



Original article

# Job loss, wealth and depression during the Great Recession in the USA and Europe

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## Abstract

**Aim:** To examine whether late-career job loss increased depression among older workers approaching retirement in the USA and Europe.

**Methods:** Longitudinal data came from the Health and Retirement Survey and the Survey of Health, Ageing, and Retirement in Europe. Workers aged 50 to 64 years in 13 European countries and the USA were assessed biennially from 2006 to 2010. Individual fixed effects models were used to test the effect of job loss on depressive symptoms, controlling for age, sex, physical health, initial wealth and socio-demographic factors.

**Results:** Job loss was associated with a 4.78% [95% confidence interval (CI): 0.823% to 8.74%] increase in depressive symptoms in the USA compared with a 3.35% (95% CI: 0.486% to 6.22%) increase in Europe. Job loss due to a worker's unexpected firm closure increased depression scores in both the USA (beta = 28.2%, 95% CI: 8.55% to 47.8%) and Europe (beta = 7.50%, 95% CI: 1.25% to 13.70%), but pooled models suggested significantly stronger effects for US workers ( $P < 0.001$ ). American workers who were poorer before the recession experienced significantly larger increases in depressive symptoms compared with wealthier US workers (beta for interaction =  $-0.054$ , 95% CI:  $-0.082$  to  $-0.025$ ), whereas pre-existing wealth did not moderate the impact of job loss among European workers.

**Conclusions:** Job loss is associated with increased depressive symptoms in the USA and Europe, but effects of job loss due to plant closure are stronger for American workers. Wealth mitigates the impact of job loss on depression in the USA more than in Europe.

**Key words:** Economic recession, unemployment, ageing, depression, mental health

**Key Messages**

- Despite differences in policy approaches job loss is associated with increased depressive symptoms in both Europe and the US.
- Pre-existing wealth constitutes a significant resilience factor in the US that is less relevant in Europe.
- This study addresses previous limitations of selection bias and reverse causality by distinguishing job loss due to plant closure and analyzing baseline employed individuals.
- Future research should address the potential role of specific social protection programmes in buffering the impact of job loss among less wealthy families.

**Introduction**

The 'Great Recession' of 2008 caused significant job losses in Europe and the USA, with particularly severe consequences for older workers.<sup>1,2</sup> Among persons aged 50 to 64 years, unemployment rates increased from 3.1% to 7.3% in the USA, and from 5.4% to 6.15% in the 15 original countries of the European Union (EU-15). Recent evidence suggests that Americans in their 50s who became unemployed lost more of their monthly per capita earnings than any other age group.<sup>3</sup> Income losses may have devastating consequences for their retirement plans, increase their risk of poverty and render them more vulnerable to mental illness.<sup>4-6</sup> Prior evidence suggests that job loss among older workers is associated with poorer health,<sup>1,7-12</sup> increased depression and substance use,<sup>13-15</sup> but whether and how these associations differ across countries is not well understood.

Policy approaches to mitigate the socioeconomic impact of job losses differ markedly across European countries and the USA. In Europe, unemployment safety nets are more comprehensive and often serve as a pathway to retirement.<sup>16</sup> Programmes such as housing or insurance benefits enable older workers to retire early,<sup>17</sup> preventing current and future income losses associated with late-career unemployment. In the USA, unemployment benefit programmes are less comprehensive, potentially rendering American workers more susceptible to depression due to income loss. Stricter policies in the USA discourage workers from retiring early, by offering limited benefits to those becoming unemployed in the pre-retirement years. The generosity of unemployment benefits also differs across the USA and Europe. For example, the long-term unemployment net replacement rate for a one-earner married couple with two children was 80% in The Netherlands and 86% in Sweden in 2010, compared with 45% in the USA. In addition, many European countries have unemployment assistance programmes of unlimited duration for workers who exhaust their first-tier unemployment insurance benefits, whereas extended unemployment assistance programmes are limited or non-existent in most US states.

We used harmonized data for the USA and 11 European countries to assess the impact of job loss on depressive symptoms during and after the Great Recession. We test the hypothesis that job loss has stronger effects on depression among US than European workers, particularly for US workers with little or no wealth. We expected wealth to be less important for displaced European workers, who would be able to rely on comprehensive income protection programmes. Our study offers important insights over previous studies<sup>1,11,18-20</sup> by using fixed effect models and distinguishing job loss most likely associated with the recession from other forms of unemployment, in order to reduce reverse causality and omitted variable bias.

**Methods**

We used harmonized longitudinal data on 38 356 individuals from the Health and Retirement Survey (HRS) and the Survey of Health, Ageing and Retirement in Europe (SHARE) covering the years 2004 to 2010. Individual longitudinal surveys were applied to non-institutionalized populations aged 50 years and older using structured questionnaires completed face-to-face in Europe and over the phone in the USA. Comparable survey questionnaires<sup>21-23</sup> were used in the USA and 13 European countries: Austria, Belgium, Czech Republic, Denmark, France, Germany, Greece, Italy, The Netherlands, Poland, Spain, Sweden and Switzerland. Data for Greece were only available for 2004 and 2006.

To address reverse causality we restricted the sample to participants aged 50 to 64, who reported being employed at study enrolment (2004 or 2006 baseline years) and who had at least 2 years of follow-up. This led to the exclusion of 8067 individuals who were outside the labour market or unemployed at baseline, leaving a total sample of 15 055. In sensitivity analyses we found that including these individuals led to similar results. We used data from assessments in 2004, 2006 and 2010. Data from 2008 was excluded because they did not include information on mental health for SHARE.

