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**Working Paper**

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GLO Discussion Paper, No. 796

**Provided in Cooperation with:**
Global Labor Organization (GLO)

*Suggested Citation:* Vandenberghe, Vincent (2021) : Work Beyond the Age of 50. What Role for Mental v.s. Physical Health?, GLO Discussion Paper, No. 796, Global Labor Organization (GLO), Essen

This Version is available at:
https://hdl.handle.net/10419/231438

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# Work Beyond the Age of 50. What Role for Mental v.s. Physical Health?

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Feb. 2021

**Abstract**

This paper contributes to the literature on old employment barriers by exploring empirically the relative importance of mental v.s. physical health in determining work. It combines regression and variance decomposition analyses to quantify the respective role of mental v.s. physical health. The data used are from SHARE and inform in great detail on the health but also work status (i.e. employment and hours) of individuals aged 50+, interviewed between 2004 and 2017 in 21 European countries. The main result of the paper is that of the rather limited role of mental health — in comparison to physical health — in accounting for older individuals' work. The paper also shows that health (physical or mental) is much better at predicting old people's propensity to be in employment than the number of hours they work. Finally, the paper reveals that, in comparison to women, men's work is more driven by their health status.

**Keywords:** Ageing, Work, Mental v.s. Physical Health, Regressions and Variance Decomposition
**JEL Codes:** J22, I10, J26, J14

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# Introduction

This paper is about older individuals' employment and more precisely the barriers they face that may lead to a lower propensity to be in paid employment and/or fewer hours of work. The focus is on the supply side of the labour market, but bearing in mind that when it comes to labour, what we observe is always the result of the interaction of labour supply and labour demand. More exactly, the focus is on the role of health and the "relative" contribution of mental v.s. physical health in determining old people's work. There are, of course, many other barriers to old employment. They will not be examined here. Some of these barriers originate more on the demand side of the labour market (i.e. correspond to some firms' reluctance to employ or recruit older workers) and have been studied by Hutchens (1986), Hutchens (2010), Dorn and Sousa-Poza (2010), Dostie (2011), Skirbekk (2004) or van Ours and Stoeldraijer (2011). Other barriers point at the supply side of the labour market, but should be distinguished from health barriers studied here. Economists have documented the important role of (early)pension schemes and other welfare regimes in enticing people to withdraw early from the labour force (Blöndal and Scarpetta, 1999; Jousten et al., 2010). There is also a large economic literature on joint retirement among dual-worker couples (Michaud et al., 2020).

What is our contribution to the literature on work and health and what are the main elements mobilised in this paper?

First, the main aim of this paper is to quantify the "relative" importance of mental health is driving key dimensions of work beyond the age of 50, namely the participation to employment and the number of hours people work. By "relative" we mean in comparison with physical health. In a sense, the paper is a response to invitations (Layard, 2013) to pay more attention to mental health in labour economics.[1] There are many works of the relationship between physical health and old work or retirement (see French and Jones, 2017 for a recent review), physical health and work capacity (Jousten et al., 2010; Coile et al., 2016; Banks et al., 2016 or Wise, 2017. ) Several papers have studied the role of mental health (Catalano et al., 1999; Lu et al., 2009; Clarfield, 2009; OECD, 2012; Frijters et al., 2010; Frijters et al., 2014). Surprisingly, there are few papers, at least authored by economists, that look simultaneously at physical *and* mental health, and try to quantify the respective contribution to work. One notable exception is the work of Pacheco et al., 2014. These authors find evidence that both types of health matter for employment, but they fall

[1] Our reading of the works of Layard (2013) is that it contains a lot of evidence about the negative impact of poor mental health on well-being, but much less about its impact on work/labour outcomes per se.

short of delivering a proper estimation of their relative importance.

Second, this paper considers both the extensive (employment) and the intensive margin of work (hours worked when in paid employment). Most existing papers only consider the propensity to be in employment, and do not look at the relationship between (physical or mental) health and the number of hours worked.[2]

Third, the focus here is on people aged 50-59. The choice of this age range is driven by data availability.[3] More fundamentally, it is justified by the wish to capture the relationship between (mental) health and employment that exists in the absence of systematic access to (early)retirement benefits i.e. before workers attain eligibility for public pensions and other replacement benefits. As a robustness check, we replicate the analysis by using only individuals aged 50-54, who we assume are even less likely than those aged 55-59 to access (early)retirement benefits.

Fourth, this paper uses a variance decomposition method to quantify (and compare) the contribution of mental v.s. physical health to work past the age of 50. Traditionally, economists rely on the direct comparison of estimated coefficients. But this approach has limitations. One of them is that the underlying metrics differ greatly and compromise interpretation. For instance, when it comes to the propensity to be employed, how to compare the coefficient capturing the contribution of body mass index and those delivered by a categorical variable reflecting people's mental health? To overcome this non-comparability/non-commensurability problem we propose using the method pioneered by Fields (2003) in labour economics, and used more recently by Jusot et al. (2013) in health economics. It consists of combining regression analysis and variance decomposition. Fields (2003) shows how regression models can be supplemented by variance decomposition analyses to learn the relative importance of different explanatory factors.[4] In regression analyses, the emphasis is on coefficients and statistical significance; in decompositions, it is on the information content of the variables in question. In short, the idea is to consider the variance of labour outcomes (employment or hours) explained by the different groups of variables of the model, singularly physical and/or mental health, and compute the respective shares that can be attributed to each group. The ratio of these shares provides an estimate of the relative importance of

[2]The paper of Pacheco et al. (2014) only considers employment. On the relationship between health and hours, a relatively recent OECD survey (OECD and Union, 2016) only mentions Pelkowski and Berger (2004) and Moran et al. (2011). Both conclude to a negative impact of physical health on hours.

[3]We use the Survey of Health, Ageing and Retirement in Europe (SHARE) Börsch-Supan et al., 2013 (more on this below) which only contains respondents older than 50.

[4]The term "decomposition" has been used in this sense in many early studies in the literature on inequality decomposition by factor components (e.g. Shorrocks, 1982).

mental v.s. physical health in driving work beyond the age of 50.

Fifth and finally, it is worth stressing that we quantify the contribution of mental v.s/ physical health simultaneously for 21 countries (AUT, BEL, CHE, CZE, DEU, DNK, ESP, EST, FRA, GRC, HRV, HUN, IRL, ISR, ITA, LUX, NLD, POL, PRT, SVN, SWE). And compared to many existing works on health and work this one has the advantage that it uses only one fully-harmonised data set, i.e. the Survey of Health, Ageing and Retirement in Europe (SHARE).[5]

The rest of this paper is organised as follows. In Section 1, we present our method of analysis. The SHARE data on physical and mental health used in this empirical paper are presented in Section 2. Section 3 presents the main results of the paper, the robustness checks, as well as our discussion of the magnitude of attenuation and "justification" biases, Section 4 concludes.

# 1 Methodology

The first step of the analysis consists of estimating, using data on individuals $i$ in country $j$, the relationship between labour outcomes ($EMPL$ or $HOURS$) and items reflecting physical ($PHEALTH$) or mental health ($MHEALTH$).

$$Z_{i,j} = \beta_0^Z + \beta_p^Z PHEALTH_{i,j} + \beta_m^Z MHEALTH_{i,j} + \gamma^Z X_{i,j} + \delta_j^Z + \epsilon_{i,j}^Z \tag{1}$$

with $Z = EMPL, HOURS$, $X_{i,j}$ a list of controls and $\delta_j$ the country fixed effects.

The above model can be specified with ($PHEALTH$) and ($MHEALTH$) being $i$) indices aggregating the many items in SHARE describing people's health, or $ii$) vectors containing the full list of items underpinning these indices. In this paper, the model is estimated using OLS, or Probit as employment ($EMPL$) is a binary labour outcome. The point is that, in a second step, we can use the model-predicted labour outcomes as inearly decomposable measures in both physical and mental health.

$$\hat{Z}_{i,j} = \hat{\beta}_0^Z + \hat{\beta}_p^Z PHEALTH_{i,j} + \hat{\beta}_m^Z MHEALTH_{i,j} + \hat{\gamma}^Z X_{i,j} + \hat{\delta}_j^Z \tag{2}$$

[5] Börsch-Supan et al. (2013).

with $Z = EMPL, HOURS$

The respectively physical v.s. mental health predicted parts are given by

$$\hat{Z}^p_{i,j} = \hat{\beta}^Z_p PHEALTH_{i,j} \tag{3}$$

$$\hat{Z}^m_{i,j} = \hat{\beta}^Z_m MHEALTH_{i,j} \tag{4}$$

with $Z = EMPL, HOURS$

And the parts to be attributed to the control variables and to the country fixed effects correspond to

$$\hat{Z}^X_{i,j} = \hat{\gamma}^Z X_{i,j} \tag{5}$$

$$\hat{Z}^\delta_{i,j} = \hat{\delta}^Z_j \tag{6}$$

with $Z = EMPL, HOURS$

Following Fields (2003) and Jusot et al. (2013), we propose quantifying the contribution of physical v.s. mental health to labour outcomes using the variance of the model-predicted labour outcomes ($\sigma(\hat{Z}_{i,j})$) as a reference. That variance is decomposable by sources. And the decomposition has certain properties.[6] Whatever the exact list of health variables, or estimation method used (OLS, Probit) for estimating eq. 1, the decomposition of the model-explained variance is simply given by the covariance between each regressor (or group of regressors) and the labour market outcome of interest.

$$\sigma(\hat{Z}_{i,j}) = cov(\hat{Z}_{i,j}, \hat{Z}^p_{i,j}) + cov(\hat{Z}_{i,j}, \hat{Z}^m_{i,j}) + cov(\hat{Z}_{i,j}, \hat{Z}^X_{i,j}) + cov(\hat{Z}_{i,j}, \hat{Z}^{\delta_j}_{i,j}) \tag{7}$$

with $Z = EMPL, HOURS$

And the relative importance of mental v.s. physical health in predicting labour outcomes can be expressed as

[6] Symmetry, independence of the level of disaggregation, consistent decomposition and population symmetry.

$$ratio^Z = cov(\hat{Z}_{i,j}, \hat{Z}^m_{i,j})/(cov(\hat{Z}_{i,j}, \hat{Z}^m_{i,j}) + cov(\hat{Z}_{i,j})\hat{Z}^p_{i,j}) \quad (8)$$

with $Z = EMPL, HOURS$

# 2 Data

To implement the above analysis, this paper uses microdata from waves 1,2 and 4 to 7 of the SHARE survey covering the years 2004 to 2017 with 2-year intervals.[7] All retained individuals are aged 50-59 and lead to a total of 61,666 observations (individuals $X$ waves; Table 1). Data limitations of different sorts (missing values for one of the key dimensions of our analysis...) explain that we retain only 21 out of the 29 participating countries (AUT, BEL, CHE, CZE, DEU, DNK, ESP, EST, FRA, GRC, HRV, HUN, IRL, ISR, ITA, LUX, PRT, SVN, SWE)

SHARE contains a rich set of items describing people's work (incl. their employment status and hours of work) but also their physical and mental health status. In SHARE, the numerous physical health items can be split in two broad categories: "subjective" (Table 2) and "objective" (Table 3). Most physical health items in SHARE are self-reported/subjective (Table 2) but many also explicitly refer to conditions diagnosed by health professionals (heart attack, hypertension, cholesterol, stroke, diabetes, lung disease, cancer) or measured by the SHARE interviewers like the maximum grip strength of respondents (see two columns before last of Table 3).

