Working longer, feeling worse? How job quality shapes the mental health toll of delayed retirement

Alexandra Lugova* Michele Belloni† Bérangère Legendre‡ Jeremy Tanguy§

Abstract

In this paper, we investigate the impact of delayed retirement on late-career depression. We contribute to recent literature by analyzing how this effect varies according to working conditions. We apply a staggered difference-in-differences approach to leverage pension reforms in several European countries, repeated cross-sectional data from the Survey of Health, Ageing and Retirement in Europe (SHARE), and exogeneous data on job quality from the European Working Conditions Survey (EWCS). We find that delaying retirement generally increases depression among older workers, with substantial variation based on job characteristics. Specifically, both male and female workers in lower-skilled, highly-intensive, insecure jobs with poor prospects and unfavorable social environments show a marked increase in depression when required to work longer. In contrast, supportive social conditions, job stability, and good career prospects may lead to less marked or even reversed effects of delayed retirement on depression.

Keywords: mental health, older workers, pension reforms, working conditions
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*Corresponding author. University Savoie Mont Blanc (France), IREGE. E-mail: alexandra.lugova@univ-smb.fr.
†University of Turin (Italy), Dept. of Economics and Statistics "Cognetti de Martiis".
‡University Savoie Mont Blanc (France), IREGE
§University Savoie Mont Blanc (France), IREGE.

1. Introduction

The ageing population poses a significant challenge, threatening the long-term viability of pension systems across the EU. Over the last decades, many countries have introduced reforms extending the working lifespan, thereby decreasing the financial burden on pension systems. However, an often overlooked aspect is the well-being of senior workers, whose mental and physical health can deteriorate toward the end of their careers, linked to the strenuousness and quality of their jobs (Miranti and Li, 2020). Raising the retirement age may lead to a prolonged period during which workers' health may deteriorate, potentially increasing the burden on social protection systems. Deteriorating mental health, in particular, a critical but under-examined factor, not only affects the quality of life of these workers, but also has broader implications for healthcare and unemployment costs (Serrano-Alarcón et al., 2023; Li, 2018) and reduced productivity in the workplace (Burton et al., 2008; Bubonya et al., 2016). In addition, these reforms confront the societal value placed on the preservation of retirement years, considering that a significant portion of the population views retirement as a highly anticipated phase of life.

Previous studies have documented a general decline in mental health among senior workers after increases in retirement age (Bertoni et al., 2023; Serrano-Alarcón et al., 2023; Carrino et al., 2020; de Grip et al., 2009), in certain cases suggesting that this negative effect is concentrated among occupations with particular working conditions, such as high strain (Carrino et al., 2020) or job insecurity (Bertoni et al., 2023). Our study goes further by exploring in detail how different job characteristics modulate this effect, thereby addressing the heterogeneity of experiences across occupational groups. Given that workers' experiences in response to pension reforms vary across occupations, understanding these differential impacts is crucial for designing policy interventions effectively.

In particular, we evaluate the effect of various pension reforms delaying the retirement age between 2011 and 2015 across 14 European countries on the mental health of senior workers, and then provide a detailed analysis of how this effect varies depending on occupational working conditions. Using a wide range of countries and pension reforms ensures that the estimated effects are not specific to a particular context. During the study period, 8 countries raised the retirement age at least once, with increases ranging from 1 year to more than 4 years. Within a country, a pension reform generally applies to all occupations[1], but mental health responses to it are likely to vary from one occupation to another due to differences in working conditions. We exploit comprehensive and exogenous occupation-level country-specific information on working conditions to analyze in depth their role in mental health responses among older workers.

We use individual cross-sectional data from different waves of the Survey of Health, Ageing and Retirement in Europe (SHARE), which provides comprehensive information on health, career and socio-economic characteristics for nationally representative samples

[1] An exception is Italy, where pension reform is applied differently depending on the sector of employment.

of individuals aged 50 and over residing in European countries. We focus on the work horizon, defined as the residual number of years of work required to be eligible for retirement. We compute changes in the work horizon induced by pension reforms between consecutive waves of the survey at the level of cells defined by country and individual characteristics used as pension eligibility criteria. We exploit these changes to assess the effect of extending the work horizon on mental health of senior workers using a staggered difference-in-differences design, which allows us to account for timing differences in policy implementation and heterogeneity of pension systems and labor markets across countries. We then investigate how this effect varies depending on working conditions by retrieving country-specific occupation-level data on working conditions from the European Working Conditions Survey (EWCS).[2] This allows us to describe working conditions of each occupation through six comprehensive job quality indices (skills and discretion, working time quality, physical environment, social environment, intensity, prospects), critical for health and well-being of workers (Fishta and Backé, 2015; Theorell et al., 2015). We then re-estimate the effect of extending the work horizon on the mental health of workers from the occupations with good and bad working conditions in each dimension.

Our findings indicate that extending the work horizon generally worsens mental health among older workers. However, this effect is not uniform: it varies significantly depending on job characteristics. Those in lower-skilled, highly-intensive, insecure jobs with limited prospects and poor social environments are particularly vulnerable, showing a significant increase in depression symptoms. Conversely, supportive working cultures with high-quality management and stable positions with good career prospects may alleviate or even reverse the effect of reforms and reduce late-career depression. These results suggest that labor market policies, by shaping the groundwork for the implementation of pension reforms, can significantly influence their effectiveness. Indeed, the quality of working conditions has the potential to mitigate the negative spillover effects of pension reforms, particularly with regard to the health of late-career workers.

This paper contributes to the literature that studies the effects of delaying the retirement age on the health of older workers. The short-term impact of transitioning from employment to retirement on physical, mental, and cognitive health has been studied extensively (see Filomena and Picchio, 2023). The literature has also explored the effects of retirement on post-retirement health outcomes (see Garrouste and Perdrix, 2022). Comparatively, fewer studies have examined the effect of delayed retirement on pre-retirement health. Studies such as those by Bertoni et al. (2023), Carrino et al. (2020), de Grip et al. (2009), and Serrano-Alarcón et al. (2023) report that delaying retirement can worsen mental health. An increase in the work horizon may indeed impact workers' health by altering the value placed on health investments, while also potentially leading to stress and frustration if the reform is perceived as limiting individuals' control over retirement

[2]Using external data on working conditions helps to avoid potential endogeneity problems related to the justification bias that arises when health and working conditions come from the same data source (Barnay, 2016).

timing (Bertoni et al., 2018; Caroli et al., 2023). In particular, delayed retirement may be perceived as unfair, especially for those close to their retirement age (de Grip et al., 2009). These mechanisms can lead to elevated stress, which is linked to adverse mental health outcomes, such as increased depression symptoms. Two recent studies specify that this damaging effect is concentrated among certain workers with particular working conditions. Exploiting a UK pension reform that increased women's retirement age, Carrino et al. (2020) show that it led to an increase in depression among women exposed to high-strain jobs for a long time. In the study closest to ours, Bertoni et al. (2023) exploit pension reforms in several European countries and find that the resulting longer work horizon is associated with an increase in depression only among workers in occupations with a high risk of automation, characterized by greater job insecurity. This earlier study differs from ours because it focuses on a single dimension of working conditions and relies for this on the information collected directly from the interviewed workers. We contribute to this specific literature by considering various dimensions of working conditions and relying on external occupational-level data on working conditions from the European Working Conditions Survey, which helps us mitigate potential endogeneity bias. This original data combination allows us to confirm the exacerbating effect of delayed retirement on depression in insecure jobs with poor prospects (as in Bertoni et al., 2023), but also to show that a similar effect may be expected for other adverse working conditions. In contrast, we also add to the literature by showing that favorable working conditions may lead to less marked or even reversed effects of delayed retirement on depression.

This paper contributes more generally to the literature examining the relationship between working conditions and workers' health. This literature documents a close relationship, even after controlling for potential socio-economic determinants. There is compelling evidence that certain working conditions negatively impact health, sometimes with a delayed effect. In particular, many studies identify high-strain, low-skilled, or physically demanding jobs as particular risk factors for poor mental health, regardless of retirement age policies (e.g., Cottini and Lucifora, 2013; Cottini and Ghinetti, 2017, 2018; Jones et al., 2011, 2013). In line with this, Belloni et al. (2022), Shai (2018), and Henseke (2018) emphasize that job strain and physical demands are especially detrimental to mental well-being in low-skilled occupations. In this context, altering the work horizon at retirement, all else being equal, is likely to impact workers' mental health. In accordance with this literature, we show that the adverse effects of longer work horizons on mental health are exacerbated among workers faced with higher intensity, lower decision-making authority and lower cognitive demands. However, we find no evidence of a greater deterioration in mental health among workers operating in unfavorable physical environments. Furthermore, our analysis reveals the critical role of the social environment in the mental health response to extensions in the work horizon, a dimension which has been overlooked in previous research.

This paper is also related to the literature on the behavioral responses to pension

reforms from both employees and employers. Such behavioral responses are expected if reforms are implemented in a context where working conditions are known to affect health. Theoretically, extending the working period allows both employees and employers to expect higher returns on investments in employment (Hairault et al., 2010). This should facilitate the development of public policies that support job retention, such as retraining initiatives and occupational health and safety policies. Evidence suggests that such investments may improve job satisfaction, potentially enhancing mental health by providing greater autonomy and professional growth opportunities. For instance, Miranti and Li (2020) indicate that skills training and job adaptations improve job satisfaction, which could mitigate some adverse mental health effects of delayed retirement. On the workers' side, an extended employment horizon is also likely to encourage health capital investment behaviors, as shown in Bertoni et al. (2018).[3] Some workers turn to retraining or skills development to adapt to a longer work horizon (Montizaan et al., 2010; Chinetti, 2024). However, neglecting the heterogeneity in the health status of older workers within a purely theoretical approach overlooks the multiple reasons that may, on the contrary, lead to an increase in work withdrawal as the retirement age rises. As highlighted by Coda Moscarola et al. (2016) and Ben Halima et al. (2022), an extended work horizon may indeed lead to increased sick leaves, signaling potential stress or physical exhaustion as workers attempt to remain active in the labor market. Duggan et al. (2007) and Staubli and Zweimüller (2013) show that older workers may seek unemployment benefits or disability pensions as alternative exit routes.

The remainder of the paper is organized as follows. Section 2 presents the data sources and variable definitions, followed by Section 3, which details our empirical methodology. Sections 4 and **??** discuss the main findings, and Section 6 concludes.

