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# Friends and health of the workers in Italy

Damiano Fiorillo\*

## Abstract

Using a rich cross-sectional dataset, we estimate the effect of meetings with friends on self-perceived health, chronic conditions and limitations in daily activities of Italian employees. We address the self-selection of individuals in labour market using an Heckman selection model. Our main preliminary findings show that meetings with friends is positively correlated with self-perceived health, negatively associated with chronic conditions but not related to limitations in activities of daily living.

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

**Keywords:** health, income, friends, workers, Italy.

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## 1. Introduction

The positive association between health and socio-economic status (SES) is one of the most robust findings in the health economics literature (Hernandez-Quevedo et al. 2008). Although evidence also shows that lower occupational status and worse working conditions are negatively linked to the health (Fletcher et al. 2011), a sizable residual still remains in health models (Datta Gupta and Kristensen 2008). Most recent evidence suggests that health outcomes are correlated with various aspects of individual relationships, from relationships with family and friends to membership of various kinds of associations. This evidence has proposed several explanations. More intense social relationships may facilitate individuals' access to social support and healthcare, as well as the development of informal insurance arrangements (Ferlander and Mäkinen 2009; Giordano and Lindstrom 2010). They can promote the diffusion of health information, increase the likelihood that healthy norms of behavior are adopted (e.g., physical activity and use of preventive services) and exert social control over deviant health-related behaviours, such as drinking and smoking (Kawachi et al. 1999; Folland 2007; Yamamura 2011). Social relations, finally, may exert the so-called "buffering effect", by balancing the adverse consequences of stress and anxiety through the provision of affective support, and by acting as a source of self-esteem and mutual respect (De Silva et al. 2007; Kawachi et al. 1997).

While there is a large body of literature on the association between social interactions and health for the whole population, the studies that focus their investigation to few specific segments of it, such as health of the workers, are short. Understanding the effects of social relations on individual health of workers is important not only from a medical point of view but also from an economic perspective. For example, although social relations plays an important role at the employee level as a determinant of Job satisfaction (Fiorillo and Nappo 2011), it is reasonable to think that they affects worker productivity and, ultimately, a society's economic prosperity. Thus, knowing whether social relations affect individual health of workers can provide useful information on key policy issues.

Hence, in this paper, we limit our analysis to the health of workers and we investigate the effect of a measure of social relations, meetings with friends, on three different health outcomes of workers: self-perceived health (SPH), chronic conditions (CC) and limitations in activities of daily living (LADLs).

The contribution of the paper to the literature is twofold. First, it complements the existing literature on health of workers by analyzing the potential relevance of meetings with friends. To our knowledge, this is the first assessment of the relationship between meetings with

friends and individual health of workers in Italy. Second, it extends the country evidence on the determinants of health of workers.

We use data from income and living conditions survey carried out in 2006 by the Italian Statistical Office (IT-SILC). This survey presents the considerable advantage of recording social participation as well as health measures, individual characteristics and work conditions.

The remainder of the paper is structured as follows. The next section briefly presents our hypotheses. We then describe methodology and data. Section five describes and discusses empirical results. Concluding remarks close the paper.

## **2. Meetings with friends and individual health of workers: suggestions**

In recent 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, often grouped together under the common label of social capital (see Fiorillo and Sabatini 2011b). In this paper, we measure social interactions through the frequency of meetings with friends, as recently seen in a small number of studies (Folland, 2007; Giordano and Lindstrom, 2010; Ronconi et al. 2010). Meetings with friends may improve health of workers through the following 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 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 and 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, 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) "Buffering effect". Meetings with friends 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. Moreover, the "buffering effect" may have a key role in reducing occupational stress as well as in modifying perceptions of distress associated to work (Cummings 1990; Lu 1999). Workers who feel supported by others may feel less stressed. If you know that your friends will support you and there is someone with whom you can talk things through, stressful working situations may be more tolerable. 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).