In SHARE mental ill-health essentially means depression. The latter is characterised by melancholy, diminished interest, sleep disorders or suicidal thoughts. The detailed list of items used to assess mental health is reported in Table 4. It logically covers the above-listed dimensions of respondents' mood or feelings. They represent depressive symptoms that, once taken together, give a fair idea of people's mental health. The 12 items are those used to build the EURO-D scale which has been validated in earlier cross-European studies of depression prevalence (Prince et al., 1999, Guerra et al., 2015).

Hereafter we will make use of the multiple items describing physical and mental health but also of indices. These are computed as the first principal components of the separate items listed in Tables 2, 3, 4. The computed index is always reported in the last column.

[7] Wave 3 contains life histories only, and is of no use here.

Table 8 in the Appendix describes the control variables that together with country and wave/year fixed effects form $X_{i,j}$ in eq. 1; namely the respondent highest educational attainment, the fact that she/he is single and has a (first-generation) immigration background. Finally, summary statistics about our two labour outcome variables (employment and hours) are also available in the Appendix (Table 9).

Table 1: SHARE data. Respondents aged 50-59[a] by country (lines) and wave[b] (col.)

| | (Waves) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 4 | 5 | 6 | 7 | Total |
| AUT | 209 | 245 | 1,317 | 896 | 472 | 6 | 3,145 |
| BEL | 754 | 1,037 | 1,743 | 1,693 | 1,616 | 33 | 6,876 |
| CHE | 153 | 472 | 1,177 | 765 | 518 | 13 | 3,098 |
| CZE | - | 901 | 1,375 | 1,126 | 729 | 13 | 4,144 |
| DEU | 437 | 749 | 254 | 1,779 | 1,134 | 11 | 4,364 |
| DNK | 306 | 893 | 793 | 1,349 | 1,118 | 41 | 4,500 |
| ESP | 354 | 589 | 865 | 1,466 | 885 | 28 | 4,187 |
| EST | - | 0 | 1,693 | 1,113 | 1,186 | - | 3,992 |
| FRA | 497 | 855 | 1,623 | 1,046 | 865 | 22 | 4,908 |
| GRC | 473 | 1,095 | - | - | 1,166 | 109 | 2,843 |
| HRV | - | - | - | - | 730 | - | 730 |
| HUN | - | - | 930 | - | - | - | 930 |
| IRL | - | 297 | - | - | - | - | 297 |
| ISR | 456 | 613 | - | 439 | 205 | - | 1,713 |
| ITA | 392 | 751 | 763 | 1,072 | 1,168 | 28 | 4,174 |
| LUX | - | - | - | 553 | 476 | - | 1,029 |
| NLD | 552 | 886 | 688 | 1,035 | - | - | 3,161 |
| POL | - | 905 | 369 | - | 406 | 23 | 1,703 |
| PRT | - | - | 589 | - | 316 | - | 905 |
| SVN | - | - | 854 | 752 | 867 | - | 2,473 |
| SWE | 490 | 647 | 210 | 735 | 402 | 10 | 2,494 |
| Total | 5,073 | 10,935 | 15,243 | 15,819 | 14,259 | 337 | 61,666 |

Source: SHARE 2004-2017

[a]: We exclude respondents younger than 50.

[b]: Wave 1 [2004], Wave 2 [2007], Wave 4 [2011], Wave 5 [2013], Wave 6 [2015], Wave 7 [2017]. Wave 3 [2009] only contains life histories and is not used here.

Table 2: Physical health (subjective) items and indices[g]: individuals aged 50-59. Country averages

| | General health[a] | Long-term illness[b] | Limited in activities[c] | # Limitations (daily living)[d] | Limitations (instrumental)[e] | Subjective health index[g] |
|---|---|---|---|---|---|---|
| AUT | 2.71 | 0.40 | 2.52 | 0.07 | 0.13 | -0.41 |
| BEL | 2.78 | 0.40 | 2.53 | 0.12 | 0.16 | -0.37 |
| CHE | 2.44 | 0.30 | 2.69 | 0.04 | 0.07 | -0.65 |
| CZE | 3.07 | 0.43 | 2.45 | 0.08 | 0.13 | -0.21 |
| DEU | 2.98 | 0.52 | 2.47 | 0.08 | 0.10 | -0.23 |
| DNK | 2.31 | 0.44 | 2.63 | 0.07 | 0.10 | -0.63 |
| ESP | 2.92 | 0.36 | 2.76 | 0.06 | 0.09 | -0.42 |
| EST | 3.50 | 0.59 | 2.40 | 0.15 | 0.17 | 0.09 |
| FRA | 2.88 | 0.34 | 2.61 | 0.09 | 0.11 | -0.39 |
| GRC | 2.44 | 0.22 | 2.84 | 0.03 | 0.06 | -0.73 |
| HRV | 2.98 | 0.48 | 2.53 | 0.08 | 0.08 | -0.27 |
| HUN | 3.44 | 0.60 | 2.38 | 0.15 | 0.27 | 0.09 |
| IRL | 2.18 | 0.30 | 2.77 | 0.12 | 0.10 | -0.78 |
| ISR | 2.71 | 0.41 | 2.68 | 0.07 | 0.23 | -0.45 |
| ITA | 2.82 | 0.28 | 2.73 | 0.05 | 0.07 | -0.48 |
| LUX | 2.76 | 0.41 | 2.54 | 0.07 | 0.09 | -0.40 |
| NLD | 2.72 | 0.43 | 2.38 | 0.06 | 0.13 | -0.36 |
| POL | 3.42 | 0.53 | 2.44 | 0.15 | 0.14 | 0.02 |
| PRT | 3.42 | 0.44 | 2.51 | 0.16 | 0.16 | -0.04 |
| SVN | 2.98 | 0.39 | 2.55 | 0.11 | 0.10 | -0.30 |
| SWE | 2.42 | 0.46 | 2.56 | 0.07 | 0.11 | -0.54 |

Source: SHARE 2004-2017
[a]: 1(good)-5(bad) European scale
[b]: Yes (1) No (0).
[c]: Limited in activities because of health [3(no)-1 scale(severely) scale].
[d]: Number of limitations with activities of daily living(0-6 scale).
[e]: Number of imitations with instrumental activities of daily living(0-9 scale).
[g]: First principal component of a-e items (the higher, the worse is people' s perceived health). Principal component analysis is carried with all countries pooled. Displayed values correspond to the predicted score values divided by standard deviation.

Table 3: Physical health (Objective, doctor-diagnosed conditions or surveyor measurements) items and indices[c]: individuals aged 50-59. Country averages

| | Heart attack | Hypertens. | Cholest. | Stroke | Diabetes | lung disease | Cancer cancer | Ulcer | Parkinson | Cataract | Hip frac. | Other frac. | Alzheimer senility | Mobility limit.[a] | Max. strength grip[b] | Objective health index[c] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AUT | 0.05 | 0.28 | 0.15 | 0.01 | 0.08 | 0.04 | 0.02 | 0.04 | 0.00 | 0.01 | 0.01 | 0.37 | 0.19 | 0.88 | 38.47 | -0.46 |
| BEL | 0.04 | 0.25 | 0.24 | 0.02 | 0.07 | 0.05 | 0.03 | 0.06 | 0.00 | 0.01 | 0.01 | 0.32 | 0.15 | 1.01 | 38.59 | -0.38 |
| CHE | 0.03 | 0.18 | 0.10 | 0.01 | 0.04 | 0.03 | 0.03 | 0.02 | 0.00 | 0.01 | 0.01 | 0.51 | 0.13 | 0.44 | 38.50 | -0.76 |
| CZE | 0.06 | 0.35 | 0.17 | 0.02 | 0.08 | 0.05 | 0.03 | 0.05 | 0.00 | 0.02 | 0.01 | 0.33 | 0.18 | 0.93 | 37.91 | -0.35 |
| DEU | 0.05 | 0.30 | 0.14 | 0.02 | 0.07 | 0.06 | 0.05 | 0.03 | 0.00 | 0.02 | 0.00 | 0.33 | 0.19 | 0.92 | 39.19 | -0.43 |
| DNK | 0.05 | 0.22 | 0.16 | 0.02 | 0.04 | 0.05 | 0.03 | 0.03 | 0.00 | 0.02 | 0.01 | 0.38 | 0.19 | 0.61 | 40.73 | -0.57 |
| ESP | 0.03 | 0.22 | 0.22 | 0.01 | 0.08 | 0.04 | 0.02 | 0.03 | 0.00 | 0.02 | 0.01 | 0.39 | 0.18 | 0.74 | 33.67 | -0.45 |
| EST | 0.09 | 0.32 | 0.16 | 0.02 | 0.07 | 0.06 | 0.03 | 0.08 | 0.00 | 0.02 | 0.01 | 0.32 | 0.15 | 1.22 | 38.34 | -0.32 |
| FRA | 0.04 | 0.20 | 0.16 | 0.01 | 0.07 | 0.03 | 0.03 | 0.03 | 0.00 | 0.02 | 0.01 | 0.39 | 0.14 | 0.89 | 36.86 | -0.51 |
| GRC | 0.03 | 0.19 | 0.18 | 0.01 | 0.06 | 0.02 | 0.02 | 0.05 | 0.00 | 0.01 | 0.01 | 0.47 | 0.11 | 0.74 | 35.58 | -0.59 |
| HRV | 0.08 | 0.32 | 0.18 | 0.02 | 0.07 | 0.03 | 0.04 | 0.05 | 0.00 | 0.01 | 0.00 | 0.37 | 0.15 | 1.19 | 37.93 | -0.37 |
| HUN | 0.13 | 0.44 | 0.21 | 0.05 | 0.12 | 0.07 | 0.04 | 0.10 | 0.00 | 0.02 | 0.03 | 0.23 | 0.18 | 1.70 | 36.49 | 0.00 |
| IRL | 0.03 | 0.18 | 0.23 | 0.01 | 0.05 | 0.01 | 0.04 | 0.06 | 0.00 | 0.00 | 0.02 | 0.43 | 0.08 | 0.68 | 36.65 | -0.57 |
| ISR | 0.06 | 0.27 | 0.30 | 0.01 | 0.16 | 0.02 | 0.03 | 0.03 | 0.00 | 0.02 | 0.00 | 0.39 | 0.15 | 0.86 | 31.92 | -0.31 |
| ITA | 0.04 | 0.25 | 0.16 | 0.01 | 0.05 | 0.03 | 0.02 | 0.03 | 0.00 | 0.01 | 0.00 | 0.43 | 0.14 | 0.68 | 35.93 | -0.56 |
| LUX | 0.04 | 0.25 | 0.26 | 0.01 | 0.07 | 0.05 | 0.06 | 0.05 | 0.00 | 0.02 | 0.01 | 0.27 | 0.15 | 0.97 | 37.06 | -0.33 |
| NLD | 0.04 | 0.20 | 0.13 | 0.02 | 0.06 | 0.06 | 0.03 | 0.02 | 0.00 | 0.01 | 0.00 | 0.42 | 0.19 | 0.77 | 38.99 | -0.58 |
| POL | 0.09 | 0.32 | 0.17 | 0.02 | 0.07 | 0.03 | 0.02 | 0.07 | 0.00 | 0.02 | 0.01 | 0.30 | 0.22 | 1.29 | 36.75 | -0.28 |
| PRT | 0.05 | 0.34 | 0.35 | 0.03 | 0.12 | 0.06 | 0.04 | 0.06 | 0.00 | 0.02 | 0.01 | 0.23 | 0.19 | 1.54 | 32.62 | -0.03 |
| SVN | 0.05 | 0.30 | 0.19 | 0.02 | 0.08 | 0.03 | 0.03 | 0.06 | 0.00 | 0.02 | 0.01 | 0.38 | 0.14 | 1.10 | 38.68 | -0.42 |
| SWE | 0.04 | 0.23 | 0.11 | 0.01 | 0.05 | 0.03 | 0.03 | 0.02 | 0.00 | 0.02 | 0.01 | 0.41 | 0.22 | 0.65 | 39.34 | -0.60 |

