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HEALTH INEQUALITIES RELATED TO INCOME IN GREECE

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The current paper examines the degree of income-related health inequalities in Greece, using data from the European Community Household Panel (1994-2001) and three different binary health indicators. The analysis is based on the Concentration Index and the regression decomposition method. Our findings indicate that income inequality in health is a burden for the low socioeconomic classes, for both genders and regardless of the health measure used. Age, education, income and employment status are the most significant contributors to the observed inequality in health.

I. INTRODUCTION

Income poverty is an important risk factor for premature mortality and morbidity, according to the health economics literature. This association implies that an individual with higher income can adopt a healthier lifestyle and can afford goods and services that promote health and prevent the onset of health problems, in contrast to the less affluent part of the population**.** However systematic health disparities exist not only with respect to income, but also with respect to other determinants of health outcomes such as education, occupation, demographic characteristics, life style and a host of other individual characteristics.

One of the most commonly used indicators of individual health is Self-Assessed Health Status (SAHS), an ordinal variable that has been used in many studies in order to examine the relationships between health and socioeconomic status (SES), health and health care utilization as well as health and life styles (Economou *et al.* 2008, Lecluyse 2007, Etile and Milcent 2006, Cantarero and Pascual 2005, Veiga 2005, Contoyiannis and Jones 2004, Doorslaer and Koolman 2004, Wagstaff *et al.* 2001, Humhries and Doorslaer 2000, Kakwani *et al.* 1997). Other health indicators also used in the health economics literature, but less frequent, are the existence of chronic problems and hampering conditions (Quevedo *et al.* 2005, Kakwani *et al.* 1997).

All the health indicators mentioned above, as well as other sociodemographic and socioeconomic characteristics of the individuals, are provided for the EU countries by the ECHP, a reliable database administered by the EUROSTAT. According to recent findings, many of those based on the ECHP, significant income-related health inequalities are present in all EU countries whichever measure of health status is used (Lecluyse 2007, Etile and Milcent 2006, Cantarero and Pascual 2005, Quevedo et al. 2005, Veiga 2005, Contoyiannis and Jones 2004, van Doorslaer and Koolman 2004, Wagstaff *et al.* 2001, Humhries and Doorslaer 2000, Kakwani *et al.* 1997, Mackenbach and Kunst, 1997). Greece is included in two of those studies (Quevedo *et al.* 2005, van Doorslaer and Koolman 2004); the first one is a cross sectional study using SAHS status as a health indicator, while the second one is a longitudinal study using hampering conditions to measure health status.

The purpose of this paper is to thoroughly examine income related health inequalities in Greece using longitudinal data from the ECHP and three different health indicators: self assessed health status, chronic problems and hampering conditions. Our analysis is based on the familiar Concentration Index (*CI*) and the regression based decomposition method introduced by Wagstaff *et al.* (2003).

This paper is organized as follows. Section 2 briefly explains the methodology used to measure and decompose health inequality while Section 3 presents the data and the variables employed. The empirical results are reported in Section 4, and Section 5 provides some concluding remarks.

II. METHODOLOGY

1. The Concentration Index

In order to calculate the income-related inequalities in health, in the current study we employ the familiar ill health *CI* (Lecluyse 2007, Jones and Lopez 2004, van Doorslaer and Jones 2004, van Doorslaer and Koolman 2004, Wagstaff *et al.* 2003, Wildman 2003, Humpries and van Doorslaer 2000). The *CI* is the quantitative expression of the concentration curve, which is, in turn, a graphical representation of the level of inequality (Wagstaff *et al.* 1991). On the horizontal axis the ranking variable (income) is plotted in increasing order, while on the vertical axis is presented the cumulative percentage of the in question health variable (figure 1). Three are the possible outcomes according to the placement of the $L(p)$ curve. An egalitarian society with an equal distribution of ill health, through different income levels,

