

Social capital, income inequality and the health of the elderly.

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Abstract

It is of common knowledge that the improvement of medicine and living conditions in the twentieth century have greatly contributed to the formidable increase of life expectancy. Therefore many key factors that influence health are well known. What it is less understood and has increasingly grasping the attention of researchers are the social determinants of health. In this paper we will focus in particular on two: income inequality and social capital. After a thorough analysis that explains the nexus at the theoretical level, we will empirically evaluate it by mean of a mixed effects logistic model for the European individuals who are older than 60 in 2011. We find a strong significant association between self-perceived health and social capital, but no link with income inequality.

1 Introduction

Ageing is at the same time one of the greatest achievement and most difficult challenge of our times. This explains why there is a huge debate going on among researchers on this topic.

A main stream of research is around the social determinants on the *healthy* ageing and therefore central to the discussion surrounding the extension of active lifespan is the state of health of older adults, where “health” refers to the physical, mental and social well being.

The European Union has recently stressed the importance of maintaining autonomy and independence for older people, as a key goal in the policy framework for active ageing. While physical and mental health are crucial in this context, there are numerous determinants of healthy and active ageing that lie beyond the health system, having direct or indirect effects on health.

Recently, an explanation has begun to take hold: social capital (see below for the definition of the concept) can be one of the key factor to understand why some individuals are more exposed to disease and mortality than other, despite the undoubted improvement of medicine and living conditions over time. As a consequence the relationship between social capital (SC) and health is capturing

the attention of an increasing number of researchers (Andrew, 2005; Folland, 2007; d’Hombres et al., 2010; Poulsen et al., 2011; van Groezen et al., 2011; Rocco and Marc, 2012; Hawe and Shiell, 2000; Szreter and Woolcock, 2004; Islam et al., 2006). However, the nexus is not fully proved: some studies provide empirical evidence that these two concepts are connected (Lindstrm, 2004), but there are others which report the absence of it (Greiner et al., 2004; Veenstra, 2005; Ziersch and Baum, 2004).

Interestingly this association seems to hold for the population of the elderly. An explanation is that older adults are considered to have higher degree of involvement in their communities compared to other age groups (Lowe, 2010). With increasing age most social contacts fade away, bonds with non-kin decrease in importance, while the bonds with children and close family members may increase; older adults could be involved in new roles within the family or in the community.

A number of studies emphasize the association between social capital and health among older people (Andrew, 2005; Veenstra, 2000; Kondo et al., 2007; Arezzo and Giudici, 2017). Recent studies attempted to prove that this relation could be more than a simple statistical association (Rocco and Marc, 2012; Arezzo and Giudici, 2016) and established a causal path leading from social capital to health.

Recently, researchers pulled together the literature that explores the relation between health and social capital to the one on socioeconomic inequality and health. This is mostly done focusing on the distribution of income. The pioneer of this stream of very recent literature was Wilkinson (1996) who demonstrated that higher income inequality is associated with lower life expectancy in wealthier countries. Wilkinson’s results has awakened an enormous interest and many works have followed ever since, some supporting (Kawachi and Berkman, 2000; Marmot, 2002; Subramanian and Kawachi, 2004; Wilkinson and Pickett, 2006), some refuting (Lynch et al., 2001, 2004; Mackenbach, 2002; Osler et al., 2002; Ross et al., 2000; Shibuya et al., 2002) his findings.

The contribution of this work is to try to understand if the relationship between social capital and income inequality with health exists for the population of the European elderly. The rest of the paper is organized as follows: section 2 provides the definitions of social capital and recall some discussions around it; section 3 illustrates the theoretical pathways from social capital to health and from income inequality to health; section 4 covers data, variables and the models used; section 5 provides the results. The conclusions are reported in section 6.

2 Social capital

The first glimmer of social capital as a concept dates back to the beginning of the 20th century with the contribution of Hanifan (1916, 1920), who emphasized the importance of social structure to people with a business. In the last twenty years a flourishing multidisciplinary literature on the topic serves to enrich and

qualify the concept of social capital.

There is widespread agreement among researchers that social capital is the synthesis of three different points of view (Grootaert and van Bastelaer T. 2001): the first, due to Putnam, defines social capital as those characteristics of social communities, such as networks of individuals and families together with norms that create externalities for the society as a whole; the second interpretation, referred to by Coleman, defines social capital as a “variety of different entities which all consist of some aspect of social structure and which facilitate certain actions of actors -whether personal or corporate actors- within the structure”; the third is associated with Olson and North and includes the social and political environment that shapes social structure and allows for the development of norms.