Source: SHARE 2004-2017

[a]: Number of limitations (measured by interviewer)

[b]: 0-100 (measured by interviewer)

[c]: First principal component of all items (the higher, the worse is people' s health). Principal component analysis is carried with all countries pooled. Displayed values correspond to the predicted score values divided by standard deviation.

Table 4: Mental health items and indices[b]: individuals aged 50-59. Country averages

| | Depression[a] | Pessimism[a] | Suicidality[a] | Guilt[a] | Sleep[a] (lack of) | Interest[a] (lack of) | Irritability[a] | Appetite[a] (lack of) | Fatigue[a] | Concentration[a] (lack of) | Enjoyment[a] (lack of) | Tearfulness[a] | Mental health index[b] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AUT | 0.34 | 0.07 | 0.04 | 0.06 | 0.28 | 0.04 | 0.24 | 0.06 | 0.21 | 0.10 | 0.14 | 0.23 | -0.28 |
| BEL | 0.41 | 0.11 | 0.09 | 0.11 | 0.37 | 0.07 | 0.31 | 0.09 | 0.34 | 0.20 | 0.08 | 0.35 | 0.04 |
| CHE | 0.43 | 0.06 | 0.05 | 0.06 | 0.29 | 0.04 | 0.31 | 0.05 | 0.26 | 0.10 | 0.05 | 0.24 | -0.21 |
| CZE | 0.41 | 0.15 | 0.08 | 0.08 | 0.32 | 0.06 | 0.27 | 0.06 | 0.29 | 0.11 | 0.05 | 0.20 | -0.15 |
| DEU | 0.46 | 0.05 | 0.05 | 0.06 | 0.37 | 0.06 | 0.32 | 0.05 | 0.30 | 0.13 | 0.10 | 0.25 | -0.11 |
| DNK | 0.33 | 0.03 | 0.03 | 0.12 | 0.33 | 0.06 | 0.27 | 0.05 | 0.32 | 0.11 | 0.05 | 0.20 | -0.24 |
| ESP | 0.32 | 0.16 | 0.06 | 0.06 | 0.28 | 0.10 | 0.24 | 0.06 | 0.31 | 0.14 | 0.09 | 0.25 | -0.15 |
| EST | 0.50 | 0.19 | 0.05 | 0.16 | 0.41 | 0.08 | 0.42 | 0.06 | 0.46 | 0.09 | 0.10 | 0.22 | 0.11 |
| FRA | 0.49 | 0.17 | 0.11 | 0.12 | 0.39 | 0.08 | 0.39 | 0.08 | 0.34 | 0.18 | 0.09 | 0.28 | 0.13 |
| GRC | 0.29 | 0.14 | 0.03 | 0.07 | 0.18 | 0.12 | 0.27 | 0.07 | 0.24 | 0.14 | 0.12 | 0.26 | -0.20 |
| HRV | 0.40 | 0.13 | 0.05 | 0.06 | 0.32 | 0.07 | 0.37 | 0.07 | 0.35 | 0.12 | 0.07 | 0.24 | -0.08 |
| HUN | 0.43 | 0.21 | 0.12 | 0.16 | 0.37 | 0.09 | 0.39 | 0.11 | 0.45 | 0.18 | 0.15 | 0.31 | 0.23 |
| IRL | 0.30 | 0.11 | 0.02 | 0.10 | 0.28 | 0.03 | 0.25 | 0.08 | 0.25 | 0.11 | 0.05 | 0.21 | -0.28 |
| ISR | 0.30 | 0.11 | 0.04 | 0.11 | 0.28 | 0.11 | 0.27 | 0.07 | 0.22 | 0.16 | 0.10 | 0.25 | -0.18 |
| ITA | 0.36 | 0.12 | 0.04 | 0.10 | 0.26 | 0.11 | 0.44 | 0.07 | 0.30 | 0.19 | 0.18 | 0.24 | -0.03 |
| LUX | 0.48 | 0.09 | 0.05 | 0.13 | 0.35 | 0.06 | 0.36 | 0.07 | 0.30 | 0.16 | 0.10 | 0.27 | -0.02 |
| NLD | 0.31 | 0.05 | 0.04 | 0.10 | 0.29 | 0.07 | 0.17 | 0.04 | 0.27 | 0.19 | 0.09 | 0.31 | -0.21 |
| POL | 0.54 | 0.34 | 0.10 | 0.14 | 0.40 | 0.10 | 0.45 | 0.09 | 0.36 | 0.16 | 0.24 | 0.23 | 0.28 |
| PRT | 0.52 | 0.42 | 0.08 | 0.08 | 0.39 | 0.11 | 0.36 | 0.11 | 0.27 | 0.27 | 0.20 | 0.36 | 0.30 |
| SVN | 0.36 | 0.25 | 0.04 | 0.09 | 0.31 | 0.05 | 0.29 | 0.05 | 0.25 | 0.09 | 0.07 | 0.18 | -0.19 |
| SWE | 0.35 | 0.04 | 0.03 | 0.09 | 0.33 | 0.05 | 0.22 | 0.05 | 0.34 | 0.12 | 0.10 | 0.27 | -0.19 |

Source: SHARE 2004-2017

[a]: No(0), yes(1)

[b]: First principal component of all items (the higher, the worse is people' s health). Principal component analysis is carried with all countries pooled. Displayed values correspond to the predicted score values divided by standard deviation.

# 3 Results

## 3.1 Main results

The main results of interest are those on the relative contribution of physical v.s. mental health to labour outcomes. Here we will not extensively comment on the intermediate OLS or Probit estimations of eq. 1. Simply, coefficient estimates generally show that ill-health (physical or mental) negatively correlates with employment and, to a lesser extent, hours. The tables exposing these regression results are available in the Appendix (Tables 11, 12). In Table 5 we report on the results of the variance decomposition announced by eq. 7. The underlying coefficients are from the OLS-estimated eq. 1 where health regressors consist of health indices¡.[8] More precisely, Table 5 reports the covariance shares $cov(\hat{Z}_{i,j}, \hat{Z}^p_{i,j}); cov(\hat{Z}_{i,j}, \hat{Z}^m_{i,j})$, corresponding to eq. 7 that quantify the contribution of the different dimensions of health. Several things are immediately visible.

First and foremost, we see that, for both men and women aged 50-59, the contribution of physical health dominates that of mental health. This is true for the extensive margins of work ($EMPL$). On average for men aged 50-59, physical health ($PHEALTH$) captures 50%-points of the employment variance, whereas mental health ($MHEALTH$) explains only 10%-points of the model-explained variance. At the bottom of Table 5 this translates into a ratio of mental health to total health of .17, meaning that only 17% of the total contribution of health to employment can be attributed to mental health. Note that that ratio is significantly different than 0 at a 0.000% threshold. Overall, these ratios range from .10 to .22 underlining the limited contribution of mental health to employment. And those obtained when focusing on the respondents age 50-54 are very similar to those obtained with the larger age band.

Second, considering the intensive margin ($HOURS$), we see that the explanatory power of health (physical + mental) is more limited than for employment. While health (physical + mental) accounts for 32 to 70% of the employment rate variance, the corresponding percentages for $HOURS$ are only 4 to 13%. What is more, and in echo to the above results on the "dominance" of physical health, we find no statistically significant contribution of mental health to the number of hours worked. In short, it is only for physical health that we find a contribution to the variance of $HOURS$; and it is of smaller magnitude than the equivalent contribution to the variance of $EMPL$.

[8] First principal components reported in the last columns of Tables 2, 3, 4.

A third interesting result is the gender asymmetry in these effects. The overall contribution of health (i.e. physical + mental) to $EMPL$ or $HOURS$ is systematically lower amongst female respondents. While health explains 32%-points of the employment variance of women aged 50-59, it explains 60%-points for men. As to $HOURS$ for men aged 50-59, physical health explains 13%-points of the variance, while only 4%-points for women. Physical health explains 29%-points of the variance of $EMPL$ among women aged 50-59, while the corresponding value for men is 50%-points. The contrast is even stronger for mental health, for which the female/male values are respectively 3%-points and 10%-points. Finally, the ratios of mental health to total health contributions reported at the bottom of Table 5 also suggest that women's mental health plays a lesser role for $EMPL$ (.10 vs .17). There is no equivalent result for $HOURS$ as the contribution or mental health to $HOURS$ is nil for both men and women.

Table 5: Variance decomposition of labour outcomes: shares to be attributed to physical v.s mental health [OLS estimation of eq. 1 using health indices[a]]

| | Employment | | | | Hours | | | |
|---|---|---|---|---|---|---|---|---|
| | 50-59 | | 50-54 | | 50-59 | | 50-54 | |
| | M | F | M | F | M | F | M | F |
| Share physical [a] | 0.50*** | 0.29*** | 0.55*** | 0.36*** | 0.13*** | 0.04*** | 0.07* | 0.03** |
| | (0.014) | (0.010) | (0.025) | (0.020) | (0.027) | (0.008) | (0.028) | (0.012) |
| Share mental [b] | 0.10*** | 0.03*** | 0.15*** | 0.05*** | 0.00 | 0.00 | 0.00 | 0.00 |
| | (0.010) | (0.005) | (0.019) | (0.010) | (0.003) | (0.002) | (0.010) | (0.003) |
| Share health [a]+[b] | 0.60*** | 0.32*** | 0.70*** | 0.41*** | 0.13*** | 0.04*** | 0.07* | 0.03** |
| | (0.014) | (0.010) | (0.022) | (0.019) | (0.026) | (0.008) | (0.028) | (0.012) |
| Diff. [a]-[b] | 0.39*** | 0.25*** | 0.40*** | 0.31*** | 0.13*** | 0.04*** | 0.07* | 0.03** |
| | (0.020) | (0.012) | (0.039) | (0.025) | (0.028) | (0.009) | (0.030) | (0.012) |
| Ratio [b]/[a]+[b] | 0.17*** | 0.10*** | 0.22*** | 0.12*** | 0.00 | 0.00 | 0.00 | 0.00 |
| | (0.016) | (0.015) | (0.027) | (0.025) | (0.024) | (0.041) | (0.145) | (0.071) |
| $N$ | 26,068 | 35,598 | 10,006 | 14,862 | 19,540 | 22,120 | 8,169 | 10,356 |

Source: SHARE 2004-2017

$^{*}p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$

Standard errors in parentheses. Reported standard errors and p-values have been boostrapped (1000 replications)

[a]: Last columns of Tables 2, 3, 4

## 3.2 Robustness Analysis

As a robustness check of the above results, we conduct three analyses. The first one simply consists of replicating the regression and variance decomposition using the data on the SHARE respondents aged 50-54. This is justified by our wish to capture the relationship between health and employment in the absence of systematic access to early retirement or equivalent benefits. Logically, respondents aged 50-54, even more than those aged 55-59, are unlikely to access early retirement benefits. The point is that we see in Table 5) that the results for individuals aged 50-54 are very similar to those obtained we considering the respondents aged 50-59.

