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Health inequalities in Europe: Does minimum income protection make a difference?

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Abstract

Poverty, a risk factor for ill health, could be alleviated by generous welfare states. However, do generous social policies also reduce the health implications of socioeconomic inequalities? This study investigates how minimum income protection is associated with socio-economic health inequalities. The author hypothesises that higher benefit levels are associated with lower health inequalities between income groups. Minimum income benefits support the people most in need, and therefore should improve the health of the lowest income groups, which in turn would reduce overall health inequalities. This hypothesis is tested with the European Social Survey (2002–2012) and the SaMip dataset using three-level multilevel models, covering 26 countries. The results show a robust relationship between benefit levels and individual self-rated health. However, the hypothesis of reduced health inequalities is not completely supported, since the findings for the cross-level interactions between income quintiles and benefit levels differ for each quintile.

Keywords

Benefit levels, ESS, income-related health inequalities, minimum income protection, social assistance

Introduction

While population health benefits from increasing national wealth, socio-economic inequalities in health still exist in all advanced industrialised countries (Mackenbach, 2012; Wilkinson, 1996). To date, many studies have described how health inequalities vary in

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size between Western societies (Dahl et al., 2006; Mackenbach, 2006). Even though the relationship between generous welfare regimes and overall population health is well established (Brennenstuhl et al., 2012), previous studies have not consistently found a relationship between the generosity of a welfare state and the size of its health inequalities. An explanation for these inconsistent findings could be that studies usually focus on the different types of general welfare regimes instead of specific areas of social policies within the welfare state (Lundberg et al., 2015). Both objects of study might differ in the way in which they affect health. Previous studies indicated that the focus on specific social policies could be the crux of the matter, compared to the study the welfare regimes (Beckfield and Bambra, 2016; Burstrom et al., 2010; Lundberg et al., 2015). In their review of 33 studies on health, health inequalities and welfare regimes, Brennenstuhl et al. (2012: 399) concluded that 'results were more consistent among the studies that examined policy instruments'. Indicators of generosity, such as regulation of benefits or size of specific public expenditures, are associated with better overall health and lower health inequalities. This approach breaks up the 'black box' of the welfare state by showing which features of specific policy programmes are important when studying health inequalities and drawing policy-relevant conclusions (Brennenstuhl et al., 2012; Lundberg, 2008). The present article contributes to this line of research by studying minimum income protection and its effect on health inequalities. The goal is to assess whether minimum income protection (MIP) accounts for the variations in the extent of health inequalities across Europe. To date, research has focused on policies for single mothers, family, old-age and unemployment policies (Burstrom et al., 2010; Ferrarini and Norström, 2010; Lundberg et al., 2008, 2015; Rodriguez, 2001), while minimum income protection has received only minimal attention despite its fundamental relevance to poverty and income-related inequalities (Bahle et al., 2011; Nelson, 2012).

The lack of studies analysing the effects of minimum income benefits on public health is even more surprising, since minimum income benefits are the core of the welfare state idea, both historically and as a last safety net to provide a bare minimum of social security. Two central features define minimum income protection: firstly, the receipt of benefits is linked to a means test, and secondly, benefits are granted at a social minimum that allows participation in society (Bahle et al., 2010). Minimum income benefits provide a basic living standard for people without income or access to benefits based on social insurance contributions (Bahle et al., 2011). Especially with respect to the role of minimum income protection schemes as a last safety net, it is important to study their effects on health, and even more so in light of the welfare state retrenchment during the last decades.

Welfare states in Europe went through a transformation from a social insurance to a social investment state (Garritzmann et al., 2017; Hemerijck, 2012; Morel et al., 2012). Classical social insurance programmes are becoming less important. In the course of the reforms of social insurance programmes, non-contributory minimum income protection has become more significant for poverty alleviation (Bahle et al., 2011; Hemerijck, 2012; Marx and Nelson, 2013). Benefit levels or coverage have not changed as the economic situation in the countries has changed, so the need for minimum income protection exists and is increasing (Van Mechelen and Marchal, 2013). As consequence of the financial crisis in 2008/2009 many European countries struggled with high youth unemployment (Diamond and Liddle, 2012), and restrictions on the duration of employment protection

during the years preceding this crisis increased the necessity of social assistance for the long-term unemployed.

In addition to the positive effects of generous social assistance for the health of vulnerable groups, I assume that minimum income protection also influences the link between income and health across the entire distribution of income. Earlier research has consistently found that generous social policies and benefits are related to good overall population health and that these positive effects on health are not restricted to those who (are entitled to) receive benefits (Bergqvist et al., 2013). Therefore, the present article examines whether the health of middle and higher income groups is affected positively by more generous benefits, even when individuals in these groups run close to a zero risk of ever being a recipient of minimum income benefits. If minimum income protection affects the income and health of the rich, this situation would influence the size of health inequality in society as well.

Minimum income protection and health inequalities in the framework of institutional theory

Generous welfare states are more likely to prevent life risks from accumulating and disadvantages in one area of an individual's life from affecting other areas at the same time, e.g. becoming unemployed while maintaining health insurance coverage. Consequently, the degree to which welfare states differ in their generosity, in terms of minimum income protection, is a possible explanation for varying health inequalities across countries (Lundberg et al., 2008; Saltkjel et al., 2013). The present study seeks to explain why health inequalities vary across countries by drawing on the institutional theory of health inequalities (Beckfield et al., 2015). Institutions – including welfare institutions in the context of the present study – set the 'rules of the game in a society' (North, 1990: 3). In their application of the 'rules', institutions distribute social determinants that enforce or reduce health inequalities. Beckfield et al. (2015) have described health inequality as a function of redistribution, compression, mediation and imbrication.

Due to my focus on one particular social policy, minimum income protection, I have concentrated on two mechanisms of the institutional framework – redistribution and compression. Both mechanisms can be used to explain variations in health inequalities across European countries. The first mechanism, *redistribution*, redirects resources among the population and shifts social determinants of health, so that the disadvantages of one group and advantages of the other group are offset or at least reduced. Redistribution can be applied to minimum income protection since it shifts economic resources from tax payers to those who are in need. Welfare institutions are instrumental for redistribution of income, since they redistribute collective resources to compensate for negative individual life events, e.g. job loss (Fritzell and Lundberg, 2006). With regard to the concept of redistribution, I assume that higher minimum income protection benefits are accompanied by lower health differences between income groups.

