

Is there a relationship between home ownership and income-related health inequality among the elder in Europe?

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Abstract

The study investigates whether there is a connection between home ownership and income-related health inequality. While such a relationship has never been investigated, it is readily motivated. First, home owners have larger opportunity losses from illness than renters which motivate them to invest more in their health. Second, home owners hold larger opportunities to furnish their home according to their desires and needs than renters whereby they realize larger life qualities which improve their wellbeing and health. Third, home owners are better off economically than renters. Put together, these three factors points to a positive connection between home ownership and income-related health inequality. Based on The Survey of Health, Ageing and Retirement in Europe (SHARE), comparative results are offered for 11 European countries. It is shown that for several countries there are substantive contributions from home ownership to income-related health inequality and that these contributions may to varying extent be related to better health of the home owners as well as an income distribution in favour of home owners.

Introduction

Earlier studies of health inequality across European countries have shown intriguing results. In a recent study van Doorslaer and Koolman (2004) analysed the level of self-assessed health as well as income-related inequalities in health across populations in 13 European countries. 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(utility) while Portugal was ranked at the bottom, followed by Italy. With respect to distribution there were significant income-related health inequalities – even when controlling for age and gender - favouring the higher income groups. This was in particular the case for Portugal, but to a lesser extent also for the UK and Denmark. Such differences that exist after control for age and gender can be seen as differences that in principle might have been evaded through a relevant health policy. The authors showed a positive correlation between income and health inequality. Still, health inequality was not seen as merely a reflection of income inequality. In a decomposition analysis they analysed the contribution to inequality by a number of socio-economic and demographic variables. In their analysis health inequality was calculated as the weighted sum of the determinants with weights equal to health elasticities of the determinants. They found that income elasticity of the explanatory variables were more important in explaining income-related inequalities in health than were their unequal distribution by income.

The present study aims at investigating whether there is a connection between home ownership and income-related health inequality. While such a relationship has never been investigated, it is readily motivated. First, home owners have larger opportunity losses from illness than renters which motivate them to invest more in their health. Second, home owners hold larger opportunities to furnish their home according to their desires and needs than renters whereby they realize larger life qualities which improve their wellbeing and health. Third, home owners are better off economically than renters. Put together, these three factors points to a positive connection between home ownership and income-related health inequality.

Data

The present study 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. Eligible individuals in each country specific sample, individuals interviewed, and response rate is shown in Table 1.

(Insert Table 1 around here)

As it appears from Table 1, there is a substantial variation in response rate between the participating ten countries with a minimum of 33% in Switzerland and 69% in France. The average is just below 50%. When compared to the earlier mentioned study by van Doorslaer *et al.*, both studies include Denmark; Germany, Italy, Netherlands, Spain, Austria, France and Greece. In addition, the present study includes Sweden and Switzerland, while van Doorslaer *et al.* also included Belgium, Luxemburg, UK, Ireland and Portugal. The overlap of countries that are included in the two studies allows some comparisons between these.

Data applied for the present study are from the SHARE Release 1. A new Release 2 was recently made available. However, there are still a few shortcomings and validations to be done in this second release. A future version of the study will apply the recent Release of SHARE when it is completely available.

In the analysis we use a number demographic and socio-economic variables defined as shown below in Table 2. Self-assessed health on a five point scale was asked in two versions with the upper category being defined as either “Very good” (version 1) or “Excellent” (version 2), and with corresponding differences in the other response categories.

(Insert Table 2 around here)

Methods

The point of departure for analysing income related health inequality is the concentration curve for health shown in Figure 1.

(Insert Figure 1 around here)

While the horizontal axis shows the cumulative proportion of a population according to income, the vertical axis shows the proportion of cumulated health possessed by the aforementioned proportion. If the 20 percent of the population earning lowest income possesses precisely 20 percent of the cumulated health and vice versa, then the relationship would be a straight line with an angle of 45 degrees. However, if the 20 percent of population earning the lowest income possesses less than 20 percent of cumulative health while the 20 percent earning the highest income possesses more than 20 percent of cumulated health and vice versa, then the relationship will be a curve below the 45 degree line, thus showing that health concentrates among the richest. The concentration index (C) is simply twice the area between the line and the curve and is restricted to the interval from 0 (if health is equally distributed across income) and 1 (if the richest person is in perfect health and all other is in perfect ill-health). Thus, the larger C is, the more is health concentrated among the high income earners.

Next, a part of the C can be ascribed to deterministic factors, like absolute income, age, gender etc. This part is shown as twice the shaded area and is termed the predicted (or deterministic) C, while twice the remaining area between the line and the curve is ascribed to as unexplained or residual health inequality. Further, for each deterministic factor, its contribution can be quantified using a decomposition technique to be outlined in some details in the following.