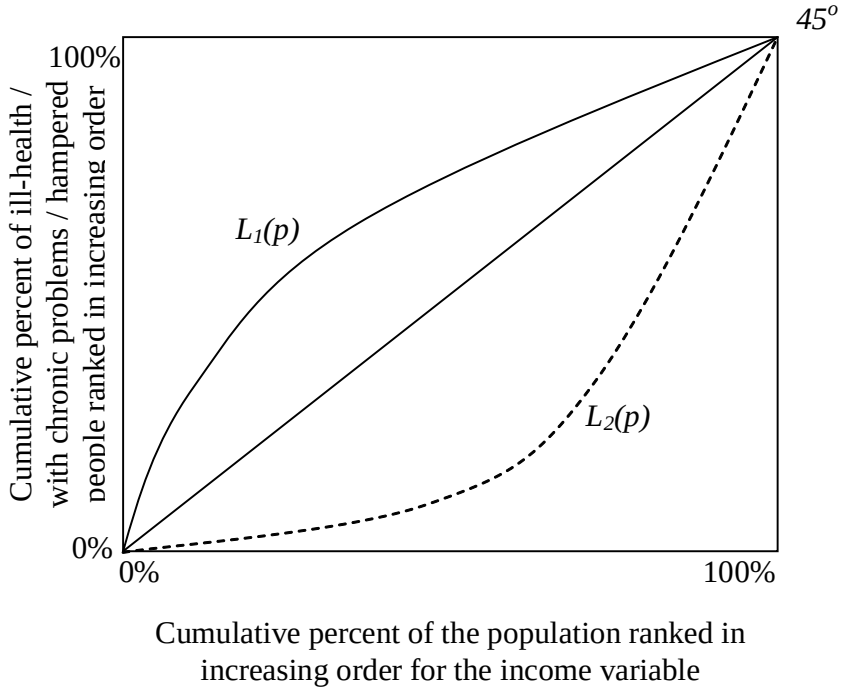

Figure 1: Concentration Curve for Ill Health, Chronic Problems and Hampered

is represented by the line of the 45° degrees (*CI = 0*). If the curve is lying above the diagonal ($L_1(p)$), disproportionate concentration of the ill health population is found within the low-income groups (CI<0), while, on the opposite, a concave curve ($L_2(p)$ reflects a disadvantage for people in the high-income levels (*CI>0*). The CI ranges from –1 to 1, with values closer to –1 (1) indicating greater inequality for the worse-off (better-off).

Let *i* refer to each individual in the population, *y* stand for the measurement of the health condition, *R* be the place of each person in the income distribution, $\text{cov}(y_i, R_i)$ express the covariance between the two variables, and μ represent the mean value of the health variable in the population. Then the computation formula of the *CI* derives from the "convenient covariance" method, as proposed by Lerman and Yitzaki (1989):

$$CI = \frac{2\,\text{cov}\left(y_i, R_i\right)}{\mu} \tag{1}$$

While very useful, the convenient covariance method yields no information on the level of statistical significance of the computed indices. Kakwani *et al.* (1997) proved that the previous covariance could be used for the estimation of a "convenient regression", where the interpretation of the variables is the same, and σ_R^2 corresponds to the variance of the rank variable. Since this equation is estimated, the coefficient β will give the value of the *CI* and its standard error, allowing for statistical inferences:

$$2\sigma_R^2\left(\frac{y_i}{\mu}\right) = \alpha + \beta R_i + e_i \tag{2}$$

Newey and West (1994) proposed an alternative method, in order to overcome the problems of heteroscedasticity and serial correlation. For the examination of income-related health inequalities in Greece, we calculated the *CI*s using the Newey-West method, due to the corrected standard errors.

2. Decomposition of Inequality

One appealing feature of the *CI* is the possibility to quantify the sources of the specific level of inequality by using the regression-based decomposition method. In other words, it allows us to examine whether the determinants of health conditions, contribute to income inequalities as well. In order to do this, the first step is to incorporate a linear additive health econometric model (Wagstaff *et al.* 2003) like the following:

$$y_{it} = \alpha + \sum_{k=1}^{K} \beta_k x_{itk} + e_{it} \tag{3}$$

where y_{it} refers to the dependent binary health measure, x_{itk} are the determinants of health and β_k are the coefficients, which are going to be estimated using the random-effects probit method. The next step is to decompose inequality into the contributors of each of the regressors. Let $\overline{y}$ and $\overline{x}_k$ denote the mean of the dependent health variable and of each health determinant, respectively. Then *CI* can be written as:

$$CI = \sum_{k=1}^{K} \frac{\hat{\beta}_k \overline{x}_k}{\overline{y}} CI_k + \frac{2\sum_{i=1}^{n} \varepsilon_i R_i}{n\overline{y}} = \sum_{k=1}^{K} \hat{\eta}_k CI_k + \frac{GC_e}{\overline{y}} = CI^{pred} + CI^{unpred} \tag{4}$$