In light of the arguments outlined above, we expect to find a significant and positive relationship between meetings with friends and self-perceived health while a significant and negative relationship among meetings with friends and chronic conditions and limitations in activities of daily living.

### 3. Methodology

To study the association between meetings with friends and health of workers we need to reflect on the self-selection of individuals into the labour market. It is possible that individuals chose to stay out of labour market because they get unemployment benefits as well as disability benefits. The last problem may be important although we are considering general health and not specific acute conditions. Therefore, in this paper, we use the Heckman selection model in the empirical analysis. It is a methodology which help us to assess the impact of meetings with friends, after accounting for the possibility of selection of individuals into the labour market. The model consists of two equations: a labour force participation equation and a health equation.

Suppose that  $L_i^*$  is the continuous latent variable associated with the work decision. This can be expressed as

$$L_i^* = Z_{1i}\beta_1 + \varepsilon_i \quad (1)$$

where  $Z_{1i}$  is a vector containing individual characteristics that influence the decision to enter the labour market,  $\beta_1$  is a vector of parameters to be estimated and  $\varepsilon_{1i}$  is a random error term. If  $L_i^* > 0$ , the wage market exceeds the reservation wage, the individual chooses to work. If  $L_i^* \leq 0$ , individual chooses not to work.  $L_i^*$  is unobservable but relates to the observable binary variable  $L_i$ , that takes the value of 1 if the individual works and 0 if the individual does not work.

Taking account for the potential bias related to the individual decisions to participate in the labour force, the health equation can be written as

$$H_i^* = Z_{2i}\beta_2 + \alpha MF_i + \chi Y_i + \varphi \lambda_i + \varepsilon_{2i} \quad (2)$$

where  $H_i^*$  is latent health for individual  $i$ ;  $MF_i$  is meetings with friends;  $Y_i$  is individual income;  $Z_{2i}$  is a matrix of control variables;  $\lambda_i = \phi(Z_{1i}\beta_1) / \Phi(Z_{1i}\beta_1)$  is the inverse Mills ratio for labour force participation equation where  $\phi(\cdot)$  is the normal probability distribution and  $\Phi(\cdot)$  is the normal cumulative distribution.  $\beta_2$ ,  $\alpha$ ,  $\chi$ ,  $\varphi$  are parameters to be estimated and  $\varepsilon$  is a random-error term.

Health equation (2) is a latent variable model, as our measure of health are all qualitative, either binary or ordinal. SPH is measured by the five conventional answers: very bad, bad, fair, good, very good. Thus, the structure of Equation (2) makes it suitable for estimation as an ordered probit model:

$$P(SAH_i = J - 1) = \Phi(\mu_j - Z_{2i}\beta_2 - \alpha MF_i - \chi Y_i - \varphi \lambda_i) - \Phi(\mu_{j-1} - Z_{2i}\beta_2 - \alpha MF_i - \chi Y_i - \varphi \lambda_i) \quad (3)$$

where  $J$  takes a value from 1 to 5,  $\mu_j$  is defined as  $SAH=J-1$  when  $\mu_{j-1} < SAH^* \leq \mu_j$  and  $\Phi(\cdot)$  is the cumulative normal distribution

CC is a measured by a dummy variable (yes or no). Hence, Equation (2) makes it appropriate for estimation as an standard probit model

$$P(CC_i = 1) = \Phi(\varepsilon_{2i} - Z_{2i}\beta_2 - \alpha MF_i - \chi Y_i - \varphi \lambda_i) \quad (4)$$

Limitations in ADLs present three possible answers: not limited, limited and strongly limited. Therefore, we use to estimation Equation (2) again an ordered probit model

$$P(LADSLs_i = J - 1) = \Phi(\mu_j - Z_{2i}\beta_2 - \alpha MF_i - \chi Y_i - \varphi \lambda_i) - \Phi(\mu_{j-1} - Z_{2i}\beta_2 - \alpha MF_i - \chi Y_i - \varphi \lambda_i) \quad (5)$$

where  $J$  takes a value from 1 to 3,  $\mu_j$  is defined as  $LADSLs=J-1$  when  $\mu_{j-1} < SAH^* \leq \mu_j$ .