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 ordered probit 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). Our approach is to use scores to scale the threshold values between intervals of SAH using a non-parametric approach applied to the HUI-3 in a 1994 Canadian survey, National Population Survey (NPS) (van Doorslaer *et al.*, 1997; van Doorslaer *et al.*, 2003).

For any variable, y , the income-related inequality is measured using the concentration index, $C = 2 \cdot \text{cov}(y, R) / \mu$, where R is the fractional income rank defined for individual i as $R_i = (r_i - 1/2) / N$, with r_i defined as the unconditional income rank for individual i . C can be calculated using the regression $(2\sigma_R^2 / \mu) y_i = \alpha + \beta R_i + u_i$, 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 readily obtained from the regression procedure output.

Assuming that health is linked to K determinants through a linear regression, $y_i = \sum_k \delta_k x_{ik} + \varepsilon_i$, the concentration index, C , for y can be decomposed as

$$(1) \quad C = \sum_k (\delta_k \mu_k / \mu) C_k + (1/\mu) CG_\varepsilon = \sum_k \eta_k C_k + (1/\mu) CG_\varepsilon$$

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 can be thought of as 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 (δ_k) (ii) its mean in population (μ_k) and (iii) its association with income rank (C_k).

Results.

(Insert Table 3 around here)

Means of predicted HUI, explanatory variables and number of observations per country are shown in Table 3. Throughout, we use the terms “predicted HUI” and “health” synonymously. Compared to the earlier study by van Doorslaer *et al.* (2004), the predicted value of HUI (as calculated by interval regression) is in general lower in the present study, ranging from 0.77 in Spain to 0.88 in Switzerland. This observation is to be expected as the population in the study is older, and health status tends to decrease by increasing age. Relatively low values of health status of the elderly are found in the SHARE survey in Spain, Italy, Germany and France. In contrast, the elderly population in Germany, followed by Denmark and Netherlands, has a relatively high level of health with predicted HUI between 0.88 and 0.85.

The demographic structure of the sample seems to vary substantially by country with 13 % being males 60-69 years in Spain as compared to 20 % in Germany. For the same age group, females make up 11 % in Switzerland and 21 % in Italy. 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 33 % in Spain should be expected as it reflects differences in female labour force participation now and in the past.

It is of particular interest to notice that the share of the population above 50 years being retired varies substantially between countries. Thus, the percentage which is retired and below the age of 65 years varies from 6 % in Spain to 24 % in Austria. Obviously, this reflects both the pattern of retirement, other means of being supported when not active on the labour market (doing housework, being unemployed or disabled), and the age composition.

The percentage possessing a secondary or higher education also varies quite substantially between countries from 8 % in Spain to 56 % in Germany. Obviously, this reflects past education policy and possibilities.

Finally, the proportion of home owners varies from 54 % in Germany and Switzerland to 88 % in Spain. Relatively low proportions are further found in Austria and the Netherlands, while relatively high proportions are further found in Greece, Italy and Belgium, and intermediate proportions are found in Denmark, Sweden and France. These varying proportions reflect variation in housing market conditions and policies as well as variation in economic conditions, including wealth composition of the elder population.

(Insert Table 4 around here)

Table 4 shows interval regression results per country. Dependent variable is HUI scaled SAH. Due to the survey nature of the study no causal relationships can be formally inferred. Strictly spoken, the regression coefficients represent interrelationships between health and the variables. For example, the relationship between health and home ownership could be an effect of home ownership on health, but it could also represent a selection effect, as it may be the healthier that are able to raise the necessary amount of money to invest in an owned home.

Log(income) has a significantly positive coefficient for three countries and is insignificant for the remainder. When significant the coefficients vary between 0.008 and 0.011. Results should be directly comparable as they are measured in the same units (PPP adjusted Euros).

The coefficients for the dummy indicating that SAH were asked by using version 2 (cf. Table 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 two exceptions (Denmark and Austria), all significant coefficients of demographic variables are negative implying lower health (utility) as compared to the reference group (males 50-59 years). For most countries, females 50-69 has a negative sign implying lower health (utility) compared to men in the same age group.

Compared to employed, unemployed and house workers have a negative coefficient when significant. Not surprisingly, disabled have a lower health compared to the employed. The same is the case for retired in both age groups.

With one exception (Belgium), marital status has no significant coefficients while long education (with the exception of Belgium) generally has a positive coefficient reflecting the well documented phenomenon that those with better education also possess better health.

(Insert Table 5 around here)

Turning to the concentration indices of dependent (predicted HUI) as well as independent variables in Table 5 some interesting results about income-related inequalities appear. While it is the case in all countries that predicted HUI is unequally distributed in favour of higher incomes, there are quite substantial differences, ranging from about 0.023 in Denmark to 0.001 in Spain. High values are further found for Germany, France and Italy, while low values are found for Switzerland, Netherlands and Austria, and intermediate values for Belgium, Sweden and Greece.

