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# Structural social capital and health in Italy

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## **Abstract**

This paper presents the first empirical assessment of the causal relationship between social capital and health in Italy. The analysis draws on the 2000 wave of the Multipurpose Survey on Household conducted by the Italian Institute of Statistics on a representative sample of the population ( $n = 50,618$ ). Our measure of social capital is the frequency of meetings with friends. Based on probit and instrumental variables estimates, we find that higher levels of social capital increase perceived good health.

**JEL Codes:** I12; I18; Z1

**Keywords:** health, instrumental variables, income, social interactions, social capital, Italy.

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## 1. Introduction

The claim that social capital plays a role in determining actual and perceived health is commonly accepted in public health studies (Kawachi et al. 1997; Kawachi et al. 1999; Kim et al. 2006; Borgonovi 2008) and has recently attracted the attention of economists and economics journals (Brown et al. 2006; Folland 2007; Petrou and Kupek 2008; Scheffler and Brown 2008; D'Hombres et al. 2010; Ronconi et al. 2010). Two critical issues have emerged from previous research on the topic.

First, social capital is a very multidimensional phenomenon and there is no univocal evidence on which of its dimensions is good for health. The relationship between the multiple facets of social capital and health is context-dependent and varies according to a number of individual, social, and institutional features.

Second, even if many studies identify social capital as a significant predictor of individual health, there are reasons to suspect this result to be due to a spurious correlation. Individual effects, such as exogenous shocks, may be correlated with both social capital and health. Moreover, it seems reasonable to assume the existence of reverse causality: unhealthy people may face obstacles to social interaction, while healthy people may be more inclined to certain relational activities such as, for example, doing sports with others.

The present paper contributes to the literature by carrying out the first assessment of the causal relationship between social capital and individual health in Italy. Similar research has been undertaken in North America (see for example Folland 2007), Latin America (Ronconi et al. 2010) and Eastern Europe (D'Hombres et al. 2010) but, to the best of our knowledge, they have never been performed in Mediterranean countries.

Probit and ordinary least squares regressions show that, in addition to civil status, age, education, income and work status, structural social capital, as measured by the frequency of meetings with friends, is strongly and positively correlated with perceived health. However, since the habit of meetings friends may be endogenously determined, we follow some promising previous studies

(D'Hombres et al. 2010, Ronconi et al. 2010) and instrument this variable with the individual propensity for talking about politics and the wealth of informal ties of the community where the individual lives. The wealth of community ties is calculated as the average frequency with which people meet friends for 6 categories of municipality size in each of the 20 Italian regions. We obtain an indicator of the local frequency of meetings across the 120 possible combinations.

Instrumental variables regressions show that the habit of meeting friends is a relevant predictor of perceived good health both with two stages probit and least squares estimators.

The remainder of the paper is structured as follows. The next section reviews the literature on social interactions and health and briefly presents our hypotheses. We then describe data and methodology. Section four describes and discusses empirical results. Concluding remarks and a brief discussion of policy implications close the paper.

## **2. Related literature**

Over the past 20 years, the literature has extensively analyzed the impact of social interactions on individual health. Various aspects of the relational sphere of individual lives have been addressed, from relationships with family and friends to membership of various kinds of associations and community cohesion, often grouped together under the common label of social capital. After Putnam's seminal work (1993; 1995), social capital is usually referred to as "features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit." (Putnam 1995, p. 65). Following Uphoff (1999), it is possible to distinguish between structural and cognitive dimensions of the concept. Structural social capital deals with individuals' behaviours and mainly takes the form of networks and associations which can be observed and measured through surveys. Cognitive social capital derives from individuals' perceptions resulting in norms, values and beliefs that contribute to cooperation. These latter aspects involve subjective evaluations of the social environment. Both structural and cognitive dimensions include several sub-dimensions whose relationship with health variables in turn varies

depending on the context and on the effect of other individual and local potentially influential factors (Moore et al., 2009; Yamamura, 2011a).

The complexity of social capital is further stressed by the existence of deep and changeable relations between its sub-dimensions. Social norms of trust and reciprocity prompt cooperative behaviours, in turn fostering the accumulation of durable ties (Antoci, Sabatini & Sodini, 2011). However, certain types of networks can hamper the exchange of information and the diffusion of trust between group members and the surrounding social environment (Knack & Keefer, 1997; Gittel & Vidal, 1998; Sabatini 2008). Previous literature on the topic generally agrees that social connectedness may in principle be a determinant of good health. However, the lack of data has often forced researchers to measure connectedness by means of indicators of participation in formal organizations – such as voluntary associations, sport clubs, trade unions and political parties. This has led to conflicting evidence. For example, membership in associations has been found to be positively correlated with health in some studies (Kawachi et al., 1999; Rose 2000; Poortinga, 2006; Giordano & Lindstrom, 2010; Yamamura, 2011b) and insignificant in others (Carlson, 1998; De Silva et al., 2007; Yip et al., 2007; D'Hombres et al., 2010). In this paper, we follow the approach of measuring structural social capital through the frequency of meetings with friends, as recently seen in a small and number of studies (Folland, 2007; Giordano & Lindstrom, 2010; Ronconi et al. 2010). Social interactions with friends may improve health through four channels:

