



UNIVERSITY OF WARSAW
FACULTY OF ECONOMIC SCIENCES

WORKING PAPERS

No. 16/2018 (275)

WHAT ACCOUNTS FOR THE RISE OF LOW
SELF-RATED HEALTH DURING THE RECENT
ECONOMIC CRISIS IN EUROPE?

MICHAŁ BRZEZIŃSKI

WARSAW 2018



What accounts for the rise of low self-rated health during the recent economic crisis in Europe?

Michał Brzezinski

*Faculty of Economic Sciences, University of Warsaw, Warsaw, Poland,
e-mail: mbrzezinski@wne.uw.edu.pl*

Abstract: This study examines how different economic mechanisms affected low self-rated health (SRH) in Europe over the recent crisis period (2008–2011). We use balanced panel data for covering 26 European countries and 43 456 participants coming from the longitudinal 2011 European Union Statistics on Income and Living Conditions (EU-SILC) database. Over-time increases in low SRH incidence are decomposed into the contributions of changes in the distribution of covariates and changes in returns to the covariates. Results show that low SRH incidence increased in Europe during the crisis by almost 2 percentage points (3.7 percentage points in case of the Baltic countries). Decomposition analysis shows that: 1) decreasing household incomes and changing income distribution had no impact on low SRH incidence, 2) rise of material deprivation accounts for 12% of the overall growth in low SRH rates (27% for the Baltic countries), 3) decreasing levels of full-time and part-time employment as well as transitions to unemployment, economic inactivity, disability, or retirement account jointly for about 21% of the rise in low SRH in Europe (73% for Baltic countries).

Keywords: self-rated health, economic crisis, decomposition, Oaxaca-Blinder, unemployment, material deprivation

JEL codes: D63, E32, I1, I14

<https://doi.org/10.26405/WP/WNE/2018/275/016>

1. Introduction

The recent economic crisis that started in 2008, often called the Great Recession (GR), was the worst global economic recession since the Great Depression of the 1930s. For many European countries, reduced economic activity has brought decreasing household incomes, increased unemployment or labor market inactivity, and growing material deprivation. Several governments responded to the crisis by implementing policies of austerity or fiscal consolidation, which could have further amplified negative impact of the crisis on health outcomes. While some studies have found some deterioration in various health outcomes due to the crisis (Margerison-Zilko et al. 2016; Abebe et al. 2016; Burgard and Kalousova 2015), other works report rather small or insignificant effects of the recession on health (Baumbach and Gulis 2014; Reibling et al. 2017; Toffolutti and Suhrcke 2014).

In this paper, we contribute to the literature on health effects of the GR by measuring changes in low self-rated health (SRH) rates for 26 European countries observed during the crisis. Using balanced panel data for 2008–2011 from the EU-SILC (European Union Statistics on Income and Living Conditions) and regression-based decomposition methodology (Oaxaca 1973; Blinder 1973; O'Donnell et al. 2008; Yun 2005), we analyse how over-time increases in the society-wide low SRH rates during the recession can be accounted for by three different economic mechanisms: changes in household income levels and income distribution (income poverty, income inequality), labour market developments (increasing unemployment, falling employment, changes in labour market inactivity), and non-income poverty (material deprivation). This approach allows to measure the strength of the association between different economic recession-related factors and low SRH in Europe. Our results may be useful from the perspective of a policymaker concerned with the incidence of low SRH in a society, as they suggest which economic mechanisms account most significantly for the worsening of the SRH distribution during the recession.

Several previous studies have investigated the impact of the GR in Europe on various health outcomes such as suicide rates (Chang et al. 2013), fertility (Goldstein et al. 2013), mortality (Baumbach and Gulis 2014; Toffolutti and Suhrcke 2014) or depression (Reibling et al. 2017; Drydakis 2015; Riumallo-Herl et al. 2014). Some papers have studied changes in SRH during recession in individual European countries such as Greece (Drydakis 2015; Simou and Koutsogeorgou 2014; Vondoros 2013), Spain (Arroyo et al. 2015; Juárez et al. 2014; Urbanos-

Garrid and Lopez-Valcaracel 2015), the UK (Astell-Burt and Feng 2013), or Estonia, Lithuania and Finland (Reile et al. 2014). Tøge and Blekesaune (2015) have used longitudinal 2008–2011 EU-SILC data to show that becoming unemployed during the GR had a negative effect on SRH. However, this effect diminishes in the first few years after becoming unemployed. Abebe et al. (2016) have shown that fair and poor SRH have increased during the GR in a sample of working-age population living in 23 European countries. They also found that the micro- and macro-level covariates of low and fair SRH did not change significantly between the pre-recession period (2005–2007) and the recession period (2008–2011). The present paper adds to this literature by decomposing the increases in low SRH rates in Europe during the GR into the components associated with three distinct types of economic factors: changes in level and distribution of income, labour market perturbations and non-income poverty (material deprivation). This analysis delivers new insights into the relative role of various economic mechanisms affecting changes in low SRH incidence during recessions.

