European health inequality through the 'Great Recession': social policy matters

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Abstract   This paper investigates the association between the Great Recession and educational inequalities in self-rated general health in 25 European countries. We investigate four different indicators related to economic recession: GDP; unemployment; austerity and a 'crisis' indicator signifying severe simultaneous drops in GDP and welfare generosity. We also assess the extent to which health inequality changes can be attributed to changes in the economic conditions and social capital in the European populations. The paper uses data from the European Social Survey (2002–2014). The analyses include both cross-sectional and lagged associations using multilevel linear regression models with country fixed effects. This approach allows us to identify health inequality changes net of all time-invariant differences between countries. GDP drops and increasing unemployment were associated with decreasing health inequalities. Austerity, however, was related to increasing health inequalities, an association that grew stronger with time. The strongest increase in health inequality was found for the more robust 'crisis' indicator. Changes in trust, social relationships and in the experience of economic hardship of the populations accounted for much of the increase in health inequality. The paper concludes that social policy has an important role in the development of health inequalities, particularly during times of economic crisis.

Keywords: social determinants of health, social change, social capital, inequalities/social inequalities in health status, welfare state

Introduction

The 2008 financial crisis and the ensuing 'Great Recession' experienced by many European countries led to longstanding high levels of unemployment. According to scholars, the crisis was further deepened by inadequate policy responses as many countries – not only those answering to the 'Troika' – introduced austerity policies to balance national budgets (e.g. Karanikolos *et al.* 2013). The economic recession, and particularly when coupled with undeveloped or retrenching social protection, may in particular have had consequences for European health inequalities (Marmot *et al.* 2013; Stuckler and Basu 2013). Social inequality in health is a key public health challenge in Europe (European Commission 2013) and the European

Commission and the Member states are called upon by the European Parliament to 'press ahead with their efforts to tackle socio-economic inequalities' (European Parliament 2011: 4). Against this backdrop, understanding the development of European health inequalities through the Great Recession and the role of social policy is important.

Although many research articles on the association between the Great Recession and health have been published in recent years, evidence on its influence on social inequality in health is surprisingly scarce (Bacigalupe and Escolar-Pujolar 2014; Bambra *et al*. 2016; Barr *et al*. 2015; Copeland *et al*. 2015). No comprehensive European level study exists on this topic: the current evidence is based on single country studies or comparing only a few cases. Hence, the aim of this paper is twofold: we investigate to what extent deteriorating economic conditions, rising unemployment and austerity were associated with changes in health inequalities in Europe during the Great Recession. In order to shed some light on the pathways involved, we also research whether the observed recession-related changes in health inequality can be explained by changes in economic conditions and social capital in the population.

Theoretical background

The consequences of a recession for health may vary across health dimensions. Some aspects of health may dominate the early effects, while others dominate the picture at a mature stage. Furthermore, different groups may experience the recession in different ways. As no objective health measure was available in the European Social Survey (ESS), this study relies on self-rated general health (SRH), a subjective and global health measure. Compared to mortality based measures, SRH is likely to better capture the experience of health through the Great recession. As respondents include a variety of information in their self-assessment (Jylhä 2009), SRH also seem to provide a more comprehensive account of health than alternative measures like health services use, mental health or functional capacity. Hence, while still being a valid measure of 'disease' – SRH is a strong predictor of future mortality (DeSalvo *et al*. 2006; Idler and Benyamini 1997) and is strongly related to conditions such as cancer, epilepsy and diabetes (Manor *et al*. 2001) – the measure also taps into the 'illness' dimension of health. Compared to objective health measures, however, the cross-national validity of SRH can be questioned (Barford *et al*. 2010), and needs to be taken into account. Our study solves this issue by investigating within-country changes, rather than looking at variation between countries.

There is good reason to expect that the health of disadvantaged groups in society will be disproportionally affected by recessions and austerity (Bambra *et al*. 2016; Marmot *et al*. 2013). Lower socioeconomic groups are more likely to become unemployed, particular long-term unemployed, or to leave the labour market permanently. They are also more vulnerable to poverty, debt and homelessness. If they keep a job, they are more likely to experience a drop in wages, precarious or temporary work, part-time work and a greater imbalance between effort and rewards. Austerity will add to the burden of a recession since disadvantaged people more often rely on public benefits and services and need public welfare resources to compensate when markets fail. Not only are groups in the lower end of the socioeconomic hierarchy more exposed to health risks, they have also less resources to cope when facing adverse circumstances. Needless to say, these risks are closely related to poorer somatic and mental health outcomes through various material and psychosocial mechanisms (Marmot *et al*. 2013).

The term 'recession' usually refers to a situation where an economy shrinks for two successive quarters. The most direct and a widely used indicator to measure recessions is gross

domestic product (GDP) (Stuckler *et al*. 2009). In the wake of the 2008 financial crisis, almost all European countries experienced a recession, according to this definition (OECD 2017). Some of the literature on recessions and health focuses on explanations related to the pace of business, such as traffic accidents and work accidents (Burgard and Kalousova 2015), which should be closely related to GDP changes. GDP may also be more closely related to working conditions and wage development, namely, outcomes concerning those in employment. Other explanations focus on the individual and collective consequences related to unemployment, such as income and status loss among the unemployed and increased job insecurity among the employed. Austerity, that is, the political response to an economic crisis, may have far reaching consequences both for employed and non-employed citizens. Reduced spending on social protection benefits and services, influences living conditions and social inequalities directly (Bacigalupe and Escolar-Pujolar 2014).