## Measures of depressive symptoms

Depressive symptoms in SHARE were measured with the Euro-Depression scale (EURO-D)<sup>24</sup> whereas the short version of the Center for Epidemiologic Studies Depression Scale (CESD-D) was used for HRS. Appendix 1 (available as Supplementary data at *IJE* online) describes items for each scale. The validity of both scales has been assessed against a variety of criteria for clinically significant depressive symptoms.<sup>24</sup> Despite some differences in items, the CES-D measures the same underlying dimensions (particularly negative affect) as Euro-D, and both scales have been shown to similarly distinguish depressive symptomatology.<sup>24–27</sup> We normalized values for both scales in order to enhance comparability. In addition, we exploited the fact that CESD-D and the Euro-D were both applied to SHARE participants in 2006–07 to examine correspondence between both scales. Appendix 2 (available as Supplementary data at *IJE* online) shows the Kernel density plot, which shows a similar distribution and moderate to high correlation between the Euro-D and CESD-D scales ( $r = 0.68$ ,  $P < 0.0001$ ).

## Unemployment and job loss

At each interview, individuals reported whether they were: employed or self-employed; unemployed and looking for work; permanently sick or disabled; homemaker; or other (tenant, living off own property, student, doing voluntary work). We reclassified these groups into four broad categories: employed; unemployed and looking for work; retired; or disabled. To distinguish job loss potentially associated with the recent recession from other forms of unemployment, data on the reason for unemployment were also used to distinguish job loss due to a worker's firm or plant been closed down; job loss due to lay-off; or job loss due to other reasons (contract termination, mutual agreement with employer or the termination of a temporary contract). Following the approach of recent studies, we considered transitions into unemployment due to plant closure to be less prone to health-related selection<sup>28–31</sup> than lay-offs or other forms of unemployment. This enables us to reduce bias due to reverse causality between health and unemployment.

## Socio-demographic covariates

Socio-demographic covariates are presented in Table 1. Marital status is defined in three categories (Single, Divorced/Widowed and Married/Partnership) according to individual responses in each survey. Pension is a dichotomous variable that describes whether an individual acknowledges receiving any private or public pension. Smoking was dichotomized based on whether individuals reported

being current or ever smokers and heavy drinking was defined based on self-reports of consuming more than two drinks per day over 5 to 7 days a week.

Wealth was measured as the sum of all household financial and housing wealth minus liabilities. Following standard approaches, missing values for wealth were imputed using hot-decking procedures.<sup>32–34</sup> To account for household size, household wealth and income were divided by the square root of household size.<sup>35,36</sup> Using purchasing power parity adjustments, income and wealth values were transformed into 2006 US dollars. We used the natural logarithm of income and wealth to account for nonlinearities and reduce the impact of outliers.

We included an extensive set of measures of physical health. Physical function was measured by self-reported difficulties with maintaining basic self-care needs, expected to last at least 3 months,<sup>37</sup> assessed at each wave using two scales: the Katz Activities of Daily Living (ADL) scale,<sup>38</sup> and the index of Instrumental Activities of Daily Living (IADL).<sup>39</sup> To maintain the consistency between waves and surveys, the ADL summary score considered five activities (bathing or showering, dressing, eating, getting in and out of bed and walking across a room), and the IADL summary score included four activities (using a telephone, taking medication, handling money, shopping and preparing meals). Incorporating other health measures into the analysis, such as the diagnosis of a major chronic disease or a global assessment of disability, led to essentially the same results.

## Statistical analysis

Individual fixed effect models were used to assess the relationship between job loss and depressive symptoms. These models exploit within-individual variation in exposure and outcome, thereby controlling for all measured and unmeasured time-invariant confounders that differ across individuals. Our basic model was as follows:

$$Dep_{it} = \beta_t^0 + \beta_t^1 U_{it} + \beta_t^2 Dem_{it} + \beta_t^3 T_i + \beta_t^4 \eta_i + \varepsilon_{it} \quad (1)$$

where  $Dep_{it}$  represents the normalized depression score for individual  $i$  at time  $t$ ;  $U_{it}$  represents employment status;  $Dem_{it}$  represents a vector of time-variant socio-demographic covariates;  $T_i$  represents age; and  $\eta_i$  corresponds to interview year fixed effects. We then extended these models to examine the interaction between household wealth at study enrolment and time-varying employment status:

$$Dep_{it} = \beta_t^0 + \beta_t^1 U_{it} + \beta_t^2 Dem_{it} + \beta_t^3 T_i + \beta_t^4 \eta_i + \beta_t^5 U_{it} * \log(Wealth_{it}) + \beta_t^6 * \log(Wealth_{it}) + \varepsilon_{it} \quad (2)$$

Models for HRS and SHARE were first run separately, and then pooled analyses for both surveys were done to test for