The concentration index for log(income) has a range between 0.009 (Sweden, followed by Denmark) and 0.067 (Spain, next to Belgium and Switzerland). In general, the concentration index is higher for the older population compared to the total as reported by van Doorslaer and Koolman (2004), implying a more skewed income distribution for the older population.

(Insert Figure 3 around here)

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

Income-related distribution of retired shows some pattern across countries. Young retired (up to the age of 64 years) are distributed in the higher income end in some countries, in particular in Austria, Italy, Greece and Belgium, while the opposite seem to be the case for Germany and Sweden. 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 (-0,294) far beyond those of the other countries.

Single persons are distributed at the lower end in all countries in contrast to high education which concentrates throughout among the high income earners.

Finally, home ownership concentrates among high income groups for all countries except Belgium, where home ownership seem to concentrate among low income earners, and Greece where no significant relationship can be shown. A particularly high concentration of home ownership is found for Denmark. This can be due to the taxation rules which are relatively generous for high income earning home owners.

(Insert Table 6 around here)

The question of how the demographic and socio-economic variables contribute to income-related inequality in health is shown in Table 6. The interpretation is as follows (cf. van Doorslaer *et al.*, 2004) with figures from Denmark as an example: The income-related health inequality for Denmark would *ceteris paribus* be 16.77 % lower if income were equally distributed, while it would be 2.83 % higher if singleness were equally distributed.

Income in itself contributes significantly to inequality in health for some countries (Sweden, Italy and France) but is insignificant for the remaining countries.

Among other variables with significant contributions are house workers in Italy, Greece and Belgium, and disabled in Denmark, Germany, Netherlands, France and Belgium. Young retired tend to increase income-related health inequality in Sweden and to decrease it in Greece, while older retired tend to increase the inequality in Denmark to a substantial extent (46.60 %), and to a

smaller extent in Germany, Sweden and Greece. Long education seems to increase health inequality in several countries (Denmark, Sweden, Netherlands, France, Greece and Belgium).

Finally, home ownership seems to increase health inequality significantly in some countries (Denmark, Sweden, Netherlands and France). This is due to the combination of a large positive effect of home ownership on health status (Table 4) and a heavy concentration of home ownership among the high income earners as shown by positive concentration indices for home ownership (Table 5).

Discussion

A general concern in this analysis is that the SHARE data set has a relatively low response rate, and consequently results must be read with this reservation.

The present paper extends the analysis made by van Doorslaer *et al.* (2004) by splitting the retired into a younger and older age group, delimited by the age of 65. A difference is that the study population in the present study is the older segment of the adult population (aged 50 and above) rather than the total adult population. We further add housing tenure choice to the set of factors potentially contributing to health inequality.

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 (Netherlands and Spain, among others) ‘other economically inactive groups’ have a greater 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 the Netherlands and Austria, leaving the young retired group for those who are relatively wealthier.

We found that unemployment did not contribute much to income-related inequality on health, while being disabled contributed substantially for several countries.

Turning to Denmark as an outlier, we found a relatively high concentration index for the predicted HUI – 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 worse health than others of the same age and income, and they concluded that it therefore mainly reflect 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 being in less than average health of the population. It is known that a big share of these live on the universal public old age pension without having additional pension. Younger generations benefit from labour market pension in addition to the old age pension and are thus better off, compared to the working population. A study by OECD has shown that disposal income of those over 64 years, as compared to those in the age group 18-64 years, is 67.4 % in Denmark while the average in OECD is 78% (OECD, 2002). This indicates that in general, income of retired in Denmark is relatively low compared to the younger individuals.

Denmark is also (together with the Netherlands) outlying by having a effect of home ownership on income-related health inequality. This large effect is due to the combination of a high positive effect of home ownership on health status and a heavy concentration of home ownership among the high income earners. While the latter may be explained by generous taxation rules favouring high income earning home owners, the former is less clear-cut. Potential relationships may be that home owners have larger opportunity losses from ill health and therefore invest more in their health. Another explanation may be that home ownership enables one to change the dwelling according to ones desire, thus leading to improved life quality which exert a positive effect on health.

As to international comparisons of self-reported health there has been documented to be large variations across countries that 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 people in Southern Europe tend to underrate. Whether this seemingly pattern affects the “true” distribution of health has still to be explored.

Literature

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Figure 1. The concentration curve.