2. Data

2.1 Sample selection

Our study uses the release 9.0.0 of the Survey of Health, Ageing and Retirement in Europe (SHARE). The survey provides comprehensive longitudinal information on socioeconomic status, health, and social and family networks for nationally representative samples of individuals aged 50 and over residing in 28 European countries and Israel. This extensive dataset covers a period during which numerous pension reforms were implemented. We aim to assess the impact of the increase in the retirement age – *i.e.* in the work horizon – on depression among senior workers across successive waves of data collection. For this purpose, we extract individual-level demographic and health data for waves 4 (2011), 5 (2013), and 6 (2015) of SHARE. We treat these data as repeated cross-sections to

[3] Bertoni et al. (2018) find that work horizon extension increases the probability of exercising regularly, having a body mass index below the level indicating obesity, and reporting high satisfaction with one's own health.

retain the largest possible sample size. We exclude retrospective waves 3 and 7, as they do not provide mental health data. Wave 8 is excluded due to the abrupt interruption of fieldwork by the COVID-19 outbreak, and the CORONA surveys because they use different instruments to measure depression.

Following the approach of Bertoni et al. (2023), we group the data in two blocks of waves: i) waves 4 and 5, ii) waves 5 and 6[4], where the first wave is the baseline and the second wave is the end line of the block (see Section 3 for more details). This approach allows us to precisely assign the treatment status of individuals and isolate the impact of pension reforms occurring within each block. As such, some observations appear twice in the resulting dataset: as the end line in the first block and as the baseline in the second block.

We retain only countries present in both waves of one block. In this way, we obtain data for 14 European countries that participated in at least two consecutive waves of SHARE.[5] To ensure that our sample is representative of individuals potentially impacted by pension reforms, we implement several filters. We narrow our focus to individuals aged 50-54, which is less than the minimum retirement age in all countries of interest over the period of study. We exclude those already retired to ensure that the analysis focuses on workers who are still in the labor market, as well as those who are eligible for special pension programs (*e.g.* disability, sickness) as they are likely to be subject to different retirement rules. Using retrospective employment data from Sharelife, we further exclude individuals with less than 10 years of social security contributions as they are likely to be detached from work. In addition, we exclude those with a work horizon of more than 10 years, as their well-being may not yet be affected by retirement age. Finally, some observations are lost due to missing values. The resulting sample consists of 10,394 observations, corresponding to 5,800 senior workers. 48.4% of these workers are female, with an average age of 52.7. On average, they have 1.78 children. 66.1% work in the private sector, 21.1% in the public sector and the rest are self-employed. Detailed descriptive statistics are presented in Table 1.

[4]We do not use waves 1 and 2 of SHARE, as in Bertoni et al. (2023), because only 2-digit occupation codes are available in EWCS before 2010. Therefore, we can only associate information on working conditions to waves 1 and 2 at this aggregated level of occupations, which is not precise enough. However, we attempted to replicate baseline estimates from Bertoni et al. (2023), including waves 1 and 2, and obtained very similar results. Moreover, since most of the major pension reforms took place between waves 4 and 6, we retain sufficient information by focusing on this period.

[5]The 14 countries included in the study are: Austria, Belgium, Czech Republic, Denmark, Estonia, France, Germany, Italy, Luxembourg (only in the second block), Netherlands (only in the first block), Slovenia, Spain, Sweden, Switzerland.

Table 1: Descriptive statistics for the final SHARE sample.

	Mean	SD
Outcome		
Euro-D score (0-12)	2.094	(1.993)
Euro-D score > 3	0.219	
Treatment		
Work horizon in years (WH)	6.814	(2.813)
$\Delta WH > 0$	0.317	
ΔWH if $\Delta WH > 0$	3.299	(1.659)
Covariates defining cells		
Age	52.733	(1.176)
Female	0.484	
Self-employed	0.128	
Civil servant	0.211	
Private employee	0.661	
Contribution years	32.984	(5.745)
No children	0.148	
1 child	0.200	
2 children	0.440	
3 or 4 children	0.200	
5 or more children	0.011	
Observations	10,394	

Note: Statistics computed using calibrated cross-sectional SHARE weights.

2.2 Mental health

We measure mental health with the Euro-D score (Beekman et al., 1999) provided by SHARE. It is a clinical measure of depression introduced in 1999 to harmonize data on late-life depression in Europe.[6] This score measures depression on a 0-12 scale, indicating the number of depressive symptoms an individual has. It covers the following depressive symptoms: depressed mood, pessimism, wishing to die, guilt, lack of sleep, lack of interest, irritability, lack of appetite, fatigue, lack of concentration, lack of pleasure, and tearfulness. Generally, clinical depression is confirmed if the individual has more than 3 of these symptoms (Beekman et al., 1999, 2005). This concerns 21.9% of our sample, within which the average Euro-D score reaches 2.09.

2.3 Work horizon

We turn to the Mutual Information System on Social Protection (MISSOC) and the previous work on summarizing EU pension reforms done by Bertoni et al. (2023, 2021) to

[6]Depression is one of the most prevalent mental health disorders globally, affecting approximately 5% of adults or 280 million people worldwide (Institute of Health Metrics and Evaluation, 2023)).

get detailed information on pension systems and their reforms across European countries. Using external information on retirement age allows us to rule out possible endogeneity issues related to individual retirement choices. Detailed pension eligibility rules for the 14 EU countries over the study period are presented in Appendix A.

Based on the pension eligibility rules, we create cells of individuals who fall under the same pension eligibility criteria in their country and are, therefore, subject to the same pension reforms. As such, cells are defined by age, gender (in many countries), number of children (for the Czech Republic), sector of employment (for Italy), and years of contribution to social security (in many countries). We cluster these cells at the block level, giving a total of 1,732 cell-by-block clusters. For each cell-by-block cluster, we define: 1) the minimum retirement age, which is the lowest age at which the cluster members are eligible to begin receiving retirement benefits in their country, 2) the work horizon, which we define as the residual number of years before the cluster members achieve the minimum retirement age, under the assumption of continuous employment until retirement. Finally, we identify pension reforms that took place in the countries studied within the time frame of each block and calculate the reform-induced extension of work horizon for the affected cell-by-block clusters.

The average minimum retirement age in our sample is 59.55 years, and the average work horizon is 6.81 years. During the study period, 8 of the 14 countries tightened old-age pension eligibility criteria, with an average increase in the minimum retirement age (conditional on positive values) of 3.3 years between two waves of a block. In total, 39.6% of individuals in our sample experienced an increase in their residual work horizon. Table 2 summarizes the reform-induced changes in the work horizon that occurred during the study period.

Table 2: Reform-induced changes in the work horizon by country and block.

	+ 1 year	+ 2 years	+ 3 years	+ $\geqslant$ 4 years
Block 1 (Waves 4-5)	Austria Belgium Czech Republic Estonia Italy Slovenia Spain	Belgium Italy Spain	Belgium Italy Spain	Italy
Block 2 (Waves 5-6)	Austria Belgium Czech Republic Italy Slovenia	Belgium Italy		France

2.4 Working conditions

We use data on working conditions from waves 5 (2010) and 6 (2015) of the European Working Conditions Survey (EWCS). Since its inception in 1990, EWCS has provided a comprehensive overview of working conditions across Europe. The survey aims to evaluate and quantify working conditions for employees and the self-employed on a harmonized basis, analyze relationships among various aspects of these conditions, identify risk groups and contribute to the development of European policies on job quality and employment. The survey covers diverse occupations, sectors, and age groups in 35 countries. It allows us to describe the work landscape in the form of six comprehensive job quality indices: skills and discretion, working time quality, physical environment, social environment, intensity, and prospects. These indices capture objective perspectives on working conditions (Eurofound, 2017), addressing observable job characteristics that directly contribute to meeting workers' needs. They reflect the multidimensional nature of job quality, and each dimension has an independent influence on the health and well-being of workers (Fishta and Backé, 2015; Theorell et al., 2015).[7]

Each index consists of a set of indicators covering different aspects of the corresponding job quality dimension. The physical environment index measures exposure to hazards such as noise, extreme temperatures, repetitive movements, awkward postures and hazardous substances. The social environment index covers adverse social behaviors (*e.g.*, abuse or harassment), social support from coworkers and supervisors, and the quality of management. The skills and discretion dimension assesses cognitive challenges, decision-making freedom, organizational involvement and access to training. Working time quality reflects working hours, schedule flexibility, atypical schedules such as night shifts and working on weekends. Intensity describes high-speed work demands, dependency on others, and emotional regulation at work. Lastly, the prospects index assesses the presence of career advancement opportunities and the risk of losing one's job. The detailed composition of the indices and the corresponding descriptive statistics are presented in Appendix B.

As the structure of surveys slightly varies across waves, we recalculate the social environment and prospects indices to achieve the maximum concordance between the EWCS editions of 2010 and 2015. We also produce an overall job quality index as a sum of the individual indices. We adjust all indices to a 0-100 scale where higher values indicate better working conditions.

Finally, both the EWCS and SHARE databases include ISCO (International Standard Classification of Occupations) codes. This classification, managed by the International Labour Organization (ILO), ensures the comparability of occupational data at the international level. The most aggregated categorization of ISCO (so-called 1-digit ISCO code) ranges from 1 (managers) to 9 (elementary occupations) and 0 representing armed forces personnel. The job categories are thus classified from the most skilled (group 1) to the

[7]The indices were constructed as independent, weakly correlated indicators of different dimensions of job quality (Eurofound, 2017). It allows us to study the effect of each dimension in isolation.

least skilled (group 9). Figure 1 compares the distributions of job quality indices across 1-digit ISCO codes. It shows that while social environment, working time quality, and intensity are relatively evenly distributed across occupation levels, physical environment, skills and discretion, and prospects tend to have higher values for lower ISCO codes, represented by high-skilled occupations.