The second mechanism, *compression*, means a change in the distribution of social determinants of health, mainly understood as a compression at the lower or upper end of a distribution. Beckfield et al. (2015) have described compression as limiting how low or high social determinants can become within society. While redistribution changes the income

distribution at both ends because some people benefit from others giving up something, the mechanism of compression reflects only impact on one side of the distribution. Beckfield et al. (2017) use the following example to illustrate compression: a minimum wage policy only affects the lower end of the income distribution, while the fiscal policy design has a compressive effect only on the upper end. As a minimum income, similar to the example of minimum wage policy, the social assistance benefits (assuming that all persons in need also apply for and receive social assistance benefits) represent the lowest possible income of the income distribution. Lifting people out of poverty, and thereby improving their health, plays a decisive role in how minimum income protection reduces health inequalities. The improved material conditions of the lowest income group lead to better health of this group and thus to lower overall health inequalities. In their study on minimum income protection and mortality, Nelson and Fritzell (2014) found exactly this effect: more financial resources to cover the basic needs of the poor lead to increased health.

I have described how the two mechanisms, redistribution and compression, explain the link between income and health among *lower* income groups. Due to means-testing, the number of recipients of minimum income protection is low in Europe, around 5% of the working age population in the year 2007 (Bahle et al., 2011: 218; for 2009 see Van Mechelen and Marchal, 2013). Irrespective of the low number of minimum income protection recipients, I expect that a larger percentage of society is aware of the last safety net and its characteristics, since in times of economic distress, the middle classes become more sensitive to the risk of long-term unemployment and social reforms (Lengfeld and Hirschle, 2009).

Aside from a general awareness of the generosity of minimum income protection, higher income groups are unlikely to directly benefit from this protection because these benefits come into play after all other social benefits, such as unemployment insurance benefits, have lapsed or are not available to individuals. On the contrary, middle and higher income groups are burdened by income redistribution, since they pay higher income taxes and social security contributions to support the tax-financed MIP schemes. On the one hand, higher income groups may feel that although they support a generous last safety net, they are unable to reap any direct benefits; on the other hand, higher income groups may perceive generous social policies as protecting, even without any monetary benefits. According to Pfeifer (2009), in times of austerity and labour markets under pressure, the likely opponents of MIP, such as the well-educated and high income groups, tend to criticise minimum income protection policies to a lesser extent. Awareness of a last safety net affects stress levels and may have subliminal positive effects on health, which has been confirmed for the middle class: Sjöberg (2010) found that generous unemployment benefits reduced the psychosocial stress of job insecurity even among the employed. However, whereas the availability of collective resources may contribute to a middle income group's feelings of security and predictability, higher income groups may perceive redistribution to support 'overly generous' minimum income protection differently. Dallinger (2013) found that the income of the highest and lowest income groups – as givers and receivers, respectively – are affected to a greater extent by welfare state interventions than the income of the middle class.

While we assume that the second mechanism, compression, can explain a reversal of health disadvantages at the lower end of income distribution, at the higher end the effects

of compression do not exist. Ultimately, the (labour) market decides the size of income and to date, limitations do not exist. The lack of compression, of regulation at the high-end incomes, is a possible explanation as to why health advantages for higher income groups, and ultimately health inequalities, still exist, even though Western European countries have taken many initiatives to tackle health inequalities (Mackenbach, 2010).

The institutional theory of health inequalities not only provides an explanation for why the health of MIP recipients would improve through more generous social protection, but also expects a positive effect from higher minimum income protection on the health of the remaining population. Simply put, the existence of a *last safety net* and the knowledge of its benefits also positively affect those people who are not impacted or threatened by economic hardship due to unemployment, disability, or old age. The approaches I have examined to this point suggest two hypotheses. First, I hypothesise that the more generous the MIP benefits, the smaller the health differences are between the income groups. Second, I hypothesise that the lower health inequalities of countries with more generous benefits are due to a decline in the health disadvantages of the lower and middle income groups, and not by a decline in the health advantages of the higher income groups. For higher income groups, social contributions do not constitute a relevant part of the tax load that might negatively affect health due to a reduced disposable income, but those groups benefit from the positive effects of generous social assistance on the cohesion of society. The following analyses test these two hypotheses.

Data and methods

Description of data

The data source used in the present study is the cumulative file of the European Social Survey (ESS), which includes the six rounds from 2002 to 2012 (ESS ERIC, 2014).[1] Only countries with a minimum of two completed surveys during that period are included. Thirteen out of 26 countries completed every survey between 2002 and 2012. The analysis contains 137,947 individuals aged 15 to 64 from 26 countries in up to six ESS rounds. Since the macro variables *minimum income benefits levels and gross domestic product (GDP)* are time variant, I nest countries in the years of interviews (2002, 2004, 2006–2013). In a few countries in which the fieldwork of one ESS round proceeds over a period of two years, the year of interview is more precise than the ESS round (e.g. in Belgium, the fieldwork period for ESS round 5 went from October 2010 until May 2011).

Missing cases are treated according to a listwise deletion that initially deleted 67,247 cases from the dataset. The variable with the most missing cases was *household income*, namely a 26.6% item non-response. To perform a sensitivity analysis on applying list-wise deletion, I ran a model that includes a flag variable on missing income, which did not change the analysis results of the model based on listwise deletion.

Variables

Dependent variable. The dependent variable is *self-rated health (SRH)*, which I measured using a single item: 'How is your health in general? Would you say it is _____.'

Response categories were *very bad, bad, fair, good*, or *very good*. The interpretation of the dependent variable is: the higher the values, the better the health. SRH is a strong predictor of mortality and morbidity (Idler and Benyamini, 1997; Jylhä, 2009). Furthermore, SRH is an appropriate measure for health inequalities. With Swedish data, Burstrom and Fredlund (2001) found a similar predictive power of SRH with respect to subsequent mortality across all occupational classes, among men and women, and different age groups.

Explanatory variables

Income in quintiles. Socio-economic inequalities in health are measured via a household's total net income. From round 3 to 4, the ESS changed its income measure from a survey-wide 12-point scale of a household's total net income to national income categories based on the deciles of the actual household income range in the respective country. Calculations of the deciles are based on external sources, such as national register data or representative country-wide surveys (e.g. EU-SILC).

To harmonise the two income measures across the six rounds, I recoded a household's total net income from round 1 to 3 into quintile categories (after conversion to purchasing power parity [PPP] and applying the square root scale as an equivalence measure); I also collapsed the 10 income deciles from round 4 to 6 into five quintiles (see also Schmidt-Catran, 2014). To reduce potential bias due to varying sizes in the income quintiles across countries – some income quintiles contained more or less than 20% – I applied a weight at the individual level as correction, so each income quintile contained 20% of a country's sample. In addition, I applied ESS post-stratification weights. As a sensitivity analysis, I ran models that included a dummy variable for the ESS rounds 1 to 3, which accounts for the possibility that the two income approaches from round 1 to 3 and 4 to 6 cannot be combined. This dummy was not significant, and the substantive results did not differ.

