Development and health among European older populations

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Abstract:

The 2011 wave of the rich Survey of Health Aging and Retirement Europe (SHARE) is used for the exploration of the full spectrum of factors behind the health-status in 16 European countries, using about 33 thousand observations. Special emphasis is given to the *examination of country development measures and their correlation with aggregate country-levels of subjective-health.* The empirical analysis includes 2 layers: (i) estimation of self-assessed-health-status (SAHS) equations, using a large set of personal socio-economic characteristics as explanatory variables (controlling for country fixed-effects); and (ii) study of the correlations between average country SAHSs – controlled for differences in individuals' socio-economic characteristics – and objective country-specific aggregate macroeconomic development variables (logarithm of per-capita GDP; the Human Development Index; life expectancy at birth; per-capita expenditures on health; percentage of GDP spent on education; income inequality). The second part of the empirical examination (that borrows the technique used by Oswald and Wu, 2010) is novel and will lead to an answer to our core question: *Is subjective-health affected by the country's economic development level?*

The main findings are: (i) the estimation of self-assessed-health-status regressions provides clear evidence of the *effects of a large set of socio-economic variables on the individual's subjective rating of her/his health status, beyond and above the obvious effects of health conditions;* (ii) the second, more innovative, finding is related to the effects of country-specific economic development variables on the subjective-health of the residents, beyond and above those of the personal characteristics. Country dummy variables are added to the SAHS regression, to derive the country-specific aggregate SAHSs. These country dummies are then examined for correlations with a set of objective country economic development measures. It appears that *five development measures (logarithm of per-capita GDP; the Human Development Index; life expectancy at birth; per-capita expenditures on health; percentage of GDP spent on education) are positively and significantly correlated with aggregate SAHSs, while Income Inequality does not correlate significantly with SAHS.*

It is therefore not only 'who you are' that affects the rating of health, but also 'in which country you live'. *Those who live in more developed countries report higher levels of subjective-health (everything else being equal).* Overall, our findings indicate that what is true for the individual is also true for the country as a whole: both *individual* and *country-level development* factors affect subjective-health and the two levels accumulate and reinforce the subjective-health assessment. This seems to be at odds with the 'Easterlin Paradox' (that relates to well-being and is borrowed here to the health arena) which emphasizes within-country individual effects and marginalizes cross-country effects.

Keywords: development; self-assessed-health-status; health determinants; SHARE; Europe

Jel Classifications: I1, I15

1. Introduction and motivation

Health is an important factor behind economic development of states. There is a dual relationship between health and economic development. The health status of the population affects its level of economic development (Commission on Macroeconomics and Health, 2001; Case, 2002; Bloom et al., 2004, 2014; Acemoglu and Johnson, 2007; Deaton, 2007). Causality can however also run in the opposite direction: from the country's economic status to health of the population (e.g., Ruhm, 2000, 2006, 2008; Bezruchka, 2009). In this study we focus on this path of causality and explore if individuals who live in more developed countries report higher levels of subjective-health (self-assessed-health-status – SAHS), everything else being equal. Specifically, we look at country effects on SAHS (controlling for individual socio-economic/demographic/health-related variables) and explore whether these country dummies (that represent country average levels of SAHSs) are significantly correlated with a battery of country development measures (logarithm of per-capita GDP; the Human Development Index – HDI; life expectancy at birth; per-capita expenditures on health; percentage of GDP spent on education; income inequality). In other words: are, otherwise similar residents, who live in more advanced/developed countries, reporting higher SAHSs? To explore the correlation between country-specific average *net* SAHSs and country development parameters, we borrow the technique employed by Oswald and Wu (2010).

Questions on subjective health were recently introduced in questionnaires used within the social sciences and the medical professions. The core variable – self-assessed-health-status (SAHS) - is evaluated by the respondents. Respondents are asked to assess their health-status by rating their overall health on a scale with 4-10 categories, ranging from ‘excellent’ to ‘very poor’, or some variant. In the Survey of Health Aging and Retirement Europe (SHARE) questionnaire the question is: “On a scale from 1 to 5, where 1 describes the worst imaginable condition and 5 the best imaginable condition, how do you rate your health in general?” A person’s own understanding of her/ his health is the

‘internal’ view of health, as opposed to ‘external’ views that are based on observations of doctors or pathologists (Sen, 2002). The external view of health has come under considerable criticism, particularly from anthropological perspectives, for taking a distanced and less sensitive view of illness and health (Kleinman, 1988, 1995).

