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Socio-economic differences in health, income inequality, unequal access to care and spending on health: A country-level comparison of Finland and 16 other European countries

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In all countries, there are differences in health between socio-economic groups. In Finland those health differences are comparatively large. Why there is such wide cross-national variation in relative health differences between socio-economic groups remains an unanswered question. One brand of explanations links health outcomes to income inequalities. The other brand of explanations emphasizes the role of health care systems and unequal access to health care. The latter explanation has dominated the Finnish debate, which is motivated by the fact that the OECD has classified the Finnish health care system as one of the most unequalizing in the industrial countries. A third set of explanations argues that health outcomes are related to the size of the health budget. In this article, we focus on socio-economic differences in self-assessed health. We ask how strongly socio-economic health differences are linked to income inequalities (H_1), how satisfactorily the characteristics of health care systems explain these differences (H_2), and what the relative role of the health budget is (H_3). The comparisons show that the socio-economic health differences among 17 European countries are more strongly associated to the health budget (H_3) than to the features of health care systems (H_2) or income inequality (H_1). However, these two explanations also get qualified support— but bigger seems to be better.

***Keywords**: Socio-economic differences in health, self-assessed health, health care systems, income inequality*

In all countries, health and ill-health are unequally distributed. Differences in health between socio-economic groups have been thoroughly reported. In some countries, health differences between socio-economic groups are large, while in others they are smaller. Finland is one of the countries that have the largest socio-economic differences in self-assessed health in the Organisation for Economic Co-operation and Development (OECD) hemisphere (OECD 2013) and especially in comparison with Western and Central European countries (Kunst et al. 2005). A similar pattern has been observed for socio-economic mortality differences (e.g., Mackenbach et al. 2003; 2008).

Health researchers have tried to find explanations for these differences both between and within countries. The explanations proposed have included biological, medical and behavioural factors, health care systems, inequality related to income distribution, and other factors linked to unequal life conditions. An influential number of these studies emphasize structural features of societies, "causes of causes". Michael Marmot's (2004) *Status Syndrome* and Richard Wilkinson's and Kate Pickett's (2010) *The Spirit Level* are perhaps the most well-known examples of how health is associated to wider social phenomena. Another set of explanations rotate around the characteristics of health care systems. The OECD has twice evaluated horizontal inequity of health care in a number of member states (van Doorslaer et al. 2004; OECD 2011b).

In this article, we evaluate the extent to which the explanatory models given for health differences apply to European data in a macro-level analysis. Thus, our focus is not on the immediate individual-level causes of health differences, such as differences in lifestyle or in individuals' material conditions, but rather on the macro-level determinants. Our first viewpoint relates to how strongly health differences are linked to more general social phenomena such as inequality in income distribution. Secondly, we explain how well the horizontal inequity measure of health care systems developed by the OECD predicts socio-economic health differences and their extent in various countries. Socio-economic status is measured by educational attainment and income – two factors often used to describe social stratification-related health outcomes in Finland and elsewhere (see e.g. Lahelma et al. 2009; Tarkiainen et al. 2012). Thirdly, we illuminate the linkage between the size of the health care budget and socio-economic health differences. Thus, in the hub of the analysis are income inequality, distributional effects of the health care system (OECD's horizontal inequity index, HII), and the health care system's volume effect (spending on health as a percentage of GDP).

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We start by discussing earlier research related to macro-level determinants of health. The discussion revolves around to what extent health and health differences can be explained by macro-level indicators such as income inequality and to what extent they can be explained by the characteristics of health care systems such as inequality in access to care and in spending on health care. After this background section, we briefly describe the data and methods we have used. The data section will be followed by an empirical analysis of socio-economic differences in self-assessed health. Thereafter follows a multivariate analysis of connections between system characteristics, health spending, and health outcomes. The results are summarized and discussed in the last section.

Are health differences based on social factors or on the health care system?

The association between health and social status is valid in all societies: the higher the status, the better the health (Blane et al. 1996; Marmot 1996; 2002; 2005; 2010). It even seems that this finding can be applied to hierarchically organized animal populations. Male baboons in Serengeti have blood counts reflecting the individual's social status, similar to those of British civil servants. The lower the status of an individual in an organization is, the more numerous are the health-harming constituents in that person's blood. The resemblance of primates in this respect seems to point to genetic explanation models and hypothetical models that are related to natural selection. The healthy and strong find themselves brought to the top by the selection process. There is some, but only some, truth in this explanation. It has been verified in experimental setups and long-term follow-ups that those who end up in weaker social positions get more disease symptoms than those who are more successful – even though there might be no differences in the start-up situations. The mechanism is associated with material conditions of the people in weaker positions, behavioural factors that are harmful to health, as well as with stress and other psychosomatic factors, which, in a gradual manner, weaken health permanently (Wilkinson 1996, 175-192; Lundberg et al. 2010).

References are often made to large income differences as having harmful health effects (e.g., Lynch et al. 2004; Ram 2005; Kawachi & Kennedy 2002; Dahl et al. 2006; Wilkinson & Pickett 2008, 2010; Babones 2008; Kondo et al. 2009; Fritzell et al. 2013). In their study of 168 articles about the connections between income differences and health published in high-ranking scientific journals, Wilkinson and Pickett (2006) got support to the income difference hypothesis. According to them, 80% of the country-specific comparisons clearly supported the hypothesis about the health-deteriorating effect of income differences (see also Lynch 2000; Navarro & Muntaner 2004; Scambler 2012). Also, the combined effects of ethnicity, religion, class status, gender and income have been highlighted (Graham 2009; Sen et al. 2009). However, the results are not unanimous. The income difference explanation does not seem to work in longitudinal analyses or regional studies in one country (Pop et al. 2013; Blomgren et al. 2004; Böckerman et al. 2007). The reason might be that the relationships between societal factors and health are multifaceted and causal loops long, as theorized by Lundberg and colleagues (2010).

