

ORIGINAL ARTICLE IN SOCIAL INEQUALITIES AND PUBLIC HEALTH

**Health inequalities, welfare state regimes and economic crisis: A comparative analysis in Sweden, Greece and Poland**

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**Abstract**

**Introduction:** The aim of this paper is to explore individual-level determinants of health inequalities across three European countries (Sweden, Greece and Poland) with different welfare systems and differently affected by the recent economic crisis.

**Methods:** The data derived from an original cross-national survey conducted in the context of the EU-funded LIVEWHAT project was used. The Chi-Square Test of Independence was used to examine potential differences in specific demographic traits, in socio-economic status and living conditions as well as in bridging and bonding social capital between individuals reporting poor health across Sweden, Greece and Poland. Binary logistic regression models were used to predict poor self-rated health based on the aforementioned predictors in the three countries under study.

**Results:** Poor self-rated health was more prevalent in Poland (42.8%), the lowest prevalence rate was in Sweden (30.4%) followed by Greece (31.9%). The Chi-Square Test of Independence

indicated significant differences between respondents reporting having poor health across the three countries with respect to their demographic characteristics, socio-economic status, socio-economic living conditions, and bridging social capital. The binary logistic regression analysis showed that specific indicators of lower socio-economic status and of adverse living conditions were more strongly associated with poor self-rated health in Greece and Poland, whereas individual traits associated with socio-economic living conditions were less important in predicting poor self-rated health in Sweden when taking into account individuals' bridging and bonding social capital. Overall the lack of different forms of social capital was more strongly related to poor self-rated health in Sweden than in the other two countries.

**Discussion and Conclusion:** Material explanations might be relatively more important in elucidating health outcomes in contexts with less generous welfare states, which were more severely affected by the recent economic crisis such as Greece and Poland, whereas social capital might be more decisive for health outcomes in a wealthy country with a universal welfare state such as Sweden.

**KEY WORDS:** Self-rated health, inequality, welfare states, social capital, economic crisis, Europe

### **Riassunto**

**Introduzione:** L'obiettivo di questo studio è stato quello di esplorare i determinanti di disuguaglianza di salute di tipo individuale in tre Paesi europei (Svezia, Grecia e Polonia) con differenti sistemi di welfare, colpiti in modo differente dalla recente crisi economica.

**Metodi:** Sono stati usati i dati di uno studio trans-nazionale condotto nell'ambito del progetto LIVEWHAT finanziato dall'Unione Europea. Il Test del Chi quadrato è stato usato per esaminare le potenziali differenze riguardanti specifiche caratteristiche demografiche, lo status socio-economico e le condizioni di vita così come il capitale sociale di tipo “bridging” e “bonding” degli individui con uno scarso livello autoriporato di salute. Modelli di regressione logistica binaria sono stati usati per prevedere i bassi livelli di salute sulla base dei sopra menzionati predittori.

**Risultati:** Bassi livelli di salute autoriferita sono risultati più frequenti in Polonia (42.8%), con il tasso di prevalenza più basso in Svezia (30.4%) seguito dalla Grecia (31.9%). Il Test del chi quadrato ha evidenziato significative differenze tra i rispondenti nei tre Paesi rispetto alle caratteristiche socio-demografiche, allo status socio-economico, alle condizioni di vita socio-economiche ed al capitale sociale di tipo “bridging”. L'analisi con la regressione logistica binaria ha evidenziato che specifici indicatori di basso status socio-economico e di difficili condizioni di vita erano fortemente associate agli scarsi livelli di salute auto-riferiti in Grecia e Polonia, mentre le caratteristiche individuali associate alle condizioni socioeconomiche di vita sono risultate meno importanti nel prevedere gli scarsi livelli di salute autoriporati in Svezia quando il capitale sociale di tipo “bridging” e “bonding” veniva tenuto in considerazione. Nel complesso, la mancanza di differenti forme di capitale sociale è risultato essere più fortemente correlato agli scarsi livelli di salute autoriferiti in Svezia piuttosto che negli altri due Paesi.

**Discussione e Conclusioni:** Spiegazioni materiali potrebbero essere relativamente più importanti nel delucidare gli effetti sulla salute in contesti che hanno welfare meno generosi e che sono stati colpiti in modo più severo dalla recente crisi economica, come la Grecia e la Polonia, mentre il

capitale sociale potrebbe essere più decisivo nel determinare le condizioni di salute in un Paese ricco con un welfare universale come la Svezia.

**TAKE HOME MESSAGE:** Specific individual traits developed under the materialist and psychosocial theoretical approaches are important in understanding health inequalities; however contextual factors, such as the welfare state regime and the economic conditions might be decisive in mediating the individual level determinants of health outcomes across different countries.

**Competing interests:** none declared

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## INTRODUCTION

Understanding the mechanisms that determine health inequalities, especially socioeconomic health inequalities, and designing adequate policy strategies that tackle such inequalities has been one of the main priorities for the European Union (EU) member states [1]. Although socioeconomic health inequalities have been studied extensively in the last decades [2–6], they still remain a puzzling issue as they are determined from a wide range of individual and

contextual factors that shape health and well-being. At the individual level, a large body of research has documented the detrimental effects of unemployment, low income, poor education and lower skilled positions on negative health outcomes [7–9]. The most critical contextual-level components that shape population health involve the economic conditions prevailing across different contexts with wealthy countries enjoying better health than poor ones [10].

Despite the impact of the overall economic performance on health outcomes, it is still not clear whether at times of economic downturn socio-economic health inequalities increase in poor and rich countries in the same way [10, 11]. During periods of economic crisis, the sharp rise in poverty, deprivation and unemployment as well as the reduced government spending in social provision and especially in healthcare services negatively affect population's health and mainly well-being of disadvantaged groups, which are more vulnerable to the major risks of illness [12, 13]. The experience from previous economic recessions provides some evidence that socio-economic health inequalities increase in times of economic crisis. For instance, during the Soviet crisis an increase of inequalities in mortality rates was reported [14, 15], whereas during the Asian crisis the escalation of socio-economic inequalities was associated with higher mortality rates in both Japan [16] and Korea [17, 18]. In the context of recent economic and financial crisis the austerity measures implemented by the EU member-states have had critical impacts on socio-economic inequalities with negative consequences on many health outcomes at population level [19].