Because GDP drops not necessarily and immediately transform into unemployment and poorer working and living conditions, one might expect this measure to have the weakest influence on health inequalities. In fact, GDP changes might even represent a more immediate threat to certain high income groups in the financial sector than to blue-collar employees and workers. With some delay, however, market failure will affect the demand for work, and thereby larger sections of the working population. At this point, national unemployment rates will rise. These are likely to affect low-skilled workers harder, as the competition for work increases. In the relatively short term, however, and particular if adequate social protection is in place, unemployment may still have modest or even beneficial effects on health (Ruhm 2000). In the longer run, however, and particularly if coupled with cut-backs in income replacement schemes and benefits in kind, the combined welfare and market failure are likely to severely affect living conditions and health. This may be particularly so for households with low socioeconomic status, as explained above (Marmot *et al*. 2013). In this paper we have chosen an encompassing approach, using measures of all these crisis dimensions, namely, changes in GDP, unemployment, austerity and combined market and welfare failure, in both cross-sectional and lagged analyses.

Recessions and health: two pathways
We are concerned with health inequality changes associated with loss of employment and economic hardship on the one hand, and those related to the 'social fabric' of societies on the other hand, namely, social capital. More precisely, we are interested in the overall contribution of economic conditions to the association between the Great Recession and health inequality, and whether social capital has any additional explanatory power.

The main public health concern during an economic crisis is the well-being of individuals and families experiencing unemployment and economic hardship. The association between unemployment and poor health at the individual level has been demonstrated in many studies (e.g. Schaller and Stevens 2015; Tøge 2016), although the causal direction has been disputed (e.g. Schmitz 2011). The link between job loss and health may run through declining material standards, such as having to move to a more deprived area with poorer housing and air quality and more traffic. It might also reduce access to work-based welfare services. Furthermore, psychosocial factors, such as perceived social status, feelings of being in control, and one's ability and opportunity to participate in social networks may decline as a consequence of unemployment. Finally, several studies have reported increases in unfavourable developments in life-style factors among people who become unemployed (e.g. Montgomery *et al*. 1998)

Curiously, at the macro-level, the unemployment-health association tends to be positive (e.g. Ruhm 2000, 2015), which indicates that the health damaging conditions experienced by a

minority may be outweighed by small improvements in broader groups. Some mechanisms suggested by the literature are improved health behaviours, a slow-down of the economy reducing traffic injuries, work accidents and pollution (Burgard and Kalousova 2015).

The relevance to social inequalities in health from the individual-level experience of unemployment is obvious, as there is a sharp educational gradient in the risk of poverty (Saltkjel and Malmberg-Heimonen 2016) and unemployment (Cutler *et al*. 2015). It is less clear how the possible positive consequences distribute across social groups.

Regarding the second pathway, we are not here concerned with social capital losses among the unemployed. Rather, our interest is in changes in the 'social fabric' of society as it enters into recession, over and above the individual experience of unemployment and economic hardship. That is not to say that social capital development in times of crisis is seen as independent of social position and positional risk. To the contrary, the extent to which society is able to alleviate the consequences of a recession among those most at risk, may be crucial to social capital.

The term 'social capital' refers to properties of the social structure, such as the norms of reciprocity and social networks that facilitate cooperative action (Coleman 1990; Putnam 2000). The concept is routinely measured by generalised social trust and participation in civic organisations and networks (Kennedy *et al*. 1998). Social capital is intimately related to health, although more strongly at the individual level than as a contextual phenomenon (Ho 2016; Rocco *et al*. 2014). As social capital is unevenly distributed across socioeconomic groups (Saltkjel and Malmberg-Heimonen 2014) and studies indicate that social capital is more important to the health of those with lower socioeconomic status (Uphoff *et al*. 2013), a reduction of social capital might serve to increase health inequalities.

Under certain conditions, social capital might improve during a crisis. If the threat is perceived as an externally induced challenge that can only be tackled by joint efforts and cooperation, the crisis may lead to a sense of being 'all in it together'. High social cohesion in wartime Britain is held to be an example of this (Kennedy *et al*. 1998). Stein (1976) concludes that 'external conflict' increases internal cohesion if the threat affects all members of society and if the leadership enforce cohesion during the crisis.

However, in many instances these conditions are not met (e.g. Rose *et al*. 1997). It is debatable whether the Great Recession in Europe was perceived as an external crisis. The role of Government and EU leaders in dealing with the crisis as a shared threat in need of collective efforts was certainly disputed. Many countries introduced austerity measures which may have added to the burden of already disadvantaged populations (Bacigalupe and Escolar-Pujolar 2014). If people felt that governments handled the crisis badly, this might spill over to generalised trust (Rothstein 2011), and particularly among those who feel most at risk. Recent studies indicate that social capital did actually decline during the crisis (Erkel *et al*. 2016; Giordano and Lindstöm 2015). This reduction might have contributed to shape health inequalities.

Previous research

Several reviews of the relationship between economic crises and public health using data from earlier recessions exist (e.g. Burgard and Kalousova 2015; Stuckler and Basu 2013). We did however only identify one international review on how the Great Recession of 2008 onwards has affected health inequalities (Bacigalupe and Escolar-Pujolar 2014). The review found that results from the Great recession were scarce and inconsistent. Increasing health inequalities were found in Spain for mental health, health-related quality of life in children and perinatal

health outcomes. In the UK, no change in health inequalities was found, except for in excessive alcohol use. Since these reviews, Barr and colleagues (2015) found increasing inequalities in mental health after 2009 in England. These increases were only partly explained by trends in unemployment and wages. Copeland *et al.* (2015) examined trends in SRH between 1991 and 2010 in England and Sweden. They found that health improved significantly among women in both countries during the recession, but that in England, this development masked deteriorating health among women with less education. However, inequalities also increased in Sweden because women with longer education histories had an even more favourable health development. Abebe *et al.* (2016) investigated how SRH developed in individuals prior to and during the Great Recession. They found that while the risk of fair/poor SRH increased during the recession, there were no sign that educational inequalities increased.