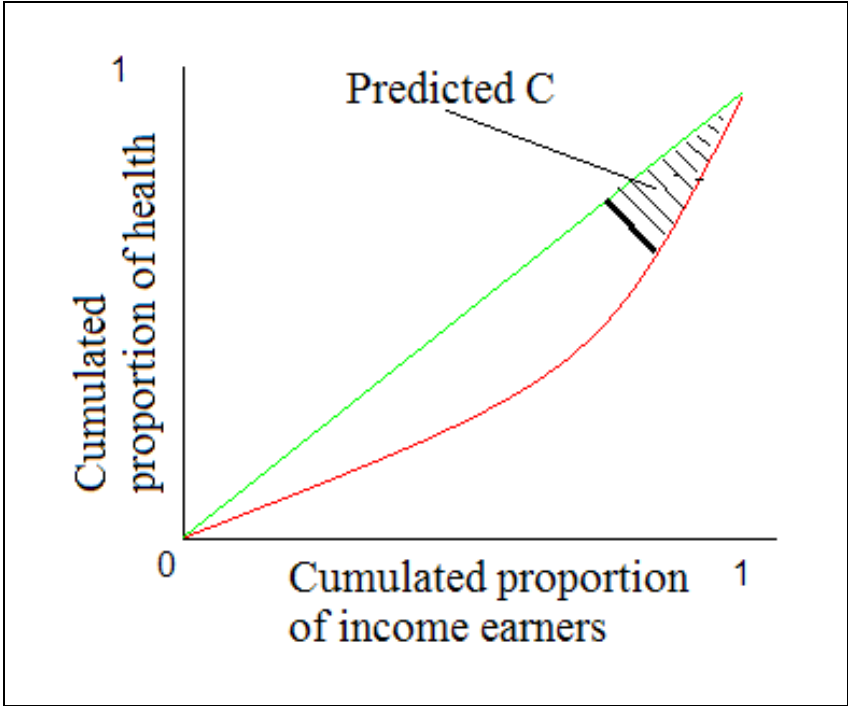


Table 1. Eligible individuals, individuals interviewed and response rate in each country sample.

Country	Total eligible individuals	Individuals interviewed	Response rate %
Denmark	2,872	1,699	59
Germany	4,478	2,350	52
Italy	4,603	2,023	44
Netherlands	4,338	2,350	54
Spain	4,900	1,813	54
Sweden	5,121	2,116	37
Austria	4,347	1,957	41
France	2,533	1,746	45
Greece	3,485	2,131	69
Switzerland	2,979	997	33
Belgium			
Total	40,016	19,182	48

Source: Börsch-Supran *et al.* 2005, p.98

Table 2. Definition of variables.

Log(Income)	Gross annual income; PPP adjusted (Euro); equalised and log transformed
SAH	Self assessed health on a five point scale. The question was asked in two versions, each to roughly half of the respondents. Version 1: Very good, Good, Fair, Bad, Very bad Version 2: Excellent, Very good, Good, Fair, Poor
SAH version 1 (*)	Dummy for those asked for SAH in Version 1
SAH version 2	Dummy for those asked for SAH in Version 2
Male 50-59 (*)	Dummy for being male aged 50-59
Male 60-69	Dummy for being male aged 60-69
Male 70-	Dummy for being male aged 70 or older
Female 50-59	Dummy for being female aged 50-59
Female 60-69	Dummy for being female aged 60-69
Female 70-	Dummy for being female aged 70 or older
Employed (*)	Dummy for being employed
Selfemployed	Dummy for being self-employed
Unemployed	Dummy for being unemployed
House worker	Dummy for being house worker
Disabled	Dummy for being disabled
Retired -64	Dummy for being retired and less than 65 years
Retired 65-	Dummy for being retired and 65 years or older
Married/cohabitated (*)	Dummy for being married or cohabitated
Single	Dummy for being single
Primary education (*)	Dummy for holding primary education (ISCED-97 codes 1 and 2)
Secondary education	Dummy for holding secondary education (ISCED-97 codes 3 and 4)
Long education	Dummy for holding long education (ISCED-97 codes 5 and 6)
Non-foreign (*)	Dummy for being non-foreign
Foreign	Dummy for being foreign
Home renter (*)	Dummy for being home renter
Home owner	Dummy for being home owner

Note. Reference categories for the subsequent analyses are marked by (*)