#### 4. Data

We use data from the income living conditions survey carried out by the Italian Statistical Office (IT-SILC) in 2006. The original sample contains 46522 observations providing information on the following types of living conditions: income, education, health, work conditions, social exclusion, housing and social participation. This last information is an appealing feature of the dataset but it is not provided in other waves of the survey thus no panel dimension is available for our study. After excluding individuals who were not employees, we were left with a subsample of 15169 employees aged between 16 and 64 in 2006.

We use three different variables to measure health status, to check the robustness of our results. The first is the self-perceived health (SPH) which is measured by the five conventional measure: very bad, bad, fair, good and very good. SPH is widely used in the literature as a convenient aggregate of all aspects of health (Bilger and Carrieri 2012) and previous studies have shown to be correlated with objective health measures such as mortality (Idler and Benyamini 1997). It is, by its nature, subjective. For this reason, we use other health variables, which are characterized by a greater level of objectivity. These are the presence of chronic (long-standing) illness or condition (CC) which admit two values (yes or no)<sup>1</sup> and the presence of limitations in activities of daily living (LADLs) with three possible answers: not limited, limited, and strongly limited. CC and LADLs measures, although self-reported, are based on the incidence of specific health conditions and limitations, which individuals are more likely to recall and report truthfully.

The information on social participation is self-assessed by the individual who are asked to report i) frequency of getting/being in contact with friends and relatives; ii) participation in informal and formal voluntary activities; iii) participation in cultural events. Our key independent variable *meetings with friends* is measured through the frequency with which the respondent usually gets together with friends during a usual year. It is a dummy variable equal to 1 if the respondent get together with friends every week during a usual year.

In order to account for other phenomena which might influence health and meetings with friends, we include in the analysis a set of control variables: demographic and worker characteristics as well as housing features, neighbourhood quality and size of municipality.

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<sup>1</sup> The main characteristics of a chronic condition are that it is permanent and may be expected to require a long period of supervision, observation and care.

Table 1. Self-perceived health

	Number of individuals	Percentage
5 (Very good)	2611	17.21
4 (good)	8635	56.93
3 (fair)	3564	23.50
2 (Bad)	318	2.10
1 (Vary bad)	41	0.27

Table 2. Chronic condition

	Number of individuals	Percentage
1 (yes)	1770	11.67
2 (no)	13399	88.33

Table 3. Limitations in ADLs

	Number of individuals	Percentage
3 (strongly limited)	214	1.41
2 (limited)	1183	7.80
1 (no limited)	13772	90.79

At the individual level, we account for gender (male), marital status (married, separated, divorced, widowed), age, household size, number of children (age 0-2, age 3-5, age 6-15, age 16-24), education (pre primary, primary, secondary), country of birth (European union, other country), labour income and homeownership. As worker characteristics we include weekly hours, experience, permanent job, type of occupation and sector of activity. Housing features concern the number of rooms and housing problems (humidity, lightness and heating problems). We measure the quality of the surrounding environment through three indicator of the subjective perception (noise, pollution and crime) and we also control for the size of municipality and regional fixed effects. All the variables are described in detail in Table 1 in Appendix A.

