Organisation de Coopération et de Développement Économiques
Organisation for Economic Co-operation and Development

DIRECTORATE FOR EMPLOYMENT, LABOUR AND SOCIAL AFFAIRS
EMPLOYMENT, LABOUR AND SOCIAL AFFAIRS COMMITTEE

OECD SOCIAL, EMPLOYMENT AND MIGRATION WORKING PAPERS No. 170

THE IMPACT OF DEPRESSION ON EMPLOYMENT OF OLDER WORKERS IN EUROPE

By Justine Knebelmann (International Growth Centre) and Christopher Prinz (OECD)

All Social, Employment and Migration Working Papers are available on:
www.oecd.org/els/workingpapers.

DIRECTORATE FOR EMPLOYMENT, LABOUR AND SOCIAL AFFAIRS

www.oecd.org/els

OECD SOCIAL, EMPLOYMENT AND MIGRATION WORKING PAPERS

www.oecd.org/els/workingpapers

OECD Working Papers should not be reported as representing the official views of the OECD or of its member countries. The opinions expressed and arguments employed are those of the author(s).

Working Papers describe preliminary results or research in progress by the author(s) and are published to stimulate discussion on a broad range of issues on which the OECD works. Comments on Working Papers are welcomed, and may be sent to the Directorate for Employment, Labour and Social Affairs OECD, 2 rue André-Pascal, 75775 Paris Cedex 16, France.

This series is designed to make available to a wider readership selected labour market, social policy and migration studies prepared for use within the OECD. Authorship is usually collective, but principal writers are named. The papers are generally available only in their original language – English or French – with a summary in the other.

This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

ACKNOWLEDGEMENTS

SHARE disclaimer

SUMMARY

According to the World Health Organization, depression is the highest ranking cause of disease in middle- and high income countries; it costs Europe around EUR 118 billion a year, mostly through lost productivity on the labour market, i.e. labour supply loss, sickness absence, and poor performance at the workplace. Using data from waves 1, 2 and 4 of the Survey of Health, Ageing and Retirement in Europe (SHARE), this paper seeks to assess the magnitude of the impact of depression on labour market outcomes of older workers, a population sub-group whose participation in the labour market is ever more crucial in view of rapid population ageing.

For each of the studied outcomes, analyses show a substantial impact of depression, measured with the European Depression Scale. Using different methods to address endogeneity this paper finds that depression decreases the probability of being employed by 22 to 51 percentage points among the 50 to 64 year old age group. Older workers with the most symptoms are more than twice as likely as others to exit employment before retirement age. Finally, depression increases annual sickness absence duration by 7.2 days on average. These figures show the necessity for national and firm-level employment policies and programmes targeting the 50 and over population to include prevention of depression, increased awareness of depression and adequate medical support.

RESUMÉ

Selon l'Organisation mondiale de la santé, la dépression détient le haut du classement parmi les causes de maladie dans les pays à revenu intermédiaire et élevé ; elle coûte à l'Europe environ 118 billions EUR chaque année, principalement en perte de productivité sur le marché du travail, c'est-à-dire, une perte d'offre d'emploi, de l'absentéisme pour maladie et une performance réduite au travail. En prenant les vagues 1, 2 et 4 de l'Enquête sur la santé, le vieillissement et la retraite en Europe (SHARE), ce rapport cherche à évaluer l'ampleur de l'incidence de la dépression sur les résultats du marché du travail chez les travailleurs âgés, une catégorie de la population dont la participation au marché du travail est plus que jamais cruciale, au regard du vieillissement rapide de la population.

Pour chacun des résultats étudiés, les analyses montrent un impact considérable de la dépression, mesuré grâce à l'échelle européenne pour la dépression. Utilisant plusieurs méthodes pour remédier à l'endogénéité, ce rapport montre que la dépression réduit la probabilité des personnes âgées de 50 à 64 ans d'être employées de 22 à 51 points de pourcentages. Il est plus de deux fois plus probable que les seniors ayant le plus de symptômes quittent leur emploi avant l'âge de la retraite. Enfin, la dépression augmente la durée annuelle des absences pour maladie de 7.2 jours en moyenne. Ces chiffres montrent la nécessité, tant au niveau national qu'à celui des entreprises, d'élaborer des politiques et des programmes pour l'emploi qui ciblent les personnes âgées de 50 ans et plus, en incluant la prévention et une sensibilisation accrue à la dépression, ainsi qu'un soutien médical adéquat.

TABLE OF CONTENTS

THE IMPACT OF DEPRESSION ON EMPLOYMENT OF OLDER WORKERS IN EUROPE

Introduction

1.   According to the World Health Organization, unipolar depression is the highest ranking cause of disease[1] in middle and high income countries, and the third worldwide (WHO, 2008). Around 27% of Europeans suffer from anxiety or depression during one given year. In addition to the obvious detrimental effects on well-being, mental health problems impose a substantial cost on society, the value of which is estimated at 3-4% of GDP on average in member states of the European Union (ILO, 2000, Gustavsson et al., 2011). Depression alone costs Europe around EUR 118 billion a year (Sobocki et al., 2006). However, the direct costs in the health and social sectors – i.e. outpatient care, drugs, hospitalisation – only account for the smaller share. Most costs – around two thirds - are due to lost productivity on the labour market, through labour supply loss, sickness absence, and poor performance at the workplace (Sobocki et al., 2006). As an illustration, the cost of lost productivity due to depression is more than twice that of productivity loss due to cardiovascular diseases in Europe (McDaid et al., 2008).

2.   In spite of these striking figures, mental health problems and depression more precisely are not systematically taken into account in studies on the determinants of labour market outcomes – nor sufficiently considered in policies designed to influence these outcomes. In this context, this paper seeks to assess the magnitude of the impact of depression on employment and productivity, as a way to make a case for increased awareness and prevention of this "hidden burden".

3.   Among the working-age population, this study focuses on individuals whose ties to the labour market are particularly fragile: the 50 plus age group. Indeed, because of rapid population ageing in Europe and the threat that this demographic phenomenon represents for the sustainability of public social expenditure, labour market participation of older workers is becoming ever more crucial. The old-age dependency ratio[2] in European countries is expected to double by 2050, and by 2030, one in every three workers will be over 50. Yet, in most countries, the effective retirement age is below the official full-rate pension age. In 2012, the employment rate of the 55-64 years old in Europe was 48.4%[3]. It is therefore essential to identify the factors that drive older workers away from employment, mental-ill health potentially being one of them.

4.   For the analyses, data from the Survey of Health, Ageing and Retirement in Europe (SHARE) are used. This longitudinal survey, launched in 2004, collects data on health, socio-economic status, employment, activities and social networks of more than 85 000 Europeans aged 50 and above. Four waves have been carried out between 2004 and 2011-12. Thanks to the variety of domains it covers, and to its longitudinal dimension, SHARE offers a unique opportunity for researchers interested in this particular age group.

5.   The measure for depression that is used in SHARE is the European Depression Scale, which has been validated as an instrument to assess the presence of depression symptoms in a cross-country setting in previous studies (Dewey and Prince, 2005). The Euro-D scale comprises 12 items taking values 0 (no) or 1 (yes): feeling sad or depressed, having no hopes for the future as a measure of pessimism, suicidal feelings, guilt, sleeping disorders, lack of interest, irritability, no appetite, fatigue, inability to concentrate,

---

1.   Measured using the DALY methodology (Disability Adjusted Life Year).

2.   Ratio of the 65 and over population to the 15-64 population.

3.   OECD Older Workers scoreboards. http://www.oecd.org/employment/ageingandemploymentpolicies.htm.

lack of enjoyment, tearfulness; and thus the total score ranges from 0 – none of the symptoms, to 12 – very depressed. This paper adopts the same methodology as the one used in the latest OECD report on mental health and employment 'Sick on the Job? Myths and Realities about Mental Health and Work'. Since the aim is to analyse the labour market outcomes of people suffering from depression, and not to measure the prevalence of depression as such, the analyses rely on the findings of epidemiological surveys that concur in showing that at any given time, mental disorders affect around 20% of the population in developed countries, with minor cross-country differences – of which 15% in a moderate form and 5% in a severe form. In this paper, depression is used as a proxy for poor mental health[4]. Cultural differences in the understanding and answers to the EURO-D questions may otherwise give rise to misleading differences across countries, whereas the aim is to identify the consequences on labour market outcomes of being, in each country, at the bottom of the "mental health ladder". Therefore, for each country and each wave of SHARE, thresholds are computed for the three different groups – no depression symptoms, moderate depression symptoms, severe depression symptoms – on the 50-64 age group[5] using the distribution of the EURO-D score[6].

6.   Although in this setting the *overall* prevalence of depression for persons aged 50 to 64 is determined, it is still possible to observe variations in prevalence for population sub-groups. In line with the literature on depression that shows much higher prevalence rates for women (Dewey and Prince, 2005), the data reveal that many more women than men are affected by depression: the share of women 50 to 64 classified as having depression symptoms is around 23-24% (depending on the wave), while for men it is only around 11-12% (Figure 1.1). This suggests that any analysis of depression's impact should be gender-specific: higher prevalence of depression among women and gender differences in the acceptance of poor mental health could lead to differences in the way depression influences labour market outcomes. Finally, for both men and women, depression prevalence increases with age in later life (Figure 1.1, Panel A), but for the 50 to 64 age segment there seems to be no striking trend (Figure 1.1, Panel B).

7.   This paper contributes to the literature on depression and on older workers by first, trying to understand how depression influences the probability of persons 50 and over of being employed; and secondly, by exploring, for those who are employed, how depression affects (i) exit from employment before retirement age and (ii) productivity at work as measured by the duration of annual sickness absence.

---

4.   Depression is by far the most widespread mental disorder. See WHO Data and Statistics on Mental Health, http://www.euro.who.int/en/health-topics/noncommunicable-diseases/mental-health/data-and-statistics

5.   Since the prevalence rates (15% - 5%) are estimated on the working age population, individuals above 65 are excluded for the computation of the thresholds (OECD 2013, p.20).

6.   Some SHARE users use the 3/12 Euro-D score as a cut-off point for depression (Dewey and Prince, 2005; Clark & Fawaz 2009), others the 4/12 cut-off point (Borges Neves et al., 2013). According to country and waves, the cut-off points obtained by the methodology adopted in this paper range from 2 to 5 (and it is 3 in the majority of countries).

Figure 1.1.   Depression is more frequent among women

Prevalence of depression by age and by gender in European countries

Panel A. Persons aged 50 and over
(Share in the population)

Panel B. Persons aged 50 to 64
(Share in the population)

——— Women   – – – Men
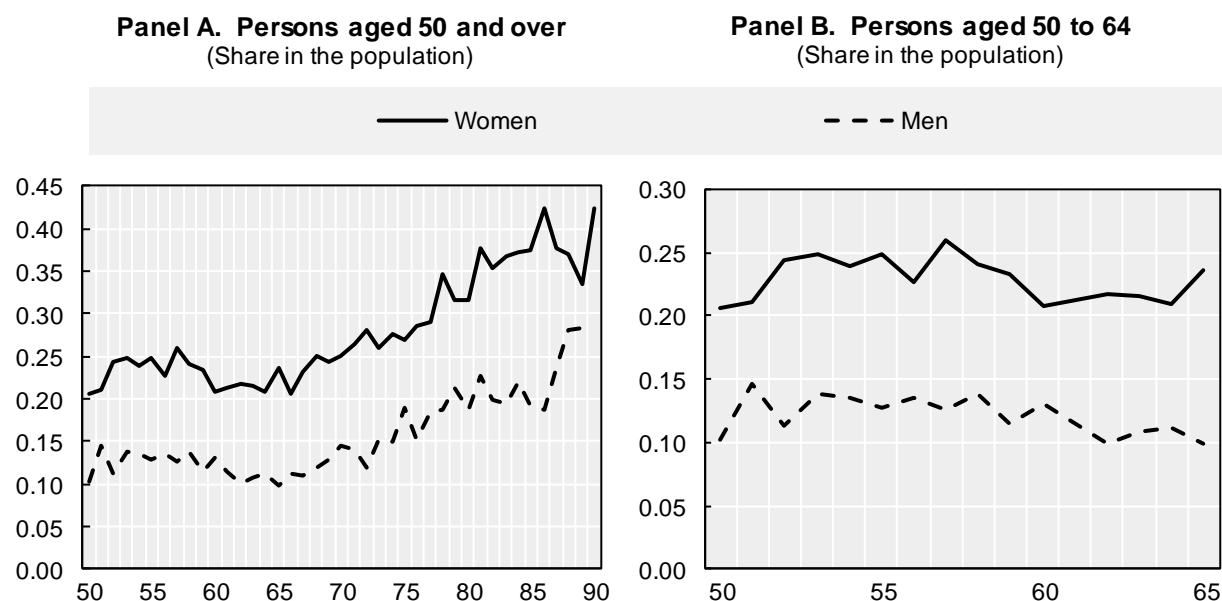
Note: 31 903 observations. Countries included are Austria, Belgium, Czech Republic, Denmark, Estonia, France, Germany, Hungary, Italy, the Netherlands, Poland, Portugal, Slovenia, Spain, Sweden and, Switzerland. Depression is measured with the Euro-D scale, assuming a 20% prevalence among the 50 to 64 year olds. The threshold obtained that way is then used for the whole 50 and over population.