The 'internal', view expressed by the ‘self-assessed-health-status’, has increasingly become a common measure of health in empirical research. The belief that the individual is the best evaluator of her/his health status was supported by the findings of numerous studies, which indicated that self-ratings of health are good predictors of mortality and morbidity even more than medical records. The first clear demonstration came with Mossey and Shapiro’s (1982) analysis of the Manitoba Longitudinal Study, which showed that elderly Canadians’ self-ratings of health were better predictors of seven-year survival than their medical records or their self-reports of medical conditions. Idler and Benyamini (1997) quote evidence from no less than 27 studies documenting that a respondent’s global health rating is an independent powerful predictor of subsequent individual mortality. Benyamini and Idler (1999) identified 19 additional studies that were published during the period 1995 to 1998. Some of the more recent studies in the same line are: Ferraro and Kelley-Moore (2001); Wang at al. (2001); van Doorslaer and Gerdtham (2003); Nagarajan and Pushpanjali (2008); Parissis et al. (2009) and Cesari et al. (2009). Up-to-date over 200 studies have reported robust relationships between self-assessments-of-heath with mortality and morbidity (Mora et al., 2008). The respondents in the above cited sample surveys are heterogeneous in terms of: country of residence, socio-economic status, race, ethnicity, education, preventive practices, and health conditions – indicating the universality of the phenomenon.

Health starts to deteriorate around the age of 50. It is therefore natural to examine the determinants of SAHS using samples from the population aged 50 or above. Moreover, the share of this sub-population is constantly growing in virtually all countries and catering to its health needs, is of great socio-political importance.

The very rich SHARE data base is an ideal data set for the exploration of the full spectrum of factors behind the SAHS. It is a multidisciplinary and cross-national panel data set of micro data on health, socio-economic status and social and family networks of more than 45,000 individuals aged 50 or over. They are a balanced representation of the

various regions in Europe, ranging from Scandinavian countries (Denmark and Sweden), through Central Europe (Austria, France, Germany, Switzerland, Belgium, the Czech Republic and the Netherlands) and Eastern Europe (Poland, Hungary, the Slovak Republic and Estonia), to the South (Spain, Italy and Portugal).

The empirical analysis includes 2 layers: (i) estimation of SAHS equations, using a set of personal socio-economic characteristics as explanatory variables (controlling for country fixed-effects). The SHARE data base facilitates the examination of variables that have not been explored before, such as: having a living mother/father; and (ii) study of the correlations between average country SAHSs – controlled for differences in individuals' socio-economic characteristics – and objective country-specific aggregate macroeconomic development variables (logarithm of per-capita GDP; the Human Development Index; life expectancy at birth; per-capita expenditures on health; percentage of GDP spent on education; income inequality). The second part of the empirical examination will lead to an answer to our core question: Is subjective-health affected by the country's economic development level?

Deaton (2008) looked at the 'satisfaction with health' versus a set of subjective aggregate country measures of health (in particular, life expectancy and country expenditures on health) and found that they are uncorrelated across 132 countries. Our study relates to a larger set of country-specific measures and their correlation with country SAHSs (controlling for differences in personal characteristics), using data for European countries, and a different statistical analysis. A comparison of the results with those presented by Deaton is obviously of interest. Moreover, evidence (based on the SHARE rich data set) on the relationship between the country's economic/social/welfare performance and the population's average SAHS, is also relevant for the heated debate on the (so-called) Easterlin Paradox that related to subjective-well-being (SWB) and suggested that wealthy people tend to be happier than poor people in the *same country*, but that there is no such relationship *across countries*, or *over time*. In a series of studies Easterlin has examined the relationship between happiness and GDP, both across countries and within individual countries through time, and found little significant evidence of a link between aggregate income and aggregate happiness. He concluded: "*what is true for the individual is not true for society as a whole*" (Easterlin, 1973, page

4, italics in the original). Our core findings can be used to test the Easterlin Paradox, *twisting it from the well-being domain to health.* See discussion in Section 4.

The structure of the paper is the following: The next section describes the variables used for the econometric analysis. The empirical analysis of the determinants of SAHS, the normalized country coefficients and their correlations with a set of country-specific development variables are presented in Section 3, and Section 4 summarizes and concludes.

2. Variables used for the econometric analysis

SHARE is a unique, innovative, carefully designed, multidisciplinary and cross-national panel data base of micro data on health, socio-economic background, and social and family networks.

Data collected include health variables (e.g. self-reported health, health conditions, physical and cognitive functioning, health behavior, use of health-care facilities); bio-markers (e.g. body-mass index); socio-economic economic variables (e.g. age, gender, wealth and consumption, education); and social support variables (e.g. marital status, number of children at home, a living father/mother).