One brand of explanations emphasizes the role of health care systems. Health care-based explanations have dominated the Finnish debate. The debate is motivated by the fact that the OECD (van Doorslaer et al. 2004; OECD 2012) has classified the Finnish health care system as one the most unequalizing in the industrial countries. In particular, inequalities in access to general practitioner and specialist consultations in Finland are among the highest in the OECD (Devaux & De Looper 2012; OECD 2012; OECD 2013). Furthermore, the Finnish system of outpatient health care is exceptional compared to many other countries: on the one hand, local municipalities are responsible for organizing health care, but on the other hand, this municipal 'public' health care is supplemented by occupational and private health care programs. The main reason behind the observed inequality in access to health care stems from the fact that while those without employment depend on municipal health care, the employed benefit from the other two care sectors. In principle, universal public services are available for all, either free of charge or with low co-payments, but they are not always easily accessible because of long waiting lists. For most employed persons, rapid and free access to primary health care is guaranteed through occupational health care that covers 89 % of employees (Työterveyslaitos 2012). In addition, those with higher income are able to utilize private care. In sum, while those with lowest resources and highest needs have difficulties in accessing health care, the better-offs have rapid access despite their needs. Inequalities in access to health care are claimed to explain the large health inequalities.

The problem with indices which try to evaluate equalizing effects of social policy systems is that they are difficult to construct. A more usual and handy way in comparative welfare state research has been to see how much money different countries invest in social security (Castles 2004). A general conclusion from these comparisons has been the bigger, the better, i.e., the higher the share of social spending in relation to GDP, the better the societal outcomes. As a rule, countries with high social spending levels display lower income inequality, poverty, and social exclusion than low-spending countries. These factors may be related to health outcomes, as argued by Wilkinson and Pickett (2010; see discussion above). Indeed, Fritzell and colleagues (2013) showed that social spending is negatively associated with poverty, and poverty, in turn, is positively associated with mortality rates. For these reasons, a look at the volume of health care expenditure is also warranted.

Interestingly enough, in many international studies on health differences, health care systems are dealt with surprisingly briefly and very little attention is paid to them (e.g., Bambra 2012). In his 250-page work *Unhealthy Societies*, Richard Wilkinson (1996) sacrifices only two pages for health care and states that neither medicine nor health care are in a key position when we try to understand health

differences (Verspohl 2012, 20). Wilkinson (1996, 66–67), in fact, compares health care to army doctors or medical corps, who, of course, can treat injuries inflicted by war but cannot prevent them. One has to hone into the causes and not merely into their consequences – which brings our discussion back to income inequalities, 'causes of causes'.

Many studies using both single country and comparative data have found that socio-economic differences in mortality are generally larger among men than among women (Mackenbach et al., 2008; Tarkiainen et al. 2012). Women and men diverge from each other also in terms of socio-economic differences in self-assessed health, but the differences between the two genders are much smaller and they may even be opposite to those in mortality: in some countries, the differences are larger among women than among men (Kunst et al. 2005; Mackenbach et al. 2008). Furthermore, the result depends on the socio-economic indicator: in the study by Kunst and colleagues (2005), the differences in self-assessed health by income level were generally larger among men than among women, while differences by education were generally larger among women. Because of these gender differences, separate analyses for men and women are warranted. Therefore, also the analyses in this paper are shown separately by gender.

Data and methods

On the basis of the three modes of explanation discussed in previous sections, i.e., income inequalities, inequity in access to health care, and spending volume, we have three working hypotheses for further comparative analyses:

- H_1 The more unequal the income distribution, the larger the socio-economic health differences.
- H_2 Socio-economic health differences are large in countries with unequal health care systems.
- H_3 The bigger the health budget, the smaller the health differences.

Measures of health status

In this study, data on population health originate from the European Social Survey (ESS) that has been carried out in two-year intervals since 2002 (for a closer description, see http://www.europeansocialsurvey.org). The latest year of observation is 2012. These micro-level data are used to calculate country-level estimates for socio-economic health differences, using the information on self-assessed health. As a rule, national samples in the ESS vary from around 1,500 to 2,000. In order to get more reliable estimates, we use the harmonized and pooled data the ESS provides for the five first ESS waves, i.e., surveys for 2002, 2004, 2006, 2008 and 2010 are merged. Included in the comparisons are only those 17 countries[1] for which the OECD horizontal inequity index is available and which are included in the ESS data. This selection yields 149,114 observations of Europeans aged 15 and over (no upper age limit). The data are weighted by the ESS design weight.

There are a number of previous studies assessing the general level of health in different countries using either self-assessed health or more 'objective' morbidity or mortality data (e.g., Eurostat 2010; Lopez et al. 1995; Mackenbach et al. 2008; Bambra 2012). Due to availability of data, self-assessed health is often used as a proxy for national health, and socio-economic health differences have been measured by comparing differences in self-assessed health in different income or educational groups between countries.

National differences in subjective estimation of health form a bigger problem if we aim to compare the average health of the residents in different countries. The problem diminishes considerably if we compare socio-economic health differences between countries and not average health statuses. Self-assessed health measures health differences better within than between countries (Manderbacka 1998). Thus, we can compare the socio-economic differences in self-assessed health more reliably between countries than the level of self-assessed health between countries.

Furthermore, in their classical study Idler and Benyamini (1997, 21) speak strongly in favour of self-assessed health status as a valid health indictor. They argue that "... self-rated health is an independent predictor of mortality in nearly all of the studies, despite the inclusion of numerous specific health status indicators and other relevant covariates known to predict mortality". Also the WHO recommends using self-assessed health for international comparisons (Bruin et al. 1996). We follow that 'subjective' track and instead of 'objective' health data (which are not available) rely on the respondent's own assessment of his or her health status. In the ESS, respondents evaluated their subjective general health on a five-graded scale ('very good', 'good', 'fair', 'bad', and 'very bad'). For our subsequent analyses we have reversed the scale and for logistic regressions we have dichotomized the variable (very good and good health = 0; other values = 1).