The definition of CI_k is analogous to that of *CI*, and is simply representing the *CI* of each of the independent variables in (3). Expression (4) shows that the *CI* can be decomposed in two parts. The first one is the weighted sum of the allocated *CI*s of the health determinants, commonly known as the deterministic component, while the second one is linked to the *CI* resulting from the unexplained component. The explained component is given by the first part in (4), calculated as the product of the elasticity of health with respect to the appropriate independent variable $\left(\hat{\eta}_k = \hat{\beta}_k \overline{x}_k / \overline{y}\right)$, with the *CI* of the independent against income. As $\hat{\eta}_k$ and CI_k grow, the contribution of a specific independent variable x_k in explaining health inequality, is higher. If only the estimated elasticity is large, and health is not unequally distributed according to the income level, or *CI* is fairly small, then the independent variable x_k can account for health itself but not income-related inequality in health (Balia and Jones 2008, Wagstaff *et al*. 2001). The unexplained component is represented by the GC_e term, which is the generalized *CI* for the disturbance term. That component reflects the inequality in health that cannot be explained by systematic variation in the x_k *s*, and thus, can be thought of as an indicator of pure health inequality. Finally, it is worth mentioning that through the use of the linear predicted model, only the explained part of inequality can be decomposed.

3. DATA AND VARIABLES

The data used in this paper come from the eight waves (1994-2001) of the European Community Household Panel (ECHP, UDB-version December 2003). The ECHP is a longitudinal survey, for the fifteen EU countries, interviewing annually a representative sample of individuals aged 16 and older. The survey contains information on individual characteristics including, demographics, income, health, housing, education, employment. In this study it is employed a balanced pooled sample of Greek individuals for the years 1994-2001.

The most commonly used health measure is the evaluation of an individual's health condition by himself. SAHS is given in the ECHP as a variable with five options (very good, good, fair, bad, very bad). In order to compare SAHS with the following two health variables, we create a binary variable by combining the first two responses into one category, representing the good SAHS, while the rest three responses consist of the group of the overall bad SAHS. At the same time, the persons are asked about the existence of any chronic health problem whether physical or mental, illness or disability. Once again the variable has two discrete answers, leading to a binary variable. Closely related to the previous measure is the variable that assigns the value one to anyone who is hampered in his daily activities either to a limited or large degree. In all the three health measures the omitted group is the population in good health condition.

The calculation of the CI, calls for a measure that allows the ranking of the examined population. The most commonly used measure for the socioeconomic status (SES) is income, since its continuous nature, allows a smooth ranking of the sample from the least wealthy persons to the wealthiest ones. The ECHP contains information on the total net household income, which is expressed in the national currency of each country. The latter not only makes comparisons problematic but is also affected by the level of yearly inflation. After we correct for the above two problems, we adjust income to the equivalized number of members in each household, using the OECD scale. Finally we use the natural logarithm in order to attenuate the variation of the variable.

Educational attainment and employment status are categorical variables, which are also used in the literature as SES approximations. *Education* level of the participants was calculated using the highest level of the degree they have obtained. The dummies primary and middle education refer to people who have completed at most the first and second stage of secondary education, respectively, whereas the high education contains the respondents who have graduated from a third level institution. *Employment status* led to four distinct categories: employed, self-employed, unemployed and inactive. In the last group we include those who are unemployed but are not willing to find a job, students, house workers, pensioners and the army employees. Other factors, which may influence an individual's health condition, are gender, age, marital status, number of household members and existence of children. The gender was used for the stratification of our sample; seven *age groups* were created: 17-24, 25-34, 35-44, 45-54, 55-64, 65-74, and over 75 years old. The participants were split into three *marital status* categories, single, married and those having been sometime in their lifetime married (divorced, separated or widowed). *House size* expresses the number of persons in each household, while the variable *children* refers to the existence of children under the age of 16.