Despite the aforementioned empirical evidence, the association between economic downturn and health inequalities is not always linear. Some scholars argue that the economic crisis' impact on population health heavily depends on each country's level of economic development, the rapidity

and severity of macro-economic changes as well as the variation in social provision policies in mitigating negative health outcomes [10, 12, 13]. With respect to the latter, during the economic crisis experienced by the Nordic countries in the 90s, their egalitarian welfare policies played a pivotal role in buffering the growth of inequalities [20–22]. Such evidence underpins that in times of economic shocks health inequalities do not necessarily heighten as more generous social welfare systems may cushion crisis' detrimental effects on population health.

Inspired from the complexities of understanding the potential interplay between welfare state, economic crisis and health, the main rationale of this paper is to explore individual-level determinants of health inequalities across three European countries such as Sweden, Greece and Poland that belong to different welfare state regimes and have been differently affected by the recent (2008) economic crisis.

### ***Theoretical framework on health inequalities***

There are different theoretical frameworks that elucidate the mechanisms that account for health inequalities [23], two of the most prominent ones involve the materialist [24, 25] and psychosocial approaches [26–28]. The former posits that health inequalities originate from differences in individuals' positions in the socio-economic stratification ladder. The main argument is that differences in social hierarchical positions are associated with differential exposure to material circumstances that may further cause health inequalities between social groups. In line with the materialist approach, research shows that individuals with lower socio-economic status (i.e., lower income earners, lower educated individuals, unemployed, manual workers, etc.) experiencing different forms of deprivation and unfavorable living conditions are more vulnerable to different health problems [2, 3, 6].

The psychosocial approach to health inequalities acknowledges that individuals at the bottom of the social ladder are more likely to experience stress-strain and frustration due to their disadvantaged social positions, which in turn lead to greater vulnerability to ill health [26, 27]. There are two main pathways that underpin the above mechanism; the first underscores that anxiety and frustration arise from status comparison and the second that it is due to the development of a weak social capital [28]. In the present paper we focus on the role of specific types of social capital on health outcomes. Some scholars argue that individuals who experience long-term deterioration in their living and working conditions are more likely to feel marginalized and socially deprived; hence, they are more susceptible to distrustful attitudes towards society and more likely to turn away from civic life, which lead to reductions in social capital and ultimately to negative health outcomes [26, 28]. However, other scholars propose that the lack of social capital can have adverse effects on health irrespective of whether individuals are under stress due to their material disadvantage [29]. Specifically, the lack of intense social networks, social support and interpersonal trust are likely to negatively affect individuals' emotional and cognitive status (such as low self-confidence, low self-esteem, etc.), which in turn might lead to health problems [30]. Drawing on the aforementioned literature, we can claim that individual social capital –which refers to individuals' features within a society in contrast to the collective social capital, which represents a feature of social structures [31], might have a direct effect on health outcomes or an indirect effect linking different stressors of material deprivation to illness [29].

Research examining the association between social capital and health involves its different forms including bonding, bridging and linking social capital [32–34]. Bonding social capital primarily

refers to close relationships and frequent interactions including relatives and friends indicating strong ties based on a shared social identity [35]. Bridging social capital involves strong ties between groups of individuals who are more loosely related and have a distinct social identity such as neighbours, colleagues, etc. Linking social capital refers to relationships between individuals across authority gradients, such as the hierarchical relationship between citizens and the state or between employees and employers [35]. It should be noted that the bonding social capital, primarily involving informal social interactions with family members and friends, enhances thick trust whereas the bridging social capital, which involves social relations encompassing individuals across diverse social cleavages, gives rise to generalised trust or thin trust [35, 36]. An additional distinction involves the cognitive and structural dimension of social capital [32]. The latter refers to behaviours and specifically to the intensity of individuals' participation in social networks, associations and other forms of social activity; whereas the cognitive component primarily involves perceptions of reciprocity and interpersonal trust. Numerous studies provide empirical support on the association between different forms of individual social capital and positive health outcomes. For instance, past research reports that both formal and informal social interactions, social support and high levels of interpersonal trust are beneficial for population health [30, 39–42]. It should be noted that although the majority of scholars, as well as the approach of the present paper, assume a positive association between social capital and health outcomes, others suggest that social capital under specific circumstances might have negative impacts on health [37]. For instance, social capital, in some instances, may promote violence [35] and other negative behaviours [38], which can have adverse health consequences.



Although the material and psychosocial approaches to health inequalities provide some important individual level explanations, contextual level factors, such as the welfare state regime and the economic conditions, might be also decisive as they are likely to mediate the individual determinants of health outcomes across different countries. For instance, comparative research shows that population health is generally better in wealthy countries with universal welfare provisions [43–46]. Egalitarian welfare policies, usually met in countries belonging to the social democratic regime, provide generous social transfers and entitlements (such as sickness and disability benefits, unemployment benefits, housing-related benefits, etc.), social services and specifically healthcare services, which are more likely to mediate the relation between socio-economic position and health status [47]. Under such framework, differences in welfare regimes may play a decisive role in health inequalities during both prosperous and recessionary times. With respect to the latter, Kunst et al [3] argue that ‘... Nordic welfare states may have been able to moderate, at least in the short term, the adverse effects that economic crises could have had on the general health of disadvantaged sections of the population’.

The countries participating in the present study belong to different welfare state regimes with distinct features; Greece belongs to the Southern European (or Mediterranean), Sweden to the social democratic (or Scandinavian) regime and Poland to the post-socialist one (or Eastern European) [48-50]. The Southern European regime is distinguished by the crucial role of family support systems and close networks and it is generally characterised by low levels of social expenditure, poorly developed labour market policies and overall limited efficiency in overcoming socio-economic inequalities [49]. Although there are some important variations between post-socialist countries [51], in the post-socialist regime benefits of social security are

limited forcing citizens to rely primarily on family or market mechanisms for support [50]. Compared to the Southern European and post-socialist regime, in the social democratic regime inequality and poverty are low [52]. The specific regime is characterised by the highest levels of social security and universal social benefits. The state promotes social equality through a redistributive social security system providing generous provisions through high social expenditure that may guarantee economic resources independently of family or market reliance [48].