Tables 1-3 present the sample distribution of the dependent variables. On average, about 74 percent of employees report good and very good health, while 12 percent present chronic condition and 9 percent limitations in ADLs. Summary weighted statistics are reported in



Table 4. Descriptive Statistics (mean)

Variable	All	Bad Health			Good Health		
		SPH	CC	LADLs	SPH	CC	LADLs
Meetings with friends	0.20	0.21	0.15	0.16	0.22	0.20	0.20
Male	0.57	0.48	0.52	0.52	0.58	0.58	0.58
Married	0.59	0.62	0.63	0.67	0.57	0.59	0.59
Separated	0.02	0.05	0.04	0.03	0.02	0.02	0.02
Divorced	0.03	0.07	0.05	0.05	0.02	0.02	0.02
Widowed	0.01	0.04	0.02	0.02	0.01	0.01	0.01
Age	39.99	46.11	43.71	44.51	38.28	39.52	39.56
Pre primary edu	0.00	0.01	0.00	0.01	0.00	0.00	0.00
Primary edu	0.06	0.15	0.07	0.11	0.05	0.06	0.06
Secondary edu	0.77	0.76	0.77	0.77	0.77	0.77	0.77
Household size	3.14	2.93	3.01	3.08	3.17	3.16	3.15
Children 0-2	0.09	0.03	0.08	0.04	0.11	0.10	0.10
Children 3-5	0.10	0.03	0.07	0.07	0.10	0.10	0.10
Children 6-15	0.35	0.31	0.36	0.39	0.35	0.35	0.34
Children 16-24	0.40	0.51	0.40	0.43	0.39	0.40	0.40
EU birth	0.01	0.01	0.01	0.01	0.01	0.01	0.01
OTH birth	0.08	0.08	0.05	0.05	0.09	0.09	0.09
Labour income	9.61	9.45	9.64	9.60	9.61	9.61	9.61
Homeowner	0.71	0.66	0.72	0.70	0.70	0.70	0.71
Weekly hours	37.77	36.10	37.25	37.01	38.01	37.83	37.84
Experience	16.08	21.12	19.23	19.91	14.59	15.68	15.70
Permanent job	0.84	0.85	0.87	0.85	0.84	0.84	0.84
Job professional	0.33	0.26	0.33	0.28	0.35	0.33	0.34
Job skilled	0.30	0.27	0.30	0.30	0.30	0.30	0.29
Agriculture	0.03	0.04	0.02	0.04	0.03	0.04	0.03
Construction	0.07	0.08	0.05	0.06	0.07	0.07	0.07
Wholesale	0.10	0.08	0.09	0.08	0.11	0.10	0.11
Hotels	0.03	0.02	0.03	0.03	0.03	0.03	0.03
Transport	0.05	0.04	0.05	0.06	0.05	0.05	0.05
Finance	0.03	0.00	0.04	0.02	0.03	0.03	0.03
Real estate	0.06	0.03	0.04	0.04	0.06	0.06	0.06
Education	0.09	0.10	0.12	0.11	0.08	0.09	0.09
Public administration	0.10	0.10	0.11	0.11	0.09	0.10	0.10
Health and social work	0.08	0.12	0.10	0.09	0.08	0.08	0.08
Other sectors	0.08	0.13	0.07	0.09	0.08	0.08	0.08
Number of rooms	3.47	3.27	3.42	3.42	3.48	3.48	3.48
Humidity problem	0.21	0.35	0.28	0.33	0.19	0.20	0.20
Warm problem	0.08	0.16	0.10	0.13	0.07	0.07	0.07
Dark problem	0.07	0.11	0.09	0.12	0.07	0.07	0.07
Noise	0.25	0.37	0.31	0.34	0.23	0.24	0.24
Pollution	0.22	0.30	0.29	0.29	0.21	0.21	0.21
Crime	0.15	0.27	0.20	0.21	0.14	0.14	0.14
Densely populated area	0.44	0.49	0.47	0.44	0.44	0.43	0.44
Intermediate area	0.39	0.36	0.36	0.37	0.39	0.39	0.39
Observations	15169	359	1770	1397	11246	13399	13772

Table 4 for all sample, as well as for bad and good health subsample<sup>2</sup>. On average, 20 percent of respondents meet friends every week. Over half of respondents are male and married and report secondary education. The average age is 40 years. Moreover, 40 percent of respondents have children aged between 16 and 24 while 71 percent of respondents are homeowners. Finally, on average, respondents work 37 hours per week and have a labour experience of 16 years.