Benefit levels of minimum income protection. The generosity of minimum income protection was operationalised by the annual benefit level (in 1000 Euro PPPs). The variable is from the Social Assistance and Minimum Income Protection Interim Data Set (SaMip), which is designed for cross-national comparisons (Nelson, 2013). It contains data from 1990 to 2013 on the level of social assistance and minimum income benefits after income taxation. Benefit levels are based on the type-case approach – benefit levels are calculated in line with national legislation for three standardised types of household: a single person household without children; a lone parent family and a two-parent family, each with two children. With respect to the variable utilised, I averaged the benefit levels of the three type-cases, which represents the yearly minimum income benefit level per country. The original variable from the SaMip dataset is *MIPavey*. This variable includes social assistance standard rates, housing supplements, and – if applicable – refundable tax credits and family allowances. Table 1 lists the 26 social assistance programmes used in SaMip (Nelson, 2013).

Control variables. Several demographic and socio-economic variables may influence both health and income, and thus, should be controlled for when analysing health inequalities:

Table 1. Social assistance programmes included in the minimum income benefits of 26 countries.

Country	Name of social assistance programme/legislative framework
Austria	Bedarfsorientierte Mindestsicherung
Belgium	Revenu d'intégration
Bulgaria	Mesechna sotsialna pomosht
Cyprus	Dimosio Voithima
Czech Republic	Systém pomoci v hmotné nouzi
Denmark	Kontanthjælp
Estonia	Toimetulekutoetus
Finland	Living Allowance
France	Revenu de Solidarité Active
Germany	Grundsicherung für Arbeitsuchende/Hilfe zum Lebensunterhalt
Great Britain	Income Support
Hungary	Rendszeres Szociális Segely
Iceland	Félagslega aðstoð
Ireland	Supplementary Welfare Allowance
Italy	Minimo Vitale
Lithuania	Piniginė Socialinė Parama
Luxembourg	Revenu Minimum Garanti
Netherlands	Wet Werk en Bijstand, WWB/Algemene Bijstand
Norway	Økonomisk Stønad
Poland	Zasilek Okresowy
Portugal	Rendimento Social de Inserção
Slovakia	Dávka v hmotnej
Slovenia	Denama Socialna Pomoc
Spain	Ingreso Minimo/Renta Mínima de Inserción
Sweden	Ekonomiskt bistånd/Försörjningsstöd
Switzerland	Aide Sociale

Source: SaMip documentation.

age, sex, number of household members (linear and squared), education and employment status. I restricted the sample to respondents of working age (15 to 64 years according the OECD [2018] definition), as in most countries older people in need receive social pensions. In addition, most minimum income protection schemes have no or only a very low age limit of 18 years. As younger people usually have not yet worked for very long, they have often not yet contributed enough to the social security system to gain access to unemployment insurance. In the case of unemployment, they are dependent on social assistance and minimum income protection. Education was classified according to the International Standard Classification of Education (ISCED 97) and used in five ordinal categories: Less than lower secondary education (ISCED 0-1); Lower secondary education completed (ISCED 2); Upper secondary education completed (ISCED 3); Post-secondary non-tertiary education completed (ISCED 4); and Tertiary education completed (ISCED 5-6). Employment status includes the employed, unemployed, and those not in

the labour force, such as people in education, people doing housework, the permanently ill and the retired.

At the macro level, GDP per capita functions as a control variable to adjust for national wealth, which affects health, the relationship between individual income and health, and the level of minimum income protection benefits.[2] GDP data are available from the World Development Indicators (WDI) of the World Bank data collection. Based on previous research (Wilkinson, 1996), I included the log of GDP in 1000 PPP (constant 2011 international dollars) to acknowledge the curvilinear relationship between GDP and population health.

Due to the small number of observations at the country level, it is crucial to check for influential cases. Based on an assessment of DFBETAs and Cook's D, Luxembourg was identified as an influential case. Following Van der Meer et al. (2010), I used a country dummy for Luxembourg, which significantly improved the model (likelihood-ratio test: Prob > χ^2 = 0.000).

Analysis methods

I accounted for the structure of the data – individuals nested in countries and years – by using a simultaneous multilevel analysis with three levels (Schmidt-Catran and Fairbrother, 2016). In this case, 137,947 individuals (Level 1) were nested in 155 country-years (Level 2) that were again nested in 26 countries (Level 3). Models are estimated using the `mixed` command in Stata 15.1.

The Intraclass Correlation (ICC) provides the proportion of total variance at the higher levels. The ICC at the country-year level was calculated according to Hox (2010: 34; eq. 2.16). It is reported as a percentage of the total variance (100*ICC). The models include random intercepts and random slopes, i.e. the relation of household income and health does not only vary between years and countries in their intercept, but also in their slopes. In random slope models, the regression lines of income and health for all countries and years can have different intercepts and different slopes. I developed the models step by step, starting with the intercept-only model and ending with the final model, which was specified by random slopes and cross-level interactions. The interactions test the impact of minimum income benefits on income-related health inequalities. To interpret the cross-level interactions in a meaningful way, I centred the variable for minimum income benefits at the grand-mean.

Results

Descriptive analyses

Minimum income protection varies broadly across Europe. In 2012, monthly minimum income benefits were EUR 1800 (PPPs) in Switzerland compared to EUR 155 (PPPs) in Bulgaria. The upper half of the benefit levels in Table 2 is dominated by Nordic countries, whereas Eastern European countries are at the lower end. A comparison of MIP benefits and gross earnings (in Euros for a single person with earnings of an average worker who works full-time) emphasises that high benefits signify generosity: countries

Table 2. Minimum income benefit levels (EUR PPPs), average self-rated health (age-standardised) and health inequalities (ratio of very good health of the lowest compared to the highest income quintile) across 26 European countries in 2012.