Furthermore, Sweden, Greece and Poland are differentiated with respect to their prevailing economic conditions specifically in the context of the recent (2008) economic crisis. In Europe, the severity of the economic crisis was the hardest in Greece, moderate in Sweden and severe in Poland [53, 54]. The austerity measures implemented in Greece were much stricter than other European Union countries, including among others, severe cuts in healthcare expenditures, which inevitably affected citizens' access to health care services, whereas moderate changes were reported in the other two countries [55]. During hard economic times, on the one hand the reduced government spending negatively affects the quality and quantity of health services and on the other hand the reduced incomes eliminate citizens' ability to utilize private health services, leaving populations especially vulnerable to such disadvantages. Specifically, in countries with less generous welfare provisions such as those included in the Southern European and post-socialist regimes, citizens are left unprotected to cope with the crisis; on the contrary countries with universal welfare provisions may lessen crisis' adverse outcomes [56, 57].

The aforementioned differences across the three countries under study are likely to mediate the individual determinants of health outcomes. The relatively poor welfare provisions and the

deterioration in economic conditions in Greece and Poland might play a more decisive role in shaping the relationship between individuals' socio-economic status and living conditions and health. Conversely, in wealthy countries with egalitarian welfare policies, such as Sweden, disadvantaged individuals might enjoy relatively better material circumstances. Moreover, some scholars argue that specifically in contexts emphasizing egalitarianism and equal opportunities for economic prosperity, such as those belonging to the social democratic regime, individuals experience higher levels of social capital than individuals in countries belonging to the Southern European and post-socialist regime [31, 58, 59]. As individual social capital might have a direct effect on health [29], we claim that in countries included in the social democratic regime individuals' lack of social capital might be more decisive for negative health outcomes [31].

Furthermore, the impacts of different types of social capital on health population are likely to vary between countries belonging to different welfare regimes [31]. Southern European and post-socialist regimes primarily entail dependence from relatives and friends; therefore, vulnerable individuals residing in such regimes are forced to rely on family and friend support systems in situations of personal crisis. Under such framework, socio-economically deprived individuals' lack of strong ties embedded in these social networks, signifying a loose bonding social capital might be relatively more important in shaping adverse health outcomes in these specific regime types.

On the other hand, the social democratic regime provides opportunities for individual independence and minimizes the dependence from family and friends [60]. Disadvantaged individuals are more likely to rely on the state, as the main provider of welfare provision, for support rather than their immediate social networks. When individuals feel confidence that the

state will take the responsibility for caring those in need, then social trust is more likely to be built. Different scholars support that social trust is generally higher in the social democratic regime than in the Southern European and the post-socialist regimes [50, 59]. Under such framework, individuals' lack of social trust, signifying a low bridging social capital might be relatively more important in shaping negative health outcomes in countries belonging to the social democratic regime.

### ***Study objectives***

Drawing on the aforementioned theoretical approaches and the empirical evidence discussed the following hypotheses are examined:

Hypothesis 1: Material explanations (associated with low socio-economic status and adverse living conditions) will be more strongly related to poor self-rated health in Greece and Poland than in Sweden.

Hypothesis 2: Lack of social capital (both bonding and bridging social capital) will be more strongly related to poor self-rated health in Sweden than in Greece and Poland.

Hypothesis 3: Deprived individuals' lack of bonding social capital will be more strongly associated with poor self-rated health in Greece and Poland than in Sweden.

Hypothesis 4: Deprived individuals' lack of bridging social capital will be more strongly related to poor self-rated health in Sweden than in Greece and Poland.

## **METHODS**

### ***Study sampling and design***

The paper uses data from an original cross-national survey fielded in 2015 and conducted across nine European countries in the context of the EU-funded LIVEWHAT (Living with Hard Times: How Citizens React to Economic Crises and Their Social and Political Consequences) project (more information can be found at: <http://www.unige.ch/livewhat/>). The survey was conducted by the specialized polling institute YouGov and robust methodological standards (such as similar sampling techniques and target response rates) were applied to ensure comparability of data across countries [61]. Random samples were generated through screening procedures and in order to be suitable for statistically representative analyses, each national sample contained a minimum of 2,000 respondents, which was the sample size within the efficient zone in terms of confidence interval (sampling error). As an Internet Panel, the survey in each country included weights based on gender, age, region as well as education quotas designed to reflect the national profile of all adults aged 18+ (including people without internet access). For the rationale of the present paper the Swedish ( $n = 2,018$ ), Greek ( $n = 2,048$ ) and Polish ( $n = 2,024$ ) samples are used, which are quota balanced in order to match national population statistics and are considered representative samples of the general populations in the three countries under study [61].

### ***Instruments and variables***

The data collection was done through the CAWI (Computer Assisted Web Interviewing) method with online accessible questionnaires and data storage (using PHPSurveyor). The questionnaire

was pretested and translated in the national languages of the countries included in the project. Translation protocols were applied to ensure equivalent translations in all the languages [61].

In order to examine the hypotheses presented in the previous section specific variables were used. Self-rated health was measured with a question asking respondents to assess their health on a scale from 0 ('Extremely poor health') to 10 ('Extremely good health'). It should be noted that as responses to self-rated health in the three countries under study were highly skewed toward 'good health', linear regressions could not be performed. Similarly, the skew toward responses of 'good health' left few cases in the lowest response categories that could allow analysis as an ordinal variable. In order to accommodate the aforementioned limitations, the original response categories were dichotomised measuring 'poor' (from 1 to 5) and 'good' (from 6 to 10) self-rated health. Similarly to the present study, previous research dichotomized the initial scale of self-rated health in order to address the skew toward responses of 'good health' [31, 46, 62, 63]. Moreover, past research shows that self-rated health is a valid and reliable indicator of individuals' general health and well-being [64], which has been widely used in relevant cross-national research [65].

Several studies show that specific demographic characteristics, such as age, gender, ethnic status, marital status and area of residence (urban/rural) are important determinants for health [66-70]; therefore, they were used in the analysis. The original continuous age variable was categorized including the age groups of 18-36, 37-55 and over 55 years old. Respondents' citizenship was measured as a dichotomous variable including those with national or foreign citizenship. Respondents' marital status was assessed with three responses including: a) Being married or in civil partnership, b) never being married or never being in civil partnership; and c) being

separated or divorced or widowed. Respondents' place of residence was measured with a recoded variable including individuals living in a big city (urban area), town or small city (semi-urban), and a country village or a farm (rural area).