- 1) Transmission of health information. Networks of relationships are a place to share past experiences on diseases, doctors, health facilities and therapies. This channel of information fosters matching procedures (in the sense that patients spend less time finding the appropriate doctor), lowers the cost of health information, speeds up the diffusion of knowledge of health innovation and eliminates mistaken perceptions on the role of healthcare, discouraging patients from undertaking inappropriate treatments.
- 2) Mutual assistance mechanisms. In case of sickness, the support of family and friends plays a fundamental role in ensuring access to healthcare services and facilities, for example through

financial assistance, transportation services and help in dealing with doctors. Social contacts may foster individual access to services even when public protection schemes are designed to provide universal coverage (van Doorslaer et al., 2004). For example, empirical evidence on the Italian National Health System (NHS) – which theoretically covers all citizens on equal terms – suggests that the wealthy are more likely to be admitted to hospital than the poor (Masseria & Giannoni, 2010). With reference to Italy, Atella et al. (2004) find that individuals who might be considered vulnerable from a societal perspective – i.e. the sick, the elderly, women and those with low incomes – are less likely to seek care from specialists and more likely to seek care from general practitioners. Since, in the Italian NHS, services are accessible by all citizens on universal bases, health inequalities may also be related to people's ability to acquire suitable information and to find the right contacts in the right places, which in turn is influenced by the extension of one's social network.

3) Promotion of healthy behaviours. Social interactions may foster the development of social norms that support health-promoting behaviours, such as prevention and physical activity, or constrain unhealthy habits, such as drinking and smoking. Lindstrom et al. (2001) argue that social interaction may influence leisure-time physical activity through peer-pressure mechanisms. For example, jogging with a friend or joining a football team may make physical exercise less boring and painful, thus providing incentives to increase fitness and to keep weight under control. According to Haughton McNeill et al. (2006), “through social networks individuals form a sense of attachment and connectedness to one another providing access to resources and material goods that support physical activity (e.g., provision of child care services)” (p. 1014). Folland (2007) argues that sympathetic relationships can provide “coaching” practices similar to those practised by fitness trainers. These hypotheses have been tested in several empirical studies. One of the main findings of this literature is the existence of a significant and positive correlation between social participation and physical activity (Brennan et al., 2003; Giles-Corti & Donovan, 2003; Huston et al., 2003).

4) “Buffering effect”. Social interactions and community cohesion provide moral and affective support which mitigates the psychological distress related to sickness. This “buffering effect” may play a role in improving patients’ ability to recover, thereby improving the health status of sick people. The buffering effect of a cohesive network or community also works for healthy people by preventing depression and mental disorders often related to social isolation and acting as a source of self-esteem and mutual respect (Kawachi et al., 1999). Evidence of the buffering effect is also provided by the growing body of studies on the relationship between volunteering and health (Post, 2005; Borgonovi, 2008; Barron et al., 2009; Haski-Levental, 2009).

In light of the arguments outlined above, we expect to find a significant and positive relationship between structural social capital and good health.

### 3. Data and methodology

Our empirical model of perceived health can be represented through the following estimation equation:

$$H_{it}^* = \alpha + SC_{it}\beta + \lambda Y_{it} + Z_{it}'\delta + R_{it}'\rho + \varepsilon_{it} \quad (1)$$

where  $H$  is self-reported health for individual  $i$  at time  $t$ ;  $SC$  is our indicator of structural social capital;  $Y$  is the annual household income; the  $Z$  vector consists of the other variables that are believed to influence self-perceived health,  $R$  is a vector of regional dummies, and  $\varepsilon$  is a random-error term.

We do not observe the “latent” variable  $H_{it}^*$  in the data. Rather, we observe  $H_{it}$  as a binary choice which takes value 1 (good or very good perceived health) if  $H_{it}^*$  is positive and 0 otherwise. Thus, the structure of (1) makes it suitable for estimation as a probit model:

$$\Pr(H_{it} = 1) = \Phi(\alpha - SC_{it}\beta - \lambda Y_{it} - Z_{it}'\delta - R_{it}'\rho) \quad (2)$$

where  $\Phi(\cdot)$  is the cumulative distribution function of a normal standard.

Structural social capital is measured through the habit of meeting friends. This indicator is drawn from the 2000 wave of the Multipurpose Survey on Household (MSH) conducted by the Italian Institute of Statistics (Istat). This survey investigates a wide range of social behaviours and perceptions by means of face-to-face interviews on a nationally and regionally representative sample of 24,000 households, roughly corresponding to 50,000 individuals. Since the MHS does not collect information on household income, we merged this source with the Survey on Household Income and Wealth (SHIW) carried out by the Bank of Italy through a statistical matching procedure (see Appendix 1 for further details).

The final dataset is a cross-section of 50,618 observations containing information on individual behaviours and perceptions as well as on household income.

Our dependent variable is self-reported health, as measured by a dummy which is equal to 1 if the respondent reports good or very good health. The main independent variable in the analysis is structural social capital. This is measured through a binary indicator of the frequency of meetings with friends, which is coded as 1 if the interviewee meets friends at least twice a week.

In order to account for other phenomena which might influence health and social capital, we include in the analysis a set of individual and household control variables.