Benefit levels, descending	Minimum income benefits /month	Working age population health	95% confidence interval		% with very good health, for each household income quintile		Ratio[a] Q5/Q1
			Lower	Upper	Q1	Q5	
Luxembourg	2042	3.91	3.84	3.98	24.1	38.7	1.6
Switzerland	1842	4.24	4.19	4.29	26.2	52.7	2.0
Ireland	1782	4.29	4.24	4.33	31.0	70.3	2.3
Denmark	1729	4.21	4.16	4.26	36.0	46.9	1.3
Cyprus	1471	4.38	4.32	4.44	49.6	84.2	1.7
Netherlands	1466	3.98	3.93	4.03	10.9	24.6	2.3
Norway	1449	4.12	4.07	4.17	30.0	44.8	1.5
Germany	1433	3.77	3.73	3.81	10.9	23.3	2.1
Finland	1408	4.01	3.97	4.05	23.1	30.0	1.3
Iceland	1363	4.19	4.12	4.26	26.5	55.4	2.1
Sweden	1290	4.17	4.12	4.21	33.3	41.1	1.2
Great Britain	1135	4.11	4.06	4.16	21.5	44.8	2.1
Belgium	1117	4.00	3.96	4.05	18.3	30.2	1.7
Austria	1079	4.15	4.10	4.19	30.9	43.9	1.4
Slovenia	1042	3.96	3.90	4.02	17.5	38.5	2.2
Italy	935	3.82	3.77	3.88	11.8	14.3	1.2
France	830	3.91	3.85	3.97	19.3	33.7	1.7
Czech Republic	749	4.13	4.09	4.18	12.8	46.7	3.6
Spain	612	3.83	3.78	3.88	15.5	27.3	1.8
Lithuania	468	3.78	3.74	3.81	7.0	17.2	2.4
Portugal	455	3.92	3.85	3.99	9.7	33.9	3.5
Slovakia	448	3.97	3.91	4.03	9.8	33.4	3.4
Hungary	430	3.76	3.71	3.81	10.7	27.8	2.6
Estonia	399	3.68	3.64	3.72	8.9	18.6	2.1
Poland	389	3.84	3.80	3.88	12.7	23.7	1.9
Bulgaria	155	3.99	3.93	4.04	14.8	35.5	2.4

[a]Health ratio: ratio of very good health, highest to lowest income quintile.
Source: SaMip and ESS, round 6 (2012); except for Austria (round 3, 2006) and Italy and Luxembourg (round 2, 2004); data weighted; listwise deletion.

with higher monthly benefits are not simply richer countries, but often have a higher ratio of benefits to earnings.

Table 2 shows further the age-standardised average of self-rated health, the shares and the ratio of 'very good' self-rated health according to the lowest and highest household income quintiles for the ESS round 6, 2012 in 26 European countries. I ranked and grouped these countries based on the level of their minimum income benefits packages. Average population health was highest in Cyprus with 4.4 (equivalent to good health) on

the five-point answering scale compared to the lowest value of 3.7 (equivalent to fair/good health) in Estonia. A health gradient across the five income quintiles was visible in all countries, which indicates the presence of health inequalities. Table 2 provides the percentage of those reporting 'very good' health, although health differences can be found for every response category (output not shown). The last column presents the ratio of the percentage of those with 'very good' health in the highest income quintile compared to the lowest quintile, which is a first descriptive indicator for health inequalities. The increasing size of the ratio indicates higher inequalities.

The descriptive data give an impression that health and minimum income benefits are related. Countries that are grouped in the two highest groups of minimum income benefits tend to have better population health. Moving down the table, overall population health worsens with lower benefit levels. A similar pattern can be found in the ratio describing health inequalities. Moving down the column with decreasing minimum income benefits, health inequalities increase as indicated by the steadily higher percentage of people reporting 'very good' health in the highest over the lowest income quintile. However, the exceptions that deviate from the general pattern – such as the Czech Republic with very high health inequalities (ratio of 3.6) and medium benefit levels – suggest that the relationship might be spurious. Another example is Poland, which has rather low benefit levels and, at the same time, low health inequalities.

Three-level analyses

The intercept-only model (M0) in Table 3 suggests that with 6.1% a considerable cross-national variation exists with respect to self-rated health at the country level (ICC: 0.061). The ICC for the country-year level (ICC-L2) was 0.006. The variance at the country-year level is, at 0.6%, extremely small compared to the overall variance. Thus, in our sample, health varies to a greater extent across countries than across years. The proportion of explained variance is the highest at the individual level with 93.3%.

In Model M1, the individual-level variables are introduced in a random-intercept model. Including the variables in the model reduces the variance components at the country level by 11% and at the individual level by 15%. For the explanatory variable – income quintiles – I found a typically health gradient of income: each step down the socio-economic status ladder is significantly negatively associated with individual health. The lowest income quintile has the strongest health disadvantage compared to the highest income quintile, followed by the second quintile, and so on. Even though people from the fourth income quintile appear to have only a small health disadvantage compared to the fifth quintile, this effect is significant. All control variables are significant, and coefficients are associated with self-rated health in line with earlier research: with increasing age, people tend to have worsening health, and women often report less good health than men (Bambra et al., 2009), and an increasing number of household members is associated with better health up to a certain number of members, after which health is affected in a negative way (illustrated by the negative quadratic term). The better educated report better health (Knesebeck et al., 2006). Compared to the currently employed, those not in the labour force and the unemployed report worse health (Bambra and Eikemo, 2009).

Table 3. Multilevel linear regression of self–rated health on minimum income protection benefit levels (MIP) in 26 countries.

	M0	M1	M2	M3
Constant	3.9397***	4.6202***	2.8565**	2.8480**
	0.0429	0.0496	0.8933	0.8924
Age (15–64)		−0.0186***	−0.0186***	−0.0186***
		0.0014	0.0014	0.0014
Female		−0.0262*	−0.0261*	−0.0260*
		0.0131	0.0130	0.0130
# of household members		0.0401***	0.0344***	0.0343***
		0.0080	0.0074	0.0075
# of HH members, squared		−0.0033**	−0.0028**	−0.0028**
		0.0011	0.0010	0.0010
Highest level of education		0.0608***	0.0609***	0.0609***
		0.0048	0.0047	0.0047
Employment status (ref. employed)				
Not in labour force		−0.1973***	−0.1971***	−0.1971***
		0.0178	0.0177	0.0177
Unemployed		−0.1213***	−0.1196***	−0.1199***
		0.0185	0.0194	0.0194
Income quintiles (ref. 5th quintile)				
1st quintile		−0.2885***	−0.2995***	−0.2931***
		0.0172	0.0163	0.0197
2nd quintile		−0.1759***	−0.1821***	−0.1782***
		0.0141	0.0134	0.0148
3rd quintile		−0.1055***	−0.1130***	−0.1075***
		0.0118	0.0102	0.0111
4th quintile		−0.0611***	−0.0682***	−0.0635***
		0.0121	0.0110	0.0119
Country-level variables				
Country Luxembourg			−0.3260***	−0.3262***
			0.0814	0.0815
GDP pc			0.1707*	0.1712*
in PPP USD, log of			0.0860	0.0860
Monthly MIP			0.0119*	0.0169**
in 100 PPP EUR, centred			0.0052	0.0056
Cross-level interactions				
1st quint. × MIP				−0.0078*
				0.0031
2nd quint. × MIP				−0.0047^{+}
				0.0028
3rd quint. × MIP				−0.0067**
				0.0023
4th quint. × MIP				−0.0058**
				0.0022