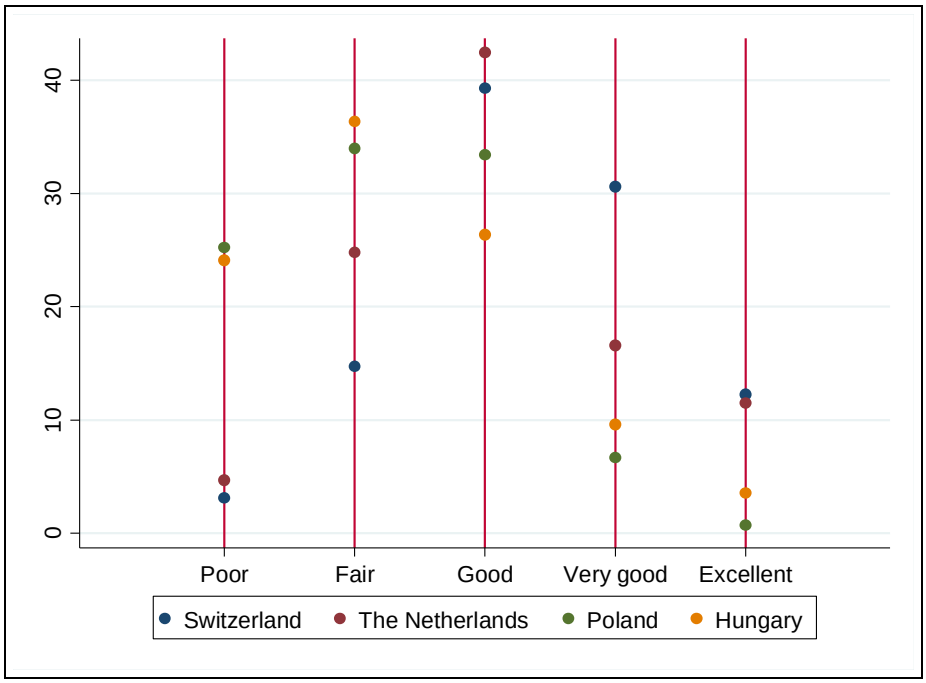
Daniel McFadden concluded that "*SHARE has become a world-class example of research infrastructure*". This incredible data base will facilitate our goal of exploring the various determinants of SAHS, as well as the country-specific effects, leading to policy implications for the improvement of the health status of European elderly.

The *dependent variable* is the individual's subjective self-assessment of her/his health status that has 5 categories and is based on the question: "On a scale from 1 to 5, where '1' describes the worst imaginable condition and '5' describes the best imaginable condition, how do you rate your health in general?" The average SAHS score for the whole sample is 2.8.

As an illustration, Figure 1 plots the distribution (in percentages) of responses to the SAHS question, for four selected countries out of the 16 sampled countries: two countries with the highest per-capita GDP (Switzerland and The Netherlands), and at the other extreme, two countries with the lowest per-capita GDP (Poland and Hungary). As it is

evident from Figure 1, there are substantial differences between these countries in the subjective-health evaluations. The country differences might stem from differences in health conditions, from country-specific macro development variables, and also from cultural and language differences.

Figure 1: Distribution (percentages) of responses to SAHS question, Share 2011



The independent variables include: Socio-demographic variables (gender, age, education, marital status, number of children in household, parents alive, pension); medically based health (drug use, diagnoses of medical problems, use of medical services, health symptoms, and quality of eyesight); functional capacity, cognitive functioning, behavioral risks (alcohol use and obesity), country dummies. Their definitions are presented in Table 1 and appendix Table A.1 summarizes the descriptive statistics of the research variables.

Table 1: Variable definitions

(i) Socio-demographic variables	
Gender	Dummy variable that is set to 1 for male respondents.
Age	Four dummy variables, relating to the age groups of: 61-to-70; 71-to-80; 81-to-90; 91 and over; with the reference group being age of 50-to-60.
Education	Dummy variable that equals 1 if the respondent has at least 13 years of schooling.
Marital status	Two dummy variables: married and widowed; with the reference group including: divorced, separated and single.
Number of children in the household	Number of children in the household.
Living parents	Two dummy variables: Mother and father alive.
Public old-age pensions	Dummy variable that is coded as 1 if a public old-age pension is received by the individual.
(ii) Medically based health	
Drug use	Continuous variable that is the number of different drugs that the respondent takes at least once a week (e.g., drugs for high-cholesterol, high blood-pressure, joint pain, back pain, sleep problems, anxiety or depression, stomach burns).
Health conditions	Set of dummy variables that relate to diseases that the individual was diagnosed with. They include: heart diseases; hypertension; vascular diseases; diabetes; lung diseases; arthritis; osteoporosis; and cancer.
Health symptoms	Continuous variable that is the sum of different symptoms that the individual suffered from during the last 6 months (e.g., sleeping problems, falling down, persistent cough, fatigue, swollen leg, dizziness).
Medical consultation	Continuous variable that is the response to the question: "During the last 12 months, about how many times in total have you seen or talked to a medical doctor about your health. Please exclude dentist visits and hospital stays, but include emergency rooms and outpatient clinic visits".
Hospitalization	Dummy variable that equals 1 if the respondent answered positively the question: "During the last 12 months, have you been in hospital overnight? Please consider stays in medical, surgical, psychiatric or any other specialized wards."
Quality of eyesight	Continuous variable ranging from 1 (poor) to 5 (excellent). It is the average of 2 variables related to eyesight that are the responses to the question: "Your distance/reading eyesight is: poor (1)…excellent (5)".
(iii) Behavioral risk factors	
Alcohol consumption	Dummy variable is defined: it equals 1 if the respondent, during the last 3 months, used to drink any alcoholic beverages, like