In our study, we extract job quality indices at the level of country-specific 3-digit ISCO codes, providing a relatively detailed indication of the employment group to which an individual belongs. We then merge these indices with the SHARE data, imposing a minimum requirement of 10 observations per ISCO code within each country to ensure reliability in the aggregated data.[8]

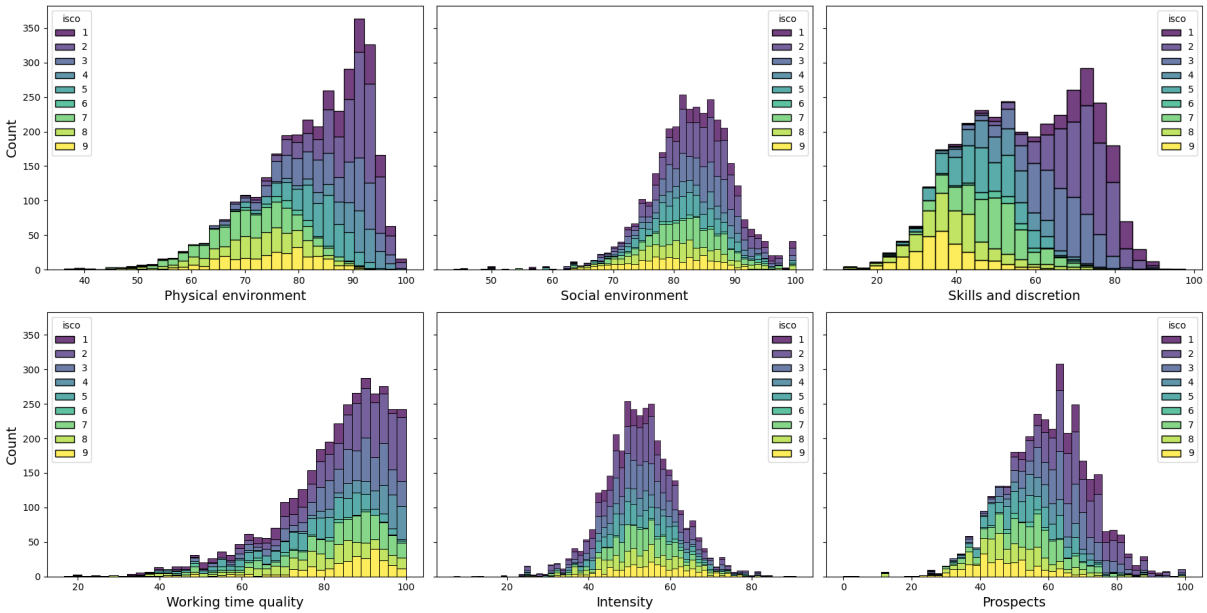


Figure 1: Distribution of values for job quality indices across 1-digit ISCO codes in the final SHARE sample.

3. Empirical strategy

Our empirical strategy focuses on estimating the effects of individual changes in the work horizon caused by pension reforms implemented between 2011 and 2013 (waves 4 and 5 of SHARE) and between 2013 and 2015 (waves 5 and 6 of SHARE) on the Euro-D depression scores. The waves have been grouped into two blocks denoted b: waves 4 and 5, and waves 5 and 6. To assess the effect of the reforms, we use a staggered difference-in-differences design. We estimate the effect by block of waves with the first wave of each block serving as the baseline, and the second wave as the end line. We combine the estimates from two blocks into a single pooled estimate following the approach advocated by Cengiz et al.

[8] After imposing the limitation to have at least 10 observations by ISCO within each country, we are able to cover 54% of the original 4-digit ISCO codes and 80% of the original 3-digit ISCO codes. We believe that 2-digit ISCO codes are not precise enough for our purposes. We, therefore, choose to use 3-digit ISCO codes as they offer a sufficient level of detail while preserving a reasonable amount of information.

(2019) and adopted in a similar setting by Bertoni et al. (2023). As such, we compare changes in the Euro-D score within the blocks of waves across individuals by estimating the following model by ordinary least squares (OLS):

$$Y_{icwb} = \sum_{b} \alpha_b POST_w \times D_b + \beta_{cb} + \gamma \Delta WH_{cb} \times POST_w + \varepsilon_{icwb} \tag{1}$$

In Equation 1, i, c, w, and b stand for individual, cell, wave, and block respectively. The outcome variable is Y_{icwb}, the Euro-D depression score on a 0-12 scale. The treatment variable is ΔWH_{cb}, the reform-induced change in the work horizon expressed in years. $POST_w$ is a dummy variable for the end line wave of each block, the effect of which (α_b) can differ across blocks, indicated by D_b dummy variables. We isolate the effect of pension reforms by including cell-by-block fixed effects (β_{cb}). Within cells, defined by pension eligibility criteria, we consider changes in the work horizon as exogenous. The coefficient of interest is γ. It represents the pooled difference-in-differences effect of a 1-year increase in the work horizon on depression. ε_{icwb} is an error term. Standard errors are clustered at the cell-by-block level and at the individual level.[9]

In addition to the continuous specification of the outcome variable, we estimate the likelihood of passing above the threshold of clinical depression (Euro-D > 3) with a linear probability model. Moreover, we consider a binary specification of the treatment variable – $\mathbb{1}\{\Delta WH > 0\}$ –, as well as a non-linear specification comparing untreated individuals with those experiencing an increase in work horizon of one year – $\mathbb{1}\{\Delta WH = 1\}$ – or more than one year – $\mathbb{1}\{\Delta WH > 1\}$ –, allowing an exploration of the effects according to the scope of the reforms.

To explore how the effect of extending the work horizon on depression varies depending on working conditions, we run a series of models on reduced samples. Specifically, we focus on each of the six job quality indices by splitting our sample into two groups: those above and below the median of each respective index. We then compare the magnitude of the estimated effects and perform the Wald test to assess their statistical equality.

It is necessary to note that, due to the inclusion of cell-by-block fixed effects, we have to exclude 639 singleton cell-by-block groups, primarily from countries where pension eligibility criteria include years of social security contributions, introducing substantial variability in the minimum retirement age. After this adjustment, our sample for baseline regression analysis includes a total of 9,755 observations and 1,093 cell-by-block groups. Further sample reductions occur when merging SHARE and EWCS data due to imperfect matching in ISCO codes coverage across countries. Consequently, our sample for heterogeneity analysis decreases to 7,554 observations and 1,058 cell-by-block groups. Both estimation samples have a proportion of treated individuals that is approximately 2% lower than in the original sample. However, as Table C.1 of Appendix C illustrates, these estimation samples remain closely aligned with the initial SHARE sample, showing only

[9]Clustering errors at the individual level accounts for cases where observations are duplicated due to the block-grouping approach.

minor differences in key characteristics.

4. Results

4.1 Baseline results

Our findings indicate that reforms extending the work horizon have a detrimental impact on late-career mental health. However, the estimated effects are rather modest, with stronger effects found only for larger reforms. Table 3 presents the baseline estimates for different outcome and treatment specifications. Columns (1) to (3) summarize the effects of the different treatment variables on the Euro-D score, which indicates the number of depressive symptoms and ranges from 1 to 12. Columns (4) to (6) specifically focus on the impact of the reforms on the binary risk of depression, defined as the likelihood of reporting at least four depressive symptoms. Specifically, we find that an additional one-year increase in work horizon (ΔWH) leads to a 0.0410 increase in depressive symptoms (Table 3, column (1)). When using the binary treatment specification, $\mathbb{1}\{\Delta WH > 0\}$, the estimated effect is of similar magnitude, but not statistically significant. This could be explained by the fact that the binary specification eliminates variation in treatment intensity, given that 70% of treated individuals faced an increase in retirement age of only one year. To support this hypothesis, we conduct a further analysis using a non-linear specification distinguishing the effect of a one-year increase in the retirement age from the effect of an increase greater than one year (Table 3, column (3)). It reveals that a one-year increase in retirement age has no significant effect, while an increase greater than one year leads to a substantial increase in depressive symptoms, the Euro-D score increasing by 0.2732. The results for the binary outcome specification (Table 3, columns (4)-(6)) are consistent with the findings presented earlier, although less precise, probably due to lower variability in the outcome variable. Only larger reforms ($\Delta WH > 1$) have a significant effect, with the probability of depression increasing by 5.17 percentage points (Table 3, column (6)) among exposed individuals.

Table 3: Baseline results: the difference-in-differences effect of an increase in work horizon on depression.

	(1) Euro-D 0-12	(2) Euro-D 0-12	(3) Euro-D 0-12	(4) Euro-D > 3	(5) Euro-D > 3	(6) Euro-D > 3
ΔWH	0.0410*			0.0072		
	(0.0220)			(0.0049)		
$\mathbb{1}\{\Delta WH > 0\}$		0.0396			-0.0053	
		(0.0950)			(0.0205)	
$\mathbb{1}\{\Delta WH = 1\}$			-0.0452			-0.0260
			(0.1079)			(0.0236)
$\mathbb{1}\{\Delta WH > 1\}$			0.2732**			0.0517**
			(0.1208)			(0.0257)
Mean for control group	2.008	2.008	2.008	0.197	0.197	0.197
Observations	9,755	9,755	9,755	9,755	9,755	9,755
Cell-by-block clusters	1,093	1,093	1,093	1,093	1,093	1,093
Individual clusters	5,516	5,516	5,516	5,516	5,516	5,516

Note: Models include cell-by-block and wave-by-block fixed effects. Errors are clustered at the cell-by-block and individual levels. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