At the individual level, we account for gender (female), marital status (married), age (dummies 21-30, 31-40, 41-50, 51-65, older than 65), education (elementary, junior high school, high school education and undergraduate degree or more), reading newspapers and work status (unemployed, self-employed, retired, student). Moreover, we measure the quality of the surrounding social environment through an indicator of the subjective perception of its safety. At the household level, we control for the natural logarithm of the imputed household income (sum of labour income, capital income and pensions) obtained through the statistical matching procedure. In addition, we account for family size, age of children (dummies 0-5, 6-12, 13-17), homeownership and the characteristics of homes (whether it is council house or not). Finally, we also control for the size of municipality. All the variables are described in detail in Table B1 in Appendix 2. Summary

weighted statistics are reported in Table 1. On average, 72% of respondents report good or very good health. 71 % meet friends at least twice a week. Over half of respondents are female and single. Over half of the sample report low education (elementary and junior high school) while only 7 % hold an undergraduate degree. The largest group of individuals (21 %) is aged between 51 and 65, followed by individuals aged 31 to 40 and more than 65 (respectively 18 % and 19 % of the sample). Over half of respondents have children aged between 0 and 17. 72 % of respondents are homeowners, while 61 % live in a popular house.

### *3.1 Instrumental variables*

The reliability of probit estimates may suffer from the endogeneity problems described in the Introduction, which suggests caution is required in interpreting correlations as causal relationships. We try to circumvent endogeneity problems by instrumenting the frequency of meetings with friends. As pointed out by French & Popovici (2011), a reliable instrumental variable must meet at least two criteria. First, it must be theoretically justified and statistically correlated with structural social capital (“relevance” condition), after controlling for all other exogenous regressors. Second, it must be uncorrelated with the disturbance term of the health equation (“orthogonality” condition). The wealth of our data source allowed us to pick two theoretically convenient and econometrically valid instrumental variables (IVs):

- The wealth of ties in the local community, given by the average frequency with which people meet friends at the community level. This variable is calculated as the mean value of the individual frequency of meetings with friends for each of the 6 categories of municipality size in each of the

Table 1. Descriptive statistics

	Observations	Mean	St. dev.
<i>Dependent variable</i>			
Self-perceived good health	49852	0.72	0.45
<i>Structural social capital</i>			
Meetings with friends	49955	0.71	0.45
<i>Instrumental variables</i>			
Propensity for talking about politics	49004	0.33	0.47
Meetings with friends at the community level (average)	49955	0.71	0.03
<i>Demographic and socio-economic characteristics</i>			
Female	50618	0.52	0.50
Married	50618	0.57	0.49
Age21-40	50618	0.16	0.37
Age31-40	50618	0.18	0.39
Age41-50	50618	0.16	0.37
Age51-65	50618	0.21	0.41
Age > 65	50618	0.19	0.39
Household size	50618	3.16	1.31
Children 0-5	50618	0.13	0.39
Children 6-12	50618	0.18	0.46
Children 13-17	50618	0.20	0.48
Elementary	50618	0.24	0.43
Junior high school	50618	0.31	0.46
High school (diploma)	50618	0.31	0.46
Undergraduate degree and beyond	50618	0.07	0.26
Household income (ln)	50618	10.77	0.44
Self-employed	50618	0.11	0.31
Unemployed	50618	0.05	0.23
Retired	50618	0.21	0.41
Student	50008	0.09	0.28
Newspaper reader	49176	0.23	0.42
Homeowner	50618	0.72	0.45
Civil house	49988	0.61	0.49
Micro-criminality	50314	0.04	0.19
<i>Size of municipality</i>			
Metropolis	50618	0.17	0.37
Neighbouring metropolis	50618	0.08	0.27
2000-10000	50618	0.27	0.44
10000-50000	50618	0.23	0.42
>50000	50618	0.16	0.37

20 Italian regions. We obtain 120 combinations across which the 50,618 observations of the sample are distributed<sup>3</sup>.

- The propensity for talking about politics, as given by a binary variable coded as 1 if the interviewee talks about politics with others at least once a week.

The relevance condition is directly testable by regressing structural social capital on the IVs and all other exogenous variables from the structural equation. The first stage of our IV regressions shows that both the instruments are strongly correlated with the endogenous variable<sup>4</sup>.

The positive relationship between community-level social capital and the individual consumption of relational goods<sup>5</sup> has been already documented in the theoretical and empirical literature (Gui and Sugden, 2005; Antoci, Sacco and Vanin, 2007). If the social environment is rich in participation opportunities, because many people already participate and there are well-established networks of relations, then the time individuals spend on social interactions will be more rewarding: as a result, people will be stimulated to meet friends more frequently (Antoci, Sabatini and Sodini, 2011). By contrast, if the surrounding environment is relationally poor (i.e. the average level of participation is low), individuals may be forced to replace human interactions with private consumption (e.g. playing a virtual match against the computer instead of meeting friends on a sport field, or chatting with unknown and distant people through the web instead of talking with neighbours). As a result, people may be discouraged from meeting others and are more likely to report being socially isolated. Regarding the propensity for talking about politics, several studies document the existence

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<sup>3</sup> The MHS sample is representative at the national and regional level, as well as at the level of 6 possible categories of municipality. Categories include: A) municipalities belonging to a metropolitan area, separated into: 1) municipalities in the centre of a metropolitan area. These are Bari, Bologna, Cagliari, Catania, Firenze, Genova, Milano, Napoli, Roma, Torino, Venezia. 2) Municipalities immediately around those metropolitan areas. B) Municipalities outside of metropolitan areas, separated into: 3) Municipalities with a population of under 2,000. 4) Municipalities with a population of between 2,001 and 10,000. 5) Municipalities with a population of between 10,001 and 50,000. 6) Municipalities with more than 50,000 inhabitants. See Istat (2000) for further details.