Respondents that declares bad health for all health measure, on average, less frequently meet friends, are older, employed less in professional and skilled occupations and work fewer hours per week but have more work experience. In addition, respondents are employed more in the public administration and declares more housing and neighbourhood problems.

## 5. Results

In this section, we present estimations of the empirical models described in Section 3. We start by estimating labour force participation equation (1) e we compute the inverse Mills ratio. Results are showed in Appendix B, Table 2. Then, we estimate health equation (2) and we use ordered probit models for SPH and LADLs and probit model for CC. For all estimates, we have computed the robust standard errors.

### 5.1. *Self-perceived Health*

Table 6 reports the results for SPH equation (3). For reasons of clarity, we display findings in Panel A, B, C. The results in Panel A for the employees population show that meetings with friends is positively associated with degree of self-perceived health state (significant at 1 %). The coefficient suggests that the health returns to meetings with friends are slightly increasing. Meet friends every week decrease the probability of reporting bad health by 0.5 percent (moving from very bad perceived state) and increase the probability of declaring good health by 1 percent (moving from fair perceived state). These marginal effects are considerably small. However, for the Italian whole population, Fiorillo and Sabatini (2011b) found that meetings with friends every week is associated with a 4.4 higher probability to report self-perceived good health.

The individual characteristics are important predictors of self-perceived health of employees. The degree of self-perceived health state is found to decrease with age and marital status. In particular, being separated and/or divorced is negatively associated respectively

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<sup>2</sup> In the bad health the following categories have been grouped: “very bad” and “bad” for SPH, and “severe limitations” and “limitations” for LADLs.

Table 6. Panel A. Individual characteristics effects on SPH

	All		Bad		Good	
	coeff.	Std. err	dy/dx	std. err.	dy/dx	Std. err
Meetings with friends	0.184***	0.045	-0.005	0.001	0.010	0.001
Male	0.048*	0.027	-0.001	0.001	0.004	0.002
Married	-0.073***	0.028	0.002	0.001	-0.005	0.002
Separated	-0.146**	0.065	0.005	0.003	-0.017	0.009
Divorced	-0.254***	0.068	0.010	0.003	-0.034	0.012
Widowed	-0.200**	0.088	0.008	0.004	-0.025	0.014
Age	-0.032***	0.002	0.001	0.000	-0.002	0.000
Pre primary edu	0.135	0.168	-0.004	0.004	0.006	0.003
Primary edu	-0.132**	0.055	0.005	0.002	-0.014	0.007
Secondary edu	-0.093***	0.031	0.003	0.001	-0.006	0.002
Household size	0.028**	0.011	-0.001	0.000	0.002	0.001
Children 0-2	0.088***	0.033	-0.003	0.001	0.008	0.003
Children 3-5	-0.008	0.032	0.000	0.001	-0.001	0.002
Children 6-15	-0.029*	0.017	0.001	0.000	-0.002	0.001
Children 16-24	-0.025	0.016	0.001	0.000	-0.002	0.001
EU birth	0.220***	0.080	-0.006	0.002	0.006	0.002
OTH birth	0.175***	0.042	-0.005	0.001	0.007	0.001
Labour income (ln)	0.047**	0.021	-0.001	0.001	0.004	0.002
Homeowner	-0.022	0.023	0.000	0.000	-0.002	0.002
Mills ratio	-0.202***	0.045	0.006	0.001	-0.016	0.004
Observations	14484					
R-squared	0.072					
Log Likelihood	-14221.47					

Note: The dependent variable *Self-perceived health* is an ordinal variable (1 = very bad, 2 = bad, 3 = fair, 4 = good, 5 = very good). See Appendix A Table 1 for a detailed description of regressors. Regional dummies are omitted for space reasons. The estimated cut points are not reported. Standard errors are corrected for heteroskedasticity. The symbols \*\*\*, \*\*, \* denote that the coefficient is statistically different from zero at 1, 5 and 10 percent.