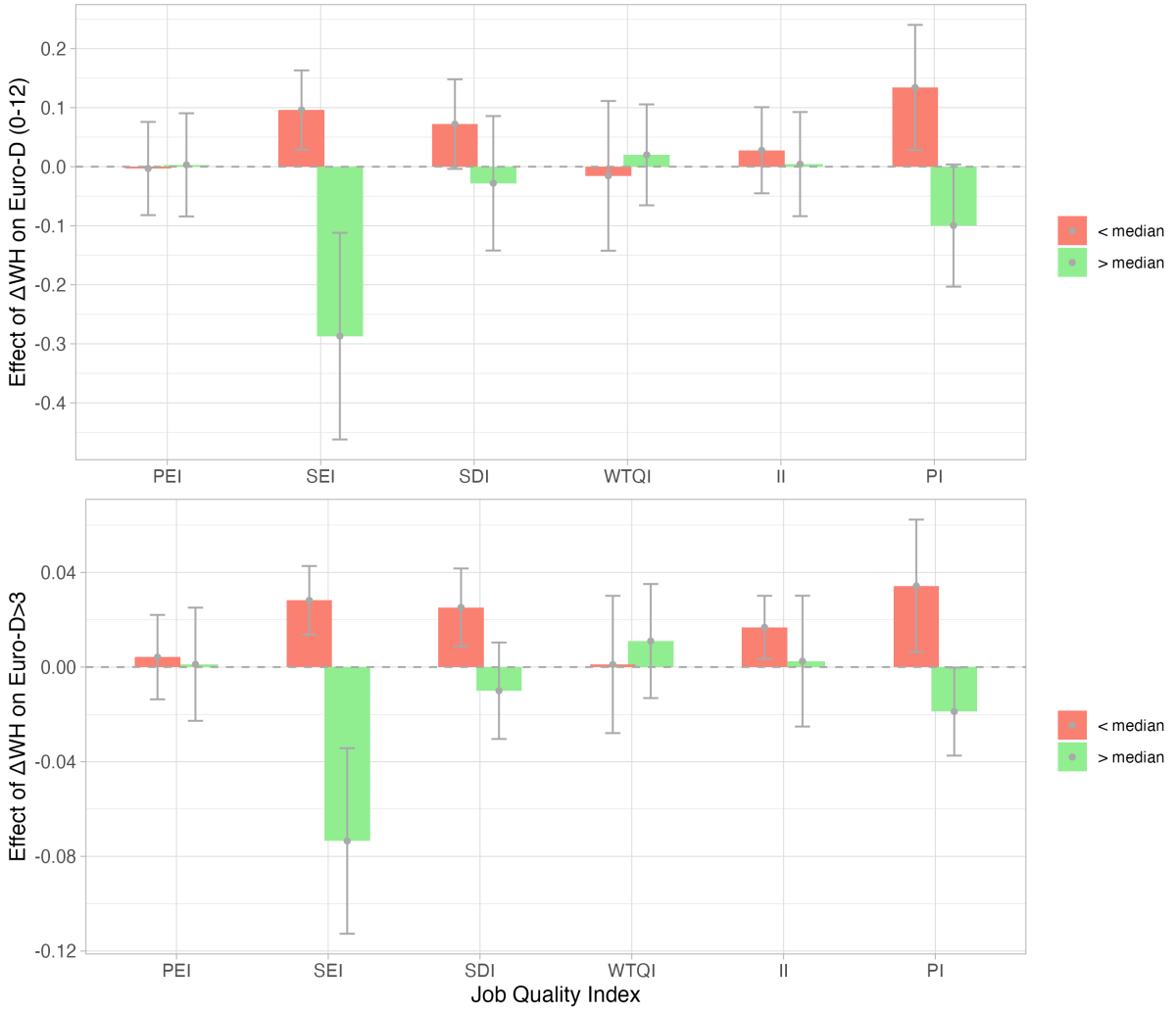
4.2 Heterogeneity analysis

4.2.1 Heterogeneous effects depending on working conditions

The various results related to the analysis of job quality heterogeneity are presented in Appendix D. Table D.1 reports the effects of the treatment variables on the Euro-D score, while Table D.2 focuses on the effects of the treatment variables on the binary risk of depression. There is significant heterogeneity in the effects depending on the working conditions. Both continuous and binary depression indicators reveal a substantial increase in depressive symptoms for individuals exposed to adverse working conditions – including challenging social environments, insecure jobs with poor prospects, and low-skilled highly-intensive jobs – with effects that are double and even triple the baseline estimates. In contrast, extending the work horizon may have strong beneficial effects for workers in occupations with supportive social environments and good prospects. This highlights the dual nature of pension reforms, where extending the work horizon can exacerbate depression for workers in poor conditions, while potentially offering protective effects for those in more favorable environments. Figure 2 compares the effects of work horizon extension on late-career depression depending on different job quality dimensions.

We observe the strongest heterogeneity in effects based on the social environment in

Figure 2: Comparison of heterogeneous effects of a one-year increase in work horizon on depression indicators depending on working conditions.



Note: The points are the estimated effects and the intervals around them are robust 95%-confidence intervals. PEI: Physical Environment Index, SEI: Social Environment Index, SDI: Skills and Discretion Index, WTQI: Working Time Quality Index, II: Intensity Index, PI: Prospects Index.

the workplace. Individuals working in poor social environments – characterized by adverse social behavior, lack of support, and low-quality management – experience a 0.0961 increase in depression symptoms and a 2.82 percentage point increase in the probability of depression in response to a one-year increase in work horizon (Tables D.1 and D.2 respectively, column (1)). These effects intensify with larger increases in work horizon ($\Delta WH > 1$), where depressive symptoms increase by 0.4775 and the probability of depression increases by 12.45 percentage points (Tables D.1 and D.2 respectively, column (4)). In contrast, workers in occupations with supportive social environments experience significant mental health improvements. Specifically, a one-year increase in retirement age reduces depressive symptoms by 0.287 and decreases the probability of depression by 7.4 percentage points (Tables D.1 and D.2 respectively, column (1)). For larger increases in retirement age , the reduction in depressive symptoms is 0.8992, with the probability of depression decreasing by 29.7 percentage points (Tables D.1 and D.2 respectively, column

(4)).

Our results also indicate substantial moderating effects of job prospects. Individuals in occupations with poor job prospects, such as limited career advancement and a higher risk of job loss, experience notable mental health deterioration. For these individuals, a one-year increase in work horizon is associated with a 0.1342 increase in depressive symptoms and a 3.4 percentage point increase in the probability of depression (Tables D.1 and D.2 respectively, column (1)). When the work horizon extends by more than one year, the impact becomes even more severe, with depressive symptoms increasing by 0.7213 and the probability of depression increasing by 15.9 percentage points (Tables D.1 and D.2 respectively, column (4)). In contrast, workers in secure occupations with good career prospects show improved mental health, with depression symptoms decreasing by 0.0997 and the probability of depression falling by 1.9 percentage points (Tables D.1 and D.2 respectively, column (1)). Although the magnitude of the positive effects is more than tripled in the case of longer retirement delays, they are not statistically significant. However, the Wald test confirms a significant difference in the effects experienced by individuals with poor versus good job prospects for both smaller and larger reforms.

Differences also emerge based on skills and discretion level. Among workers in low-skilled occupational grades – characterized by low cognitive demands, minimal decision-making authority, and limited training – a one-year increase in work horizon results in a 0.0721 increase in depressive symptoms and a 2.5 percentage point increase in the probability of depression (Tables D.1 and D.2 respectively, column (1)). When the work horizon is extended by more than one year, the probability of depression increases by 10.9 percentage points (Table D.2, column (4)) and the effects on depressive symptoms become more pronounced, though not statistically significant. In contrast, workers in higher occupational grades experience either less detrimental effects or even beneficial effects, although these effects are also not statistically significant. Only the effects on the probability of depression are significantly different between high- and low-skilled occupations.

Additionally, delaying retirement age increases the probability of depression among workers in highly intensive occupations – those involving high-speed work demands, reliance on others, and high emotional burden. For these workers, the probability of depression increases by 1.7 percentage points following a one-year increase in work horizon and by 8.4 percentage points in the case of an extension of the work horizon greater than one year (Table D.2, columns (1) and (4) respectively). However, the effects observed in continuous outcome specifications and the differences between high- and low-intensity occupations are not statistically significant. Results involving the physical environment and the quality of working time show less consistency, without any clear heterogeneity being observed.

4.2.2 Gender differences

The literature suggests that there are pronounced inequalities in mental health between women and men, with women suffering more often from depression (Riecher-Rössler, 2017; Yu, 2018), which attenuate only toward the age of 60 (Anderson, 2021). Indeed, some authors find gender differences in the effects of reforms extending working life on mental health (*e.g.*, Bertoni et al., 2018; Carrino et al., 2020; Serrano-Alarcón et al., 2023) as well as in the relationship between working conditions and mental health (*e.g.*, Belloni et al., 2022; Bratberg et al., 2020; Hiesinger and Tophoven, 2019).[10] We therefore explore potential gender-specific variations by conducting separate analyses for women and men and comparing the estimates (see Tables D.3 and D.4 of Appendix D). In general, the estimated effects seem to be slightly more pronounced for male workers. However, we find no evidence of gender inequalities, with estimates for the male and female sub-samples being not statistically different.

4.3 Robustness and sensitivity tests

4.3.1 Validity of the parallel trends assumption

We control the validity of the parallel trends assumption by conducting a placebo test which consists of artificially anticipating pension reforms by one block. Table E.1 of Appendix E reports the estimates with the anticipated treatment timing. The absence of significant treatment effects in this setting supports the validity of the parallel trends assumption.

4.3.2 Sample selection

We also assess whether our estimates are influenced by specific sample selection criteria. First, we include individuals retired before their minimum retirement age and treat them as if they were not retired (see Table E.2 of Appendix E). Second, we apply the cell-specific minimum retirement age as the upper age limit instead of focusing only on the 50–54 age group (see Table E.3 of Appendix E). Lastly, we remove the restriction for the residual work horizon to be not longer than 10 years (see Table E.4 in Appendix E). In each case, we estimate models with different specifications, as presented in Section 4.1, and obtain results that are closely aligned with our baseline findings, suggesting that our estimates are robust to variations in sample selection criteria.

4.3.3 Poolability

A potential issue is that our sample includes countries with varying labor market and retirement systems. Moreover, the literature debate on well-being and mental health

[10] Their findings are however contradictory, with some studies showing the effects only for women (Carrino et al., 2020; Serrano-Alarcón et al., 2023; Belloni et al., 2022) and others only for men (Bertoni et al., 2018; Bratberg et al., 2020; Hiesinger and Tophoven, 2019).

throughout the life cycle reveals diverse patterns – U-shape, inverse U-shape, and other relationships (Bell, 2014; Frijters and Beatton, 2012; Blanchflower and Oswald, 2008), suggesting that the end of the career is not universally understood across countries, depending on retirement systems and senior employment policies. Therefore, although estimating a uniform treatment effect across all countries allows to attain a reasonable sample size, it may be restrictive. To address this, we compare estimates obtained by sequentially excluding one country at a time. The estimates remain rather stable across different subsamples for different treatment and outcome specifications (see Tables E.5 and E.6 of Appendix E).

4.3.4 Endogeneity of occupational choice

Workers may self-select into occupations based on their mental health or other unobserved characteristics that may correlate with mental health risks. It may introduce endogeneity into estimates based on working conditions. For instance, workers with better mental health may choose or be able to take on more demanding or stressful jobs, while those with poorer mental health may choose or be forced into less demanding jobs. We control for this potential problem by focusing only on workers who have not changed occupation (defined by 3-digit ISCO codes) in the past 5 years at the time of the first wave of each block. The results do not change significantly (see Table E.7 of Appendix E), suggesting that any changes in mental health within a block are more likely to be related to other factors rather than to occupational choices made by individuals based on their mental health status.

4.3.5 Isolating the effects of individual job quality dimensions

Our approach of analyzing each job quality dimension in isolation may fail to capture the full complexity of occupational environments, as different dimensions are likely to be interdependent. For example, it is possible that individuals with higher skill levels self-select into occupations that perform well across multiple dimensions of job quality, which could lead to a scenario in which workers enjoy "more of everything". To account for this, we perform the heterogeneity analysis by splitting the sample at the median for each dimension of job quality, while simultaneously including all other dimensions of job quality as controls. Furthermore, differences in mental health outcomes may reflect a wealth effect, which may be related to working conditions, rather than the direct impact of working conditions themselves. To control for this wealth effect, we include the monthly earnings index from EWCS [11] as an additional control variable in these models. This approach allows us to isolate the unique contribution of each dimension to the observed effects. The results of this robustness test are presented in Tables E.8 and E.9, in Appendix E. The estimated effects remain highly robust to the inclusion of these additional controls,

[11] This index provides a measure of average monthly earnings, converted into euros, at the country-specific-3-digit ISCO code level.

with minimal changes observed, suggesting that our findings effectively capture the impact of each distinct job quality dimension on depression.

