continuity of employment using four items: employment status/type of contract, job security, career prospects and downsizing at the workplace. The working time quality index comprised 19 items to measure the quality of working time related to duration of work, atypical working time, working time arrangements (ability to control or change working time) and work flexibility. For more details about measurements of the above six job quality indexes, see the Eurofound report of EWCS6 ([Eurofound, 2017](#)). The meaningful work index consisted of a summated score from two questions about the frequencies (1–5) of having feelings of doing useful work and work well done ($\alpha = 0.81$). All job quality indexes were recoded into binary variables with the threshold being the median job quality score.¹

¹ In most cases this achieved a 50:50 or 49:51 split. However, due to the lumpiness of the Meaningful Work index, the high-low split was 55:45.

3.2.3 Covariates

In addition, we also controlled for a number of demographic and household characteristics, and participation in non-work activities such as leisure and cultural activities, which have been shown to affect people's mental health (Iwasaki *et al.*, 2010). These covariates included age, age squared, gender, whether there is a partner in the household, presence of children (no child, preschool children aged 0–4, primary school children aged 5–15, children aged 16+), ethnicity and education levels. We also controlled for presence of activity-limiting illness (no illness, have illness not limiting activities, have illness limiting activities), which captures the health effects on activities such as work. Previous research suggests that controlling for this variable could to some extent exclude the reversed causal effects of work on health (Kamerāde *et al.*, 2019). In terms of non-work activities, the questionnaire asked respondents about the frequencies (5-point scale from *daily* to *never*) of participating in seven activities outside work: voluntary or charitable activities; cooking and doing housework; caring for elderly/disabled; sport, culture or leisure activities. Further robustness checks suggest that there was no multicollinearity among all independent and control variables especially job quality indexes ($VIF < 3$).

For more details of the measurements and descriptive statistics, see Table A1 in the Online Supplementary Materials. Furthermore, Table A2 shows there are some country differences in job quantity and job quality. For example, employees from Eastern Europe especially East Central and East South are more likely to work over-time than those in other European areas. In addition, employees from North West and Nordic regions are more likely to report over-employment but employees from Southern Europe are more under-employed than those from other areas. In terms of job quality, employees from North West, Nordic and Continental regions have higher levels of earning, skills and discretion, employment prospects than those from Southern and Eastern areas, while employees from Southern and Eastern regions tend to have better social environment at workplace than those from other areas.

3.3 Analytic strategies

Given that the data are hierarchically structured (individuals are clustered within countries), the basic statistical model can be expressed in the following equation. *Mental health_{ij}* is the dependent variable measuring mental health status of individual *i* in country *j*. *Job quantity_{ij}* and *Job quality_{ij}* are explanatory variables measuring job quantity and job quality of individual *i* in country *j*. *Covariates_{ij}* are control variables, which can vary at both individual and country level. *c_j* is country level error term and *μ_{ij}* is individual level error term.

$$Mental\ health_{ij} = \beta_1 Job\ quantity_{ij} + \beta_2 Job\ quality_{ij} + \beta_3 Covariates_{ij} + c_j + \mu_{ij}$$

To ensure that the coefficients of job quantity and job quality are unbiased, we need to assume that the explanatory variables are independent of two error terms, that is, $Cov(X_{ij}, c_j) = 0$ and $Cov(X_{ij}, \mu_{ij}) = 0$. To estimate the above equation, this study uses country-level fixed effects model, which only focuses on within-country variation and drops all between-country variation (*c_j*). In doing so, the fixed effects model only needs to satisfy one assumption (i.e., $Cov(X_{ij}, \mu_{ij}) = 0$) and is thus less likely to be biased than multilevel random effects model, which needs to satisfy both assumptions

Table 2. Associations between work hours/work hour match and above median job quality