With respect to the indicators measuring socio-economic status, educational attainment and income variables were used in the analysis. The former was assessed with three responses including individuals with higher (university and above), intermediate (upper secondary and post-secondary non-tertiary education), and lower education (less than lower secondary education). Income was measured with a question asking respondents for their household monthly net income, after tax and compulsory deductions, from all sources on a scale from 1 to 10 with higher values indicating higher income. The recoded variable had three responses; the first included the first three values measuring low income, the second (values from 4 to 6) assessed middle income and the last (values from 7 to 10) high income. Respondents' socio-economic living conditions were assessed with two variables measuring deprivation and denial to access to social benefits/services which have been used in previous research [71, 72]. The first indicator assessed deprivation by asking respondents whether they had real financial difficulties in the last year (for instance, they could not afford food, rent, and electricity expenses, etc) and the second measured whether respondents have been denied access to public social benefits/services that they think they should receive. The specific indicators capture potential impacts on respondents' socio-economic living conditions associated with the recent economic crisis and the implemented austerity measures related to severe cuts in welfare provision services and benefits. Finally, two indicators that measure bonding and bridging social capital were used in the analysis, which have been commonly used in relevant research [31]. The former, which involves

the structural dimension of social capital [32], derived from a question asking respondents how often they have met with friends during the past month, including four responses which were dichotomised into ‘Almost every day or every week’ (indicating frequent social interactions, i.e., high bonding social capital) and ‘Once or twice this month or less than once per month’ (indicating infrequent social interactions, i.e., low bonding capital). Bridging social capital, which involves the cognitive dimension of social capital, was measured with an item assessing on a scale from 0 to 10 respondents’ level of trustfulness to people with higher scores indicating higher levels of inter-personal trust. The variable was recoded into a dichotomous one including low (from 1 to 5) and high (from 6 to 10) social trust, which indicate low and high bridging social capital, respectively.

### ***Statistical analysis***

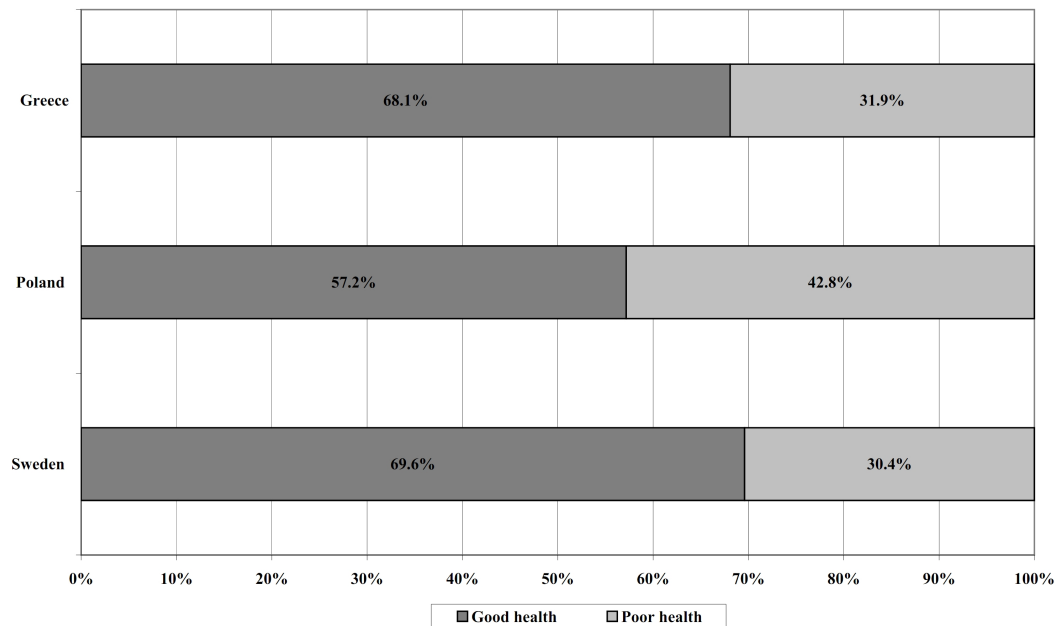
The Chi-Square Test of Independence and the binary logistic regression analysis were used to investigate health inequalities in Sweden, Greece and Poland. The first one was used to examine potential differences in specific demographic traits, in socio-economic status (educational attainment and income) and living conditions (deprivation and denial to social benefits/services) as well as in bonding (interactions with friends) and bridging (social trust) social capital between individuals reporting having poor health in Sweden, Greece and Poland. Binary logistic regressions were used to predict poor self-rated health in the three countries under study based on the variables previously described. In order to examine the hypotheses presented in the previous section, the variables were entered into four blocks; the first included variables associated with demographics, the second with socio-economic status and living conditions, the third with bonding and bridging social capital and the fourth block included the interaction terms



of deprivation and the social capital indicators under study. Data analysis was performed by SPSS software (version 25). The significance threshold was set at  $\alpha = 0.05$ .

## RESULTS

Figure 1 shows that the highest prevalence of poor self-rated health was reported in Poland (42.8%), whereas the lowest prevalence rate was in Sweden (30.4%) followed by Greece (31.9%).



**Figure 1.** Self-rated health (%) in Sweden, Greece and Poland (LIVEMWHAT, 2015).

Table 1 presents the results from the Chi-Square Test of Independence indicating statistically significant associations between respondents reporting having poor health across the three countries with respect to their demographic characteristics (except from gender), such as age-group ( $\chi^2(4) = 40.76, P < .05$ ), citizenship ( $\chi^2(2) = 28.25, P < .05$ ), marital status ( $\chi^2(4) = 58.13, P < .05$ ) and place of residence ( $\chi^2(4) = 111.21, P < .05$ ), their socio-economic status such as educational attainment ( $\chi^2(4) = 232.78, P < .05$ ) and income ( $\chi^2(4) = 202.64, P < .05$ ), their socio-economic living conditions such as deprivation ( $\chi^2(2) = 385.52, P < .05$ ) and social benefits denial ( $\chi^2(2) = 174.74, P < .05$ ) as well as their social trusts (i.e., bridging social capital) ( $\chi^2(2) = 62.97, P < .05$ ). Specifically, among younger respondents (i.e., 18-36 years old) poor self-rated health was more widespread in Sweden (32.1%), among middle-aged ones in Greece (42.8%) and among older age-groups in Poland (44.2%). Polish citizens (99.9%) and individuals with foreign citizenship in Greece (3.9%) were more likely to report poor health than citizens or foreign citizens in the other countries. Additionally, Swedish respondents who had never been married or in civil partnership (23.9%), Greek respondents who were separated or divorced or widowed (21.5%) and married Polish individuals (71.3%) were more likely to report poor health than their counterparts in the other countries. The prevalence of poor self-rated health was higher among individuals residing in semi-urban and rural areas in Sweden and Poland and in urban areas in Greece.