Since this work concentrates on the case of income-related health inequalities in Greece, the sample is narrowed to 85,748 individuals. After deleting 1,691 persons who did not complete the questionnaire about their general health status and 536 persons who avoided providing information about their income, the sample contained 83,521 individuals. The distribution according to the gender of the respondents showed a slight prevalence of the female population with 44,067 women or 52.76%, the rest 39,454 individuals being men. According to table 1, the female population (column 11) has the tendency to be in worse health regardless of the health measure used. Approximately 28% of women report that they consider themselves being in a bad health condition, whereas for men that percentage is 22%. The same trend also holds when chronic problems or the existence of hampering conditions is used as a measure of health conditions. Nevertheless, the concentration of the sample is shorter when the attention is drawn on the other two health measures. Thus, more persons are in an ill health condition according to the SAHS, followed by the chronic

Table 1
Distribution of Health Categories Per income Quintile

	1st Quintile		*2nd Quintile*		*3rd Quintile*		*4th Quintile*		*Total*		
	Male	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*	*Total*
Bad	3,115	4,675	2,410	3,468	1,941	2,721	1,277	1,809	8,743	12,673	21,416
	(7.90)	(10.61)	(6.11)	(7.87)	(4.92)	(6.17)	(3.24)	(4.11)	(22.16)	(28.76)	(25.64)
Good	6,207	6,884	7,372	7,636	8,164	8,048	8,968	8,826	30,711	31,394	62,105
	(15.73)	(15.62)	(18.69)	(17.33)	(20.69)	(18.26)	(22.73)	(20.03)	(77.84)	(71.24)	(74.36)
Chronic	1,824	2,445	1,514	1,842	1,199	1,509	801	959	5,338	6,755	12,093
	(5.43)	(6.52)	(4.51)	(4.91)	(3.57)	(4.02)	(2.39)	(2.56)	(15.90)	(18.00)	(17.01)
No Chronic	6,194	7,527	6,986	7,793	7,404	7,607	7,657	7,837	28,241	30,764	59,005
	(18.45)	(20.06)	(20.80)	(20.77)	(22.05)	(20.28)	(22.80)	(20.89)	(84.10)	(82.00)	(82.99)
Hampered	2,083	2,748	1,664	2,063	1,321	1,689	850	1,122	5,918	(7,622	13,540
	(5.28)	(6.24)	(4.22)	(4.68)	(3.35)	(3.83)	(2.15)	(2.55)	(15.00)	(17.30)	(16.21)
Non	7,239	8,811	8,118	9,041	8,784	9,080	9,395	9,513	33,536	36,445	69,981
Hampered	(18.35)	(19.99)	(20.58)	(20.52)	(22.26)	(20.60)	(23.81)	(21.59)	(85.00)	(82.70)	(83.79)

Notes: The values in the parenthesis represent percentages (%).

problems and the hampering status, something that applies for both genders. An interesting finding is also that the majority of the sample tends to assess its health condition as good, or at least, without chronic and hampering problems: an almost 70-80% of the respondents, is not classified within the ill health group. This result confirms the existing literature that people tend to overestimate their health condition.

An initial indication of the degree of inequality between the genders can be seen in the first nine columns where we can observe the distribution of the six health categories in four income quintiles. The quintiles are shorted in ascending order so that quintile 1 contains the least wealthy, while quintile 4 the wealthiest portion of the sample. As we move towards higher income groups, the percentage of people in ill health is attenuated for both genders. What is worth mentioning is that the percentage of females with ill health exceeds the corresponding percentage of their male counterparts in all income groups.

IV. RESULTS AND DISCUSSION

1. Results from the Health Equation

The estimations of the health equation are given in tables 2 through 4 for each one of the three health measures. Note, however, that there is a high likelihood of reverse causality, if we bear in mind that education or income may as well be determined by one's health.