**Table 1.** Descriptive statistics of study sample, ages 50–64, HRS and SHARE

	HRS			SHARE		
	2004	2006	2010	2004	2006	2010
Average normalized depression score	0.154	0.170	0.149	0.174	0.165	0.176
Employment status						
Employed	4994 (100%)	4023 (81.8%)	2508 (55.8%)	7199 (100%)	8167 (87.6%)	4406 (60.6%)
Retired	0 (0%)	765 (15.5%)	1798 (40.0%)	0 (0%)	840 (9.0%)	2479 (34.1%)
Disabled	0 (0%)	64 (1.3%)	55 (1.2%)	0 (0%)	141 (1.5%)	155 (2.1%)
Unemployed	0 (0%)	69 (1.4%)	137 (3.0%)	0 (0%)	170 (1.8%)	225 (3.1%)
Average age (years)	56.4	58.4	62.6	55.9	57.5	61.6
Gender						
Male	2877 (57.6%)	2847 (57.9%)	2621 (58.3%)	4174 (58.0%)	5359 (57.3%)	4261 (57.6%)
Female	2117 (42.4%)	2074 (42.1%)	1877 (41.7%)	3025 (42.0%)	3990 (42.7%)	3134 (42.4%)
Marital status						
Single	181 (3.6%)	168 (3.4%)	155 (3.4%)	379 (5.3%)	481 (5.2%)	357 (4.9%)
Divorced or widowed	870 (17.4%)	909 (18.5%)	1077 (23.9%)	875 (12.2%)	1187 (12.7%)	1015 (13.9%)
Married or partnership	3937 (78.9%)	3842 (78.1%)	3265 (72.6%)	5944 (82.6%)	7666 (82.1%)	5908 (81.2%)
Pension						
Yes	284 (5.7%)	410 (8.4%)	615 (13.9%)	294 (4.1%)	1486 (15.9%)	3273 (44.8%)
No	4661 (94.3%)	4466 (91.6%)	3799 (86.1%)	6905 (95.9%)	7863 (84.1%)	4028 (55.2%)
Average household wealth (US\$ ppp)	\$ 380,317.23	\$ 548,914.56	\$ 370,373.14	\$ 446,083.44	\$ 438,642.65	\$ 315,976.72
Average household income (US\$ ppp)	\$ 90,415.50	\$ 104,642.42	\$ 84,229.56	\$ 63,847.47	\$ 44,695.35	\$ 39,089.23
Currently smokes						
Yes	934 (18.8%)	855 (17.4%)	675 (15.1%)	1761 (47.1%)	2256 (28.4%)	1538 (21.2%)
No	4042 (81.2%)	4050 (82.6%)	3809 (84.9%)	1976 (52.9%)	5688 (71.6%)	5713 (78.8%)
Drinking (>2 drinks 5–7 days/week)						
Yes	174 (3.5%)	163 (3.3%)	138 (3.1%)	735 (10.2%)	685 (9.5%)	584 (10.2%)
No	4807 (96.5%)	4738 (96.7%)	4334 (96.9%)	6463 (89.8%)	6549 (90.5%)	5161 (89.8%)
Average number of IADLS	0.053	0.073	0.130	0.017	0.021	0.033
Average number of ADLS	0.084	0.114	0.160	0.041	0.041	0.067

effect heterogeneity. We calculated individual clustered robust standard errors for all estimates. All analyses were performed in Stata version 12.1.

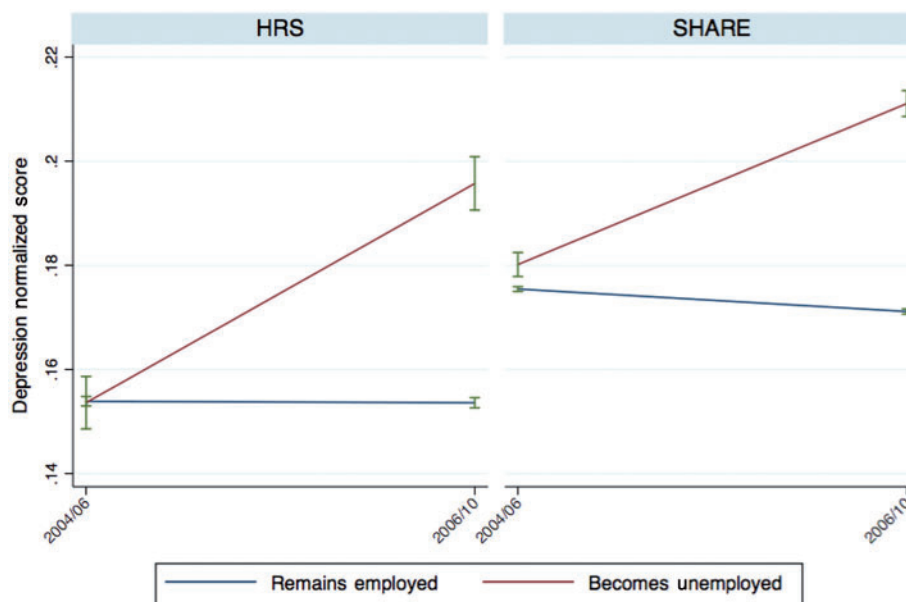
## Results

Sample characteristics are summarized in [Table 1](#). Average age at baseline was 56.4 years for the HRS and 57.5 years for SHARE respondents; 1.3% of the initial HRS sample were unemployed in 2006, and 3% were unemployed in 2010. Similarly, 1.8% of the SHARE sample of workers were unemployed in 2006, compared with 3.1% in 2010. These values correspond to the incidence of unemployment within our initially employed population. As cohorts aged, the proportion of individuals who retired and received pensions increased, as did the average scores of limitations in physical functioning. Depression scores increased from 2004 to 2006 and declined thereafter in the USA, whereas little change was observed overall in Europe. However, [Figure 1](#) shows that, for both HRS and SHARE, participants who became unemployed experienced a large

increase in depression scores after job loss, whereas little change was evident for those who remained employed.