4.3.6 Role of the wealth effect

To further examine the potential influence of the wealth effect, we conduct an additional analysis by comparing our baseline estimates across samples split according to the median of the monthly earnings index (see Table E.10 of Appendix E). People with lower income show a slightly higher increase in the probability of depression. However, these differences remain statistically insignificant. Models with continuous outcome specification reveal no clear differences between low and high income groups. These results confirm that income does not significantly alter the relationship between delayed retirement age and depression.

5. Discussion

5.1 Mental health and social environment

Our findings emphasize that mental health outcomes are strongly influenced by social dynamics, a dimension often overlooked in prior research evaluating the effects of pension reforms. We observe not only a deterioration in mental health among workers in disadvantaged social environments, but also a significant improvement in mental health when retirement age is delayed for individuals employed in supportive workplaces characterized by high-quality management. These findings highlight the critical role of workplace support and camaraderie in mitigating late-career stress, echoing the broader literature on the impact of organizational culture on mental health (Monteiro and Joseph, 2023), which underscores the essential role of a supportive work environment in reducing stress and improving mental health outcomes. Positive organizational cultures, marked by supportive leadership, teamwork, and social support, have been shown to result in better mental health and well-being outcomes, and conversely, poor organizational cultures lead to negative outcomes (Kolomitro et al., 2019; Grant et al., 2007). For example, older workers with mental health problems who work in supportive environments feel comfortable disclosing their problems and accessing short-term disability benefits (Coduti et al., 2015). Management plays a pivotal role in fostering such cultures (Ciulla, 2020; Sergeant and Laws-Chapman, 2012). Conversely, toxic or unsupportive workplace cultures – characterized by poor management, a lack of social support, and high job demands – are associated with increased stress, depression, and burnout (Halbesleben and Rathert, 2008; Nielsen et al., 2017).

5.2 Mental health and job insecurity

We demonstrate that workers in jobs with poor career prospects – characterized by limited advancement opportunities and a high risk of job loss – experience increased levels of

depression when the retirement age is extended. This finding extends the results of Bertoni et al. (2023), who highlight the key role of automation as a proxy for job insecurity in the deterioration of mental health following delayed retirement. The increased risk of job loss associated with automation generates prolonged exposure to uncertainty, which significantly increases levels of depression among affected workers. Those in such vulnerable occupations exhibit more pronounced depressive symptoms when their work horizon is extended, compared to their counterparts in lower-risk occupations. This finding highlights perceived job insecurity as a key mechanism, further intensified by the threats posed by automation. Our findings allow to consider a broader role of job insecurity than through automation, which is a specific instance of a career with little or no prospects. We thus contribute to the extensive literature documenting the negative effects of job insecurity on mental health (*e.g.*, Rönnblad et al., 2019; Llosa et al., 2018; Cottini and Ghinetti, 2018; Gutierrez and Michaud, 2017; Kim and von dem Knesebeck, 2015).

5.3 Autonomy versus job demands

Furthermore, this study highlights the importance of job autonomy and skill utilization, showing that workers with lower decision-making authority and cognitive demands are less able to cope with an extended work horizon. These findings align with the previous results of Belloni et al. (2022) and Carrino et al. (2020), as well as with a large body of literature on workplace autonomy and its impact on well-being. Job autonomy, which refers to the control workers have over their tasks and working conditions, has consistently been identified as a critical resource for managing stress at work (Van Yperen and Snijders, 2000; Bond and Flaxman, 2006; Bond et al., 2008). Health economics studies link greater autonomy to better mental health outcomes and greater overall life satisfaction (Coad and Binder, 2014; Johannsen and Zak, 2020).

We find that job intensity – *i.e.*encompassing workload, time pressure, and mental demands – exacerbates the adverse effects of extending working horizon on mental health. These findings, together with evidence on the importance of job autonomy and skill utilization, align well with the demand-control model proposed by Karasek (1979). According to this model, the highest risk of occupational stress and related health issues, such as depression and cardiovascular disease, occurs when individuals face high job demands (as captured by our intensity index) combined with low control over their job (as reflected by our skills and discretion index) – a condition often referred to as a "high-strain job".

The findings of our study are also aligned with the framework of self-determination theory (Deci and Ryan, 1985; Ryan and Deci, 2000), which posits that competence, autonomy, and social connectedness are essential psychological needs for well-being. These factors play a crucial role in individuals' perception of the meaning of their work. In labor economics, this theory has been applied to explain job satisfaction and retirement decisions. For instance, Nikolova and Cnossen (2020) demonstrate that finding meaning in one's job can delay retirement intentions by up to 2.5 years. Our heterogeneity analysis reflects

this, revealing notable variations in the psychological impact of pension reforms depending on workers' sense of competence, autonomy, and their social environment at work. Specifically, the negative effects of pension reforms on mental health appear to be mitigated when individuals feel empowered or supported in their work. This suggests that the meaning of work – defined by workers' ability to meet these psychological needs – plays a significant role in how pension reforms influence mental health outcomes.

5.4 Labor market policies

The potential negative consequences of pension reforms on late-career mental health extend beyond the loss of individual well-being, impacting labor market productivity (Bubonya et al., 2017) and public finances (Prince et al., 2007), due to increased absenteeism, healthcare and disability costs, and reduced job retention. Mental health considerations should therefore be carefully integrated into the design and implementation of policies aimed at extending working lives.

Beyond the direct implications for pension policy, our findings highlight the critical importance of working conditions as a prerequisite for any successful extension of working life. Although the overall effect of such an extension on the prevalence of depressive symptoms in late career is relatively modest, this average masks significant heterogeneity related to workplace quality. A supportive working environment thus emerges as a key factor in ensuring the success of pension reforms, allowing governments to extend working life to ensure the sustainability of the pension system without exacerbating the risk of premature exit from the labor market.

Pension policies would benefit from being closely aligned with labor market policies designed to create sustainable conditions for extended working lives. This includes workplace safety policies and measures to minimize job strain wherever possible. Adaptating job roles to individuals' skills, experience, and health as they age can also be supported by lifelong learning initiatives that facilitate worker mobility. These initiatives, which improve adaptability and resilience, help workers manage changing job demands at later stages of their careers. By promoting lifelong learning and reducing job strain, such policies can minimize costly early exits from the labor market and enable workers to manage career disruptions and stress that may arise from pension system reforms.

Public policies aimed at improving working conditions not only help to avoid premature retirements and the associated economic costs, but also create an environment in which workers can better withstand the career adjustments made necessary by pension reforms. Beyond the ethical and efficiency considerations that already justify efforts to improve workplace quality, our findings suggest that such measures are a prerequisite for governments seeking to implement policies that extend working lives.

6. Conclusion

Combining data from 14 EU countries from the Survey of Health, Ageing and Retirement in Europe (SHARE) and the European Working Conditions Survey (EWCS), we explore the effects of reforms delaying retirement age on late-career depression. In accordance with previous work (Bertoni et al., 2023; Serrano-Alarcón et al., 2023; Carrino et al., 2020; de Grip et al., 2009), we find that pension reforms extending the work horizon have a negative impact on the mental health of senior workers, specifically by increasing the symptoms of depression.

We contribute to the literature by identifying significant heterogeneity in the effects depending on working conditions. Previous studies have only focused on specific aspects of working conditions, such as high-strain jobs or the risk of automation, without fully considering a broad spectrum of job characteristics. We do this by examining six comprehensive dimensions of job quality, *i.e.*skills and discretion, working time quality, physical environment, social environment, intensity, and prospects. Furthermore, by using external occupation-level data to measure working conditions, we avoid potential endogeneity issues related to self-reporting, thereby strengthening the robustness of our results.

We find that the adverse mental health effects of delaying retirement age among workers in precarious jobs far outweigh those among workers in better working conditions. Workers in low-skilled, highly-intensive, insecure jobs with limited prospects and poor social environments are disproportionately affected by delayed retirement, experiencing double or even triple detrimental effects compared to baseline. In contrast, delaying the retirement age may have positive effects on the mental health of workers who enjoy good working conditions, in particular supportive social environments and secure jobs with good career prospects.

Although the psychological literature provides valuable insights to explain these heterogeneous effects associated with the increase in retirement age, it nevertheless raises crucial questions about the interplay between labor market policies and pension policies. Our results suggest that an extension of working life cannot be achieved without a thorough effort to improve working conditions at later career stages, to limit its harmful effects on mental health and social security expenditure. Labor market policies and the successful implementation of pension reforms are thus deeply interconnected.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendices

A Pension eligibility rules

Table A.1: Retirement age and pension eligibility rules.

Country	Old age retirement	Early retirement	Contribution years
AT	65 males, 60 females	62 males, 57 females 2013: 63 males, 58 females 2015: 64 males, 59 females	15 years - both programs
BE	65 both genders	60 both genders 2015: 61 both genders	35 years - both programs 2013: 38 years - both programs 2015: 40 years - both programs
CZ	62 males, females: 60 if no children, 59 if 1 child, 58 if 2 children, 57 if 3 or 4 children, 56 if 5 or more children 2013: 62 males, females: depending on children, +1 year in each category 2015: 62 males, females: depending on children, +1 year in each category	Up to 2 years before old age retirement	35 years - both programs
DK	65 both genders	60 both genders	Not required
EE	63 males, 61 females 2013: 63 males, 62 females	60 males, 58 females 2013: 60 males, 59 females	15 years - both programs
FR	Both genders: 60 if born in 1952 or earlier, 61 if born in 1953-1954, 62 if born 1955 or later	55 both genders 2015: 60 both genders	Not required
DE	65 both genders 2012: 67 both genders	63 both genders	5 years - both programs

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Table A.1 – *Continued from previous page*

Country	Old age retirement	Early retirement	Contribution years
IT	66 males, 60 females (61 if public sector) 2013: 66 males, females: 66 if public sector, 65 if self-employed, 64 if private sector 2015: 66 males, females: 66 if public sector, 64 if self-employed, 62 if private sector	60 both genders (61 if self-employed) 2013: depends only on contribution years	35 years - both programs, 40 years - regardless of age 2013: 43 years - regardless of age for males, 42 years - regardless of age for females
LU	65 both genders	57 males, 60 females	Not required
NL	65 both genders	60 both genders	Not required
SI	65 males, 63 females 2015: 65 both genders	58 males, 57 females 2015: 59 males, 58 females	Not required
ES	65 both genders	61 both genders	15 years - old age, 30 years - early retirement 2013: 15 years - old age, 33 years - early retirement
SE	65 both genders	61 both genders	Not required
CH	65 males, 64 females	63 males, 62 females	Not required

Note: AT - Austria, BE - Belgium, CZ - Czech Republic, DK - Denmark, EE - Estonia, FR - France, DE - Germany, IT - Italy, LU - Luxembourg, NL - Netherlands, SI - Slovenia, ES - Spain, SE - Sweden, CH - Switzerland

B Job Quality Indices

Table B.1: Composition and summary descriptive statistics of job quality indices for the final SHARE sample.