Indicators of socio-economic status

In order to analyze socio-economic differences we used four income groups (income quartiles) and four education groups. These two variables were used separately as two different markers of socio-economic status of the respondent. It goes without saying that they are strongly correlated and if included in the same regression models they could eat away each other's effects.

Income data in the ESS are not perfect. While in the three first rounds the respondents were asked to report their income on a 12 -category scale, since the 2008 ESS wave the income variable has included ten categories. In order to create a new income indicator with fewer bands we have separately created, for each individual country, four categories roughly equivalent to income quartiles in the respective countries.

The construction of educational attainment demanded some data manipulation as well. The question "What is your highest level of education?" was too nation-specific and yielded too many missing observations. Therefore, we used

[1] Austria, Belgium, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the U.K.

the question about years of education ("How many years of full-time education have you completed?") as a starting point. On the basis of the number of years in education, the respondents were divided into four categories as follows: the lowest level = less than 10 years; the second lowest level = 10–12 years; the second highest level = 13–15 and the highest level = more than 15 years of education. These educational attainment categories are used as proxies for the basic, lower secondary, higher secondary and the university levels of education, respectively.

Income inequality

For measuring income inequality, we use the Gini index (from the year 2008) as provided by Eurostat (2013).[2] The Gini index varies between zero and one. Value 0 means that there are no income differences at all: everyone has exactly the same income. Value 1 tells us that a single person gets all the income and others are left with nothing. Often the Gini index is multiplied by a hundred, as is the case in our analyses (for the relative positions of countries, see Figure 1).

Indicators of the health care system

Our study is inspired by the societal explanations discussed above and by various OECD reports on the relationship between income and health services (van Doorslaer et al. 2004; Wahlbeck et al. 2008; OECD 2011b). *The horizontal inequity index* (HII) – which we use in our study – is used to examine the extent to which the use of health services based on standardized needs differs among different income groups in various countries. For the index, measurements were made about how much the different income groups use general medical practitioners' and specialists' services, whereafter the use of services was related to the health status of the income group in question. A positive index value means that, in relation to their needs of health services, high-income earners use services more than people with low income. A negative value, on the other hand, means that the use of health services is distributed in favour of low income groups. Zero signifies that the services are equally distributed among the income groups, once the health care needs of the different groups have been controlled for. Needless to say, the HII has its problems (see OECD 2011b, 138), but the OECD index is the most serious undertaking to make some incommensurable things commensurable and comparable between different countries.

Data on health care spending are derived from the OECD's health statistics (OECD 2011a). We use health care spending (2008 data) in relation to GDP as an indicator of the national health care budget.

To begin with, Figure 1 gives a preliminary glance on the connections of health care expenditure and income inequality to the OECD inequity index. In both cases, linkages are negligible. The correlation between spending and the HII is -0.15. However, if we omit the outlying Hungary, the correlation coefficient becomes somewhat stronger (r = -.23). When it comes to overall income inequality, there is no connection at all (r = -.04). Health care systems in 'equal' Finland and Sweden are as regressive as in 'unequal' Portugal. Whereas the results are not very flattering for the two Nordic countries praised for their welfare states, the most equal – actually propoor – systems are found in Belgium, Ireland, the Netherlands, Spain, and Switzerland. To make a preliminary conclusion, there are no straightforward linkages between the distributional characteristics of the health care system and the spending volume or income inequality.

