Determinants of inequalities in health with focus on retired - with particular regard to retired Danes

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Foreword

The present paper is derived from the EU-funded project known as the "ECuity project" which developed a set of methodologies to provide practical tools for the measurement and explanation of inequality and inequity in health and health care. See: http://www2.eur.nl/bmg/ecuity/ . The ECuity project found unexpected results from Denmark indicating a relatively high inequality in income-related inequality in health. Reasons for this finding have been addressed in the paper. Earlier versions of the paper have been presented at the yearly meeting of the Nordic Health Economists' Study group in Tartu, August 16-17 ,2007, and at the 2nd Biennial Conference of the American Society of Health Economists, Duke University, Durham, North Carolina, June 22-25, 2008.

Abstract

Previous studies of health inequality across European countries have shown intriguing results, in particular for Denmark with high index of income-related inequality in health. Status as retired was found to be the most important determinant of health inequality. We decomposed the inequality index and looked further into the contribution by retired to inequality in health by dividing the retired into two or three age groups. Hypotheses about the factors that constitute the contribution by retired to the overall inequality in health were tested (the share of the population being retired, the health of retired, and the income of retired). We used data from the European Household Panel and SHARE and found that all three factors contribute to the high contribution by retired to the overall inequality index particularly from Denmark. The contribution was most remarkable for the oldest age group among retired, which is explained by the fact that the group of younger retired has better coverage through labour market related pensions in supplement to the universal public pension scheme.

Introduction

Inequality in health is a theme that constantly draws public attention from both a public healthperspective and a general policy perspective. Previous studies of health inequality across European countries have shown intriguing results, in particular with respect to being retired as one of the determinants of health inequality. In a recent study van Doorslaer and Koolman (2004) analysed the level of self-assessed health as well as income-related inequalities in self-assessed health across populations in 13 European countries. Self-assessed health is often used in surveys, and even though it appears to be a simple way of measuring it has proven to be a strong predictor for mortality later in life (Idler, 1997). Unexpected results were found for Denmark, as an index for income related inequality in health showed a relatively high value, compared to other countries. Thus, with data from the 1996 wave of the *European Community Household Panel* (ECHP), (EUROSTAT 1999) they found that Denmark and Greece were ranked at the top with respect to health (measured in terms of utility) while Portugal was ranked at the bottom, followed by Italy. Te income-related distribution of health indicated however another picture where Denmark was ranked at the bottom along with Portugal. Previous r studies have shown similar results with respect to Denmark (Christiansen, 1997). These findings were unexpected, in particular because the income distribution in Denmark is among the most equal, and because inequality in income and health tends to be associated.

Doorslaer et al. (2004) showed a general positive association between income inequality and inequality in health for the included EU countries, but the inequality in health was not seen to be merely a reflection of income inequality. In a closer analysis of the determinants for inequality in health the contribution from a number of socio-economic and demographic variables were estimated, and they found that the inequality in health to a large extent could be explained by an association between income and each of these variables. In other words, the income elasticity of these variables was more important in explaining the inequality in health than the unequal distribution of income *per se*. Still, with the exception of Denmark, they found a significant association between income and health. For Denmark they found a particular skew income-related

distribution of health for retired, followed by the UK, while for Spain, France and Austria it was only found to be the case to a limited extent. For Denmark, status as retired could explain 90% of the measured high income-related inequality in health while for UK it explained 22.5%, and for the rest of the countries it explained even less, in particular Spain (3%), France and Austria.

Such differences appear remarkable and it is difficult to find a coherent pattern. van Doorslaer et al. concluded that the relatively high income-related health inequality for Denmark was almost entirely due to the group of early retired with much poorer health who are strongly concentrated among the lower income groups. Thus, retirement might be seen as a way to withdraw early form the labour market due to health problems.

Purpose

Because status as retired appears to be a key for understanding the extreme high inequality index for Denmark, our aim is to look furthermore into the contribution by retired Europeans to income-related inequalities in health and to compare the contribution from retired Danes to the contribution of retired in other EU countries. It goes beyond previous studies, allowing an analysis of the contribution of retired by different age groups.

Data

The present study is based on two data sets. The first is the same as the one used by van Doorslaer et a. (2004) and is based on the 3rd wave of The European Community Household Panel (ECHP) from 1996 which is a panel study based on a standardised questionnaire for interviewing a representative sample of households and individuals in 12 EU countries (EU, 2008). The population from which the sample was taken, included all individuals who lived in one of the EU-countries, who were 16 years of age or more, and who did not live in an institution. The original sample from 1994 included 60,500 households and 130,000 individuals. In the following waves the panel was replenished to substitute drop-outs. The questionnaire covered a broad spectre of topics like income, self-assessed health, demographics and occupational status. For Denmark, the 2nd wave was also

included to see whether results from the two waves were similar, as the results from the 3rd wave reported by van Doorslaer et al (2004) were unexpected for Denmark with respect to the lack of significant association between income and health.

Self-assessed health was measured by asking the question "How is your health in general" with five response categories from very good to very bad. Income was measured as disposable household income, that is, monetary income after income tax. No correction was made for indirect social transfers like subsidies to medical care and medicine or rental of housing, services in kind or calculated value of own dwelling in accordance with the approach by van Doorslaer et al. (2004). Household income was adjusted for the household composition by using OECD's modified equivalence scale (with 1 for 1st adult; 0.5 for the 2nd and children above 14 years; 0.3 for each child below 14 years) (OECD Social Policy Division).

The included countries and number of respondents are shown in Table 1. From the data set we excluded the Netherlands as it was pointed out by van Doorslaer et al. that the data set had a coding error implying that no pensioners over 75 were found in the data set. We also excluded Germany as it appeared that no pensioners over 75 were found in the data set. Minor deviations in our results from the results by van Doorslaer et al. may be due to different coding.

The second data set is based on data from The Survey of Health, Ageing and Retirement in Europe (SHARE, Release 2) (Börsch-Supran and Jürges 2005). The target population of individuals in the survey was defined as "All individuals born in 1954 or earlier, speaking the official language of the country and not living abroad or in an institution such as a prison during the duration of the field work*, and their spouses/partners independent of age.* The remark above as to people living in institutions for elderly applies here as well" (Börsch-Supran *et al*., 2005, p. 30). Thus, the survey focuses on individuals above the age of 50 years in contrast to the ECHP survey which included adults of the age 16 years or older. In order not to mix retired due to disability and age, we omitted 141 individuals of the age of 65 years or more who responded that they were disabled (0.53 % of the sample). Countries and number of respondents included are shown in Table 6.

When compared to the previously mentioned study by van Doorslaer et al., both studies include Denmark; Germany, Italy, the Netherlands, Spain, Austria, France and Greece. In addition, the SHAREdata includes Sweden and Switzerland, while the ECHP also include Belgium, Ireland, Luxemburg, UK, and Portugal.

Methods

The two data sets are analysed separately.

The method used to measure inequality in health can be illustrated by a Lorenz curve and measured quantitatively by a Gini coefficient as a concentration index. Thus, inequality in health can be illustrated graphically in a diagram which shows a ranking of individuals by increasing income on the horizontal axis and vertically measures the aggregate of a good health in the population. See Figure 1. This will of course require that health is measured quantitatively and aggregated over

/ Figure 1/

individuals. If health is equally distributed by income, the concentration curve is identical to the diagonal from the origin of the diagram. When bad health is predominantly concentrated among the lower income groups, the concentration curve will lie under the diagonal as x% of the individuals possess less than x% of total health – and vice versa if good health was concentrated among the lower income groups. As health is related to income by this method, we measure income-related inequality in health. When income is substituted by a socio-economic index and ranked accordingly, the index will express social inequality in health. The index of inequality can be expressed by the area between the diagonal and the concentration curve, and to standardise the index it is multiplied by 2. A positive index can be interpreted as inequality to the disadvantage of the poor. The index can vary between -1 and +1. The closer the index is to an extreme value, the more inequality. An index of zero would indicate a perfect equal distribution over income (apart from the exceptional case where the concentration curve crosses the diagonal). When the position and form of the curve are based on data on health that are adjusted for age and gender (which are

variables that cannot be influenced), the rest can be seen as an expression of potentially "avoidable" inequality in health. As shown in the figure, the curve is everywhere under the diagonal, but it might cross the diagonal and have a form like and S if both the poor and the rich have a disproportional big share of ill-health.