Table 3. 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)	10.08	9.84	10.02	10.18	10.12	9.30	9.55	9.93	9.22	10.11	9.88
SAH version 1 (*)											
SAH version 2	0.50	0.48	0.49	0.49	0.50	0.50	0.50	0.50	0.50	0.48	0.52
Male 50-59 (*)											
Male 60-69	0.14	0.18	0.20	0.15	0.15	0.13	0.16	0.13	0.14	0.19	0.14
Male 70-	0.14	0.12	0.12	0.15	0.13	0.17	0.13	0.14	0.14	0.17	0.16
Female 50-59	0.17	0.15	0.17	0.20	0.23	0.19	0.18	0.19	0.19	0.17	0.19
Female 60-69	0.12	0.20	0.18	0.16	0.14	0.17	0.21	0.13	0.15	0.11	0.13
Female 70-	0.20	0.21	0.16	0.18	0.15	0.21	0.17	0.21	0.21	0.17	0.17
Employed (*)											
Selfemployed	0.04	0.04	0.06	0.06	0.05	0.06	0.07	0.04	0.11	0.11	0.04
Unemployed	0.05	0.02	0.06	0.02	0.02	0.04	0.01	0.04	0.01	0.02	0.05
House worker	0.01	0.10	0.09	0.01	0.21	0.33	0.22	0.09	0.24	0.04	0.13
Disabled	0.03	0.01	0.03	0.02	0.08	0.04	0.01	0.03	0.01	0.04	0.05
Retired -64	0.11	0.24	0.11	0.08	0.07	0.06	0.20	0.14	0.12	0.06	0.15
Retired 65-	0.43	0.45	0.42	0.46	0.31	0.32	0.37	0.43	0.34	0.44	0.39
Married/cohabitated (*)											
Single	0.45	0.50	0.31	0.32	0.27	0.31	0.28	0.42	0.44	0.40	0.37
Primary education (*)											
Secondary education	0.45	0.47	0.56	0.26	0.23	0.08	0.18	0.29	0.24	0.21	0.25
Long education	0.30	0.22	0.27	0.21	0.20	0.08	0.05	0.19	0.14	0.29	0.25
Non-foreign (*)											
Foreign	0.01	0.02	0.02	0.02	0.01	0.01	NA	0.05	0.01	0.08	0.04
Home renter (*)											
Home owner	0.68	0.56	0.54	0.73	0.59	0.88	0.79	0.73	0.84	0.54	0.79
Number of observations	1142	1369	1927	2062	1841	1633	1698	1942	1865	647	2408

Note. Reference categories are marked by (*). Means are omitted for reference categories.

Table 4. Health equation: Interval regression results by country. SHARE data.

Variable	Denmark		Austria		Germany		Sweden		Netherlands	
	Coef	T	Coef	T	Coef	T	Coef	T	Coef	T
Log(Income)	0.008	1.23	0.002	0.54	0.006	1.65	0.008*	2.17	-0.001	-0.16
SAH version 2	-0.053*	-6.77	-0.081*	-11.11	-0.110*	-16.43	-0.039*	-7.79	-0.079*	-15.80
Male 60-69	0.032	1.92	0.040*	2.50	-0.024	-2.01	0.012	1.23	-0.001	-0.10
Male 70-	0.012	0.52	0.012	0.54	-0.061*	-3.57	-0.031*	-2.42	-0.010	-0.75
Female 50-59	0.001	0.11	0.020	1.37	0.001	0.04	-0.021*	-2.48	-0.001	-0.13
Female 60-69	0.044*	2.43	0.037*	2.15	-0.008	-0.63	0.001	0.01	0.007	0.65
Female 70-	0.035	1.58	-0.021	-1.02	-0.079*	-4.90	-0.034*	-2.67	-0.017	-1.45
Selfemployed	-0.003	-0.26	-0.026	-1.48	0.019	1.95	0.004	0.34	0.004	0.28
Unemployed	-0.052*	-2.08	-0.063*	-2.70	-0.045*	-3.17	-0.035*	-2.05	-0.020	-1.15
House worker	-0.017	-0.56	-0.031*	-2.14	-0.044*	-3.10	0.004	0.13	-0.011	-1.25
Disabled	-0.252*	-6.12	-0.235*	-4.37	-0.231*	-7.95	-0.148*	-8.40	-0.174*	-15.97
Retired -64	-0.083*	-4.27	-0.049*	-3.67	-0.044*	-3.28	-0.118*	-11.37	-0.002	-0.17
Retired 65-	-0.071*	-3.99	-0.066*	-4.40	-0.037*	-2.87	-0.029*	-2.97	-0.033*	-3.18
Single	0.004	0.35	0.005	0.59	-0.004	-0.44	-0.005	-0.73	-0.011	-1.78
Secondary education	0.023	1.84	0.043*	4.71	0.040*	3.47	0.011	1.80	0.015*	2.33
Long education	0.037*	2.74	0.047*	4.09	0.060*	4.93	0.032*	4.77	0.019*	2.71
Home owner	0.041*	3.75	0.020*	2.59	0.012	1.76	0.018*	2.98	0.033*	5.87
Foreign	-0.126*	-2.08	0.035	1.80	-0.032	-1.30	-0.040*	-2.32	-0.063*	-2.81
Log likelihood	-2132.65		-2308.84		-3149.73		-3502.46		-2909.12	
LR test	249.65		314.27		610.28		389.84		653.01	

Table 4 (continued)