The second robustness check consists of estimating eq. 1 using the detailed list of health items underpinning the health indices used above (i.e. long-term illness, limitations in daily activities, heart attack, cholesterol, diabetes (...), depression...described in Tables 2, 3, 4). Regression results are available in the Appendix (Table 11). Results of the variance decomposition are reported in Table 6. They are qualitatively very similar to the ones exposed in Table 5. We still get that physical health "dominates" mental health in accounting for both employment participation and the number of hours worked, be it for the 50-59 years old or for those aged 50-54. We verify that dominance for men and women. We also keep finding gender asymmetries. Overall health (physical + mental) is more predictive of labour outcomes for men than women. And the relative contribution of mental health to employment participation remains smaller for women. One difference with Table 5 is that mental health now plays a limited role in explaining $HOURS$, with shares ranging for 1 to 6%-points.

In the Appendix (Table 10) we report on a third robustness check tat consists of re-estimating eq. 1 for employment ($EMPL$) only, using Probit instead of OLS.[9]. This is in principle more adequate given the binary nature of responses and also the fact that, at its core, our variance decomposition analysis, rests on predicted values[10], But, in our case, resorting to OLS- v.s Probit-estimated coefficients does not seem to make much of a difference.

[9]Note that using Probit does alter the idea of linearly decomposable variance exposed in eq. 7. Simply what is decomposed is the latent variable underlying $EMPL$ responses in the data

[10]And is it well known OLS applied by binary outcomes (i.e. linear probability models) does no guarantee predicted values falling between 0 and 1.

Table 6: Robustness check - Variance decomposition of labour outcomes: shares to be attributed to physical v.s mental health [OLS estimation of eq. 1 using detailed list of health items[a]]

| | Employment | | | | Hours | | | |
|---|---|---|---|---|---|---|---|---|
| | 50-59 | | 50-54 | | 50-59 | | 50-54 | |
| | M | F | M | F | M | F | M | F |
| Share physical [a] | 0.57*** | 0.33*** | 0.65*** | 0.43*** | 0.26*** | 0.08*** | 0.10* | 0.08*** |
| | (0.015) | (0.012) | (0.024) | (0.022) | (0.035) | (0.012) | (0.046) | (0.018) |
| Share mental [b] | 0.08*** | 0.04*** | 0.12*** | 0.05*** | 0.04* | 0.02* | 0.06* | 0.01 |
| | (0.011) | (0.006) | (0.020) | (0.013) | (0.017) | (0.006) | (0.029) | (0.012) |
| Share health [a]+[b] | 0.65*** | 0.37*** | 0.77*** | 0.48*** | 0.30*** | 0.09*** | 0.16** | 0.09*** |
| | (0.014) | (0.012) | (0.022) | (0.022) | (0.038) | (0.013) | (0.052) | (0.021) |
| Diff. [a]-[b] | 0.49*** | 0.29*** | 0.53*** | 0.38*** | 0.22*** | 0.06*** | 0.04 | 0.07** |
| | (0.022) | (0.015) | (0.038) | (0.029) | (0.039) | (0.014) | (0.057) | (0.022) |
| Ratio [b]/[a]+[b] | 0.13*** | 0.10*** | 0.16*** | 0.10*** | 0.14** | 0.18** | 0.38*** | 0.16 |
| | (0.016) | (0.016) | (0.025) | (0.027) | (0.053) | (0.060) | (0.105) | (0.088) |
| $N$ | 26,068 | 35,598 | 10,006 | 14,862 | 19,540 | 22,120 | 8,169 | 10,356 |

Source: SHARE 2004-2017

*$p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Standard errors in parentheses. Reported standard errors and p-values have been boostrapped (1000 replications)

[a]: Described in Tables 2, 3, 4

## 3.3 Attenuation and justification biases

Most observers will rightly stress that all the results presented so far in the paper rest exclusively on observed health. What is the risk of bias? Blundell et al. (2017) contains an excellent review of potential biases when estimating the relationship between health and work. Hereafter, we will focus on those affecting coefficients estimated using self-reported health items; namely the attenuation bias and the "justification" bias,

Baker et al. (2004) consider self-reported measures of health of the sort we get in SHARE as "noisy" measures of a latent (unobserved) health stock $H$.[11] If $PHEALTH$ and $MHEALTH$ in eq. 1 essentially consist of self-reported items, they can deviate from

[11]This stock can be considered as the "true" measure of health influencing work.

the actual health stock. Abandoning temporarily the distinction between mental and physical health, we formally have

$$HEALTH_{i,j} = H_{i,j} + \tau_{i,j} \tag{9}$$

In that expression the deviation term $\tau_{i,j}$ amounts to a (randomly distributed) reporting/measurement error creating a wedge between the estimated coefficient and the true one $\tilde{\beta}^Z$. The term $VAR(\tau)$ on the denominator eq. 10 captures the attenuation bias; with noise: i.e. larger $VAR(\tau)$ pushing the OLS-Probit-estimated $\beta^Z$ towards zero.

$$\beta^Z = \frac{\tilde{\beta}^Z VAR(H)}{VAR(H) + VAR(\tau)} \tag{10}$$

This said, given our focus on the "relative" contribution of mental v.s. physical health, the real risk is to have more of that attenuation bias for mental than physical health. And this could be because, in SHARE, there is a limited number of items describing people's mental health. Conversely, SHARE abounds in items documenting physical health, meaning that for the latter the attenuation bias is potentially less important. To assess that risk of asymmetry, we reestimate the shares of variance to be attributed to physical v.s mental health with alternative reduced sets of physical health variables as regressors. More specifically, we drop from the list of regressors all the objective, doctor-diagnosed conditions or surveyor measurements listed in Table 3, The point is that the re-estimation of eq. 1 is likely to deliver a lower bound of the contribution of physical health to $EMPL$ and $HOURS$ that is comparable to what we view as a lower bound estimate of the contribution of mental health. Results are reported in Table 7. They are very similar to those reported above (Table 6). In particular, the share of variance to be attributed physical health does not appear to shrink, to the contrary. We tentatively conclude that the risk of asymmetric attenuation biases in our results is limited. Note also that we still find with this re-estimation that physical health matters more than mental health. At the bottom of Table 7, for employment ($EMPL$), the ratio quantifying the importance of mental health ranges from 5 to 19%, still stressing its limited contribution relative to physical health. And we keep finding a quasi absence of contribution of mental health to the distribution of ($HOURS$). We also keep finding that women's health (physical or mental) is a weaker predictor of labour outcomes, and that hours are generally less impacted by health than employment.

Table 7: Assessment of attenuation bias - Variance decomposition of labour outcomes: shares to be attributed to physical v.s mental health [OLS estimation of eq. 1 via using a restricted list of physical health items[a]]

| | Employment | | | | Hours | | | |
|---|---|---|---|---|---|---|---|---|
| | 50-59 | | 50-54 | | 50-59 | | 50-54 | |
| | M | F | M | F | M | F | M | F |
| Share physical [a] | 0.65*** | 0.31*** | 0.77*** | 0.40*** | 0.12*** | 0.05*** | 0.08* | 0.06*** |
| | (0.019) | (0.013) | (0.030) | (0.022) | (0.030) | (0.012) | (0.040) | (0.017) |
| Share mental [b] | 0.12*** | 0.02* | 0.18*** | 0.03 | 0.04* | 0.00 | 0.07* | 0.00 |
| | (0.014) | (0.008) | (0.025) | (0.014) | (0.020) | (0.006) | (0.032) | (0.010) |
| Share health [a]+[b] | 0.77*** | 0.33*** | 0.95*** | 0.42*** | 0.17*** | 0.06*** | 0.15** | 0.06** |
| | (0.019) | (0.014) | (0.026) | (0.023) | (0.036) | (0.013) | (0.050) | (0.019) |
| Diff. [a]-[b] | 0.53*** | 0.30*** | 0.59*** | 0.37*** | 0.08* | 0.05*** | 0.02 | 0.06** |
| | (0.027) | (0.017) | (0.049) | (0.029) | (0.036) | (0.014) | (0.053) | (0.020) |
| Ratio [b]/[a]+[b] | 0.15*** | 0.05* | 0.19*** | 0.06* | 0.25** | 0.03 | 0.44** | 0.01 |
| $N$ | 26,068 | 35,598 | 10,006 | 14,862 | 19,540 | 22,120 | 8,169 | 10,356 |

Source: SHARE 2004-2017

$^{*}p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$

Bootstrapped standard errors and pvalues, with 1000 replications

[a]: Only those presented in Tables 2

But, as stressed by Blundell et al. (2017), it is unlikely that $\tau_i$ just amounts to "noise", implying that attenuation bias is the only concern. If it is more than "noise" than eq. 10 could become

$$\beta^Z = \frac{\tilde{\beta}^Z VAR(H) + COV(\epsilon, \tau)}{VAR(H) + VAR(\tau)} \tag{11}$$

And $COV(\epsilon, \tau)$ on the numerator — where $\epsilon$ is the residual of eq. 1 — is different than zero. What is more, it is likely that $COV(\epsilon, \tau) > 0$ due to respondents' "justification bias" (Baker et al., 2004). This happens when they report values of $PHEALTH$ and $MHEALTH$ (and thus of $\tau_i$) that are driven by their labour-market status: with unemployed individuals reporting lower level of health to justify their absence of employment. And as eq. 11 shows, this potentially translates into an OLS-Probit estimated $\beta^Z$ that is larger than the coefficient of interest $\tilde{\beta}^Z$. So far, the literature remains inconclusive about the importance

of the justification bias. O'Donnell et al. (2015) suggest they are important (and dominate attenuation biases mentioned above). However, Stern (1989) and Dwyer and Mitchell (1999) do not find that the justification bias prevails.