The distribution of other variables which in theory are associated with income related inequality in health can be illustrated in a similar way. If the variable is dichotomous, for example retired or not, it is possible to illustrate the income-related distribution of the probability of certain outcome, in this case the probability of being retired. Likewise, it would be straight forward to calculate a concentration index for this case. If the probability of being retired decreases with increasing income, the curve can be drawn as a concave curve over the diagonal.

When health is measured by self-assessed health (SAH) on a scale with ordered categories – usually on a five point scale with categories from bad to very good - an ordinal scale is obtained. This can be transformed to a cardinal scale by using a mapping method to scale the thresholds, based on already known scores from another survey which has included both the SAH measure and an instrument allowing a cardinal measure. Our approach is based the HUI-3 (Health Utility Index, version 3) instrument that was included along with the SAH measure in a previous Canadian survey, National Population Survey (NPS) (van Doorslaer *et al*., 1997; van Doorslaer *et al*., 2003). Throughout, we use the terms "predicted HUI" and "health" synonymously.

Econometric analysis of an ordered categorical dependent variable, such as SAH, is based on the interval (grouped data) regression model. It uses an alternative to an ordered probit model in the case where the threshold parameters among SAH categories are known. Using such information the estimates of the coefficients for the individual characteristics are more efficient (Jones, 2000). For any variable, y, the income-related inequality is measured using the concentration index,

(1) $C = 2*\mathrm{cov}(y,R)/\mu,$

where R is the fractional income rank defined for individual *i* as $R_i = (r_i - ½)/N$, with r_i defined as the unconditional income rank for individual *i*. C can be calculated using the regression

(2) $$(2\sigma_R^2/\mu)y_i = \alpha + \beta R_i + u_i,$$

where σ_R^2 is the variance of R. The estimate of β is then equal to C. Using the regression approach, standard errors and t-values for the calculated C values are obtained from the regression procedure output.

Assuming that health is linked to K determinants through a linear regression,

(3) $$y_i = \Sigma_k \delta_k x_{ik} + \varepsilon_i,$$

the concentration index, C, for y can be decomposed as

(4) $$C = \Sigma_k (\delta_k \mu_k/\mu) C_k + (1/\mu) CG_\varepsilon$$

where μ is the mean of y, μ_k the mean of x_k, C_k the concentration index for x_k, and CG_ε the generalized concentration index for ε (Wagstaff *et al*., 2003). Equation (1) shows that C is made up by two components: a deterministic component equal to the weighted sum of concentration indices of the *k* regressors where the weight of x_k is the elasticity of y with respect to x_k (η_k) and a residual unexplained inequality captured by the last term. The decomposition further shows how each determinant's separate contribution to inequality in health can be separated into three sources: (i) its effect on health (through the regression coefficient δ_k) (ii) its mean in population (μ_k) standardised by division by mean health (μ) and (iii) the income-related inequality of the determinant (C_k).

When inequality in health is measured and decomposed into contributions from each of the determinants, the relative size of each contribution can be compared as well as each determinant's contribution can be compared across countries. For these comparisons it is valuable to be able to compare the statistical significance of each the contributions. To enable this, a bootstrap procedure

(Efron et al., 1993) has been carried out with 1,000 replications. Finally, sample weights were applied similar to the approach used by van Doorslaer *et al*. (2004).

Theoretical considerations and hypotheses

In theory, status as retired from the labour market should be a factor that contributes to income-related inequality in health as retired typically have a lower income compared to active on the labour market, and as health status for retired in general is worse than for active, either because of age or because of ill-health as reason for retirement. To investigate how status as retired from the labour market contributes to income-related inequality in health, it is necessary to distinguish between the three factors that contribute to the measure, namely health status of retired, their share of the total population and distribution of income among retired. It is also possible to formulate working hypotheses about retired in Denmark compared to retired in other EU countries.

1. The share of the population being retired is larger in Denmark compared to other countries (implying that they contribute more to the over-all inequality; works through μ_k)

2. The retired have a relatively poorer health in Denmark, compared to retired in other EU-countries (works through δ_k).

3. The retired in Denmark have a lower relative income, defined as income ratio between retired and non-retired, compared to other EU-countries (works through C_k).

It can be assumed that health and income are different for different age groups among the retired. The increasing use of pensions since the early 1990s that are related to the labour market as a supplement to public financed universal age pension may have resulted in an income inequality between younger and older age pensioners (DØR, 2008). The youngest among the retired (below 65 years) are expected to be a mixed group of retired due to their health and other reasons, and consequently no specific hypotheses are formulated for those. When

distinguishing between younger and older pensioners (65-74 and 75+ years) it would be natural to expect a different contribution from these two groups to income-related inequality in health:

4. The older groups among pensioners contribute relatively more to inequality in health (when corrected for share of the population).

Results

1. ECHP data

As we used the same data set as van Doorslaer et al. (2004) we obtained similar results except for retired. Minor deviations may be ascribed to differences in coding. Table 1 shows means of relevant variables by country for the 3rd wave of the ECHP study and the number of observations by country. For Denmark the means are shown for both waves 2 and 3. Predicted health is health status on a 0-1 scale resulting from the mapping of SAH. Apart from Portugal, the range is between 0.87 and 0.92 (with 0.90 and 0.91 for Denmark). Income is shown as the logarithmic value which is used in the analyses. The income of Italians appears to be an outlier, probably due to a coding error. With respect to occupational status as a house worker Denmark and Finland are outliers due to the very high rate of women in the labour force. The reference individual is a male 16-29 years old with primary education, full time employed, married and EU citizen of origin. It appears that status as retired varies substantially between countries. For the age group until 64 years, the range varies between 0.02 and 0.08 as share of the population of age 16 or more (with 0.06 for Denmark), while for the age group 65-74 years it varies from 0.04 to 0.10 (with 0.09 for Denmark); and for the oldest age group it varies from 0.03 to 0.08 (with 0.08 for Denmark). As the share of the population recorded as retired is relatively high in Denmark, this yields some support for hypothesis 1, in particular for the oldest age group among retired.

/insert Table 1/

The bootstrapped regressions of income in Table 2 show interesting results with respect to Denmark. It appears that the coefficient of log(income) is statistically insignificant in wave 3 while significant in wave 2 and at a level comparable to the rest of the countries. This indicates a possible selection bias or income reported in the third wave. With respect to retired relative high coefficients are seen , in particular, for Denmark (both waves), Portugal and Finland. Thus, the coefficient is -0.094 for retired less than 65 years while the average is -0.055 for the rest of the countries. For retired 65-74 years old the corresponding coefficient is -0.080 (average -0.040) and for retired 75+ years old it is -0.103 (average -0.063). These findings support hypothesis 2.

/insert Table 2/

Table 3 shows concentration indices. As already mentioned in the introduction, the concentration index of predicted health shows a relative high income-related inequality in health for Denmark (both waves) as compared to most other countries. In contrast, inequality in income distribution is relatively low. The table furthermore shows income distribution among retired. For the youngest retired the CI is -0.182 while the average for the other countries is -0.054. Corresponding figures for the other groups of retired are -0.402 (-0.124) and -0.544 (-0.233). This clearly shows a more skew income distribution among retired in Denmark as compared to the other countries, and hypothesis 3 is thus supported.

/insert Table 3/

Finally, the contribution by various determinants to inequality in health is shown in table 4. While wave 3 does not indicate an association between health and income for Denmark as pointed out by van Doorslaer *et al*. (2004), wave 2 does indicate an association that is highly significant, although of a smaller size compared to the rest of the EU countries. The most interesting result is the high contributions from retired of any age in Denmark and Finland. Thus, retired contribute with 82.3% of the measured inequality in health (67.1% according to wave 2) in Denmark, and with 55.3% in Finland while the contribution in other countries is much lower and even insignificant in some countries. In other words, if health and income had been equally distributed among occupational groups, the inequality would be reduced by 82.3% in Denmark and 55.3 % in Finland. The

contribution from the oldest age group among the retired is the highest, both in Denmark and in other countries, where there are significant results. This supports hypothesis 4.

Table 5 summarises the contributions by retired of various age groups to overall income-related inequality in health. The factor 'mean of retired as share of the population divided by mean health of the population' is calculated from Table 1 and shown in Table 5. While the factor is 0.064 for the youngest retired (-64 years), the average is 0.063 for the rest of the countries. The corresponding results are 0.099 (0.098) for the 65-74 years old retired and 0.099 (0.067) for the oldest retired. These findings contribute to supporting hypothesis 4.