Recent reports indicate that the socioeconomic consequences of the recession are still developing. In the UK, infant mortality among children from poor families has been rising since 2010, while continuing to fall among infants from more advantaged families (Taylor-Robinson and Barr 2017). Furthermore, the beneficial development in geographical inequalities in life expectancy following the English health inequality strategy seem to have been reversed after 2012, a likely consequence of recent austerity measure according to the authors (Barr *et al.* 2017).

Regarding the role of welfare policies, empirical findings show that austerity in the form of spending cuts, mainly affect the poorest part of the population (OECD 2014). For instance, the negative impact of unemployment on suicide was modified by active labour market policies (ALMP) in European countries (Reeves *et al.* 2015; Stuckler *et al.* 2009). A similar modifying effect could not be identified for social protection spending per capita (Reeves *et al.* 2015). However, a longitudinal study from the United States shows that the impact of unemployment on suicide was modified by generous unemployment benefits (Cylus *et al.* 2014). Abebe *et al.* (2016) also found that welfare generosity could 'buffer' the negative SRH trends associated with the Great Recession. Little is known however about how austerity affects health inequalities.

Data and methods

We use data from the European Social Survey (ESS), round 1 to round 7, which covers a time span of twelve years (2002–2014).[1] As we are interested in health inequalities during the Great Recession, this study includes countries that participated in the ESS at least one time prior to round 4 (2008) and at least one time after round 3 (2006). Consequently, we exclude data from Croatia, Lithuania, Luxembourg and Turkey. We also dismissed Israel, Russia and Ukraine on the basis of missing country level data. The resulting sample consists of 25 countries. After restricting the data to those in working age (25–64 years) and excluding cases with missing information, the total individual level sample counted 171,880 individuals nested within 143 country-year groups. The reason for focussing on the working age population was that children and people in old age are less dependent on the labour market. Hence, any effects on health inequalities are likely to be more pronounced using only the working age population.

Dependent variable
We use general SRH as our measure of health. The ESS questionnaire includes the question, 'How is your health in general? Would you say it is very good, good, fair, bad, or very bad?'.

We use the variable as a continuous measure, taking higher values for poorer health. The minimum value is 1 and the maximum value is 5.

Individual level independent variables

We use education as our measure of socioeconomic position, albeit one could argue that a study of the impact of the Great Recession on health inequality should target vulnerable groups more directly, such as the unemployed or those experiencing economic hardship. The reason for this choice is that selection into most such groups are intimately related to labour market fluctuations. In good times, the pool of unemployed is likely to become more selected for poor health, as the labour market consumes most able bodied workers (Heggebø and Dahl, 2015). Education was measured by the highest level of education. ESS includes a variable (edulvla), based on ISCED-97,[2] that has been harmonised across all waves (ESS 2017). Education was coded into three levels; short (lower secondary or less), intermediate (upper-secondary and post-secondary, non-tertiary education) and tertiary education.

To shed some light on the pathways involved in the association between the Great Recession and changes in health inequalities, we include economic status and social capital as explanatory variables. Respondents were asked about their feelings about their household's income. Respondents who said that they found it difficult or very difficult were classified as experiencing economic hardship. Employment status was measured by the main activity of the respondent. The variable was coded into four categories; in employment, active unemployment, permanently sick and disabled, and other inactive.

Social capital is often measured by both cognitive and social dimensions. Generalised trust is a measure available in many studies, and together with 'bridging' and 'bonding' social capital, a frequent measure of social capital (Putnam 2000). 'Bridging' social capital is found in social networks with members with different backgrounds in terms of for instance ethnic group, demography or class, typically voluntary organisations. 'Bonding' social capital is the type of capital that accumulate in more homogenous social networks (Szreter and Woolcock 2004). The ESS includes several variables on social capital, including the following questions on generalised social trust:

1 Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?
2 Do you think that most people would try to take advantage of you if they got the chance, or would they try to be fair?
3 Would you say that most of the time people try to be helpful or that they are mostly looking out for themselves?

Responses were recorded on a scale ranging from 0 to 10. The survey also includes a question on how often people meet socially with friends, relatives and work colleagues, namely, an indicator of 'bonding' social capital. This variable includes values from 1(Never) to 7 (Every day). Unfortunately, no measure of bridging social capital was available across all rounds in the ESS.

We also included demographic control variables: gender; grand mean centred age; not born in country; not living with partner and the presence of children in the household as control variables.

Country-level variables

In this study we use four indicators related to economic recession: changes in the unemployment rates; annual changes in GDP; changes in welfare generosity; and a 'crisis' indicator

based on a fuzzy set classification. Annual GDP per capita growth in per cent was retrieved from World Bank.[3] To indicate worsening economic conditions, the measure was reversed. Unemployment rates were obtained from Eurostat.[4] For each country we constructed change scores to assess the annual unemployment rate percentage point change.

A welfare spending approach was applied to measure austerity. In this context, we believe this is preferable to using institutional data (see for instance Scruggs *et al*. 2014). First, institutional data were only available for a limited number of countries in this study. Second, they usually do not include measures on disability benefits, social assistance benefits and family benefits. They also do not include benefits in kind, such as housing, which may be crucial to health. Third, institutional data do not capture changes in the practice of distributing social protection, namely, the impact of street-level bureaucrat discretion. Hence, using spending data facilitates a measure of austerity which is based on a wider concept of welfare generosity than would have been possible with institutional data.