**Table 1.** Chi-Square analysis of individuals reporting poor health in Sweden ( $n = 595$ ), Poland ( $n = 847$ ) and Greece ( $n = 647$ ).

	Sweden	Poland	Greece	<i>Chi-Square test</i>	<i>P</i>
	% (n)	% (n)	% (n)		
<b>Demographic characteristics</b>					
<b>Gender</b>				.375	0.829
Male	48.1(286)	49.2 (417)	49.8 (322)		
Female	51.9 (309)	50.8 (430)	50.2 (325)		
<b>Age-groups</b>				40.76	0.000
18-36 years old	32.1 (191)	22.8 (193)	24.6 (159)		
37-55 years old	35.6 (212)	33.1 (280)	42.8 (277)		
Over 55 years old	32.3 (192)	44.2 (374)	32.6 (211)		
<b>Citizenship</b>				28.25	0.000
National citizenship	97.6 (581)	99.9 (846)	96.1 (622)		
Foreign citizenship	2.4 (14)	0.1 (1)	3.9 (25)		
<b>Marital status</b>				58.13	0.000
Never married/civil partnership	23.9 (142)	12.0 (102)	22.6 (146)		
Separated/divorced/widowed	20.3 (121)	16.6 (141)	21.5 (139)		
Married/civil partnership	55.8 (332)	71.3 (604)	56.0 (362)		
<b>Place of residence</b>				111.21	0.000
Urban	46.4 (276)	46.2 (392)	69.1 (448)		
Semi-urban	37.5 (223)	37.6 (319)	16.0 (104)		
Rural	16.1 (96)	16.2 (137)	14.8 (96)		
<b>Socio-economic status and living conditions</b>					
<b>Educational attainment</b>				232.78	0.000
Low	26.4 (157)	14.4 (122)	46.8 (303)		
Medium	47.6 (283)	68.0 (576)	35.0 (227)		
High	26.1 (155)	17.6 (149)	18.2 (118)		
<b>Income</b>				202.64	0.000
Low	36.0 (180)	30.3 (226)	61.0 (363)		
Medium	24.4 (122)	38.3 (285)	29.4 (175)		
High	39.6 (198)	31.4 (234)	9.6 (57)		

<b>Social benefits/services</b>				174.74	0.000
Access	94.3 (517)	85.5 (650)	64.4 (342)		
Denial	5.7 (31)	14.5 (110)	35.6 (189)		
<b>Deprivation</b>				385.52	0.000
Yes	19.2 (114)	49.9 (423)	74.8 (485)		
No	80.8 (481)	50.1 (425)	25.2 (163)		
<b>Bridging and bonding social capital</b>					
<b>Social trust</b>				62.97	0.000
Low social trust	43.1 (250)	61.3 (506)	63.5 (410)		
High social trust	56.9 (330)	38.7 (319)	36.5 (236)		
<b>Interactions with friends</b>				4.42	0.109
Infrequent	54.5 (324)	59.8 (507)	59.0 (382)		
Frequent	45.5 (271)	40.2 (341)	41.0 (266)		

Notes: Data weighted

With respect to the indicators of socio-economic status, Table 1 shows that poor self-rated health is more prevalent among lower educated (46.8%) and lower income individuals (61.0%) in Greece than their counterparts in the other two countries. Moreover, middle-educated (68.0%) and middle-income individuals (38.3%) in Poland and high-educated (26.1%) and high-income individuals in Sweden (39.6%) are more likely to report poor health than their Greek counterparts. Additionally, poor self-rated health is more widespread among individuals who have been denied access to social services/benefits (35.6%) and were deprived (74.8%) in Greece than their counterparts in Sweden and Poland. With respect to the indicators measuring social capital, poor self-rated health is more prevalent among individuals reporting low social trust in Greece (63.5%) and high social trust in Sweden (56.9%), whereas non-significant differences are reported for the indicator measuring interactions with friends (i.e., bonding social capital) in the three countries under study.

Table 2, Table 3 and Table 4 present the binary logistic regression analysis for the Swedish, Greek and Polish datasets, respectively. The first model including specific demographic attributes indicates that in Sweden poor self-rated health is more likely to take place among separated/divorced/widowed individuals than married ones, in Greece among foreign citizens than Greek ones and in Poland for age groups over 37 years old than younger ones (i.e., 18-36 years old) as well as for individuals residing in semi-urban areas than urban ones. The Hosmer-Lemeshow (H-L) statistic of the binary logistic regressions in the three countries was not significant ( $P > .05$ ) indicating that all the models were quite a good fit.

In the second model adding the indicators associated with socio-economic status and living conditions, the analysis shows that the probability of reporting poor health in Sweden increases for individuals of low educational attainment (i.e., less than secondary education) than high educated ones, for low income earners than high income ones, and for those who had been denied access to social benefits/services as well as experience deprivation (Table 2). Similar findings are reported in the binary logistic regressions for the Greek (Table 3) and Polish datasets (Table 4); however, income and educational attainment do not significantly contribute in predicting poor self-rated health in Greece and Poland, respectively. It should be noted that the Hosmer-Lemeshow (H-L) statistic of the binary logistic regressions in the three countries was not significant ( $P > .05$ ) and, therefore, all the models were fit to the data well.

In the third model adding the social capital indicators, the analysis shows that the probability of reporting having poor health in Sweden increases for those lacking social trust (i.e., low bridging social capital) and with infrequent interactions with friends (i.e., low bonding social capital), whereas the indicator measuring denial of social services/benefits becomes non-significant

(Table 2). Lack of social trust increases the probability of reporting poor health in both Greece (Table 3) and Poland (Table 4), whereas non-significant associations are reported for interactions with friends. It should be noted that in both models the effects of specific indicators measuring socio-economic status and living conditions remain significant as in the previous model. The Hosmer-Lemeshow (H-L) statistic was not significant ( $P > .05$ ) in the Swedish and Polish binary logistic regressions and significant ( $P < .05$ ) in the Greek one, indicating that the Swedish and Polish models were fit to the data well but the Greek one was not.