Theoretical research identifies a structural and a cognitive aspect of social capital, the first being related to actions of individuals and the second to their perception. Structural aspects appear in rules and in specific behavior (such as networking or volunteering activities), whereas cognitive aspects materialize as trust, shared values, empathy and respect towards community. The former are more easily measured objectively than the latter.

Another important distinction, particularly relevant to our research, can be drawn between bonding and bridging social capital (Putnam 1995): the first refers to the relations that an individual has within his/her “inner circle” whereas the second relates to ties with people outside of the closest circle. In other words, bonding SC refers to the trusting and co-operative strong relations among individuals who recognize to be similar in terms of social identity (family ties are an important example of this category); bridging SC comprises relations among people who know they are not alike in some socio-demographic sense (Szreter and Woolcock 2004).

Another important issue discussed in theoretical literature is on the level of relevance of its tenure and measurement: the sociologist Pierre Bourdieu defines social capital as “the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships” (Bourdieu 1985).

As argued by Andrew (2005), Bourdieu’s conceptualization of social capital as a durable network of relationships is consistent with the idea that social capital is a resource which can be measured at an individual level. According to Bourdieu “the volume of social capital possessed by a given agent thus depends on the size of the network of connections he can effectively mobilize and the volume of the capital possessed by each of those to whom he is connected” (Bourdieu 1985).

Also according to Lin (1999), who says that “social capital is captured from the embedded resources in social networks”, social capital is more properly captured at the individual level.

In other conceptualizations, social capital is considered in purely collective terms. For example in Kawachi and Berkman (2000) it is argued: “social capital inheres in the structure of social relationships; in other words it is an ecological characteristic” which “should be properly considered a feature of the collective

(neighborhood, community, society) to which an individual belongs”.

Although some authors consider social capital more relevant at an individual level (Bourdieu 1985; Portes 1998; Veenstra 2000; Dayton-Johnston 2003; Pevalin 2003) whereas others at collective level (Lochner et al. 1999; Kawachi and Berkman 2000; McKenzie et al. 2002; Szreter and Woolcock 2004) and the appropriate level at which it should be measured remains uncertain, the literature on social capital and health shows that differences in health could be better predicted by individual level social capital (De Silva et al. 2005). We follow this approach and use an individual level measurement of SC.

3 Theoretical pathways from social capital and income inequality to health

The findings of an empirical association between social capital and income inequality with health require a deeper analysis highlighting the theoretical motivations and the mechanisms underlying these nexuses.

3.1 Income inequality and health

Three mechanisms have been suggested to link income inequality and health (Kawachi et al., 1994; Lynch and Kaplan, 1997): (a) the disinvestment in human capital; (b) the erosion of social capital; and (c) social comparisons.

On behalf of the first path, there is a strong evidence (Kaplan et al., 1996) that the degree of income inequality at the state level and indicators of human capital investment are negatively and significantly correlated. One reason why high income inequality may translate into lower spending in education (and other social areas) is that in countries with rising inequalities, the interests of the rich diverge profoundly from those of the typical family. Paul Krugman said that: *A family at the 95th percentile pays a lot more in taxes than a family at the 50th, but it does not receive a correspondingly higher benefit from public services, such as education. The greater the income gap, the greater the disparity in interests. This translates, because of the clout of the elite, into a constant pressure for lower taxes and reduced public services* (Krugman, 1996).

Another mechanism through which income inequality may affect health is via the crumbling of social capital; in fact as the gap between rich and poor increases, the resulting social conflict leads to increasing mistrust between members of society. Kawachi et al. (1997) showed that citizens living in states characterized by high income inequalities are more mistrustful of each other.

The last pathway from income inequality to health is through social comparisons. More specifically the comparison between individuals with very different economic status and/or possibilities to have access to relevant resources, very typical in unequal societies, results in a direct negative effect on health (Dressler, 1996; Dressler et al., 1998).

3.2 Social capital and health

The theoretical literature identifies two major ways in which social capital influences health (Veenstra et al., 2005; Veenstra, 2005): the first, also known as “compositional” health effect of social capital, is a direct pathway to individual health whereas the second, the so called “contextual” health effect of social capital, exerts its influence only indirectly.