Social protection expenditure on sickness, disability, families and children, unemployment and housing included in the Eurostat *spr_exp_sum* data were used.[5] The data were expressed in Euro per inhabitant at constant 2010 prices to ensure comparability over time within countries. To adjust the data for 'need', we divided the annual summarised spending data on the inverse of the employment rate in the population age 20 to 64 years as measured by Eurostat.[6] Without this adjustment, the level of unemployment, for instance, would automatically increase social expenditure, leaving a false impression of increasing welfare generosity. (For a more thorough discussion of this procedure, see the Appendix). Welfare generosity change was measured as percentage change on the basis of the mean level of welfare generosity the preceding 3 years. For ease of interpretation, we use the reversed values so that increasing values signify reductions in welfare generosity, that is, 'austerity'.

The measures above represent different unidimensional and linear representations of macro-level changes associated with economic recessions. Although conventional, this approach has some weaknesses. From a sociological perspective, an economic recession only becomes a 'crisis' when it affects people's living conditions, namely, their material, social, physical and psychological coping resources. Furthermore, the notion of 'crisis' implies that changes that occur are extraordinary. A linear approach will certainly be able to capture extremes, but the effect of such changes will be averaged over the possible absent effects of normal fluctuations (Reeves *et al*. 2015). Hence, to more accurately assess the substantial impact that recessions might have on health inequality we need to supplement our analyses with a more complex approach.

To this end, we conducted a fuzzy set analysis similar to the analysis in Saltkjel *et al*. (2017). Using GDP per capita growth and welfare generosity, as above, we were able to identify country-wave episodes that were simultaneously affected by critical levels of GDP drops and austerity. For the fuzzy sets, we used 2007 as the baseline year. Up until 2008, all countries were given the value 0 as this year marks the first year of the recession in the ESS. The observed 'crisis'-episodes in the fuzzy-sets were coded 1 on an indicator variable otherwise taking the value 0. We argue that this measure, in contrast to the three other measures, is a methodological and theoretically more valid measure of 'economic crisis'. Summary statistics for the four macro-level variables are found in the Appendix, Table 1.

Statistical and analytical approach
We use multilevel linear regression random intercept models with two hierarchical levels: individuals nested within country-years. Linear regression was chosen based on ease of interpretation, to prevent loss of information and because results usually are nearly identical compared to logistic regression (Hellevik 2007). Country-level variation was accounted for using country

dummies. This approach effectively remove all time-invariant cross-country variation (Wooldridge 2002), such as cultural and institutional differences, probably even reporting styles. Hence, only the within-country contextual variance remains. As the interest of this paper is the changes in SRH associated with macro-level changes in countries over time – not the differences between countries – this serves the purpose of our paper well. In addition, a continuous time variable based on ESS round number was added to the model to account for shared trends in SRH.

To assess the association between economic crisis and health inequality, we added interaction terms between the macro-level variables and educational level. To investigate whether any longer-term effects could be detected, we ran separate models with the four macro-level variables measured two years before each ESS round (lagged effects models).

For each of the four macro-level indicators, we ran four regression models, and investigated both cross-sectional and lagged effects, namely, a total of 32 regressions models. The cross-sectional models are numbered 0–3 and the lagged models are numbered 4–7. The base model includes the macro-level variable in question, all demographic control variables (educational level, gender, age, not born in country, not living with partner and the presence of children in the household), as well as the trend indicator and country dummies. This will provide evidence on any overall association between the macro-level variables and SRH. Model 1 for cross-sectional results and Model 4 for lagged results add the cross-level interaction term between the macro-level variables and the individual-level variable, educational level. This will provide a test of the extent to which there are group-specific population changes associated with changes in the macro-level variables, that is, whether educational inequalities in health co-vary with worsening economic conditions and austerity. Model 2 (cross-sectional)/Model 5 (lagged effects) add employment status and economic hardship to Model 1/4. This will help us understand whether any changes in health inequality can be explained by simultaneous changes in the economic conditions experienced by the different educational groups. In the same vain, Model 3/6 adds the social capital variables to investigate whether they contribute to further explain any observed association between the recession variables and health inequality.

Results

Descriptive results

In Figure 1, we show the development of SRH by educational level over time in the countries classified with 'crisis'- episodes in the fuzzy-set classification, that is, countries that were classified with simultaneous critical levels of GDP and welfare generosity reductions. The episodes are marked with vertical lines. Note that some of the episodes do not coincide with the bi-annual collection of ESS data. However, in all instances except for Greece (GR), these countries had subsequent episodes that did coincide with available data. In addition, Iceland (IS), which only had observations in two rounds of the ESS will not be among the crisis countries in the cross-sectional analysis, but will be included in the analysis of lagged effects.