Source: OECD calculations based on the Survey of Health, Ageing and Retirement in Europe (SHARE), wave 4.

1. How does depression affect employment of the 50 and over?

1.1 Significant gaps in employment rates

8.   According to the OECD report on mental health and work, the gap in employment rates for the whole working-age population between persons with and without mental disorders is around 10-15 percentage points for common mental disorders, and 25-30 percentage points for severe mental disorders. For the 50-64 age group, figures computed with SHARE data are rather on the higher side of these estimations: 14.5 percentage points for moderate depression symptoms, and 32 percentage points for severe depression symptoms[7]. These gaps vary across countries, as shown in Figure 1.2. Poland and Spain show the biggest relative differences in the employment rates, the rate for those with depression symptoms not exceeding 50-55% of the rate for persons with no depression symptoms, in both 2006 and 2011. Sweden, Spain, and Estonia display the largest gaps in absolute value (22 to 28 percentage points), while the smallest are observed in France and Slovenia.

---

7.   Calculations on the 50-64 population in wave 4 of SHARE in 2011. Employment status is self-declared and thus does not necessarily correspond to the ILO definition.

Figure. 1.2.   Poland and Spain display the largest relative difference in employment rates of the population with and without depression
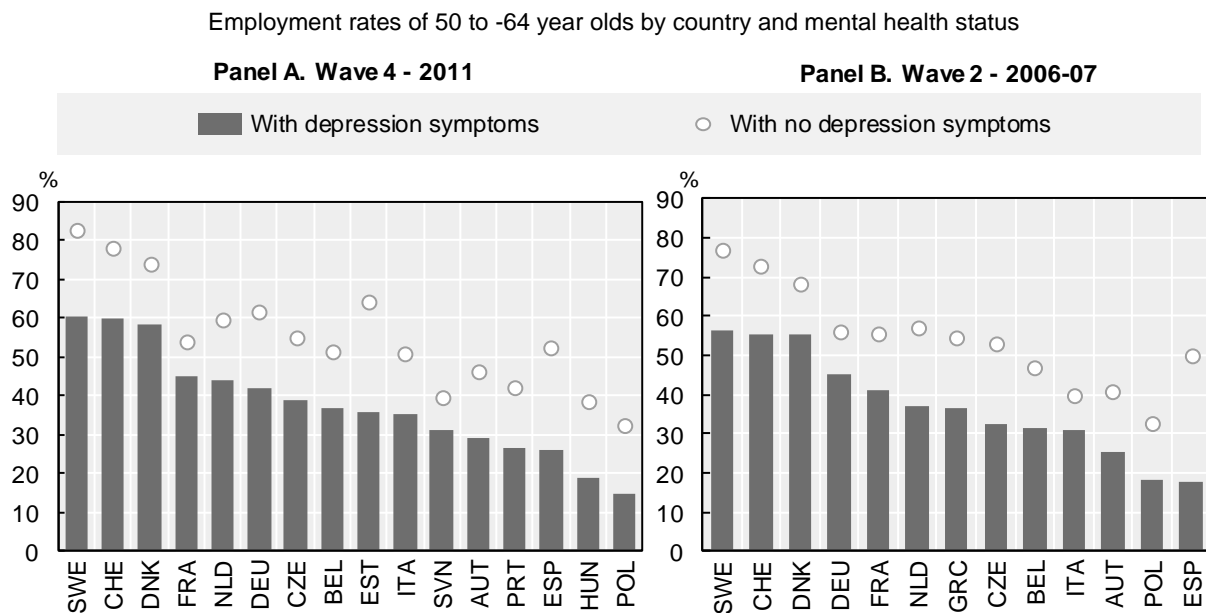
Employment rates of 50 to -64 year olds by country and mental health status

Note: Labour force status is self-declared and thus does not necessarily correspond to the ILO definition. The data are weighted.

Source: OECD calculations based on the Survey of Health, Ageing and Retirement in Europe (Share), waves 2 and 4.

9.   The employment gap is significantly higher for men than women: the difference in employment rates between persons with and without depression symptoms is 25 percentage points for men (taking moderate and severe depressive symptoms together), against 9 percentage points only for women[8] (Figure 1.3).

1.2. Issues raised by the literature

10.   However, no direct conclusions on the impact of depression on employment can be drawn from these purely descriptive statistics, for two reasons. First, depression often co-occurs with physical sicknesses or impairments: among the 50-64 population suffering from depression, around four in five also suffer from a physical condition[9] (OECD, 2012). It is therefore quite plausible, for example, that a respondent suffers from a disease or a handicap, which is the cause of his/her depression symptoms and of his/her absence from the labour market. Therefore, a multivariate analysis is necessary. Furthermore, depression and labour force status interact in both directions. Many studies have shown the impact of (un)employment on mental health, as discussed in Chapter 2 of 'Sick on the Job' (OECD, 2012). Thomas et al. (2005) show that transitions from paid work to unemployment or to inactivity lead to poorer mental health. Using SHARE data, Borges Neves et al. (2013) show that unemployment is associated with a 45% increase in the odds of depression. This reverse causality must be taken into consideration when trying to identify the impact of depression on employment.

---

8.   Calculations on the 50 to 64 population in wave 4 of SHARE in 2011.

9.   These figures from OECD, 2012 were computed using SHARE data as well.

Figure. 1.3.   The employment rate gaps between those with and without depression are larger for men

Employment rates 50 to 64 year olds by gender and intensity of depression symptoms, 16 European countries, 2011
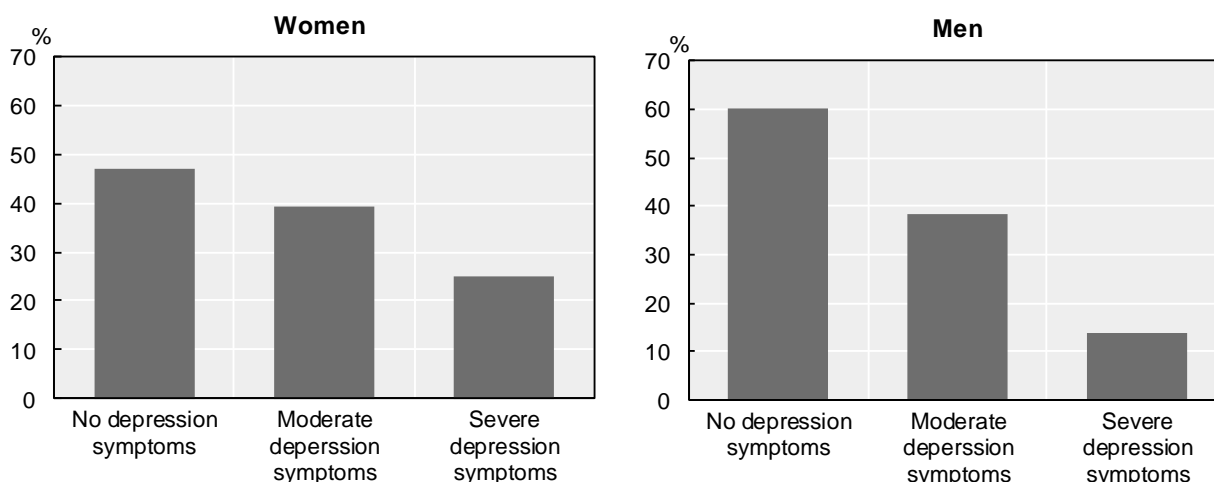
Note: Labour force status is self-declared and thus does not necessarily correspond to the ILO definition. The data are weighted. Countries are the same as those used in Figure 1.2.

Source: OECD calculations based on the Survey of Health, Ageing and Retirement in Europe, wave 4.

11.   Taking these aspects into account, the economic literature brings to light a significant impact of depression on employment, although the magnitude of this impact varies across studies. Using American data from the 2004-09 Medical Expenditure Panel Survey, Peng et al. (2013) find that depression reduces the probability of employment by 2.6 percentage points. Using the American National Comorbidity Survey-Replication, Chatterji et al. (2011) find a 9 (19) percentage points decrease in labour force participation for men (women) and 14 (13) in employment. Using data from the Household, Income, and Labour Dynamics in Australia Survey, Frijters et al. (2010) find that a one standard deviation worsening of their mental health index leads to a 17-25 percentage point decrease in the probability of employment. Similarly, with data from the Australian National Health Survey, Zhang et al. (2009) find that the decrease in the probability of employment due to depression can reach 25 percentage points. These studies concern the whole working-age population, yet, it is interesting to note that both Frijters et al. (2010) and Zhang et al. (2009) find stronger impacts of depression on employment for older workers. In the SHARE literature on the determinants of employment, self-assessed health is widely used and appears to be an interesting predictor. Yet, it cannot be combined with a variable on mental health since the two are too likely to capture the same individual characteristic(s).

1.3. Estimation of the impact of depression on employment of older workers (Annex A)

12.   The first model used in this paper is a binary response model fit to data from wave 4, the explained variable taking values 1 if employed or self-employed, or 0 if unemployed or inactive[10], and keeping individuals who are 50 to 64 years old. The regressor of interest is a dummy for depression symptoms, taking value 1 if the individual has a Euro-D score among the 20% highest of his/her country. In order to address the reverse causality issue, a recursive bivariate estimation is used[11] (Annex A). The

---

10.   Respondents had to choose one of the following modalities in the employment status question: employed or self-employed, retired, unemployed, permanently sick or disabled, homemaker, other.

11.   An instrumental variable, related to mental health status but not directly to the current employment status, must be found. The presence of depression episodes in the past (10 years or more before the first interview) is selected. See Annex A for more detail.

socio-economic characteristics that are controlled for are age, country, gender, education level, having a partner, partner employment status, children living in household, and quintiles of household income. It is also essential to control for physical health condition – knowing that physical and mental health are likely to be correlated (potentially causing multi-collinearity concerns) and, thus, trying to find variables that have a weak relation to mental health (as opposed to self-assessed health), namely the presence of two or more chronic diseases excluding depression (e.g. cardio-vascular problems, diabetes, lung diseases, cancer, arthritis[12]), and the presence of a mobility limitation[13]. Results are very similar to the higher figures found in the literature: the presence of depression symptoms decreases the probability of being employed by 22 percentage points for women, and by 26 percentage points for men (Figure 1.4).