Index (0-100)	Components	Mean (SD)
Physical environment	*Ambient*	82.499 (9.661)
	Exposure to vibrations from hand tools, machinery	
	Exposure to noise so loud that you would have to raise your voice to talk to people	
	Exposure to high temperatures that make you perspire even when not working	
	Exposure to low temperatures whether indoors or outdoors	
	Exposure to breathing in smoke, fumes, powder or dust	
	Posture related	
	Posture-related painful or tiring positions	
	Carrying or moving heavy loads	
	Repetitive hand or arm movements	
	Biological, chemical conditions	
	Handling or being in direct contact with dangerous substances such as chemicals or infectious materials	
Social environment	*Adverse social behaviour*	79.033 (5.604)
	- In the last month:	
	Exposure to verbal abuse	
	Exposure to unwanted sexual attention	
	Exposure to threats	
	- In the last year:	
	Exposure to physical violence	
	Exposure to sexual harassment	
	Exposure to bullying/harassment	

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Table B.1 – *Continued from previous page*

Index (0-100)	Components	Mean (SD)
	Social support - Management quality: Your immediate boss respects you as a person Your immediate boss provides useful feedback in your work - Social support: Help and support from colleagues (most of the time/always) Help and support from your manager (most of the time/always)	
Skills and discretion	*Cognitive dimension* Solving unforeseen problems Carrying out complex tasks Learning new things Working with computers, smartphones and laptops, etc. (at least a quarter of the time) Ability to apply your own ideas in work *Decision latitude* Ability to choose or change order of tasks Ability to choose or change speed or rate of work Ability to choose or change methods of work Having a say in choice of work colleagues *Organisational participation* Consulted before objectives are set for own work ('always' or 'most of the time') Involved in improving the work organisation or work processes of own department or organisation ('always' or 'most of the time') Ability to influence decisions that are important for your work ('always' or 'most of the time')	54.993 (13.944)

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Table B.1 – *Continued from previous page*

Index (0-100)	Components	Mean (SD)
	Training	
	Training paid for or provided by employer over the past 12 months (or paid by oneself if self-employed)	
	On-the-job training over the past 12 months	
	Trend index score (maximum 100)	
Working time quality	*Duration*	87.138 (8.901)
	Long working hours (48 h or more a week)	
	Long working days (10h or more a day)	
	Atypical working time	
	Night work	
	Saturday work	
	Sunday work	
	Shift work	
	Working time arrangements	
	Set by the company	
	Can choose between different schedules	
	Can adapt working hours	
	Entirely self-determined	
	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	
Intensity	*Quantitative demands*	52.147 (6.785)
	Working at very high speed (three-quarters of the time or more)	
	Working to tight deadlines (three-quarters of the time or more)	
	Enough time to get the job done (never or rarely)	
	Frequent disruptive interruptions	

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Table B.1 – *Continued from previous page*

Index (0-100)	Components	Mean (SD)
	Pace determinants and interdependency Interdependency: three or more pace determinants Work pace dependent on: the work done by colleagues Work pace dependent on: direct demands from people such as customers, passengers, pupils, patients, etc Work pace dependent on: numerical production targets or performance targets Work pace dependent on: automatic speed of a machine or movement of a product Work pace dependent on: the direct control of your boss	
	Emotional demands Hiding your feelings at work (most of the time or always) Handling angry clients, customers, patients, pupils, etc. (three-quarters of the time or more)	
Prospects	*Career prospects* Job offers good prospects for career advancement	57.647 (9.591)
	Job security Might lose job in the next six months	
Overall job quality (sum of indices)		**63.205 (8.316)**

Note: Statistics computed using calibrated cross-sectional SHARE weights.

C Sample descriptive statistics

Table C.1: Descriptive statistics for (1) final SHARE sample, (2) baseline estimation sample, (3) heterogeneity estimation sample.

	(1) Mean (SD)	(2) Mean (SD)	(3) Mean (SD)
Outcome			
Euro-D score (0-12)	2.094 (1.993)	2.104 (1.998)	2.117 (2.009)
Euro-D score > 3	0.219	0.218	0.217
Treatment			
Work horizon in years (WH)	6.814 (2.813)	6.811 (2.832)	6.841 (2.815)
$\Delta WH > 0$	0.317	0.298	0.297
ΔWH if $\Delta WH > 0$	3.299 (1.659)	3.428 (1.674)	3.450 (1.644)
Covariates determining cell			
Age	52.733 (1.176)	52.781 (1.143)	52.775 (1.148)
Female	0.484	0.476	0.472
Self-employed	0.128	0.120	0.122
Civil servant	0.211	0.210	0.199
Private employee	0.661	0.670	0.679
Contribution years	32.984 (5.745)	33.013 (5.657)	32.929 (5.694)
No children	0.148	0.150	0.144
1 child	0.200	0.189	0.200
2 children	0.440	0.444	0.450
3/4 children	0.200	0.206	0.195
5 or more children	0.011	0.012	0.011
Observations	*10,394*	*9,755*	*7,554*

Note: Statistics computed using calibrated cross-sectional SHARE weights.

D Heterogeneity analysis

Table D.1: Heterogeneity of effects depending on working conditions, outcome: Euro-D (0-12).

		ΔWH	$\mathbb{1}\{\Delta WH > 0\}$	$\mathbb{1}\{\Delta WH = 1\}$	$\mathbb{1}\{\Delta WH > 1\}$
Physical environment	**<median**	-0.0031	-0.0555	-0.1045	0.0461
		(0.0403)	(0.1558)	(0.1828)	(0.1991)
	>median	0.0031	-0.1255	-0.2611	0.2420
		(0.0446)	(0.1720)	(0.1975)	(0.2363)
	p-value for equality	*0.9171*	*0.7631*	*0.5608*	*0.5265*
Social environment	**<median**	0.0961***	0.2720*	0.0609	0.4775***
		(0.0342)	(0.1634)	(0.2252)	(0.1705)
	>median	-0.2870***	-0.3237**	-0.2937*	-0.8992**
		(0.0893)	(0.1613)	(0.1656)	(0.4470)
	p-value for equality	*0.0001*	*0.0097*	*0.2052*	*0.0042*
Skills and discretion	**<median**	0.0721*	0.1093	-0.0233	0.3418
		(0.0387)	(0.1706)	(0.1939)	(0.2074)
	>median	-0.0281	-0.1134	-0.1975	0.1700
		(0.0581)	(0.1757)	(0.1966)	(0.2838)
	p-value for equality	*0.1517*	*0.3638*	*0.5286*	*0.6254*
Working time quality	**<median**	-0.0155	-0.2017	-0.3133*	0.0576
		(0.0647)	(0.1635)	(0.1760)	(0.2753)
	>median	0.0201	0.0376	-0.0609	0.2469
		(0.0436)	(0.1868)	(0.2258)	(0.2431)
	p-value for equality	*0.6487*	*0.3836*	*0.3785*	*0.6065*
Intensity	**<median**	0.0278	-0.0469	-0.1734	0.2399
		(0.0372)	(0.1616)	(0.1980)	(0.1962)
	>median	0.0044	-0.0076	-0.0771	0.1529
		(0.0450)	(0.1533)	(0.1708)	(0.2344)

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Table D.1 – *Continued from previous page*

		ΔWH	$\mathbb{1}\{\Delta WH > 0\}$	$\mathbb{1}\{\Delta WH = 1\}$	$\mathbb{1}\{\Delta WH > 1\}$
	p-value for equality	*0.6883*	*0.8601*	*0.7129*	*0.7759*
Prospects	**<median**	0.1342**	0.0949	-0.1752	0.7213***
		(0.0541)	(0.1692)	(0.1771)	(0.2626)
	>median	-0.0997*	-0.2589	-0.2047	-0.3728
		(0.0528)	(0.1717)	(0.2011)	(0.2527)
	p-value for equality	*0.0021*	*0.1429*	*0.9126*	*0.0028*
Overall quality	**<median**	0.0327	0.0111	-0.0778	0.1745
		(0.0266)	(0.1563)	(0.1816)	(0.1609)
	>median	-0.0023	-0.0925	-0.2059	0.3087
		(0.0829)	(0.1830)	(0.2017)	(0.3449)
	p-value for equality	*0.6876*	*0.6672*	*0.6371*	*0.7246*

Note: Models include cell-by-block and wave-by-block fixed effects. Errors are clustered at the cell-by-block and individual levels. * p < 0.1, ** p < 0.05, *** p < 0.01

Table D.2: Heterogeneity of effects depending on working conditions, outcome: Euro-D > 3.

		ΔWH	$\mathbb{1}\{\Delta WH > 0\}$	$\mathbb{1}\{\Delta WH = 1\}$	$\mathbb{1}\{\Delta WH > 1\}$
Physical environment	**<median**	0.0042	-0.0155	-0.0408	0.0370
		(0.0091)	(0.0346)	(0.0415)	(0.0463)
	>median	0.0012	-0.0394	-0.0657	0.0317
		(0.0122)	(0.0375)	(0.0426)	(0.0516)
	p-value for equality	*0.8433*	*0.6387*	*0.6756*	*0.9395*
Social environment	**<median**	0.0282***	0.0757**	0.0309	0.1245***
		(0.0074)	(0.0323)	(0.0359)	(0.0338)
	>median	-0.0735***	-0.0717**	-0.0600*	-0.2974***
		(0.0200)	(0.0353)	(0.0358)	(0.1055)
	p-value for equality	*0.0000*	*0.0022*	*0.0960*	*0.0002*
Skills and discretion	**<median**	0.0252***	0.0368	-0.0046	0.1093***
		(0.0084)	(0.0361)	(0.0409)	(0.0416)
	>median	-0.0100	-0.0167	-0.0206	-0.0034
		(0.0104)	(0.0347)	(0.0393)	(0.0535)
	p-value for equality	*0.0088*	*0.2869*	*0.7782*	*0.0967*
Working time quality	**<median**	0.0011	-0.0197	-0.0409	0.0297
		(0.0148)	(0.0343)	(0.0369)	(0.0593)
	>median	0.0110	-0.0008	-0.0339	0.0696
		(0.0123)	(0.0391)	(0.0442)	(0.0580)
	p-value for equality	*0.6088*	*0.7163*	*0.9031*	*0.6303*
Intensity	**<median**	0.0168**	0.0236	-0.0029	0.0835**
		(0.0068)	(0.0322)	(0.0374)	(0.0349)
	>median	0.0025	-0.0045	-0.0197	0.0308
		(0.0141)	(0.0370)	(0.0417)	(0.0592)

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Table D.2 – *Continued from previous page*

		ΔWH	$\mathbb{1}\{\Delta WH > 0\}$	$\mathbb{1}\{\Delta WH = 1\}$	$\mathbb{1}\{\Delta WH > 1\}$
	p-value for equality	*0.3579*	*0.5675*	*0.7634*	*0.4425*
Prospects	**<median**	0.0343**	0.0427	-0.0073	0.1585**
		(0.0143)	(0.0370)	(0.0389)	(0.0618)
	>median	-0.0188**	-0.0761**	-0.0776*	-0.0730
		(0.0095)	(0.0345)	(0.0426)	(0.0443)
	p-value for equality	*0.0022*	*0.0193*	*0.2235*	*0.0025*
Overall quality	**<median**	0.0177**	0.0196	-0.0128	0.0792**
		(0.0070)	(0.0351)	(0.0411)	(0.0363)
	>median	-0.0164	-0.0510	-0.0629	-0.0089
		(0.0130)	(0.0358)	(0.0403)	(0.0620)
	p-value for equality	*0.0212*	*0.1595*	*0.3843*	*0.2205*

Note: Models include cell-by-block and wave-by-block fixed effects. Errors are clustered at the cell-by-block and individual levels. * p < 0.1, ** p < 0.05, *** p < 0.01

Table D.3: Heterogeneity of effects depending on gender, outcome: Euro-D (0-12).