2. Methods

2.1. Decomposition technique

To identify factors that are associated with changes in low SRH over time, we use a variant of multivariate regression-based Oaxaca–Blinder decomposition technique (Oaxaca 1973; Blinder 1973), which is routinely applied to account for changes in mean socio-economic outcomes (e.g. wages, health statuses) between various socio-economic groups (e.g. men versus women) or changes in these outcomes over time. The methodology allows to partition the observed difference in a given outcome into a component attributable to differences in the observed *characteristics* (i.e. individual demographic, economic or educational attributes) and a component attributable to differences in the *returns* to these characteristics. The former component is often called an “explained” part of the difference in the outcome, while the latter component is called an “unexplained” one. The Oaxaca-Blinder methodology has been applied to analyse various issues in the health literature (O'Donnell et al. 2008; Powell et al. 2012; Sen 2014). For the logit model, the low SRH rate in period t , H^t , is equal to the average predicted probability of having low SRH:

$$H^t = \overline{F(X_i^t \hat{\beta}^t)}, \quad (1)$$

where F is the logistic probabilistic cumulative distribution, X_i^t is a vector of independent variables or characteristics describing the individual i in period t , and $\hat{\beta}^t$ is the vector of estimated

coefficients or returns to these characteristics in period t . Using property (1), the difference between the low SRH rates observed in two periods $t = 0$ and $t = 1$,

$$H^1 - H^0 = \overline{F(X^1\beta^1)} - \overline{F(X^0\beta^0)}, \quad (2)$$

can be decomposed into the aggregate characteristics or “explained” effect, E , and aggregate coefficients or “unexplained” effect, C :

$$H^1 - H^0 = E + C = \{\overline{F(X^1\beta^1)} - \overline{F(X^0\beta^1)}\} + \{\overline{F(X^0\beta^1)} - \overline{F(X^0\beta^0)}\}. \quad (3)$$

The aggregate “explained” and “unexplained” effects can be further decomposed into individual effects E_g and C_g , $g = 1, \dots, G$, representing the contributions of an individual g -th element of X to, respectively, the aggregate effects E and C :

$$H^1 - H^0 = E + C = \sum_{g=1}^G W_{\Delta X}^g E + \sum_{g=1}^G W_{\Delta \beta}^g C, \quad (4)$$

where W are the appropriate weights obtained by approximating the value of the average of function $\overline{F(\bar{X}\beta)}$ with the value of the function evaluated at the average values of the elements of X , $F(\bar{X}\beta)$, and applying a first-order Taylor linearization of equation (3) around $\bar{X}^1\beta^1$ and $\bar{X}^0\beta^0$ [10,25,26]. This approach is easy to interpret, straightforward to compute, invariant to the order of inclusion of variables into the decomposition, as well as invariant to the choice of the reference (or omitted) category, when categorical variables are used as elements of X .

2.2. Data on SRH and covariates

We use data on SRH and its correlates from the longitudinal 2011 European Union Statistics on Income and Living Conditions (EU-SILC) database. These data refer to the period 2008–2011, which covers most of the crisis period in Europe. We use a balanced four-year panel sample of individuals that were interviewed in each year between 2008 and 2011. The sample covers 26 EU countries; no longitudinal information for Germany and Ireland was available for the 2008–2011 period. In all analyses, we apply EU-SILC individual longitudinal weight to account for survey non-response and longitudinal attrition.

The wording of the SRH question in EU-SILC is as follows: “How is your health in general?”. The answers are ranked on a 5-point scale: 5 = “very good”, 4 = “good”, 3 = “fair”, 2 = “bad”, and 1 = “very bad”. We define low SRH as reporting “fair” or worse health. Our analysis is performed for individuals between 18 and 64 years of age. We excluded proxy interviewees

(respondents who had someone else answer the questions for them). Table 1 shows descriptive statistics for all variables used.

In our decomposition analyses aiming at identification of factors that are associated with changes in low SRH, we use several variables that can potentially affect SRH. The standard controls include age, sex, educational attainment, marital status, and degree of urbanization. We expect that the impact of the economic crisis on low SRH can be captured using three types of economic variables: income and its distribution (Frijters et al. 2005; Jones and Schurer 2011), labour market status (Tøge and Blekesaune 2015), and material deprivation status (Imlach Gunasekara et al. 2013; Aue et al. 2016). We use real equivalized disposable (after tax and transfer) income expressed in 2004 prices as our main income variable.

Table 1: Descriptive statistics for the pooled sample of 26 EU countries

	2008		2011	
	Mean	SD ^a	Mean	SD ^a
SRH status: 1-5 scale, 1=very bad, 5=very good	3.908	0.852	3.844	0.878
Very bad SRH	0.009	0.094	0.013	0.112
Very bad or bad SRH	0.060	0.238	0.076	0.265
Very bad, bad or fair SRH	0.267	0.442	0.285	0.452
Female	0.591	0.492	0.563	0.496
Age	44.343	12.043	46.004	12.412
Real equivalent household income (Euro in 2004 prices)	18 824.3	14 381.9	16 945.3	14 837.6
Poor (income < 60% of the median)	0.154	0.361	0.173	0.378
Rich (income > 200% of the median)	0.083	0.276	0.083	0.276
Relatively poor	0.116	0.320	0.125	0.330
Relatively rich	0.057	0.231	0.059	0.236
Material deprivation	0.154	0.361	0.178	0.382
Primary education and less	0.114	0.317	0.102	0.303
Lower secondary education	0.154	0.361	0.155	0.362
Upper secondary education	0.462	0.499	0.472	0.499
Tertiary education	0.270	0.444	0.271	0.444
Married	0.587	0.492	0.610	0.488
No longer married	0.135	0.341	0.138	0.344
Never married	0.279	0.448	0.252	0.434
Employed, full-time	0.544	0.498	0.519	0.500
Employed, part-time	0.125	0.331	0.107	0.310
Unemployed	0.058	0.233	0.072	0.259
Retired	0.126	0.332	0.146	0.353
Disabled	0.041	0.198	0.040	0.196
Inactive	0.106	0.308	0.116	0.320
Densely populated area	0.452	0.498	0.468	0.499
Intermediate populated area	0.319	0.466	0.289	0.453
Thinly populated area	0.257	0.437	0.316	0.465
Observations	43 456			