	EI	SDI	PEI	SEI	WII	PI	WTQI	MWI
Work hours								
1–16	11%	34%	50%	49%	60%	32%	55%	57%
17–34	34%	48%	55%	47%	54%	42%	52%	58%
35–40	57%	52%	48%	50%	50%	50%	55%	56%
41–48	51%	47%	44%	44%	40%	51%	26%	49%
Work hour match								
Over-employed	62%	56%	47%	42%	40%	49%	42%	49%
Matched	49%	50%	50%	52%	53%	51%	53%	58%
Under-employed	28%	38%	43%	45%	51%	34%	47%	54%
Work hour and match								
Full-time matched	52%	49%	48%	52%	52%	52%	53%	57%
Part-time matched	35%	51%	59%	50%	57%	47%	57%	60%
Full-time over-employed	64%	56%	46%	42%	39%	50%	41%	49%
Part-time over-employed	43%	57%	51%	40%	48%	46%	49%	52%
Full-time under-employed	48%	44%	37%	42%	45%	43%	43%	52%
Part-time under-employed	15%	33%	47%	47%	55%	28%	49%	56%
All	50%	50%	49%	49%	50%	49%	50%	55%

Note. EI = Earnings index, SDI = Skills and discretion index, PEI = Physical environment index, SEI = Social environment index, WII = Work intensity index, PI = Prospects index, WTQI = Working time quality index, MWI = Meaningful work index.

stated above (Allison, 2009). However, the disadvantage of the fixed effects model means that we are not able to examine the impact of country level characteristics on individual mental health and we attend to this limitation in the Discussion and Conclusions.

Specifically, we first examined the relationship between job quantity and mental health controlling for a wide range of socio-demographic characteristics and non-work activities, and then added the eight job quality indicators into the model to explore the relative importance of job quantity and these job quality indexes. To explore whether the effects of job quality depend on the level of job quantity, we fitted interaction terms between job quantity (work hours and work hour match) and each of the eight job quality indexes.

4. Results

Table 2 explores the associations between job quantity and job quality and shows the percentages of employed individuals across different categories of work hours and work hour match who reported high job quality (above median scores). For example, only 11% of those in the lowest working hours (1–16) have above median monthly income, rising to 57% in the 33–40 hours category, and falling to 51% in the long working hours category. It shows that people working short hours, especially only 1–16 h per week, are less likely to have high levels of monthly income, high levels of skills and discretion and good job prospects compared with those working full-time. In contrast, similar or higher proportions of people working 1–16 h per week have high scores on the physical environment, social environment, work intensity, working time quality and meaningful work indicators compared with full-time employees.

In addition, we find that people who report being under-employed are consistently less likely to access most high job quality characteristics except work intensity than those whose actual work hours and working time preference are matched. The results for short work hours (Panel A) and the results for under-employment (Panel B) remain generally similar for individuals who are both part-time employees and under-employed (Panel C).

Table 3 used multivariate country-level fixed effects models to explore the associations between job quantity, job quality and mental health. Model 1 shows that, after controlling for a wide range of social and demographic characteristics, compared with those working full-time people working long hours have worse mental health whereas people working shorter hours have similar levels of mental health. In addition, we find that those who work more (over-employed) or less (under-employed) than they would prefer, especially more, have significantly worse mental health than those whose work hours and work hour preference are matched. Model 2 replicates the previous model by combining work hours and work hour match. In line with Model 1, it shows that those who feel over-employed or under-employed have consistently worse mental health than those who work full-time and feel their work hours matched regardless of actual work hours. Model 2 also shows that for people who feel their work hours matched, those working part-time have better mental health than those working full-time.

Model 3 further added eight job quality indicators and show that in general better job quality (except earnings) was significantly associated with better mental health. A joint significance test for all job quality indexes suggests that job quality as a whole was significantly associated with employees' mental health ($p < 0.001$). Notably, after adding job quality into the model, the R^2 has increased markedly from 11% in Model 1 to 22% in Model 3. This suggests that job quality played an important role in explaining the variance of employees' mental health. Importantly, after including job quality the negative effects of long work hours, over- and under-employment have been attenuated in size and degree of significance, suggesting that the effects of long work hours and work hour mismatch on mental health were in part explained by poor job quality. For robustness check, we ran another model (not shown) entering job quality and control variables first and then entering job quantity measures. However, we find that adding job quantity measures does not increase the R^2 of the model, again highlighting the importance of job quality over job quantity.