In the last model the interaction term of deprivation and the social capital indicators under study do not significantly contribute in predicting poor self-rated health in Sweden. The effects of social trust and interactions with friends as well as of the socio-economic status indicators (i.e., income and educational attainment) remain significant; however, both indicators of socio-economic living conditions (i.e., deprivation and denial to social benefits) become non-significant (Table 2). Similarly, in both the Greek and Polish binary logistic regression models, the interaction terms of deprivation and social capital indicators do not significantly contribute to the model, whereas the reported effects of the socio-economic indicators and the indicator of interactions with friends remain significant as in the previous model (Table 3 and Table 4). It should be noted that the Hosmer-Lemeshow (H-L) statistic of the binary logistic regressions in the three countries was not significant ( $P > .05$ ) indicating that all the models were fit to the data well.



Semi-urban	0.21	0.09	1.23	0.97	1.57	0.16	0.21	1.17	0.91	1.51	0.15	0.26	1.16	0.90	1.49	0.15	0.24	1.16	0.90	1.50
Rural	0.12	0.45	1.13	0.82	1.55	0.09	0.60	1.09	0.79	1.51	0.06	0.70	1.07	0.77	1.48	0.06	0.72	1.06	0.76	1.48
<b>Educational attainment (Ref. High)</b>																				
Intermediate						0.25	0.09	1.28	0.96	1.70	0.20	0.17	1.22	0.92	1.62	0.21	0.15	1.23	0.93	1.64
Low						0.48	0.00***	1.62	1.18	2.22	0.40	0.01**	1.50	1.09	2.07	0.41	0.01**	1.51	1.09	2.08
<b>Income level (Ref. High)</b>																				
Medium						0.27	0.08	1.30	0.97	1.76	0.25	0.10	1.29	0.95	1.74	0.25	0.10	1.29	0.95	1.74
Low						0.76	0.00***	2.14	1.53	2.98	0.75	0.00***	2.12	1.51	2.97	0.76	0.00***	2.13	1.52	2.98
<b>Denial for social benefits (Ref.No)</b>						0.63	0.05*	1.88	1.45	3.06	0.57	0.08	1.76	1.35	2.87	0.57	0.08	1.76	1.35	2.88
<b>Deprivation (Ref.No)</b>						0.75	0.00***	2.11	1.01	3.50	0.68	0.00***	1.97	0.94	3.28	0.17	0.61	1.19	0.94	3.32
<b>Low social trust (Ref. High social trust)</b>											0.34	0.01**	1.40	1.11	1.78	0.27	0.04*	1.31	1.02	1.70
<b>Infrequent interactions (Ref. Frequent interactions)</b>											0.59	0.00***	1.80	1.43	2.27	0.54	0.00***	1.72	1.34	2.19
<b>Deprivation * Low social trust</b>															0.58	0.12	1.78	0.86	3.67	
<b>Deprivation * Infrequent interactions</b>															0.46	0.21	1.58	0.77	3.25	
<b>Nagelkerke R<sup>2</sup></b>	0.02					0.08					0.11				0.11					



<b>Hosmer-Lemeshow (H-L) statistic</b>	$\chi^2 = 6.29, P=0.61$	$\chi^2 = 4.87, P=0.77$	$\chi^2 = 9.21, P=0.33$	$\chi^2 = 13.72, P=0.09$
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Notes: CI = Confidence Interval, OR = Odds Ratio, \*\*\* P < 0.001; \*\* P < 0.01; \* P < 0.05, Data weighted

**Table 3.** Binary logistic regression analysis for predicting poor self-rated health in Greece (n = 1,572).

Variable	Model 1					Model 2					Model 3					Model 4				
	$\beta$	P	OR	95% CI for OR		$\beta$	P	OR	95% CI for OR		$\beta$	P	OR	95% CI for OR		$\beta$	P	OR	95% CI for OR	
				Lower	Upper				Lower	Upper				Lower	Upper				Lower	Upper
<b>Constant</b>	-1.09	0.00**	0.34			-1.83	0.00**	0.16			-1.98	0.00**	0.14			-2.23	0.00**	0.11		
<b>Gender (Ref. Female)</b>																				
Male	0.08	0.50	1.08	0.86	1.35	-0.01	0.92	0.99	0.78	1.25	0.02	0.89	1.02	0.80	1.28	0.01	0.92	1.01	0.80	1.28
<b>Age-groups (Ref. 18-36 years old)</b>																				
37-55	0.28	0.07	1.32	0.98	1.79	0.31	0.05*	1.37	1.00	1.86	0.26	0.10	1.30	0.95	1.77	0.26	0.10	1.30	0.95	1.77
Over 55	0.18	0.27	1.20	0.87	1.67	0.30	0.08	1.35	0.96	1.91	0.29	0.10	1.33	0.95	1.88	0.29	0.10	1.33	0.95	1.89
<b>Citizenship (Ref. Greek)</b>																				
Foreign citizenship	1.30	0.00**	3.69	1.89	7.20	1.08	0.00**	2.93	1.47	5.84	1.09	0.00**	2.98	1.48	6.01	1.07	0.00**	2.92	1.44	5.92
<b>Marital status (Ref. Married/civil partnership)</b>																				
Never married/civil partnership	-0.03	0.82	0.97	0.72	1.30	0.03	0.85	1.03	0.76	1.39	0.05	0.77	1.05	0.77	1.42	0.06	0.72	1.06	0.78	1.43
Separated/divorced/widowed	0.27	0.06	1.31	0.99	1.73	0.13	0.37	1.14	0.85	1.53	0.13	0.38	1.14	0.85	1.53	0.13	0.37	1.14	0.85	1.53