a: Standard deviation

The impact of income poverty and inequality (Wilkinson 1992; Wilkinson 1992; Pickett and Wilkinson 2015) is accounted for by binary indicators of income poverty and richness. In order to verify the relative income hypothesis, which posits that individual's health is affected rather by her relative than absolute income (Gerdtham and Johannesson 2004; O'Donnell et al. 2015), we use binary indicators of being relatively poor (rich) defined as having income lower (higher) than 60% (200%) of her reference income (average income of individuals with the same gender, age class and education category). Material deprivation is measured by binary indicator variable taking the value of one if a person cannot afford at least three of the following nine items: mortgage, rent or utility payments, one week's holiday away from home, a meal with meat every second day, unexpected financial expenses, a telephone (including mobile telephone), a colour TV, a washing machine, a car and heating to keep the home sufficiently warm. Finally, the role of rapid and profound labour market perturbations during the GR is accounted for by dummy variables describing whether a person was full-time or part-time employee, unemployed, retired, disabled or inactive due to other reason.

3. Results

Figure 1 plots the percentage increase in low SRH incidence against the percentage increase in unemployment rate over 2008–2011 for each country in our sample. Strikingly, the countries group around two clusters – one with low or moderate increases in unemployment rate and the other with high unemployment rate growth (severe recession countries). In the former cluster, there seems to be a slightly negative relationship between increases in low SRH incidence and increases in unemployment rate. On the other hand, the relationship is positive in the group of countries heavily hit by the crisis.

Table 2 presents estimates for low SRH rates and their changes between 2008 and 2011, calculated separately for the sample of all EU countries, severe recession countries and the Baltic countries, which were hit particularly hard by the GR. In case of all EU countries, we observe that the low SRH incidence grew over 2008–2011 by almost 2 percentage points. The incidence of low SRH increased even more for the Baltic countries (3.8 percentage points). Estonia and Lithuania have experienced increases in low SRH rates by more than 4 percentage points. On the other hand, we observe a small decline, although statistically insignificant, in low SRH incidence in the group

of severe recession countries. It is likely that the negative impact of recession on health in the Baltics was amplified by cuts in healthcare funding and reductions in coverage of health services (Reile 2014). These results are consistent with Abebe et al. (2016) who have found that during the crisis low SRH incidence was either increasing or stable in most of the EU countries.

Figure 1: Percentage increase in low SRH incidence versus percentage increase in the unemployment rate in 26 European countries, 2008–2011

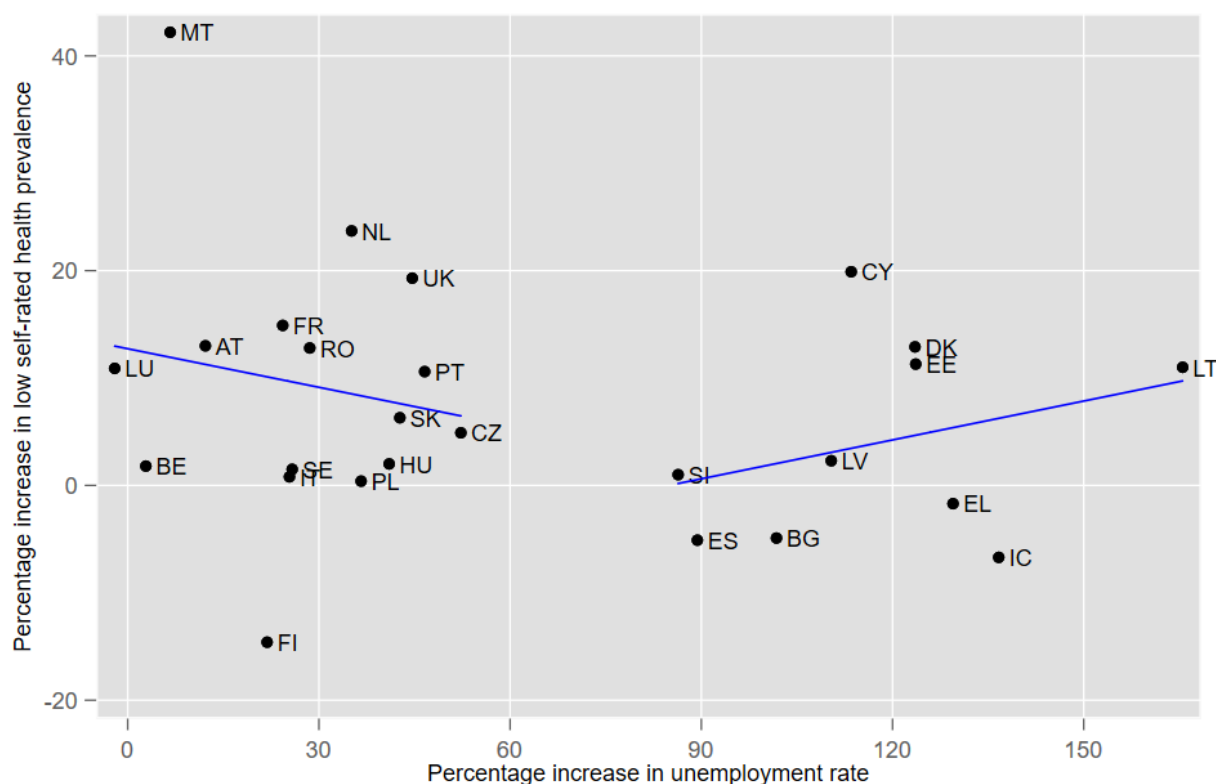


Table 2: Estimates of low SRH^a rates for various samples of European countries, 2008–2011