13.   In a second specification, the longitudinal feature of SHARE data is fully exploited, in a linear probability fixed-effects model which controls for unobserved heterogeneity across individuals. This means that time-unvarying individual characteristics for which there is no data (for example motivation, risk aversion, social norms, etc.) are controlled for. Data from waves 1, 2 and 4 are used, keeping individuals who are between 50 and 59 in wave 1 (2004) and did not reach age 66 by wave 4. Here too the reverse causality problem is taken into consideration[14]. Results show that depression leads to a 31 percentage point decrease in the probability of being employed, which is larger than the impact found with the previous cross-sectional model. However, interestingly, when men and women are compared, the impact for men is no longer significant, and the one for women inflates, reaching 51 percentage points. This result is in line with Fritjters et al. (2010) who with a cross-sectional model find a significant impact of depression on employment for men and women, but with a fixed-effects model find that the effect is no longer significant for men. How can such a difference occur between the two models? It is possible that in a cross-sectional setting, the answers to the questions of the Euro-D scale, and thus the depression variable, capture aspects of a person that are not depression, but which can also impact employment, like motivation, self-esteem, personality traits. These aspects are neutralised in the fixed-effect model.

14.   Gender differences found by descriptive statistics and by in-depth modelling do not seem coherent because descriptive statistics suggest that depression makes a bigger difference for men than for women. However, as mentioned above, these estimation models also incorporate the higher depression prevalence caused by non-employment. Precisely, it has been shown that the detrimental effects on mental health of not being in employment are stronger for men than for women (OECD, 2008). A plausible hypothesis is that for men this difference in the employment gap is to a large extent caused by reverse causality (i.e. the impact of employment status on depression[15]). This is not in contradiction with the finding that the impact of depression on employment is stronger for women than for men.

---

12.   For a complete list see SHARE Wave 4 Questionnaire question PH006 http://www.share-project.org/data-access-documentation/questionnaires/questionnaire-wave-4.html

13.   For a complete list of the possible mobility limitations see SHARE Wave 4 Questionnaire question PH048

14.   Although it is preferred, the instrumental variable that was used for the bivariate probit model cannot be inserted here since it is time-unvarying (instead, average Euro-D score in the region was chosen as a time-varying instrument). That is the reason why the bivariate probit results are displayed in addition to the fixed-effects model ones, because each of the two models has its advantages and drawbacks.

15.   One other way of addressing concerns about reverse causality could be to focus on the unemployed only and assess the effect of depression on their likelihood of being employed in the next period. This could be done using SAHRELIFE – SHARE's life history module which is a retrospective panel collecting information on the entire job, health and wage history of a representative sample of older workers and retirees.

Figure. 1.4.   Depression symptoms decrease the probability of employment; in a fixed-effects setting the effect is no longer significant for men

Percentage points decrease in the probability of being employed induced by depression according to two different econometric models
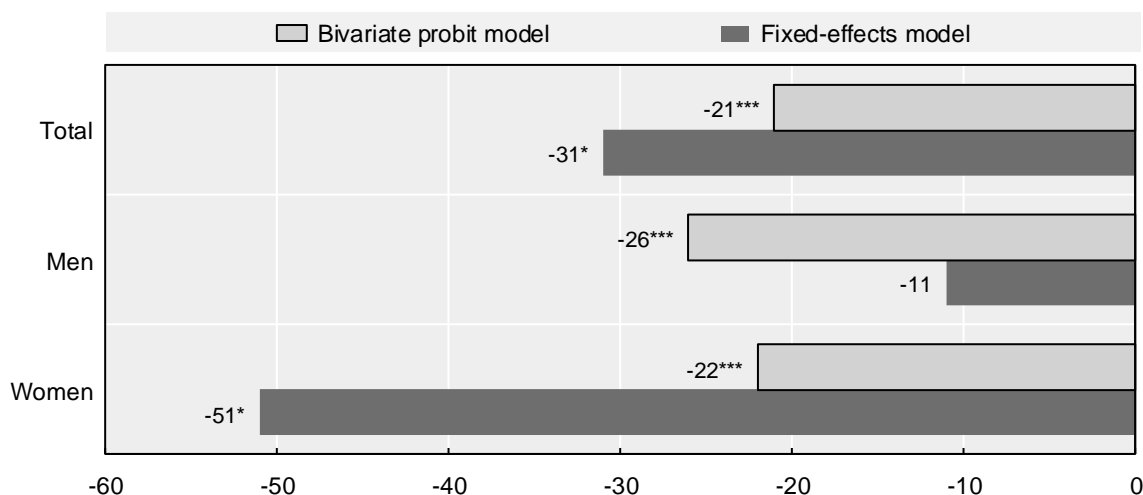
* 5% significance level **1% significance level *** 0.1% significance level

Note: In both models the explained variable is the self-declared employment status, taking value 1 if "employed or self-employed" and 0 otherwise. Instruments are used to correct for endogeneity: past depression episodes in the bivariate probit; regional Euro-D average in the fixed-effects model. See Annex A.

Source: OECD calculations based on the Survey of Health, Ageing and Retirement in Europe, waves 1, 2 and 4.

1.4. Reasons behind the lower probability of employment of older workers induced by depression

15.   This strong impact of depression on older workers' probability of employment, a 22 to 51 percentage point decrease, can be explained by various mechanisms, which exist for all ages but are reinforced for persons 50 and over. First, depression is often characterised by life-time prevalence with recurrent episodes (Kessler and Bromet, 2013). Therefore, it can weaken professional trajectories over the life cycle, through prolonged sickness absence, lack of career opportunities, reduced participation in continuing education and training, and so on. For these reasons, working conditions and job stability of employed older workers with depression history might be less satisfactory than that of others. Thus their situation can be particularly sensitive to the onset of a new depression episode, which can easily drive them away from employment, especially at this age where labour market participation is extremely sensitive to health shocks in general. For those who are not working, job prospects might be less appealing than for older workers with no depression, the onset of a depression episode thus creating a "double barrier" to employment: mental disorder in addition to dimmer prospects on the labour market, at an age where re-entry into the labour market is already very difficult irrespective of the health status. For the unemployed, the onset of a depression episode can dramatically reduce the odds of finding a job, as shown in the OECD report on mental health and work (OECD, 2012). Furthermore, as mentioned above, unemployment spells can easily trigger or worsen depression symptoms (OECD, 2008). This can drive the unemployed into a vicious circle, depression hindering access to employment and unemployment reinforcing depression. For older workers, long-term unemployment spells are much more likely to result in a definitive exit from the labour market than for younger age groups. The latest OECD country report on employment of older workers indeed shows that in France for example, 40% of older workers who lose their job become inactive, whereas only 10% of those under 50 who lose their job are inactive 18 months later (OECD, 2014). This series of OECD analyses on older workers has also shown that disability

(notably disability benefit recipiency) is often a pathway to retirement for older workers. Depression is a strong determinant of entry into disability. Using SHARE data from waves 1 and 2, Börsch-Supan et al. (2009) show that conditional on physical health, depression is a significant determinant of disability benefit recipiency. This contributes to the impact of depression on the probability of being in employment.

16.   Finally, stigma and discrimination are important obstacles to employment for persons suffering from mental health problems in general. McDaid et al. in the Mental Health Economics European Network's policy briefing on employment and mental health insist on this point. They argue that employers are often more reluctant to hire persons with mental health problems than persons with physical disabilities, because they consider the former as less productive. As an illustration, the authors mention a survey in Ireland carried out by the National Disability Authority[16] in which only 55% of the respondents thought that persons with mental ill-health should have the same access to employment as anybody else (compared to 82% when the question concerned physical disability), and 33% of respondents thought that they should not have the same opportunities as everyone else (McDaid et al., 2008). Here again, the effect might be even stronger for older workers than for other age groups, since they are already vulnerable to discrimination because of their age, and depression therefore appears as an additional discriminative factor.

17.   For all these reasons, the impact of depression on employment is likely to be stronger for persons 50 and over than for younger workers. This could explain why the results presented in this paper show bigger effects than those found in the literature for the whole working-age population. The fact that the impact of depression is no longer significant for men once fixed-effects are controlled for is consistent with Cowell et al. (2009), Fritjters et al. (2010) and Chatterji et al. (2011)[17] who also find stronger effects among women. This can be explained by men's stronger attachment to the labour market (as a consequence of cultural and social norms), and by the fact that men may less easily adjust their labour market situation to the presence of depression[18]. Indeed, psychological studies reveal that men have more negative attitudes towards depression (stronger stigma), and are less likely than women to seek help (Coppens et al., 2013; Tedstone Doherty and Kartalova-O'Doherty, 2010).

2. The role of depression in older workers' early exit from employment

2.1. Findings from the literature on (early) retirement

18.   Many studies have shown the impact of health on retirement and early-retirement, but less is known on the precise role of mental health. A few papers from the SHARE literature include depression as one of the potential factors leading to exit from employment. Blanchet and Debrand (2007), who focus on the determinants of the wish to retire, include in their model a variable for being "sad or depressed" (i.e. one of the 12 items of the Euro-D scale) but find no significant effect[19]. De Preter et al. (2012) use waves 1 and 2 and find that depression increases the probability of retirement[20]. Similarly in Alavinia and

---

16.   "National Survey of Public Attitudes to Disability", three versions carried out in 2001, 2006 and 2011 by the Irish National Disability Authority. For more information visit http://www.nda.ie

17.   More precisely, it is when labour force participation (and not employment) is considered that the effect is stronger for women.

18.   Although the impact of depression on employment is not necessarily channelled by the conscious recognition of depression status, since depression symptoms (fatigue, lack of motivation, lack of concentration…) can drive a person away from employment or hinder a person from getting a job without this person openly defining himself/herself as depressed.

19.   A possible explanation is that they also include a variable for self-assessed health, and that both variables may actually capture the same factors.

20.   They use 1/12 as a cut-off point in the Euro-D score which results in a very high depression prevalence.

Burdof (2008), who find that depression is the single chronic disease most strongly associated with all types of labour force exits. The authors also use SHARE data, however only the first wave. This does not allow for a correction of the reverse causality problem. Working with Austrian data from 2006, Biffl and Leoni (2009) find that mental health problems as a whole account for as much as 27% of early retirements (cited in OECD, 2012). Similarly, according to the German Federal Health Monitoring (2007), mental health problems are the leading cause of early retirement in Germany since 1996 (McDaid et al., 2008).

2.2. Results: depression's role in early exit from employment (Annex B)

19.   In this analysis, the focus is on the 50-59 years old population from 12 countries[21], working in 2006 (wave 2), who by 2011 (wave 4) have not reached the legal retirement age of their country/gender[22]. The outcome of interest is whether they are still working in 2011, or have exited employment (early exit)[23]. It could be argued that such an exit out of employment is not necessarily early retirement, i.e. the definitive end of one's working life. However, the figures show that for this age group the odds of going back to work later are extremely low. Individuals of the sample are between 54 and 65 in 2011; as an illustration, among those who were in that age group and not working in 2006, only 3.6% are employed in 2011.

20.   Figure 2.1 shows the 2011 employment statuses of the selected sample. It appears that a smaller proportion remain employed in the group with depression symptoms (68%, against 73% for those with no depression symptoms). The proportion of those who declare themselves as "retired" is not bigger for the group with depression symptoms, however, for this group, the shares of "unemployed", "permanently sick or disabled" and "homemaker" are larger. For the same reason as previously, a multivariate analysis is necessary in order to distinguish the effects of depression from the ones of factors that can be correlated to it. The same covariates as for the model on employment in section 1 are used: socio-economic characteristics (age, country, gender, education level, having a partner, partner employment status, children living in household, quintiles of household income) and physical health (presence of two or more chronic diseases excluding depression, presence of a mobility limitation). To these, variables on job characteristics are added: being self-employed, working part-time, and individual working conditions[24]. In a logistic regression, the explained variable takes value 0 if the respondent is still working in 2011 and value 1 if s/he is retired, unemployed, permanently sick or disabled, homemaker or "other".

---

21.   Countries that participated in waves 2 and 4: Austria, Belgium, the Czech Republic, Denmark, France, Germany, Italy, the Netherlands, Poland, Spain, Sweden and Switzerland.