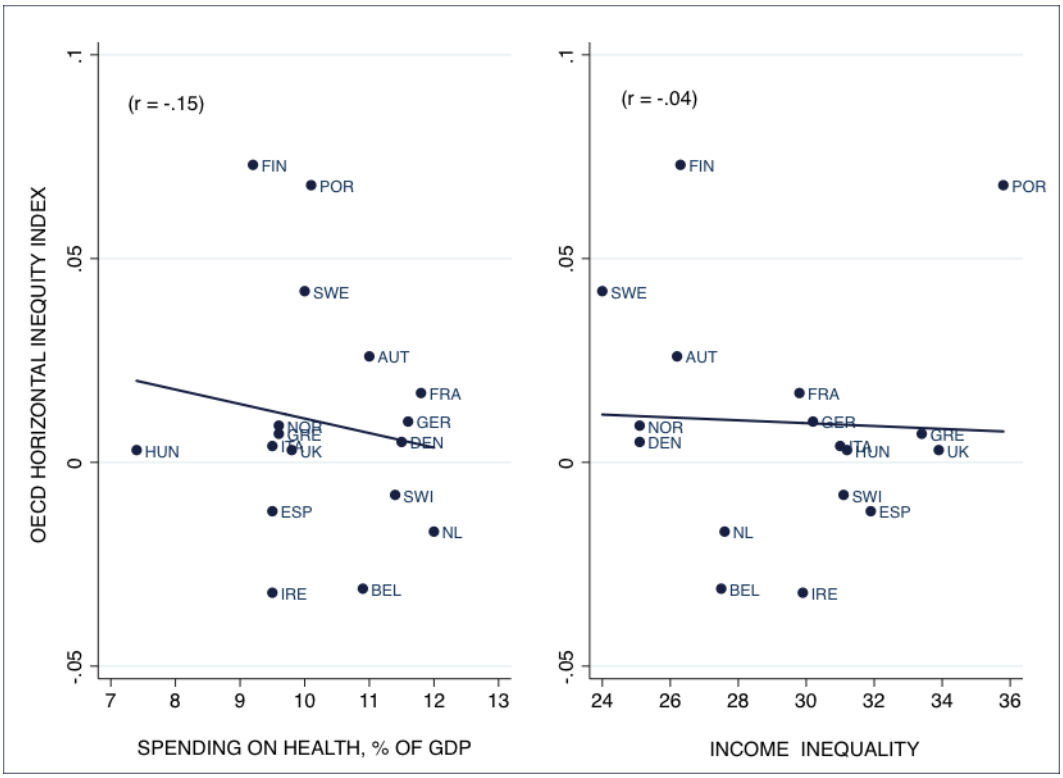
Methods

The following comparisons are based on easy-to-read scatter plots. Cross-tabulations given in Appendix Tables A1 and A2 show the proportion of persons having suboptimal health in different income quartiles and four educational attainment groups. The problem in such inspections is that cross-tabulations do not take into consideration differences in the composition of the populations, for example in the age structure. In more elaborate analyses (Table 1), we have standardized the effects of background variables by logistic regression that produce easy-to-interpret key figures (odds ratios) for socio-economic health differences when age is controlled for. This method resembles the relative index of inequality measure, used by, e.g., Mackenbach and colleagues (2008). Due to multicollinearity, we do not include income and education in the same regression models as explanatory variables, but give separate odds ratios for education and income. Since gender differences are significant (as seen in the Appendix), we also run separate analyses for males and females as displayed in Table 1.

As our hypothesis is that micro-level phenomena are related to the country-level, we were able to utilize a multilevel approach. We preliminarily ran a specification of a 'no predictor model' to see how much of the variance in socioeconomic health differences is due to countries. The preliminary test indicated that 8.4 % of the total variability in health differences lies between countries. However, to properly continue to carry out multilevel analyses, we should have a considerable number of higher-level units and a limited number of lower-level units (Rasbash et al. 2000; Goldstein 2003; Bryan & Jenkins 2013). In our case, the data situation is reversed: in the ESS we have close to 150,000 lower-level units (individuals) and only 17 higher-level units (countries). In their evaluation of the multi-level approach, Bryan and Jenkins (2013) conclude: "With large sample sizes of individuals within each country but a small number of countries, analysts can reliably estimate individual level effects within each country but estimates of parameters summarizing country effects are likely to be unreliable". Therefore, because the requirements for reliable multi-level analyses are not met, we mimic a method called the two-step strategy (Achen 2005). For the first step, we calculate micro-level parameters for each country through logistic regression models, as described above. For the second step, we correlate the country-level parameters (odds ratios for education

[2] The 'too' low Gini value for Hungary is corrected by data from World Bank (World Bank 2014).

Figure 1. Spending on health (% of GDP), income inequality (Gini) and the OECD Horizontal Inequity Index.



and income) separately with country-level indicators, i.e. income inequality, horizontal inequity index and health spending. The country-level parameters represent nation-specific factors not captured by the covariates included in the logistic regressions.

Socio-economic differences in self-assessed health

Appendix Tables A1 and A2 provide a starting point for evaluating socio-economic differences in self-assessed health. The problem with the numbers in the Appendix tables is that in those countries, where there is a tendency to assess the status of health as poor, the absolute differences in poor health (when measured in percentage points between population groups) also tend to be larger than in countries where the health status is estimated as good, on average. For example, while the difference between the lowest and the highest income quartiles of Finnish men is 26.5 percentage points, the corresponding difference is only 11.2 percentage points for Swiss men (Appendix Table A1). However, if we instead look at relative differences and take into consideration the levels by dividing the percentage of those with a low income by the percentage of those with a high income, the situation between these two countries looks different (Switzerland 21.7/10.5 = 2.1; Finland: 47.6/21.1 = 2.3).

In order to eliminate that kind of impact of levels that are sensitive to national response patterns, we run logistic regressions. Table 1 presents the odds ratios obtained. A simplified interpretation of the values goes as follows: Once age has been controlled for, the value 3.01 for the Finnish men in the lowest (= the first) income quartile indicates that the 'probability' (however, odds is not exactly the same as probability) of a man in the first income quartile to report poor health is three times higher compared with a man belonging to the highest quartile (4). Thus, values larger than 1 mean a higher probability to experience poor health in comparison with those in a higher position. In all countries age (not displayed in the table) was a statistically very significant covariate.

The verdict from the logistic regression analysis is broadly in line with the picture obtained on the basis of the distributional analysis. However, in some cases the story is more complex and coefficients for men and women may differ, as do coefficients for education and income. As a rule, socio-economic differences in self-assessed health in Finland are among the highest in the European hemisphere. The same goes for Hungary, Greece, and the UK (income only). Of the Nordic countries, Norway displays the smallest differences, with the exception of large differences between educational groups among women. Broadly in line with previous results obtained by Kunst and colleagues (2005), relative health differences seem to be generally larger among men than among women when socio-economic status is measured with income, but larger among women when it is measured with education. The result may be connected to differential selection into low-income and low-educated groups among men and women.

Table 1
Health experienced as poor or fair, according to gender, income quartile and educational attainment in Europe. Odds ratios of logistic regression for males (m) and females (f). Highest income quartile and educational group, respectively, are the reference groups.