Table 6. Panel B. Worker characteristics effects on SPH

	All		Bad		Good	
	coeff.	Std. err	dy/dx	std. err.	dy/dx	Std. err
Weekly hours	0.001	0.001	-0.000	0.000	0.000	0.000
Experience	-0.001	0.002	0.000	0.000	-0.000	0.000
Permanent job	0.030	0.030	-0.001	0.001	0.002	0.002
Job professional	0.180***	0.028	-0.005	0.001	0.012	0.002
Job skilled	0.077***	0.028	-0.002	0.001	0.005	0.002
Agriculture	-0.040	0.059	0.001	0.002	-0.003	0.006
Construction	-0.022	0.040	0.001	0.001	-0.002	0.003
Wholesale	-0.036	0.037	-0.001	0.001	0.003	0.002
Hotels	-0.049	0.061	0.002	0.002	-0.004	0.006
Transport	-0.038	0.045	0.001	0.001	-0.003	0.004
Finance	-0.002	0.056	0.000	0.002	-0.000	0.004
Real estate	-0.034	0.046	0.001	0.001	-0.003	0.004
Education	-0.034	0.042	0.001	0.001	-0.003	0.004
Public administration	-0.008	0.038	0.000	0.001	-0.001	0.003
Health and social work	-0.050	0.041	0.002	0.001	-0.004	0.004
Other sectors	-0.007	0.041	0.000	0.001	-0.000	0.003

Table 6. Panel C. Housing features, neighbourhood quality and size of municipality effects on SPH

	All		Bad		Good	
	coeff.	Std. err	dy/dx	std. err.	dy/dx	Std. err
Number of rooms	0.027***	0.009	-0.001	0.000	0.002	0.001
Humidity problem	- 0.247***	0.024	0.009	0.001	-0.027	0.004
Warm problem	-0.193***	0.041	0.007	0.002	-0.023	0.006
Dark problem	-0.092**	0.039	0.003	0.001	-0.009	0.004
Noise <sup>7</sup>	-0.062**	0.026	0.002	0.001	-0.005	0.002
Pollution	-0.088***	0.029	0.003	0.001	-0.008	0.003
Crime	-0.056*	0.033	0.002	0.001	-0.005	0.003
Densely populated area	0.143***	0.030	-0.004	0.001	0.010	0.002
Intermediate area	0.087***	0.027	-0.002	0.001	0.006	0.002
Regional dummies		Yes		Yes		Yes

with a 1.7 and 3.4 percent higher probability of declaring good perceived health (moving from fair perceived state). Previous empirical studies did not find correlation (Fischer and Sousa-Poza 2009). Moreover, having children aged 6-15 is negatively statistically correlated (at 10%) with SPH, too. On the other hand, the degree of self-perceived health state increase with male, education, labour income, household size, having little children (aged 0-2) and if the respondent was born in any European union or other countries. These last three variables are the most important individual control variables: they are associated respectively with 0.8, 0.6 and 0.7 percent higher probability to report good perceived health. The association between employees with children aged between 0 and 2 and self-perceived good health seems to support 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). Moreover, results on male and education are in line with findings of Datta Gupta and Kristensen (2008). Finally, the Mills ratio coefficient is negative and significant at 1 percent. This means that there is an overestimation of the grade of self-perceived health state, if we do not consider the selectivity problem of individuals in the labour market.