Variable	Spain		Italy		France		Greece		Switzerland		Belgium	
	Coef	T	Coef	T	Coef	T	Coef	T	Coef	T	Coef	T
Log(Income)	-0.005	-1.47	0.011*	3.20	0.011*	3.19	0.001	0.42	-0.001	-0.08	0.001	0.35
SAH version 2	-0.127*	-15.58	-0.109*	-15.19	-0.120*	-18.97	-0.094*	-15.59	-0.065*	-10.11	-0.087*	-17.54
Male 60-69	-0.003	-0.17	-0.011	-0.74	-0.026	-1.79	-0.004	-0.35	0.005	0.39	-0.009	-0.89
Male 70-	-0.058*	-2.70	-0.058*	-3.27	-0.090*	-5.27	-0.048*	-3.07	-0.014	-0.87	-0.037*	-2.92
Female 50-59	-0.003	-0.19	0.002	0.13	-0.012	-1.16	-0.011	-0.97	0.003	0.23	-0.003	-0.38
Female 60-69	-0.039*	-2.15	-0.027	-1.90	-0.028	-1.90	-0.030*	-2.24	-0.022	-1.53	-0.020	-1.84
Female 70-	-0.103*	-5.29	-0.100*	-5.63	-0.072*	-4.44	-0.078*	-5.23	-0.028	-1.65	-0.050*	-4.15
Selfemployed	-0.001	-0.03	0.011	0.67	-0.017	-0.94	0.010	0.91	0.002	0.20	0.001	0.01
Unemployed	-0.044	-1.86	-0.012	-0.39	-0.003	-0.15	-0.044	-1.67	-0.021	-0.84	-0.014	-1.10
House worker	-0.048*	-3.05	-0.037*	-2.43	-0.009	-0.62	-0.027*	-2.26	-0.009	-0.48	-0.026*	-2.45
Disabled	-0.169*	-7.08	-0.202*	-4.69	-0.222*	-9.88	-0.300*	-9.55	-0.224*	-11.78	-0.194*	-14.14
Retired -64	-0.081*	-4.02	-0.025	-1.73	-0.028*	-2.12	-0.025*	-2.11	-0.010	-0.65	-0.018	-1.95
Retired 65-	-0.050*	-2.81	-0.034*	-2.10	-0.024	-1.64	-0.048*	-3.76	-0.020	-1.47	-0.031*	-2.88
Single	0.001	0.02	-0.002	-0.17	0.003	0.38	-0.010	-1.48	-0.003	-0.37	-0.013*	-2.15
Secondary education	0.036*	2.31	0.014	1.44	0.022*	2.78	0.037*	4.67	0.003	0.31	0.023*	3.76
Long education	0.040*	2.60	0.029	1.74	0.053*	5.76	0.054*	5.50	0.018*	2.26	-0.035*	5.48
Home owner	0.006	0.49	0.016	1.73	0.019*	2.55	0.025*	2.94	0.010	1.36	0.006	0.91
Foreign	0.013	0.38	NA	NA	-0.031*	-2.06	-0.097	-1.82	-0.010	-0.77	-0.031*	-2.28
Log likelihood	-2725.36		-2733.03		-3261.26		-3153.53		-970.68		-3946.93	
LR test	418.97		400.77		630.43		674.71		248.91		645.34	

Note. Significance at 5 percent level indicated by *. All LR tests are significant on levels lower than 0.0001. For the Italian sample, there were no foreigners.

Table 5. Concentration indices (CI) with t values of variables by country.

Variable	Denmark		Austria		Germany		Sweden		Netherlands	
	CI	T	CI	T	CI	T	CI	T	CI	T
Observed HUI										
Predicted HUI	0.023*	7.34	0.007*	2.74	0.018*	6.65	0.013*	7.34	0.006*	3.57
Log(Income)	0.043*	32.44	0.056*	32.01	0.055*	42.38	0.039*	42.90	0.053*	41.77
SAH version 2	-0.004	-0.26	-0.023	-1.41	-0.006	-0.46	-0.002	-0.18	0.005	0.41
Male 60-69	0.119*	2.97	0.183*	6.39	0.019	0.76	0.103*	3.74*	0.009	0.27
Male 70-	-0.232*	-5.92	0.122*	3.26	-0.024	-0.79	-0.001	-0.01	0.068*	2.20
Female 50-59	0.245*	7.11	-0.083*	-2.13	0.054	1.71	0.074*	2.90	-0.051*	-2.00
Female 60-69	-0.064	-1.50	-0.066*	-2.10	-0.034	-1.32	0.032	1.15	0.024	0.70
Female 70-	-0.420*	-15.85	-0.112*	-3.74	-0.187*	-6.18	-0.334*	-12.56	-0.112*	-3.71
Selfemployed	0.417*	4.79	-0.043	-0.47	0.534*	10.37	0.103	1.89	0.195*	2.86
Unemployed	0.007	0.11	-0.322*	-3.35	-0.320*	-5.78	-0.197*	-2.56	-0.147	-1.51
House worker	-0.262	-1.88	-0.212*	-4.36	-0.004	-0.08	-0.263	-1.64	-0.113*	-4.07
Disabled	-0.352*	-4.14	-0.047	-0.32	-0.286*	-3.55	-0.109	-1.51	-0.118*	-2.67
Retired -64	-0.034	-0.79	0.095*	3.48	-0.071*	-1.99	-0.093*	-2.14	0.057	1.11
Retired 65-	-0.294*	-15.87	0.019	1.13	-0.090*	-5.80	-0.126*	-8.54	-0.026	-1.39
Single	-0.314*	-18.27	-0.173*	-11.29	-0.223*	-12.32	-0.384*	-24.49	-0.137*	-6.51
Secondary education	0.037*	2.04	0.038*	2.33	-0.022	-1.85	0.041	1.90	0.065*	2.69
Long education	0.253*	10.05	0.168*	5.58	0.176*	8.04	0.236*	10.45	0.253*	10.14
Home owner	0.146*	12.37	0.090*	6.58	0.116*	9.70	0.082*	10.36	0.075*	7.07
Foreign	0.024	0.13	-0.179	-1.57	-0.199*	-2.22	-0.129	-1.62	-0.240*	-2.06