	Income quartiles						Educational attainment					
	1. Lowest		2. Second lowest		3. Second highest		1. lowest		2. Second lowest		3. Second highest	
	m	f	m	f	m	f	m	f	m	f	m	f
Austria	2.37***	1.62**	2.05***	1.29	1.28	1.22	1.54**	2.70***	1.36*	1.51**	1.38*	1.34
Belgium	2.92***	2.60***	1.87***	1.96***	1.21	1.44**	2.12***	2.97***	1.87***	1.65***	1.21	1.31*
Denmark	3.23***	2.31***	2.13***	1.99***	1.80***	1.50**	2.08***	2.47***	1.88***	1.96***	1.32*	1.34***
Finland	**3.01*** **	**2.99*** **	**2.22*** **	**2.46*** **	**1.48*** **	**1.53*** **	**2.64*** **	**3.11*** **	**1.89*** **	**2.17*** **	**1.41** **	**1.65*** **
France	2.30***	2.52***	1.65***	2.00***	1.33	1.45**	1.81***	2.09***	1.33**	1.43***	.91	1.08
Germany	2.21***	2.27***	1.77***	1.77***	1.35***	1.18	2.02***	2.33***	1.56***	1.54***	1.24**	1.43***
Greece	3.48***	3.29***	2.12***	2.59***	1.47*	1.47*	2.99***	2.79***	1.51*	1.39	1.63	1.08
Hungary	3.09***	2.79***	1.52*	2.46***	1.48*	1.33*	3.13***	4.66***	2.31***	2.41***	1.83***	1.51***
Ireland	2.23***	1.77***	1.43*	1.27	.98	.93	2.60***	2.01***	1.67***	1.52**	1.10	.99
Italy	4.04***	1.79	2.74*	1.70	2.04	1.36	2.14*	1.34	1.17	1.30	1.29	.98
Netherlands	2.50***	2.49***	1.79***	1.66***	.94	1.33**	2.24***	1.74***	1.39**	1.39***	1.24*	1.24*
Norway	2.78***	2.53***	2.30***	2.21***	1.78***	2.01***	2.50***	3.17***	1.97***	2.27***	1.66***	1.51***
Portugal	3.01***	2.35***	1.76***	1.51***	1.22	.88	2.15***	2.30***	1.53**	1.26	1.20	1.72**
Spain	1.22	1.81***	1.12	1.45**	1.17	1.37*	1.27*	1.73***	1.05	1.09	1.07	1.17
Sweden	2.45***	2.79***	2.02***	2.16***	1.36*	1.58***	1.74**	2.46***	1.50***	1.78***	1.71***	1.38**
Switzerland	2.01***	2.40***	1.44*	1.36*	1.18	1.23	1.65***	2.38***	1.41*	1.80***	1.16	1.06
Switzerland	2.01***	2.40***	1.44*	1.36*	1.18	1.23	1.65***	2.38***	1.41*	1.80***	1.16	1.06
UK	3.05***	3.17***	2.10***	2.18***	1.71***	1.40**	2.31***	2.09***	2.07***	1.58***	1.28*	1.06

*Age (not shown in the table) is controlled for. The reference group is the highest income quartile and the highest educational level (university degree). Values (=1) for these two categories are not displayed. * p < 0.05; ** p < 0.01; *** p < 0.001.*

Macro-level factors and socio-economic health differences

Income inequality thesis. Our first research hypothesis H_1 states that the more unequal the income distribution is in a country, the more unequally health problems are distributed. The validity of this hypothesis is examined in Figure 2. Country-specific odds ratios from Table 1 are portrayed on the vertical axes (differences between income quartiles in the upper panels and differences between educational groups in the lower panels). Thus, vertical axes represent the "probability" of poor health in the lowest income group/educational category in relation to those in the highest group/category when age is controlled for. Separate plots are depicted for men and women. The horizontal axis displays income inequalities as measured by the Gini index in respective countries.

Figure 2 suggests that income inequality is positively associated with health differences, with the exception of education-related disparities among women. If we omit Spain and Italy in the upper left-hand panel, the correlation increases up to .39 giving qualified support to H_1. However, the omission of the outlying Hungary in the lower right-hand panel makes the negative correlation stronger (-.42).

Why is the association negative among women as regards education-related differences? The counterintuitive result may be related to the fact that health differences seem to be relatively large among women in the Nordic welfare states, despite their egalitarian policies and low levels of inequality, and small in some Mediterranean countries such as Spain and Italy, despite their high degree of inequality. The explanation for the difference in educational gradients may, at least partly, lie in the differential distribution of women's education: in the Nordic countries, women in the lowest educational categories may be strongly selected in terms of health status since the proportion of low-educated women in these countries is relatively small (Eurostat 2014), while women remaining without higher education in southern European countries are many and they are most likely less selected in terms of health. Moreover, the explanation may lie in cultural factors related to health behaviour, and, for example, in the fact that women in Mediterranean countries are reluctant to take up smoking despite income inequalities that are normally associated with lifestyle-related risk factors for health (Mackenbach et al. 2008). Furthermore, it is also possible that the counterintuitive association observed in the figure follows from confounding by some unmeasured variable that we could not include in the analyses. If this is true, the observed negative correlation is only a spurious artefact.

Despite the result concerning women discussed above, the relationship between income inequality and health inequality is positive, albeit weak, in the other comparisons. It is noteworthy that while in the international context Finland – as

Figure 2. Income inequality and socio-economic differences in self-evaluated health status. Odds ratios between highest and lowest income and educational groups, respectively.

well as the other Nordic countries – displays low income inequality but relatively speaking high socio-economic health disparities, some countries with higher income inequalities, notably Spain, have smaller social differences in health. It may be that theories on the impact of income inequality would receive more support if the objective levels of health were analysed instead of relative differences (e.g., mortality or life expectancy) in various countries (Mackenbach et al. 2008; Fritzell et al. 2013). As can be seen in the appendix tables, whereas the level of self-assessed health in all population groups in Spain is lower than, for example, in Sweden, the gap in relative differences is narrower.

Characteristics of health care systems. Another way of trying to explain socio-economic health differences is to look at national institutional settings. There are studies on relationships between social policy programs and health (Ferrarini & Sjöberg 2010), welfare state regimes, poverty and mortality (Fritzell et al. 2013), and minimum income and health (Nelson & Fritzell 2014). In this paper, our focus is on the inequity in access to health care, which in the Finnish political debate is often argued to be the main explanation for the large socio-economic health disparities in Finland. Following the Finnish discourse, our H_2 states that the more unequal the access to health care is, the larger the health differences are between social classes. In figure 3, socio-economic differences (odds ratios) are projected against the OECD inequity index. If the H_2 holds, there should be a positive association and the regression line should go from the lower left-hand corner to the upper right-hand corner in the graph.