To begin with, income displays a negative coefficient which is statistically significant in all cases, implying that the higher the income inflow, the lesser the probability that a person is of ill health. This pattern is consistent with any measure of the health variable used and applies to both genders. For the male population the impact of income on health is a bit lower, compared to females, suggesting a more unequal concentration of women in low-income levels. As anticipated, health problems become more likely with age, which is confirmed by the positive sign of the age group variables: in comparison with the reference group (ages between 17 and 24), the older the person the worst his health status is.

Marital status seems to affect the health of both genders and especially that of women. Married women are of better health in comparison to single and separated ones. Furthermore, it turns out invariably of model specification that the higher the level of education a person has completed, the better his health appears to be. The employment status shows a similar trend, as the participation of men in the labour force is related with a better health, whereas their inactive counterpart faces a deteriorating health. If we exclude the case of unemployed women, which is a non-significant factor in the determination of women's health, the impact is similar to the one of the males.

From the above aforementioned results it becomes clear that there is no qualitative difference either someone is male or female as the signs of the coefficients are the same, with only a slight difference concerning the magnitude of the coefficients. Finally, all the findings are robust regardless of the specific health measure used as dependent variable.

2. Results from the Concentration Indices

The first part of table 5 presents the estimated total *CI*s for each of the three models specification, first for the entire population, then stratified by gender. All the *CI*s are negative and statistically significant at the 1% level, denoting the existence of a health inequality in favor of the rich. Furthermore, inequality seems to be more prevalent for the case of SAHS,

Table 2
Concentration Indices for the SAHS Variable Per gender

Variables	*Males*				*Females*			
	Coefficient	*Elasticity*	*Partial CI*	*Contribution to CI*	*Coefficient*	*Elasticity*	*Partial CI*	*Contribution to CI*
Age group 25-34	0.9061***	0.1616***	0.1043***	0.0169	0.6199***	0.1020***	0.1375***	0.0140
Age group 35-44	1.3458***	0.2306***	0.0917***	0.0211	1.3457***	0.2179***	0.1113***	0.0242
Age group 45-54	1.9612***	0.3211***	0.0778***	0.0250	1.8673***	0.2819***	0.1108***	0.0312
Age group 55-64	2.4232***	0.3759***	0.0038	0.0014	2.4629***	0.3661***	-0.0337***	-0.0123
Age group 65-74	2.6357***	0.3685***	-0.1560***	-0.0575	2.9837***	0.4419***	-0.1410***	-0.0623
Age group 75+	3.3191***	0.2479***	-0.2615***	-0.0648	3.4943***	0.3554***	-0.2628***	-0.0934
Single	-0.0874	-0.0219	0.0542***	-0.0012	0.1418**	0.0255**	0.0369***	0.0009
DivSepWid	0.1845**	0.0079**	-0.0169	-0.0001	0.4424***	0.0819***	-0.1133***	-0.0093
Middle Education	-0.4076***	-0.1150***	0.1476***	-0.0170	-0.4612***	-0.1142***	0.1959***	-0.0224
Higher Education	-0.6436***	-0.0991***	0.4839***	-0.0480	-0.5928***	-0.0722***	0.4649***	-0.0336
Employed	-0.9272***	-0.3257***	0.1817***	-0.0592	-0.3553***	-0.0850***	0.2184***	-0.0186
Self-employed	-0.8821***	-0.2334***	-0.0536***	0.0125	-0.4021***	-0.0276***	0.1111***	-0.0031
Unemployed	-0.4511***	-0.0224***	-0.1930***	0.0043	-0.0717	-0.0047	-0.0950***	0.0004
Income (ln)	-0.1376***	-2.0069***	0.0259***	-0.0521	-0.1082***	-1.5718***	0.0265***	-0.0417
House-size	-0.0457***	-0.1589***	-0.0154***	0.0024	-0.0296**	-0.0981**	0.0056***	-0.0006
Dependentchildren	-0.1458***	-0.0681***	-0.0035	0.0002	-0.1760***	-0.0805***	0.0290***	-0.0023