We conducted a series of Wald tests to compare the relative importance of various job quality indexes. They suggest that the meaningful work index had the largest coefficient compared to all other job quality indexes ($p < 0.001$). In addition, social environment and work intensity had the second and third largest effects compared to the rest of job quality indexes ($p < 0.05$). Model 4 replicates Model 3 using a combined variable of both work hours and work hour match and shows generally consistent results, confirming the importance of job quality in shaping employees' mental health.

Next, we explore the interaction effects between job quantity and job quality on mental health. Table 4 shows the interactions between work hour match and job quality. In the main effects models where all jobs are of low quality, we find that people who were either over- or under-employed have consistently worse mental health than those with matched work hours. However, in the main effects models where all jobs are

Table 3. Effects of job quantity and job quality on mental health

	Model 1		Model 2		Model 3		Model 4	
	Coef	SE	Coef	SE	Coef	SE	Coef	SE
<i>Job quantity</i>								
Work hours per week (Ref. = 35–40)								
1–16	0.38	(1.01)			0.25	(0.99)		
17–34	1.10	(0.59)			0.98	(0.58)		
41–48	–1.41*	(0.62)			–0.54	(0.59)		
Work hour match (Ref. = Matched)								
Over-employed	–5.35***	(0.51)			–3.34***	(0.48)		
Under-employed	–3.48***	(0.68)			–1.99**	(0.62)		
Work hours and work hour match (Ref. = Full-time matched)								
Part-time matched			1.26*	(0.64)			1.00	(0.64)
Full-time over-employed			–5.65***	(0.52)			–3.47***	(0.49)
Part-time over-employed			–4.06**	(1.29)			–2.03	(1.24)
Full-time under-employed			–3.03**	(0.95)			–1.55	(0.88)
Part-time under-employed			–2.62**	(0.85)			–1.35	(0.80)
<i>Job quality (binary)</i>								
Earnings index (Ref. = Low)					0.70	(0.54)	0.74	(0.53)
Skills and discretion index (Ref. = Low)					1.64***	(0.44)	1.63***	(0.44)
Physical environment index (Ref. = Low)					2.57***	(0.42)	2.56***	(0.42)
Social environment index (Ref. = Low)					5.66***	(0.39)	5.66***	(0.39)
Work intensity index (Ref. = Low)					3.85***	(0.40)	3.86***	(0.40)
Prospects index (Ref. = Low)					2.76***	(0.40)	2.75***	(0.40)
Working time quality index (Ref. = Low)					1.78***	(0.39)	1.83***	(0.39)
Meaningful work index (Ref. = Low)					7.40***	(0.39)	7.40***	(0.39)
Constant	76.24***	(1.66)	75.60***	(1.30)	64.90***	(1.62)	64.48***	(1.33)
R-squared	0.11		0.11		0.22		0.22	
Observations	24,524		24,524		24,524		24,524	
Number of countries	34		34		34		34	

Note. All models control for age, gender, partnership, presence of children, education levels, presence of longstanding illness, ethnicity, household work and caring responsibilities. Robust standard errors in parentheses, *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Table 4. Interactions between work hour match and job quality

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
EI		SDI	PEI	SEI	WII	PI	WTQI	MWI
Main effects (low job quality)								
Work hour preference (Ref. = Matched)								
Over-employed	-2.98*** (0.81)	-3.47*** (0.72)	-3.50*** (0.65)	-3.21*** (0.61)	-4.77*** (0.64)	-3.79*** (0.67)	-4.08*** (0.66)	-3.91*** (0.67)
Under-employed	-2.64** (0.82)	-3.02*** (0.84)	-2.41** (0.85)	-2.97*** (0.82)	-2.52** (0.89)	-2.89*** (0.81)	-2.98*** (0.87)	-2.80** (0.88)
Main effects (high job quality)								
Work hour preference (Ref. = Matched)								
Over-employed	-3.45*** (0.57)	-3.21*** (0.60)	-3.17*** (0.65)	-3.60*** (0.70)	-1.45* (0.65)	-2.92*** (0.63)	-2.55*** (0.64)	-2.76*** (0.63)
Under-employed	-0.84 (0.91)	-0.63 (0.86)	-1.46 (0.85)	-0.61 (0.89)	-1.49 (0.83)	-0.72 (0.92)	-1.00 (0.85)	-1.25 (0.83)
Differences (interaction effects)								
Work hour pref. x Job quality (Ref. = Low)								
Over-employed x High	-0.47 (0.97)	0.26 (0.90)	0.32 (0.88)	-0.39 (0.89)	3.32*** (0.88)	0.87 (0.88)	1.53 (0.89)	1.15 (0.88)
Under-employed x High	1.80 (1.20)	2.40* (1.16)	0.95 (1.17)	2.36* (1.17)	1.03 (1.18)	2.17 (1.19)	1.97 (1.18)	1.55 (1.18)
R-squared	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Observations	24,524	24,524	24,524	24,524	24,524	24,524	24,524	24,524
Countries	34	34	34	34	34	34	34	34