But again, our point is that what matters is this paper is the "relative" importance of physical v.s. mental health. *Ceteris paribus*, not taking into account the justification bias creates a risk of overestimating the specific contribution of each of them in terms of labour outcome, but not necessarily of their "relative" importance. If the magnitude of the justification bias is more or less the same for both mental and physical health, then there is a good chance our estimates of their relative contribution at the bottom of Tables 5, 6 or 7 might be correct.[12]

# 4 Summary and concluding remarks

The aim of this paper was to contribute to the literature on barriers to old employment, by exploring not just the role of physical health, but also that of mental health in explaining work. By "work" we mean the propensity to stay in paid employment (the extensive margin of work), but also the number of hours worked (the intensive margin). The focus here is on people aged 50-59, and as part or robustness check those aged 50-54. The choice of these age bands is justified by our willingness to identify the relationship between health and work in the absence of systematic access to early or part-time retirement or equivalent benefits. Also, the paper considers simultaneously 21, mostly European countries[13] that differ quite significantly in many respects (GDP per capita, retirement institutions...), but in doing so uses comparable fully-harmonised microdata on health and work, amassed via the SHARE survey.

The results of the paper are essentially fourfold.

First, there is solid evidence that the health of people aged 50-59 is a strong predictor or their labour outcomes. This result is relatively unsurprising and aligns with those already published by many economists (Wise, 2017, French and Jones, 2017). Regression results clearly indicate that ill-health (physical and, to a lesser extent, mental) negatively correlates

[12]This is know in the treatment/programme evaluation literature as the *ignorability* assumption (Fortin et al., 2011).

[13]AUT, BEL, CHE, CZE, DEU, DNK, ESP, EST, FRA, GRC, HRV, HUN, IRL, ISR, ITA, LUX, NLD, POL, PRT, SVN, SWE

with employment and hours. And our variance decomposition exercises suggests that up to 60% of the variance accounted for by our regression models can be attributed to (physical + mental) health.

Second, our paper distinguishes the extensive and intensive margins of work (i.e. employment and hours). We find evidence that the impact of health on hours is also negative, but its contribution to the variance is much smaller, and not always statistically significant, particularly when it comes to mental health. This suggests, at least in Europe in the early 2000s, that older workers suffering from ill-health rarely adjust work at the intensive margin but rather stop working altogether.

Third, gender matters when it comes to the health-work relationship. And it is for men that the relationship appears to be the strongest. In comparison to women, their physical and mental health explain a greater part of the variance of employment and hours.

Fourth, and foremost, for both males and females aged 50-59, the impact of physical health dominates — in fact, it is at least double — that of mental health, That result holds for the intensive and the extensive margins of work. In spite all that has been written and documented recently about mental problems — their rising prevalence (Knapp and Wong, 2020 ) and its cost for communities[14] and their highly detrimental impact on people's private or professional life (Layard et al., 2014) — it seems that older people's participation to paid work remains primarily driven by physical health. And this seems to be the case across 21 countries that tend to differ quite significantly in terms of their overall wealth (GDP per head of Switzerland is more than double that of Poland, and significantly larger than that of Belgium). Could it be that mental health problems are intrinsically less of a barrier to elderly employment? Or is it that they remain largely hidden, underdiagnosed or simply accepted at a legitimate cause of (total or partial) absence from work among people aged 50 to 59?

Finally, it is important to stress that the methods and results presented in this paper suffer limitations and call for additional research. This study splits mental and physical health into clear and separable/additive dimensions. Thus the paper falls short of exploring the consequences for older work of what health experts call co-morbidity. It is indeed well established that poor mental health can be strongly related to (and possibly caused by) physical ill-health, particularly among elderly individuals. Sartorious (2013) explains that

[14]In 2011, the World Economic Forum projected that, by 2030, mental ill-health will account for more than half of the global economic burden attributable to noncommunicable diseases, at US$6 trillion (Bloom et al., 2012)

"Co-morbidity does not mean the simple addition of two diseases that independently follow their usual trajectories. The simultaneous presence of two or more diseases will worsen the prognosis". In economic terms, this hints at the possibility of (production) complementarity[15] between physical and mental health in determining old people's work.

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[15] For an illustration of the use of the notion of production complementarity in health economics see Abramovsky et al. (2019)

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# Appendix

Table 8: Control variables: individuals aged 50-59. Country averages

| | Education[a] | Single | Immigrant [ first gen.] |
|---|---|---|---|
| AUT | 3.36 | 0.27 | 0.08 |
| BEL | 3.30 | 0.22 | 0.12 |
| CHE | 3.36 | 0.19 | 0.19 |
| CZE | 2.77 | 0.20 | 0.04 |
| DEU | 3.60 | 0.17 | 0.12 |
| DNK | 3.85 | 0.16 | 0.04 |
| ESP | 2.27 | 0.15 | 0.08 |
| EST | 3.60 | 0.25 | 0.18 |
| FRA | 3.07 | 0.22 | 0.12 |
| GRC | 2.88 | 0.16 | 0.03 |
| HRV | 3.02 | 0.15 | 0.19 |
| HUN | 3.14 | 0.20 | 0.01 |
| IRL | 3.67 | 0.23 | 0.08 |
| ISR | 3.25 | 0.13 | 0.39 |
| ITA | 2.41 | 0.14 | 0.02 |
| LUX | 2.90 | 0.15 | 0.42 |
| NLD | 3.19 | 0.15 | 0.07 |
| POL | 2.87 | 0.20 | 0.01 |
| PRT | 1.92 | 0.14 | 0.05 |
| SVN | 3.14 | 0.16 | 0.13 |
| SWE | 3.57 | 0.20 | 0.10 |

Source: SHARE 2004-2017
[a]: ISCED1997 classification of educational attainment [0:no degree 6: tertiary long]

‘

‘

Table 9: Labour outcomes: individuals aged 50-59. Country averages

| | Employment rate | Number of hours worked [weekly] |
|---|---|---|
| AUT | 0.61 | 37.82 |
| BEL | 0.66 | 36.40 |
| CHE | 0.84 | 36.11 |
| CZE | 0.70 | 41.80 |
| DEU | 0.75 | 36.75 |
| DNK | 0.85 | 37.70 |
| ESP | 0.58 | 38.18 |
| EST | 0.73 | 39.51 |
| FRA | 0.72 | 37.09 |
| GRC | 0.54 | 40.15 |
| HRV | 0.46 | 41.42 |
| HUN | 0.55 | 40.37 |
| IRL | 0.68 | 37.79 |
| ISR | 0.65 | 38.79 |
| ITA | 0.60 | 37.26 |
| LUX | 0.59 | 36.79 |
| NLD | 0.71 | 33.24 |
| POL | 0.44 | 40.84 |
| PRT | 0.53 | 23.84 |
| SVN | 0.54 | 40.01 |
| SWE | 0.87 | 39.60 |

Source: SHARE 2004-2017

Table 10: Robustness check - Variance decomposition of employment: shares to be attributed to physical v.s mental health [based on Probit estimation of eq. 1 using health indices[a]]

| | 50-59 | | 50-54 | |
|---|---|---|---|---|
| | M | F | M | F |
| Share physical [a] | 0.45*** | 0.29*** | 0.51*** | 0.35*** |
| | (0.014) | (0.010) | (0.023) | (0.020) |
| Share mental [b] | 0.09*** | 0.03*** | 0.12*** | 0.04*** |
| | (0.010) | (0.005) | (0.019) | (0.012) |
| Share health [a]+[b] | 0.54*** | 0.32*** | 0.63*** | 0.39*** |
| | (0.014) | (0.010) | (0.022) | (0.019) |
| Diff. [a]-[b] | 0.37*** | 0.26*** | 0.40*** | 0.31*** |
| | (0.020) | (0.013) | (0.035) | (0.027) |
| Ratio [b]/[a]+[b] | 0.16*** | 0.10*** | 0.18*** | 0.11*** |
| | (0.017) | (0.015) | (0.028) | (0.030) |
| $N$ | 26,068 | 35,598 | 10,006 | 14,862 |

Source: SHARE 2004-2017

Bootstrapped standard errors and pvalues, with 1000 replications

[a]: Last columns of Tables 2, 3, 4

Table 11: Regression analysis of labour outcomes: OLS estimation of eq. 1 using health indices]

| | Employment | | | | Hours | | | |
|---|---|---|---|---|---|---|---|---|
| | 50-59 | | 50-54 | | 50-59 | | 50-54 | |
| | M | F | M | F | M | F | M | F |
| Physical ill-health index(subj) | -0.12*** | -0.11*** | -0.12*** | -0.11*** | -1.29*** | -1.11*** | -0.97*** | -1.14*** |
| | (0.004) | (0.004) | (0.006) | (0.006) | (0.166) | (0.151) | (0.261) | (0.222) |
| Physical ill-health index(obj) | -0.04*** | -0.03*** | -0.03*** | -0.03*** | 0.15 | -0.30* | 0.27 | -0.21 |
| | (0.004) | (0.004) | (0.005) | (0.006) | (0.139) | (0.134) | (0.223) | (0.202) |
| Poor mental health index | -0.05*** | -0.02*** | -0.05*** | -0.02*** | 0.15 | -0.01 | -0.07 | -0.00 |
| | (0.003) | (0.003) | (0.005) | (0.004) | (0.133) | (0.100) | (0.203) | (0.147) |
| Aged 51 | 0.01 | 0.01 | 0.01 | 0.02 | -1.19 | -0.36 | -1.35 | -0.33 |
| | (0.022) | (0.014) | (0.020) | (0.014) | (0.769) | (0.491) | (0.784) | (0.496) |
| Aged 52 | -0.02 | -0.00 | -0.01 | 0.00 | -1.23 | 0.58 | -1.41 | 0.61 |
| | (0.022) | (0.014) | (0.020) | (0.014) | (0.769) | (0.489) | (0.784) | (0.494) |
| Aged 53 | -0.02 | -0.01 | -0.00 | -0.00 | -1.11 | 0.11 | -1.28 | 0.19 |
| | (0.021) | (0.014) | (0.019) | (0.014) | (0.761) | (0.483) | (0.776) | (0.489) |
| Aged 54 | -0.02 | -0.01 | -0.01 | -0.01 | -0.91 | 0.21 | -1.09 | 0.27 |
| | (0.021) | (0.014) | (0.019) | (0.014) | (0.758) | (0.483) | (0.774) | (0.489) |
| Aged 55 | -0.03 | -0.05*** | | | -0.74 | -0.27 | | |
| | (0.021) | (0.014) | | | (0.756) | (0.484) | | |
| Aged 56 | -0.06** | -0.08*** | | | -1.12 | -0.24 | | |
| | (0.021) | (0.014) | | | (0.757) | (0.484) | | |
| Aged 57 | -0.08*** | -0.10*** | | | -1.17 | -0.30 | | |
| | (0.021) | (0.014) | | | (0.757) | (0.487) | | |
| Aged 58 | -0.14*** | -0.15*** | | | -1.17 | -0.47 | | |