Table 5. (continued).

Variable	Spain		Italy		France		Greece		Switzerland		Belgium	
	CI	T	CI	T	CI	T	CI	T	CI	T	CI	T
Observed HUI												
Predicted HUI	0.001	0.40	0.014*	5.29	0.015*	6.30	0.014*	6.91	0.004*	1.59	0.008*	4.99
Log(Income)	0.067*	37.94	0.059*	36.90	0.054*	41.17	0.055*	33.29	0.061*	24.61	0.061*	43.49
SAH version 2	0.019	1.34	0.010	0.69	0.18	1.47	-0.001	-0.09	0.026	1.09	-0.001	-0.01
Male 60-69	0.033	0.97	0.109*	3.80	0.036	1.07	0.134*	4.14	0.153*	3.27	0.061*	2.17
Male 70-	-0.104*	-3.54	-0.049	-1.45	0.066*	2.03	-0.023	-0.75	0.048	1.07	0.028	1.06
Female 50-59	-0.027	-0.82	-0.044	-1.43	-0.019	-0.70	-0.001	-0.03	-0.051	-1.01	-0.01	-0.02
Female 60-69	0.134*	4.42	0.034	1.29	-0.012	-0.36	-0.035	-1.13	-0.124*	-2.12	-0.022	-0.80
Female 70-	-0.107*	-4.06	-0.112*	-3.60	-0.145*	-5.86	-0.201*	-8.48	-0.177*	-3.93	-0.158*	-6.36
Selfemployed	0.325*	5.42	0.242*	4.40	0.225*	3.00	0.173*	4.02	0.078	1.06	0.287*	4.35
Unemployed	-0.050	-0.69	-0.425*	-3.76	-0.145	-1.86	-0.351*	-2.61	-0.240*	-2.01	-0.243*	-5.09
House worker	-0.051*	-2.52	-0.205*	-7.71	-0.229*	-5.26	-0.178*	-7.80	-0.120	-0.94	-0.166*	-5.53
Disabled	-0.030	-0.44	-0.293	-1.87	-0.287*	-3.36	-0.128	-1.40	-0.056	-0.46	-0.189*	-3.32
Retired -64	0.093	1.78	0.123*	4.67	0.057	1.79	0.139*	4.06	0.022	0.23	0.080*	2.82
Retired 65-	-0.053*	-2.72	-0.035	-1.90	-0.011	-0.71	-0.072*	-3.97	-0.045	-1.77	-0.028	-1.91
Single	-0.193*	-9.87	-0.221*	-11.01	-0.196*	-13.65	-0.124*	-8.44	-0.148*	-5.57	-0.173*	-11.26
Secondary education	0.216*	4.50	0.218*	7.98	0.075*	3.75	0.098*	3.81	-0.115*	-2.61	0.054*	2.57
Long education	0.219*	4.07	0.471*	9.56	0.343*	14.82	0.430*	15.21	0.257*	7.74	0.175*	9.15
Home owner	0.013*	2.45	0.042*	5.83	0.082*	9.68	0.001	0.30	0.074*	3.66	0.031*	4.97
Foreign	0.016	0.11	NA	NA	-0.318*	-5.52	0.225	0.73	-0.106	-1.16	-0.156*	-2.58

Table 6. Contributions of regressors (in percent of predicted CI) with bootstrapped t values by country.