22.   Legal retirement age by country (if different the age used for calculations is in brackets): Austria: Men 65, Women 60; Belgium 65; Czech Republic gradually increasing with no upper limit (65); Denmark 65; France increasing from 60 to 62 (60); Germany: 65+1 month (65); Italy: Men 66, Women 62/63 (62); the Netherlands 65; Poland: Men 65, Women 60; Spain 67 since 2011 (65); Sweden 61; Switzerland: Men 65, Women 64; (OECD, Pensions at a Glance, 2013)

23.   A multinomial analysis taking into consideration the different categories of non-employment (retired, unemployed, permanently sick or disabled, homemaker, other) would be very interesting but the sample sizes are quite small.

24.   Self-employed is a dummy taking value 1 if the respondent declares being self-employed. Working part-time is a dummy taking value 1 if the respondent declares working no more than 30 hours a week. The working conditions index is composed of 8 items – job satisfaction, receiving adequate support in difficult situations, receiving the recognition one deserves, job physically demanding, being under constant time pressure due to a heavy workload, having freedom to decide how to do one's work, job security, and receiving adequate salary or earnings - each scoring between 1 (worst) and 4 (best). The total score thus ranges from 8 to 32.

Figure 2.1.   There are more exits from employment among those with depression symptoms

Employment status in 2011 by mental health status at baseline, for 50 to 59 year olds working in 2006-07

Note: Labour force status is self-declared and thus does not necessarily correspond to the ILO definition. Countries: Austria, Belgium, Czech Republic, Denmark, France, Germany, Italy, the Netherlands, Poland, Spain, Sweden and Switzerland.

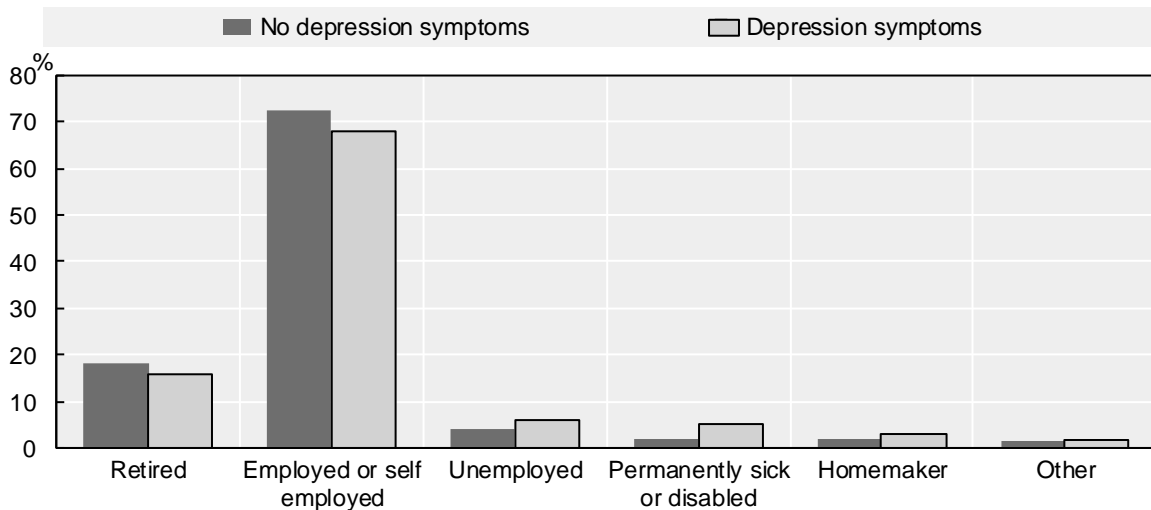*Source*: OECD calculations based on the Survey of Health, Ageing and Retirement in Europe, wave 2. The data are weighted.

21.   Even after controlling for the different socio-demographic, health and job characteristics variables, it appears that depression does have an impact on early exit out of employment: having depression symptoms increases the odds of exit by 30%. The impact appears to be higher than that of chronic diseases. There is no significant difference between the impact for men and women.

22.   The difference in the predicted probability of exit by age is displayed in Figure 2.2., Panel A. In a second logistic regression, individuals with depression are distinguished according to the intensity of their depressive symptoms. The results show that the gap in probabilities of exiting employment is mostly driven by the group having the most symptoms. Indeed, in this second regression, there is no longer a statistically significant difference between the group with no symptoms and the group with moderate symptoms. However, the impact of severe depression symptoms is quite substantial: for those with more severe symptoms, the odds of exiting employment are 2.34 to 1, severe depression symptoms making older workers more than twice as likely to exit employment within four years. The impact does not vary in a significant way between men and women. Results of the logistic regression are shown in Figure 3.1.

2.3. The impact of depression is larger at younger ages of the age group

23.   Figure 2.2 Panel B shows that the impact of severe depression symptoms is not constant over age[25]: it is stronger for the younger individuals of the age group. This could be due to a selection issue. Contrary to physical chronic diseases (such as those measured here, i.e. cancer, cardio-vascular problems, cognitive impairments, arthritis) and mobility limitations which are more prevalent past a certain age, the onset of depression most often occurs earlier in life (Marcus et al., 2012). Therefore, it is possible that by the age of 54/55, individuals for whom depression represents a substantial obstacle to employment have already left the labour market. Indeed, data for a range of OECD countries suggest that retirement due to mental health problems occurs at an earlier age than for other health problems (OECD, 2010). Another

---

25.   The logistic regression includes interaction variables *moderate symptoms X age* and *severe symptoms X age*. Only the latter is significant (Annex B).

possible explanation could be that the closer people are to retirement, the smaller is the role that mental health plays in the decision to remain in employment or to exit employment. How could this work? Because depression is not always well-known, neither systematically diagnosed nor assumed, contrarily to other sicknesses, depression symptoms may be considered as a "bearable burden" if only a short period is left before retirement. However, even if depression does not systematically trigger employment exit, it remains an issue: a public health issue since like any other disease it hinders the well-being of those who suffer from it, but also an economic issue at the workplace: people suffering from depression symptoms are likely to be less efficient at work and absent more often, an issue that is explored in section 3.

Figure. 2.2.   Those with more severe depression symptoms are on average twice more likely to exit employment

Probability of exiting employment for older workers aged 50-64 in 2006 by mental health status

Panel A. Impact of depression

Panel B. Impact of different intensities of depression
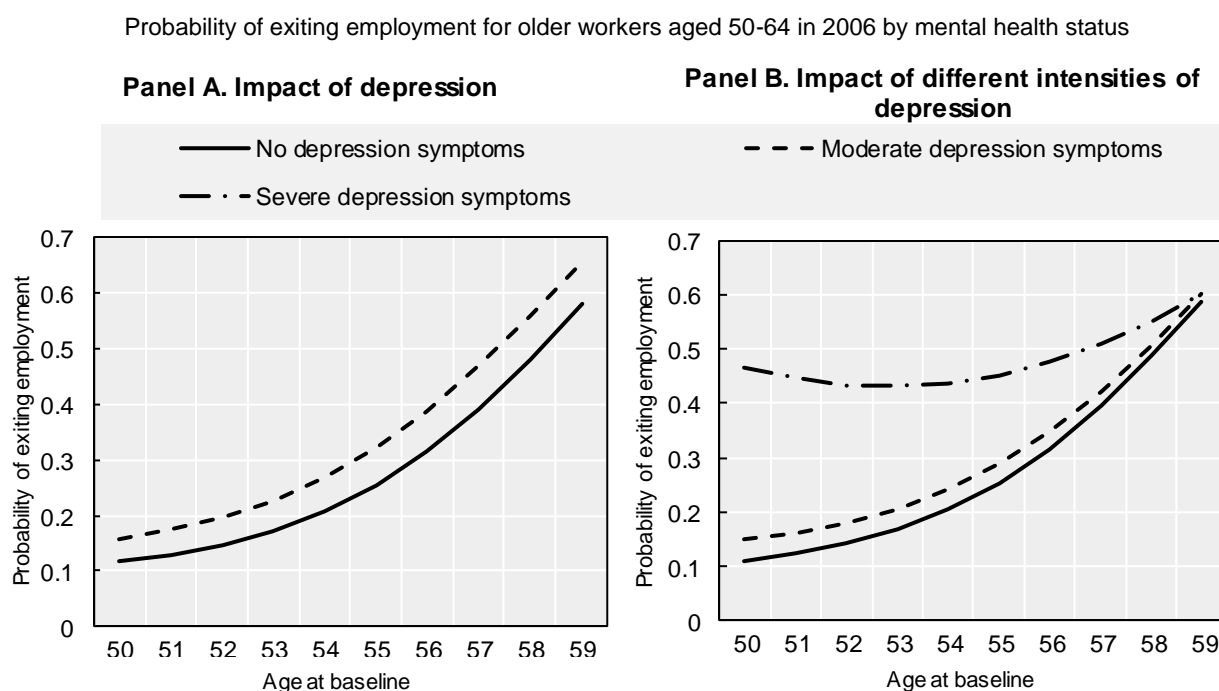
Note: Results from two separate logistic regressions. Panel A: The difference in probabilities between the group with depression symptoms and the group with no depression symptoms is significant at a 5% significance level. Panel B: The difference between the group with no depression symptoms and the group with moderate symptoms is not significant. The difference between the group with severe symptoms and the two other groups is significant at a 1% significance level.

Source: OECD calculations based on the Survey of Health, Ageing and Retirement in Europe (SHARE), waves 2 and 4.

24.   Taking into account physical and mental health through depression, it appears that the latter plays a significant role in older workers' early exit from employment. Therefore, mental health of older workers is all the more crucial as in many European countries, legal retirement age is increasing and older workers will be expected to stay longer in the labour market.

3. Depression as a determinant of older workers' sickness absence (Annex C)

25.   Sickness absence duration is used as a proxy for deteriorated worker productivity, since SHARE data do not offer any other direct way to measure performance *at* the workplace. Mental health problems in general play a substantial role in sickness absence: a 2005 comparative cross-European study shows that, in some countries, they are gradually replacing musculoskeletal problems as the first cause of sickness absence (McDaid et al., 2008).

26.   Using data from the European Working Conditions Survey, the recent OECD report on employment and mental health shows that severe (moderate) mental disorders lead to an increase in annual sick leave by 12.1 (3.5) days. Mental health problems are a predictor of both short-term and long-term sick leave, increasing the probability of short-term sick leave by 10% and that of long-term sick leave by 6% (moderate disorders) to 13% (severe disorders). However, these figures concern the whole working-age population (OECD, 2012). Focusing on older employees, Leijten et al. (2013) find that psychological health complaints correspond to the health-related issue that contributes most strongly to sickness absence.

Figure 3.1.   Depression symptoms are a major determinant of the exit from employment

Determinants of exit from employment by 2011 for individuals aged 50 to 59 in 2006, odds ratios
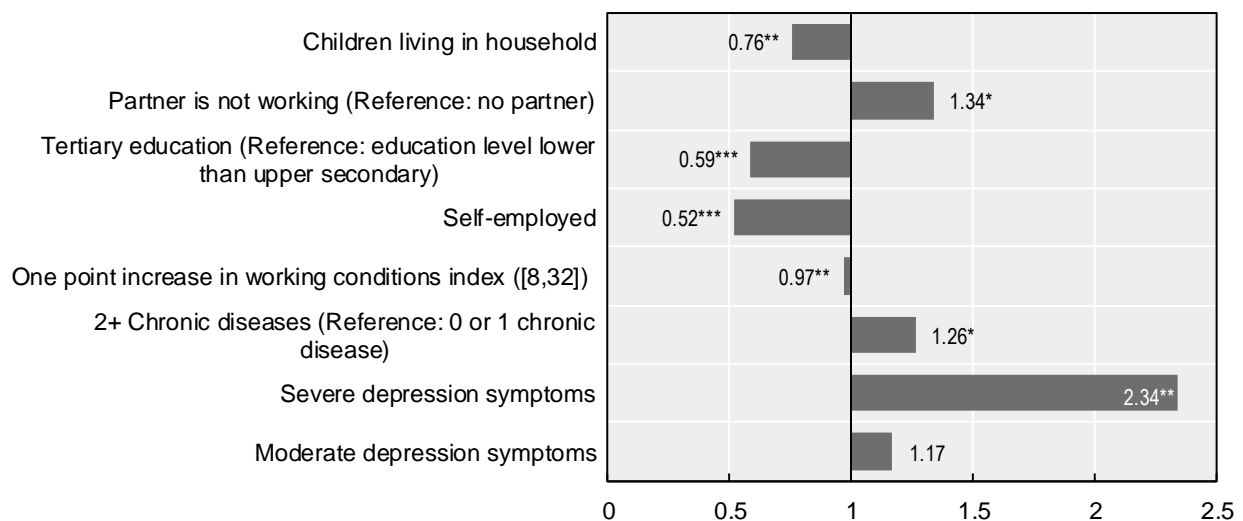
* 5% significance level **1% significance level *** 0.1% significance level

Note: Results from a logistic regression in which the explained variable takes value 1 if an individual exited employment between 2006-07 and 2011 and value 0 if and individual remained in employment. N=3 485. "All things being equal, the odds of exiting employment for someone with severe depression symptoms are 2.34 to 1". Non-displayed control variables: age, age square, country, moderate (severe) depression symptoms interacted with age. Variables non displayed because not significant: mobility limitation, working part time, gender, secondary education versus primary education or no education, partner is working vs no partner, quintiles of household incomes.