Table 11 – continued from previous page

| | Employment | | | | Hours | | | |
|---|---|---|---|---|---|---|---|---|
| | 50-59 | | 50-54 | | 50-59 | | 50-54 | |
| | M | F | M | F | M | F | M | F |
| | (0.021) | (0.014) | | | (0.760) | (0.494) | | |
| Aged 59 | -0.17*** | -0.20*** | | | -1.25 | -1.02* | | |
| | (0.021) | (0.014) | | | (0.764) | (0.500) | | |
| 12. Germany | 0.12*** | 0.15*** | 0.06** | 0.06** | -0.73 | -0.81 | -0.62 | -1.06 |
| | (0.014) | (0.013) | (0.020) | (0.020) | (0.536) | (0.482) | (0.842) | (0.700) |
| 13. Sweden | 0.19*** | 0.29*** | 0.11*** | 0.17*** | -1.52* | 4.69*** | -0.57 | 4.05*** |
| | (0.016) | (0.015) | (0.025) | (0.025) | (0.596) | (0.519) | (0.984) | (0.814) |
| 14. Netherlands | 0.14*** | 0.12*** | 0.11*** | 0.07** | -2.95*** | -5.92*** | -2.13* | -5.65*** |
| | (0.015) | (0.014) | (0.022) | (0.022) | (0.575) | (0.526) | (0.897) | (0.759) |
| 15. Spain | 0.05*** | 0.02 | 0.01 | -0.05* | -3.17*** | 3.50*** | -2.57** | 3.00*** |
| | (0.014) | (0.014) | (0.022) | (0.021) | (0.565) | (0.521) | (0.907) | (0.764) |
| 16. Italy | 0.08*** | -0.01 | 0.08*** | -0.06** | -3.71*** | 1.95*** | -3.72*** | 1.44 |
| | (0.015) | (0.013) | (0.021) | (0.020) | (0.560) | (0.519) | (0.877) | (0.746) |
| 17. France | 0.08*** | 0.17*** | 0.09*** | 0.10*** | -2.90*** | 1.58*** | -2.23** | 0.96 |
| | (0.014) | (0.013) | (0.020) | (0.020) | (0.525) | (0.473) | (0.810) | (0.691) |
| 18. Denmark | 0.13*** | 0.19*** | 0.06** | 0.10*** | -3.56*** | 2.04*** | -2.34** | 1.72* |
| | (0.014) | (0.013) | (0.020) | (0.020) | (0.519) | (0.470) | (0.806) | (0.681) |
| 19. Greece | 0.04* | -0.17*** | 0.01 | -0.23*** | -1.64** | 3.49*** | -0.64 | 2.28* |
| | (0.016) | (0.015) | (0.023) | (0.023) | (0.615) | (0.629) | (0.948) | (0.884) |
| 20. Switzerland | 0.17*** | 0.19*** | 0.11*** | 0.09*** | 1.06 | -3.58*** | 2.23* | -4.14*** |
| | (0.015) | (0.014) | (0.023) | (0.022) | (0.561) | (0.500) | (0.903) | (0.755) |
| 23. Belgium | 0.06*** | 0.06*** | 0.07*** | 0.02 | -2.04*** | -1.59*** | -0.74 | -1.71** |

Table 11 – continued from previous page

| | Employment | | | | Hours | | | |
|---|---|---|---|---|---|---|---|---|
| | 50-59 | | 50-54 | | 50-59 | | 50-54 | |
| | M | F | M | F | M | F | M | F |
| | (0.013) | (0.012) | (0.019) | (0.019) | (0.502) | (0.457) | (0.774) | (0.656) |
| 25. Israel | 0.09*** | 0.08*** | 0.01 | -0.00 | 0.27 | 1.64** | -0.71 | 0.56 |
| | (0.019) | (0.017) | (0.028) | (0.027) | (0.718) | (0.637) | (1.173) | (0.975) |
| 28. Czech Republic | 0.13*** | 0.17*** | 0.04 | 0.15*** | -0.07 | 8.70*** | -0.29 | 7.85*** |
| | (0.014) | (0.013) | (0.022) | (0.021) | (0.554) | (0.483) | (0.901) | (0.721) |
| 29. Poland | -0.07*** | -0.06*** | -0.08** | -0.01 | 0.53 | 6.35*** | -0.01 | 7.28*** |
| | (0.018) | (0.017) | (0.029) | (0.027) | (0.789) | (0.734) | (1.266) | (1.019) |
| 30. Ireland | 0.09* | -0.03 | 0.06 | -0.09 | -0.22 | -1.97 | 3.25 | -1.23 |
| | (0.036) | (0.035) | (0.051) | (0.054) | (1.288) | (1.341) | (2.009) | (1.998) |
| 31. Luxembourg | 0.02 | -0.01 | 0.13*** | 0.02 | -1.05 | -2.06** | 1.37 | -1.59 |
| | (0.022) | (0.021) | (0.034) | (0.033) | (0.852) | (0.797) | (1.345) | (1.168) |
| 32. Hungary | -0.00 | 0.06** | -0.10** | 0.05 | -2.26* | 8.71*** | -1.63 | 6.20*** |
| | (0.022) | (0.021) | (0.034) | (0.034) | (0.921) | (0.834) | (1.552) | (1.210) |
| 33. Portugal | 0.01 | 0.11*** | 0.04 | 0.07* | -17.50*** | -9.30*** | -20.80*** | -13.09*** |
| | (0.024) | (0.021) | (0.039) | (0.034) | (1.011) | (0.833) | (1.680) | (1.264) |
| 34. Slovenia | -0.07*** | -0.04** | -0.01 | 0.03 | -2.24*** | 6.29*** | -0.54 | 5.88*** |
| | (0.016) | (0.015) | (0.025) | (0.024) | (0.657) | (0.589) | (1.028) | (0.839) |
| 35. Estonia | 0.10*** | 0.19*** | 0.05* | 0.10*** | -2.05*** | 6.29*** | -1.36 | 6.27*** |
| | (0.015) | (0.014) | (0.021) | (0.021) | (0.571) | (0.484) | (0.896) | (0.719) |
| 47. Croatia | -0.14*** | -0.13*** | -0.23*** | -0.11** | -1.47 | 7.17*** | -1.36 | 8.11*** |
| | (0.025) | (0.023) | (0.038) | (0.036) | (1.085) | (1.004) | (1.847) | (1.384) |
| wave=2 | 0.05*** | 0.06*** | 0.04** | 0.05*** | -1.11** | -1.24** | -0.71 | -2.44*** |

Table 11 – continued from previous page

| | Employment | | | | Hours | | | |
|---|---|---|---|---|---|---|---|---|
| | 50-59 | | 50-54 | | 50-59 | | 50-54 | |
| | M | F | M | F | M | F | M | F |
| | (0.010) | (0.010) | (0.014) | (0.014) | (0.377) | (0.392) | (0.547) | (0.534) |
| wave=4 | 0.05*** | 0.11*** | 0.03* | 0.09*** | -1.37*** | -0.85* | -1.16* | -1.98*** |
| | (0.010) | (0.010) | (0.014) | (0.014) | (0.379) | (0.385) | (0.553) | (0.529) |
| wave=5 | 0.07*** | 0.14*** | 0.02 | 0.10*** | -0.92* | -0.19 | -0.39 | -1.13* |
| | (0.010) | (0.010) | (0.013) | (0.014) | (0.365) | (0.372) | (0.530) | (0.508) |
| wave=6 | 0.08*** | 0.15*** | 0.03* | 0.10*** | -0.05 | 0.06 | 0.34 | -1.47** |
| | (0.010) | (0.010) | (0.014) | (0.014) | (0.378) | (0.382) | (0.564) | (0.529) |
| wave=7 | 0.14 | 0.21*** | 0.28 | 0.12* | -3.49 | -0.29 | -8.79 | 0.02 |
| | (0.077) | (0.026) | (0.172) | (0.059) | (2.819) | (0.969) | (6.316) | (2.132) |
| isced=1 | -0.00 | -0.00 | 0.01 | -0.05 | 1.41 | 1.58 | 1.00 | 2.54* |
| | (0.020) | (0.018) | (0.029) | (0.028) | (0.820) | (0.822) | (1.271) | (1.170) |
| isced=2 | 0.05* | 0.05** | 0.04 | 0.02 | 1.38 | 0.80 | 1.58 | 2.47* |
| | (0.019) | (0.018) | (0.027) | (0.027) | (0.780) | (0.788) | (1.186) | (1.102) |
| isced=3 | 0.10*** | 0.16*** | 0.11*** | 0.12*** | 0.84 | 1.76* | 0.63 | 3.59*** |
| | (0.018) | (0.018) | (0.026) | (0.026) | (0.764) | (0.771) | (1.158) | (1.075) |
| isced=4 | 0.13*** | 0.26*** | 0.13*** | 0.22*** | 1.11 | 1.57 | 0.77 | 3.43** |
| | (0.021) | (0.020) | (0.031) | (0.030) | (0.861) | (0.839) | (1.318) | (1.186) |
| isced=5 | 0.16*** | 0.27*** | 0.14*** | 0.23*** | 1.31 | 3.49*** | 1.30 | 4.95*** |
| | (0.019) | (0.018) | (0.027) | (0.026) | (0.771) | (0.775) | (1.171) | (1.082) |
| isced=6 | 0.26*** | 0.30*** | 0.20*** | 0.25*** | 4.13*** | 8.17*** | 2.52 | 10.14*** |
| | (0.030) | (0.033) | (0.043) | (0.049) | (1.086) | (1.141) | (1.702) | (1.678) |
| Single | -0.09*** | 0.04*** | -0.11*** | 0.03*** | -1.35*** | 1.72*** | -0.98* | 1.72*** |

Table 11 – continued from previous page

| | Employment | | | | Hours | | | |
|---|---|---|---|---|---|---|---|---|
| | 50-59 | | 50-54 | | 50-59 | | 50-54 | |
| | M | F | M | F | M | F | M | F |
| | (0.006) | (0.006) | (0.009) | (0.009) | (0.256) | (0.202) | (0.389) | (0.309) |
| Immigrant | -0.05*** | -0.01 | -0.06*** | -0.04*** | -0.97** | 0.37 | -1.17* | 0.06 |
| | (0.008) | (0.008) | (0.012) | (0.011) | (0.315) | (0.277) | (0.483) | (0.411) |
| Constant | 0.52*** | 0.28*** | 0.58*** | 0.40*** | 44.08*** | 29.82*** | 43.54*** | 29.71*** |
| | (0.029) | (0.024) | (0.036) | (0.034) | (1.136) | (0.992) | (1.541) | (1.327) |
| *N* | 26,068 | 35,598 | 10,006 | 14,862 | 19,540 | 22,120 | 8,169 | 10,356 |

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Standard errors in parentheses