	(1) Males	(2) Females	*p-value* *for equality*
ΔWH	0.1169*** (0.0424)	0.0127 (0.0461)	*0.0963*
$\mathbb{1}\{\Delta WH > 0\}$	0.1333 (0.1412)	0.0415 (0.1360)	*0.6396*
$\mathbb{1}\{\Delta WH = 1\}$	-0.0808 (0.1580)	0.0062 (0.1465)	*0.6865*
$\mathbb{1}\{\Delta WH > 1\}$	0.5187*** (0.1790)	0.1624 (0.2228)	*0.2129*
Mean for control group	1.682	2.287	
Observations	4,060	5,648	
Cell-by-block clusters	481	697	
Individual clusters	2,326	3,173	

Note: Models include cell-by-block and wave-by-block fixed effects. Errors are clustered at the cell-by-block and individual levels. * p < 0.1, ** p < 0.05, *** p < 0.01

Table D.4: Heterogeneity of effects depending on gender, outcome: Euro-D > 3.

	(1) Males	(2) Females	*p-value* *for equality*
ΔWH	0.0249** (0.0108)	0.0002 (0.0111)	*0.1104*
$\mathbb{1}\{\Delta WH > 0\}$	0.0325 (0.0290)	-0.0151 (0.0308)	*0.2609*
$\mathbb{1}\{\Delta WH = 1\}$	-0.0095 (0.0307)	0.1082** (0.0432)	*0.7011*
$\mathbb{1}\{\Delta WH > 1\}$	-0.0269 (0.0332)	0.0254 (0.0509)	*0.2159*
Mean for control group	0.143	0.244	
Observations	4,060	5,648	
Cell-by-block clusters	481	697	
Individual clusters	2,326	3,173	

Note: Models include cell-by-block and wave-by-block fixed effects. Errors are clustered at the cell-by-block and individual levels. * p < 0.1, ** p < 0.05, *** p < 0.01

E Robustness and sensitivity tests

Table E.1: Placebo test: artificially anticipating reforms by one block.

	(1) Euro-D 0-12	(2) Euro-D 0-12	(3) Euro-D 0-12	(4) Euro-D > 3	(5) Euro-D > 3	(6) Euro-D > 3
ΔWH	0.0162			0.0024		
	(0.0454)			(0.0140)		
$\mathbb{1}\{\Delta WH > 0\}$		0.0056			0.0222	
		(0.1662)			(0.0419)	
$\mathbb{1}\{\Delta WH = 1\}$			-0.0858			0.0173
			(0.2094)			(0.0478)
$\mathbb{1}\{\Delta WH > 1\}$			0.1418			0.0294
			(0.2265)			(0.0679)
Mean for control group	1.990	1.990	1.990	0.194	0.194	0.194
Observations	3,712	3,712	3,712	3,712	3,712	3,712
Cell-by-block clusters	285	285	285	285	285	285
Individual clusters	3,020	3,020	3,020	3,020	3,020	3,020

Note: Models include cell-by-block and wave-by-block fixed effects. Errors are clustered at the cell-by-block and individual levels. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table E.2: The differences-in-differences effect of an increase in work horizon on depression. Including retirees.

	(1) Euro-D 0-12	(2) Euro-D 0-12	(3) Euro-D 0-12	(4) Euro-D > 3	(5) Euro-D > 3	(6) Euro-D > 3
ΔWH	0.0433**			0.0078		
	(0.0213)			(0.0047)		
$\mathbb{1}\{\Delta WH > 0\}$		0.0396			-0.0057	
		(0.0948)			(0.0205)	
$\mathbb{1}\{\Delta WH = 1\}$			-0.0486			-0.0276
			(0.1079)			(0.0237)
$\mathbb{1}\{\Delta WH > 1\}$			0.2793**			0.0537**
			(0.1166)			(0.0246)
Mean for control group	2.007	2.007	2.007	0.197	0.197	0.197
Observations	9,816	9,816	9,816	9,816	9,816	9,816
Cell-by-block clusters	1,100	1,100	1,100	1,100	1,100	1,100
Individual clusters	5,551	5,551	5,551	5,551	5,551	5,551

Note: Models include cell-by-block and wave-by-block fixed effects. Errors are clustered at the cell-by-block and individual levels. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table E.3: The differences-in-differences effect of an increase in work horizon on depression. Setting upper age limits cell-wise.

	(1) Euro-D 0-12	(2) Euro-D 0-12	(3) Euro-D 0-12	(4) Euro-D > 3	(5) Euro-D > 3	(6) Euro-D > 3
ΔWH	0.0456**			0.0053		
	(0.0216)			(0.0047)		
$\mathbb{1}\{\Delta WH > 0\}$		0.0178			-0.0054	
		(0.0593)			(0.0131)	
$\mathbb{1}\{\Delta WH = 1\}$			-0.0452			-0.0157
			(0.0673)			(0.0151)
$\mathbb{1}\{\Delta WH > 1\}$			0.1941**			0.0237
			(0.0935)			(0.0205)
Mean for control group	1.939	1.939	1.939	0.187	0.187	0.187
Observations	26,440	26,440	26,440	26,440	26,440	26,440
Cell-by-block clusters	3,084	3,084	3,084	3,084	3,084	3,084
Individual clusters	11,788	11,788	11,788	11,788	11,788	11,788

Note: Models include cell-by-block and wave-by-block fixed effects. Errors are clustered at the cell-by-block and individual levels. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table E.4: The differences-in-differences effect of an increase in work horizon on depression. Allowing the residual work horizon be longer than 10 years.

	(1) Euro-D 0-12	(2) Euro-D 0-12	(3) Euro-D 0-12	(4) Euro-D > 3	(5) Euro-D > 3	(6) Euro-D > 3
ΔWH	0.0415**			0.0092*		
	(0.0218)			(0.0050)		
$\mathbb{1}\{\Delta WH > 0\}$		0.0356			-0.0024	
		(0.0882)			(0.0191)	
$\mathbb{1}\{\Delta WH = 1\}$			-0.0611			-0.0293
			(0.1013)			(0.0222)
$\mathbb{1}\{\Delta WH > 1\}$			0.2641**			0.0611**
			(0.1153)			(0.0254)
Mean for control group	2.024	2.024	2.024	0.201	0.201	0.201
Observations	11,385	11,385	11,385	11,385	11,385	11,385
Cell-by-block clusters	1,318	1,318	1,318	1,318	1,318	1,318
Individual clusters	6,028	6,028	6,028	6,028	6,028	6,028

Note: Models include cell-by-block and wave-by-block fixed effects. Errors are clustered at the cell-by-block and individual levels. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table E.5: Poolability test: dropping one country at a time, outcome: Euro-D (0-12).

Dropped country	ΔWH	$\mathbb{1}\{\Delta WH > 0\}$	$\mathbb{1}\{\Delta WH = 1\}$	$\mathbb{1}\{\Delta WH > 1\}$
Austria	0.0405*	0.0270	-0.0876	0.2743**
	(0.0217)	(0.1042)	(0.1239)	(0.1210)
Belgium	0.0395**	0.0015	-0.1293	0.3071**
	(0.0199)	(0.0994)	(0.1142)	(0.1188)
Czech Republic	0.0367*	0.0272	-0.0689	0.2626**
	(0.0220)	(0.0999)	(0.1160)	(0.1227)
Denmark	0.0604**	0.1041	0.0194	0.3396***
	(0.0246)	(0.1018)	(0.1129)	(0.1283)
Estonia	0.0616***	0.1580	0.0890	0.3119**
	(0.0234)	(0.1021)	(0.1191)	(0.1225)
France	0.0449	-0.0017	-0.0619	0.4115
	(0.0829)	(0.1058)	(0.1093)	(0.2536)
Germany	0.0283	0.0004	-0.0822	0.2298*
	(0.0209)	(0.0937)	(0.1066)	(0.1218)
Italy	0.0227	-0.0077	-0.0476	0.1432
	(0.0211)	(0.0971)	(0.1086)	(0.1063)
Luxembourg	0.0477**	0.0587	-0.0267	0.2949**
	(0.0226)	(0.0963)	(0.1088)	(0.1219)
Netherlands	0.0408*	0.0387	-0.0462	0.2724**
	(0.0220)	(0.0950)	(0.1079)	(0.1208)
Slovenia	0.0429*	0.0760	-0.0156	0.2684**
	(0.0220)	(0.0967)	(0.1162)	(0.1217)
Spain	0.0345	0.0181	-0.0665	0.2509**
	(0.0225)	(0.0971)	(0.1096)	(0.1237)
Sweden	0.0409*	0.0411	-0.0429	0.2732**
	(0.0224)	(0.0960)	(0.1086)	(0.1225)
Switzerland	0.0380*	0.0307	-0.0536	0.2627**
	(0.0225)	(0.0971)	(0.1098)	(0.1230)

Note: Models include cell-by-block and wave-by-block fixed effects. Errors are clustered at the cell-by-block and individual levels. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table E.6: Poolability test: dropping one country at a time, outcome: Euro-D > 3.