<sup>4</sup> Estimates are available upon request to the authors.

<sup>5</sup> Relational goods are a distinctive type of good that can only be enjoyed if shared with others. They are different from private goods, which are enjoyed alone (Uhlener 1989). A peculiarity of relational goods is that it is virtually impossible to separate their production from consumption, since it is very likely that they will coincide (Gui and Sugden 2005). For example, a football match with friends is enjoyed (consumed) in the very moment of its production (i.e. the 90 minutes spent on the sports field). For the sake of simplicity, the frequency of meetings with friends, the frequency of relational goods consumption, and individual-level structural social capital can be considered equivalent/synonymous in this discussion.

of a significant and positive correlation between meeting with friends and interest in politics (Dekker & Uslaner, 2001; Völker & Flap, 2001; Mutz, 2002; Walsh, 2004). In particular, the workplace has been identified in the political science literature as a place for valuable cross-cutting political discussion (Mutz & Mondak, 2006). Engagement in political discourses may help workers to identify those colleagues with whom they share higher affinities. The will to continue the exchange of ideas even outside of the workplace may favour the consumption of relational goods such as having dinner together. Referring to the workplace, Mutz & Mondak (2006) suggest that political discourses may produce social interactions as a by-product. More generally, individuals with a particular propensity for conversing about politics may be stimulated to create opportunities for meetings. Informal meetings with friends are probably the best context for talking about politics, since they rarely imply limitations of individuals' freedom of expression<sup>6</sup>.

The orthogonality condition cannot be tested directly as it involves a relationship between the instruments and the error term of the structural equation. Hence, we rely on the following theoretical considerations and intuitions and we indirectly address the excludability condition through a number of over-identification tests we present in section 4.

As regards the community-level instrument, it must be stated that several studies report a positive correlation between community social capital and individual health (Kawachi et al., 1999; Islam et al., 2006). However, as properly reported by D'Hombres et al. (2010), these studies do not simultaneously include indicators of individual social capital in the health equation. "Thus, the effect of community level social capital can be due to its positive correlation with individual social capital" (D'Hombres et al., 2010, p. 62). Many authors show that the effect of community-level social capital becomes insignificant after controlling for measures of individual-level social capital

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<sup>6</sup> In other contexts, people may prefer to be prudent about sharing their own political views. As noted by Rosenberg (1954-55), "The man engaged in commerce cannot afford to alienate either Democrats or Republicans; in this sense business is not merely apolitical but anti-political. Similarly an employer may be reluctant to alienate his workers, and a worker may be unwilling to jeopardize his job, in defence of his political principles. These factors may be extremely significant deterrents to the free expression of political ideas". (p. 353).

(Subramanian et al., 2002; Poortinga 2006), or other individual-level socio-demographic characteristics (Kennelly et al., 2003).

As for the propensity for talking about politics, it is worth noting that a number of studies have found a significant and positive association between health and forms of political participation such as active volunteer work for political parties (Yip et al., 2007) and voter turnout at elections (Blakely et al., 2001). However, the variable we use as an instrument does not refer to active engagement in political activities, which may, in turn, be endogenous in respect to health status. Rather, it reflects the interviewee's interest in public affairs. Some authors have argued that communities or states where citizens are more informed about public life should report better health outcomes because a strong political will that advocates for more egalitarian welfare policies, including public medical services, is important in maintaining and improving public health (Chung & Muntaner, 2006, p. 829). Muntaner et al. (2002) and Navarro et al. (2003) suggest that active political participation could sustain the dominance of pro-egalitarian political ideology which, when measured by the votes gained by left-wing parties in political elections, is found to be positively correlated with better population health. The public health spending possibly promoted by left-wing administrations has in fact been claimed to reduce the detrimental effect of inequalities on health (Navarro & Shi, 2001; Conley & Springer, 2002; Muntaner et al., 2002; Raphael & Bryant, 2003). These arguments are informative and suggestive, but cannot apply in the context of this paper: our measure of the propensity for talking about politics does not capture the political ideology of respondents. Rather, it refers to the "relational" attitude of sharing one's own views with others. Generally speaking, it seems possible to argue that citizens' interest in politics could influence public (not individual) health only indirectly, by making public institutions work better. In the limited framework of our empirical analysis, we have no reason to hypothesize the existence of a direct link leading from the propensity for talking about politics to individual health. On the other hand, it must be noted that several studies empirically assessing the role of political participation in well-being do not find forms of political engagement to be correlated with self-reported health at

the individual level (see for example Engström et al., 2008; Petrou & Kupék, 2008). In light of the arguments outlined above, it seems reasonable to argue that the propensity for talking about politics may influence health in our dataset only indirectly, by reason of its possible correlation with the propensity for meeting friends and acquaintances.