Source: SHARE 2004-2017



Table 12: Regression analysis of labour outcomes: OLS estimation of eq. 1 using detailed health items

| | Employment | | | | Hours | | | |
|---|---|---|---|---|---|---|---|---|
| | 50-59 | | 50-54 | | 50-59 | | 50-54 | |
| | M | F | M | F — | M | F | M | F |
| General health[a] | -0.02*** | -0.03*** | -0.02*** | -0.02*** | -0.31** | -0.39*** | -0.11 | -0.42** |
| | (0.003) | (0.003) | (0.004) | (0.004) | (0.117) | (0.108) | (0.181) | (0.157) |
| Long-term illness[b] | -0.02** | -0.01* | -0.02 | -0.03** | -0.43 | -0.57** | -0.63 | -0.33 |
| | (0.007) | (0.006) | (0.009) | (0.009) | (0.245) | (0.220) | (0.389) | (0.328) |
| Limited in activities because of health [c] | 0.09*** | 0.07*** | 0.09*** | 0.06*** | 0.80*** | 0.36 | 0.44 | 0.55* |

Table 12 – continued from previous page

| | Employment | | | | Hours | | | |
|---|---|---|---|---|---|---|---|---|
| | 50-59 | | 50-54 | | 50-59 | | 50-54 | |
| | M | F | M | F | M | F | M | F |
| | (0.005) | (0.005) | (0.007) | (0.007) | (0.209) | (0.183) | (0.336) | (0.271) |
| Number of limit. with activities[d] | 0.03*** | 0.01* | 0.04*** | 0.01 | -0.33 | 0.57 | -1.03 | 1.56** |
| | (0.007) | (0.006) | (0.011) | (0.010) | (0.416) | (0.326) | (0.673) | (0.501) |
| Number of limit. with instrum. activities [e] | -0.04*** | -0.06*** | -0.06*** | -0.08*** | -1.04* | -1.00*** | -0.79 | -1.32** |
| | (0.007) | (0.006) | (0.010) | (0.009) | (0.411) | (0.295) | (0.681) | (0.456) |
| Heart attack | -0.04*** | -0.06*** | -0.05** | -0.09*** | -0.75 | 1.13* | -0.78 | 2.08* |
| | (0.010) | (0.012) | (0.015) | (0.021) | (0.428) | (0.549) | (0.718) | (0.890) |
| Hypertension | -0.00 | -0.00 | 0.01 | -0.00 | 0.08 | 0.52* | -0.10 | 0.25 |
| | (0.006) | (0.006) | (0.009) | (0.010) | (0.247) | (0.229) | (0.402) | (0.351) |
| Cholesterol | -0.00 | 0.00 | -0.01 | 0.00 | 0.15 | -0.52* | 0.37 | -0.57 |
| | (0.007) | (0.007) | (0.010) | (0.011) | (0.263) | (0.255) | (0.425) | (0.403) |
| Stroke | -0.11*** | -0.09*** | -0.10*** | -0.09** | 0.08 | -1.81 | 1.79 | -2.15 |
| | (0.018) | (0.020) | (0.028) | (0.032) | (0.883) | (0.951) | (1.476) | (1.448) |
| Diabetes | -0.04*** | -0.06*** | -0.05** | -0.09*** | 0.32 | -0.35 | 0.27 | -0.50 |
| | (0.009) | (0.010) | (0.015) | (0.017) | (0.385) | (0.433) | (0.673) | (0.718) |
| Lung disease | -0.06*** | -0.01 | -0.08*** | -0.01 | 0.65 | -0.39 | 1.63 | -0.19 |
| | (0.012) | (0.012) | (0.019) | (0.019) | (0.576) | (0.468) | (0.969) | (0.731) |
| Cancer | -0.06*** | -0.07*** | -0.07** | -0.06*** | 1.60* | -1.43** | 2.29 | -2.23** |
| | (0.017) | (0.012) | (0.027) | (0.019) | (0.716) | (0.489) | (1.260) | (0.715) |
| Ulcer | -0.01 | 0.00 | -0.03 | 0.00 | 0.77 | 1.24* | 1.29 | 1.59* |
| | (0.011) | (0.012) | (0.016) | (0.018) | (0.487) | (0.482) | (0.759) | (0.690) |
| Parkinson | -0.08 | -0.01 | 0.02 | -0.13 | 0.85 | 0.04 | -1.27 | 4.55 |

Table 12 – continued from previous page

| | Employment | | | | Hours | | | |
|---|---|---|---|---|---|---|---|---|
| | 50-59 | | 50-54 | | 50-59 | | 50-54 | |
| | M | F | M | F | M | F | M | F |
| | (0.057) | (0.068) | (0.087) | (0.137) | (2.803) | (3.019) | (4.222) | (7.029) |
| Cataract | -0.02 | -0.02 | -0.06 | 0.01 | -1.17 | -0.41 | 0.30 | -0.25 |
| | (0.020) | (0.018) | (0.030) | (0.033) | (0.826) | (0.751) | (1.414) | (1.289) |
| Hip fracture | -0.05* | -0.06* | -0.01 | -0.08 | -0.11 | -1.29 | -0.44 | 0.14 |
| | (0.024) | (0.028) | (0.033) | (0.047) | (1.110) | (1.292) | (1.570) | (2.030) |
| Other fractures | -0.02* | -0.00 | -0.03*** | -0.02 | -0.67* | -0.01 | -0.61 | -0.31 |
| | (0.007) | (0.007) | (0.010) | (0.010) | (0.268) | (0.239) | (0.417) | (0.353) |
| Alzheimer's disease, dementia, senility | -0.03*** | -0.01* | -0.05*** | -0.02* | -0.84** | -0.47 | -0.93 | -0.78* |
| | (0.008) | (0.007) | (0.011) | (0.010) | (0.310) | (0.255) | (0.498) | (0.380) |
| Mobil., arm funct. & fine motor limit. | -0.03*** | -0.01*** | -0.04*** | -0.01*** | -0.22 | -0.11 | -0.17 | -0.14 |
| | (0.002) | (0.002) | (0.004) | (0.003) | (0.117) | (0.078) | (0.195) | (0.117) |
| Max. of grip strength measure | 0.00*** | 0.00*** | 0.00*** | 0.00*** | 0.09*** | 0.10*** | 0.08*** | 0.09*** |
| | (0.000) | (0.000) | (0.000) | (0.001) | (0.011) | (0.014) | (0.017) | (0.020) |
| Depression | -0.01* | -0.01* | -0.03** | -0.01 | 0.28 | -0.44* | 0.22 | -0.35 |
| | (0.006) | (0.005) | (0.008) | (0.008) | (0.229) | (0.196) | (0.354) | (0.288) |
| Pessimism | -0.06*** | -0.03*** | -0.05*** | -0.05*** | -0.83** | -0.37 | -1.31** | -0.20 |
| | (0.007) | (0.007) | (0.011) | (0.011) | (0.304) | (0.289) | (0.476) | (0.429) |
| Suicidality | -0.07*** | -0.04*** | -0.06*** | -0.04** | 0.61 | 0.14 | -0.89 | -0.05 |
| | (0.012) | (0.010) | (0.018) | (0.015) | (0.572) | (0.410) | (0.874) | (0.609) |
| Guilt | -0.01 | -0.02** | 0.01 | -0.03** | -0.85* | -0.37 | -1.05 | -0.18 |
| | (0.009) | (0.008) | (0.013) | (0.011) | (0.387) | (0.281) | (0.584) | (0.413) |
| Sleep | -0.01 | 0.00 | -0.02* | 0.01 | 0.10 | 0.06 | 0.29 | -0.28 |

Table 12 – continued from previous page

| | Employment | | | | Hours | | | |
|---|---|---|---|---|---|---|---|---|
| | 50-59 | | 50-54 | | 50-59 | | 50-54 | |
| | M | F | M | F | M | F | M | F |
| | (0.006) | (0.005) | (0.009) | (0.008) | (0.234) | (0.185) | (0.372) | (0.274) |
| Interest | -0.03** | -0.00 | -0.03* | -0.04** | 0.97* | -0.26 | 1.97** | 0.07 |
| | (0.010) | (0.009) | (0.015) | (0.013) | (0.434) | (0.359) | (0.673) | (0.533) |
| Irritability | 0.00 | 0.03*** | 0.00 | 0.03*** | 0.48* | 0.83*** | -0.15 | 0.72* |
| | (0.006) | (0.005) | (0.008) | (0.008) | (0.218) | (0.195) | (0.335) | (0.284) |
| Appetite | -0.04*** | -0.03** | -0.06*** | -0.03* | 1.05* | 0.60 | 1.35 | 1.25* |
| | (0.011) | (0.009) | (0.016) | (0.014) | (0.496) | (0.369) | (0.765) | (0.541) |
| Fatigue | 0.01* | 0.02*** | 0.02** | 0.02** | 0.02 | 0.28 | 0.05 | 0.34 |
| | (0.006) | (0.006) | (0.009) | (0.008) | (0.236) | (0.198) | (0.368) | (0.291) |
| Concentration | -0.01 | -0.02* | -0.01 | -0.01 | -0.22 | -0.03 | -0.34 | -0.37 |
| | (0.007) | (0.007) | (0.010) | (0.010) | (0.295) | (0.264) | (0.453) | (0.384) |
| Enjoyment | -0.03*** | -0.01 | -0.03** | -0.02 | 0.09 | 1.23*** | -0.28 | 1.34** |
| | (0.008) | (0.008) | (0.012) | (0.012) | (0.334) | (0.310) | (0.516) | (0.441) |
| Tearfulness | -0.02** | -0.03*** | -0.02 | -0.02** | -0.80* | -0.57** | -0.71 | -0.68* |
| | (0.008) | (0.005) | (0.011) | (0.008) | (0.313) | (0.194) | (0.483) | (0.283) |
| Aged 51 | -0.00 | 0.01 | 0.01 | 0.02 | -1.25 | -0.28 | -1.37 | -0.17 |
| | (0.021) | (0.014) | (0.019) | (0.014) | (0.767) | (0.490) | (0.783) | (0.495) |
| Aged 52 | -0.02 | -0.00 | -0.01 | 0.00 | -1.13 | 0.67 | -1.29 | 0.75 |
| | (0.021) | (0.014) | (0.019) | (0.014) | (0.767) | (0.488) | (0.783) | (0.494) |
| Aged 53 | -0.02 | -0.01 | -0.00 | -0.01 | -1.04 | 0.21 | -1.20 | 0.34 |
| | (0.021) | (0.014) | (0.019) | (0.014) | (0.759) | (0.482) | (0.776) | (0.488) |
| Aged 54 | -0.03 | -0.02 | -0.01 | -0.01 | -0.84 | 0.32 | -1.02 | 0.43 |