Note. EI = Earnings index, SDI = Skills and discretion index, PEI = Physical environment index, SEI = Social environment index, WII = Work intensity index, PI = Prospects index, WTQI = Working time quality index, MWI = Meaningful work index. All models controlled for all covariates in Table 1. Robust standard errors in parentheses. ***p < 0.001, **p < 0.01, *p < 0.05.

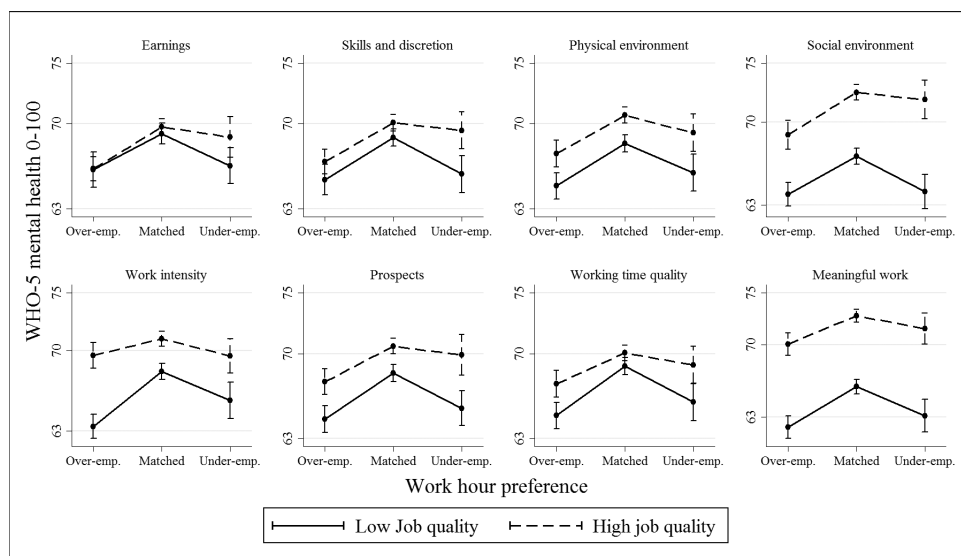


Fig. 2. Interaction between work hour match and job quality.

of high quality we find that the negative effects of under-employment become marginal and non-significant. The negative effects of over-employment still remain significant even in high quality jobs. The interaction effects (differences between high job quality and low job quality main effects) show that under-employed people tend to have significantly better mental health when people work in a job characterised by higher levels (above the median) of skill/discretion or prospects.

Figure 2 used the predicted coefficients and shows the interaction effects. It shows that as long as a job is of low quality in any job quality indicators, under-employed people tend to have worse mental health than those with matched work hours (characterised by the steep slopes). However, when people work in a job characterised by high levels (above the median) of meaningfulness, skill/discretion, prospects or social environment, such negative effects of under-employment become marginal and non-significant (see the flat slopes).

We further tested the interaction effects between work hours and job quality in Table 5. Most interactions between work hours and job quality were not statistically significant. Further Wald tests of joint significance confirmed that the interactions between working hours and job quality as a whole were statistically insignificant (all p -values > 0.05). This pattern can be also shown in Figure 3, which suggests that in general the effects of job quality on mental health were independent from working hours and remained similar in micro or full-time jobs. In other words, employees tended to have better mental health when they work in higher quality jobs, and employees still benefited equally from higher job quality regardless of whether they worked in micro jobs or full-time jobs.