At first glance there indeed seems to be an association, albeit weak, between socio-economic health differences and the OECD horizontal inequity index. In three panels the correlations hover around .20. The only exceptions are educational groups among men where the association is negligible (r = .02). All scatter plots reveal some deviant cases. Italy, Greece, and Spain deviate from the general pattern in the upper left-hand panel and Austria and Greece in the upper right-hand panel. If we omit these countries, the correlation coefficients are .32 and .24, respectively. However, in all panels Finland and Portugal are influential cases with high leverage affecting regression lines in these three instances. Consequently, the omission of these two countries with the highest HII values affects correlations (r = .10; .17; -.20, and .13, respectively) and weakens support for the H_2. Thus, some of the depicted relationships are in line with H_2 but without statistical significance.

The bigger the better? The role of the health budget. The third, and more spending centered, approach focuses on the volume effect of the health budget. Our H_3 assumed that the more money is spent on health care, the smaller the health differences are.

The size of the national health budget (% of GDP) seems to be more strongly connected to socioeconomic health differences than the other two macro variables (Gini and HII) –

Figure 3. Characteristics of health care systems (OECD inequity index) and socio-economic differences in self-evaluated health status. Odds ratios between highest and lowest income and educational groups, respectively.

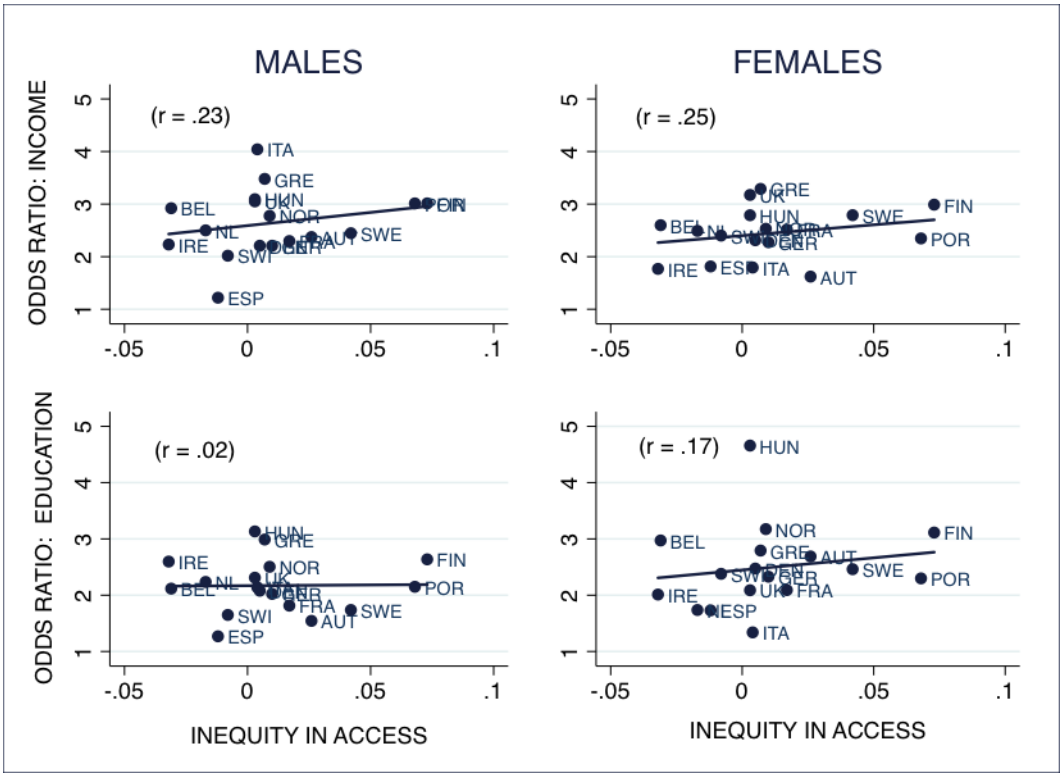
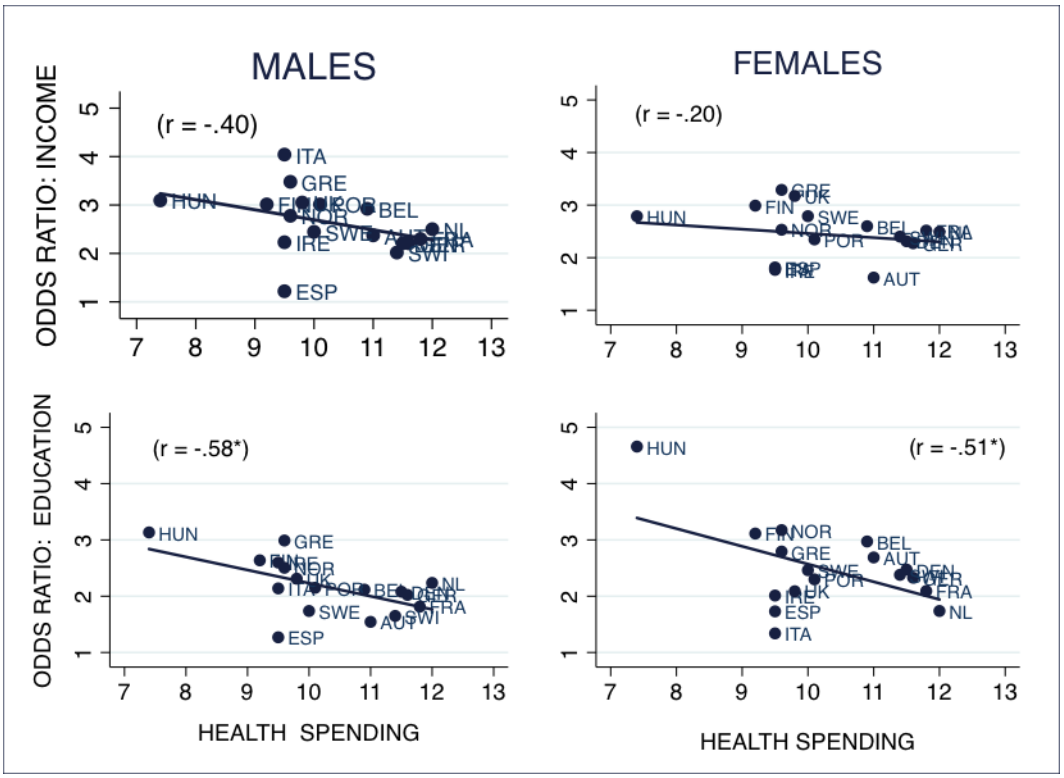