The results from the fixed effect models are presented in [Table 2](#) and reflect the transition of employment to unemployment of 719 individuals over the study period. In models that controlled for household wealth, household income, pension receipt, health behaviour and functional status, job loss was associated with a 4.78% increase in depression scores in the USA [95% confidence interval (CI): 0.823%, 8.74%] and a 3.35% increase in Europe (95% CI: 0.486%, 6.22%). Heterogeneity tests presented in [Appendix 5](#) (available as Supplementary data at *IJE* online) suggest no difference in the effect of job loss on depression between HRS and SHARE ( $P = 0.615$ ).

The estimates presented in [Figure 2](#) distinguish job loss due to firm closure from job loss due to lay-off or other reasons (contract termination, mutual agreement with employer or the termination of a temporary contract). Job loss due to firm closure increased depressive symptom scores by 28.2% (95% CI: 8.55, 47.80) in the USA and by 7.50% (95% CI: 1.25, 13.70) in Europe. Unemployment



**Figure 1.** Depression score for employed workers at baseline. Displaced workers (top line) and continually employed workers (bottom line) over the period 2004 to 2010; ages 50–64, HRS and SHARE

**Table 2.** The impact of job loss on depression score,<sup>a</sup> ages 50–64, HRS and SHARE sample employed at baseline

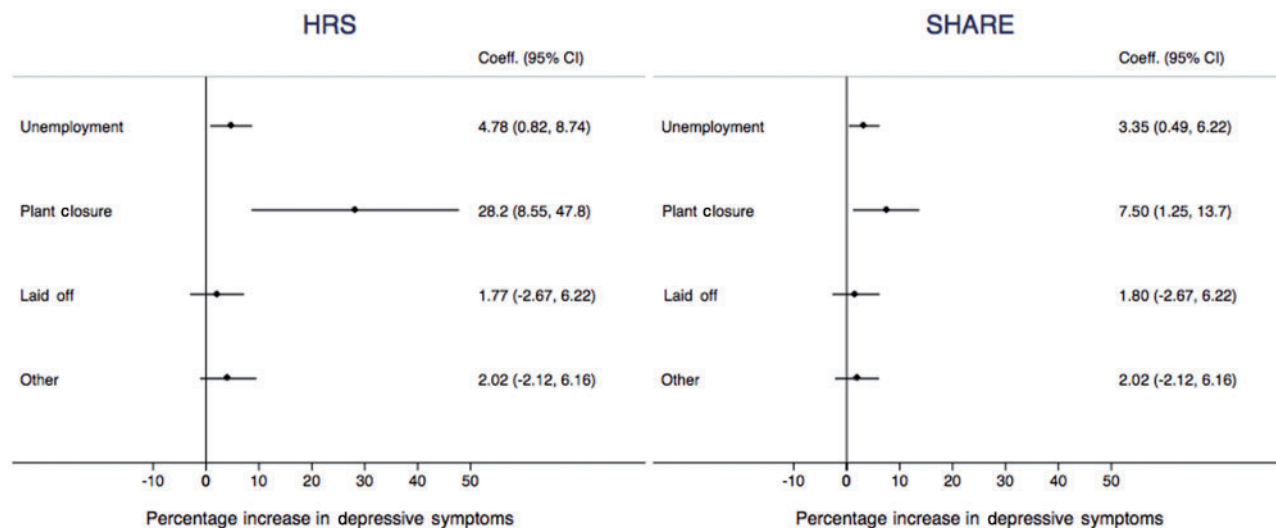
	HRS (I) Depression score	HRS (II) Depression score	SHARE (I) Depression score	SHARE (II) Depression score
Unemployed	0.054** [0.015,0.092]	0.048* [0.0082,0.087]	0.037*** [0.018,0.056]	0.033* [0.0043,0.062]
Retired	-0.0039 [-0.015,0.0073]	-0.007 [-0.019,0.0048]	0.0008 [-0.0064,0.0080]	-0.0089 [-0.021,0.0030]
Disabled	0.11*** [0.045,0.17]	0.058 [-0.017,0.13]	0.069*** [0.041,0.097]	0.075*** [0.034,0.12]
Age	0.0073 [-0.0024,0.017]	0.0053 [-0.0046,0.015]	-0.0053*** [-0.0079, -0.0027]	-0.002 [-0.0060,0.0019]
Single	0.066 [-0.017,0.15]	0.061 [-0.012,0.13]	0.035 [-0.026,0.097]	0.073 [-0.016,0.16]
Divorced or widowed	0.060*** [0.037,0.084]	0.069*** [0.044,0.094]	0.043** [0.017,0.069]	0.029 [-0.0064,0.065]
Log wealth <sup>b</sup>		-0.0088*** [-0.014, -0.0036]		0.000054 [-0.0034,0.0035]
Pension		-0.013 [-0.030,0.0035]		0.00012 [-0.011,0.011]
Log income		0.0017 [-0.0043,0.0077]		0.0012 [-0.0024,0.0048]
Currently smokes		0.003 [-0.020,0.026]		-0.0079 [-0.020,0.0041]
Drinking		0.013 [-0.015,0.042]		0.00038 [-0.011,0.011]
IADL score		0.042*** [0.023,0.062]		0.028 [-0.0060,0.062]
ADL score		0.030*** [0.013,0.046]		0.028** [0.0087,0.047]
Observations	13597	12215	23597	15006
R <sup>2</sup>	0.015	0.03	0.009	0.015

95% confidence intervals in brackets.