(Continued)

Table 3. (Continued)

	M0	M1	M2	M3
Variance components				
Level-3 variance	0.0450***	0.0401***	0.0214***	0.0214***
(countries)	0.0054	0.0047	0.0034	0.0034
Level-2 variance	0.0042***	0.0037***	0.0026***	0.0026***
(country-years)	0.0006	0.0005	0.0004	0.0004
Level-1 variance	0.6900***	0.5893***	0.5851***	0.5852***
(individuals)	0.0091	0.0076	0.0078	0.0078
Level-3 var (income)			0.0008***	0.0008***
			0.0002	0.0002
Level-2 var (income)			0.0046***	0.0044***
			0.0006	0.0006
ICC L-3	0.061	0.063		
ICC L-2	0.006	0.006		
AIC	442198	413974	413345	413343
BIC	442238	414122	413532	413570
−2 Log likelihood	−221095	−206972	−206654	−206649
df	0	11	14	18

Standard errors in second row.
N of individuals = 137,947; *N* of country-years = 155; *N* of countries = 26.
Self-rated health: 1: very bad, 2: bad, 3: fair, 4: good, 5: very good.
Sources: ESS (rounds 1–6), data weighted, listwise deletion; SaMip.
$^{+}p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Before introducing the country-level variables and the cross-level interactions, I tested whether the association between household income and self-rated health varied across countries by adding random slopes at both the level of country-years and the level of countries. At both levels, the random slopes of the effect of income quintiles were significant. Since this finding indicates that the effect of income on health indeed varies across countries, earlier research on income-related health inequalities in Europe (Eikemo et al., 2008; Jutz, 2015) is confirmed. A likelihood-ratio test suggested a better model fit when using a model with random slopes.

In Model M2, I examined the effect of minimum income protection and economic performance on overall self-rated health. The significantly positive effect of minimum income benefits on health confirms earlier research that examined mortality and life expectancy (Nelson and Fritzell, 2014). GDP per capita is also associated with health in a positive way, as previous studies have shown (e.g. Kangas, 2010). The country dummy of Luxembourg is significant which is in line with findings from regression diagnostics tests. Country-level variance is further reduced by around 47%.

In the final model, M3, I tested the hypothesis that minimum income benefits reduce health inequalities. This model included cross-level interaction terms for income quintiles and minimum income benefits (centred at the grand-mean). The cross-level interaction terms of the first, the third and the fourth income quintile differed significantly from the reference of the fifth income quintile and MIP, with the interaction terms showing a

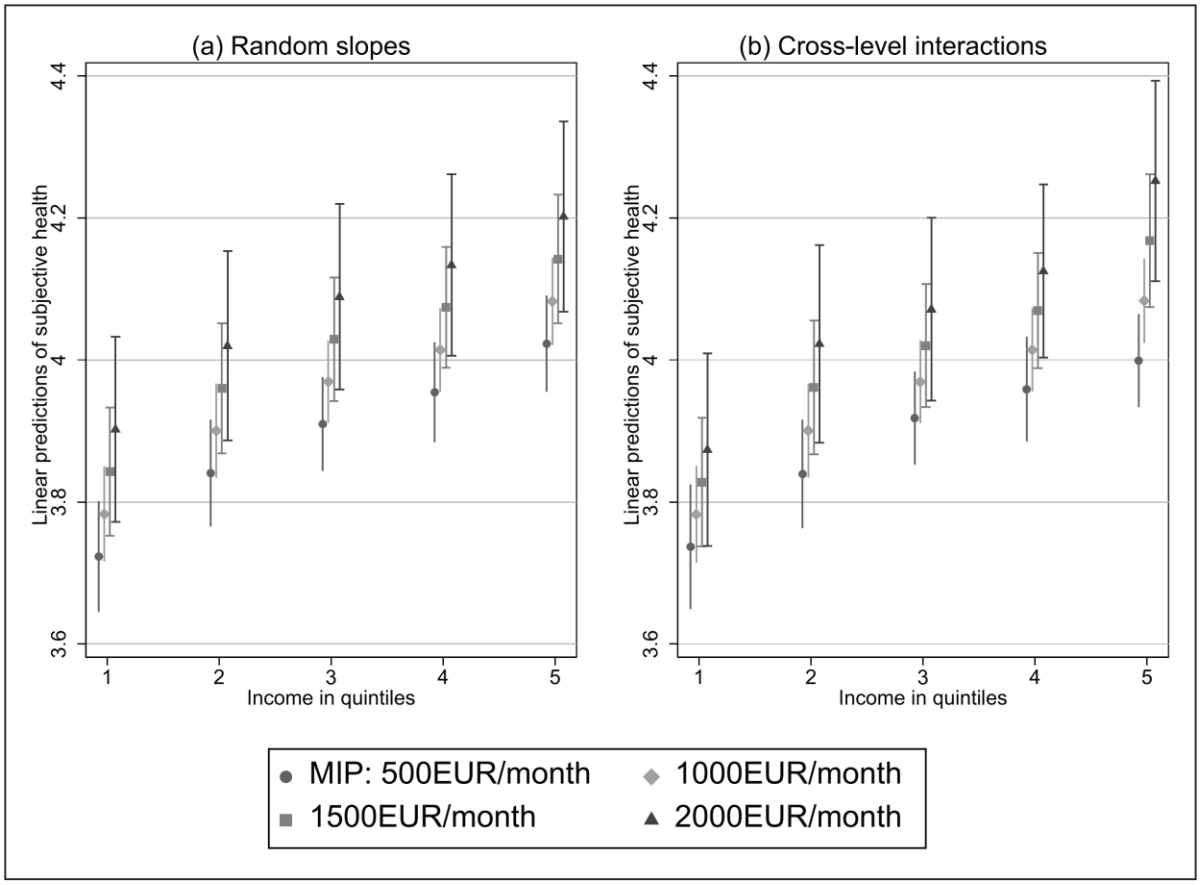

Figure 1. Margins plots based on model M2 vs M3.

gradient – except for the second cross-level interaction term ($p < 10\%$). The gradient is like the main effects of income quintiles which also show a gradient: in comparison to the reference category, i.e. the top 20% of the income distribution, all lower income quintiles are disadvantaged in terms of subjective health. The health disadvantage increases with each level of income distribution. The lowest 20% have the greatest health disadvantage compared to the top 20%. I expected a less pronounced negative or even positive cross-level interaction effect of the lowest income quintile, which would have shown that MIP has an impact on the relationship of income and health. However, MIP does not reduce the health disadvantages of the lower income groups compared to the fifth quintile.