After round 4 in 2008, health inequalities seem to have increased in Hungary (HU), and perhaps in Sweden (SE) and Slovenia (SI). Still, there was little change in some countries that experienced severe drops in unemployment, like Spain (ES), Italy (IT), Portugal (PT) and Iceland (IS). In the Czech Republic, health inequalities appear to have decreased. Crisis episodes seem to have coincided with an overall improvement in SRH in some countries. Two years (one round) after a crisis episode, however, some countries displayed a general increase in poor health. Figure 1 also show the trends for countries not being classified with any 'crisis' episodes.
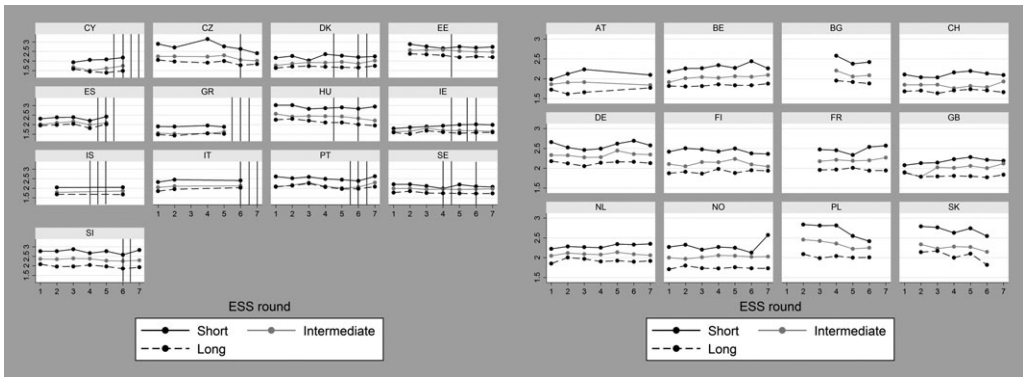
Figure 1 *Mean SRH in three educational groups across 7 ESS rounds in 13 countries that were classified as "crisis countries" (left panel). The vertical lines indicate the timing of the crisis. The right panel shows SRH in three educational groups across 7 ESS rounds in 12 countries that were not classified as "crisis countries". Weighted data*

Regression analyses

In the eight regression analyses performed with cross-sectional or lagged effects for four different indicators of economic crisis on SRH (base models, not shown), only two proved to have a significant influence on overall SRH; GDP and the crisis indicator. The effects were only significant in the cross-sectional analyses, and showed that on average, health improved in 'bad times'. Even if not statistically significant, the association for Unemployment (UE) rate and austerity pointed in the same direction. The effects were not particularly strong. A one per cent decline in GDP was associated with 0.004 (p-value = 0.04) SRH scale points improvement in health. Even for the largest observed decline in GDP in our sample (6.3 per cent), the effect was smaller than for two years of ageing. The effect for the crisis indicator, namely, simultaneous critical reductions in GDP and welfare generosity, was 0.044, which is also relatively modest, although substantial. The lagged base models showed no tendency of health improving.

Model 1/4 in Table 1, which includes interaction terms between the four crisis measures and educational level, gives a mixed impression. Increasing UE rate contributed to smaller health inequalities (Model A1), as indicated by the negative coefficients for shorter educations. Negative GDP growth was also associated with decreasing health inequality, as health improved for both short and intermediate education (Model B1). Interestingly, austerity (Model C1) and experiencing simultaneous critical levels of GDP drops and austerity (Model D1) contributed to increase health inequalities. Furthermore, while no lagged effects could be identified for GDP and UE rate (Models A4 and B4), the increase of health inequalities associated with the two austerity measures became even stronger when observed with two years delay (lagged effects, Models C4 and D4).

To assess and compare the strength of the associations found in Table 1, and to measure the magnitude of change in health inequality, Table 2 presents predicted changes in health inequalities for one standard deviation change on the relevant macro-level variables. The effect sizes are mostly small with decreasing health inequalities of 3–5 per cent associated with increasing UE rate and GDP drops, and increasing inequalities of 4–5 per cent associated with austerity. Looking at the maximum observed values in our data, the predicted change in health inequalities were in the range of 9–12 per cent change in health inequalities. In countries that experienced an episode of simultaneous significant austerity and GDP drops (Recession/austerity), the predicted increases in health inequalities were 10 per cent in the same year and 15

Table 1 Main effects and interaction effects with educational level for four crisis/related measures on individual self-rated general health. Results from linear multilevel regression models, p-values in brackets. N = 171 880 in 143 country-wave units.

Cross-sectional findings

	UE rate change			GDP growth (reversed)			Austerity			Recession+austerity		
	Model A1	Model A2	Model A3	Model B1	Model B2	Model B3	Model C1	Model C2	Model C3	Model D1	Model D2	Model D3
Main effect	−0.0003	−0.0027	−0.0027	−0.0010	−0.0029	−0.0031	−0.0011*	−0.0016***	−0.0016***	−0.0521**	−0.0551***	−0.0519**
	(0.9591)	(0.5877)	(0.5877)	(0.6753)	(0.1922)	(0.1539)	(0.0692)	(0.0034)	(0.0041)	(0.0208)	(0.0079)	(0.0119)
Main effect × education												
Short	−0.0116**	−0.0090*	−0.0090*	−0.0079***	−0.0056***	−0.0059***	0.0015***	0.0012**	0.0009*	0.0348*	0.0090	0.0054
	(0.0254)	(0.0664)	(0.0664)	(0.0002)	(0.0059)	(0.0035)	(0.0039)	(0.0208)	(0.0844)	(0.0993)	(0.6535)	(0.7878)
Intermediate	−0.0057	−0.0080*	−0.0080*	−0.0037*	−0.0037**	−0.0029*	0.0003	0.0001	0.0001	−0.0012	−0.0124	−0.0124
	(0.1874)	(0.0504)	(0.0504)	(0.0351)	(0.0294)	(0.0800)	(0.4899)	(0.7280)	(0.8437)	(0.9440)	(0.4611)	(0.4580)

Lagged effects (two years)