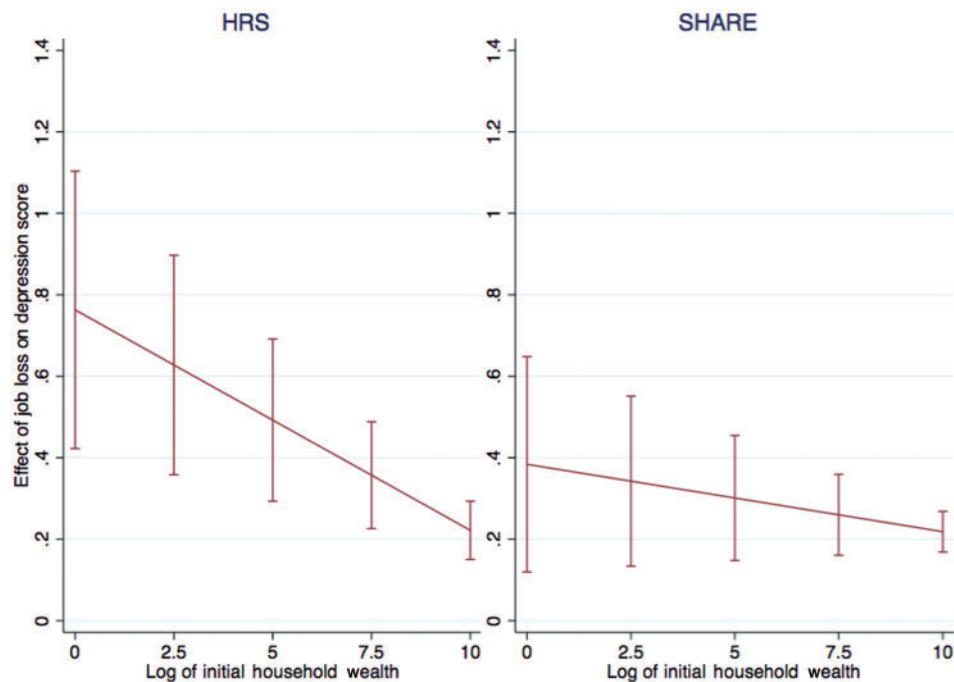
<sup>a</sup>Higher values indicate more depressive symptoms; models additionally include country and interview year fixed effects but these are omitted from the table.

<sup>b</sup>Wealth is divided by the square root of household size to account for different size households.

\* $P < 0.05$ , \*\* $P < 0.01$ , \*\*\* $P < 0.001$ .



**Figure 2.** The impact of unemployment (all categories); job loss due to plant closure; and lay-off or other reasons; on depression score in workers aged 50 to 64 in the USA and 13 European countries, HRS and SHARE. Higher values indicate more depressive symptoms; models include country fixed effect, survey year fixed effects, sociodemographics, wealth, income and physical health measures



**Figure 3.** Predicted depression score before and after job loss according to household wealth among displaced workers aged 50 to 64 in the USA and 13 European countries, HRS and SHARE. Higher values indicate more depressive symptoms; models additionally include country and interview year fixed effects. Estimates are from a model that includes an interaction between unemployment and initial household income wealth; and controls for sociodemographics, wealth, income and physical health

due to both lay-off and to other causes were also associated with increased symptom scores, but estimates were weaker than those for firm closure. Based on a model that pooled both surveys (Appendix 3, available as Supplementary data at *IJE* online), heterogeneity tests suggested that the effect of plant closure was stronger in the USA than in Europe ( $P < 0.001$ ).

The predicted depression scores by employment status in Figure 3 show the distribution of depression across initial household wealth. Predicted scores are from a model that incorporated an interaction between job loss and log-wealth, controlling for demographics, household net worth, household income, pension receipt, health behaviour and functional status. In the USA, the effect of job loss

on depressive symptoms was weaker among workers with higher pre-existing wealth (beta =  $-0.054$ , 95% CI:  $-0.082$ ,  $-0.025$ ) than among workers with little or no wealth. In contrast, there was no interaction between wealth and job loss in Europe (beta =  $-0.165$ , 95% CI:  $-0.389$ ,  $0.006$ ), suggesting that wealth did not modify the effect of job loss on mental health in European countries. Testing for heterogeneity (Appendix 4, available as Supplementary data at *IJE* online) suggests that the interaction between wealth and unemployment is stronger for the USA than Europe ( $P < 0.001$ ).

We conducted a series of sensitivity analyses to assess the robustness of our results. A potential concern is that focusing on employed workers at baseline leads to sample selection. We therefore conducted sensitivity analyses that included both employed and non-employed at baseline. These analyses yielded essentially the same results (Appendix 5, available as Supplementary data at *IJE* online). For example, in the USA, job loss led to a 3.67% increase in depression scores (95% CI: 0.765%, 6.58%), similar to the results obtained for the baseline employed sample. As before, job loss also increased depression scores in Europe for the complete sample by 2.47% (95% CI: 0.734%, 4.20%). Another concern refers to the comparability of the CESD and Euro-D scales. To assess the robustness of our results to the choice of scale, we carried out sensitivity analyses focusing only on three individual items that were fully comparable across both scales (feelings of depression, restless sleep and life enjoyment) (Appendix 6, available as Supplementary data at *IJE* online). These results show that job loss increases the feeling of depression in both HRS and SHARE. Similar results, but with larger confidence intervals, were found for restless sleep and life enjoyment. We also examined the sensitivity of our results to controlling for cognitive function. Results in Appendix 7 (available as Supplementary data at *IJE* online) show that controlling for word recall, a measure of cognitive function comparable across both surveys, did not alter our results (Appendix 7, available as Supplementary data at *IJE* online).