<b>Area of residence (Ref.Urban)</b>																				
Semi-urban	-0.05	0.75	0.95	0.71	1.28	-0.18	0.26	0.84	0.62	1.14	-0.19	0.23	0.83	0.61	1.13	-0.18	0.24	0.83	0.61	1.13
Rural	-0.03	0.88	0.97	0.69	1.38	-0.11	0.53	0.89	0.62	1.28	-0.10	0.58	0.90	0.63	1.30	-0.10	0.57	0.90	0.63	1.29
<b>Education attainment (Ref.High)</b>																				
Intermediate						0.03	0.84	1.03	0.76	1.41	0.02	0.92	1.02	0.74	1.39	-0.01	0.96	0.99	0.72	1.36
Low						0.63	0.00** *	1.88	1.37	2.58	0.62	0.00** *	1.86	1.35	2.56	0.60	0.00** *	1.83	1.33	2.51
<b>Income level (Ref.High)</b>																				
Medium						-0.06	0.76	0.94	0.64	1.38	-0.12	0.54	0.89	0.60	1.31	-0.10	0.61	0.90	0.61	1.33
Low						0.02	0.93	1.02	0.69	1.50	-0.02	0.91	0.98	0.66	1.45	-0.01	0.95	0.99	0.67	1.46
<b>Denial for social benefits (Ref.No)</b>						0.43	0.00** *	1.53	1.44	2.39	0.38	0.00** *	1.46	1.43	2.37	0.38	0.00** *	1.46	1.64	4.35
<b>Deprivation (Ref.No)</b>						0.62	0.00** *	1.86	1.20	1.97	0.61	0.00** *	1.84	1.13	1.88	0.98	0.00** *	2.67	1.14	1.89
<b>Low social trust (Ref. High social trust)</b>											0.07	0.59	1.07	0.84	1.36	0.36	0.09	1.44	0.94	2.20
<b>Infrequent interactions (Ref. Frequent interactions)</b>											0.35	0.00** *	1.42	1.13	1.78	0.49	0.02**	1.62	1.08	2.45
<b>Deprivation * Low social trust</b>																-0.43	0.09	0.65	0.39	1.08
<b>Deprivation * Infrequent interactions</b>																-0.20	0.43	0.82	0.50	1.34
<b>Nagelkerke R<sup>2</sup></b>	0.02					0.09					0.10					0.10				

<b>Hosmer-Lemeshow (H-L) statistic</b>	$\chi^2 = 10.86, P = 0.21$	$\chi^2 = 9.5, P = 0.34$	$\chi^2 = 22.71, P = 0.00$	$\chi^2 = 13.85, P = 0.09$
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Notes: CI = Confidence Interval, OR = Odds Ratio, \*\*\* P < 0.001; \*\* P < 0.01; \* P < 0.05, Data weighted

**Table 4.** Binary logistic regression analysis for predicting poor self-rated health in Poland ( $n = 1,531$ ).

Variable	Model 1					Model 2					Model 3					Model 4				
	$\beta$	P	OR	95% CI for OR		$\beta$	P	OR	95% CI for OR		$\beta$	P	OR	95% CI for OR		$\beta$	P	OR	95% CI for OR	
			Lower	Upper				Lower	Upper				Lower	Upper				Lower	Upper	
<b>Constant</b>	-1.22	0.00**	0.29			-1.90	0.00**	0.15			-2.10	0.00**	0.12			-2.13	0.00**	0.12		
<b>Gender (Ref. Female)</b>																				
Male	-0.04	0.71	0.96	0.77	1.19	0.00	0.99	1.00	0.80	1.25	0.02	0.87	1.02	0.81	1.28	0.02	0.88	1.02	0.81	1.27
<b>Age-groups (Ref. 18-36 years old)</b>																				
37-55	0.68	0.00**	1.98	1.50	2.61	0.76	0.00**	2.15	1.60	2.88	0.74	0.00**	2.09	1.55	2.80	0.74	0.00**	2.09	1.56	2.80
Over 55	1.50	0.00**	4.50	3.35	6.03	1.59	0.00**	4.92	3.61	6.71	1.58	0.00**	4.85	3.55	6.63	1.58	0.00**	4.86	3.55	6.65
<b>Citizenship (Ref. Polish)</b>																				
Foreign citizenship	1.46	0.36	4.29	0.19	97.31	1.88	0.24	6.56	0.29	14.94	1.76	0.27	5.82	0.25	13.34	1.79	0.26	5.97	0.26	13.69
<b>Marital status (Ref. Married/civil partnership)</b>																				
Never married/civil partnership	0.22	0.19	1.25	0.89	1.74	0.09	0.61	1.10	0.77	1.56	0.11	0.54	1.12	0.78	1.59	0.11	0.55	1.11	0.78	1.59

Separated/ divorced/ widowed	0.2 3	0.1 5	1.2 6	0.9 2	1.7 3	0.0 3	0.8 5	1.0 3	0.7 4	1.4 4	0.0 3	0.8 7	1.0 3	0.7 4	1.4 4	0.0 3	0.8 7	1.0 3	0.7 4	1.4 4	
<b>Area of residence (Ref.Urban )</b>																					
Semi-urban	0.3 1	0.0 1* *	1.3 6	1.0 8	1.7 2	0.3 4	0.0 1** *	1.4 0	1.1 0	1.7 9	0.3 4	0.0 1** *	1.4 0	1.1 0	1.7 9	0.3 4	0.0 1** *	1.4 0	1.1 0	1.7 9	
Rural	0.1 6	0.3 2	1.1 7	0.8 6	1.6 0	0.1 0	0.5 4	1.1 1	0.8 0	1.5 2	0.1 1	0.5 0	1.1 2	0.8 1	1.5 4	0.1 1	0.5 0	1.1 2	0.8 1	1.5 4	
<b>Education I attainment (Ref. High)</b>																					
Intermediate						0.1 9	0.1 8	1.2 1	0.9 2	1.6 0	0.1 8	0.2 1	1.2 0	0.9 0	1.5 9	0.1 8	0.2 1	1.2 0	0.9 1	1.5 9	
Low						-0. 13	0.5 3	0.8 8	0.6 0	1.3 0	-0. 10	0.6 0	0.9 0	0.6 1	1.3 3	-0. 11	0.5 9	0.9 0	0.6 1	1.3 2	
<b>Income level (Ref.High)</b>																					
Medium						0.3 6	0.0 1** *	1.4 3	1.1 1	1.8 5	0.3 4	0.0 1** *	1.4 1	1.0 9	1.8 2	0.3 5	0.0 1** *	1.4 1	1.0 9	1.8 3	
Low						0.5 9	0.0 0** *	1.8 1	1.3 2	2.4 9	0.5 9	0.0 0** *	1.8 1	1.3 2	2.4 9	0.6 0	0.0 0** *	1.8 1	1.3 2	2.4 9	
<b>Denial for social benefits (Ref.No)</b>						0.8 9	0.0 0** *	2.4 3	1.2 0	1.9 3	0.8 8	0.0 0** *	2.4 0	1.1 8	1.8 9	0.8 7	0.0 0** *	2.4 0	1.0 6	2.4 9	
<b>Deprivation (Ref.No)</b>						0.4 2	0.0 0** *	1.5 2	1.6 7	3.5 2	0.4 0	0.0 0** *	1.4 9	1.6 5	3.5 0	0.4 9	0.0 3** *	1.6 2	1.6 5	3.4 9	
<b>Low social trust (Ref. High social trust)</b>											0.1 3	0.2 6	1.1 4	0.9 1	1.4 2	0.1 7	0.2 5	1.1 9	0.8 9	1.5 9	
<b>Infrequent interactions (Ref. Frequent interactions )</b>											0.2 7	0.0 2** *	1.3 2	1.0 5	1.6 4	0.2 9	0.0 5*	1.3 4	1.0 0	1.7 9	
<b>Deprivation * Low social trust</b>																	-0. 10	0.6 5	0.9 0	0.5 7	1.4 2
<b>Deprivation * Infrequent interactions</b>																	-0. 05	0.8 4	0.9 6	0.6 1	1.4 9
<b>Nagelkerke R<sup>2</sup></b>	0.1 1					0.1 8					0.1 8						0.1 8				