Since the endogenous variable is dichotomous, we estimate its effect on health in two stages. First, we regress the endogenous variable on the instruments (IV) and all the exogenous variables from the structural health equation. This first stage can be formally described by equation (3):

$$\Pr(SC_{it} = 1) = \Phi(\alpha - IV_{it}'\gamma - \lambda Y_{it} - Z_{it}'\delta - R_{it}'\rho) \quad (3)$$

We obtain the fitted values of  $\hat{SC}$ . In the second stage, we run a new estimation of the structural equation (2) where  $SC$  is replaced by the fitted values  $\hat{SC}$ :

$$\Pr(H_{it} = 1) = \Phi(\alpha - \hat{SC}_{it}\beta - \lambda Y_{it} - Z_{it}'\delta - R_{it}'\rho) \quad (4)$$

#### 4. Empirical results

Table 2 presents estimates of the health equation (2). To compare relative magnitudes of the effects of the independent variables, we report their marginal effects. Column 1 reports the probit estimate and column 2 presents the linear estimation.

Table 2. Probit and least-squares estimates

	I		II	
	Probit	Least squares	Probit	Least squares
	Marg. Eff.	Std. Err.	Marg. Eff.	Std. Err.
Meetings with friends	0.044***	0.005	0.041***	0.005
Female	-0.003	0.004	-0.004	0.004
Married	0.058***	0.005	0.059***	0.005
Age21-30	-0.001	0.012	-0.008	0.009
Age31-40	-0.035**	0.014	-0.031***	0.011
Age41-50	-0.058***	0.015	-0.053***	0.011
Age51-65	-0.119***	0.016	-0.106***	0.010
Age > 65	-0.297***	0.018	-0.292***	0.014
Household size	0.018***	0.002	0.019***	0.002
Children 0-5	0.053***	0.008	0.0273***	0.005
Children 6-12	0.010*	0.006	0.001	0.004
Children 13-17	0.038***	0.006	0.024***	0.004
Elementary	0.050***	0.008	0.066***	0.010
Junior high school	0.088***	0.010	0.113***	0.011
High school (diploma)	0.106***	0.010	0.129***	0.012
Bachelor's degree and beyond	0.121***	0.011	0.152***	0.014
Household income (ln)	0.069***	0.009	0.064***	0.008
Self-employed	0.022***	0.007	0.020***	0.006
Unemployed	-0.037***	0.011	-0.031***	0.009
Retired	-0.040***	0.007	-0.044***	0.007
Student	-0.008	0.012	-0.007	0.009
Newspaper reader	0.022***	0.005	0.021***	0.005
Homeowner	-0.031***	0.006	-0.029***	0.005
Civil house	0.004	0.004	0.004	0.004
Micro-criminality	-0.006	0.013	-0.005	0.011
<i>Size of municipality</i>				
Metropolis	-0.014	0.009	-0.012	0.008
Neighbouring metropolis	-0.018*	0.011	-0.015*	0.009
2000-10000	-0.007	0.008	-0.006	0.007
10000-50000	-0.016*	0.008	-0.014*	0.007
>50000	-0.010	0.009	-0.008	0.008
Regional dummies	Yes		Yes	
No. of observations	46804		46804	
Pseudo R-squared	0.13		0.15	
Log-likelihood	-24037.03			

Note: The dependent variable *Self-perceived good health* is a binary variable (1 = good and very good, 0 otherwise).. See Appendix 2 Table 1B for a detailed description of regressors. Regional dummies are omitted for space reasons. Standard errors are corrected for heteroskedasticity. The symbols \*\*\*, \*\*, \* denote that the coefficient is statistically different from zero at 1, 5 and 10 percent.

Before discussing the impact of structural social capital, we briefly present the effect of individual and household variables on self-reported health. As the estimates resulting from probit and linear specifications are almost identical, we base the discussion below only on the results displayed in column 1 of Table 2.

The household characteristics are important predictors of health. Being married raises the probability of reporting good health by 5.8%. People with children aged between 0 and 5 present a 5.3% higher likelihood of reporting good health. This finding supports the hypotheses on the “relational” incentives towards healthy behaviour: as noted by Folland, “responsibility to others requires at a minimum that one stay alive and healthy” (2007, 2345) and can discourage potentially self-damaging behaviours such as excessive drinking and smoking. As expected, the imputed household income is significantly and positively correlated with good health.

Regarding individual characteristics, we find that women and men do not show statistically significant difference in good health, while in other countries women turn out lower levels of perceived good health (D’Hombres et al. 2010). Education is a relevant predictor of health. Having a high-school leaving certificate increases the probability of perceived good health by about 10.6%. This probability rises to 12% in individuals with an undergraduate or graduate degree. A new and interesting result regards the habit of reading newspapers every day, which is significantly and positively correlated with good health. As expected and found in other countries (D’Hombres et al. 2010; Ronconi et al. 2010), age is negatively correlated with good health.