Notes: Calculations of the authors. The signs ***, **, * refer to statistical significance at the levels of 1%, 5% and 10%, respectively

Table 3
Concentration Indices for the Chronic Variable Per Gender

Variables	*Males*				*Females*			
	Coefficient	*Elasticity*	*Partial CI*	*Contribution to CI*	*Coefficient*	*Elasticity*	*Partial CI*	*Contribution to CI*
Age group 25-34	0.9437***	0.1683***	0.1043***	0.0176	0.5524***	0.0896***	0.1375***	0.0123
Age group 35-44	1.3314***	0.2258***	0.0917***	0.0207	1.1173***	0.1811***	0.1113***	0.0202
Age group 45-54	1.8642***	0.3080***	0.0778***	0.0240	1.5415***	0.2355***	0.1108***	0.0261
Age group 55-64	2.2394***	0.3428***	0.0038	0.0013	2.0130***	0.2951***	-0.0337***	-0.0099
Age group 65-74	2.2938***	0.3282***	-0.1560***	-0.0512	2.2630***	0.3389***	-0.1410***	-0.0478
Age group 75+	2.6707***	0.2000***	-0.2615***	-0.0523	2.5625***	0.2677***	-0.2628***	-0.0704
Single	-0.0148	-0.0037	0.0542***	-0.0002	0.2182***	0.0388***	0.0369***	0.0014
DivSepWid	0.1446*	0.0061*	-0.0169	-0.0001	0.3364***	0.0630***	-0.1133***	-0.0071
Middle Education	-0.2037***	-0.0578***	0.1476***	-0.0085	-0.3986***	-0.1001***	0.1959***	-0.0196
Higher Education	-0.4223***	-0.0638***	0.4839***	-0.0309	-0.4466***	-0.0523***	0.4649***	-0.0243
Employed	-1.0481***	-0.3696***	0.1817***	-0.0671	-0.4168***	-0.0998***	0.2184***	-0.0218
Self-employed	-1.0010***	-0.2635***	-0.0536***	0.0141	-0.4820***	-0.0332***	0.1111***	-0.0037
Unemployed	-0.7247***	-0.0349***	-0.1930***	0.0067	-0.1560*	-0.0099*	-0.0950***	0.0009
Income (ln)	-0.0927***	-1.3518***	0.0259***	-0.0351	-0.0273*	-0.3968	0.0265***	-0.0105
House-size	-0.0892***	-0.3102***	-0.0154***	0.0048	-0.0796***	-0.2635***	0.0056***	-0.0015
Dependentchildren	-0.0209	-0.0097	-0.0035	0.0000	-0.1211**	-0.0554**	0.0290***	-0.0016

Notes: Calculations of the authors. The signs ***, **, * refer to statistical significance at the levels of 1%, 5% and 10%, respectively

Table 4
Concentration Indices for the Hampered Variable Per Gender

Variables	*Males*				*Females*			
	Coefficient	*Elasticity*	*Partial CI*	*Contribution to CI*	*Coefficient*	*Elasticity*	*Partial CI*	*Contribution to CI*
Age group 25-34	0.9158***	0.1633***	0.1043***	0.0170	0.4954***	0.0816***	0.1375***	0.0112
Age group 35-44	1.2922***	0.2214***	0.0917***	0.0203	1.0456***	0.1693***	0.1113***	0.0188
Age group 45-54	1.8219***	0.2983***	0.0778***	0.0232	1.4476***	0.2185***	0.1108***	0.0242
Age group 55-64	2.0881***	0.3239***	0.0038	0.0012	1.9119***	0.2842***	-0.0337***	-0.0096
Age group 65-74	2.1432***	0.2996***	-0.1560***	-0.0467	2.1334***	0.3159***	-0.1410***	-0.0445
Age group 75+	2.5179***	0.1880***	-0.2615***	-0.0492	2.4552***	0.2497***	-0.2628***	-0.0656
Single	0.0460	0.0116	0.0542***	0.0006	0.1880***	0.0338***	0.0369***	0.0013
DivSepWid	0.0944	0.0040	-0.0169	-0.0001	0.3091***	0.0573***	-0.1133***	-0.0065
Middle Education	-0.2667***	-0.0752***	0.1476***	-0.0111	-0.3976***	-0.0985***	0.1959***	-0.0193
Higher Education	-0.5208***	-0.0802***	0.4839***	-0.0388	-0.4007***	-0.0488***	0.4649***	-0.0227
Employed	-1.0027***	-0.3523***	0.1817***	-0.0640	-0.3584***	-0.0857***	0.2184***	-0.0187
Self-employed	-0.9287***	-0.2458***	-0.0536***	0.0132	-0.4385***	-0.0301***	0.1111***	-0.0033
Unemployed	-0.6447***	-0.0320***	-0.1930***	0.0062	-0.1032	-0.0068	-0.0950***	0.0006
Income (ln)	-0.1317***	-1.9201***	0.0259***	-0.0498	-0.0497**	-0.7218**	0.0265***	-0.0191
House-size	-0.0805***	-0.2794***	-0.0154***	0.0043	-0.0566***	-0.1874***	0.0056***	-0.0011
Dependentchildren	-0.0435	-0.0203	-0.0035	0.0001	-0.0809*	-0.0370*	0.0290***	-0.0011