	beer, wine, spirits or cocktails at least 5 days a week.
Obesity	Dummy variable that is equal to 1 if the Body Mass Index (BMI, based on weight and height) is greater than 30.
(iv) Functional capacity	
ADL	This variable relates to limitations with basic activities of daily living (ADL). Six activities are included: dressing (including putting on shoes and socks), walking across the room, bathing or showering, eating (such as cutting up your food), getting in and out of bed, and using the toilet (including getting up or down). We use the individual's answer to these questions for the construction of a linear index, using the principal components analysis.
IADL	This variable describes the number of limitations with instrumental activities of daily living (IADL) reported by each individual. Seven activities are included: using a map to figure out how to get around in a new place, preparing a hot meal, shopping for groceries, making telephone calls, taking medications, doing work around the house or garden, and managing money (such as paying bills). We use the respondent's answers to these questions to construct a linear index using the analysis of principal components.
(v) Cognitive abilities	
Identifying animals	Continuous variable that is the number of animals that the individual listed in 60 seconds, in response to the question: "I would like you to name as many different animals as you can think of. You have one minute to do this."
(vi) Country dummy variables	
	The countries included in the sample are: Austria, Germany, Sweden, The Netherlands, Spain, Italy, France, Denmark, Switzerland, Belgium, The Czech Republic, Poland, Hungary, Portugal, Slovenia and Estonia. Austria is serving as the reference country.

SHARE has also data on employment, attitudes and beliefs (e.g., hope, trust), and social activities (e.g., voluntary work, social networks). These variables are not included in the estimation of SAHS equations due to simultaneity problems.

3. Econometric analysis and findings

The econometric analysis has 2 layers: (i) estimation of a SAHS equation, using the explanatory variables described above with a special focus on the country coefficients;

and (ii) based on the regression results: derivation of standardized country coefficients (that reflect country average SAHSs) and estimation of correlations between the country SAHSs and macro country development measures (logarithm of per-capita GDP; Human Development Index; life expectancy; per-capita health expenditures; percentage of GDP spent on education; income inequality).

Investigation of SAHS determinants is reported in many studies. The second stage is novel and will also contribute to the discussion on the correlation between individuals' subjective characteristics and aggregate macro characteristics of their countries of residence. There is already an extensive heated debate on this topic, regarding individuals' well-being and country characteristics. We will extend the debate in the direction of *correlations between SAHS and macro development variables.*

3.1 *SAHS regression equation: Determinants of subjective-health*

Since reported subjective-health is intrinsically ordinal (with 5 values of 1-5), the natural way to estimate a SAHS equation is by using Ordered Logit or Ordered Probit. However - as discussed in Ferrer-i-Carbonell and Frijters (2004) – when the dependent variable relates to satisfaction scores, the use of a linear model instead of an Ordered Logit Model, does not change the basic results. The simpler OLS method allows coefficients to be read off as cardinal subjective-health scores.

The dependent variable is the respondent's subjective assessment of her/his health-status, ranging from 1 (worst imaginable condition) to 5 (best imaginable condition). Standard errors are adjusted for clustering at the country level.

Table 2 presents the OLS regression results. Experimenting with Ordered Logit regressions, resulted in minor changes (in terms of sign, magnitude, and significance of coefficients, available upon request).

Table 2: Determinants of SAHS, OLS regression, clustered (at the country level) standard errors, SHARE 2011