Source: OECD calculations based on the Survey of Health, Ageing and Retirement in Europe (SHARE), wave 4.

27.   Descriptive statistics from SHARE data hint to similar associations – although with depression in particular rather than with all mental health problems. Keeping individuals from wave 4 (2011), and from 15 countries[26], who are between 50 and 64 and declare themselves as employed or self-employed, it appears that 48.7% of those with depression symptoms missed some days from work in the past year because of health problems, against only 33.4% of those with no depression symptoms. The average number of missed days is 7.4 for those with no depression symptoms, 18 for those with moderate depression symptoms and 29 for those with severe depression symptoms.

28.   In order to assess the precise contribution of depression symptoms to sick-leave duration, a negative binomial regression[27] is fit to the data. The control variables that are integrated in the model are

---

26.   Countries are those present in SHARE wave 4: Austria, Belgium, Czech Republic, Denmark, Estonia, France, Germany, Hungary, Italy, the Netherlands, Poland, Portugal, Slovenia, Spain and Sweden.

27.   This type of regression is used for modelling count data (in this case a number of missed days) when there is over-dispersion, i.e. when the mean of the variable is inferior to its variance. See Annex.

gender, age, country, education level, working conditions, being self-employed, and the same physical health variables as used previously: presence of two or more chronic diseases and presence of mobility limitations (Figure 3.2). Depression symptoms have a significant and large effect: they account for an additional 7.2 days of annual sickness leave[28]. The difference in the effect between men and women is not significant, nor is the difference in the effect between moderate and severe symptoms. All intensities of depression symptoms thus contribute to increased sickness absence. The size of this impact is similar (and not statistically different) from the impact of chronic diseases and of mobility limitations.

Figure 3.2.   Depression symptoms account for an additional seven days in annual sickness absence

Determinants of the annual number of sickness absence days for older workers (impact is expressed as a number of additional days)
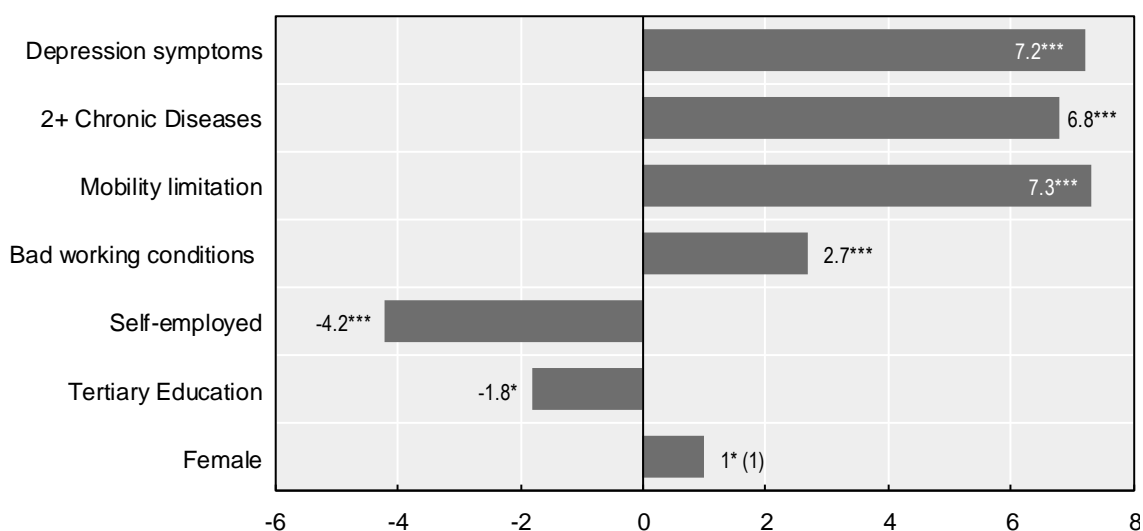
* 5% significance level **1% significance level *** 0.1% significance level

Note: Results from a negative binomial regression in which the explained variable is the (self-declared) number of days missed from work in the past year for health reasons. N=13 096. Non-displayed control variables: age, age square, country. The difference between the impact of depression symptoms, chronic diseases and mobility limitations is not significant.

[1]The coefficient for female is barely significant, the P-value being 0.050, whereas a variable is considered significant at 5% if the P-value is strictly inferior to 0.050.

Source: OECD calculations based on the Survey of Health, Ageing and Retirement in Europe (SHARE), waves 2 and 4.

29.   This shows that for this population sub-group, depression symptoms contribute as much to sickness absence as physical health problems such as chronic diseases and mobility limitations. For older workers, long-term sickness absence is sometimes a pathway to retirement. Prevention of depression symptoms and social and medical support to overcome depression episodes are therefore all the more important for this age group.

---

28.   A reason why this result is less striking than the one from OECD 2013 might be that in the present analysis, controls for physical health have been added whereas in the 2013 report only socio-demographic variables and working conditions were used as covariates.

Conclusion

30.   The Survey of Health, Ageing and Retirement in Europe offers a unique opportunity to assess the impact of depression on labour market outcomes of persons 50 and over in European countries, and thus to explore a factor which is not always brought to the fore in empirical microeconomic employment studies, in spite of its strong influence.

31.   Results from 2004-11 data show that for persons aged 50 to 64, depression symptoms lead to a decrease in the probability of being employed or self-employed between 22 and 51 percentage points, an effect that is predominantly driven by women. This is consistent with other findings of the literature, although the impact seems to be stronger for older workers than for younger age groups. In the fixed-effects model, the impact of depression is no longer significant for men. Yet, endogeneity is a substantial problem for all analyses focusing on the relation between health and employment, and no method seeking to correct it is perfect. Future research may allow further investigating this gender difference if better time-varying instrumental variables become available in upcoming SHARE waves.

32.   Depression symptoms also play a leading role in early exits out of employment of the 50-59 age group (analysed between 2006 and 2011): those with stronger symptoms are more than twice as likely – even more if they are 50 to 54 – to exit employment before reaching retirement age as their peers without depression symptoms. This is true for both men and women. Finally, on average, depression symptoms increase by 7.2 days the annual number of sickness-leave days of workers aged 50-64, irrespective of the intensity of the symptoms. This implies substantial productivity losses, possible deterioration of human capital if sickness absence is long and/or recurrent, and possible transitions into inactivity and early retirement. All these results are obtained while controlling for physical health conditions.

33.   Findings for people with a moderate mental disorder are especially interesting. Their employment rate is significantly hampered by their health problems. When employed, however, they are not more likely than people without a mental disorder to leave employment. Those people stay in employment but they are much more likely than their peers without a mental disorder to suffer substantial productivity losses.

34.   Cases of early retirements and of sickness absence due to mental health problems (in particular depression) are increasing (OECD, 2012; McDaid et al., 2008). This is all the more worrisome as the share of persons 50 and over in the workforce is also sharply increasing in Europe. Therefore, productivity losses due to depression are not only substantial, but increasingly burdensome. Prevention of depression, increased awareness and adequate medical support should therefore be key elements of state-level and firm-level employment policies and programmes targeting the 50 and over population.

REFERENCES

Alavinia, S.M. and A. Burdorf (2008), "Unemployment and retirement and Ill-health: a cross-sectional analysis across European countries", *International Archives of Occupational and Environmental Health,* Vol. 82(1) pp.39-45.

Blanchet, D. and T. Debrand (2007), "Souhaiter prendre sa retraite le plus tôt possible", *Économie et Statistique*, N°403-404, pp.39-62.

Borges Neves, R., F. Barbosa, A. Delerue Matos et al. (2013), "Unemployed 50+: exploring risk factors for depression in Europe", In A. Börsch-Supan et al. *Active ageing and solidarity between generations in Europe*, pp.91-100 Berlin: de Gruyter.

Börsch-Supan A., A. Brugiavini and E. Croda (2009), "The Role of Institutions and Health in European Patterns of Work and Retirement", *Journal of European Social Policy*, Vol. 19(4), pp.340-358.

Chatterji, P., M. Alegria and D. Takeuchi (2011), "Psychiatric disorders and labour market outcomes: Evidence from the National Comorbidity Survey-Replication", *Journal of Health Economics*, Elsevier, vol. 30(5), pp.858-868.

Clark, A.E. and Y. Fawaz (2009): "Valuing jobs via retirement: European évidence", *National Institute Economic Review*, 209

Coppens, E. et al. (2013), "Public attitudes toward depression and help-seeking in four European countries - baseline survey prior to the OSPI-Europe intervention*", Journal of Affective Disorders* Vol. 150(2), pp.320-329.

Cowell, A.J., Z. Luo and Y.J. Masuda (2009), "Psychiatric Disorders and the labour market: an analysis by disorder profiles", *Journal of Mental Health Policy and Economics*, Vol. 12(1) pp.3-17.

De Preter H., D. Mortelmans and D. Van Looy (2012), "Retirement in Europe: does sector make a difference", *Industrial Relations Journal* Vol. 43(6), pp.511-526

Dewey, M.E. and M.J. Prince (2005), "Mental Health", In: A. Börsch-Supan et al. *Health, Ageing and Retirement in Europe - First Results from the Survey of Health, Ageing and Retirement in Europe*, pp.108-117 Mannheim: MEA.

Frijters, P., D. Johnston and M. Shields (2010), *Mental health and labour market participation*, IZA Working Paper N°4883.

Gustavsson, A., M. Svensson, F. Jacobi, et al. (2011), "Cost of Disorders of the Brain in Europe 2010", *European Neuropsychopharmacology*, vol. 21, pp.718-779.

Hospido, L. and G. Zamarro (2014), "Retirement Patterns of couples in Europe", IZA Discussion Paper No 7926.

ILO (2000), "Mental Health at the Workplace – Introduction", ILO publication, Geneva. http://www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/publication/wcms_108221.pdf

Kessler, R. and E. Bromet (2013), "The Epidemiology of Depression Across Cultures", *Annual Review of Public Health*, Vol. 34, pp.119-138

Leijten, F.R.M., S.G. van den Heuvel, J.F. Ybema, S.J.W. Robroek and A. Burdorf (2013),"Do work factors modify the association between chronic health problems and sickness absence among older employees?", *Scandinavian Journal of Work Environment and Health,* Vol. 39(5), pp.477-485.

Marcus, M., Yasamy, T., van Ommeren, M., Chisholm, D. and Saxena, S. (2012), *Depression, a Global Public Health Concern*, World Health Organization, Dep. of Mental Health and Substance Abuse. http://www.who.int/mental_health/management/depression/who_paper_depression_wfmh_2012.pdf.

McDaid D., M. Knapp and H. Medeiros (2008), "Employment and mental health: Assessing the economic impact and the case for intervention", *Mental Health Economics European Network Policy Briefing,* Personal Social Services Research Unit, London School of Economics and Political Science.