Work status is found to be another important explanatory variable. Being unemployed increases the individuals’ probability of rating their own health as poor by about 4%. By contrast, self-employed workers exhibit a 2.2 points higher probability of reporting good health. Research into the relationship between unemployment and well-being generally agree that people in secure employment recover more quickly from illness (Bartley, 1994; Dorling, 2009). In contrast, unemployment increases the chance of being ill, especially for those who had never worked or had

had poorly paid jobs (Gerdtham & Johannesson, 2003; Bartley et al., 2004). Unemployment increases rates of depression, particularly in the young (Branchwaite & Garcia, 1985; Artazcoz et al., 2004) and causes unhappiness (Clarke & Oswald, 1994), which has, in turn, been linked to poor health (Danner et al., 2001; Bjørnskov, 2008; Veenhoven, 2008).

Overall, results from our estimates show the existence of health disparities based on socio-economic status in Italy, as already claimed by two previous studies (Atella et al. 2004; Masseria & Giannoni, 2010). Even though the Italian NHS is in principle designed to provide universal coverage for all citizens at the point of use, poorer and less educated individuals are more likely to report poor health conditions. The risk is even worse for unemployed and retired workers. The significance of regional dummies also reveals the existence of relevant territorial health disparities. This result may reflect the influence of a number of local factors and suggests the need for a regional analysis of the socio-economic determinants of health, which should draw attention to the role of public policies. The Italian healthcare system is in fact going through a major transition, affecting policy decisions, financing methods and service provision. These changes are taking place within the larger context of the so-called “devolution”, a process of decentralization, which has afforded regions greater autonomy in the definition of health policies, including the responsibility of financing healthcare through regional taxes and of allowing for-profit providers to replace the NHS in the provision of a growing number of healthcare services. Some authors have pointed out underlined how this decentralization process implies a substantial risk of exacerbating the incidence of health inequalities (De Vries, 2000; Walker, 2002; Mosca, 2006).

In line with our hypothesis, structural social capital is found to be strongly and positively associated with perceived health. Individuals who meet friends at least twice a week are 4.4% more likely to report good health. However, because of the statistical problems we discussed in the previous section, we must be careful in interpreting this correlation as causal. In order to shed more light on the causal relationship connecting structural social capital to perceived health, we now turn to instrumental variables estimates. Results are reported in Table 3. The upper part of the Table

presents the marginal effect of structural social capital on self-rated health. The lower part of the table reports diagnostic tests of the validity of our instrumental variable estimators. Column 1 refers to two stages probit estimates. As robustness checks, in columns 2 and 3 we report results of IV probit and two-stage least-squares estimates. As for the orthogonality condition, in column 2 the Amemiya-Lee-Newey test of over-identifying restrictions does not lead us to reject the orthogonality of our instruments with respect to the disturbance term of the health equation with a  $p$ -value of 0.17. The Hansen test of over-identifying restrictions in column 3 does not lead us to reject the null hypothesis that the excluded instruments are valid instruments, i.e., uncorrelated with the error term, and that they are correctly excluded from the estimated equation, with a  $p$ -value  $\approx$  0.19. Regarding the relevance condition, its satisfaction is first testified by the significance and sign of the instrumental variables' coefficients in the first stage of the estimates (see Table 2 all columns). In column 3 we also report results of the Anderson-Rubin Wald test, which in all cases leads us to reject the null of the weakness of the set of instruments with a  $p$ -value lower than 0.00. Taken together with the non-rejection of the tests of over-identification and the theoretical considerations mentioned in the previous section, this suggests that our set of instruments is reasonable.

IV estimates in column 1 show a very slight increase in the marginal effect of structural social capital. Individuals who meet friends at least twice a week have an approximately 9% higher likelihood of reporting good health. Since the estimates now account for the endogeneity problems described in section 3, we are more confident that this positive association can be interpreted as the result of a causal effect of structural social capital on health.

Table 3. IV estimates

	I two stage probit	II IV probit	III Two stage least-squares
Meetings with friends	0.090*** (0.022)	0.315*** (0.076)	0.284*** (0.068)
Joint significance of Instruments (p-value)	0.00	0.00	0.00
Anderson –Rubin test joint-significance			10.23 (0.00)
Coefficient F (p-value)			
Test of overidentifying Hansen J statistic (p-value)			0.189
Test of overidentifying Amemiya-Lee-Newey (p-value)		0.170	

Note: The dependent variable *Self-perceived good health* is a binary variable (1 = good and very good, 0 otherwise). The full set of exogenous variables is described in Table 2. Instruments for meetings with friends are *wealth of ties of the local community* and *propensity for talking about politics*. Standard errors are corrected for heteroskedasticity. The symbols \*\*\*, \*\*, \* denote that the coefficient is statistically different from zero at 1, 5 and 10 percent.

## 5. Conclusions

In this paper we have investigated the impact of structural social capital on individual self-reported health in Italy. To the best of our knowledge this is the first assessment of the relationship between a dimension of social capital and a health outcome in a Mediterranean country. Results of the empirical analysis support the hypothesis that structural social capital improves the health conditions of individuals. In section 2 we have suggested four mechanisms of transmission of this beneficial effect.