Measures of fit, such as the Akaike information criterion (AIC), indicates that the final model was the model with the best fit, whereas Bayesian information criterion (BIC) supports Model M2.[3]

Figure 1 (a) shows the margins plots of predicted self-rated health across the five income quintiles from the random slopes model (M2) for different levels of MIP. The benefit levels (EUR PPPs 500, 1000, 1500 and 2000) are according to the arrangements in Table 2. Predicted health increases by higher income and with higher benefits levels.

To study the possible moderating role of minimum income benefit levels on health inequalities, cross-level interactions are applied. Figure 1 (b) shows the cross-level interaction effects of the five income quintiles and minimum income benefit levels on self-rated health, based on Model M3. We see that more generous MIP seems to increase health differences between the lowest and the highest income group. At the low MIP

benefit level of 500 Euros which is roughly the same level as in Lithuania or Portugal, the health advantage of the higher income groups is less pronounced than in countries with higher benefit levels of 1500 or 2000 Euros per month such as in the Netherlands or Luxembourg. Moreover, the lowest income quintile does not seem to benefit from generous minimum income protection. The predicted health status in the lowest income quintile assumes similar values of around 3.8 (on the five-point scale) across the four different benefit levels.

Discussion

Researchers have found a positive relationship between welfare state generosity and population health, not only regarding egalitarian, more generous welfare states (Muntaner et al., 2011) but also with regard to the design of specific programmes and benefit levels (Bambra and Eikemo, 2009; Ferrarini and Norström, 2010; Lundberg et al., 2008; Nelson and Fritzell, 2014). The present study builds on this research and has taken it one step further by looking at one social policy programme in particular – minimum income protection. The results of the present study confirm that generosity in benefit levels is related significantly to overall population health, as also was found by Nelson and Fritzell (2014) for mortality. Even when controlling for a country's wealth, the significant positive effects of minimum income benefits on health remains. In addition, the present study confirms earlier findings that income-related health inequalities vary by country.

However, the main purpose of the present study was to test whether higher minimum income benefit levels reduce health inequalities. My first assumption, that more generous benefits would reduce differences in health between income groups, is not supported. Cross-level interaction terms in Table 3 and in Figure 1 (b) show that the health differences between the income quintiles are not reduced after introducing the interaction with benefit levels, which means that minimum income protection does not lead to a reduction of the income gradient in health. All interaction terms are significant. Figure 1 (b) even shows that the differences in health between the lowest and the highest income quintile are largest at the highest benefit level and not, as expected, at lower benefit levels such as 500 Euros per month.

After rejection of the first hypothesis, the second hypothesis can only be evaluated to a limited extent. My analysis shows that the health disadvantage of lower income groups is not reduced by generous minimum income protection. A steeper slope between the first and second income quintiles with increasing MIP benefits indicates that there are large differences in predicted health between these two groups. Higher benefit levels do not reduce the health disadvantage of the lowest income quintile. This finding is surprising, since minimum income protection is targeted towards those with low or no income at all. The recipients and beneficiaries of minimum income protection are in the lowest income group. For this study, it was not possible to test this finding further, since the ESS does not collect data on the share of minimum income benefits as part of household income but asks for the main source of income with one response category called *any other social benefits or grants*. Over the six ESS rounds, fewer than 4% choose this answer category, and only about 15% of the lowest income quintile fall into this category. Possible health-beneficial effects of higher benefit levels for recipients of

minimum income protection and social assistance do not seem to have led to a visible decline in health disadvantages of the lowest income quintile. According to the mechanism of compression, the results might be an indication that the numbers of beneficiaries is too small to show an effect for health inequalities. My arguments made in the second section of the article that a larger share of the population is aware of the beneficial effects of minimum income protection are not supported by the findings. The level of MIP has no impact on middle income groups, which would have led to a reduction in health inequalities. In addition, the number of actual recipients of MIP in the lowest income group may be too small to influence health inequalities. The mechanism of compression therefore does not come into play for minimum income protection schemes.

In line with the second hypothesis, I find that the higher income groups are not disadvantaged, even if MIP benefits are generous. The steep slope between the second highest and the highest income quintile displays the health advantage of the highest income group. Interestingly, this is most evident in the slope of the highest benefit level (2000 Euros per month), while it is not that obvious at the low level of 500 Euros per month. The health advantage of the highest income quintile, which is more pronounced at higher benefit levels, might indicate that this particular group is 'rich enough', and may not experience any negative effects such as higher taxes from welfare generosity. Overall, health inequalities are not reduced by generous benefit levels, but rather increased, and this is partly due to a clear health advantage of the top income group. If lower income groups do not benefit disproportionately from generous minimum income benefits for their health, MIP could reduce the number of people in absolute poverty, but the health differences between lower and higher income groups can remain unchanged.

Recognising the robust positive main effect of minimum income benefit levels on individual health, it also is important to point out the inconclusive relationship of minimum income protection and health inequalities. To better understand the link between minimum income protection and health inequalities, further research should study the recipients of minimum income protection and how changes in benefit levels or how transitions in and out of social assistance affect their individual health. In addition to benefit levels, future research also could include other aspects of minimum income protection, such as conditions of reception, duration of benefits, or possible sanctions. Overall, the findings of my study tentatively suggest that the benefit level does not make a difference in health for the lowest income group compared to the highest income group but that higher benefit levels even lead to an increased health advantage of the highest income quintile. Minimum income protection, which is existential for people who are not covered by any contributory social insurance programmes, may not be an appropriate instrument for reducing income-related health inequalities. However, the question arises as to why higher income groups experience health advantages in countries with generous minimum income protection. As MIP benefits are targeted and means-tested, middle and higher income groups are not recipients of MIP benefits.

Does MIP obscure another variable, which was not controlled for? Based on 13-year data, Nelson (2007: 54) notes that 'the development of general means-tested benefits shows more likenesses than differences' compared to social insurance. The unexpected findings of the present study can be interpreted as a strong link between minimum income protection and social insurance. As social insurance contributions are linked to income, middle and higher income groups benefit more from the contribution-based

components of the social security system, are better protected by their acquired social insurance entitlements, and may have a health advantage.

Future research should consider the interdependencies of social insurance and minimum income protection with regard to health inequalities and, in particular, the health disadvantages of lower income groups.