Table 5. *Interactions between work hours and job quality*

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	EI	SDI	PEI	SEI	WII	PI	WTQI	MWI
Main effects (low job quality)								
Work hours per week (Ref. = 35–40)								
1–16	–0.11 (1.13)	–0.49 (1.23)	–1.43 (1.52)	0.60 (1.33)	–0.57 (1.65)	0.21 (1.24)	–1.09 (1.57)	0.48 (1.50)
17–34	1.98* (0.81)	1.22 (0.81)	1.13 (0.84)	0.49 (0.75)	1.10 (0.81)	1.44 (0.76)	0.49 (0.78)	1.92* (0.85)
41–48	0.51 (0.90)	–0.89 (0.85)	–0.06 (0.77)	–1.00 (0.77)	–0.97 (0.74)	–0.43 (0.87)	–1.23 (0.72)	–0.89 (0.78)
Main effects (high job quality)								
Work hours per week (Ref. = 35–40)								
1–16	5.26** (1.90)	1.49 (1.49)	1.75 (1.16)	–0.21 (1.34)	0.88 (1.13)	0.45 (1.46)	1.34 (1.17)	0.10 (1.22)
17–34	–0.38 (0.78)	0.76 (0.72)	0.91 (0.70)	1.62* (0.77)	0.93 (0.72)	0.47 (0.76)	1.42 (0.74)	0.24 (0.68)
41–48	–1.09 (0.74)	–0.25 (0.75)	–1.24 (0.83)	0.05 (0.82)	0.14 (0.86)	–0.64 (0.73)	0.68 (0.90)	–0.18 (0.81)
Differences (interaction effects)								
Work hours × Job quality (Ref. = Low)								
1–16 × High	5.37* (2.21)	1.98 (1.86)	3.18 (1.85)	–0.81 (1.81)	1.45 (1.93)	0.24 (1.83)	2.43 (1.89)	–0.38 (1.86)
17–34 × High	–1.36 (1.09)	–0.46 (1.00)	–0.22 (1.00)	1.13 (0.99)	–0.17 (0.99)	–0.97 (1.00)	0.93 (0.99)	–1.68 (1.00)
41–48 × High	–1.61 (1.14)	0.64 (1.08)	–1.19 (1.09)	1.06 (1.07)	1.11 (1.09)	–0.21 (1.08)	1.91 (1.11)	0.71 (1.07)
R-squared	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Observations	24,524	24,524	24,524	24,524	24,524	24,524	24,524	24,524
Countries	34	34	34	34	34	34	34	34

Note. EI = Earnings index, SDI = Skills and discretion index, PEI = Physical environment index, SEI = Social environment index, WII = Work intensity index, PI = Prospects index, WTQI = Working time quality index, MWI = Meaningful work index. All models controlled for all covariates in [Table 1](#). Robust standard errors in parentheses. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