/Insert table 5/

2. SHARE data

/Insert Table 6/

Means of predicted HUI, explanatory variables and number of observations per country are shown in Table 6. Compared to the results from the ECHP data set, the predicted value of HUI (as calculated by interval regression) is in general lower, ranging from 0.77 in Spain to 0.87 in Switzerland. This observation is expected as the population in the study is older, and health status tends to decrease by increasing age. A relatively low value of health status of the elderly is found in the SHARE survey in Italy, Spain and France. In contrast, the elderly population in Germany, followed by Denmark and the Netherlands, has a relatively high level of health with predicted HUI between 0.86 and 0.85.

The demographic structure of the sample appears to vary substantially by country with 14 % being males 60-69 years in Spain as compared to 22% in Austria. For the same age group, females make up 9% in France and 18 % in Austria and Germany. These differences may be a reflection of the age composition and different response rates as well. The very different rates of 'house worker' as employment status from 1% in Denmark to 34% in Spain should be expected as it reflects differences in female labour force participation now and in the past.

In this section, retired are divided into two age groups. In r particular, it is interesting to notice that the share of the population above 50 years being retired varies substantially between countries. Thus, the percentage which is recorded as retired and below the age of 65 years varies from 5 % in Switzerland to 24 % in Austria. In the Danish sample, 40% are recorded as retired of any age while the range is between 34% (the Netherlands) and 65% (Austria). Obviously, this reflects both the pattern of retirement, other ways of being supported when not active on the labour market (doing housework, being unemployed or disabled), and the age composition and possible difference in response rates.

The percentage possessing a secondary or higher education also varies quite substantially between countries from14% in Spain to 81% in Germany. Obviously, this reflects past education policy and possibilities.

Due to the age limitation of the data set, hypothesis 1 will not apply to the SHARE data. The factor ' mean of retired as share of the population > 50 years divided by the mean health of the same population' is shown in table 10. Due to the sizable variation in the share of the population recorded as retired, in the sample, this factor also varies substantially across countries It takes a value of 0.47 for Denmark while the range is from 0.40 (the Netherlands) to 0.78 (Austria).

Table 7 shows Interval regression results per country. Dependent variable is HUI scaled SAH. Log(income) has a positive coefficient for all countries and is significant at a 5 % level in 6 out of 11 countries. When significant the coefficients vary between 0.007 and 0.014. Results should be directly comparable as they are measured in the same units (PPP adjusted Euros).

The coefficients for the dummy indicating that SAH (version 2) are significantly negative for all countries. This indicates that those respondents who were asked the question in Version 2, as expected, on average reported a lower health than those asked the question in Version 1.

With one exception (Denmark), some coefficients of demographic variables are negative implying lower health (utility) as compared to the reference group (males 50-59 years). For most countries, women aged 50-69 have s a negative sign implying lover health (utility) compared to men in the same age group.

For the retired Danes under 65 years the coefficient is -0.098 while the range across the other countries goes from -0.22 (Greece) to -0.113 (Sweden). For older retired the coefficient is –0.072 for Denmark, ranging from – 0.025 (Switzerland and Sweden) to -0.72 (Denmark). (Only significant results are compared). The findings from the oldest group lend support to hypothesis 2.

/insert Table 7/

Turning to the concentration indices of dependent (predicted health) as well as independent variables in Table 8 some interesting results about income-related inequalities appear. While it is the case in all countries that predicted health is unequally distributed in favour if higher incomes, there are quite substantial differences, ranging from about 0.021 for Denmark, Germany and Greece to 0.004 in Austria. It appears that the association between health and income distribution is negative with a correlation coefficient of -0.51. This result is unexpected as van Doorslaer *et al*. (2004) found that to some extent the pattern of income inequality follows the pattern of health inequality for the sample of adults.

/insert Table 8/

The concentration index for log(income) has a range between 0.037 (Sweden, followed by Denmark) and 0.606(Spain). In general, the concentration index is higher for the older age groups compared to the total, implying a more skew income distribution for the older population.

The concentration index for the dummy indicating that SAH were asked by using Version 2 is close to zero throughout. This is expected, as the version of SAH was assigned to each respondent based on a fifty-fifty game.

An interesting finding among the income-related distributions of demographic groups is that older males tend to be found in the lower income group, in particular in Denmark, , while “younger” females (50-59 years) and even males 60-69 years old tend to be found among the higher income groups in Denmark. The reference group is males 50-59 years.

Income-related distribution of retired shows some common pattern across countries. Young retired (up to the age of 64 years) are distributed in the higher income end in most countries, in particular in Greece, followed by Italy, while older retired are generally to be found in the lower end of the income distribution. This is most clearly the case in Denmark with a concentration index (-0,308) far beyond those of the other countries. This finding supports hypothesis 3.

/insert Table 9/

The question of how the demographic and socio-economic variables contribute to income-related inequality in health is shown in Table 9. A general pattern is that income in itself contributes to income-related inequality in health, but to a varying degree. While the contribution is -9.43% in Austria, the contribution is 45.74 % in France. Somewhere in between are Denmark, Germany and Sweden with positive contributions.

Among other variables with a substantial contribution are house workers in Spain and Italy, and disabled in the Netherlands and Spain,. Young retired tend to decrease income-related health inequality in a number of countries, in particular in Austria , while older retired tend to increase the inequality in Denmark to a substantial extent (51,93 %), while unemployment contributes substantially in Austria.

Austria distinguishes itself from the other countries in the analysis by having more variables with substantial contributions to inequality in health. Especially, being retired of any age reduced inequality in health.

In conclusion with respect to retired it appears that young retired contribute negatively to inequalities in health in most countries while older retired contributes positively in most countries with Denmark and Austria as outliers in different directions.

Table 10 summarises the contributions by retired to the overall income-related inequality in health by country and age group.

/insert Table 10/

Discussion

While the index of inequality in health merely gives a summary measure of health inequality, it is possible by means of the decomposition to get a deeper insight into measured inequality. Compared to the analyses by van Doorslaer at al. (2004) we have furthermore divided retired by two or three age groups which allows a more precise analysis of the contributions to inequality by retired. In general the contribution from retired to inequality in income-related health varies very much between countries and between age groups. While this is related to three determining factors as well as an unexplained residual, it is difficult to find a coherent pattern across countries.

In contrast to the conclusions by van Doorslaer et al. (2004) we find from the ECHP data that it is especially the oldest among the retired who contribute to income-related inequality in health in both Denmark and in most other EU countries. If the retired in Denmark over 65 years had the same health status and income as the rest of the population over 16 years, 73% of the measured inequality would disappear, whereof 46% can be ascribed to the oldest above 75 years. Only Finland shows results of a comparable size, although lowersmaller, while the contribution for other countries is substantially lower, and for some even insignificant. A corresponding result is found from the SHARE data with retired 65+ years old contributing with 43% of income-related inequality in health among the 50+ years old population

The results for Denmark, as compared to the rest of the countries, can be supported by an OECD survey (OECD, 2002) that showed that the disposable income for persons above 64 years, compared to the age group 18-64 years, was 67.4% in Denmark while the OECD average was about 78% and 73 for the other countries in this study. This does not mean that elderly people in Denmark are in a worse position in an absolute sense, compared to inhabitants in other countries; what it means is that their income relative to the income by younger generations is lower. Moreover, disposable income does not account for rebates and services which pensioners receives from the public sector, or for a possible dissaving of their fortune.

As Denmark showed unexpected results in the study by van Doorslaer and Koolman, op cit., we furthermore added results from the previous wave of ECHP to get some indication of the validity of the results. While the results indicated a difference with respect to the relation between income and health between the two waves for Denmark, the results with respect to contribution from retired did not vary substantially between the two waves as the contributions were substantially higher compared to what was found in other countries, although wave 2 yielded lower results for Denmark. Still, using the time-dimension of the data in ECHP might lead to different results, although we believe that overall the findings for Denmark is robust as it corresponds with earlier findings as to size of the inequality index. Moreover, the sizable contribution by retired has been supported by using SHARE data.

The different contribution from retired to the inequality index across countries is to a large extent associated with different relative income levels by retired. This may be ascribed to different pension schemes as well as possibilities or habits in various countries in having supplementary income through jobs for retired. This is particularly obvious from the very different shares of the population recorded as retired, as seen from, in particular, the SHARE data.

As we included both age and retirement in the same regression analyses, one may fear that a certain degree of association may exist between the two variables leading to a multicorrelation problem. Still, when omitting one of the variables, the other variable may be biased because it includes the effect of the first variable- and vice versa.