Sample	Low SRH (%) in 2008	Low SRH (%) in 2011	Change in low SRH	% change in low SRH	P-value ^b
All EU countries	26.66 (0.2)	28.52 (0.2)	1.9	7.0	0.000
Severe recession countries ^c	24.44 (0.4)	23.89 (0.4)	-0.6	-2.3	0.315
Baltic countries	46.50 (0.8)	50.29 (0.8)	3.8	8.2	0.001

Standard errors appear in parentheses.

a: Low SRH is defined as the proportion of population with very bad, bad or fair SRH.

b: *p*-value for the test of equality between the estimates of low SRH rates for 2008 and 2011.

c: Bulgaria, Cyprus, Denmark, Estonia, Greece, Iceland, Latvia, Lithuania, Slovenia, Spain.

Decompositions of increases in low SRH rates for all EU countries and the Baltic countries observed over 2008–2011 are presented in Table 3. In both cases, the “explained” part of the decomposition is highly statistically significant. It accounts for as much as 1.8 percentage point increase in the low SRH rate in the sample of all EU countries (93% of the overall rise in low SRH incidence over 2008–2011). For the Baltic countries, the contribution of the “explained” part to the increase in low SRH rate is actually higher than the overall rise in low SRH incidence. This happens as the “unexplained” part due to the changing returns to covariates is negative (it reduces the incidence of low SRH). However, the “unexplained” component is statistically insignificant. Overall, these results suggest that our decomposition approach does a good job in accounting for the increases in low SRH incidence in Europe during the GR.

Table 3 presents also individual characteristics effects, which identify contributions of changes in the distribution of SRH covariates to the overall increases in low SRH. Surprisingly, we do not find any role for changes in income level or its distribution as captured by indicators of being absolutely (or relatively) poor or rich.

On the other hand, increasing material deprivation contributed significantly to the rise in low SRH rates. In case of all EU countries, the characteristics effect associated with the growth of material deprivation (by 2.4 percentage points over 2008–2011, see Table 1) accounts for about 0.2 percentage point rise in the low SRH rate (or 12% of the overall increase in low SRH incidence). For the Baltic countries, the size of the effect is larger and reaches 27% of the total rise of the low SRH rate.

All individual characteristics effects related to labour market status are highly significant. Full-time and part-time employment rates in the EU have jointly fallen over 2008–2011 by 4.3 percentage points. These labour market perturbations contributed to the rise in low SRH rate by about 0.5 percentage point (27% of the increase in the overall low SRH rate).

Table 3: Decomposition of changes in low SRH^a rates for various samples of European countries, 2008-2011

	All EU countries		Baltic countries	
	Estimate	% of change in low SRH	Estimate	% of change in low SRH
Change in low SRH	1.935***	100	3.790***	100

	(0.514)		(1.229)	
Total “explained” effect	1.802*** (0.291)	93.1	4.771*** (0.460)	125.9
Total “unexplained” effect	0.133 (0.616)	6.9	-0.981 (1.325)	-25.9
<i>Individual characteristics effects</i>				
Real equivalent income	0.205 (0.180)	10.6	0.372 (0.342)	9.8
Poor	0.002 (0.023)	0.1	0.001 (0.073)	0.0
Rich	-0.000 (0.000)	-0.0	0.002 (0.002)	0.0
Relatively poor	0.005 (0.010)	0.2	0.018 (0.043)	0.5
Relatively rich	0.000 (0.003)	0.0	-0.065 (0.048)	-1.7
Material deprivation	0.224*** (0.019)	11.6	1.011*** (0.186)	26.7
Employed full time	0.345*** (0.036)	17.8	1.332*** (0.115)	35.2
Employed part time	0.168*** (0.028)	8.7	-0.184*** (0.046)	-4.8
Unemployed	-0.104*** (0.024)	-5.4	-0.734*** (0.114)	-19.4
Retired	0.091*** (0.031)	4.7	0.780*** (0.162)	20.6
Disabled	-0.028*** (0.002)	-1.5	0.896*** (0.207)	18.0
Inactive	-0.059*** (0.015)	-3.0	0.896*** (0.207)	23.6
Other factors ^b	0.955*** (0.322)	49.3	0.661*** (0.193)	17.4
Observations	43 456		3 719	

Standard errors for estimates appear in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

a: Low SRH is defined as the proportion of population with very bad, bad or fair SRH.

b: Other factors include sex, age, education, marital status, degree of urbanization and region variables.

For the Baltic countries, declines in employment rates account for 1.1 percentage point increase in the low SRH incidence. The results suggest also that increasing rates of unemployment during the crisis had a small (0.1 percentage point), statistically significant effect on reducing low SHR rates in the EU (and somewhat larger effect in case of the Baltic countries). This counterintuitive result is due to weakening of the association between unemployment and the probability of reporting low SRH during the recession (see full regression results in the Supplementary Appendix). While in 2008 unemployment was a relatively strong statistically significant positive predictor of low SRH,

it has become an insignificant correlate in 2011. Transitions to retirement during recession were increasing low SRH rates for both samples. Effects associated with disability and economic inactivity played a smaller role in case of all EU countries but were more sizable for the Baltics.