Variables		Coefficients (t-statistics)
(i) Socio-demographic personal variables		
Male		-0.068 (-5.171)***
Age (years)		
	50-60	Ref.
	61-70	0.001 (0.065)
	71-80	-0.042 (-1.557)
	81-90	-0.062 (-2.080)*
	more than 90	0.067 (1.159)
Education		
More than 12 years of schooling		0.128 (11.239)***
Marital status		
	Single/Divorced/Separated	Ref.
	Married	0.036 (2.558)**
	Widowed	0.036 (1.798)*
Number of children in household		0.022 (0.822)
Living parents		
	Mother	0.058 (4.845)***
	Father	0.079 (4.324)***
Old age pension		0.039 (2.225)**
(ii) Medically based health		
Drug use		-0.081 (-9.336)***
Health conditions –diagnosed with:		
	Heart problems	-0.122 (-10.845)***
	Hypertension	-0.030 (-1.956)*
	Cerebral vascular disease	-0.141 (-5.695)***
	Diabetes	-0.117 (-7.715)***
	Chronic lung disease	-0.160 (-8.200)***
	Arthritis	-0.191 (-11.238)***
	Osteoporosis	-0.103 (-3.814)***
	Cancer	-0.319 (-9.652)***
Health symptoms (number)		-0.121 (-14.293)***
Medical consultation (number)		-0.012 (-10.024)***
Hospitalization (dummy)		-0.182 (-16.262)***
Quality of eyesight (range of 1-5)		0.167 (17.517)***
(iii) Behavioral risks		
Alcohol consumption		0.027 (2.959)***
Obesity (BMI>30)		-0.100 (-6.484)***
(iv) Functional Capacity Indices		
ADL		-0.030 (-5.839)***
IADL		-0.022 (-4.031)***
(v) Cognitive abilities		
Identifying animals		0.011 (9.314)***

Variables	Coefficients (t-statistics)
(vi) Country dummy variables	
Austria	**Ref.**
Germany	**-0.294 (-38.499)*** **
Sweden	**-0.031 (-5.929)*** **
The Netherlands	**-0.076 (-13.150)*** **
Spain	**-0.211 (-15.751)*** **
Italy	**-0.061 (-5.195)*** **
France	**-0.187 (-16.863)*** **
Denmark	**0.188 (27.380)*** **
Switzerland	**0.132 (24.300)*** **
Belgium	**0.032 (2.720)** **
The Czech Republic	**- 0.292 (-32.207)*** **
Poland	**-0.374 (-22.949)*** **
Hungary	**-0.340 (-22.210)*** **
Portugal	**-0.363 (-22.485)*** **
Slovenia	**-0.335 (-62.781)*** **
Estonia	**-0.660 (-50.401)*** **
Constant	2.703 (89.477) ***
Sample Size	32,768
R-squared	0.4484

* significant at 0.10; ** significant at 0.05; ***significant at 0.01

The pattern that emerges from Table 2 is clear: while health conditions (obviously) play a significant role in the individual's subjective-health-assessment, non-medical factors are also significant contributors to the SAHS. More specifically: suffering from diseases and bad health conditions lower the subjective assessment of health. Diagnosed with Cancer leads to an average drop of about 0.3 (on a scale of 1-5), while suffering from other major diseases (heart, cerebral vascular, diabetes, arthritis, and chronic lung disease) leads to a drop of around 0.1. Other indications of poor health conditions (use of drugs, hospitalization, number of annual medical consultations, number of medical symptoms) also lead to significant drops in the self-assessment-of-health, whereas better eye sight has a pronounced positive effect on SAHS. Lack of functional capacity (ADL and IADL) has a negative effect. .

Obese people have lower subjective-health assessments. However, individuals who drink report higher SAHSs. The difference between the effects of these 2 risk factors is somewhat unexpected. Could be that psychological factors are at work – while obese

people feel less attractive, drinking is accepted in Western society as a social positive norm and promotes social ties (SIRC, 1998). Moreover, drinking results in a mood upgrade, that probably leads also to more favorable subjective-health assessments.

As for the socio-economic personal variables: men have lower average valuations of SAHS than women. Murtang and Hubert (2004) claimed that at older age, women experience more health-related problems and functional limitations than men, leading to lower valuations of SAHS. However, as we control for a large series of health-related problems, this argument is not valid anymore. *Could be* that men are more hypochondriac than women and/or more ignorant on disease/health issues, leading to more pessimistic reports on their health status.

More educated individuals (those with 13+ years of schooling) tend to report higher SAHS levels (after controlling for household wealth). In line with the speculation that ignorance (of men) leads to lower reports of SAHS, highly educated individuals have the knowledge how to better control diseases, and therefore feel healthier.

As expected, members of wealthier households feel healthier. Wealth adds an element of protection and confidence that a need to deal with health problems will not be confounded by financial restrictions. Age does not affect subjective-health scores.

Interestingly, living parents add significantly to the valuation of subjective health. One explanation for this finding can be related to genetics – parents of individuals who are at the age of 50 and over, must be at least in their late 70s. This is an indication of high life expectancy that might affect health valuations of their offspring. Another option is that parents provide affection and psychological/emotional support (although they also demand help) that affects SAHS.

Married and widowed individuals report higher SAHSs compared to those who belong to any other group (single, divorced).

Of special interest are the coefficients of the country dummies, which measure the contribution of the country of residence to the subjective-health of its residents, beyond the effects of all other personal explanatory variables that are included in the regression analysis.