Nichols, A. (2011), "Causal Inference for Binary regression", 2011 CHI11 Stata Conference 6, Stata Users Group, http://www.stata.com/meeting/chicago11/materials/chi11_nichols.pdf.

OECD (2014), *Vieillissement et politiques de l'emploi : France 2014: Mieux travailler avec l'âge*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264206847-fr.

OECD (2013), *Pensions at a Glance 2013: OECD and G20 Indicators*, OECD Publishing, Paris, http://dx.doi.org/10.1787/pension_glance-2013-en.

OECD (2012), *Sick on the Job?: Myths and Realities about Mental Health and Work*, Mental Health and Work, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264124523-en.

OECD (2010), *Sickness, Disability and Work: Breaking the Barriers: A Synthesis of Findings across OECD Countries*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264088856-en.

OECD (2008), *OECD Employment Outlook 2008*, OECD Publishing, Paris, http://dx.doi.org/10.1787/empl_outlook-2008-en.

Peng L., C. Meyerhoefer and S. Zuvekas (2013), *The Effect of Depression on Labour Market Outcomes*, National Bureau of Economic Research Working Paper N°19451, Cambridge MA.

Sobocki, P., B. Jonsson, J. Angst and C. Rehnberg (2006), "Cost of depression in Europe", *Journal of Mental Health Policy and Economic*s, Vol. 9(2) pp.87–98.

Tedstone Doherty, D. and Y. Kartalova-O'Doherty (2010), "Gender and self-reported mental health problems: predictors of help-seeking from a general practitioner", *British Journal of Health Psychology*, Vol. 15 pp.213-228.

Thomas, C., M. Benzeval and S. Stansfeld (2005), "Employment Transitions and Mental Health: an Analysis from the British Household Panel Survey", *Journal of Epidemiology and Community Health,* Vol. 59(3), pp.243-249.

WHO (2008), *The Global burden of Disease – 2004 update*, World Health Organization, Geneva, http://www.who.int/healthinfo/global_burden_disease/GBD_report_2004update_full.pdf

Zhang, X., X. Zhao and A. Harris (2009), "Chronic diseases and labour force participation in Australia", *Journal of Health Economics,* Vol. 28 pp. 91-108.

ANNEXES

Annex A. Impact of depression on probability of employment

35.   In this section, the explained variable is employment status, taking value 1 if the respondent declares being "employed or self-employed" and value 0 otherwise. Depression is assessed using the methodology described in the introduction: a respondent is considered as depressed if his/her Euro-Depression 12-items score is among the highest 20% of the 50-64 population of his/her given country in a given wave.

36.   The main difficulty in assessing the impact of depression on employment is the endogeneity of the depression variable, due to the existence of reverse causality: employment status influences mental health as much as mental health influences employment status. In order to overcome this identification problem, instrumental variables are used, first in a cross-sectional bivariate probit model (Annex A.1.) and then in a longitudinal setting, allowing control for unobserved heterogeneity but imposing a linear probability model unlike the bivariate probit model (Annex A.2.). For a presentation and discussion of the different instruments for depression used in the literature, see Frijters et al. (2010).

The models that are fit are:

1.   A probit model on Wave 4 data.

2.   A bivariate probit model on Wave 4 data. Instrument: existence of past episodes of depression (10 years before first interview or earlier).

3.   A conditional fixed-effects logit model.

4.   A fixed-effects linear probability model.

5.   An IV- fixed-effects linear probability model which is preferred to 3 and 4 since it corrects for endogeneity. Instrument: Euro-D regional score.

37.   Models 2 and 5 correct for endogeneity. In addition, model 5 corrects for unobserved heterogeneity, unlike model 2. But model 2 respects the binary nature of the explained variable, and uses an instrument that appears more reliable in theory. Thus both models have substantial advantages and relative drawbacks; that is the reason why it was found relevant to present both.

A.1. Binary response models on cross-sectional data

38.   A simple probit model is first run on wave 4 data only, keeping individuals who are 50 to 64 years old (N=27 182). Results reveal a negative correlation between depression and the probability of employment (Column (1) in Table A.1.1.). However, this model does not correct for endogeneity. Therefore, a recursive bivariate probit is run on the same sample. Let E_i be a binary variable taking value 1 if individual i is employed and 0 otherwise. Let D_i be a binary variable taking value 1 if individual i has depression symptoms and 0 otherwise. The estimated model can be expressed as:

$$E_i = 1[(\alpha D_i + \beta X_i) > \varepsilon_i] \qquad (A)$$

$$D_i = 1[(\gamma Z_i + \theta X_i) > \mu_i] \qquad (B)$$

$$(\varepsilon, \mu) \sim N(0, \Sigma)$$

22

39.	where X_i are individual characteristics included in both regressions, unlike Z_i, included in equation (B) only, and which is a determinant of current depression status with supposedly no direct influence on current employment status (but with an indirect influence via current depression status). Z_i is a dummy variable indicating the existence of past depression episodes (10 years or more before the interview). The two equations are estimated simultaneously. The model is first run on the whole sample, then on men and women separately (Columns (2), (2 bis) and (2 ter) of Table 1.1.1.)[29].

40.	It appears that in each case, the variable indicating past episodes of depression is a good predictor for current depression, and thus a good instrument. The Wald statistic leads to the conclusion that there is correlation between equations (A) and (B) and thus the bivariate probit is preferred to the simple probit. The coefficient for depression symptoms is significant in all three cases, and the sign as expected: depression leads to a decrease in the probability of employment. Calculating the marginal effects in each equation yields the following results[30]:

	Marginal effect of depression on probability of employment
Whole sample	-21 pp
Men only	-26 pp
Women only	-22 pp

41.	In addition to these interesting findings on the role of depression, other influential factors are brought to light: age, physical health problems and being a women decrease the probability of being employed. Higher education levels and higher household incomes are associated with an increased probability of being employed. For men, having a partner who does not work (vs no partner) decreases the probability of employment, but having a partner who does work increases the probability of working. This could be linked with the SHARE literature on retirement patterns of couples[31]. For women, both variables on partner's employment status have a negative impact which means that the sole fact of having a partner decreases women's probability of employment. Finally, countries in which the probability of employment is above average once individual characteristics are controlled for are Denmark, Estonia, Germany, the Netherlands, Sweden and Switzerland. Countries in which the probability of being employed is below average are Austria, Belgium, Czech Republic, Hungary, Italy, Poland, Portugal, Slovenia and Spain (France is omitted because it represents the largest sub-sample).

42.	Results for the regression corresponding to equation (B) show that physical health problems, being a women and younger age (50-59) are associated with a higher probability of being depressed. Having a partner and higher household income are associated with a lower probability of depression.

29.	For another example of a bivariate probit used to analyse the impact of depression on employment see Chatterji et al. (2011).

30.	The methodology followed for the calculation of the marginal effects is presented in A. Nichols, "Causal Inference for Binary regression", 2011 CHI11 Stata Conference 6, Stata Users Group. http://www.stata.com/meeting/chicago11/materials/chi11_nichols.pdf

31.	See for instance Hospido and Zamarro (2014), "Retirement Patterns of couples in Europe", IZA Discussion Paper No 7926.

Table A.1.1. Determinants of employment of the 50-65: results from a Probit and Recursive Bivariate Probit models

	(1) Probit	**(2)** **Bivariate** **probit**	(2 bis) Bivariate probit Men	(2 ter) Bivariate probit Women
Equation (A) Dependent variable: being employed or self-employed				
Mental and physical health				
Depression symptoms	-0.295***	-0.734***	-0.954***	-0.793***
	(-12.27)	(-9.84)	(-8.12)	(-8.57)
Mobility limitation	-0.318***	-0.247***	-0.305***	-0.177***
	(-16.16)	(-10.69)	(-8.64)	(-5.74)
2+ chronic diseases	-0.221***	-0.177***	-0.170***	-0.164***
	(-11.19)	(-8.40)	(-5.58)	(-5.60)
Socio-demographic variables				
Age dummies (Ref : 64-65)				
50-51	1.931***	1.932***	2.017***	1.920***
	(37.98)	(37.88)	(26.59)	(27.49)
52-53	1.859***	1.865***	1.895***	1.874***
	(38.77)	(38.04)	(26.45)	(27.76)
54-55	1.749***	1.754***	1.840***	1.711***
	(37.24)	(36.96)	(26.49)	(26.11)
56-57	1.562***	1.565***	1.603***	1.558***
	(33.97)	(33.92)	(24.18)	(24.28)
58-59	1.260***	1.263***	1.377***	1.174***
	(27.65)	(27.72)	(21.11)	(18.46)
60-61	0.749***	0.747***	0.878***	0.638***
	(16.52)	(16.53)	(13.74)	(10.00)
62-63	0.296***	0.297***	0.353***	0.239***
	(6.37)	(6.41)	(5.40)	(3.67)
Female	-0.249***	-0.212***		
	(-13.73)	(-11.11)		
Highest education level (Ref : none or primary)				
Secondary	0.243***	0.222***	0.173***	0.229***
	(11.08)	(10.06)	(5.10)	(7.74)
Tertiary	0.515***	0.485***	0.437***	0.474***
	(19.79)	(18.25)	(10.80)	(13.11)
Employed partner (Ref : no partner)	-0.0872*	-0.112***	0.161***	-0.299***
	(-3.27)	(-4.13)	(3.77)	(-8.33)
Partner not employed (Ref : no partner)	-0.325***	-0.341***	-0.123**	-0.485***
	(-12.86)	(-13.44)	(-2.99)	(-14.86)
Children living in household	-0.0219	0.0291	0.0549	-0.0251
	(0.91)	(1.21)	(1.48)	(-0.78)
Household income quartiles (Ref : first quartile)				
Second quartile	0.220***	0.210***	0.148**	0.247***
	(7.07)	(6.58)	(2.97)	(5.96)
Third quartile	0.459***	0.437***	0.410***	0.446***
	(15.04)	(13.90)	(8.56)	(10.62)
Fourth quartile	0.601***	0.576***	0.510***	0.617***
	(20.10)	(18.44)	(10.88)	(14.59)
Fifth quartile	0.743***	0.716***	0.681***	0.738***
	(24.64)	(22.55)	(14.39)	(17.05)
Countries (Ref : average of all countries. France omitted)				
Germany	0.232***	0.207***	0.0551	0.308***
	(4.25)	(3.78)	(0.65)	(4.26)
Sweden	1.047***	1.047***	0.994***	1.083***
	(17.89)	(17.34)	(10.41)	(13.86)
Netherlands	0.187***	0.194***	0.244***	0.176***