Variable	Denmark		Austria		Germany		Sweden		Netherlands	
	CI	T	CI	T	CI	T	CI	T	CI	T
Log(Income)	16.771	1.27	27.562	0.05	21.679	1.85	27.195*	2.49	-9.616	-0.29
SAH version 2	0.561	0.23	13.752	0.09	2.029	0.41	0.366	0.16	-5.377	-0.43
Male 60-69	2.952	1.51	16.967	0.06	-0.656	-0.64	1.606	1.25	-0.125	-0.10
Male 70-	-2.125	-0.49	1.652	0.04	1.260	0.73	-0.021	-0.01	-1.707	-0.52
Female 50-59	0.271	0.09	-3.091	-0.07	0.027	0.04	-2.686	-1.84	0.237	0.11
Female 60-69	-1.724	-1.22	-6.099	-0.05	0.364	0.50	0.001	0.01	0.633	0.38
Female 70-	-15.528	-1.50	6.977	0.08	16.719*	3.61	19.963*	2.59	5.903	1.11
Selfemployed	-0.280	-0.21	0.715	0.03	3.938*	1.79	0.138	0.31	0.529	0.31
Unemployed	-0.117	-0.12	7.138	0.08	5.701*	2.41	1.465	1.52	1.198	0.76
House worker	0.409	0.55	8.203	0.04	0.123	0.08	-0.006	-0.01	5.345	1.00
Disabled	15.854*	3.03	0.459	0.01	12.415*	2.91	3.234	1.44	33.175*	2.48
Retired -64	1.637	0.74	-16.237	-0.08	2.512	1.59	7.756*	2.00	-0.117	-0.10
Retired 65-	46.595*	3.47	-6.464	-0.03	9.615*	2.50	14.127*	2.93	5.065	1.09
Single	-2.827	-0.35	-3.141	-0.01	1.724	0.43	4.713	0.69	8.175	1.43
Secondary education	2.029	1.23	10.883	0.08	-3.462	-1.51	1.028	1.15	4.651	1.46
Long education	14.448*	2.48	26.122	0.12	19.721*	3.63	14.021*	3.78	19.160	1.83
Home owner	21.185*	3.42	17.114	0.14	5.188	1.66	9.166*	2.45	28.666*	2.61
Foreign	-0.112	-0.07	-2.514	-0.15	1.097	0.97	0.929	1.07	4.201	1.28

Table 6. (continued).

Variable	Spain		Italy		France		Greece		Switzerland		Belgium	
	CI	T	CI	T	CI	T	CI	T	CI	T	CI	T
Log(Income)	-96.507	-0.04	52.915*	3.95	43.809*	3.75	4.714	0.43	-20.099	-0.02	4.403	0.25
SAH version 2	-42.885	-0.03	-5.122	-0.69	-9.302	-1.32	0.249	0.04	-54.788	-0.08	-0.484	-0.06
Male 60-69	0.747	0.02	-1.619	-0.71	-0.908	-0.78	-0.595	-0.33	13.329	0.06	-1.053	-0.81
Male 70-	42.037	0.06	3.383	1.22	-6.751	-1.71	1.309	0.69	-5.832	-0.08	-2.295	-0.91
Female 50-59	1.531	0.03	-0.075	-0.07	0.354	0.51	0.019	0.02	1.490	0.02	0.017	0.03
Female 60-69	-27.279	-0.05	-1.720	-0.94	0.409	0.37	1.423	0.98	19.265	0.09	0.866	0.65
Female 70-	101.343	0.06	15.585*	2.58	17.457*	3.14	27.841*	4.05	28.609	0.09	19.493*	2.98
Selfemployed	-7.466	-0.03	1.679	0.89	-1.026	-0.98	1.688	1.17	-0.133	-0.01	0.031	0.01
Unemployed	-1.775	-0.01	0.720	0.38	0.151	0.17	1.960	0.83	4.354	0.08	2.385	1.21
House worker	31.522	0.05	15.010*	2.20	1.660	0.61	10.236*	2.32	-1.701	-0.03	8.246*	2.19
Disabled	9.451	0.03	4.114	1.55	12.679*	2.78	4.432	1.33	-7.189	-0.01	24.034*	3.01
Retired -64	-30.092	-0.07	-5.472	-1.63	-1.722	-1.31	-3.401*	-1.99	1.052	0.01	-3.144	-1.61
Retired 65-	31.094	0.05	4.018	1.33	0.873	0.55	10.161*	2.80	15.706	0.10	5.03	1.45
Single	17.318	0.05	0.766	0.14	-1.747	-0.34	4.717	1.43	11.838	0.05	11.250	1.74
Secondary education	34.235	0.07	4.917	1.37	3.807*	2.05	7.155*	2.91	-8.456	-0.07	4.476*	2.00
Long education	29.627	0.05	6.350	1.76	27.137*	4.06	28.246*	4.92	77.339	0.09	22.148*	3.35
Home owner	5.564	0.04	4.549	1.45	9.079*	2.16	0.344	0.29	19.426	0.09	2.057	0.75
Foreign	1.536	0.04	NA	NA	4.038	1.65	-0.501	-0.50	5.790	0.04	2.532	1.34