Van Doorslaer *et al*. concluded that in some countries (Denmark and Germany) it is mainly the health and income distribution of the retired which contribute to inequality in income-related health, while in other countries (the Netherlands and Spain, among others) 'other economically inactive groups' have a larger contribution to inequality in health. The contribution of young retired to inequality in health should be interpreted in connection with other ways of withdrawing from the labour market. Thus, disabled contribute substantially in some countries, in particular in the Netherlands and Austria while the young retired group consists of those who are relatively healthy.Our findings concur with those of van Doorslaer et al. as far as Denmark is concerned.

Turning to Denmark as an outlier, we found a relatively high concentration index for the predicted health – a finding that corresponds with earlier findings (Christiansen, 1997). This was intuitively

unexpected when comparing the distribution of income across countries. From our analysis it appears that in particular the older retired contribute to the inequality health of the Danes, and income distribution in itself contributes to a smaller extent. In contrast, van Doorslaer *et al*. (2004) found in their analysis that income distribution contributed with almost nothing while retirement contributed with 91%, and they concluded that the findings for Denmark should be attributed to a disadvantaged position of the early retired. Their reasoning departed from the observation that the contributions should be interpreted as partial effects, i.e. after having controlled for demographics and income. Thus, the retired report poorer health than others of the same age and income, and they concluded viewed in the light of these facts that it mainly reflects the disadvantaged position of the early retired (p. 622). In contrast, we found that the results are attributable to the oldest among the retired. The reason for this high contribution to health inequality by older retired Danes may be a combination of a skew income distribution in disfavour of the older retired, and older retired having less than average health of the population.

As to international comparisons of self-reported health large variations across countries are seen which to a certain extent may be due to differences in reporting style rather than health (Jürges, 2007). Accordingly, e.g. Danes tend to overrate their health (compared to the average) while Germans and the populations in Southern Europe tend to underrate. Whether this seemingly pattern affects the "true" distribution of health has still to be explored.

An important observation from this paper is that the crude index for income-related quality may hide relevant information which is necessary to disentangle before making policy recommendations. The policy implications for Denmark appears to be that as far as the retired are concerned, much of the contribution to inequality in income-related health stems from income inequality rather than health inequality. This will probably disappear with a still increasing use of labour market pension schemes in addition to the public financed universal pensions scheme which will make the older age group better off economically, compared to today. Still, as pointed out by the Danish Economic Council (DØR, 2008), a rest group without this supplementary pension scheme still exists.

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Table 1. Means of variables and number of observations by country. ECHP data, 3rd wave 1996 (including 2nd wave for Denmark).

Variable	AU	BE	DK	DK(2)	ES	FR	GR	IE	IT	LU	PT	SF	UK
Predicted health	0.89	0.90	0.90	0.91	0.88	0.87	0.91	0.92	0.87	0.89	0.82	0.88	0.90
Log Income	9.47	9.49	9.51	11.83	8.94	9.36	8.73	9.20	2.16	9.93	8.60	9.36	9.38
Male 30-44	0.13	0.16	0.15	0.15	0.13	0.14	0.12	0.13	0.13	0.16	0.12	0.15	0.14
Male 45-59	0.11	0.10	0.12	0.12	0.09	0.11	0.11	0.11	0.12	0.12	0.10	0.15	0.11
Male 60-69	0.05	0.05	0.05	0.05	0.07	0.06	0.08	0.06	0.06	0.06	0.07	0.06	0.06
Male 70+	0.04	0.05	0.06	0.05	0.05	0.05	0.06	0.05	0.05	0.04	0.06	0.03	0.06
Female 16-29	0.11	0.10	0.11	0.12	0.13	0.13	0.11	0.14	0.12	0.11	0.11	0.10	0.10
Female 30-44	0.14	0.17	0.15	0.15	0.13	0.15	0.13	0.13	0.14	0.17	0.12	0.17	0.17
Female 45-59	0.12	0.11	0.12	0.12	0.10	0.12	0.12	0.12	0.13	0.12	0.12	0.16	0.13
Female 60-69	0.06	0.07	0.06	0.06	0.07	0.07	0.08	0.06	0.06	0.06	0.08	0.06	0.07
Female 70+	0.07	0.08	0.07	0.07	0.08	0.07	0.08	0.05	0.06	0.06	0.08	0.04	0.09
Secondary educ.	0.59	0.27	0.36	0.36	0.18	0.31	0.24	0.31	0.31	0.26	0.09	0.37	0.33
Higher educ.	0.06	0.26	0.28	0.28	0.14	0.17	0.14	0.12	0.06	0.14	0.03	0.28	0.21
Part-time empl.	0.07	0.08	0.10	0.10	0.04	0.05	0.03	0.08	0.05	0.07	0.05	0.06	0.14
Self-employed	0.08	0.07	0.04	0.05	0.09	0.05	0.20	0.11	0.12	0.06	0.15	0.14	0.08
Student	0.06	0.09	0.08	0.08	0.09	0.08	0.05	0.09	0.08	0.07	0.07	0.09	0.03
Unemployed	0.03	0.07	0.06	0.07	0.11	0.07	0.07	0.06	0.08	0.02	0.04	0.09	0.03
House worker	0.15	0.09	0.02	0.01	0.21	0.11	0.20	0.24	0.17	0.19	0.10	0.03	0.14
Inactive	0.01	0.02	0.01	0.01	0.07	0.02	0.02	0.03	0.03	0.01	0.06	0.01	0.04
Retired – 64	0.08	0.06	0.06	0.06	0.02	0.06	0.05	0.02	0.07	0.08	0.05	0.08	0.05
Retired 65-74	0.08	0.10	0.09	0.09	0.07	0.10	0.10	0.04	0.07	0.07	0.10	0.08	0.10
Retired 75+	0.04	0.07	0.08	0.07	0.05	0.06	0.07	0.03	0.04	0.04	0.07	0.04	0.07
Divorced/sep.	0.05	0.08	0.09	0.09	0.02	0.06	0.02	0.02	0.02	0.06	0.03	0.06	0.10
Widowed	0.08	0.08	0.07	0.08	0.08	0.07	0.10	0.07	0.07	0.07	0.10	0.04	0.09
Unmarried	0.27	0.23	0.32	0.32	0.30	0.29	0.22	0.35	0.29	0.23	0.24	0.27	0.20
EU foreigner	0.05	0.01	0.01	0.01	0.01	0.01	0	0.01	0.01	0.02	0.01	0	0.01
Non-EU foreign.	0.01	0.02	0.02	0.02	0.01	0.04	0	0.01	0.01	0.02	0.02	0	0.03
Number of obs.	7115	5803	4936	5443	15262	12108	11128	7303	16988	1881	11253	7421	6076

Note. DK(2) are results from Wave 2 for Denmark.

Table 2. Bootstrapped interval regression results. ECHP data, 3rd wave 1996 (including 2nd wave for Denmark). Dependent variable is 'predicted health' from a mapping approach