Regarding worker characteristics, we find that the only important predictor is occupation. Employees who are employed in professional and skilled occupation report a higher perceived health state than workers engaged in no-skilled occupation. The association is statistically significant at 1 percent. The presence of housing problems and low neighborhood quality (both self-assessed) seems to be significant explanatory variables. Employees who judge that dwelling presents humidity and warm problems exhibit, respectively, a 2.7 and 2.3 percent lower probability of reporting good self-perceived health (moving from fair perceived state). Moreover, our estimation also reveal a negative association, significant at conventional level, between the believes of noise and pollution in the area of residence and the self-perceived

Table 7. Panel A. Meetings with friends and individual characteristics effects on CC

	coeff.	Std. err	dy/dx	std. err.
Meetings with friends	-0.138***	0.040	-0.023	0.006
Male	0.013	0.041	0.002	0.007
Married	0.045	0.043	0.008	0.007
Separated	0.110	0.088	0.020	0.018
Divorced	0.327***	0.083	0.070	0.021
Widowed	0.074	0.112	0.014	0.022
Age	0.021***	0.003	0.004	0.000
Pre primary edu	-0.076	0.243	-0.013	0.039
Primary edu	-0.119	0.083	-0.020	0.013
Secondary edu	0.002	0.048	0.000	0.008
Household size	-0.049***	0.017	-0.009	0.003
Children 0-2	0.035	0.053	0.006	0.009
Children 3-5	-0.021	0.052	-0.004	0.009
Children 6-15	0.084***	0.025	0.015	0.005
Children 16-24	0.022	0.025	0.004	0.004
EU birth	0.020	0.116	0.004	0.021
OTH birth	-0.366***	0.075	-0.052	0.008
Labour income (ln)	-0.105***	0.031	-0.019	0.005
Homeowner	0.040	0.034	0.007	0.006
Mills ratio	0.139**	0.066	0.025	0.012
Observations	14484			
R-squared	0.057			
Log Likelihood	-4871.78			

Note: The dependent variable *Chronic conditions* is a binary variable (1 = yes, 0 = no). See Appendix A Table 1 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.

Table 7. Panel B. Worker characteristics effects on CC

	coeff.	Std. err	dy/dx	std. err.
Weekly hours	0.002	0.002	0.000	0.000
Experience	-0.000	0.003	-0.000	0.000
Permanent job	0.012	0.047	0.002	0.008
Job professional	-0.079*	0.044	-0.014	0.008
Job skilled	-0.025	0.042	-0.004	0.007
Agriculture	-0.218**	0.097	-0.034	0.013
Construction	-0.082	0.066	-0.014	0.011
Wholesale	-0.056	0.058	-0.010	0.010
Hotels	0.019	0.093	0.003	0.017
Transport	-0.074	0.070	-0.013	0.011
Finance	0.120	0.083	0.023	0.017
Real estate	-0.075	0.073	-0.013	0.012
Education	0.115*	0.061	0.022	0.012
Public administration	0.107*	0.056	0.020	0.011
Health and social work	0.176***	0.059	0.034	0.012
Other sectors	-0.001	0.060	-0.000	0.011

Table 7. Panel C. Housing features, neighbourhood quality and size of municipality effects on CC

	coeff.	Std. err	dy/dx	std. err.
Number of rooms	-0.025*	0.014	-0.004	0.002
Humidity problem	0.203***	0.035	0.039	0.007
Warm problem	0.226***	0.054	0.045	0.012
Dark problem	0.047	0.054	0.009	0.010
Noise	0.074**	0.037	0.013	0.007
Pollution	0.154***	0.041	0.029	0.008
Crime	0.076*	0.045	0.014	0.009
Densely populated area	-0.006	0.046	-0.001	0.008
Intermediate area	-0.014	0.041	-0.002	0.007
Regional dummies		Yes		Yes

health. Furthermore, the size of municipality in which the employees are residents is positively and statistically correlated, at 1 percent, with SPH. Employees who are resident in densely area have a higher probability of declaring good self-perceived health by 1 percent. Finally, results on regional dummies (not reported) do not show geographical differences statistically significant.

### 5.2. Chronic conditions

Table 7 reports the results for CC equation (4). For reasons of clarity, we display findings in Panel A, B, C, too. In Panel A, we observe a negative relationship between meetings with friends and chronic conditions, statistically significant at 1 percent. Meet friends every week decrease the probability of suffering from chronic conditions by 2.3 percent.