Table 12 – continued from previous page

| | Employment | | | | Hours | | | |
|---|---|---|---|---|---|---|---|---|
| | 50-59 | | 50-54 | | 50-59 | | 50-54 | |
| | M | F | M | F | M | F | M | F |
| | (0.021) | (0.014) | (0.019) | (0.014) | (0.756) | (0.482) | (0.773) | (0.489) |
| Aged 55 | -0.03 | -0.05*** | | | -0.61 | -0.12 | | |
| | (0.021) | (0.014) | | | (0.754) | (0.483) | | |
| aged 56 | -0.06** | -0.08*** | | | -0.95 | -0.04 | | |
| | (0.021) | (0.014) | | | (0.756) | (0.484) | | |
| aged 57 | -0.08*** | -0.10*** | | | -0.94 | -0.13 | | |
| | (0.021) | (0.014) | | | (0.756) | (0.486) | | |
| aged 58 | -0.14*** | -0.15*** | | | -0.92 | -0.31 | | |
| | (0.021) | (0.014) | | | (0.759) | (0.493) | | |
| Aged 59 | -0.16*** | -0.20*** | | | -1.04 | -0.85 | | |
| | (0.021) | (0.014) | | | (0.763) | (0.500) | | |
| 12. Germany | 0.10*** | 0.14*** | 0.04 | 0.05* | -1.04 | -0.80 | -0.92 | -0.96 |
| | (0.014) | (0.013) | (0.020) | (0.020) | (0.536) | (0.482) | (0.842) | (0.700) |
| 13. Sweden | 0.17*** | 0.29*** | 0.09*** | 0.17*** | -1.55** | 4.85*** | -0.50 | 4.27*** |
| | (0.016) | (0.015) | (0.024) | (0.025) | (0.598) | (0.520) | (0.987) | (0.816) |
| 14. Netherlands | 0.14*** | 0.13*** | 0.10*** | 0.08*** | -2.80*** | -5.70*** | -2.08* | -5.28*** |
| | (0.015) | (0.014) | (0.022) | (0.022) | (0.576) | (0.528) | (0.900) | (0.764) |
| 15. Spain | 0.04** | 0.01 | -0.01 | -0.06** | -2.74*** | 4.04*** | -2.20* | 3.47*** |
| | (0.014) | (0.014) | (0.021) | (0.021) | (0.570) | (0.528) | (0.916) | (0.774) |
| 16. Italy | 0.06*** | -0.02 | 0.05* | -0.08*** | -3.49*** | 1.99*** | -3.41*** | 1.47* |
| | (0.014) | (0.013) | (0.021) | (0.020) | (0.562) | (0.523) | (0.881) | (0.751) |
| 17. France | 0.07*** | 0.16*** | 0.07*** | 0.09*** | -2.80*** | 1.85*** | -2.04* | 1.29 |

Table 12 – continued from previous page

| | Employment | | | | Hours | | | |
|---|---|---|---|---|---|---|---|---|
| | 50-59 | | 50-54 | | 50-59 | | 50-54 | |
| | M | F | M | F | M | F | M | F |
| | (0.013) | (0.013) | (0.019) | (0.020) | (0.527) | (0.477) | (0.814) | (0.697) |
| 18. Denmark | 0.11*** | 0.18*** | 0.04* | 0.09*** | -3.72*** | 2.16*** | -2.45** | 1.85** |
| | (0.014) | (0.013) | (0.019) | (0.020) | (0.522) | (0.473) | (0.810) | (0.686) |
| 19. Greece | 0.05** | -0.17*** | 0.02 | -0.23*** | -1.30* | 3.77*** | -0.38 | 2.57** |
| | (0.016) | (0.015) | (0.023) | (0.023) | (0.617) | (0.632) | (0.951) | (0.888) |
| 20. Switzerland | 0.16*** | 0.19*** | 0.09*** | 0.09*** | 1.03 | -3.37*** | 2.31* | -3.88*** |
| | (0.015) | (0.014) | (0.022) | (0.022) | (0.561) | (0.501) | (0.904) | (0.756) |
| 23. Belgium | 0.04** | 0.05*** | 0.04* | 0.02 | -2.03*** | -1.42** | -0.74 | -1.49* |
| | (0.013) | (0.012) | (0.018) | (0.019) | (0.503) | (0.459) | (0.777) | (0.659) |
| 25. Israel | 0.10*** | 0.09*** | 0.01 | 0.01 | 0.82 | 2.38*** | -0.33 | 1.30 |
| | (0.018) | (0.017) | (0.027) | (0.027) | (0.721) | (0.643) | (1.179) | (0.984) |
| 28. Czech Republic | 0.11*** | 0.17*** | 0.02 | 0.14*** | -0.15 | 8.77*** | -0.19 | 8.00*** |
| | (0.014) | (0.013) | (0.021) | (0.021) | (0.555) | (0.486) | (0.904) | (0.723) |
| 29. Poland | -0.08*** | -0.08*** | -0.10*** | -0.04 | 0.64 | 6.21*** | 0.35 | 7.07*** |
| | (0.018) | (0.017) | (0.028) | (0.028) | (0.791) | (0.738) | (1.272) | (1.027) |
| 30. Ireland | 0.09* | -0.02 | 0.05 | -0.08 | 0.23 | -1.57 | 3.62 | -0.80 |
| | (0.035) | (0.035) | (0.050) | (0.054) | (1.286) | (1.339) | (2.007) | (1.995) |
| 31. Luxembourg | 0.00 | -0.01 | 0.11** | 0.01 | -1.02 | -1.90* | 1.56 | -1.48 |
| | (0.021) | (0.021) | (0.033) | (0.033) | (0.851) | (0.797) | (1.346) | (1.168) |
| 32. Hungary | -0.01 | 0.06** | -0.13*** | 0.04 | -2.31* | 8.68*** | -1.76 | 6.02*** |
| | (0.022) | (0.021) | (0.033) | (0.034) | (0.920) | (0.836) | (1.552) | (1.212) |
| 33. Portugal | 0.00 | 0.11*** | 0.02 | 0.06 | -17.09*** | -8.76*** | -20.36*** | -12.87*** |

Table 12 – continued from previous page

| | Employment | | | | Hours | | | |
|---|---|---|---|---|---|---|---|---|
| | 50-59 | | 50-54 | | 50-59 | | 50-54 | |
| | M | F | M | F | M | F | M | F |
| | (0.024) | (0.021) | (0.039) | (0.034) | (1.013) | (0.840) | (1.683) | (1.275) |
| 34. Slovenia | -0.08*** | -0.05*** | -0.02 | 0.02 | -2.28*** | 6.33*** | -0.51 | 5.84*** |
| | (0.016) | (0.015) | (0.024) | (0.024) | (0.659) | (0.591) | (1.033) | (0.844) |
| 35. Estonia | 0.06*** | 0.16*** | -0.00 | 0.07*** | -2.37*** | 6.14*** | -1.59 | 6.01*** |
| | (0.015) | (0.014) | (0.021) | (0.021) | (0.577) | (0.490) | (0.908) | (0.727) |
| 47. Croatia | -0.15*** | -0.15*** | -0.25*** | -0.13*** | -1.58 | 7.11*** | -1.55 | 7.85*** |
| | (0.025) | (0.023) | (0.037) | (0.036) | (1.083) | (1.004) | (1.845) | (1.383) |
| wave=2 | 0.05*** | 0.06*** | 0.04** | 0.05*** | -1.15** | -1.29** | -0.76 | -2.50*** |
| | (0.010) | (0.010) | (0.013) | (0.014) | (0.376) | (0.392) | (0.546) | (0.533) |
| wave=4 | 0.05*** | 0.12*** | 0.03* | 0.09*** | -1.36*** | -0.88* | -1.16* | -2.00*** |
| | (0.010) | (0.010) | (0.013) | (0.014) | (0.378) | (0.385) | (0.553) | (0.528) |
| wave=5 | 0.07*** | 0.14*** | 0.02 | 0.10*** | -0.88* | -0.19 | -0.35 | -1.14* |
| | (0.009) | (0.010) | (0.013) | (0.014) | (0.365) | (0.371) | (0.529) | (0.507) |
| wave=6 | 0.08*** | 0.15*** | 0.03* | 0.10*** | -0.04 | 0.09 | 0.34 | -1.40** |
| | (0.010) | (0.010) | (0.014) | (0.014) | (0.378) | (0.382) | (0.563) | (0.529) |
| wave=7 | 0.16* | 0.20*** | 0.32 | 0.12* | -3.10 | -0.13 | -7.69 | 0.08 |
| | (0.076) | (0.026) | (0.168) | (0.059) | (2.810) | (0.967) | (6.311) | (2.128) |
| isced=1 | -0.01 | -0.01 | 0.01 | -0.05* | 1.44 | 1.51 | 1.15 | 2.50* |
| | (0.019) | (0.018) | (0.028) | (0.027) | (0.818) | (0.820) | (1.271) | (1.168) |
| isced=2 | 0.03 | 0.04* | 0.03 | 0.00 | 1.29 | 0.75 | 1.56 | 2.49* |
| | (0.019) | (0.018) | (0.026) | (0.026) | (0.778) | (0.786) | (1.184) | (1.100) |
| isced=3 | 0.08*** | 0.15*** | 0.09*** | 0.11*** | 0.72 | 1.74* | 0.60 | 3.65*** |

Table 12 – continued from previous page

| | Employment | | | | Hours | | | |
|---|---|---|---|---|---|---|---|---|
| | 50-59 | | 50-54 | | 50-59 | | 50-54 | |
| | M | F | M | F | M | F | M | F |
| | (0.018) | (0.017) | (0.026) | (0.026) | (0.762) | (0.771) | (1.157) | (1.073) |
| isced=4 | 0.11*** | 0.25*** | 0.11*** | 0.21*** | 0.95 | 1.60 | 0.71 | 3.55** |
| | (0.021) | (0.020) | (0.030) | (0.030) | (0.860) | (0.838) | (1.317) | (1.185) |
| isced=5 | 0.13*** | 0.26*** | 0.12*** | 0.22*** | 1.25 | 3.54*** | 1.35 | 5.06*** |
| | (0.019) | (0.018) | (0.026) | (0.026) | (0.770) | (0.775) | (1.170) | (1.082) |
| isced=6 | 0.24*** | 0.29*** | 0.18*** | 0.25*** | 4.18*** | 8.36*** | 2.60 | 10.23*** |
| | (0.029) | (0.033) | (0.042) | (0.049) | (1.085) | (1.141) | (1.701) | (1.679) |
| Single | -0.08*** | 0.05*** | -0.10*** | 0.04*** | -1.14*** | 1.78*** | -0.89* | 1.73*** |
| | (0.006) | (0.006) | (0.009) | (0.009) | (0.257) | (0.202) | (0.391) | (0.309) |
| Immigrant | -0.04*** | -0.02* | -0.06*** | -0.04*** | -0.86** | 0.37 | -1.06* | 0.11 |
| | (0.008) | (0.008) | (0.011) | (0.011) | (0.315) | (0.277) | (0.484) | (0.411) |
| Constant | 0.39*** | 0.25*** | 0.45*** | 0.40*** | 39.03*** | 27.64*** | 39.51*** | 27.51*** |
| | (0.037) | (0.032) | (0.049) | (0.047) | (1.460) | (1.268) | (2.112) | (1.769) |
| $N$ | 26,068 | 35,598 | 10,006 | 14,862 | 19,540 | 22,120 | 8,169 | 10,356 |

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Standard errors in parentheses

Source: SHARE 2004-2017

[a]: 1(good)-5(bad) European scale

[b]: Yes (1) No (0).

[c]: Limited in activities because of health [3(no)-1 scale(severely) scale].

[d]: Number of limitations with activities of daily living(0-6 scale).

[e]: Number of imitations with instrumental activities of daily living(0-9 scale).