Variable	AU	BE	DK	DK(2)	ES	FR	GR	IE	IT	LU	PT	SF	UK
Log (Income)	0.011***	0.007***	0.003	0.010***	0.008***	0.006***	0.011***	0.006***	0.008***	0.023***	0.018***	0.009***	0.012***
Male 30-44	-0.028***	-0.017***	-0.013***	-0.014***	-0.023***	-0.030***	-0.022***	-0.009***	-0.025***	-0.015***	-0.029***	-0.018***	-0.011***
Male 45-59	-0.067***	-0.027***	-0.022***	-0.019***	-0.045***	-0.053***	-0.043***	-0.020***	-0.051***	-0.030***	-0.060***	-0.056***	-0.023***
Male 60-69	-0.057***	-0.030***	0.001	-0.004	-0.069***	-0.047***	-0.063***	-0.028***	-0.077***	-0.019	-0.081***	-0.036***	-0.012*
Male 70+	-0.115***	-0.036***	0.001	-0.002	-0.100***	-0.057***	-0.102***	-0.051***	-0.141***	-0.071***	-0.115***	-0.080***	-0.010
Female 16-29	-0.005*	-0.006**	0.002	0.001	-0.006***	-0.006**	-0.001	0.001	-0.008***	-0.010*	-0.002	-0.001	-0.002
Female 30-44	-0.019***	-0.021***	-0.011**	-0.011**	-0.022***	-0.020***	-0.018***	-0.010***	-0.026***	-0.019***	-0.036***	-0.022***	-0.006*
Female 45-59	-0.056***	-0.036***	-0.027***	-0.028***	-0.059***	-0.048***	-0.046***	-0.015***	-0.066***	-0.049***	-0.089***	-0.055***	-0.020***
Female 60-69	-0.076***	-0.049***	-0.015	-0.012	-0.102***	-0.046***	-0.082***	-0.043***	-0.106***	-0.051***	-0.119***	-0.036***	0.002
Female 70+	-0.116***	-0.061***	-0.027*	-0.025*	-0.126***	-0.062***	-0.123***	-0.064***	-0.146***	-0.088***	-0.138***	-0.056***	-0.026***
Secondary educ.	0.015***	0.003	0.017***	0.017***	0.013***	0.011***	0.011***	0.005***	0.014***	0.018***	0.013***	0.016***	0.010***
Higher educ.	0.019***	0.008***	0.022***	0.025***	0.013***	0.020***	0.013***	0.008***	0.019***	0.014**	0.032***	0.027***	0.021***
Part-time empl.	0.003	0.003	-0.006	0.002	-0.001	-0.012***	-0.004	0.001	-0.001	-0.006	-0.036***	0.006**	0.002
Self-employed	-0.008**	0.007***	-0.007	-0.007	0.002	-0.005	0.007***	-0.001	0.006***	0.008	0.003	-0.009***	-0.003
Student	0.015***	0.002	0.006*	-0.001	0.002	0.007**	0.007***	0.003	0.011***	0.019***	0.005*	0.005	-0.003
Unemployed	-0.035***	-0.022***	-0.026***	-0.021***	0.001	-0.015***	-0.003	-0.010***	-0.004*	-0.088***	-0.019***	-0.007***	-0.014**
Houseworker	-0.017***	-0.009**	-0.020**	-0.050***	-0.007***	-0.064***	-0.016***	-0.014***	-0.009***	0.006	-0.039***	-0.005	-0.032***
Inactive	-0.115***	-0.104***	-0.091***	-0.034***	-0.106***	-0.001	-0.186***	-0.150***	-0.089***	-0.083**	-0.163***	0.010	-0.154***
Retired – 64	-0.056***	-0.008*	-0.094***	-0.102***	-0.024***	-0.032***	-0.056***	-0.026***	-0.019***	-0.064***	-0.135***	-0.079***	-0.053***
Retired 65-74	-0.021***	-0.030***	-0.080***	-0.066***	-0.017***	-0.048***	-0.042***	-0.006	-0.015***	-0.026**	-0.094***	-0.057***	-0.049***
Retired 75+	-0.053***	-0.037***	-0.103***	-0.084***	-0.052***	-0.067***	-0.067***	-0.031***	-0.030***	-0.033*	-0.127***	-0.095***	-0.046***
Divorced/sep.	-0.013**	-0.008**	-0.011**	-0.009*	-0.016**	-0.020***	-0.013**	-0.006	-0.001	-0.023*	-0.001	-0.006*	-0.005
Widowed	-0.002	-0.002	0.002	0.003	0.010*	-0.014**	-0.018***	-0.007	-0.008*	0.015	0.010	-0.004	-0.007
Unmarried	-0.008***	-0.001	0.006*	0.006*	-0.001	-0.010**	-0.005*	-0.001	0.002	0.011***	-0.005	-0.001	0.001
EU foreigner	-0.008*	-0.036**	-0.049**	-0.034**	-0.004	0.002		-0.023***	0.005	-0.029	0.041***		-0.007
Non-EU foreign.	0.011	0.010**	-0.029**	-0.022*	0.005	-0.007		-0.036**	0.002	-0.001	-0.001		-0.013*

Note. DK(2) are results from Wave 2 for Denmark. Significance indicated by *** (1%), ** (5%), * (10%).

Table 3. Bootstrapped concentration indices for variables by country. ECHP data, 3rd wave 1996 (including 2nd wave for Denmark)

Variable	AU	BE	DK	DK(2)	ES	FR	GR	IE	IT	LU	PT	SF	UK
Predicted health	0.009***	0.008***	0.012***	0.014***	0.007***	0.008***	0.012***	0.008***	0.007***	0.013***	0.023***	0.009***	0.012***
Income	0.028***	0.030***	0.024***	0.020***	0.041***	0.032***	0.043***	0.033***	0.170***	0.027***	0.044***	0.024***	0.034***
Male 30-44	0.052***	0.138***	0.154***	0.189***	0.074***	0.057***	0.124***	0.094***	0.124***	0.099***	0.062***	0.140***	0.115***
Male 45-59	0.185***	0.151***	0.276***	0.249***	0.011	0.141***	0.079***	0.078***	0.060***	0.044	0.123***	0.192***	0.196***
Male 60-69	-0.021	-0.113***	-0.034	-0.098***	-0.008	0.035	-0.054***	-0.024	0.023	-0.043	-0.083***	-0.046*	0.005
Male 70+	-0.164***	-0.219***	-0.502***	-0.506***	-0.031*	-0.065***	-0.190***	-0.229***	-0.047***	-0.046	-0.266***	-0.135***	-0.291***
Female 16-29	-0.043**	-0.027	-0.102***	-0.077***	-0.046***	-0.127***	-0.032**	-0.006	-0.112***	-0.015	0.031**	-0.184***	-0.005
Female 30-44	0.004	0.060***	0.143***	0.205***	0.049***	0.033***	0.125***	0.016	0.061***	0.019	0.044***	0.118***	0.028
Female 45-59	0.129***	0.085***	0.208***	0.189***	0.005	0.129***	0.046***	0.090***	0.032***	0.035	0.062***	0.210***	0.122***
Female 60-69	-0.204***	-0.158**	-0.230***	-0.311***	-0.023	-0.022	-0.117***	-0.127***	-0.051***	-0.130***	-0.128***	-0.190***	-0.135***
Female 70+	-0.283***	-0.295***	-0.509***	-0.575***	-0.081***	-0.205***	-0.215***	-0.348***	-0.114***	-0.172***	-0.294***	-0.404***	-0.382***
Secondary educ.	0.090***	0.024**	-0.010	0.005	0.151***	0.058***	0.167***	0.164***	0.181***	0.158***	0.307***	-0.031***	0.044***
Higher educ.	0.353***	0.319***	0.275***	0.280***	0.422***	0.438***	0.444***	0.536***	0.497***	0.498***	0.787***	0.327***	0.364***
Part-time empl.	-0.060**	0.062**	-0.029	0.036	-0.047**	-0.075***	-0.117***	-0.004	0.058***	-0.062	-0.195***	-0.106***	-0.006
Self-employed	-0.055**	0.103***	0.107**	0.194***	-0.021	0.104***	-0.052***	0.154***	0.052***	0.049	-0.149***	0.021	0.169***
Student	-0.125***	-0.041*	-0.189***	-0.154***	0.014	-0.087***	-0.015	-0.052**	-0.081***	-0.106**	0.150***	-0.230***	-0.117***
Unemployed	-0.134***	-0.303***	0.009	-0.096***	-0.253***	-0.311***	-0.157***	-0.360***	-0.418***	-0.444***	-0.148***	-0.283***	-0.329***
Houseworker	-0.264***	-0.227***	-0.223***	-0.157***	-0.141***	-0.242***	-0.076***	-0.217***	-0.235***	-0.103***	-0.203***	-0.206***	-0.266***
Inactive	-0.024	-0.296***	0.006	0.068	-0.116***	-0.073*	-0.060	-0.317***	-0.192***	-0.238*	-0.228***	-0.153	-0.277***
Retired – 64	0.013	-0.008	-0.182***	-0.263***	0.006	0.034	0.129***	0.017	0.082***	-0.186***	0.005	-0.110***	-0.005
Retired 65-74	-0.110***	-0.212***	-0.402***	-0.445***	-0.005	-0.021	-0.159***	-0.127***	-0.031**	-0.075*	-0.167***	-0.208***	-0.247***
Retired 75+	-0.230***	-0.285***	-0.544***	-0.587***	-0.007	-0.187***	-0.299***	-0.281***	-0.078***	-0.137***	-0.279***	-0.375***	-0.398***
Divorced/sep.	-0.011	-0.105***	-0.094***	-0.107***	-0.043	-0.045**	0.087**	-0.299***	0.173***	0.010	-0.008	-0.074***	-0.191***
Widowed	-0.195***	-0.227***	-0.424***	-0.491***	-0.055***	-0.217***	-0.119***	-0.284***	-0.100***	-0.051	-0.211***	-0.359***	-0.352***
Unmarried	0.007	0.035***	-0.031***	-0.036***	0.015**	-0.069***	0.042***	-0.004	-0.031***	0.048**	0.023***	-0.122***	0.054***
EU foreigner	-0.178***	-0.286***	-0.160*	-0.251***	0.001	-0.084	NA	0.317	-0.050	-0.189**	-0.338	NA	0.039
Non-EU foreign.	-0.011	-0.122**	-0.267***	-0.106**	-0.051	-0.183***	NA	-0.094	0.012	-0.162	0.182***	NA	-0.079***

Note. DK(2) are results from Wave 2 for Denmark. Significance indicated by *** (1%), ** (5%), * (10%).