4. Discussion

The main findings from the decomposition analysis are as follows. First, we do not find any impact of decreasing household incomes and changing income distribution on growing incidence of low SRH in Europe. A possible explanation for this result is that the impact of (absolute and relative) incomes and income inequality on health is empirically small or even negligible (Frijters et al 2005; Jones and Schurer 2011; O'Donnell et al 2015; Hildebrand and van Kerm 2009). It is also worth recalling here that in the short-run the impact of the GR on income inequality and poverty rates in Europe was rather small (Jenkins et al. 2011). Second, we find that the rise of non-income poverty (material deprivation) accounts for a significant portion (12%) of the overall growth in low SRH in Europe during recession. The effect is even larger (27%) for of the Baltic countries. Third, decreasing levels of full-time and part-time employment as well as transitions to unemployment, economic inactivity, disability, or retirement account jointly for about 21% of the rise in low SRH in Europe, and for about 73% in case of the Baltic countries. Together, the recession-related economic factors account for about 33% of the increase in low SRH incidence in Europe, and for about 100% of the increase in the Baltic countries. While some previous studies have investigated the relationship between transitions from employment to unemployment and SRH during the GR (Abebe et al. 2016; Tøge and Blekesaune 2015), the present paper explores additionally the role of transitions from employment to retirement, disability, or inactivity. The overall effect associated with these transitions account for as much as 62% of the rise of low SRH in the Baltic countries (see Table 3). Future studies should devote more attention to the problem of how recessions affect health of those who are retired, disabled or economically inactive.

An important novel insight of the present paper is that growing material deprivation can be an important factor worsening health during recessions. This calls for both more research on the relationship between material deprivation (or other measures of non-income poverty) and health, as well as for reconsideration of policies directed at reducing material deprivation. Such policies could include progressive taxation, free or subsidized access to public services, active labour market interventions, public housing, and others (Terraneo 2017).

This study has a number of limitations. First, it relies on self-reported health data, which are subjective and can have limited comparability across time and various groups in the society [39]. Second, since the panel dimension of the EU-SILC data is rather short (4-years), it does not allow for studying health effects of the GR over the longer period. Third, although we were able to control for many socio-economic characteristics of individuals, there are some omitted factors such as subjective economic stress, health behaviours or psychological justification mechanisms [22] that could be mediators between the economic effects of the recession and reported health statuses. Finally, it must be stressed that, despite the use of panel data, the paper estimates mainly associations, not the causal relationships between low SRH rates and recession-related economic variables.

5. Conclusions

In this paper, we have used balanced panel data from 2008–2011 EU-SILC database and regression-based decomposition methodology to understand how different economic mechanisms (changing income distribution, labour market developments, increases in material deprivation) have affected changes in the incidence of low SRH in Europe during the recent economic crisis. To our knowledge, this is the first study to estimate the separate impact of distinct recession-related economic factors on SRH in Europe. We have found that low SRH incidence increased during the GR by almost 2 percentage points for all EU countries, and by 3.8 percentage points for the Baltic countries. The recession-related economic factors together account for about 33% of the increase in low SRH incidence in Europe, and for about 100% of the increase in the Baltic countries. Our novel finding is that non-income poverty (material deprivation) has been an important factor worsening health during the recession as it accounted for 12% of the overall growth in low SRH in Europe (27% for of the Baltic countries). Future studies should investigate whether the link between increasing material deprivation and poorer SRH can also be found in case of other recessions.

References

- Abebe, D.S., Tøge, A.G., Dahl, E. 2016. Individual-level changes in self-rated health before and during the economic crisis in Europe. *International Journal for Equity in Health* 15, 1.
- Arroyo, E., Renart, G., Saez, M. 2015. How the economic recession has changed the likelihood of reporting poor self-rated health in Spain. *International Journal of Equity in Health* 14, 149.
- Astell-Burt, T., Feng, X. 2013. Health and the 2008 Economic Recession: Evidence from the United Kingdom. *PLoS One* 8, e56674.
- Aue, K., Roosen, J., Jensen, H.H. 2016. Poverty dynamics in Germany: Evidence on the relationship between persistent poverty and health behavior. *Social Science & Medicine* 153, 62–70.
- Baumbach, A., Gulis, G. 2014. Impact of financial crisis on selected health outcomes in Europe. *European Journal of Public Health* 24, 399–403.
- Blinder, A.S. 1973. Wage discrimination: Reduced form and structural estimates. *Journal of Human Resources* 8 (4), 436–455.
- Burgard, S.A., Chen, P.V. 2014. Challenges of health measurement in studies of health disparities. *Social Science & Medicine* 106, 143–50.
- Burgard, S.A., Kalousova, L. 2015. Effects of the Great Recession: Health and well-being. *Annual Review of Sociology* 41, 181–201.
- Chang, S.-S., Stuckler, D., Yip, P., Gunnell, D. 2013. Impact of 2008 global economic crisis on suicide: Time trend study in 54 countries. *BMJ* 347, f5239.
- Drydakis, N. 2015. The effect of unemployment on self-reported health and mental health in Greece from 2008 to 2013: A longitudinal study before and during the financial crisis. *Social Science & Medicine* 128, 43–51.
- Frijters, P., Haisken-DeNew J.P., Shields, M.A. 2005. The causal effect of income on health: Evidence from German reunification. *Journal of Health Economics* 24 (5), 997–1017.
- Gerdtham, U.-G., Johannesson, M. 2004. Absolute income, relative income, income inequality, and mortality. *Journal of Human Resources* 39 (1), 228–247.
- Goldstein, J., Karaman Örsal, D.D., Kreyenfeld, M., Jasilioniene, A. 2013. Fertility reactions to the “Great Recession” in Europe. *Demographic Research* 29, 85–104.