3.2 *Correlations between standardized subjective country effects and country-specific macro development measures*

A novel question that this paper attempts to address is whether objective country-specific development measures are affecting significantly the country population's average subjective-health-assessments. Is the country's level of development (proxied by per-capita GDP, and its economic/social/welfare performance) also contributing to SAHS (beyond the effects of personal traits of the residents)? In other words: is subjective-health affected by 'where you live' and not only 'how you live'? The standardized country dummies are used for the exploration of correlations between aggregate country SAHSs and some country-specific objective economic performance characteristics:

- *Logarithm of per-capita GDP* (in 2011). Per-capita GDP is the most common indicator for a country's level of economic development and economic performance. International institutions, such as the United Nations Organization, the World Bank, the OECD, and the International Monetary Fund, classify countries as developed, intermediate or under-developed, depending on whether they are above or below certain thresholds of GDP per-capita. It is also used frequently as a marker of the population's standard of living. The logarithm of GDP per-capita (that relates to the change in GDP per-capita) is often used in empirical studies as a better measure of development and economic power (e.g., Sacks et al., 2010; Clark and Senik, 2011; Easterlin et al., 2011).
- *Human Development Index* (in 2011). The Human Development Index (HDI) is a composite summary measure of human development that is published by the United Nations Development Program.[1] It combines indicators of health, education and standard-of–living and provides an alternative to the common practice of evaluating a country's progress in development based on per-capita GDP. The HDI ranges from 0 to 1.
- *Life expectancy at birth* (in 2011). Life expectancy at birth is defined as the average number of years that a newborn is expected to live, assuming that current

[1] http://hdr.undp.org/en/statistics/hdi/

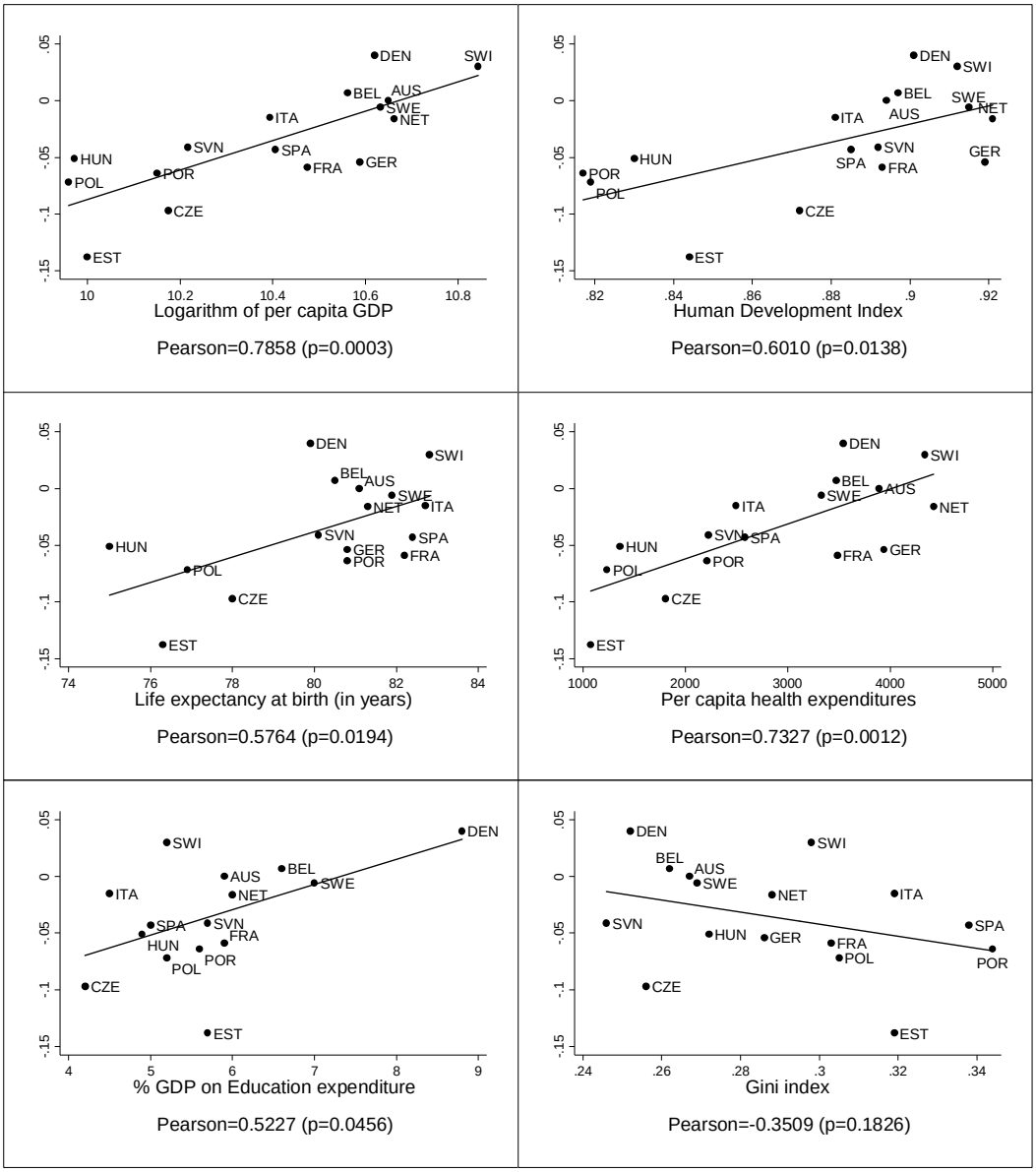
mortality rates will not change. It is one of the measures of economic development.