Table 4. Bootstrapped contributions of regressors to predicted health inequality (in percentage) by country. ECHP data, 3rd wave 1996 (including 2nd wave for Denmark)

Variable	AU	BE	DK	DK(2)	ES	FR	GR	IE	IT	LU	PT	SF	UK
Income	36.7***	27.6***	8.1	19.5***	51.6***	27.3***	37.8***	27.4***	47.8***	56.9***	38.1***	26.4***	34.8***
Male 30-44	-2.6***	-4.8***	-2.7***	-3.0***	-3.9***	-3.8***	-3.1***	-1.9***	-6.6***	-2.2**	-1.3***	-4.4***	-1.7***
Male 45-59	-17.2***	-6.0***	-7.3***	-4.7***	-0.9	-12.8***	-3.6***	-2.3***	-5.5***	-1.4	-4.1***	-16.9***	-4.6***
Male 60-69	0.81	2.9***	-0.02	0.2	0.6	-1.4	2.4***	0.5	-1.9	0.5	2.2***	1.1	-0.04
Male 70+	9.8***	5.9***	-0.2	0.6	2.7*	3.3***	11.3***	6.8***	5.5***	1.3	7.6***	5.4***	1.6
Female 16-29	0.3	0.3	-0.2	-0.03	0.7***	1.4**	0.04	-0.01	1.6***	0.1	-0.1	0.2	0.02
Female 30-44	-0.2	-2.5***	-1.9*	-2.5**	-2.5***	-1.5**	-2.8***	-0.4	-3.4***	-0.6	-1.2***	-4.9***	-0.3
Female 45-59	-10.3***	-4.8***	-6.6***	-5.1***	-0.6	-10.7***	-2.3***	-2.0***	-4.0***	-1.7	-3.3***	-18.9***	-2.8***
Female 60-69	11.7***	7.8***	1.8	1.7	2.7	1.1	7.7***	4.0***	6.6***	3.7**	5.9***	5.8***	-0.2
Female 70+	34.8***	21.1***	10.3*	9.5*	13.3***	17.1***	19.8***	17.6***	21.5***	9.5***	15.6***	22.3***	8.0***
Secondary educ.	10.2***	0.3	-0.6	0.2	5.9***	3.0***	4.2***	3.6***	11.9***	6.5***	2.5***	-2.2***	1.5***
Higher educ.	5.2***	9.2***	15.7***	15.0***	13.7***	22.9***	8.8***	7.0***	9.5***	8.7**	7.0***	27.3***	14.7***
Part-time empl.	-0.2	0.2	0.2	0.1	0.02	0.7**	0.2	-0.003	-0.04	0.2	2.0***	-0.4*	-0.02
Self-employed	0.4	0.7**	-0.3	-0.5	-0.1	-0.4	-0.7***	-0.2	0.7***	0.1	-0.4	-0.2	-0.5
Student	-1.2***	-0.1	-0.9*	0.04	0.1	-0.8*	-0.1	-0.2	-1.1***	-1.3	0.3*	-1.2	0.1
Unemployed	2.0***	6.5***	-0.1	1.1**	-0.3	4.7***	0.3	3.9***	2.1*	6.4**	0.7***	2.7***	1.5**
Houseworker	8.1***	2.9**	0.8*	1.1**	3.5***	26.0***	2.4***	10.6***	6.4***	-1.1	3.1***	0.4	9.8***
Inactive	0.4	9.6***	-0.1	-0.2	13.6***	0.002	1.5	18.6***	6.8***	1.0	9.3***	-0.1	12.6***
Retired – 64	-0.7	0.1	9.2***	12.8***	-0.04	-0.9	-3.6***	-0.1	-1.9***	8.0***	-0.2	9.1***	0.1
Retired 65-74	2.4**	9.2***	26.6***	20.8***	0.1	1.7	6.2***	0.5	0.7*	1.5	6.7***	16.2***	9.9***
Retired 75+	7.8***	10.8***	46.5***	33.5***	0.3	14.6***	12.0***	3.4***	2.3***	2.2	10.6***	30.0***	12.4***
Divorced/sep.	0.1	0.9*	0.7*	0.6	0.2	0.8*	-0.2	0.7	-0.02	-0.1	0.01	0.7	0.7
Widowed	0.5	0.6	-0.7	-1.1	-0.8*	3.8**	2.1***	2.2	1.3*	-0.6	-1.0	1.6	2.0
Unmarried	-0.2	-0.02	-0.6	-0.6	-0.04	3.2***	-0.5*	0.02	-0.4	1.3*	-0.2	0.4	0.1
EU foreigner	1.2*	1.8*	0.7	0.7*	0.05	-0.04	NA	-0.03	-0.03	0.7	-0.02	NA	-0.03
Non-EU foreign.	0.02	-0.3	1.3**	0.3	-0.03	0.9	NA	0.3	-0.003	0.02	-0.04	NA	0.4

Note. DK(2) are results from Wave 2 for Denmark. Significance indicated by *** (1%), ** (5%), * (10%).

Table 5. Contribution of retired to inequality in health. Summary of results. ECHP data, 3rd wave 1996 (including 2nd wave for Denmark)

	AU	BE	DK	DK (2)	ES	FR	GR	IE	IT	LU	PT	SF	UK
Retired - 64													
Regression Coeff.	**-0.056**	-0.008	**-0.094**	**-0.102**	**-0.024**	**-0.032**	**-0.056**	**-0.026**	**-0.019**	**-0.064**	**-0.135**	**-0.079**	**-0.053**
Mean / Mean(Health)	**0.080**	**0.077**	**0.064**	**0.066**	**0.022**	**0.064**	**0.059**	**0.019**	**0.085**	**0.085**	**0.057**	**0.097**	**0.047**
CI	0.013	-0.008	**-0.182**	**-0.263**	0.006	0.034	**0.129**	0.016	**0.082**	**-0.186**	0.004	**-0.110**	**-0.005**
Contribution (%)	-0.66	0.06	**9.19**	**12.79**	-0.03	-0.91	**-3.56**	-0.09	**-1.85**	**8.03**	-0.15	**9.05**	0.11
Retired 65-74													
Regression Coeff.	**-0.022**	**-0.031**	**-0.080**	**-0.066**	**-0.017**	**-0.048**	**-0.042**	-0.006	**-0.015**	**-0.026**	**-0.094**	**-0.057**	**-0.049**
Mean / Mean(Health)	**0.092**	**0.113**	**0.099**	**0.099**	**0.078**	**0.121**	**0.110**	**0.047**	**0.103**	**0.095**	**0.098**	**0.126**	**0.099**
CI	**-0.111**	**-0.213**	**-0.402**	**-0.445**	-0.005	-0.021	**-0.159**	**-0.126**	**-0.030**	-0.075	**-0.167**	**-0.208**	**-0.247**
Contribution (%)	**2.42**	**9.21**	**26.56**	**20.83**	0.10	1.71	**6.16**	0.48	0.69	1.53	**6.74**	**16.15**	**9.89**
Retired 75-													
Regression Coeff.	**-0.054**	**-0.038**	**-0.103**	**-0.084**	**-0.052**	**-0.067**	**-0.067**	**-0.031**	**-0.030**	-0.033	**-0.127**	**-0.095**	**-0.046**
Mean / Mean(Health)	**0.057**	**0.082**	**0.099**	**0.095**	**0.051**	**0.087**	**0.072**	**0.030**	**0.070**	**0.059**	**0.068**	**0.078**	**0.082**
CI	**-0.230**	**-0.286**	**-0.544**	**-0.587**	-0.007	**-0.187**	**-0.299**	**-0.280**	**-0.078**	**-0.137**	**-0.279**	**-0.375**	**-0.398**
Contribution (%)	**7.75**	**10.81**	**46.48**	**33.46**	0.29	**14.57**	**11.96**	**3.43**	**2.29**	2.20	**10.61**	**29.65**	**12.38**

Boldface indicates significance at 5 percent level. All results are based on 1,000 bootstrap replications.