- Hildebrand, V., Van Kerm, P. 2009. Income inequality and self-rated health status: Evidence from the European Community Household Panel. *Demography* 46, 805–825.
- Imlach Gunasekara, F., Carter, K.N., Crampton, P., Blakely, T. 2013. Income and individual deprivation as predictors of health over time. *International Journal of Public Health* 58 (4), 501–511.
- Jenkins, S.P., Brandolini, A., Micklewright, J., Nolan, B. 2011. *The Great Recession and the Distribution of Household Income*. Oxford: Oxford University Press.
- Jones, A.M., Schurer, S. 2011. How does heterogeneity shape the socioeconomic gradient in health satisfaction? *Journal of Applied Econometrics* 26, 549–79.
- Juárez, S., Revuelta-Eugercios, B.A., Ramiro-Fariñas, D., Vicianá-Fernández, F. 2014. Maternal education and perinatal outcomes among Spanish women residing in southern Spain (2001–2011). *Maternal and Child Health Journal* 18, 1814–1822.
- Margerison-Zilko, C., Goldman-Mellor, S., Falconi, A., Downing, J. 2016. Health impacts of the great recession: A critical review. *Current Epidemiology Reports* 3 (1), 81–91.
- O'Donnell O, Van Doorslaer E, Van Ourti T. 2015. Health and inequality, in: Bourguignon, F., Atkinson, A.B (Eds.), *Handbook of Income Distribution*, vol 2B. Amsterdam: Elsevier, pp. 1419–1533.
- O'Donnell, O., Doorslaer, E., Wagstaff, A. 2008. *Analyzing Health Equity Using Household Survey Data: A Guide to Techniques and Their Implementation*. World Bank Group, Washington, DC.
- Oaxaca, R. 1973. Male-female wage differentials in urban labor markets. *International Economic Review* 14 (3), 693–709.
- Pickett, K.E., Wilkinson, R. Income inequality and health: A causal review – supplementary. *Social Science & Medicine* 128, 316–326.
- Powell, L.M., Wada, R., Krauss, R.C., Wang, Y. 2012. Ethnic disparities in adolescent body mass index in the United States: the role of parental socioeconomic status and economic contextual factors. *Social Science & Medicine* 75, 469–476.
- Reibling, N., Beckfield, J., Huijts, T., Schmidt-Catran, A., Thomson, K., Wendt, C. 2017. Depressed during the depression: Has the economic crisis affected mental health inequalities in Europe? Findings from the European Social Survey (2014) special module on the determinants of health. *European Journal of Public Health* 27, 47–54.

- Reile, R., Helakorpi, S., Klumbiene, J., Tekkel, M., Leinsalu, M. 2014. The recent economic recession and self-rated health in Estonia, Lithuania and Finland: A comparative cross-sectional study in 2004–2010. *Journal of Epidemiology and Community Health* 68, 1072–1079.
- Riumallo-Herl, C., Basu, S., Stuckler, D., Courtin, E., Avendano, M. 2014. Job loss, wealth and depression during the Great Recession in the USA and Europe. *International Journal of Epidemiology* 43, 1508–1517.
- Sen, B. 2014. Using the Oaxaca-Blinder decomposition as an empirical tool to analyze racial disparities in obesity. *Obesity* 22, 1750–1755.
- Simou, E., Koutsogeorgou, E. 2014. Effects of the economic crisis on health and healthcare in Greece in the literature from 2009 to 2013: a systematic review. *Health Policy* 115, 111–119.
- Terraneo, M. 2017. Material deprivation, health and well-being in older age: A comparative analysis of 14 European countries, in: White, R. (ed.), *Measuring Multidimensional Poverty and Deprivation*. Cham, Palgrave Macmillan, pp. 113–137.
- Toffolutti, V., Suhrcke, M. 2014. Assessing the short term health impact of the Great Recession in the European Union: A cross-country panel analysis. *Preventive Medicine* 64, 54–62.
- Tøge, A.G., Blekesaune, M. 2015. Unemployment transitions and self-rated health in Europe: A longitudinal analysis of EU-SILC from 2008 to 2011. *Social Science & Medicine* 143:171–178.
- Urbanos-Garrido, R.M., Lopez-Valcarcel, B.G. 2015. The influence of the economic crisis on the association between unemployment and health: An empirical analysis for Spain. *European Journal of Health Economics* 16, 175–184.
- Vandoros, S., Hessel, P., Leone, T., Avendano, M. 2013. Have health trends worsened in Greece as a result of the financial crisis? A quasi-experimental approach. *European Journal of Public Health* 23, 727–731.
- Wilkinson, R.G. 1992. Income distribution and life expectancy. *BMJ* 304, 165–168.
- Wilkinson, R.G. 1992. National mortality rates: The impact of inequality? *American Journal of Public Health* 82, 1082–1084.
- Yun, M.-S. 2008. Identification problem and detailed Oaxaca decomposition: a general solution and inference. *Journal of Economic and Social Measurement* 33, 27–38.
- Yun, M.-S. 2004. Decomposing differences in the first moment. *Economic Letters* 82, 275–280.

Yun, M.-S. 2005. A simple solution to the identification problem in detailed wage decompositions. *Econonomic Inquiry* 43 (4), 766–772.