<b>Hosmer-Lemeshow (H-L) statistic</b>	$\chi^2 = 8.48, P=0.39$	$\chi^2 = 13.13, P=0.11$	$\chi^2 = 12.7, P=0.12$	$\chi^2 = 7.06, P=0.53$	
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Notes: CI = Confidence Interval, OR = Odds Ratio, \*\*\* P < 0.001; \*\* P < 0.01; \* P < 0.05, Data weighted

## DISCUSSION AND CONCLUSION

Although some studies have shown that during times of economic crisis, including the recent one [19] health inequalities increase [15, 16, 18], others suggest that the adverse impacts of recessions on health do not only depend on economic conditions but also on additional factors including the capacity of the welfare states to absorb economic shocks [10, 12, 21]. In line with such arguments some scholars argue that the interaction of recessionary conditions and weak social provisions was decisive in shaping negative health outcomes in Europe during the recent economic crisis [73].

Inspired from the complexities of understanding the potential interplay between welfare state, economic crisis and health, this paper, which is based on a materialist and a psychosocial theoretical approach primarily associated with a social capital perspective [24–29], explores individual determinants of health inequalities across three countries belonging to different welfare regimes, which have been differently affected from the recent recession. The descriptive analysis is in line with past research, showing that poor self-rated health is more prevalent in an Eastern European country such as Poland and least prevalent in a Nordic one such as Sweden [6, 46]. Moreover, the explorative analysis of the Chi-Square Test of Independence shows significant differences in specific demographic traits, in socioeconomic status (educational attainment and

income) and living conditions (deprivation and social benefits denial) as well as in bridging social capital between individuals reporting having poor health in Sweden, Greece and Poland.

The binary logistic regression models shed some light on specific individual traits associated with poor self-rated health in the three countries under study. The findings partly support the first hypothesis developed under the materialist theoretical approach. Specifically, after controlling for specific demographic characteristics, the probability of reporting having poor health increases for individuals with lower socio-economic status and adverse living conditions in the three countries under study. However, when adding the social capital indicators and the interaction terms the indicators of socio-economic living conditions (i.e., deprivation and denial to social benefits) become non-significant in the Swedish model. Such a preliminary evidence indicates that material explanations, primarily those associated with socio-economic living conditions might become less important in predicting poor self-rated health when taking into account individuals' bonding and bridging social capital in Sweden. On the other hand, material explanations related to socio-economic status and living conditions might be relatively more important in elucidating poor self-rated health in contexts with less generous welfare provisions (i.e., those belonging to the Southern European and post-socialist welfare regimes) and adverse economic conditions such as Greece and Poland. Moreover, the results providing some support to the second hypothesis with respect to the direct effects of social capital on health outcomes show that overall the lack of different forms of social capital (including both bonding and bridging social capital) is more strongly

related to poor self-rated health in Sweden than in the other two countries. In line with these findings, past research showed that psychosocial explanations might be relatively more important in explaining health inequalities in contexts with good living standards and rich economic conditions; whereas material explanations might be more decisive in contexts with poorer economic performance [74]. Moreover, studies incorporating the welfare state perspective have found that social trust as an indicator of social capital contributes most of the health inequalities by education in countries belonging to the social democratic regime rather than the Southern European and post-socialist regimes [31]. It is likely that in countries emphasizing egalitarianism and equal opportunities, such as those belonging to the social democratic regime individuals experience high levels of social capital; therefore, the lack of such ties might have more detrimental consequences on their health outcomes [31].

The third and fourth hypotheses of the study were not supported as the interaction effects of social capital and deprivation were non-significant in the binary logistic regression models in the three countries under study. Although some studies showed the interactions between social capital and socioeconomic inequalities in health [75], the present study did not confirm such an association.

### ***Strengths and limitations***

Research examining the individual level determinants of health inequalities is relatively rich; however, most of this research rarely explores the potential role of contextual level factors such as the welfare state and the economic conditions in mediating the individual level determinants of health outcomes across different countries. Despite the

potential merits of the study to contribute to the aforementioned field of research, there are some limitations that need to be addressed. Although self-rated health has been frequently used in cross-national research [65] and considered as a reliable indicator of overall health [64], there might be some important differences across different cultures in the way individuals perceive their personal health status and interpret relevant questions. Additional shortcomings are associated with the cross-sectional design of the study and the direction of the relation between social capital and health outcomes. Although most research supports the causal link from social capital to health, i.e. social capital enhances better health rather than inversely [32, 41], caution should be taken in interpreting results in any causal direction.

### ***Implications for research and policymakers***

As material explanations are likely to be more important in understanding health inequalities in Greece and Poland, policies that target to improve economic circumstances and tackle socio-economic inequalities (for instance, through tax and benefit changes which redistribute income) as well as aimed at increasing the government budget for social protection, and specifically for healthcare services, are likely to improve population health in the specific countries. Although further research is needed to understand the psychological experience of material disadvantage related to social capital on health outcomes, policies aimed at developing social-safety nets, providing adequate preconditions for civic involvement and promoting social trust could be beneficial to the health of general population and, more specifically, of disadvantaged individuals in society.



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