Table 6. Means of variables and number of observations by country. SHARE data.

Variable	Denmark	Austria	Germany	Sweden	Netherlands	Spain	Italy	France	Greece	Switzerland	Belgium
Predicted HUI	0.85	0.83	0.80	0.86	0.85	0.77	0.79	0.81	0.83	0.88	0.84
Log(Income)	10.15	9.89	10.05	10.21	10.14	9.29	9.56	9.98	9.26	10.14	9.91
SAH version 1 (*)											
SAH version 2	0.51	0.48	0.50	0.49	0.50	0.50	0.50	0.50	0.50	0.49	0.52
Male 50-59 (*)											
Male 60-69	0.14	0.17	0.19	0.16	0.16	0.13	0.17	0.12	0.14	0.15	0.13
Male 70-	0.13	0.11	0.12	0.16	0.13	0.17	0.14	0.14	0.13	0.15	0.14
Female 50-59	0.20	0.16	0.19	0.20	0.23	0.19	0.19	0.21	0.20	0.20	0.21
Female 60-69	0.14	0.22	0.19	0.17	0.15	0.16	0.21	0.14	0.14	0.15	0.15
Female 70-	0.19	0.20	0.16	0.16	0.14	0.23	0.16	0.20	0.18	0.18	0.17
Employed (*)											
Selfemployed	0.04	0.04	0.05	0.05	0.05	0.06	0.07	0.04	0.11	0.10	0.04
Unemployed	0.04	0.02	0.05	0.02	0.02	0.03	0.01	0.04	0.01	0.02	0.05
House worker	0.02	0.12	0.10	0.01	0.24	0.35	0.23	0.11	0.25	0.08	0.16
Disabled	0.03	0.01	0.03	0.03	0.08	0.04	0.01	0.03	0.01	0.03	0.04
Retired -64	0.13	0.25	0.11	0.08	0.07	0.06	0.20	0.14	0.12	0.05	0.15
Retired 65-	0.41	0.42	0.41	0.45	0.29	0.31	0.36	0.41	0.32	0.42	0.37
Married/cohabitated (*)											
Single	0.33	0.39	0.21	0.23	0.18	0.26	0.22	0.30	0.32	0.29	0.26
Primary education (*)											
Secondary education	0.44	0.48	0.57	0.26	0.23	0.07	0.17	0.28	0.23	0.21	0.26
Long education	0.31	0.20	0.25	0.21	0.20	0.07	0.05	0.18	0.15	0.26	0.23
Non-foreign (*)							1				
Foreign	0.01	0.02	0.02	0.02	0.01	0.01	0	0.05	0.01	0.08	0.04
Number of observations	1593	1811	2905	2936	2773	2277	2437	2880	2604	916	3594

Note. Reference categories are marked by (*).

Table 7. Health equation: Interval regression results by country. SHARE data. Dependent variable is 'prediced health' form a mapping approach.

	Denmark		Austria		Germany		Sweden		Netherlands	
Variable	**Coef**	**T**	**Coef**	**T**	**Coef**	**T**	**Coef**	**T**	**Coef**	**T**
Log(Income)	0.009	1.67	-0.001	-0.19	0.005	1.92	0.012*	3.73	0.001	0.39
SAH version 2	-0.059*	-8.53	-0.080*	-12.74	-0.103*	-19.83	-0.037*	-8.90	-0.081*	-20.14
Male 60-69	0.047*	3.38	0.032*	2.27	-0.020	-1.87	0.009	1.08	-0.002	-0.26
Male 70-	0.019	0.98	-0.005	-0.29	-0.066*	-4.84	-0.036*	-3.40	-0.024*	-2.29
Female 50-59	0.008	0.71	0.023	1.90	0.002	0.22	-0.015*	-2.16	-0.001	-0.08
Female 60-69	0.051*	3.44	0.025	1.84	-0.005	-0.46	0.007	0.79	0.006	0.66
Female 70-	0.029	1.60	-0.035*	-2.19	-0.071*	-5.27	-0.041*	-3.88	-0.023*	-2.37
Selfemployed	-0.005	-0.26	-0.011	-0.62	0.022	1.73	0.008	0.85	0.005	0.45
Unemployed	-0.057*	-3.25	-0.056*	-2.58	-0.048*	-3.78	-0.023	-1.60	-0.029*	-2.04
House worker	-0.025	-0.87	-0.023	-1.52	-0.042*	-3.75	-0.025	-1.15	-0.020*	-2.75
Disabled	-0.288*	-12.89	-0.294*	-8.94	-0.251*	-13.83	-0.151*	-11.04	-0.187*	-20.68
Retired -64	-0.098*	-7.24	-0.049*	-3.90	-0.044*	-3.93	-0.113*	-13.01	-0.007	-0.70
Retired 65-	-0.072*	-4.69	-0.058*	-3.96	-0.048*	-4.64	-0.025*	-3.21	-0.038*	-4.47
Single	-0.003	-0.30	-0.001	-0.05	-0.010	-1.48	-0.004	-0.67	-0.014*	-2.40
Secondary education	0.032*	3.47	0.046*	5.99	0.037*	4.79	0.015*	2.80	0.016*	3.15
Long education	0.045*	4.42	0.053*	5.62	0.056*	6.25	0.036*	6.44	0.024*	4.31
Foreign	-0.109*	-3.22	0.014	0.65	-0.029	-1.68	-0.036*	-2.66	-0.066*	-3.59
Log likelihood	-2994.37		-3108.64		-4729.92		-4925.26		-4346.20	
LR test	350.68		407.41		893.38		565.65		926.23	

Table 7 (continued)

	Spain		Italy		France		Greece		Switzerland		Belgium	
Variable	**Coef**	**T**	**Coef**	**T**	**Coef**	**T**	**Coef**	**T**	**Coef**	**T**	**Coef**	**T**
Log(Income)	-0.004	-1.35	0.013*	4.05	0.011*	3.98	-0.001	-0.06	0.001	0.27	0.001	0.42
SAH version 2	-0.127*	-18.13	-0.115*	-18.77	-0.120*	-22.76	-0.088*	-17.47	-0.073*	-12.21	-0.087*	-21.48
Male 60-69	-0.005	-0.33	-0.005	-0.40	-0.018	-1.48	-0.006	-0.61	0.010	0.89	-0.004	-0.48
Male 70-	-0.047*	-2.61	-0.061*	-3.96	-0.085*	-5.98	-0.059*	-4.60	-0.018	-1.15	-0.035*	-3.35
Female 50-59	-0.008	-0.61	-0.003	-0.26	-0.005	-0.61	-0.010	-1.13	0.001	0.07	0.001	0.16
Female 60-69	-0.047*	-3.02	-0.023	-1.90	-0.018	-1.50	-0.031*	-2.82	-0.025*	-1.99	-0.015	-1.78
Female 70-	-0.116*	-7.09	-0.097*	-6.64	-0.067*	-4.98	-0.086*	-6.97	-0.028	-1.85	-0.047*	-4.91
Selfemployed	-0.005	-0.31	0.010	0.68	-0.020	-1.43	0.009	0.94	-0.001	-0.03	-0.004	-0.32
Unemployed	-0.044*	-2.05	-0.035	-1.24	0.001	0.01	-0.051*	-2.29	-0.022	-0.87	-0.028*	-2.70
House worker	-0.037*	-2.70	-0.039*	-2.99	-0.016	-1.46	-0.020*	-2.00	-0.016	-1.24	-0.023*	-2.77
Disabled	-0.191*	-9.46	-0.249*	-7.62	-0.218*	-11.98	-0.271*	-10.64	-0.216*	-11.30	-0.218*	-18.78
Retired -64	-0.080*	-4.54	-0.031*	-2.58	-0.027*	-2.55	-0.022*	-2.30	-0.021	-1.39	-0.021*	-2.72
Retired 65-	-0.054*	-3.48	-0.039*	-2.87	-0.032*	-2.69	-0.042*	-3.89	-0.025*	-2.04	-0.033*	-3.80
Single	0.002	0.22	-0.007	-0.88	0.002	0.34	-0.011	-1.85	0.003	0.38	-0.012*	-2.40
Secondary education	0.039*	2.86	0.018*	2.06	0.022*	3.45	0.040*	6.05	0.002	0.30	0.023*	4.57
Long education	0.039*	2.79	0.037*	2.55	0.052*	6.77	0.051*	6.35	0.027*	3.64	0.038*	7.17
Foreign	0.019	0.63	NA	NA	-0.061*	-4.84	-0.058	-1.29	-0.017	-1.44	-0.023*	-2.07
Log likelihood	-3801.82		-3957.48		-4841.16		-4411.44		-1440.01		-5903.58	
LR test	600.82		620.49		946.57		875.37		298.21		987.65	

Table 8. Concentration indices of variables by country. SHARE data.