Supplementary Appendix**Table A1: Descriptive statistics for the sample of Baltic countries (Estonia, Lithuania, Latvia)**

	2008		2011	
	Mean	SD	Mean	SD
SRH status: 1-5 scale, 1=very bad, 5=very good	3.474	0.806	3.389	0.800
Very bad SRH	0.016	0.124	0.018	0.133
Very bad or bad SRH	0.107	0.309	0.128	0.334
Very bad, bad or fair SRH	0.465	0.499	0.503	0.500
Female	0.604	0.489	0.595	0.491
Age	42.542	12.404	44.743	12.597
Real equivalent household income (Euro in 2004 prices)	9848.0	7625.9	8784.0	5558.6
Poor (income < 60% of the median)	0.208	0.406	0.189	0.392
Rich (income > 200% of the median)	0.105	0.307	0.105	0.306
Relatively poor	0.193	0.394	0.182	0.386
Relatively rich	0.084	0.278	0.074	0.262
Material deprivation	0.242	0.428	0.333	0.471
Primary education and less	0.010	0.100	0.011	0.102
Lower secondary education	0.118	0.323	0.120	0.325
Upper secondary education	0.588	0.492	0.574	0.495
Tertiary education	0.284	0.451	0.296	0.456
Married	0.605	0.489	0.567	0.496
No longer married	0.194	0.395	0.222	0.416
Never married	0.202	0.401	0.211	0.408
Employed, full-time	0.693	0.461	0.633	0.482
Employed, part-time	0.031	0.173	0.044	0.206
Unemployed	0.057	0.232	0.100	0.300
Retired	0.067	0.249	0.113	0.316
Disabled	0.051	0.221	0.064	0.246
Inactive	0.101	0.302	0.046	0.210
Densely populated area	0.436	0.496	0.463	0.499
Intermediate populated area	0.000	0.000	0.000	0.000
Thinly populated area	0.564	0.496	0.537	0.499
N	3719			

Table A2: Descriptive statistics for the sample of severe recession countries (Cyprus, Denmark, Estonia, Hungary, Iceland, Italy, Latvia, Lithuania, Portugal, Spain, and the UK)

	2008		2011	
	Mean	SD	Mean	SD
SRH status: 1-5 scale, 1=very bad, 5=very good	3.900	0.859	3.885	0.873
Very bad SRH	0.012	0.110	0.013	0.114
Very bad or bad SRH	0.062	0.241	0.070	0.256
Very bad, bad or fair SRH	0.263	0.440	0.265	0.441
Female	0.551	0.497	0.553	0.497
Age	44.096	11.988	46.209	12.194
Real equivalent household income (Euro in 2004 prices)	16549.5	11666.9	17452.8	13849.1
Poor (income < 60% of the median)	0.188	0.391	0.191	0.393
Rich (income > 200% of the median)	0.087	0.282	0.088	0.284
Relatively poor	0.136	0.343	0.131	0.338
Relatively rich	0.065	0.246	0.061	0.240
Material deprivation	0.153	0.360	0.167	0.373
Primary education and less	0.147	0.354	0.120	0.325
Lower secondary education	0.223	0.416	0.203	0.402
Upper secondary education	0.389	0.488	0.399	0.490
Tertiary education	0.241	0.428	0.279	0.448
Married	0.643	0.479	0.630	0.483
No longer married	0.119	0.324	0.131	0.337
Never married	0.238	0.426	0.239	0.427
Employed, full-time	0.564	0.496	0.506	0.500
Employed, part-time	0.099	0.298	0.108	0.311
Unemployed	0.057	0.232	0.088	0.283
Retired	0.083	0.277	0.124	0.329
Disabled	0.034	0.181	0.037	0.189
Inactive	0.163	0.369	0.136	0.343
Densely populated area	0.460	0.498	0.475	0.499
Intermediate populated area	0.281	0.449	0.291	0.454
Thinly populated area	0.260	0.439	0.234	0.424
N	18092			

Table A3: Logit regressions for low SRH, all countries

	2008	2011
Female	-0.0365	0.0403
	(0.0582)	(0.0398)
Age 18–24	-1.465***	-1.591***
	(0.177)	(0.170)
Age 25–34	-0.539***	-0.879***
	(0.106)	(0.0820)
Age 45–54	0.598***	0.456***
	(0.0727)	(0.0481)
Age 55–64	0.803***	0.541***
	(0.0819)	(0.0472)
Real equivalent household income (Euro in 2004 prices)	-0.0171***	-0.00720
	(0.00444)	(0.00625)
Poor (income < 60% of the median)	-0.00292	0.00826
	(0.0915)	(0.0803)
Rich (income > 200% of the median)	0.153	-0.158
	(0.135)	(0.138)
Relatively poor	0.0120	0.0350
	(0.0924)	(0.0741)
Relatively rich	-0.00908	0.00236
	(0.132)	(0.0962)
Material deprivation	0.711***	0.620***
	(0.0717)	(0.0524)
Primary education and less	0.452***	0.790***
	(0.0852)	(0.0586)
Lower secondary education	0.335***	0.369***
	(0.0718)	(0.0553)
Tertiary education	-0.291***	-0.341***
	(0.0815)	(0.0547)
Married	-0.182**	-0.239***
	(0.0795)	(0.0571)
No longer married	0.0413	-0.0600
	(0.0973)	(0.0691)
Employed, full-time	-0.288***	-0.280***
	(0.0897)	(0.0670)
Unemployed	0.309**	0.147
	(0.125)	(0.0905)
Retired	0.385***	0.926***
	(0.110)	(0.0721)
Disabled	1.519***	2.658***
	(0.144)	(0.134)
Inactive	0.0445	0.213**

	(0.105)	(0.0830)
Missing information about labor market status	-0.200***	0.701
	(0.0689)	(0.651)
Thinly populated area	0.0609	-0.180***
	(0.0651)	(0.0428)
Densely populated area	0.0153	-0.0397
	(0.0622)	(0.0437)
Central-Western Europe	0.0999	0.290***
	(0.0834)	(0.0871)
South-Eastern Europe	-0.399***	-0.0649
	(0.0956)	(0.107)
Central-Eastern Europe	0.573***	0.762***
	(0.0759)	(0.0790)
North-Western Europe	-0.0688	-0.00879
	(0.0884)	(0.0824)
North-Eastern Europe	1.075***	1.403***
	(0.0840)	(0.0981)
South-Western Europe	0.00767	-0.0824
	(0.0562)	(0.0570)
Constant	-1.121***	-1.237***
	(0.157)	(0.154)
<i>N</i>	43456	

Note: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Omitted categories are: age 35–44, upper secondary education, never married, part-time employed, intermediate populated area, Western Europe.