## Discussion

Our study suggests that job loss is associated with increased depressive symptoms both in Europe and the USA, but the role of wealth differs across the two regions. In the USA, the impact of job loss is significantly stronger for Americans with little or no wealth than for wealthier Americans. Furthermore, the impact of job loss due to plant closure was stronger in the USA than in Europe. In contrast, we observe significant but weaker effects of job loss on depressive symptoms in Europe, which are not

modified by pre-existing levels of wealth. These findings raise questions about the potential role of safety net programmes in Europe in mitigating the impact of job loss on depression among workers with little or no savings.

Our study contributes new insights. By distinguishing job loss due to plant closures, we lessen possible bias due to selection and reverse causality. Using individual fixed effect models, we also control for time-invariant factors that differ among individuals and that may confound the association between job loss and depression. Our findings support previous evidence that job loss is associated with poorer mental health<sup>6–11,40–42</sup>. Interestingly, we find that even in the context of generous social protection programmes such as those available in Europe, job loss has negative effects on mental health. This suggests that earning losses might be only one among several pathways through which job loss influences depression. Non-financial mechanisms proposed include withdrawal from social networks, loss of a social role, social stigma and psychological distress.<sup>40–47</sup> Social networks within jobs may improve mental health by enhancing access to social support structures and buffering the impact of stress on mental health.<sup>48</sup> Job loss may also lead to increased anxiety and negative health behaviours.<sup>49</sup> It has also been proposed that work has several other non-financial benefits that include providing a time structure for the day, self-esteem and status formation, and a sense of contributing to a collective purpose.<sup>49</sup> Work may also promote the use of cognitive skills, decision latitude, interpersonal contact, social status and a motivation to go on from one day to the next.<sup>47,50</sup> Our results, however, did not change after controlling for some of these factors including health behaviour and cognitive function (Appendix 7, available as Supplementary data at *IJE* online). Nonetheless, future studies based on more extensive data with comparable measures for social networks and psychosocial factors are warranted.

Our results suggest that pre-existing wealth constitutes a significant resilience factor in the USA that is less relevant in Europe. The contrasting health trajectory between the USA and Europe is supported by previous evidence showing a differential effect of social influences and socioeconomic inequalities.<sup>51,52</sup> A potential hypothesis is that, albeit at the cost of higher incentives to leave the labour market early,<sup>17,50</sup> the greater generosity of European benefit systems translates into more financial security and less depletion of individual wealth before retirement. In the USA, about 59% of long-term unemployed aged between 50 and 61, and 46% of those over 62, are eligible for unemployment benefits.<sup>3</sup> In contrast, in Europe, all unemployed workers are eligible for some type of benefit, either unemployment insurance, unemployment assistance or housing benefits. With the exception of Germany and Greece, net replacement rates for the initial

phase of unemployment are larger in most Western European countries than in the USA.<sup>53</sup> Maximum unemployment benefit duration in the USA is around 26 weeks, compared with 60 weeks in Sweden, 100 in Spain and 38 months in The Netherlands.<sup>17</sup> More generous benefits may enable individuals to accumulate savings for retirement. Furthermore, a longer period of benefit receipt may enable many European workers to reach retirement age without drawing on their savings or collecting social security benefits early. Because social security actuarially reduces early retirees' monthly payments to compensate for the additional payments they receive, early retirees receive lower monthly benefits for the rest of their lives than those retiring at ages 66 and beyond. In contrast, early retirees in Europe often transit to retirement via long-term disability, unemployment or other benefit programmes targeted at older workers, with less long-term consequences for their retirement benefits.<sup>17</sup>

Despite several strengths in our study, some limitations should be considered. We measured depressive symptoms using the CESD in the USA and the Euro-D for European countries. We minimized differences by using a normalized version of these scales, and found very similar distribution properties for both measures. However, the domains covered in the Euro-D focus more on negative affect whereas those in the CESD cover both negative and positive affect. As a result, differences may partly stem from different dimensions being emphasized by each of these scales. Nonetheless, we do not explicitly compare depressive symptom scores across populations, but focus on associations within each region. In addition, robustness analyses using similar items from both scales yielded very similar patterns to those based on the full Euro-D and CESD scales (Appendix 6, available as Supplementary data at *IJE* online), suggesting that results are unlikely to be driven by differences in the scale used. Another limitation is the lack of data on depressive symptoms for 2008 in SHARE. To assess the impact of excluding this year, we re-analysed data for HRS including the period of 2008. Estimates were very similar to those obtained excluding 2008 (Appendix 8, available as Supplementary data at *IJE* online). Another limitation in our study is the larger attrition rate in SHARE compared with HRS, which may have downwardly biased estimates for European countries. Nonetheless, we used individual fixed effect models, which control for time-invariant factors affecting differences across individuals in retention rates. Although bias may remain, this is unlikely to fully explain differences between the USA and Europe.