On behalf of the first, durable networks impact people behavior through four primary pathways: 1) social support; 2) social influence; 3) social engagement and attachment; and 4) access to resources and material goods. These behavioral processes have direct pathways to health status: 1) direct physiological stress responses, 2) psychological states and traits (for example self-esteem, self-efficacy, security), 3) health behaviors (for example they inhibit damaging habits like tobacco or alcohol consumption and foster healthy behavior such as appropriate health service utilization, medical adherence, and exercise) (Berkman et al., 2000).

Another interesting point of view that sheds lights on the compositional health effect and that is particularly suited for our purposes is given by the Social Production Function (SPF) theory applied to ageing (Ormel et al., 1999; Ormel, 2002; Steverink and Lindenberg, 2006). The SPF theory identifies three basic social needs: affection, behavioral confirmation, and status; the overall well being increases as these three needs are satisfied. In particular, affection is fulfilled by relationships that give the feeling of being loved, trusted and accepted; behavioral confirmation results primarily from the feeling of doing the “right” thing in the eyes of relevant others and oneself; and the need of status is fulfilled by relationships that give one the feeling to be treated with respect, taken seriously etc. In the light of the SPF theory, bonding social capital would benefit health because it fulfills affection whereas bridging SC behavioral confirmation and/or status. The variables we chose to measure SC, see subsection 4.2, are consistent with this theory.

The second pathway, i.e. the “contextual” health effect of social capital, has an impact on individual health indirectly through its influence on socio-economic and environmental factors of the community as a whole. These elements are determinants of health themselves. For example social capital is known to generate overall economic prosperity and wealth (Woolcock, 1998) and there is evidence for a link between community wealth and health (see for example Kaplan et al., 1996; Wilson and Daly, 1997; Lynch et al., 1998; Veenstra, 2003).

4 Methods

4.1 Data

Our study is based on the fourth wave of the survey on health and retirement in Europe (SHARE). SHARE is a multidisciplinary and cross-national panel database of micro data on health, socio-economic status and social and family networks of more than 85,000 individuals aged 50 or over. SHARE involves 18

European countries plus Israel and aims at analyzing the process of population ageing in depth.

The fourth wave (2010-11) introduces for the first time a social network module that allows for the computation of social capital and its dimensions. This is the reason why we decided to base our study on the fourth wave.

Since we are interested in the ongoing mechanisms of the older adults, we downsized the sample to the population older than 60. The countries analyzed are Austria, Germany, Sweden, Netherlands, Spain, Italy, France, Denmark, Switzerland, Belgium, Czechia, Poland, Hungary, Portugal, Slovenia, Estonia.

Our results are based on a sample is of 35,391 individuals who live (i.e. are nested) in 16 European countries and are older than 60 in 2011.

4.2 Variables

The dependent variable is the self-perceived health (SPH). The original 5 levels variable (excellent, very good, good, fair and poor) was transformed into a dichotomous one (excellent/very good/good and fair/poor). If an individual perceive to be in fair/poor health he/she is labeled with 1; otherwise it is 0. Dichotomization of self-rated health is not a seldom practice among authors and is due to the fact that the distribution of SPH is concentrated in the central values (Nieminen et al., 2010; Pirani and Salvini, 2012; Kim et al., 2006; Kawachi et al., 1999, Sme examples are). We decided to transform SPH in a binary variable to have results comparable with other works on social capital and health.

Among the independent variables we considered age, gender, income, body mass index (BMI), years of education and social capital. Income was measured using a proxy: the ability to make ends meet. In particular, we created a binary variable which assumed value 1 if to make ends meet is easy or fairly easy and 0 otherwise.

For the measurement of social capital we proceeded in two steps. First we selected those questions from the survey relevant for our purpose; they are: frequency of family contacts, number of individuals in family network, frequency done charity or voluntary work in the last 12 months, frequency attended an educational or training course in the last 12 months, frequency gone to a club in the last 12 months. Second we performed a principal component analysis (PCA) and used the loadings of the two factors extracted as the social capital variables. The variables with the highest relative contributions to the first components are frequency of family contacts and number of individuals in family network. We therefore named the first factor as *bonding social capital*. The second component was named *bridging social capital*.