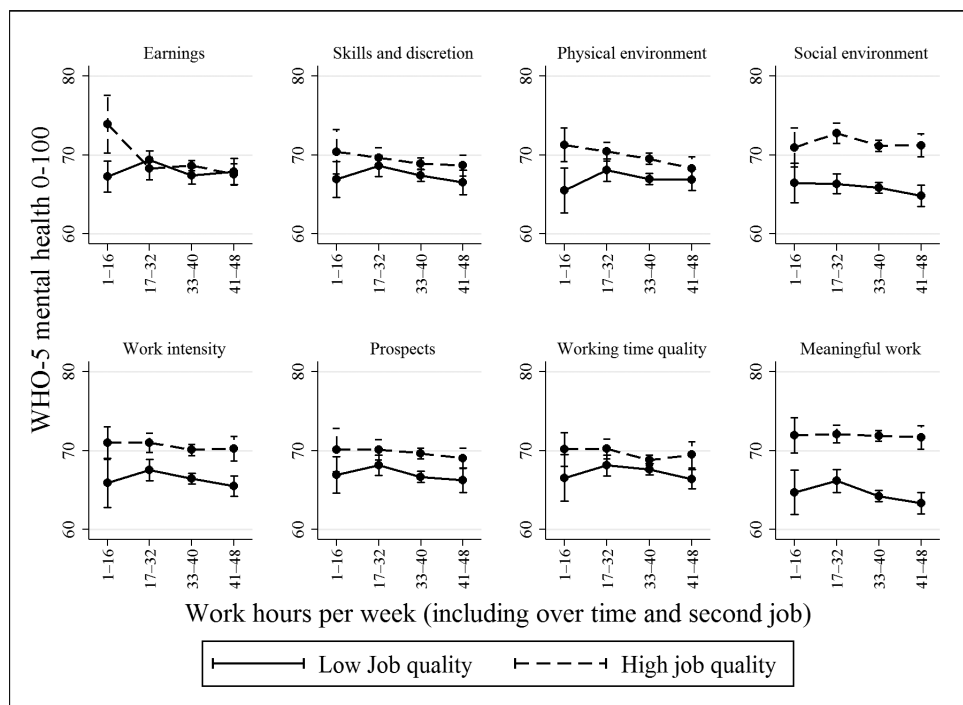


Fig. 3. Interactions between work hours and job quality.

5. Discussion and conclusions

The aim of this article was to contribute to the current debates about shorter working week by examining the relative impact of job quality and job quantity on employees' mental health and the extent to which the effects of job quality depend on people's work hours and work hour match.

The first key finding of this study is that for employees job quality plays a much more important role than job quantity in their mental health. Our results suggest that in general there are no significant differences between different working hour categories in terms of mental health, and there is no also optimum number of working hours at which employees' mental health is at its highest. This finding from 34 European countries is in line with a recent study in the UK on job quantity and mental health which controlled only for a few job quality indicators (Kamerāde *et al.*, 2019). In contrast, people who feel over- and under-employed have worse mental health than those with work hour match. This highlights the importance of considering both actual work hours and work hour preference when examining the effects of job quantity on employees' mental health (Angrave and Charlwood, 2015).

Secondly, we find that job quality makes a considerable difference to employees' mental health. In our study most job quality indexes were highly significant. The exception from this pattern was earnings, which was non-significant. Among other job quality indexes, the meaningful work index, social environment index and work intensity index had the largest effects on mental health compared with the other job quality indexes. In other words, doing meaningful and useful work, having a positive

relationship with colleagues and low work intensity are particularly important for employees' mental health.

Thirdly, we find that the negative effects of under-employment become marginal and non-significant when people work in a job characterised by high levels of skill/discretion or prospects. In contrast, working more hours than one prefers (over-employment) especially in full-time jobs has negative effects on mental health regardless of job quality. These findings confirm the negative mental health impacts of over-employment ([Angrave and Charlwood, 2015](#)) and suggest that good job quality characteristics can compensate the negative effects of under-employment.

Fourth, our study finds that the importance of job quality generally remains similar across different working hour categories for employees. This suggests that employed people could obtain mental health benefits from good job characteristics to a similar degree in micro, part-time and full-time jobs. Consistent with previous research on health effects of long working time ([Bannai and Tamakoshi, 2014](#)), we find that working more than 40 h per week has significantly larger negative effects on mental health compared to full-time work; however, these effects are largely explained by their poor job quality.

Our findings have very important theoretical and policy implications. Firstly, this study facilitates an integration of both job quantity and quality dimensions in the debates of future of work, shorter working week and employees' mental health. The key idea of a shorter working week debates is to reduce the standard working week to four or even less days and to redistribute working time more equally so that the under-employed people could benefit from doing additional work and over-employed people could enjoy more leisure and family time ([Messenger and Ghosheh, 2013](#); [Messenger, 2018](#); [Autonomy, 2019](#); [Kamerāde *et al.*, 2019](#)). Given that current discussions of having over-emphasised that reduced quantity of working would result in better mental health of employees and address other social problems, this article has challenged this assumption and empirically demonstrated that job quality plays a more important role in employees' mental health than job quantity.

Based on our findings we suggest that the theoretical debates on a shorter working week must integrate the job quality into considerations of the future of work. Reduction of the quantity of work in order to move to a society where paid work is less dominant, advocated by 'post-work' and 'anti-work' camps ([Frayne, 2019](#); [Suskind, 2020](#)), alone could have other valuable advantages to reducing working time. For instance, it could lower carbon emissions, increase productivity or improve the quality of parenting; we are not suggesting that the mental health of employees is the only dependent variable of importance in the debates on working time. However, our results indicate that reducing quantity of work alone would not necessarily result in better employees' mental health and well-being. On the contrary, the neglect of job quality in shorter working week debates could lead to poorer employees' mental health and well-being.