Figure 4. Health spending (% of GDP) and socio-economic differences in self-evaluated health status. Odds ratios between highest and lowest income and educational groups, respectively.



giving qualified support to H_3 on the volume effect (Figure 4). The bigger seems to be the better. However, here we also have some outliers and influential cases that affect the results. Hungary is an influential case with strong leverage. The same goes for Spain (and Italy in the lower right-hand panel). If we exclude Hungary, correlations become smaller but they are nevertheless negative (income: males = -.36; females = -.11; education: males = -.38; females = -.09). The omission of three countries (Hungary, Italy and Spain) strengthens the associations ($r = -.62$, $p < 0.05$; -.36; -.64, $p < 0.05$ and -.45, respectively). In this inspection, Finland is a country with a relatively small health budget associated with relatively large health disparities.

Discussion

Socio-economic differences in health have been subject to researchers' attempts to explain them with all kinds of factors, starting from individual-level factors, going to health care systems and reaching to the more general kinds of macro-economic explanations. Richard Wilkinson and Kate Pickett (2010) have provided one of the most influential explanations for health differences. For them, as for many others in the same school of thinking, health and socio-economic health differences are related to structural properties of a society, notably so to income inequality that is seen to be the "cause of causes". Our results on the income inequality hypothesis (H_1) bifurcated. On the one hand, correlations between income inequality and socio-economic health differences were in expected directions concerning income quartile-related health disparities, as well as educational differences among men. On the other hand, associations were not very convincing. First, in the case of education-related health disparities among women, the relationships ran against the hypothesis. Second, the fact that the Nordic countries with their small income inequalities show larger socio-economic health differences than a number of countries with higher income differences also does not support the inequality theory. The inequality hypothesis might receive more support if objective levels of health were in focus (e.g., mortality or life expectancy) in different populations of various countries (see Mackenbach et al., 2008; Fritzell et al., 2013). Furthermore, the associations between macro characteristics and health are most likely much more complex than the-more-inequality-the-more-harmful-outcomes, as argued by Wilkinson & Pickett (2010). There may be – and in fact are – numerous intervening factors (e.g., age structure of the population, institutional settings of the welfare state, behavioral factors and eating and drinking habits etc.) that blur the direct 'Wilkinsonian' relationships (for a closer discussion, see Lundberg et al. 2010).

In Finland, the discussion on health policy has turned into debating the possibilities of the health care system to narrow health differences. The discussion has been inspired by reports of the OECD (van Doorslaer et al. 2004; OECD 2011b; Devaux & De Looper 2012) which classified the Finnish health care system as one of the most unequal ones in the OECD hemisphere. Using this Finnish policy discourse as our platform, we evaluated whether the OECD inequity index can satisfactorily explain socio-economic differences in self-assessed health status in 17 European countries. The answer here was also partially inconclusive. There is an association and, in line with our expectations (H_2), inequality in a health care system (the OECD's horizontal inequity index) is positively linked with health differences. However, the linkages were not strong and undisputable: correlations were not statistically significant, and often their strength was affected by a few influential cases, Finland being one of them.

If the results regarding our two first hypotheses were conditional, the third one, i.e. the-bigger-the-better dealing with the size of the health care budget, got stronger support. All correlations were in the expected directions, and the omission of outliers and influential cases fortified the association. There is a tendency that the more European countries spend on their health care, the smaller the socio-economic health differences are. The finding is in concordance with results from studies analyzing the impacts of the level of public social spending. These studies have shown that the size of the welfare state matters for income poverty and social exclusion: the bigger the welfare state, the lower the poverty rate. Poverty, for its part, is correlated with various health problems. When it comes to the size of the health care budget, bigger spending associated with equal access to health care indicates that wider layers of population may benefit from a wider array of public health provisions, which yields better health outcomes. In our inspection, Finland, after Hungary, had the lowest spending on health which may have its bearings on socio-economic health disparities. Finland uses fewer resources on health than do other comparable countries. The horizontal inequity index, in turn, indicates that the money is perhaps not spent in the best possible way to diminish socio-economic health disparities.

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APPENDIX

Table A1. Health experienced as bad or fair (%) according to gender and income quartiles in 17 European countries (Diff. = difference between the lowest and highest income groups).