At baseline, we selected participants who reported being employed. If the employed population in the USA differs from the employed population in Europe in key

characteristics, this may have led to compositional differences between the two samples. However, this would not bias our fixed effect estimates, which are based on within-individual variation in employment and health. Individual fixed effects effectively control for differences in health and employment across individuals. Fixed effect models, however, do not control for time-varying confounders. Nevertheless, we controlled for a rich variety of potential time-varying confounders, minimizing concerns that other variables might be driving our results. A separate concern is that compositional differences between the US and European samples explain the difference in the effect of job loss. Although US participants have higher household income than European participants, Table 1 shows that other demographic characteristics are very similar across both samples. If household income is an effect modifier of the impact of job loss on depression, this may explain differences in the effect of job loss between Europe and the USA. However, this is an unlikely explanation for the stronger effect of job loss in the USA, where we have shown that higher wealth is associated with weaker effects of job loss on depression.

Due to small country-specific samples, we were unable to examine differences in the effect of job loss on depression across European countries. Any classification of countries is problematic in sensitivity analyses, so we implemented models separately for three regional clusters: Northern (Denmark, Sweden), Western (Austria, Belgium, Germany, The Netherlands, Switzerland) and Southern Europe (Italy, France and Greece) (Appendix 9, available as Supplementary data at *IJE* online). Although confidence intervals were wide, results suggest that the mental health effects of job loss are similar across the three regions. Future studies should assess whether the effects of job loss on mental health differ across European countries within each of these regions.

## Conclusion and policy implications

Results from this study suggest that, despite substantial differences in social policy approaches, job loss is associated with increased depressive symptoms in both Europe and the USA. This suggests that social protection programmes may not be sufficient to eliminate the impact of job loss, which may influence depression via both financial and non-financial mechanisms. Nevertheless, whereas job loss effects on depressive symptoms are confined to poorer Americans, both rich and poor Europeans experience relatively small effects of job loss on mental health. Further evidence is needed, but our study may point towards the role of unemployment benefits and income transfer programmes in buffering the impact of job loss on mental



health among European workers. The stronger effect of job loss on depression in poor Americans compared with poor Europeans should prompt future research on the potential role of specific social protection programmes in buffering the impact of job loss among less wealthy workers and their families.

## Supplementary Data

Supplementary data are available at *IJE* online.

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## References

- Sullivan D, von Wachter T. Job displacement and mortality: an analysis using administrative data. *Q J Econ* 2009;124:1265–306.
- Paul K, Moser K. Unemployment impairs mental health: Meta-analyses. *J Voc Behav* 2009;74:264–82.
- Johnson R, Feng A. Financial consequences of long-term unemployment during the great recession and recovery. Chicago, IL: Urban Institute, 2013.
- Li ZY, Page A, Martin G, Taylor R. Attributable risk of psychiatric and socio-economic factors for suicide from individual-level, population-based studies: A systematic review. *Soc Sci Med* 2011;72:608–16.
- Taylor R, Page A, Morrell S, Harrison J, Carter G. Mental health and socio-economic variations in Australian suicide. *Soc Sci Med* 2005;61:1551–59.
- Zhang J, Mckeown RE, Hussey JR, Thompson SJ, Woods JR. Gender differences in risk factors for attempted suicide among young adults: Findings from the Third National Health and Nutrition Examination Survey. *Ann Epidemiol* 2005;15:167–74.
- Black SE, Devereux PJ, Salvanes KG. *Losing Heart? The Effect of Job Displacement on Health*. Working Paper Series 18660. Cambridge, MA: National Bureau of Economic Research, 2012.
- Burgard SA, Brand JE, House JS. Toward a better estimation of the effect of job loss on health. *J Health Soc Behav* 2007;48:369–84.
- Gerdtham UG, Johannesson M. A note on the effect of unemployment on mortality. *J Health Econ* 2003;22:505–18.
- Schroder M. Jobless now, sick later? Investigating the long-term consequences of involuntary job loss on health. *Adv Life Course Res* 2013;18:5–15.
- Strully KW. Job loss and health in the US labor market. *Demography* 2009;46:221–46.
- Bender KA, Theodossiou I. Controlling for endogeneity in the health-socioeconomic status relationship of the near retired. *J Socio-Econ* 2009;38:977–87.
- Gallo WT, Bradley EH, Siegel M, Kasl SV. Health effects of involuntary job loss among older workers: Findings from the health and retirement survey. *J Gerontol B Psychol Sci Soc Sci* 2000;55:S131–S40.
- Gallo WT, Bradley EH, Dubin JA *et al*. The persistence of depressive symptoms in older workers who experience involuntary job loss: results from the health and retirement survey. *J Gerontol B Psychol Sci Soc Sci* 2006;61:S221–28.
- Bor J, Basu S, Coutts A, McKee M, Stuckler D. Alcohol use during the great recession of 2008–2009. *Alcohol Alcohol* 2013;48:343–48.
- Organization for Economic Cooperation and Development (OECD). *Benefits and Wages: Country Specific Information*. Paris: OECD, 2013.
- Brugiavini A. Early retirement in Europe. *Eur Rev* 2001;90:501–15.
- Gallo WT, Bradley EH, Siegel M, Kasl SV. Health effects of involuntary job loss among older workers: findings from the Health and Retirement Survey. *J Gerontol B Psychol Sci Soc Sci* 2000;55:S131–S40.
- Gallo WT, Bradley EH, Dubin JA *et al*. The persistence of depressive symptoms in older workers who experience involuntary job loss: results from the Health and Retirement Survey. *J Gerontol B Psychol Sci Soc Sci* 2006;61:S221–S28.
- Schröder M. Jobless now, sick later? Investigating the long-term consequences of involuntary job loss on health. *Adv Life Course Res* 2013;18:5–15.
- Hu P, Lee J. Chronic Medical Conditions. 2011. Rand Working Paper (WR-861/1).
- Zamarro G, Lee J. Employment and Retirement Measures. 2011. Rand Working Paper (WR-861/4).
- Agrisani M, Lee J. *Wealth Measures*. 2011. Rand Working Paper (WR-861/6).
- Prince MJ, Beekman AT, Deeg DJ *et al*. Depression symptoms in late life assessed using the EURO-D scale. Effect of age, gender and marital status in 14 European centres. *Br J Psychiatry* 1999;174:339–45.
- Prince MJ, Reischies F, Beekman AT *et al*. Development of the EURO-D scale – a European Union initiative to compare