Dropped country	ΔWH	$\mathbb{1}\{\Delta WH > 0\}$	$\mathbb{1}\{\Delta WH = 1\}$	$\mathbb{1}\{\Delta WH > 1\}$
Austria	0.0079	-0.0032	-0.0289	0.0524**
	(0.0049)	(0.0224)	(0.0271)	(0.0256)
Belgium	0.0074	-0.0054	-0.0345	0.0626**
	(0.0047)	(0.0220)	(0.0260)	(0.0273)
Czech Republic	0.0067	-0.0076	-0.0314	0.0505*
	(0.0049)	(0.0215)	(0.0254)	(0.0260)
Denmark	0.0110**	0.0055	-0.0153	0.0633**
	(0.0052)	(0.0219)	(0.0246)	(0.0269)
Estonia	0.0114**	0.0195	0.0025	0.0573**
	(0.0050)	(0.0211)	(0.0248)	(0.0259)
France	0.0027	-0.0157	-0.0291	0.0769
	(0.0174)	(0.0226)	(0.0238)	(0.0529)
Germany	0.0052	-0.0120	-0.0322	0.0444*
	(0.0049)	(0.0206)	(0.0237)	(0.0261)
Italy	0.0029	-0.0159	-0.0264	0.0238
	(0.0049)	(0.0212)	(0.0237)	(0.0223)
Luxembourg	0.0093*	0.0006	-0.0203	0.0584**
	(0.0050)	(0.0207)	(0.0237)	(0.0256)
Netherlands	0.0071	-0.0056	-0.0263	0.0514**
	(0.0049)	(0.0205)	(0.0236)	(0.0257)
Slovenia	0.0071	-0.0055	-0.0324	0.0511**
	(0.0048)	(0.0214)	(0.0260)	(0.0257)
Spain	0.0053	-0.0120	-0.0326	0.0447*
	(0.0050)	(0.0210)	(0.0240)	(0.0263)
Sweden	0.0072	-0.0051	-0.0257	0.0517**
	(0.0050)	(0.0208)	(0.0238)	(0.0261)
Switzerland	0.0064	-0.0075	-0.0279	0.0489*
	(0.0050)	(0.0208)	(0.0239)	(0.0262)

Note: Models include cell-by-block and wave-by-block fixed effects. Errors are clustered at the cell-by-block and individual levels. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table E.7: The differences-in-differences effect of an increase in work horizon on depression. Only individuals with no changes in occupation over the last 5 years at the moment of the first wave of a block.

	(1) Euro-D 0-12	(2) Euro-D 0-12	(3) Euro-D 0-12	(4) Euro-D > 3	(5) Euro-D > 3	(6) Euro-D > 3
ΔWH	0.0370*			0.0078		
	(0.0194)			(0.0050)		
$\mathbb{1}\{\Delta WH > 0\}$		-0.0158			-0.0092	
		(0.1033)			(0.0222)	
$\mathbb{1}\{\Delta WH = 1\}$			-0.1224			-0.0336
			(0.1186)			(0.0254)
$\mathbb{1}\{\Delta WH > 1\}$			0.2841**			0.0595**
			(0.1143)			(0.0271)
Mean for control group	1.960	1.960	1.960	0.190	0.190	0.190
Observations	7,433	7,433	7,433	7,433	7,433	7,433
Cell-by-block clusters	943	943	943	943	943	943
Individual clusters	4,286	4,286	4,286	4,286	4,286	4,286

Note: Models include cell-by-block and wave-by-block fixed effects. Errors are clustered at the cell-by-block and individual levels. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table E.8: Heterogeneity of effects depending on working conditions, outcome: Euro-D (0-12). Including job quality indices as controls.

		ΔWH	$\mathbb{1}\{\Delta WH > 0\}$	$\mathbb{1}\{\Delta WH = 1\}$	$\mathbb{1}\{\Delta WH > 1\}$
Physical environment	**<median**	-0.0048	-0.0745	-0.1293	0.0392
		(0.0425)	(0.1545)	(0.1807)	(0.2059)
	>median	0.0097	-0.1103	-0.2520	0.2741
		(0.0450)	(0.1718)	(0.1970)	(0.2387)
	p-value for equality	*0.8148*	*0.8771*	*0.6464*	*0.4565*
Social environment	**<median**	0.1005***	0.2729*	0.0410	0.4989***
		(0.0346)	(0.1612)	(0.2215)	(0.1704)
	>median	-0.2812***	-0.3298**	-0.3046*	-0.8145*
		(0.0868)	(0.1581)	(0.1626)	(0.4218)
	p-value for equality	*0.0001*	*0.0078*	*0.2090*	*0.0041*
Skills and discretion	**<median**	0.0717*	0.0992	-0.0373	0.3385*
		(0.0372)	(0.1691)	(0.1930)	(0.2036)
	>median	-0.0300	-0.1219	-0.2090	0.1719
		(0.0553)	(0.1739)	(0.1952)	(0.2751)
	p-value for equality	*0.1274*	*0.3623*	*0.5320*	*0.6266*
Working time quality	**<median**	-0.0187	-0.2101	-0.3185*	0.0418
		(0.0633)	(0.1631)	(0.1773)	(0.2696)
	>median	0.0263	0.0532	-0.0494	0.2720
		(0.0444)	(0.1874)	(0.2261)	(0.2451)
	p-value for equality	*0.5614*	*0.2896*	*0.3494*	*0.5277*
Intensity	**<median**	0.0321	-0.0391	-0.1713	0.2606
		(0.0367)	(0.1620)	(0.1967)	(0.1920)
	>median	0.0038	-0.0160	-0.0880	0.1504
		(0.0450)	(0.1519)	(0.1720)	(0.2293)

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Table E.8 – *Continued from previous page*

		ΔWH	$\mathbb{1}\{\Delta WH > 0\}$	$\mathbb{1}\{\Delta WH = 1\}$	$\mathbb{1}\{\Delta WH > 1\}$
	p-value for equality	*0.6185*	*0.9171*	*0.7500*	*0.7128*
Prospects	**<median**	0.1343**	0.0901	-0.1858	0.7295***
		(0.0528)	(0.1680)	(0.1766)	(0.2594)
	>median	-0.0968*	-0.2562	-0.2109	-0.3514
		(0.0523)	(0.1717)	(0.2006)	(0.2512)
	p-value for equality	*0.0020*	*0.1501*	*0.9250*	*0.0029*
Overall quality	**<median**	0.0300	0.0064	-0.0769	0.1597
		(0.0267)	(0.1551)	(0.1800)	(0.1614)
	>median	-0.0030	-0.0942	-0.2097	0.3143
		(0.0804)	(0.1819)	(0.2008)	(0.3373)
	p-value for equality	*0.6976*	*0.6739*	*0.6226*	*0.6796*

Note: Models include cell-by-block and wave-by-block fixed effects. Errors are clustered at the cell-by-block and individual levels. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table E.9: Heterogeneity of effects depending on working conditions, outcome: Euro-D > 3. Including job quality indices as controls.

		ΔWH	$\mathbb{1}\{\Delta WH > 0\}$	$\mathbb{1}\{\Delta WH = 1\}$	$\mathbb{1}\{\Delta WH > 1\}$
Physical environment	**<median**	0.0038	-0.0193	-0.0461	0.0363
		(0.0093)	(0.0345)	(0.0411)	(0.0468)
	>median	0.0030	-0.0354	-0.0637	0.0414
		(0.0123)	(0.0374)	(0.0423)	(0.0524)
	p-value for equality	*0.9592*	*0.7523*	*0.7659*	*0.9427*
Social environment	**<median**	0.0290***	0.0759**	0.0277	0.1229***
		(0.0074)	(0.0320)	(0.0404)	(0.0359)
	>median	-0.0722***	-0.0719**	-0.0609*	-0.2842***
		(0.0201)	(0.0350)	(0.0355)	(0.1079)
	p-value for equality	*0.0000*	*0.0019*	*0.1002*	*0.0004*
Skills and discretion	**<median**	0.0252***	0.0364	-0.0054	0.1097***
		(0.0084)	(0.0361)	(0.0407)	(0.0415)
	>median	-0.0100	-0.0175	-0.0218	-0.0028
		(0.0100)	(0.0346)	(0.0392)	(0.0523)
	p-value for equality	*0.0070*	*0.2810*	*0.7711*	*0.0927*
Working time quality	**<median**	0.0007	-0.0206	-0.0411	0.0271
		(0.0145)	(0.0341)	(0.0370)	(0.0582)
	>median	0.0127	0.0034	-0.0314	0.0776
		(0.0125)	(0.0394)	(0.0441)	(0.0588)
	p-value for equality	*0.5295*	*0.6452*	*0.8662*	*0.5420*
Intensity	**<median**	0.0173***	0.0239	-0.0034	0.0860**
		(0.0066)	(0.0322)	(0.0372)	(0.0342)
	>median	0.0032	-0.0052	-0.0227	0.0352
		(0.0140)	(0.0369)	(0.0418)	(0.0592)

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Table E.9 – *Continued from previous page*

		ΔWH	$\mathbb{1}\{\Delta WH > 0\}$	$\mathbb{1}\{\Delta WH = 1\}$	$\mathbb{1}\{\Delta WH > 1\}$
	p-value for equality	*0.3617*	*0.5523*	*0.7307*	*0.4581*
Prospects	**<median**	0.0342**	0.0413	-0.0097	0.1594**
		(0.0141)	(0.0368)	(0.0388)	(0.0614)
	>median	-0.0178*	-0.0753**	-0.0794*	-0.0668
		(0.0094)	(0.0346)	(0.0426)	(0.0438)
	p-value for equality	*0.0023*	*0.0215*	*0.2272*	*0.0029*
Overall quality	**<median**	0.0173**	0.0189	-0.0126	0.0770**
		(0.0070)	(0.0348)	(0.0408)	(0.0363)
	>median	-0.0165	-0.0511	-0.0632	-0.0084
		(0.0129)	(0.0357)	(0.0402)	(0.0617)
	p-value for equality	*0.0212*	*0.1609*	*0.3776*	*0.2332*

Note: Models include cell-by-block and wave-by-block fixed effects. Errors are clustered at the cell-by-block and individual levels. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table E.10: Heterogeneity of effects depending on monthly income.

	ΔWH	$\mathbb{1}\{\Delta WH > 0\}$	$\mathbb{1}\{\Delta WH = 1\}$	$\mathbb{1}\{\Delta WH > 1\}$
Outcome: Euro-D (0-12)				
Income < median	0.0479	0.0494	-0.0346	0.3379
	(0.0379)	(0.1352)	(0.1439)	(0.2109)
Income > median	0.0496	0.2102	0.2011	0.2269
	(0.0496)	(0.1623)	(0.2025)	(0.2148)
p-value for equality	*0.9912*	*0.4469*	*0.3432*	*0.7127*
Outcome: Euro-D > 3				
Income < median	0.0174*	0.0187	-0.0047	0.0990**
	(0.0089)	(0.0307)	(0.0334)	(0.0445)
Income > median	0.0046	0.0136	0.0104	0.0195
	(0.0068)	(0.0313)	(0.0408)	(0.0353)
p-value for equality	*0.2532*	*0.9074*	*0.7749*	*0.1622*

Note: Models include cell-by-block and wave-by-block fixed effects. Errors are clustered at the cell-by-block and individual levels. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$