Some descriptive statistics are reported in table 1.

4.3 Statistical models

To take into account the clustered structure of the data (i.e. individuals nested into countries), we used multilevel models (Hox, 2010; Rabe-Hesketh and Skro-

Table 1: Descriptive statistics for individual and country level variables.

	N	Mean	Std. Dev.	Min	Max	Type ^a
<i>Individual level variables</i>						
SPH	35,391	0.470	0.499	0	1	B
Years of education	35,391	10.062	4.320	0	25	D
BMI	35,391	26.945	4.634	1.469	76.125	C
Age	35,391	71.475	7.733	61	102	D
Bonding SC	35,391	0.001	1.246	-2.106	5.987	C
Bridging SC	35,391	-0.059	1.125	-3.145	6.791	C
Female	35,391	0.553	0.497	0	1	B
Ends meet:						
With some difficulty	35,391	0.290	0.454	0	1	B
Fairly easily	35,391	0.349	0.477	0	1	B
Easily	35,391	0.265	0.442	0	1	B
<i>Country level variable:</i>						
Gini index ^b	35,391	28.375	3.040	23.800	33.700	C

^a B = Binary; D = Discrete; C = Continuous.

^b Obtained from the OECD Regional well-being database.

ndal, 2008) and to evaluate how each component influence SPH we used a sequential approach. In particular we fitted a series of four models. The first (*Null Model*) was an intercept-only model and allows to see how much of the variance in SPH is due to differences among countries. In the second model (*Compositional Model*) there are all the individual level covariates but social capital (age, gender, income, BMI, years of education). In the third (*Social Capital Model*) we added social capital and in the last (*Full Model*) it is included the Gini index for the 16 countries. In all models the intercept is random.

Formally, we write the generic model as:

$$\text{logit}(\pi_{ij}) = \beta X_{ij} + \gamma K_j + u_j + e_{ij} \quad (1)$$

with the distribution of the random components assumed to be normal: $e_{ij} \sim N(0, \sigma_e^2)$ and $u_j \sim N(0, \sigma_u^2)$.

Where j indicates the countries, i the individuals, π_{ij} is the probability that the i -th individual who lives in j -th country has a fair/poor self-perceived health, β, γ is a vector of parameters to be estimated as well as σ_e^2 and σ_u^2 .

The model is a random intercept type and it assumes that each country has its own effect on self-perceived health. Note that if $\sigma_u^2 = 0$ the model reduces to the ordinary logistic regression, meaning that there is no need for setting a different intercept for each country (i.e. no country specific effect).

5 Results

The results of all models are presented in table 2. We will first comment on the random component and then on the regression coefficients. The null model gives an estimated standard deviation (σ_u^2) equal to 0.694. This indicates a substantial variation in perceived health across countries: an individual in a country which is one standard deviation above the mean have odds of perceiving a fair/poor health that is almost double than a comparable individual in an average country [$\exp(0.694) = 2.002$]. This standard deviation indicates a correlation of 0.174 in the latent propensities to be in fair/poor self-perceived health of comparable individual in the same country. The result follows from the fact that $\rho = \frac{\sigma_u^2}{\sigma_u^2 + \pi^2/3} = \frac{0.694}{0.694 + 3.290}$ (Rabe-Hesketh and Skrondal, 2008)¹.

When we insert the control variables (contextual model), the standard deviation decreases to $\hat{\sigma}_u^2 = 0.589$. Adding up the social capital variables (social capital model) lead to $\hat{\sigma}_u^2 = 0.537$. That means that bridging and bonding social capital are able to capture 8.83%² of the unexplained variation of the model with only the control variables. It certainly is a non-negligible percentage which testifies the importance of social capital in explaining self-perceived health.

As for the full model, the standard deviation decreases to 0.526, meaning that the introduction of the Gini index gives only a very small contribution to the reduction of the unexplained health heterogeneity.

On behalf of the regression coefficients (top part of table 2), we note that all the individual level variables have a significant association with health and the sign of the coefficients is consistent with the literature: it is well known that self-perceived health worsens with age and is negatively influenced by bad physical conditions captured by the BMI . Among all the variables considered the ability to make ends meet easily appears to be the most important factor associated with self-perceived health. People with economic difficulties are more likely to report being in poor self-perceived health.