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Notes

1. Since macro data on minimum income benefit levels were not available beyond 2013, the most recent ESS modules were not part of the analysis.
2. Another possible control variable is the size of the welfare state, which is usually measured with total social expenditures (TSE) in % of GDP (Nelson and Fritzell, 2014), e.g. from ESSPROS, Eurostat (2018). The results remained robust, irrespective of whether TSE were included in the analysis or not. Since the variable TSE was not significant, it was excluded to keep the models concise.
3. Depending on the data structure, sample sizes of different levels are used. Here, the sample size of Level 1 is used (as also provided by Stata) for the Bayesian information criterion (BIC), but to avoid confusion, interpretation of AIC is preferred (Hox, 2010). That lower values represent better model fit applies to all measures of fit.

References

Bahle T, Pfeifer M and Wendt C (2010) Social assistance. In: Castles FG, Leibfried S, Lewis J et al. (eds) *The Oxford Handbook of the Welfare State.* Oxford: Oxford University Press, pp. 448–461.

Bahle T, Hubl V and Pfeifer M (2011) *The Last Safety Net: A Handbook of Minimum Income Protection in Europe.* Bristol: Policy Press.

Bambra C and Eikemo TA (2009) Welfare state regimes, unemployment and health: A comparative study of the relationship between unemployment and self-reported health in 23 European countries. *Journal of Epidemiology and Community Health* 63(2): 92–98.

Bambra C, Pope D, Swami V et al. (2009) Gender, health inequalities and welfare state regimes: A cross-national study of 13 European countries. *Journal of Epidemiology and Community Health* 63(1): 38–44.

Beckfield J and Bambra C (2016) Shorter lives in stingier states: Social policy shortcomings help explain the US mortality disadvantage. *Social Science and Medicine* 171: 30–38.

Beckfield J, Bambra C, Eikemo TA et al. (2015) An institutional theory of welfare state effects on the distribution of population health. *Social Theory and Health* 13(3–4): 227–244.

Beckfield J, Balaj M, McNamara CL et al. (2017) The health of European populations: Introduction to the special supplement on the 2014 European Social Survey (ESS) rotating module on the social determinants of health. *European Journal of Public Health* 27(Suppl. 1): 3–7.

Bergqvist K, Yngwe MA and Lundberg O (2013) Understanding the role of welfare state characteristics for health and inequalities: An analytical review. *BMC Public Health* 13(1): Article 1234.

Brennenstuhl S, Quesnel-Vallée A and McDonough P (2012) Welfare regimes, population health and health inequalities: A research synthesis. *Journal of Epidemiology and Community Health* 66(5): 397–409.

Burstrom B and Fredlund P (2001) Self rated health: Is it as good a predictor of subsequent mortality among adults in lower as well as in higher social classes? *Journal of Epidemiology and Community Health* 55(11): 836–840.

Burstrom B, Whitehead M, Clayton S et al. (2010) Health inequalities between lone and couple mothers and policy under different welfare regimes: The example of Italy, Sweden and Britain. *Social Science and Medicine* 70(6): 912–920.

Dahl E, Fritzell J, Lahelma E et al. (2006) Welfare state regimes and health inequalities. In: Siegrist J and Marmot M (eds) *Social Inequalities in Health: New Evidence and Policy Implications.* Oxford: Oxford University Press, pp. 193–222.

Dallinger U (2013) The endangered middle class? A comparative analysis of the role played by income redistribution. *Journal of European Social Policy* 23(1): 83–101.

Diamond P and Liddle R (2012) Aftershock: The post-crisis social investment welfare state in Europe. In: Morel N, Palier B and Palme J (eds) *Towards a Social Investment Welfare State? Ideas, Policies and Challenges.* Bristol: Policy Press, pp. 285–308.

Eikemo TA, Bambra C, Joyce K et al. (2008) Welfare state regimes and income-related health inequalities: A comparison of 23 European countries. *European Journal of Public Health* 18(6): 593–599.

ESS ERIC (2014) *European Social Survey Cumulative File, ESS 1-6 (2014).* Bergen: NSD - Norwegian Centre for Research Data.

Eurostat (2018) *European System of Integrated Social Protection Statistics (ESSPROS): Social Protection Expenditure Data.* Luxembourg: Eurostat.

Ferrarini T and Norström T (2010) Family policy, economic development and infant mortality: A longitudinal comparative analysis. *International Journal of Social Welfare* 19: S89–S102.

Fritzell J and Lundberg O (2006) Health, inequalities, welfare and resources. In: Fritzell J and Lundberg O (eds) *Health Inequalities and Welfare Resources: Continuity and Change in Sweden.* Bristol: Policy Press, pp. 1–18.

Garritzmann J, Häusermann S, Palier B et al. (2017) *WoPSI-the World Politics of Social Investment: An International Research Project to Explain Variance in Social Investment Agendas and Social Investment Reforms across Countries and World Regions.* 64. LIEPP Working Paper, Paris.

Hemerijck A (2012) Two or three waves of welfare state transformation? In: Morel N, Palier B and Palme J (eds) *Towards a Social Investment Welfare State? Ideas, Policies and Challenges.* Bristol: The Policy Press, pp. 33–60.

Hox JJ (2010) *Multilevel Analysis: Techniques and Applications.* New York: Routledge.

Idler EL and Benyamini Y (1997) Self-rated health and mortality: A review of twenty-seven community studies. *Journal of Health and Social Behavior* 38(1): 21–37.

Jutz R (2015) The role of income inequality and social policies on income-related health inequalities in Europe. *International Journal for Equity in Health* 14(117): 1–14.

Jylhä M (2009) What is self-rated health and why does it predict mortality? Towards a unified conceptual model. *Social Science and Medicine* 69(3): 307–316.

Kangas O (2010) One hundred years of money, welfare and death: Mortality, economic growth and the development of the welfare state in 17 OECD countries 1900–2000. *International Journal of Social Welfare* 19: S42–S59.

Knesebeck O, Verde PE and Dragano N (2006) Education and health in 22 European countries. *Social Science and Medicine* 63(5): 1344–1351.

Lengfeld H and Hirschle J (2009) Fear of falling in the German middle class: A longitudinal analysis, 1984–2007. *Zeitschrift für Soziologie* 38(5): 379–398.

Lundberg O (2008) Commentary: Politics and public health – Some conceptual considerations concerning welfare state characteristics and public health outcomes. *International Journal of Epidemiology* 37(5): 1105–1108.

Lundberg O, Yngwe MA, Stjärne MK et al. (2008) The role of welfare state principles and generosity in social policy programmes for public health: An international comparative study. *The Lancet* 372(9650): 1633–1640.