	UE rate change			GDP growth (reversed)			Austerity			Recession+austerity		
	Model A4	Model A5	Model A6	Model B4	Model B5	Model B6	Model C4	Model C5	Model C6	Model D4	Model D5	Model D6
Main effect	−0.0031	−0.0062	−0.0069	0.0008	−0.0024	−0.0026	−0.0005	−0.0009	−0.0009*	−0.0219	−0.0146	−0.0157
	(0.5958)	(0.2509)	(0.1999)	(0.7730)	(0.3318)	(0.2875)	(0.3853)	(0.1156)	(0.0903)	(0.3985)	(0.5491)	(0.5149)
Main effect × education												
Short	0.0072	0.0024	0.0023	0.0009	0.0003	−0.0009	0.0018***	0.0014***	0.0010**	0.0558**	0.0066	0.0026
	(0.1998)	(0.6485)	(0.6661)	(0.6727)	(0.8798)	(0.6384)	(0.0004)	(0.0045)	(0.0306)	(0.0330)	(0.7906)	(0.9156)
Intermediate	−0.0021	−0.0027	−0.0029	0.0003	0.0008	0.0003	0.0003	0.0003	0.0002	−0.0256	−0.0138	−0.0163
	(0.6386)	(0.5315)	(0.4934)	(0.8713)	(0.6498)	(0.8522)	(0.4814)	(0.5064)	(0.6772)	(0.1989)	(0.4674)	(0.3837)

Source: European Social Survey, rounds 1–7. Model 1/4 control for educational level, gender, age, cohabitation status, immigrant status, children in household, time trend and country dummies. Model 2/5 include additional control for economic hardship and employment status. Model 3/6 add controls for generalised trust informal social participation frequency.

*** indicates p-values < 0.02, ** indicates p-values < 0.05 and * indicates p-values < 0.1.

Table 2 *Predicted effects as SRH scale points and as per cent of observed health inequalities in the base model (short education = 0.3775).[1] Predictions are presented for one standard deviation change (St.d.) and the maximum observed change (Max.) for relevant macro variables.*

	St.d.		Max.	
	Scale	Per cent	Scale	Per cent
Annual UE rate change	−0.012	−3.3	−0.045	−12.0
Annual GDP growth (reversed)	−0.020	−5.4	−0.050	−13.2
Austerity	0.015	4.1	0.036	9.5
Recession + austerity	–	–	0.035	9.2
Austerity, lagged	0.019	5.0	0.039	10.4
Recession + austerity, lagged	–	–	0.056	14.8

1The base model included no macro level variables and was controlled for gender, age, cohabitation status, immigrant status, children in household, time trend and country dummies

per cent after two years. Figure 2 illustrates the lagged associations for austerity and recession + austerity.

Next, Model 2/5 in Table 1 enters economic hardship and employment status into the analysis, and Model 3/6 adds the social capital variables. Here, we focus on the extent to which the inclusion of these control variables changes the strength of the interaction term between the macro-level variables and short education. Changes in economic hardship and employment status had only a modest impact on educational inequalities in health associated with the macro-level variables for UE rate, GDP and austerity, with around 20 per cent reduction in the coefficients. For the Recession + austerity crisis measure, however, the associated increase in health inequality became statistically insignificant after taking changes in the economic conditions into account.

Adding the social capital variables to the model made little difference for health inequality changes in the UE rate and GDP analyses. They did however contribute to further reduce the strength of the austerity × short education coefficient. Although still statistically significant at the 0.1 level (models C3 and C6), the coefficient was reduced by 40–44 per cent compared to models C1 and C4.
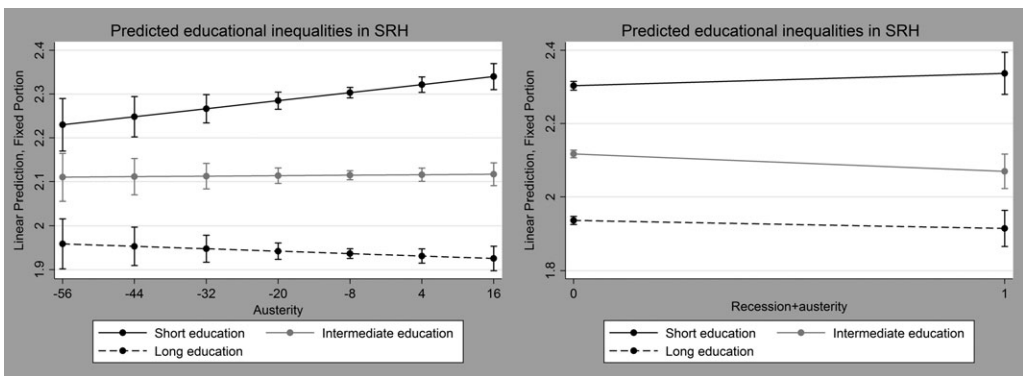

Figure 2 *Predicted educational inequalities in poor SRH for lagged effects of Austerity and Recession+austerity, based on Model C4 and D4 in Table 1, respectively.*

Discussion

This paper demonstrates that the answer to the question of whether health inequalities increased during the Great Recession depends on the choice of 'crisis' measure. UE rate change and changes in GDP are routinely used in studies of recessions and health (e.g. Ruhm 2000, 2015, Stuckler *et al*. 2009). In cross-section, these measures contributed to decrease health inequalities, but no associations were found in the lagged analyses. For Austerity and the combined recession + austerity measure, we found widening health inequalities that seemed to increase over time. Interestingly, the theoretically and methodologically more sound measure, recession + austerity, exhibited the strongest effect. Health inequalities widened with as much as 0.056 scale points, or by 15 per cent. Thus, regarding health inequalities in Europe, policy responses to the crisis seem to be more important than the crisis itself, as measured by purely economic dimensions (Stuckler and Basu 2013: xiv).

Previous studies of health inequalities through the crisis are few and ambiguous (Bacigalupe and Escolar-Pujolar 2014). Copeland *et al*. (2015) found that health inequalities widened among women in England and in Sweden, but for different reasons. In England, women with shorter education experienced deteriorating health, while the corresponding group in Sweden did not experience health improvements during the crisis to the same extent as those with longer educations. Our cross-sectional analyses show that health inequalities widened as a result of a lack of health improvement among those with short education. Two years after, however, there was no effect for those with long education, while health decreased among those with short educations. Hence, it seems as if the mature associations are more severe than the immediate ones. This is in keeping with a recent international study identifying the long-term effects of economic crises on health inequalities (Antonova *et al*. 2017) as well as emerging evidence from the UK (Barr *et al*. 2017, Taylor-Robinson and Barr 2017).