Notes: Calculations of the authors. The signs ***, **, * refer to statistical significance at the levels of 1%, 5% and 10%, respectively

followed by the existence of hampering conditions and the chronic problems, while income-related inequality in health appears to be a greater burden for the male group rather than the female one, regardless of the health measure used.

Table 5
Percentage Contribution of Each Characteristic on Income Inequality in ill Health, Chronic Problems and Hampered

	SAHS			*Chronic*			*Hampered*		
Part A	*Total*	*Male*	*Female*	*Total*	*Male*	*Female*	*Total*	*Male*	*Female*
Total CI estimation	-0.193	-0.206	-0.180	-0.172	-0.182	-0.162	-0.185	-0.185	-0.167
Part B (%)	Total	Male	Female	Total	Male	Female	Total	Male	Female
Year	-1.06	-1.11	0.99	-0.15	-0.57	-0.15	-2.25	-1.83	-1.95
Demographics	41.94	27.10	43.53	44.65	25.72	44.26	39.23	20.01	42.96
Marital	-0.11	0.62	3.69	-0.68	0.19	3.63	-0.78	-0.33	3.44
Education	27.41	30.42	24.73	26.95	25.36	27.97	28.47	29.29	27.55
Income	22.09	24.39	18.41	14.76	22.59	6.69	21.78	29.23	12.55
Employment Status	10.78	19.83	9.36	17.64	29.80	15.62	15.74	26.19	14.05
Housesize	-0.93	-1.15	0.25	-3.09	-3.08	0.95	-2.33	-2.52	0.69
Children	-0.12	-0.11	1.03	-0.08	-0.02	1.03	-0.07	-0.04	0.71

Notes: Calculations of the authors based on the E.C.H.P.

Tables 2 to 4 also present the *CI*s of each regressor in the health equation (partial *CI*). For both males and females aged from 25 to 54, the financial placement is better than for the other age groups. The two upper age categories (65-74 and over 75) are worse-off compared to the other age groups, indicating that the higher incomes are met in ages 25-64 for men and 25-54 for women. Thus, a positive *CI* indicates higher income for the respondents with the specific characteristic, while a negative *CI* represents a lower income level. Being single or having attended a higher level of education, are factors that can guarantee a greater influx of financial resources. As expected, persons who are unemployed are concentrated in the lower income groups, whereas employed ones belong to the higher income groups. A discrepancy between males and females is reported, as far as the variables of self-employed and number of persons in the household is concerned, since these characteristics rank men low in income and women high in income. Regarding the logarithm of equivalized income, the *CI* possesses the expected positive sign. Moreover, children under the age of 14 are of concern only for the women.

What is of most importance in our survey is the contribution of each independent variable on the observed part of income inequality in health. Column five for males and nine for the females in tables 2 to 4, provide these details. Examining the case of men, it appears that the bulk of inequality in health is caused by income inequalities and age over 65 years, both disfavoring the least affluent. Employment and education are factors that contribute to the exacerbation of inequality in health, while the contribution of marital status is almost negligible. Turning to the female population, the most significant contributors are income itself and being old, while the education level and being employed rank second in order of importance. Despite the fact that inequalities in self-employment, house size, children and single marital status constitute a burden for the poor, their contribution to the observed *CI* is small, almost zero.