According to our findings, three job quality dimensions that are particularly significant for any theoretical model of a shorter working week in European societies are doing meaningful and useful work, quality of social environment and job intensity. These three job quality dimensions have so far received little attention in shorter working week debates. Our results suggest that a shorter working week model should pay particular attention to these three job quality dimensions, highlighting that there are complex trade-offs between working hours and job quality. For example, it has been also argued that compressing work hours, if not organised to protect employees'

interests, could possibly lead to higher work intensity or a harsher social environment where there is less time devoted to treating employees with dignity and making them feel listened to and their voices respected (Burchell *et al.*, 2001). However, the impacts of shorter working time arrangements can vary by occupation. For example, previous research shows that some short hours jobs are created for business reasons deteriorate employees' working conditions, while other reduced-hours work arrangements can help employees achieve better work-life balance (Avgoustaki and Bessa, 2019). Thus, without taking this broader picture, attempts to shorten the working week might lead to a deterioration, not an improvement, in the mental health of employees. By exploring the simultaneous and interactive effects of job quantity and job quality on employees' mental health, this article broadens the perspective of the labour market literature by integrating our understanding of the relationships between shorter working hours, job quality and mental health.

Secondly, this study also makes a significant contribution to the existing policy narrative. Our results suggest that current shorter working week policies require us to pay more attention to importance of job quality – if reductions in hours of work are associated with reductions in job quality, the many benefits for individuals, families, communities and the environment of reducing working time will be more difficult to achieve. This is particularly important considering that part-time jobs have traditionally been seen as non-standard, atypical or poor quality jobs, with lower hourly pay, poor training opportunities and worse promotion prospects than equivalent full-time jobs (Burchell, 2012), and associated with lower well-being and mental health (Kamerāde and Richardson, 2018). Therefore, all of the social partners – employers, government and employee representatives need to prioritise the quality of part-time jobs (including four days a week jobs and reduced-hours full-time jobs) if society is to reap the advantages of shorter working time whilst retaining the benefits of good working life for employees. On an optimistic note, Burchell (2012) finds a clear relationship between the prevalence of part-time working in each EU member state and the desirability of part-time jobs; countries like the Netherlands where part-time working is common had better quality of part-time jobs than countries at the other extreme, such as Greece. This may mean that increasing the prevalence of shorter hours jobs would drive up the quality of those jobs.

Despite important contributions, there are limitations of this study, which could be the potential focus of future research. First, although EWCS is the best available dataset to study various dimensions of job quality, it is a cross-sectional survey based on which we are unable to examine the long-term and dynamic impacts of job quantity and job quality on mental health. However, our findings are consistent with a recent UK study on job quantity and mental health, which used a panel survey but controlled only for a few job quality indicators (Kamerāde *et al.*, 2019). Future research could explore the causal and diverse consequences of changing working hours and job quality on mental health when suitable longitudinal data are available. Secondly, our study was conducted before COVID-19 pandemic and therefore does not consider any possible labour market re-configurations that are happening during and are likely to happen post-pandemic, such as growing inequalities (Beck *et al.*, 2020). However, a recent study in the UK also makes strong case for a shorter standard working week as the way of addressing the mental health challenges of COVID-19 (Burchell *et al.*, 2020).

Taken together, the findings from the current study and from Kamerāde *et al.* (2019) suggest that the avoidance of unemployment should be an overarching priority; once in

employment, it is job quality rather than job quantity that is important for employees' mental health. These findings also hold significant policy implications during the recovery from the Covid-19 crisis. As job quality is more important than quantity, creating more good quality short-hours jobs while considering employees' working time preferences can be a more efficient way to avoid unemployment and protect population mental health than creating poor quality part or full-time jobs. This also echoes a recent study in the UK, which makes strong case for a shorter standard working week as the way of addressing the mental health challenges of COVID-19 (Burchell *et al.*, 2020). If mass unemployment and a reduction in job quality ensues, this will result in mass-misery.

Supplementary data

Supplementary data are available at *Cambridge Journal of Economics* online.

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