Previous studies have suggested that existing levels of benefits and services in social protection programmes determine the health impacts of the crisis (Reeves *et al*. 2015, Stuckler *et al*. 2009). While the present study have not investigated the so-called 'buffer effect' of existing social protection systems when the crisis hit, we have found that changes in welfare generosity, isolated or in tandem with a shrinking economy, is likely to widen health inequalities.

We were also able to evaluate the contribution of changing poverty and employment patterns and social capital to changes in health inequality associated with the crisis. These variables explained substantial proportions of the changes in health inequalities associated with the crisis measures. The finding indicates that, as expected, the dominant pathway between economic recession + austerity and health inequality runs via the experience of job loss and economic hardship. Again, this finding underscores the importance of crisis response to health inequality.

For the other measures, the contribution of employment status and economic hardship was rather modest: they accounted for about 20 per cent of the initial association. Some of the widening health inequalities associated with austerity policies, however, seem to run through changes in the 'social fabric', that is, social capital, independently of changes in the employment status of the population. Adding social trust variables and participation in informal networks to employment and economic hardship resulted in about 40 per cent of the initial association being explained. Reducing welfare generosity in the face of crisis may thus undermine social cohesion and the sense of being 'all in it together', and particularly from the view point of those most likely to feel the consequences. In line with Stein's (1976) study, social cohesion in times of crisis depends among other things on whether the cost of the crisis is evenly felt in society, and whether leaders act to mobilise and enforce pre-existing social cohesion.

Strengths and limitations

Our analysis has several strengths. We have built on, but also extended, the scarce literature of economic crisis and health inequality in Europe by using seven waves of ESS that encompasses 25 European countries. The main strength of our analysis is the ability to track changes over time within countries, and link macro-level changes to micro-level changes in a sound methodological environment. In comparison with much of the previous literature, this allows us to make inferences about the association between the Great Recession and health inequality independent of differences between countries, such as institutional differences, variation in occupational structure and legal systems, and even cultural properties and reporting styles. This is particularly useful when studying SRH, a measure that on its own does not correlate well with international differences in life-expectancy (Barford *et al.* 2010). The country fixed-effect approach accounts for all between country variation in SRH, allowing for a within-country interpretation of the association between economic crisis and SRH. Another possible bias is that SRH reporting is affected by the experience of the crisis. This bias, however, could run in both directions as respondents might over-report poor health to justify unemployment or economic hardship (Dwyer and Mitchell 1999), or they might under-report poor health as a coping strategy. Furthermore, our results are corroborated by key studies of economic crisis and social inequalities in mortality and objective measures of morbidity (Antonova *et al.* 2017; Barr *et al.* 2017; Taylor-Robinson and Barr 2017).

Much of the literature so far has had limited focus on identifying pathways between economic crisis and health inequality. This study explores two main pathways, employment and economic conditions, and social capital. Finally, unlike most studies, we used four different 'crisis'-measures, one of which was based on a fuzzy-set classification. We argue that this measurement represents a theoretically and methodologically advanced way of analysing the effects of the economic recession in comparison to unidimensional and linear approaches, like using GDP or the UE rate. Also counting on the positive side is that ESS is well known for its scientific quality and high degree of comparability across countries.

The study also has its limitations and weaknesses. The associations identified by this paper can only be used for inferences at the European level: they are formalised predictions based on rather simplistic representations of highly complex and context-bound processes. Hence, our findings are best understood as average European tendencies, not as universal associations. Even though we were able to establish significant associations for time-ordered variables, net of all time-invariant heterogeneity between countries and individual level compositional change over time, we cannot make strong claims regarding causality. There may for instance be time-varying country-level variables that co-vary with our crisis measures, and even though educational groups should be relatively stable comparison groups during the relatively short time span of our study, we cannot completely rule out health-related selection into education.

The sensitivity analyses indicate that alternative estimation strategies produce similar but not identical results. However, for the recession + austerity measure and for the austerity measure, the lagged associations with health inequalities were robust across estimation strategies and model specifications. None of the models including weights resulted in statistically significant results. This could be the results of the weights not functioning well in a multilevel framework, or that some countries with small populations or skewed samples had more influence on the results in the unweighted model than in the weighted model. One would, however, expect non-response to lead to underestimation of results, rather than overestimation, as individuals and countries experiencing the recession should be less likely to participate. Nevertheless, this calls for some caution in interpreting the findings.

More detailed data would have been preferably. For instance, we did not have access to data on organisational participation, a key measure of social capital. Information on life style changes and a measure of mental health would also have been useful. Using group-specific unemployment rates by education and gender might produce more precise results, and hence shed some light on the unexpected lack of an association between overall unemployment rate changes and SRH in our analyses. Future research should address this.

The timing of data collection in the ESS might have affected our results if large proportions were interviewed prior to the macro-level conditions averaged over each survey year. Looking at the distribution of responses in ESS 2012, we note that 89 per cent of the total sample were interviewed in the last quarter of 2012 or later. This mean that the vast majority of the sample gave their responses after or while experiencing macro-economic changes that was measured in 2012. Hence, this source of bias should be negligible. Furthermore, it would only affect the cross-sectional results. The use of lagged variables circumvent the problem entirely, as the macro-level variables were measured two years prior to the survey year.