An evaluation of the policy implications of this study first requires a discussion of the possible determinants of social capital. The first stage of our instrumental variables estimates shows that, in our dataset, the main predictors of structural social capital are education (which exhibits a significant and positive correlation with relational goods consumption) and household income (negative correlation). This negative correlation may be explained as a result of the substitution of time spent on “relational” activities (such as meeting friends) with time devoted to work and material consumption, which has been claimed to be a major factor in the erosion of social capital in the context of a growing economy (Hirsch, 1976; Antoci, Sacco & Vanin, 2005; Gui & Sugden, 2005; Bartolini & Bonatti, 2008; Antoci, Sabatini & Sodini, 2011).

More generally, the literature has suggested that the main objectives that policy makers should pursue in order to improve social cohesion and to foster the accumulation of social capital are the reduction of inequalities and the accumulation of human capital. In a seminal epidemiological study on the United States based on the 1990 section of the General Social Survey (GSS), Kawachi et al. (1997) find support for the thesis that income inequality leads to increased mortality through disinvestment in social capital. Uslaner & Brown (2005) argue that inequalities play a major role in determining cognitive and structural social capital. Drawing on American state-level data for the 1970s, 1980s, and 1990s, the authors present evidence that income inequality is the strongest determinant of trust and that trust has a major effect on the consumption of relational goods such as meeting with friends. Several other authors find social trust to be a major determinant of structural social capital (Brehm & Rahn, 1997; Claibourn & Martin, 2000; Igarashi et al., 2008). Alesina & La Ferrara (2002) use GSS data for the period 1974-1994 to show that, among the main factors associated with low trust, are: i) belonging to a group that historically felt discriminated against, such as a minority group; (ii) being economically unsuccessful in terms of income and education; (iii) living in a community with a high degree of income disparity. According to the political science literature, the state can help build trust and foster social participation in a number of ways. Levi (1998) argues that the “trustworthiness of the state influences its capacity to generate interpersonal trust” (p. 87). The more people experience compliance (Brehm & Rahn, 1997; Levi, 1998; Offe, 1999) or the trustworthiness of public institutions (Rothstein, 2001a; 2001b; Uslaner, 2002), the more they are likely to have confidence in others. According to the political science literature, welfare state institutions play a particularly significant role in the interplay between the reduction of inequalities and the accumulation of social capital (Uslaner, 2002; 2008; Kumlin & Rothstein, 2005; Rothstein & Stolle, 2008). Several authors have shown that countries with high levels of trust and participation are more likely to have universalistic welfare programs (Rothstein, 2002; De Hart & Dekker, 2003; Stolle, 2003; Torpe, 2003; Rothstein & Kumlin, 2005; Van Oorschot, 2005; Uslaner, 2008). It must be stated that many studies in the field of public health

have found that welfare state variables (e.g. public spending for healthcare services) can be important factors of health outcomes (David & Collins, 1997; Macinko et al., 2004; Muntaner et al., 2002; Navarro & Shi, 2001; Raphael & Bryant, 2003; Conley & Springer, 2005; Chung & Muntaner, 2005). In addition to this “direct” effect, welfare programs may also have, *ceteris paribus*, the potential to improve health indirectly, by fostering the accumulation of social capital through the reduction of inequalities. Of course, these are just speculative arguments which cannot be supported by our data. Moreover, it must be noted that the expansion of welfare programs may bring about other side effects with uncertain consequences on health. Another important result of the analysis is the existence of health disparities based on socio-economic status. People with a low level of education and unemployed workers are exposed to a particularly high risk of reporting poor health condition. Since, in Italy, healthcare services are in principle equally accessible by all citizens, these inequalities may be related both to people’s ability to acquire suitable health information – which basically depends on the individual endowments of human capital – and to being able to find the right contacts in the right places, which in turn is influenced by the extension of one’s social network or, in other words, by the individual endowments of social capital.

In general, our study suggests the need for further research on the sources of social capital and on the causes of disparities in access to health information and healthcare services.

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## Appendix 1. Statistical matching

In simple terms, the matching procedure consists of the imputation of the household income of an individual from the SHIW to a similar individual from the Multipurpose Survey. As in Fiorillo (2008), let  $A$  be the MSH dataset (the so-called “base file”) collecting information on  $X_A$  variables for each of  $n_A$  records, and let  $B$  be the SHIW dataset (the “supplemental file”) comprising  $X_B$  variables for each of  $n_B$  records. Let  $X = (X_1, \dots, X_p)$  be the vector of variables measured in both the files, i.e. for each of the units  $n_A$  and  $n_B$  included in the two datasets. The remaining variables in each of the files will be referred to as  $Y = (Y_1, \dots, Y_Q)$  in file  $A$  and as  $Z = (Z_1, \dots, Z_R)$  in file  $B$ . The statistical matching procedure is aimed at creating a file  $C$  which includes all the variables  $X$ ,  $Y$ , and  $Z$  for each of  $n_A$  records of the base file. For each unit in file  $A$  we identify a similar unit in file  $B$  as a function of the  $X$  “common” variables. After this, we impute the household income variable collected in the supplemental file  $B$  (the SHIW) to the matching records in the base file  $A$ , in order to obtain an original dataset  $C$  including all the variables of interest for the analysis. The inherent assumption in this procedure is that the random vector  $Y$  given  $X$  is independent of the random vector  $Z$  given  $X$ . The conditional independence assumption implies that  $Y$ ’s relationship to  $Z$  can be totally inferred from  $Y$ ’s relationship to  $X$  and  $Z$ ’s relationship to  $X$ . Thus, the distributions of  $X$ ,  $Y$ , and  $Z$  of the new file  $C$  must be identical to the distributions of  $X$ ,  $Y$ , and  $Z$  empirically observed in the original files  $A$  and  $B$ . As a consequence, the best test to evaluate the quality of the statistical matching relies on the marginal distributions of the variables. As stated by Rässler (2002, 23), “A statistical match is said to be successful if the marginal and joint empirical distributions of  $Z$  and  $Y$  as they are observed in the donor samples are nearly the same in the statistically matched file”. It should be clear, however, that “the statistical matching procedure does not generate new information about the conditional relationship of the  $Y$ - $Z$  pair, but only reflects the assumptions used in creating the matched file” (Kadane 1978, 166).