Table A4: Logit regressions for low SRH, Baltic countries

	2008	2011
Female	0.106	0.103
	(0.109)	(0.111)
Age 18–24	-1.448***	-1.577***
	(0.280)	(0.341)
Age 25–34	-1.241***	-0.868***
	(0.201)	(0.196)
Age 45–54	0.448***	0.887***
	(0.122)	(0.128)
Age 55–64	1.220***	1.367***
	(0.152)	(0.143)
Real equivalent household income (Euro in 2004 prices)	-0.0396**	-0.0207
	(0.0168)	(0.0192)
Poor (income < 60% of the median)	-0.225	-0.00260
	(0.196)	(0.237)
Rich (income > 200% of the median)	0.606*	-0.220
	(0.315)	(0.274)
Relatively poor	0.369*	-0.0979
	(0.202)	(0.233)
Relatively rich	-0.465*	0.377
	(0.249)	(0.281)
Material deprivation	0.358***	0.660***
	(0.130)	(0.122)
Primary education and less	1.049*	0.514
	(0.562)	(0.766)
Lower secondary education	0.359**	0.171
	(0.179)	(0.198)
Tertiary education	-0.450***	-0.689***
	(0.129)	(0.132)
Married	0.373**	0.250
	(0.154)	(0.156)
No longer married	0.239	0.220
	(0.175)	(0.180)
Employed, full-time	-0.352	-0.511**
	(0.291)	(0.219)
Unemployed	0.261	-0.220
	(0.352)	(0.259)
Retired	0.479	1.806***
	(0.394)	(0.289)
Disabled	2.977***	3.889***
	(0.691)	(0.618)
Inactive	-0.297	-0.166

	(0.330)	(0.325)
Thinly populated area	0.0597	-0.201*
	(0.104)	(0.106)
Densely populated area	-	-
Latvia	0.586***	0.432***
	(0.110)	(0.131)
Lithuania	0.247**	0.260**
	(0.117)	(0.130)
Constant	-0.375	-0.379
	(0.352)	(0.339)
<i>N</i>	3719	3719

Note: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Omitted categories are: age 35–44, upper secondary education, never married, part-time employed, intermediate populated area, Estonia.

Table A5: Logit regressions for low SRH, severe recession countries

	2008	2011
Female	0.187 [*]	0.154
	(0.105)	(0.0997)
Age 18–24	-1.429 ^{***}	-2.020 ^{***}
	(0.296)	(0.431)
Age 25–34	-0.662 ^{***}	-0.995 ^{***}
	(0.175)	(0.202)
Age 45–54	0.462 ^{***}	0.297 ^{**}
	(0.119)	(0.117)
Age 55–64	0.778 ^{***}	0.510 ^{***}
	(0.139)	(0.119)
Real equivalent household income (Euro in 2004 prices)	-0.0451 ^{***}	-0.0137
	(0.0148)	(0.0114)
Poor (income < 60% of the median)	-0.207	0.127
	(0.178)	(0.174)
Rich (income > 200% of the median)	0.844 ^{***}	-0.0420
	(0.257)	(0.235)
Relatively poor	-0.184	0.0630
	(0.166)	(0.170)
Relatively rich	0.0370	0.250
	(0.207)	(0.193)
Material deprivation	0.680 ^{***}	0.632 ^{***}
	(0.126)	(0.126)
Primary education and less	0.203	0.445 ^{***}
	(0.144)	(0.145)
Lower secondary education	-0.192	0.182
	(0.145)	(0.148)
Tertiary education	-0.508 ^{***}	-0.432 ^{***}
	(0.142)	(0.129)
Married	0.0768	-0.122
	(0.145)	(0.146)
No longer married	0.0913	0.0480
	(0.186)	(0.181)
Employed, full-time	-0.596 ^{***}	-0.464 ^{**}
	(0.228)	(0.212)
Unemployed	-0.0261	-0.0753
	(0.257)	(0.238)
Retired	0.322	1.053 ^{***}
	(0.272)	(0.230)
Disabled	3.024 ^{***}	3.185 ^{***}
	(0.468)	(0.402)
Inactive	-0.193	0.322

	(0.230)	(0.229)
Thinly populated area	0.0697	-0.00685
	(0.156)	(0.157)
Densely populated area	-0.0870	0.166
	(0.153)	(0.155)
Spain	0.665***	0.464***
	(0.112)	(0.115)
Estonia	1.450***	1.918***
	(0.150)	(0.143)
Lithuania	1.700***	2.204***
	(0.152)	(0.143)
Latvia	1.992***	2.271***
	(0.136)	(0.140)
Constant	-1.343***	-2.086***
	(0.413)	(0.350)
<i>N</i>	8206	8206

Note: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Omitted categories are: age 35–44, upper secondary education, never married, part-time employed, intermediate populated area, Greece.



UNIVERSITY OF WARSAW
FACULTY OF ECONOMIC SCIENCES
44/50 DŁUGA ST.
00-241 WARSAW
WWW.WNE.UW.EDU.PL