Looking at the estimates of the social capital model, we note first of all that both components of SC have a strong significant association with self-perceived health. In particular the higher the SC the lower the risk of having a poor perceived health. Secondly, the greatest effect is exerted by the bridging component. A possible explanation is that interaction with people not belonging to someone's inner circle triggers a psychological effect with positive consequences on self-perceived health. A virtuous circle can be imagined: more bridging social capital, better perceived health, more strength and willingness to interact with others, more social capital.

¹Here $\pi = 3.14$.

²It is the relative change between between the two models: $(0.537 - 0.589)/0.589$

Table 2: Regression coefficients (standard errors in parentheses) of fitted multilevel models

	Null Model	Contextual Model	Social capital Model	Full Model
	Coef.	Coef.	Coef.	Coef.
Constant	-0.139 (0.423)	-4.651 (0.000)	-4.495 (0.000)	-5.441 (0.000)
Years of education		-0.061 (0.000)	-0.051 (0.000)	-0.050 (0.000)
BMI		0.056 (0.000)	0.055 (0.000)	0.055 (0.000)
Age		0.060 (0.000)	0.056 (0.000)	0.056 (0.000)
Female		0.109 (0.000)	0.114 (0.000)	0.114 (0.000)
Ends meet (ref: with great difficulty)		-0.527 (0.000)	-0.491 (0.000)	-0.491 (0.000)
With some difficulty		-0.935 (0.000)	-0.878 (0.000)	-0.878 (0.000)
Fairly easily		-1.203 (0.000)	-1.116 (0.000)	-1.116 (0.000)
Easily			-0.146 (0.000)	-0.146 (0.000)
Bonding SC			-0.208 (0.000)	-0.208 (0.000)
Bridging SC			0.033 (0.413)	0.033 (0.413)
Gini Index				
Random effect estimate	0.694	0.589	0.537	0.526
Log-likelihood	-24213.164	-20922.242	-20499.139	-20498.810
Chi ²		3120.65*** (df=7)	3380.48*** (df=9)	3381.76*** (df=10)

There is a possible existence of a reverse effect between social capital (especially the bridging component) and health: people in bad health may not feel like having contacts with others and be involved in activities. The existence of endogeneity, as well known, leads to biased estimates of the parameters which doesn't allow to properly capture the effect of the variables in the model. Therefore some caution is needed.

The regression coefficient associated with income inequality is not significant proving the lack of effect. This is also confirmed by the small variation in the estimated standard deviations passing from the social capital model to the full model.

6 Conclusions

There are three main results in our analysis: the first and most important is the strong association between both bridging and bonding social capital and self-perceived health: the higher the SC the lower is the risk of having a poor perceived health; the second result is that we identify in the bridging component that with the highest effect, suggesting a sort of virtuous circle linking health and social capital; the third is that we find no significant effects of income inequality measured at country level.

Consistently with the literature on the determinants of health, we find that age, lifestyle elements, the ability to make ends meet and education are also statistically significant: overweight and difficulty to make ends meet are associated with fair/poor health ratings; a high education and the facility to make ends meet are associated with good to excellent health ratings.

Although the possibility of reverse causation in social capital claims for caution when interpreting these findings, it is not out of place to say that improvements in social capital give the potential to improve health quite considerably in Europe. In fact it might well be, and the results of other researches point in that direction (d'Hombres et al., 2010; Arezzo and Giudici, 2016), that the nexus between social capital and health could be found stronger once the reverse causation is ruled out.

This gives room for some recommendations to policy makers. Sure enough the policies that confront the multiple impacts of population ageing should be multidimensional: they should regard labour market, social and health care, housing, education, social protection and pension schemes. The traditional political answer to the current demographic challenges mainly concerns pension and health systems, but a more comprehensive approach on health issues, which includes family, housing and other social policies is emerging. In this sense a brand new approach is the one related to the build of social capital. States cannot intervene directly: social capital is frequently a byproduct of religion, tradition, shared historical experience, and other factors that lie outside the control of any government. But, as the literature has suggested, the main objectives that policy makers should pursue in order to foster the accumulation of social capital are the reduction of inequalities (which have an impact on social capital

accrual) and the accumulation of human capital. Regarding the latter, the area where governments probably have the greatest direct ability to generate social capital is education. Educational institutions do not simply transmit/increase human capital, they also pass on social capital in the form of social rules and norms.

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