Variable	Denmark	Austria	Germany	Sweden	Netherlands	Spain	Italy	France	Greece	Switzerland	Belgium
Predicted HUI	0.021	0.004	0.017	0.014	0.006	0.002	0.017	0.016	0.013	0.004	0.008
Log(Income)	0.042	0.054	0.053	0.037	0.053	0.066	0.058	0.054	0.055	0.061	0.061
SAH version 2	-0.006	-0.026	-0.012	0.001	-0.003	0.012	0.004	0.004	0.002	0.013	-0.001
Male 60-69	0.094	0.174	-0.009	0.096	-0.035	0.045	0.084	0.011	0.107	0.105	0.049
Male 70-	-0.273	0.118	-0.030	-0.059	0.050	-0.082	-0.052	0.028	-0.040	-0.018	-0.02
Female 50-59	0.277	-0.087	0.085	0.091	-0.008	-0.022	-0.023	0.015	0.067	0.006	0.014
Female 60-69	-0.045	-0.040	-0.027	0.037	0.001	0.114	0.035	-0.008	-0.049	-0.043	-0.016
Female 70-	-0.430	-0.088	-0.171	-0.330	-0.72	-0.102	-0.119	-0.104	-0.212	-0.107	-0.122
Selfemployed	0.342	-0.040	0.511	0.124	0.217	0.340	0.251	0.230	0.158	0.122	0.299
Unemployed	0.026	-0.391	-0.300	-0.131	-0.142	-0.040	-0.365	-0.123	-0.316	-0.356	-0.201
House worker	-0.249	-0.211	-0.007	-0.263	-0.081	-0.067	-0.219	-0.163	-0.155	0.008	-0.135
Disabled	-0.305	-0.051	-0.210	-0.040	-0.119	-0.061	-0.233	-0.255	-0.152	-0.059	-0.159
Retired -64	0.001	0.107	-0.063	-0.113	0.006	0.124	0.134	0.064	0.164	0.060	0.079
Retired 65-	-0.310	0.039	-0.091	-0.131	-0.033	-0.026	-0.028	-0.019	-0.079	-0.061	-0.033
Single	-0.371	-0.191	-0.230	-0.426	-0.142	-0.171	-0.197	-0.223	-0.147	-0.157	-0.180
Secondary education	0.018	0.038	-0.022	0.048	0.052	0.204	0.250	0.062	0.101	-0.108	0.054
Long education	0.252	0.164	0.189	0.239	0.256	0.246	0.512	0.355	0.419	0.245	0.191
Foreign	0.057	-0.173	-0.133	-0.129	-0.199	0.036	NA	-0.316	0.185	-0.153	-0.170

Table 9. Bootstrapped contributions of regressors to predicted health inequality (in percentage) by country. SHARE data.

Variable	Denmark	Austria	Germany	Sweden	Netherlands	Spain	Italy	France	Greece	Switzerland	Belgium
Log(Income)	20.97	-9.43	21.28	36.83	8.36	-169.74	52.31	45.74	-0.78	12.02	6.96
SAH version 2	1.11	30.19	4.43	-0.06	2.22	-49.30	-1.66	-1.70	-0.63	-12.31	0.31
Male 60-69	3.61	28.73	0.26	1.09	0.23	-2.07	-0.53	-0.18	-0.87	4.46	-0.41
Male 70-	-3.77	-2.00	1.83	2.68	-2.91	43.31	3.36	-2.47	3.03	1.31	0.12
Female 50-59	2.56	-9.62	0.24	-2.25	0.02	2.29	0.10	-0.12	-1.31	0.02	0.05
Female 60-69	-1.88	-6.56	0.21	0.34	-0.01	-59.87	-1.26	0.14	2.12	4.36	0.55
Female 70-	-13.40	18.40	14.09	17.62	4.38	179.25	13.65	10.73	32.09	14.25	15.31
Selfemployed	-0.39	0.49	4.17	0.43	0.85	-7.04	1.26	-1.40	1.51	-0.11	-0.60
Unemployed	-0.38	15.92	5.61	0.54	1.70	3.73	1.34	-0.01	2.14	3.18	4.06
House worker	0.59	17.26	0.24	0.52	7.23	58.52	14.51	2.31	7.27	-0.29	7.59
Disabled	16.20	5.45	10.52	1.38	33.94	33.98	4.86	11.36	5.46	10.40	23.17
Retired -64	-0.07	-38.78	2.35	8.57	-0.06	-41.32	-6.43	-1.86	-4.25	-1.75	-3.70
Retired 65-	51.93	-27.97	13.51	12.16	7.04	29.09	3.03	1.94	10.23	17.33	6.21
Single	1.77	0.86	3.77	2.92	6.71	-5.60	2.32	-1.11	5.06	-3.28	8.45
Secondary education	1.45	25.23	-3.54	1.43	3.70	39.24	5.72	3.02	8.93	-1.45	4.77
Long education	20.11	53.36	20.34	14.84	23.32	44.90	7.41	26.05	30.29	46.64	25.05
Foreign	-0.40	-1.55	0.69	0.93	3.27	0.61	NA	7.56	-0.32	5.22	2.12

Table 10. Contribution of retired to inequality in health. Summary of results. SHARE data,

	Denmark	Austria	Germany	Sweden	Netherlands	Spain	Italy	France	Greece	Switzerland
Retired -64										
Regression coeff.	-0.088	-0.050	-0.056	-0.102	-0.027	-0.089	-0.039	-0.030	-0.023	-0.015
Mean/Mean(health)	0.141	0.289	0.138	0.105	0.082	0.091	0.256	0.150	0.157	0.057
CI	0.006	0.118	-0.047	-0.047	0.214	0.119	0.149	0.080	0.169	0.086
Contribution (%)	-0.38	-38.44	1.72	3.79	-4.49	-12.22	-9.34	-2.18	-2.84	-1.33
Retired 65+										
Regression coeff.	-09.065	-0.065	-0-055	-0.030	-0.045	-0.046	-0.047	-0.055	-0.042	-0.031
Mean/Mean(health)	0.447	0.494	0.500	0.500	0.318	0.377	0.449	0.500	0.410	0.471
CI	-0.308	0.029	-0.132	-0.178	-0.084	0.020	-0.019	-0.039	-0.190	-0.079
Contribution (%)	42.90	-21.78	16.15	19.19	11.27	-4.40	2.48	6.66	15.46	19.61

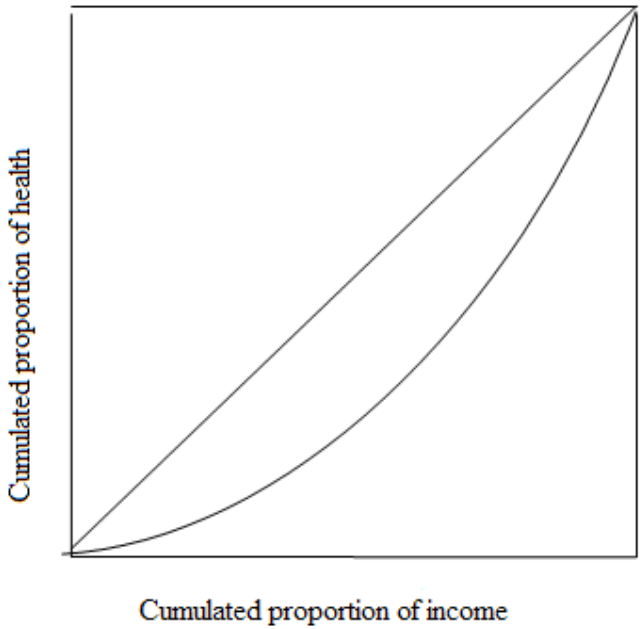

Figure 1. Example of a concentration curve for health.