Country	Gender	Income quartiles: 1. (lowest)… 4. (highest)				All	Diff. 1. – 4.	N
		1.	2.	3.	4.			
Austria	Men	27.5	23.0	16.6	12.4	19.5	15.1	377
	Women	30.5	22.9	20.5	17.1	23.2	13.4	492
Belgium	Men	37.4	26.8	18.2	13.1	22.0	24.3	813
	Women	40.3	29.6	20.6	14.8	25.6	25.5	961
Denmark	Men	33.6	24.0	19.1	11.4	22.5	22.2	772
	Women	32.4	26.6	18.8	13.1	23.8	19.3	765
Finland	**Men**	**47.6**	**42.8**	**29.8**	**21.1**	**34.4**	**26.5**	**1,524**
	Women	**50.0**	**40.9**	**25.2**	**16.9**	**34.5**	**33.1**	**1,611**
France	Men	44.9	38.1	26.5	26.1	33.4	18.8	1,055
	Women	47.9	39.4	29.7	23.3	36.4	24.6	1,247
Germany	Men	46.3	42.4	34.6	28.7	38.1	17.6	2,162
	Women	52.8	46.1	33.0	28.9	41.6	23.9	2,296
Greece	Men	38.3	25.9	15.7	9.0	20.0	35.1	681
	Women	47.6	34.9	19.9	12.5	27.7	35.1	681
Hungary	Men	64.0	54.2	44.7	36.1	48.3	27.9	767
	Women	70.1	64.2	45.0	37.7	54.5	32.4	1,123
Ireland	Men	28.3	21.6	13.6	12.8	18.1	15.5	375
	Women	23.3	16.8	11.6	11.5	15.7	11.8	379
Italy	Men	45.8	38.5	29.0	16.2	32.0	29.6	99
	Women	49.5	40.0	33.6	25.4	37.8	24.1	129
Netherlands	Men	36.5	30.2	17.5	17.4	23.0	19.1	901
	Women	43.7	32.1	24.5	19.6	28.9	24.1	1,247
Norway	Men	30.7	26.8	20.9	12.2	22.4	18.5	977
	Women	34.0	27.9	23.7	12.7	25.2	21.3	998
Portugal	Men	69.9	47.9	35.1	30.8	45.8	39.1	794
	Women	77.8	58.3	39.0	43.0	57.1	34.8	1,379
Spain	Men	40.4	34.9	28.7	25.1	32.2	15.3	983
	Women	56.4	43.6	36.5	27.7	41.7	28.7	1,320
Sweden	Man	29.8	25.0	17.5	12.9	20.7	16.9	899
	Women	39.1	30.1	22.4	15.4	27.6	23.7	1,172
Switzerland	Men	21.7	16.1	13.0	10.5	15.1	11.2	532
	Women	27.0	15.9	13.2	10.2	17.3	16.8	627
UK	Men	40.8	31.3	24.5	15.5	26.3	25.3	1,117
	Women	40.3	29.9	20.4	14.3	26.2	26.0	1,183
ALL 17 countries	Men	38.7	32.0	23.4	17.8	27.2	20.9	14,566
	Women	44.2	35.2	24.8	19.0	31.3	25.2	17,609

Table A2. Health experienced as bad or fair (%) according to gender and educational attainment in 17 European countries (Diff. = difference between the lowest and highest educational groups).

Country	Gender	Income quartiles: 1. (lowest)... 4. (highest)				All	Diff. 1. – 4.	N
		1.	2.	3.	4.			
Austria	Men	24.0	19.1	17.8	16.4	19.2	7.9	618
	Women	39.9	20.9	16.4	14.4	22.5	25.5	826
Belgium	Men	32.6	23.5	15.1	13.9	21.2	18.7	924
	Women	43.7	24.8	19.3	14.8	25.8	28.9	1,174
Denmark	Men	32.1	27.3	19.4	16.3	22.7	15.8	867
	Women	38.6	28.3	20.4	15.5	24.2	23.1	930
Finland	**Men**	**55.8**	**32.1**	**25.5**	**21.0**	**34.6**	**34.8**	**1,663**
	Women	**59.9**	**34.5**	**25.3**	**16.9**	**34.7**	**43.0**	**1,794**
France	Men	49.9	33.1	23.5	26.9	33.6	23.0	1,434
	Women	57.4	37.4	26.8	26.3	37.3	31.1	1,800
Germany	Men	52.9	41.4	33.9	32.0	37.5	20.9	2,710
	Women	62.1	42.8	36.0	29.7	40.9	32.4	2,961
Greece	Men	33.3	9.6	9.5	8.2	18.5	25.1	583
	Women	43.4	13.4	10.3	9.2	26.4	34.2	1,027
Hungary	Men	62.9	47.5	39.2	6.7	46.9	26.2	1,642
	Women	79.1	51.1	41.0	34.7	54.5	44.4	2,341
Ireland	Men	33.0	17.9	10.9	10.2	16.3	22.8	577
	Women	28.0	19.1	11.4	11.1	15.4	16.8	660
Italy	Men	43.9	19.7	20.0	23.8	30.3	20.1	164
	Women	52.0	34.4	26.4	33.9	40.2	18.1	268
Netherlands	Men	37.7	23.3	19.3	16.5	22.3	21.2	1,004
	Women	42.0	29.3	24.0	20.6	28.5	21.4	1,492
Norway	Men	39.4	24.0	20.2	14.7	22.3	24.7	1,001
	Women	46.9	29.5	20.2	14.5	25.2	32.4	1,051
Portugal	Men	50.5	24.5	20.4	25.0	41.7	25.5	1,784
	Women	64.2	26.9	36.1	29.3	54.3	34.9	3,267
Spain	Men	43.6	24.3	23.3	24.6	30.9	19.0	1,460
	Women	58.5	30.1	27.0	27.2	39.7	31.3	1,986
Sweden	Man	29.7	18.4	20.4	14.2	20.6	15.5	944
	Women	43.3	27.5	22.8	17.9	27.7	25.4	1,279
Switzerland	Men	17.3	13.4	12.8	11.6	14.7	5.7	660
	Women	22.4	16.0	13.9	9.1	17.6	13.3	851
UK	Men	43.3	32.1	20.5	18.0	27.0	25.3	1,420
	Women	47.4	30.4	19.9	19.3	26.6	28.1	1,551
ALL 17 countries	Men	40.0	27.4	21.8	19.9	27.5	20.1	19,455
	Women	51.3	30.0	23.5	20.0	32.3	31.3	25,256