	(1) Probit	**(2)** **Bivariate** **probit**	(2 bis) Bivariate probit Men	(2 ter) Bivariate probit Women
	(4.90)	(5.05)	(4.08)	(3.49)
Spain	-0.159***	-0.156***	0.0336	-0.313***
	(-4.25)	(-3.87)	(0.56)	(-5.59)
Italy	-0.136***	-0.138***	0.0987	-0.324***
	(-3.71)	(-3.84)	(1.76)	(-6.75)
Austria	-0.348***	-0.341***	-0.273***	-0.382***
	(-11.79)	(-12.22)	(-6.40)	(-10.19)
Denmark	0.430***	0.444***	0.385***	0.509***
	(9.71)	(10.04)	(5.74)	(8.66)
Switzerland	0.580***	0.594***	0.753***	0.512***
	(16.41)	(15.84)	(12.51)	(10.55)
Belgium	-0.152***	-0.153***	-0.205***	-0.105**
	(-5.50)	(-5.58)	(-4.99)	(-2.84)
Czech Republic	-0.0587*	-0.0462	-0.0150	-0.0721*
	(-2.13)	(-1.84)	(-0.37)	(-2.22)
Poland	-0.583***	-0.584***	-0.434***	-0.718***
	(-10.64)	(-10.57)	(-5.17)	(-9.60)
Hungary	-0.418***	-0.443***	-0.529***	-0.388***
	(-11.67)	(-12.96)	(-10.33)	(-8.47)
Portugal	-0.189***	-0.199***	-0.350***	-0.105
	(-4.36)	(-4.33)	(-5.14)	(-1.71)
Slovenia	-0.548***	-0.532***	-0.502***	-0.546***
	(-14.25)	(-14.72)	(-9.17)	(-11.08)
Estonia	0.239***	0.209***	0.0200	0.326***
	(8.95)	(7.31)	(0.46)	(8.64)
Constant	-1.294***	-1.232***	-1.383***	-1.322***
	(-25.79)	(-23.43)	(-17.66)	(-18.01)
Equation (B) Dependent variable: having depression symptoms				
Mental and physical health				
Past depression episodes (Instrument)		0.570***	0.614***	0.546***
		(27.80)	(17.11)	(22.08)
Mobility limitation		0.550***	0.618***	0.512***
		(26.54)	(17.92)	(19.75)
2+ chronic diseases		0.313***	0.265***	0.339***
		(15.15)	(7.76)	(13.05)
Socio-demographic variables				
Age dummies (Ref : 64-65)				
50-51		0.264***	0.214**	0.279***
		(5.33)	(2.64)	(4.47)
52-53		0.268***	0.165*	0.316***
		(5.69)	(2.10)	(5.34)
54-55		0.255***	0.205**	0.275***
		(5.56)	(2.73)	(4.78)
56-57		0.226***	0.150*	0.264***
		(5.04)	(2.03)	(4.70)
58-59		0.189***	0.125	0.215***
		(4.21)	(1.72)	(3.81)
60-61		0.0658	0.0266	0.0772
		(1.48)	(0.37)	(1.37)
62-63		0.0438	-0.0259	0.0779
		(0.98)	(-0.35)	(1.40)
Female		0.268***		
		(13.24)		
Highest education level (Ref : none or primary)				
Secondary		-0.153***	-0.123**	-0.167***
		(-6.61)	(-3.13)	(-5.81)

	(1) Probit	**(2)** **Bivariate** **probit**	(2 bis) Bivariate probit Men	(2 ter) Bivariate probit Women
Tertiary		-0.232***	-0.143**	-0.283***
		(-8.08)	(-2.98)	(-7.83)
Employed partner (Ref : no partner)		-0.165***	-0.227***	-0.144***
		(-5.76)	(-4.81)	(-3.96)
Partner not employed (Ref : no partner)		-0.107***	-0.181***	-0.0832*
		(-4.08)	(-4.01)	(-2.57)
Children living in household		0.0646*	0.0451	0.0852**
		(2.50)	(1.02)	(2.64)
Household income quartiles (Ref : first quartile)				
Second quartile		-0.0646*	-0.0245	-0.0804*
		(-2.06)	(-0.46)	(-2.09)
Third quartile		-0.136***	-0.139**	-0.134***
		(-4.31)	(-2.64)	(-3.40)
Fourth quartile		-0.160***	-0.219***	-0.122**
		(-5.05)	(-4.16)	(-3.08)
Fifth quartile		-0.182***	-0.214***	-0.163***
		(-5.64)	(-4.04)	(-3.97)
Countries (Ref : average of all countries. France omitted)				
Germany		-0.245***	-0.200	-0.264**
		(-3.57)	(-1.69)	(-3.16)
Sweden		0.137*	0.101	0.165*
		(2.20)	(0.95)	(2.14)
Netherlands		0.0662	0.00204	0.0944
		(1.59)	(0.03)	(1.85)
Spain		0.0184	0.0175	0.0139
		(0.46)	(0.25)	(0.27)
Italy		0.00591	0.0188	-0.00840
		(0.15)	(0.27)	(-0.17)
Austria		0.0521	0.120*	0.00656
		(1.64)	(2.34)	(0.16)
Denmark		0.220***	0.170*	0.262***
		(4.99)	(2.34)	(4.67)
Switzerland		0.213***	0.273***	0.171***
		(5.87)	(4.68)	(3.69)
Belgium		-0.0917**	-0.124*	-0.0729
		(-3.00)	(-2.40)	(-1.92)
Poland		0.122***	0.193***	0.0819*
		(4.31)	(4.19)	(2.31)
Hungary		-0.0322	-0.0313	-0.0421
		(-0.57)	(-0.31)	(-0.62)
Portugal		-0.261***	-0.174**	-0.307***
		(-6.60)	(-2.69)	(-6.25)
Slovenia		-0.160***	-0.223**	-0.126*
		(-3.36)	(-2.63)	(-2.15)
Estonia		0.133***	0.0748	0.162**
		(3.30)	(1.08)	(3.23)
Constant		-1.505***	-1.440***	-1.253***
		(-30.20)	(-17.91)	(-20.92)
athrho		0.268***	0.305***	0.357***
		(5.88)	(4.41)	(5.80)
Wald test of rho=0		chi2(1) = 34.5991 Prob > chi2 = 0.0000	chi2(1) = 19.4041 Prob > chi2 = 0.0000	chi2(1) = 33.6514 Prob > chi2 = 0.0000
N	27182	27182	11905	15277

Note: t statistics in parentheses * p < 0.05, ** p < 0.01, *** p < 0.001

A.2. Linear probability model on panel data

43.   The sample consists of 3 755 individuals who participated in waves 1, 2 and 4 – respectively in 2004, 2006-07 and 2011 – who are between 50 and 59 in wave 1 and who did not reach age 66 by wave 4. The countries that are represented are: Austria, Belgium, Denmark, France, Germany, Italy, the Netherlands, Spain, Sweden and Switzerland. For descriptive statistics of variables of interest see Table A.2.1.

Table A.2.1.   Prevalence of depression and employment rates by gender in longitudinal sample

	Wave 1	Wave 2	Wave 4
Average age			
All	54.7	57.0	61.3
Men	54.7	57.1	61.4
Women	54.7	57.0	61.3
Prevalence of depression			
All	19.80%	18.84%	15.83%
Men	13.85%	10.83%	10.13%
Women	26.16%	25.30%	21.34%
Employment rate			
All	63.48%	56.00%	37.25%
Men	73.77%	63.58%	43.74%
Women	54.20%	48.89%	31.66%
Employment rate of those with no depression symptoms			
All	66.09%	57.77%	37.76%
Men	76.57%	65.16%	45.54%
Women	55.93%	50.63%	33.17%
Employment rate of those with depression symptoms			
All	50.62%	45.21%	26.78%
Men	56.25%	50.40%	28.00%
Women	49.32%	43.62%	26.00%

Note: The data are weighted using longitudinal individual weights. Employment is self-declared. Depression is measured using the Euro-D 12-items scale, a respondent being considered as depressed if his/her score is among the highest 20% of the 50-65 population of the given country and wave.

Source: OECD calculations based on the Survey of Health, Ageing and retirement in Europe. Waves 1, 2 and 4.

44.   First, a conditional fixed-effects model is run (Column (1) in Table A.2.2.). The coefficient for depression symptoms is significant and the sign is as expected: the odds of being employed for someone with depression symptoms are only 0.65 to 1[32]. The interest of this model lies in the fact that it respects the binary nature of the explained variable and that it also controls for fixed effects. But it does not correct for endogeneity. Therefore, the aim is to run a two-stage least squares model for panel data with fixed effects (IV-FE model)[33]. Before that, a simple linear probability model with no correction for endogeneity is run (Column (2) in Table A.2.2.). A Hausman test leads to choose a fixed-effects model rather than a random-effects one. The standard errors are adjusted for individual clusters. In this fixed-effects model, the coefficient for depression is significant and shows that depression symptoms decrease the probability of being   employed   by   2.5   percentage   points.

---

32.   The odds ratio is obtained by exponentiating the coefficient yielded by the regression.

33.   For another example of an IV-FE model used to analyse the impact of depression on employment see Frijters et al. (2010).

Table A.2.2. Determinants of employment of the 50-65: results from fixed-effects models

Probability of being employed or self-employed	(1) Conditional fixed-effects logit	(2) Fixed-effects model	(3) Instrumental variable in fixed-effects model	(3 bis) Instrumental variable in fixed-effects model Men	(3 ter) Instrumental variable in fixed-effects model Women
Mental and physical health					
Depression symptoms	-0.423**	-0.0259*	-0.306*	0.109	-0.509*
	(-2.71)	(-2.13)	(-1.99)	(0.40)	(-2.57)
Mobility limitation	-0.365**	-0.0308**	-0.0132	-0.0404*	0.00921
	(-2.78)	(-2.98)	(-0.92)	(-1.97)	(0.45)
2+ chronic diseases	-0.248	-0.0238*	-0.00686	-0.0211	0.00752
	(-1.73)	(-2.27)	(-0.47)	(-1.11)	(0.34)
Socio-demographic variables					
Age dummies (Ref : 64-65)					
50-51	5.398***	0.462***	0.483***	0.539***	0.429***
	(15.75)	(21.01)	(18.98)	(13.65)	(11.89)
52-53	5.340***	0.454***	0.470***	0.527***	0.426***
	(17.33)	(22.35)	(21.09)	(16.59)	(12.98)
54-55	5.085***	0.442***	0.456***	0.524***	0.406***
	(17.32)	(22.97)	(21.84)	(17.66)	(13.10)
56-57	4.445***	0.386***	0.398***	0.457***	0.339***
	(16.40)	(21.57)	(20.86)	(14.47)	(13.24)
58-59	3.645***	0.327***	0.334***	0.365***	0.301***
	(14.12)	(19.29)	(19.15)	(14.06)	(12.25)
60-61	2.206***	0.191***	0.191***	0.213***	0.163***
	(9.35)	(11.97)	(11.65)	(8.64)	(7.03)
62-63	1.473***	0.0943***	0.0997***	0.133***	0.0550
	(4.78)	(4.28)	(4.54)	(3.84)	(1.80)
Employed partner (Ref : no partner)	-0.681*	-0.0367	-0.0550	0.0272	-0.103*
	(-2.04)	(-1.28)	(-1.80)	(0.64)	(-2.27)
Partner not employed (Ref : no partner)	-0.483	-0.0630*	-0.0821**	-0.0147	-0.131**
	(-1.50)	(-2.29)	(-2.78)	(-0.35)	(-2.97)
Children living in household	-0.114	-0.0284*	-0.0270*	-0.0138	-0.0499**
	(-0.70)	(-2.50)	(-2.31)	(-0.80)	(-2.88)
Household income quartiles (Ref : first quartile)					
Second quintile	0.489*	0.0413**	0.0469**	0.0376	0.0525*
	(2.34)	(2.73)	(2.97)	(1.47)	(2.39)
Third quintile	0.764***	0.0594***	0.0591***	0.0526*	0.0582**
	(3.83)	(3.84)	(3.78)	(2.04)	(2.74)
Fourth quintile	1.236***	0.113***	0.119***	0.128***	0.103***
	(6.00)	(6.99)	(7.15)	(4.57)	(4.43)
Fifth quintile	1.542***	0.136***	0.139***	0.155***	0.111***
	(7.24)	(8.32)	(8.43)	(5.66)	(4.77)
Constant		0.200***			
		(7.15)			
N	3930	11263	11263	4973	6290

Note: t statistics in parentheses * *p* < 0.05, ** *p* < 0.01, *** *p* < 0.001

45.   The instrument used for the IV-FE model must be time-varying. Among the options available in the SHARE database, the regional average of the Euro-D score was selected. The model is run on the whole sample, and then on men and women separately (Columns (3), (3 bis) and (3 ter) in Table A.2.2.). An under-identification test and a weak identification test - which assess the correlation of the instrument with the endogenous variable - lead to accepting the instrument in all three models. Results show that depression decreases the probability of employment by 31 percentage points; but when the analysis is carried out by gender, the coefficient is no longer significant for men, and enlarges for women among who a decrease by 51 percentage points of the probability of being employed is found. However, for women, none of the physical health variables have a significant coefficient. This could mean that some of the physical health features are captured by the depression variable.