The sample sizes in ESS are also quite small which gives the analysis lower statistical power than desired. Furthermore, even if this study includes a longer multi-country time series than most previous studies of the SRH and recessions in Europe, seven observations over twelve years are still less than would be optimal in this type of study (Ruhm 2015). All in all, however, to our knowledge the ESS provides better opportunities than any other dataset for studying the European population through the Great Recession.

Conclusion

This study concludes that the Great Recession in Europe was associated with widening educational inequalities in SRH. The association did however vary across different measures of the crisis, with largest and most consistent results for measures related to austerity policies. Our results indicate that the consequences of austerity policies grow stronger over time, contributing to widen educational inequalities in SRH. In countries experiencing simultaneous austerity and economic recession, health inequality two years later had widened by as much as 15 per cent. As this development is likely to continue unless austerity policies are reversed, there is a need for further studies monitoring the long-term direct and indirect consequences of the Great Recession. Changes in the population's employment status and experience of economic hardship explained a substantial part of the observed changes in health inequality, particularly for the Recession + austerity measure. However, the results also indicate that social capital may play a role in the association between austerity and health inequality, over and above employment changes.

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Notes

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Appendix

'Need'-adjusting social expenditure data

The magnitude of social protection expenditure is in part dependent on the level of need in a population, particularly the number of people not gainfully employed. In order to arrive at a measure of changes in welfare generosity that is not simply a reflection of changing labour market conditions we thus need to adjust the data for changes in 'need'. The table below illustrates this. In the context of varying non-employment rates (Column 1) and constant 'true' welfare generosity (100), social expenditure (Column 2) reflect purely the level of 'need'that is, the size of the non-employed population. Adjusting for 'need', we arrive at the 'true' level of welfare generosity (column 3).

Illustration of controlling social expenditure data for 'need'.

Non.-Emp.	*Soc.Exp.*	*WG=Soc.Exp/Non-emp*
20	2000	100
30	3000	100
40	4000	100

Hence, we divided the annual summarised spending data on the inverse of the employment rate in the population age 20 to 64 years as measured by Eurostat (2017). Although not perfect, we argue that we obtain a measure of welfare generosity that is unaffected by labour

Table A1 *Descriptive statistics country-wave variables 2000-2014. 145 country-waves.*

	Mean	St.d.	Min.	Max.
Macro variables				
Annual UE rate change	0.13	1.07	−3.40	3.90
Annual GDP growth (reversed)	−1.71	2.56	−10.92	6.30
Austerity (%)	−5.43	10.29	−55.54	23.95
Recession/austerity	0.07	0.25	0.00	1
Macro variables (T-2)				
Annual UE rate change	0.00	1.06	−3.4	3.40
Annual GDP growth (reversed)	−2.22	2.56	−10.92	6.30
Austerity (%)	−6.59	10.53	−55.54	21.77
Recession/austerity	0.05	0.22	0	1

Table A2 *Summary of results from four sensitivity analyses for main findings (Models 1/4) in Table 2. Bold notation signifies deviations from main results in Table 1.*

			UE rate change	GDP growth (reversed)	Austerity	Recession/ austerity
Multilevel ordered logit regression	Cross-sectional	Main effect	ns.	ns.	−	−
		Interaction effect	**ns.**	−	−	+
	Lagged effects	Main effect	ns.	ns.	ns.	ns.
		Interaction effect	**+**	(+)	+	+
Multilevel logistic regression, Less than good SRH	Cross-sectional	Main effect	ns.	ns.	ns.	**ns.**
		Interaction effect	−	−	**ns.**	**ns.**
	Lagged effects	Main effect	ns.	ns.	ns.	ns.
		Interaction effect	ns.	ns.	+	(+)
Linear multilevel model with no time trend	Cross-sectional	Main effect	ns.	ns.	−	−
		Interaction effect	−	−	+	**ns.**
	Lagged effects	Main effect	ns.	−	−	−
		Interaction effect	ns.	ns.	+	(+)
Weighted linear multilevel model	Cross-sectional	Main effect	ns.	ns.	ns.	**ns.**
		Interaction effect	(−)	(−)	**ns.**	**ns.**
	Lagged effects	Main effect	ns.	ns.	ns.	**ns.**
		Interaction effect	ns.	ns.	**ns.**	**ns.**

*Ns.= not statistically significant, − / + = direction of coefficient (p-value<0.05), (−/+) = direction of coefficient (p-value<0.01).

market fluctuations. A weakness of this approach is that it does not take into account rising social expenditure to those in employment in times of economic turbulence. These measurement problems are likely to downwardly bias the association between austerity and health, but to a much smaller extent than using unadjusted social spending data.

Welfare generosity change was measured as percentage change on the basis of the mean level of welfare generosity the preceding 3 years. This approach secures a floating baseline broad enough to avoid single years from having too much influence on the denominator. For ease of interpretation, we use the reversed values so that increasing values signify reductions in welfare generosity, namely 'austerity'.

Sensitivity analyses

We have carried out several sensitivity tests (see Table 2). As an alternative to linear regression, we ran model 1/model 4 using: (1) multilevel ordered multinomial models and (2) multilevel logistic regression. The findings from the ordered regression model were largely similar to those obtained by linear regression, with the exception of an insignificant interaction term in model A1, and a reversed sign of the interaction term with short education in the cross-sectional austerity model (Model C1). Also, the ordered regression model indicated increasing health inequalities in the lagged models for UE rate and GDP. In the logistics regression, no increase in health inequality could be identified in the cross-sectional models for austerity and the combined recession/austerity model. Excluding the time-trend variable from the analyses did not lead to different conclusions. Using weighted regression models left most of the interactions terms with education insignificant.