- *Per-capita expenditures on health* (in 2011). Per-capita expenditures on health relate to total public and private health expenditures (ppp in 2005 US$) covering expenditures for: the provision of health services (preventive and cure), family planning, nutrition consultation, and medical emergency aid. It does not include provision of water and sanitation.
- *Percentage of GDP spent on education* (in 2010). OECD (2013) provides data on public expenditure on educational institutions plus public subsidies to households, as a percentage of GDP.
- *Income inequality – The Gini Index* (in 2011). The Gini index measures the extent of deviation of the distribution of income (among individuals or households) from a perfectly equal distribution. A Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality.

The statistical analysis that is employed follows Oswald and Wu (2010). They used a sample of US states to investigate correlations between state-level subjective-well-being (estimated using a SWB equation) and objective state measures. We borrow their technique and twist it into the health arena, using countries rather than states as our units of analysis.

The standardized country coefficients of the 16 countries included in our sample (see Appendix Table A.2) are plotted against various country macro development measures. Pearson correlations are calculated and tested for significance. The results are presented in Figure 2.

Figure 2: Country development measures versus standardized country SAHS effects



Source of country development measures: OECD (2013)
Vertical axis= standardized fixed-effects country coefficients, based on SAHS regression (Table 2)

As figure 2 indicates, in 2011, the correlations between these macro development measures and the country standardized effects are positive and significant, except for the Gini Index. Table 3 summarizes the results:

Table 3: Pearson correlation coefficients – size and significance

Correlation between	Country SAHS	Significance level
Logarithm of per-capita GDP	0.7858***	0.0003
HDI- Human Development Index	0.6010**	0.0138
Life expectancy at birth	0.5764**	0.0194
Per-capita expenditures on health	0.7323***	0.0012
Percentage of GDP spent on education	0.5227**	0.0456
Income inequality (Gini Index)	-0.3509	0.1826

** significant at 0.05; *** significant at 0.01

As is indicated by Table 3, the significant correlations vary between 0.58-0.78. It should be noted that a correlation coefficient (r) of about 0.6 is unusual by standards of behavioral science. It is high by the cut-offs suggested by Cohen's (1988) rules-of-thumb, which argued that in human data an r value over 0.5 should be seen as large association, and 0.3 as a medium one. An r=0.6 is the same degree of correlation as, for example, has been found for people's own life-satisfaction readings, taken 2 weeks apart (that is, using the same well-being question, asked of the same person) (Oswald and Wu, 2010).

4. Conclusions and discussion

Our empirical study is based on data for more than 32,700 respondents from 16 European countries and employs numerous variables from the SHARE data base.

The core conclusions that are derived from the 2 parts of the statistical analysis are the following:

(i) The estimation of a self-assessed-health-status regression shows clear evidence of the significant effects of socio-economic variables, above and beyond the effects of medical factors. While it is not surprising that socio-economic factors play a role in building the individual's well-being, it is less

expected that they also play a major role behind the individual's rating of her/his subjective-health.

(ii) The second, more innovative, finding is related to the effects of country-specific economic development variables on the subjective-health of the residents, beyond and above those of the personal characteristics. It is therefore not only 'who you are' that affects the subjective rating of health, but also 'in which country you live'. Following the technique presented in Oswald and Wu (2010), country dummy variables are added to the SAHS regression, to derive the country-specific aggregate SAHSs. These country dummies are then examined for correlations with a set of objective country macro measures. They include: logarithm of GDP per-capita; the Human Development Index (HDI); life expectancy at birth; per-capita health expenditures; education expenditures as percentage of GDP; and income inequality. It appears that the first 5 country measures have a positive significant correlation with country controlled SAHS (standardized country dummy variables). The income inequality measure does not correlate significantly with country SAHSs. Similar investigations have been performed within the field of well-being/happiness. To the best of our knowledge, the extension of the investigation into the domain of health, using the technique presented in Oswald and Wu (2010), is novel.

(iii) The findings of positive significant correlations between the countries' development levels and the subjective-health of the populations, has policy implications: improvement of development measures affects perceived-health above and beyond the more documented effect on well-being. Better subjective health could consequently lead to a more efficient use of welfare and public-health budgets (e.g., if less is demanded for drugs, medical consultation etc., funds can be redirected para-medical uses, such as: preventive health or the improvement of patients' quality of life).