Annex B. The role of depression in older workers' early exit out of employment

46.   Transition in employment status across two waves of SHARE (from wave 2 to wave 4) is used in order to avoid potential endogeneity bias. The sample consist of 3 485 respondents, aged 50-59 in wave 2 and who declare themselves as employed or self-employed in wave 2. The dependent variable takes value 0 if the individual remained in employment or 1 if the individual is no longer employed in wave 4. The same covariates as in Annex A are used, to which variables on job characteristics[34] are added. Concerning the depression variables, EURO-D scores of the whole 50-65 years old sample from wave 2 were divided in 20 percentiles. Those with a score below the 16th percentile are classified as having no depression symptoms, percentiles 17, 18 and 19 correspond to moderate symptoms, and the 20th percentile (theoretically the worst 5%) corresponds to severe symptoms.

47.   The first model (Column (1) in Table B.1.) shows a significant impact of depression on exit from employment (odds increased by 30%). Breakdown by intensity of depression symptoms shows that this impact is mainly driven by the group with more severe symptoms (Column (2) in Table B.1.). Interacting the depression variable with gender did not show a significant difference between the effect for men and for women, neither in the initial model nor in the one with different intensities. However, interacting with age in the model with different intensities shows that the impact of the more severe symptoms is larger for younger respondents of the sample. Finally, attempts to identify an impact of the evolution in mental health between waves 1 and 2 (considering an evolution between waves 2 and 4 would have led to endogeneity problems) did not lead to any significant results.

48.   In all three specifications, the difference between the coefficient for depression symptoms and that for 2+ chronic diseases is significant (Wald test), therefore it appears that the impact of depression symptoms is slightly larger than that of chronic diseases as measured here. Other interesting findings not related to depression are that working conditions play a significant role: the better they are the less likely a person is to exit employment. Self-employed persons are much less likely to exit employment than others (odds are around 0.52 to 1 in all three specifications). The same is true for respondents who reached tertiary education. Having a partner who does not work appears to be an incentive to leave employment. Here again, this is in line with the literature on couple retirement (Annex A). Having children in the household also decreases the odds of exiting employment. Finally, in Austria, Belgium, Czech Republic and Poland, respondents are more likely than average to exit employment before legal retirement age. The opposite is true in Switzerland and Sweden.

---

34.   See section 3.2, footnote 23 for a description of the variables. The working conditions index which ranges from 8 to 32 is included as a linear variable.

Table B.1.   Determinants of early exit from employment: results from logistic regressions

Odd ratios are reported

Explained variable: exit of employment between 2006-07 and 2011	(1) Logit	(2) Logit Different intensities of depression symptoms	(3) Logit Different intensities of depression symptoms interacted with age
Mental and physical health			
Depression symptoms	1.302*		
	(2.05)		
Moderate depression symptoms		1.150	1.170
		(1.00)	(1.11)
Severe depression symptoms		2.459**	2.340**
		(3.23)	(3.16)
Moderate depression symptoms*Age			0.967
			(-0.64)
Severe depression symptoms * Age			0.789*
			(-2.19)
Mobility limitation	1.101	1.100	1.093
	(0.91)	(0.90)	(0.83)
2+ Chronic diseases	1.270*	1.255*	1.262*
	(2.32)	(2.20)	(2.25)
Job characteristics			
Working part time	1.234	1.224	1.232
	(1.95)	(1.87)	(1.93)
Working conditions (Aggregated index: higher values indicate better working conditions)	0.966**	0.966**	0.966**
	(-2.68)	(-2.65)	(-2.70)
Self-employed	0.519***	0.517***	0.517***
	(-4.73)	(-4.74)	(-4.73)
Socio-demographic characteristics			
Age (centered)	1.332***	1.332***	1.348***
	(13.74)	(13.74)	(13.35)
Age square	1.023***	1.023***	1.022***
	(3.45)	(3.48)	(3.29)
Female	1.153	1.148	1.158
	(1.50)	(1.46)	(1.54)
Highest education level (Ref : none or primary)			
Secondary	0.950	0.960	0.960
	(-0.47)	(-0.37)	(-0.37)
Tertiary	0.577***	0.587***	0.589***
	(-4.29)	(-4.14)	(-4.12)
Employed partner (Reference: no partner)	1.111	1.124	1.112
	(0.77)	(0.85)	(0.78)
Partner not employed (Reference: no partner)	1.336*	1.352*	1.337*
	(2.05)	(2.13)	(2.06)
Children living in household	0.754**	0.758**	0.760**
	(-2.88)	(-2.82)	(-2.78)
Household income quartiles (Ref : first quartile)			
Second quintile	1.224	1.203	1.202
	(1.03)	(0.94)	(0.93)

| Explained variable: exit of employment between 2006-07 and 2011	(1) Logit	(2) Logit Different intensities of depression symptoms	(3) Logit Different intensities of depression symptoms interacted with age
Third quintile	0.961	0.951	0.957
	(-0.21)	(-0.27)	(-0.23)
Fourth quintile	1.007	1.002	1.004
	(0.04)	(0.01)	(0.02)
Fifth quintile	1.014	1.006	1.009
	(0.08)	(0.03)	(0.05)
Country *Reference: average of all countries.* *Denmark is omitted.*			
Germany	0.885	0.890	0.882
	(-0.90)	(-0.85)	(-0.92)
Sweden	0.268***	0.264***	0.263***
	(-5.15)	(-5.20)	(-5.22)
Netherlands	0.827	0.828	0.826
	(-1.49)	(-1.47)	(-1.49)
Spain	0.724	0.736	0.740
	(-1.70)	(-1.62)	(-1.59)
Italy	1.085	1.076	1.079
	(0.55)	(0.49)	(0.51)
France	1.172	1.149	1.158
	(0.99)	(0.86)	(0.91)
Austria	2.518***	2.556***	2.552***
	(4.02)	(4.09)	(4.08)
Switzerland	0.285***	0.287***	0.287***
	(-6.76)	(-6.71)	(-6.71)
Belgium	2.018***	2.013***	1.999***
	(6.23)	(6.20)	(6.13)
Czech Republic	1.924***	1.945***	1.959***
	(4.85)	(4.92)	(4.97)
Poland	3.371***	3.359***	3.386***
	(8.06)	(8.02)	(8.04)
N	3485	3485	3485

Note: Exponentiated coefficients; *t* statistics in parentheses

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

Annex C. Depression as a determinant of older workers' sickness absence

49.   The sample comprises 13 096 respondents aged 50 to 64, who declare themselves as employed or self-employed in wave 4. The dependent variable is the number of days missed from work in the past 12 months because of health reasons, it ranges from 0 to 365 and its mean is 8.44. Figure 3.2. shows the distribution of the dependent variable. Because it is a censured variable, it is best to avoid using an OLS model and instead use a model for count data, either a Poisson model or a negative binomial regression. A likelihood ratio test implemented after running the negative binomial regression shows that the latter is preferred to a Poisson model, because of the presence of over-dispersion (i.e. the variance of the dependent variable is superior to its mean). The model seems to yield plausible predictions: the predicted average value of the dependent variable is 8.7 days.

Figure C.1.   Distribution of the annual number of missed days for the 50-64 workers

Share in population for values 0-60 missed days
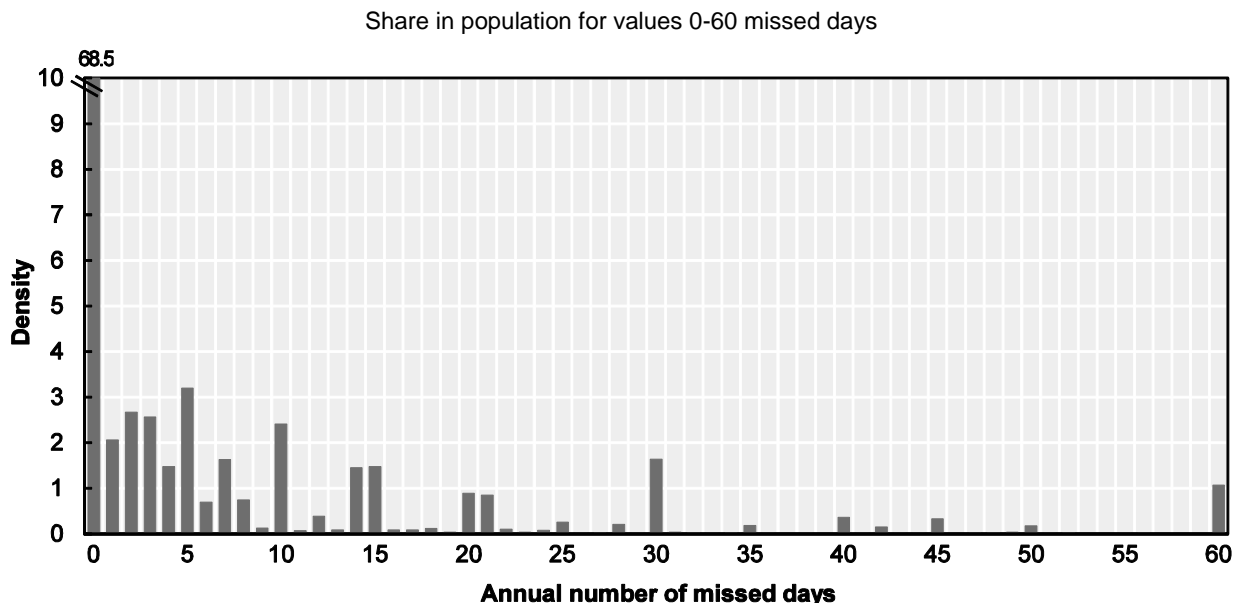
Note: Only individuals who declare themselves as "employed or self-employed" are considered. The number of missed days is self-declared. The total share in population does not equal 100% because only values up to 60 missed days are shown, whereas the maximal value of the actual number of missed days is 365.

Source: SHARE wave 4, all countries.

50.   Results are displayed in Table C.1, and expressed as incidence rates. Depression symptoms significantly increase the number of missed days: the incidence rate of sickness absence is almost two times higher (1.95 to 1) for respondents suffering from depression. Including an interaction variable to assess the difference of this impact across genders shows that the effect of depression on sickness absence is not significantly different among men and women. Similarly, the impacts of severe and moderate depression symptoms are not significantly different.

51.   The marginal effect of each variable is calculated and expressed in number of days (Figure 3.2 in the main paper). The working conditions index has been changed into a dummy variable, making it easier to compute the marginal effect: the new variable takes value 1 if the index is lower than the average value for the sample and 0 otherwise.

Table C.1.   Determinants of sickness absence duration: results from a negative binomial regression

Dependent variable : Number of days missed from work because of health reasons in past 12 months	Negative binomial regression on cross-sectional data
Mental and physical health	
Depression symptoms	1.954***
	(7.16)
Mobility limitation	2.241***
	(11.94)
2+ Chronic diseases	2.070***
	(10.74)
Job characteristics	
Self-employed	0.551***
	(-6.92)
Bad working conditions	1.367***
	(5.11)
Socio-demographic variables	
Female	1.123
	(1.96)
Age	0.895
	(-0.46)
Age square	1.001
	(0.44)
Highest education level (Ref : none or primary)	
Secondary	0.959
	(-0.53)
Tertiary	0.808*
	(-2.46)
Country dummies (Ref : average. Denmark omitted)	
Germany	1.829**
	(3.29)
Sweden	0.897
	(-0.70)
Netherlands	1.288*
	(2.11)
Spain	0.852
	(-1.20)
Italy	0.578***
	(-4.23)
France	1.267*
	(2.54)
Austria	1.127
	(1.13)
Switzerland	0.755**
	(-2.96)
Belgium	1.275**
	(2.61)
Czech Republic	0.918
	(-0.91)
Poland	1.620*
	(2.00)
Hungary	0.791
	(-1.71)
Portugal	0.965
	(-0.22)
Slovenia	1.116
	(0.75)
Estonia	0.544***
	(-7.13)
N	13096

Note: Exponentiated coefficients; *t* statistics in parentheses

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