- symptoms of depression in 14 European centres. *TBr J Psychiatry* 1999;174:330–38.
26. Copeland J, Beekman A, Braam A *et al.* Depression among older people in Europe: the EURODEP studies. *World Psychiatry* 2004;3:45–49.
  27. Prince M. The development of the EURO-D Scale. In: Copeland J, Abou-Saleh M, Blazer D (eds). *Principles and Practice of Geriatric Psychiatry*. Chichester, UK: John Wiley, 2002.
  28. Browning M, Dano AM, Heinesen E. Job displacement and stress-related health outcomes. *Health Econ* 2006;15:1061–75.
  29. Browning M, Heinesen E. Effect of job loss due to plant closure on mortality and hospitalization. *J Health Econ* 2012;31:599–616.
  30. Schmitz H. Why are the unemployed in worse health? The causal effect of unemployment on health. *Labour Econ* 2011;18:71–78.
  31. Strully KW. Job loss and health in the U.S. *labor market. Demography* 2009;46:221–46.
  32. Borsch-Supan A, Brugiavini A, Jürges H, Mackenbach J, Siegrist J, Weber G. *Health, Ageing and Retirement in Europe*. Morlenbach, Germany: Strauss GmbH, 2005.
  33. Marmot M, Banks J, Blundell R, Lessof C, Nazroo J. Health, wealth and lifestyles of the older population in England: The 2002 English Longitudinal Study of Ageing. London: University College London, 2002.
  34. St Clair P, Blake D, Bugliari D *et al.* *RAND HRS Data Documentation, Version J*. Santa Monica, CA: RAND, 2010.
  35. Organization for Economic Cooperation and Development OECD. *Divided We Stand: Why Inequality Keeps Rising*. Paris: OECD, 2011.
  36. Organization for Economic Cooperation and Development (OECD). *Growing Unequal? Income Distribution and Poverty in OECD Countries*. Paris: OECD, 2008.
  37. Tsae-Jyy W. Concept analysis of functional status. *Int J Nurs Stud* 2004;41:457–62.
  38. Katz S, Downs TD, Cash HR, Grotz RC. Progress in development of the Index of ADL. *Gerontologist* 1970;10:20–30.
  39. Katz S. Assessing self-maintenance: activities of daily living, mobility, and instrumental activities of daily living. *J Am Geriatr Soc* 1983;31:721–27.
  40. Gathergood J. An instrumental variable approach to unemployment, psychological health and social norm effects. *Health Econ* 2013;22:643–54.
  41. Iversen L, Klausen H. Alcohol consumption among laid-off workers before and after closure of a Danish ship-yard – a 2-year follow-up-study. *Soc Sci Med* 1986;22:107–09.
  42. Murphy GC, Athanasou JA. The effect of unemployment on mental health. *J Occup Organ Psychol* 1999;72:83–99.
  43. Clark AE. Unemployment as a social norm: Psychological evidence from panel data. *J Labor Econ* 2003;21:323–51.
  44. Jahoda M. Work, employment, and unemployment – values, theories, and approaches in social research. *Am Psychol* 1981;36:184–91.
  45. Joelson L, Wahlquist L. The psychological meaning of job insecurity and job loss – results of a longitudinal study. *Soc Sci Med* 1987;25:179–82.
  46. Siegel M, Bradley EH, Gallo WT, Kasl SV. Impact of husbands' involuntary job loss on wives' mental health, among older adults. *J Gerontol B Psychol Sci Soc Sci* 2003;58:S30–S37.
  47. Bartley M. Unemployment and ill health – understanding the relationship. *J Epidemiol Community Health* 1994;48:333–37.
  48. Kawachi I, Berkman LF. Social ties and mental health. *J Urban Health* 2001;78:458–67.
  49. Jahoda M. *Employment and Unemployment: A Social Psychological Analysis*. New York: Cambridge University Press, 1982.
  50. Warr PB. *Work, Unemployment, and Mental Health*. Oxford, UK: Oxford University Press, 1987.
  51. McDonough P, Worts D, Sacker A. Socioeconomic inequalities in health dynamics: a comparison of Britain and the United States. *Soc Sci Med* 2010;70:251–60.
  52. Sacker A, Worts D, McDonough P. Social influences on trajectories of self-rated health: evidence from Britain, Germany, Denmark and the USA. *J Epidemiol Community Health* 2011;65:130–36.
  53. Organization for Economic Cooperation and Development (OECD). *Benefits and Wages: Statistics 2013*. Paris: OECD, 2013.

## Commentary: The hidden and not so hidden benefits of work: identity, income and interaction

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Work provides people with an income, and income is important for health. We know this. It is obvious, but work does much more. Work provides most of us with one of our primary roles in society: as a worker. We may see our-

selves as mechanics, nurses, teachers, construction workers, farmers, scientists, architects or additional identities, but at the core we are all workers. We provide for ourselves and often for others.