In order to make the aforementioned results even more clear, the summary contributions of the grouped variables are presented as percentages of the *CI* in table 5 (part B). The larger contributors to the income-related inequality in health are the demographic characteristics, for all groups, which mainly reflect the effect of age on inequality, followed by education, income and employment status. The impact of age is of outmost importance for the female population, as an approximately 44% of the inequality is attributed to age, regardless of the health variable used. Education accounts for more than one fourth of the recorded income inequality, while income and employment status rank third in terms of importance. For the male population, the unequal distribution of income is the second most significant contributor to inequality in health, together with age, varying from 23% (chronic) to 29% (hampered), after education level (25-30%), while the employment status comes last in the rank.

3. Discussion

Comparing our results with those of other countries, Greece would still exhibit the anticipated pattern. European countries (Lecluyse 2007, Cantarero, *et al.* 2005, Quevedo *et al.* 2005, van Doorslaer and Koolman 2004, Wagstaff *et al.* 2001, Humphries and van Doorslaer 2000), Canada (Safaei 2007, van Doorslaer and Jones 2003, Humphries and van Doorslaer 2000) and US (Humphries and van Doorslaer, 2000), confirm that inequality is a burden for the worst off, which is represented by the expected negative sign for the *CI*. Income, education and age are the most significant factors in explaining the observed inequality in health, followed by employment.

In two of the European studies mentioned above, Van Doorslaer and Koolman (2004) and Quevedo *et al.* (2005), both based on the ECHP, Greece is also included among other EU countries examined. The first study is using the 1996 wave of the ECHP for 13 EU countries and a health measure close to our SAHS, but a different econometric method. Despite this difference, they report a pro-rich health-inequality in Greece, exactly as we do in this work. It is worth mentioning that the observed inequality places Greece in the third place among countries with the most unequal distribution of income. The degree of inequality is attributed mainly to income with 39% whereas in our study this effect is a bit lower (22%). However, the three most significant contributors to the income-related inequality in health are common in the two studies. Quevedo *et al.* (2005), is a longitudinal study for 14 EU countries and is using hampering conditions as a measure of health. Once again health inequality seems to be a burden for the least affluent of Greek population and its extent ranks Greece and Ireland in the first two places. What is worth mentioning is that Quevento *et al.* document a more intense inequality, as the value of the *CI* mounts to –0.224, whereas our estimation resulted in a value of –0.185. This disparity can be most possibly attributed to the differences in the econometric approach, as well as to the utilization of non-identical independent variables.

The SES-health relationship in Greece is also investigated by a number of other studies. A variety of health indicators has been used and the data on which the empirical analysis is based are usually collected from constructed questionnaires. The findings have shown a positive impact of all SES variables on SAHS, while individual health seems to be worse in older age groups and for those individuals adopting risky health behaviour. For a review of the Greek literature see Economou and Nikolaou (2005).

V. CONCLUSIONS

Using the ECHP we studied the existence of income-related health inequalities in Greece. Whatever the measure of the health outcome used, the estimated health inequalities clearly show that inequalities in health favored the higher income groups. The main results can be summarized in the following points: First, the total *CIs* are greater for the male group as compared to the female group, implying that men with ill health are more likely to be classified in the lowest income groups. Second, men with age greater than 65 years, a lower education attainment, a significant number of persons in their household and who are either self-employed or unemployed are disproportionately classified in the lower income groups. Respectively, the less educated, the separated, divorced, or widowed, the older than 55 and the unemployed Greek women are more likely to belong to the least affluent.

Our findings are in line with other European or Greek studies regardless of the health measures and the data sets used. Despite the increased economic prosperity that Greece has enjoyed during the last decades, ill health remains mostly concentrated in the poor and low socioeconomic groups. These inequalities are preventable and call for adequate policies that address income related, as well as broader socioeconomic inequalities in health.

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