(iv) The evidence that country development measures (in particular the logarithm of per-capita GPD) do affect subjective-health, can be related also to the heated debate between the supporters and the opponents of the so-called

'Easterlin Paradox', extending it into the domain of health, rather than the original field of well-being/happiness.

Richard Easterlin, who pioneered the Economics of Happiness in the mid-1970s, suggested that wealthy people tend to be happier than poor people in the *same country*, but that there is no such relationship *across countries*, or *over time*. This assertion is known as the 'Easterlin Paradox'. Easterlin has examined the relationship between happiness and GDP, both across countries and within individual countries through time (Easterlin, 1974, 1995, 2001, 2005). In both types of analysis he found little significant evidence of a link between aggregate income (per-capita GDP) and aggregate happiness, concluding that "*what is true for the individual is not true for society as a whole*" (Easterlin, 1973, page 4, italics in the original). Layard (1980) presented evidence that supported the 'Easterlin Paradox'. Layard was even more succinct and concluded: "a basic finding of happiness surveys is that, though richer societies are not happier than poorer ones, within any society happiness and riches go together" (page 737). Graham and Pettinato (2001) examined data for a sample of 17 developing economies in Latin America and arrived at a similar result: No clear relationship between gross national product and happiness. Several studies challenged the 'Easterlin Paradox'. Two of the more determined opponents are: Deaton (2008) and Stevenson and Wolfers (2008). Using the 2006 Gallup World Poll that was conducted in 132 countries, Deaton arrived at a clear-cut conclusion that average life satisfaction is strongly related to per-capita national income. Stevenson and Wolfers (2008) were even more determined. Based on a statistical analysis of several rich data bases, they conclude that "*Across the world's population, variation in income explains a sizable proportion of the variation in subjective well-being. There appears to be a very strong relationship between subjective well-being and income, which holds for both rich and poor countries*" (page 2). Sacks, Stevenson and Wolfers (2010) reconfirm these results.

Overall, our findings (twisted from the well-being to the health domain) show that *residents of more developed countries have significantly higher*

valuations of their subjective-health (everything else being equal). This seems to be at odds with the 'Easterlin Paradox' that denies differences across countries.

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APPENDIX

Table A.1: Sample characteristics

	Mean (standard deviation)
Dependent Variable. SAHS (range of 1-5)	2.81(1.06)
(i) Socio-demographic personal variables	
Male (%)	45.09
Age in years (%)	
50-60	27.67
61-70	37.34
71-80	25.05
81-90	9.36
more than 90	0.58
Education	
More than 12 years of schooling (%)	30.30
Marital status (%)	
Married	74.79
Widowed	12.43
Number of children in household	0.01 (0.14)
Living parents (%)	
Mother	18.33
Father	7.02
Old age pension (%)	55.74
(ii) Medically based health	
Drug use (number of drugs)	1.64 (1.65)
Health conditions – diagnosed with..(%)	
Heart problems	13.28
Hypertension	40.08
Cerebral vascular disease	3.95
Diabetes	12.96
Chronic lung disease	6.52
Arthritis	24.07
Osteoporosis	1.46
Cancer	5.14
Health symptoms (number)	1.70 (1.74)
Medical consultation (annual-number)	6.81 (9.39)
Hospitalization (%)	15.98
Quality of eyesight (range of 1-5)	3.33 (0.98)
(iii) Behavioral risks (%)	
Alcohol consumption (at least 5 days a week)	23.07
Obesity (BMI>30)	21.12
(iv) Functional Capacity Indices (standardized)	
ADL	-0.12 (1.51)
IADL	-0.16 (1.52)

		Mean (standard deviation)
(v) Cognitive abilities		
Identifying animals		19.88 (7.70)
(vi) Country shares in the sample (%)		
	Austria	11.49
	Germany	3.99
	Sweden	4.75
	The Netherlands	5.48
	Spain	4.85
	Italy	6.91
	France	12.77
	Denmark	5.24
	Switzerland	4.95
	Belgium	7.92
	The Czech Republic	14.25
	Poland	4.38
	Hungary	2.63
	Portugal	3.59
	Slovenia	1.66
	Estonia	5.16
	Sample Size	32,768

Standard deviations in parentheses

Table A.2: Standardized country dummy variables

Country	Standardized Country dummies
Austria	0
Germany	-0.054
Sweden	-0.006
The Netherlands	-0.016
Spain	-0.043
Italy	-0.015
France	-0.059
Denmark	0.040
Switzerland	0.027
Belgium	0.007
The Czech Republic	-0.097
Poland	-0.072
Hungary	-0.052
Portugal	-0.064
Slovenia	-0.041
Estonia	-0.138