Lundberg O, Yngwe MA, Bergqvist K et al. (2015) Welfare states and health inequalities. *Canadian Public Policy – Analyse de Politiques* 41: S26–S33.

Mackenbach JP (2006) Socio-economic inequalities in health in Western Europe: From description to explanation to intervention. In: Siegrist J and Marmot M (eds) *Social Inequalities in Health: New Evidence and Policy Implications.* Oxford and New York: Oxford University Press, pp. 223–250.

Mackenbach JP (2010) The English strategy to reduce health inequalities. *The Lancet* 377(9782): 1986–1988.

Mackenbach JP (2012) The persistence of health inequalities in modern welfare states: The explanation of a paradox. *Social Science and Medicine* 75(4): 761–769.

Marx I and Nelson K (2013) A new dawn for minimum income protection? In: Marx I and Nelson K (eds) *Minimum Income Protection in Flux.* London: Palgrave Macmillan, pp. 1–27.

Morel N, Palier B and Palme J (2012) Beyond the welfare state as we knew it? In: Morel N, Palier B and Palme J (eds) *Towards a Social Investment Welfare State? Ideas, Policies and Challenges.* Bristol: Policy Press, pp. 1–30.

Muntaner C, Borrell C, Ng E et al. (2011) Review article: Politics, welfare regimes, and population health – Controversies and evidence. *Sociology of Health and Illness* 33(6): 946–964.

Nelson K (2007) Universalism versus targeting: The vulnerability of social insurance and means-tested minimum income protection in 18 countries, 1990–2002. *International Social Security Review* 60(1): 33–58.

Nelson K (2012) Counteracting material deprivation: The role of social assistance in Europe. *Journal of European Social Policy* 22(2): 148–163.

Nelson K (2013) *Social Assistance and Minimum Income Protection Interim Dataset (SAMIP).* Stockholm: Swedish Institute for Social Research (Stockholm University).

Nelson K and Fritzell J (2014) Welfare states and population health: The role of minimum income benefits for mortality. *Social Science and Medicine* 112: 63–71.

North D (1990) *Institutions, Institutional Change and Economic Performance.* Cambridge: Cambridge University Press.

OECD (2018) Working age population. Available at: https://data.oecd.org/pop/working-age-population.htm (accessed 9 October 2018).

Pfeifer M (2009) Public opinion on state responsibility for minimum income protection a comparison of 14 European countries. *Acta Sociologica* 52(2): 117–134.

Rodriguez E (2001) Keeping the unemployed healthy: The effect of means-tested and entitlement benefits in Britain, Germany, and the United States. *American Journal of Public Health* 91(9): 1403–1411.

Saltkjel T, Dahl E and van der Wel K (2013) Health related social exclusion in Europe: A multi-level study of the role of welfare generosity. *International Journal for Equity in Health* 12 (81): 1–11.

Schmidt-Catran AW (2014) Economic inequality and public demand for redistribution: Combining cross-sectional and longitudinal evidence. *Socio-Economic Review* 14(1): 119–140.

Schmidt-Catran AW and Fairbrother M (2016) The random effects in multilevel models: Getting them wrong and getting them right. *European Sociological Review* 32(1): 23–38.

Sjöberg O (2010) Social insurance as a collective resource: Unemployment benefits, job insecurity and subjective well-being in a comparative perspective. *Social Forces* 88(3): 1281–1304.

Van der Meer T, Te Grotenhuis M and Pelzer B (2010) Influential cases in multilevel modeling: A methodological comment. *American Sociological Review* 75(1): 173–178.

Van Mechelen N and Marchal S (2013) Struggle for life: Social assistance benefits, 1992–2009. In: Marx I and Nelson K (eds) *Minimum Income Protection in Flux.* London: Palgrave Macmillan, pp. 28–53.

Wilkinson RG (1996) *Unhealthy Societies: The Afflictions of Inequality.* New York: Routledge.

Author biography

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Résumé

La pauvreté, qui est un facteur de risque pour la santé, pourrait être réduite par des systèmes de protection sociale généreux. Mais une politique sociale généreuse réduit-elle également les conséquences des inégalités socioéconomiques sur la santé ? Dans cette étude, j'examine comment la protection du revenu minimum est associée aux inégalités socioéconomiques en matière de santé. Mon hypothèse est que des niveaux de prestations plus élevés vont de pair avec des inégalités de santé moins élevées entre les groupes de revenus. Les prestations de revenu minimum aident les personnes qui en ont le plus besoin et devraient donc améliorer l'état de santé des groupes les plus démunis, ce qui, à son tour, devrait réduire les inégalités de santé globales. Je teste cette hypothèse à partir des données de l'Enquête sociale européenne (ESS 2002–2012) et de l'ensemble de données provisoires sur l'aide sociale et la protection du revenu minimum (SaMip) en utilisant des modèles multiniveaux à trois niveaux, pour 26 pays. Les résultats montrent un rapport fiable entre les niveaux de prestations et l'état de santé individuel autoévalué. Toutefois, l'hypothèse d'une réduction des inégalités de santé n'est pas entièrement étayée, dans la mesure où les résultats des interactions entre les niveaux, entre les quintiles de revenu et les niveaux de prestations, diffèrent pour chaque quintile.

Mots-clés

Aide sociale, ESS, inégalités de santé liées au revenu, niveau des prestations, revenu minimum

Resumen
La pobreza, un factor de riesgo para la salud, podría ser aliviada a través de un estado de bienestar generoso. No obstante, ¿reducen también las políticas sociales generosas las implicaciones sobre la salud de las desigualdades socioeconómicas? Este estudio investiga cómo la protección del ingreso mínimo está asociada con las desigualdades socioeconómicas en salud. Mi hipótesis es que los niveles más altos de prestaciones están asociados con menores desigualdades de salud entre los grupos de ingresos. Las prestaciones de ingresos mínimos apoyan a las personas más necesitadas y, por lo tanto, deberían mejorar la salud de los grupos de ingresos más bajos, lo que a su vez reduciría las desigualdades de salud en general. Esta hipótesis se testa usando la Encuesta Social Europea (2002–2012) y la base de datos SaMip utilizando modelos multinivel de tres niveles, para 26 países. Los resultados muestran una relación sólida entre la cuantía de la protección y la salud individual autoevaluada. Sin embargo, la hipótesis de la reducción de las desigualdades en salud no se confirma totalmente, ya que los resultados de las interacciones entre niveles entre los quintiles de ingresos y los niveles de prestaciones difieren para cada quintil.

Palabras clave
Asistencia social, cuantía de las prestaciones, ESS, desigualdades de ingresos en salud, protección del ingreso mínimo