The common variables  $X = (X_1, \dots, X_p)$  shared by the original datasets are identified according to the following criteria: 1) they must have been classified and measured in the same (or very similar) way in both of the surveys. 2) They must have been observed for all the individuals included in the samples. 3) They can be assumed as possible determinants of health and social interaction in the base file. Based on suggestions from previous studies, we chose the following variables: gender, age, education, family size, number of children, region of residence, work status, sector of activity, and homeownership. The statistical matching was then performed through a regression imputation with random residuals. More specifically, the regression parameters of  $Z$  (i.e. the household income) on  $X$  were estimated on the SHIW. After this, a random residual was added to the regression prediction to obtain the imputed value of  $z$  for each  $a = 1, \dots, n_A$  record in file A. Finally, the quality of the procedure was controlled by comparing, for each of the considered years, the conditional distribution of the household income given  $X$  in the new and the original files. The marginal distributions are not found to be statistically different<sup>7</sup>.

Our final dataset  $C$  is a cross section sample of 50,618 observations. In this file, the level of household income “drawn” from the Survey on Household Income and Wealth carried out by the Bank of Italy is imputed to the  $n_A$  statistical records included in the Istat Survey on Households.

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<sup>7</sup> Distributions are available upon request to the authors.

## Appendix 2

Table B1. Detailed description of variables

<i>Dependent variable</i>	
Self-perceived good health	Individual assessment of health; 1 = good and very good
<i>Social capital: frequency of meeting with friends</i>	
Meetings with friends	1 = every day or more
<i>Instrumental variable</i>	
Propensity for talking about politics	Habit of talking about politics, 1 = every day or more
Wealth of ties in the local community	The mean value of the individual frequency of meetings with friends for each of the 6 categories of municipality size in each of the 20 Italian regions
<i>Demographic and socio-economic characteristics</i>	
Male	Gender of the respondent, 1= male. <b>Reference group: female</b>
Married	Marital status of the respondent, 1= married. <b>Reference group: others</b>
Age21-40	Age of the respondent, 1 = age between 21 and 30. <b>Reference group: age14-20</b>
Age31-40	Age of the respondent, 1 = age between 31 and 40
Age41-50	Age of the respondent, 1 = age between 41 and 50
Age51-65	Age of the respondent, 1 = age between 51 and 65
Age>65	Age of the respondent, 1 = age above 65
Household size	Number of people who live in the family
Children0_5	Age of children, 1 = children aged between 0 and 5 years. <b>Reference group: no children.</b>
Children6_12	Age of children, 1 = children aged between 6 and 12 years
Children13_17	Age of children, 1 = children aged between 13 and 17 years
Elementary	Education of the respondent, 1 = completed elementary school (5 years). <b>Reference group: no education</b>
Junior high school	Education of the respondent, 1 = completed junior high school (8 years)
High school (diploma)	Education of the respondent, 1 = completed high school (13 years)
Bachelor's degree	Education of the respondent, 1 = university degree and/or doctorate (18 years and more)
Household income (ln)	Natural logarithm of imputed household income (sum of labour income, capital income and pensions)

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Self-employed	Employment status of the respondent, 1 = self-employed. <b>Reference group: employed</b>
Unemployed	Employment status of the respondent, 1 = unemployed
Student	Employment status of the respondent, 1 = student
Retired	Employment status of the respondent, 1 = retired
Newspapers	Whether the respondent reads newspapers every day, 1 = yes
Homeowner	Whether the respondent owns a home outright, yes = 1
Civil house	Whether the respondent lives in a council house, yes = 1
Micro-criminality	Whether the respondent has even been pickpocketed, yes = 1
<i>Size of municipality</i>	
Metropolis	Whether the respondent declares that he lives in a metropolitan area, yes=1. <b>Reference group: &lt;2000</b>
Neighboring metropolis	Whether the respondent declares that he lives in a municipality neighbouring a metropolitan area, yes=1
2,000-10,000	Whether the respondent declares that he lives in a municipality with 2,000-10,000 inhabitants, yes=1
10,000-50,000	Whether the respondent declares that he lives in a municipality with 10,000-50,000 inhabitants, yes=1
>50,000	Whether the respondent declares that he lives in a municipality with more than 50,000 inhabitants, yes=1

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