The results for the individual control variables indicate that gender and education are not significant predictor of chronic conditions. Instead, being divorced and having children aged 6-15 increase the likelihood of reporting chronic conditions, respectively, by 7 and 1.5 percent. Age also presents a positive and statistically significant (at 1 %) correlation with CC. On the other hand, household size, being born in a no European union country and labour income decrease the probability of suffering from chronic conditions. In particular, being born out of European union is associated with 5.6 percent lower probability to report of suffering from chronic conditions. The evidence on age and household size are in line with results of Su et al. (2006). The Mills ratio coefficient is positive and significant at 5 percent. This means that there is an underestimation of suffering from chronic condition, if we do not consider the selectivity problem of individuals in the labour market.

Among worker characteristics, a significant (at 10%) negative correlation exists between managerial positions and chronic conditions. Industry seems important, too. Working in the sector of education, public administration and social work is found to worsen chronic

conditions. Working in agriculture, on the other hand, is associated with an decrease in the probability of suffering from chronic conditions.

The presence of housing problems and low neighborhood quality seems to be important explanatory variables also in this sample. Employees who judge that dwelling presents humidity and warm problems exhibit, respectively, a 3.9 and 4.5 percent higher probability of suffering from chronic conditions. Moreover, employees who believe that in the area of residence there are noise, pollution and crime problems present higher probability of suffering from chronic conditions, too. The size of municipality in which the employees are residents is not statistically significant. Finally, evidence on regional dummies (not reported) points out some geographical differences: South regions (Campania, Puglia and Sicily) present a negative and highly significant association with chronic conditions.

### *5.3. Limitations in activities of daily living*

We turn to self-reported measure of limitations in daily activities. Here, we face the problem that these limitations may be so severe that they inhibit participation in the labour market. Indeed, in the sample of the individuals who do not participate in the labour market (no workers) we found that 1957 respondents (13%) declare limitations and 855 (6%) affirm severe limitations. However, in the sample of employees, we have observations to robustly estimate the relationship between meetings with friends and limitations in activities because of health problems. We show the results in Table 8, again in Panel A, B and C. The findings in Panel A show that meetings with friends does not induce a reduction in the limitations of daily activities. The coefficient has the expected sign but is not statistically significant. As in previous findings, education is not significant predictor of LADLS while marital status and age have a positive and statistically significant effect on limitations in daily activities. In particular, being divorced and widowed increase the probability of being hampered in daily activities by, respectively, 6.6 and 3.5 percent (Column 2). Furthermore, being male and having children aged 6-15 is associated with higher likelihood of limitations in ADLs, too. Other significant (at 1%) individual characteristics are having little children (aged 0-5), being born in a country outside the European union and labour income. The negative signs of the coefficients of these variable suggest that they reduce the probability of health limitations in daily activities. Finally, the Mills ratio coefficient is positive and significant at 1 percent. This means that there is an underestimation of LADLs, if we do not consider the selectivity problem of individuals in the labour market. Among the worker characteristics, first, a significant negative correlation is present with job professional variable. High managerial

Table 8. Panel A. Meetings with friends and individual characteristics effects on LADLs

	All		Limited		Strongly limited	
	coeff.	Std. err	dy/dx	std. err.	dy/dx	Std. err
Meetings with friends	-0.037	0.065	-0.004	0.005	-0.001	0.001
Male	0.083*	0.044	0.010	0.005	0.002	0.001
Married	0.150***	0.048	0.017	0.005	0.003	0.001
Separated	0.171*	0.100	0.022	0.014	0.005	0.004
Divorced	0.439***	0.088	0.066	0.016	0.018	0.005
Widowed	0.252**	0.109	0.035	0.017	0.008	0.005
Age	0.016***	0.003	0.002	0.000	0.000	0.000
Pre primary edu	0.076	0.255	0.009	0.033	0.002	0.007
Primary edu	0.013	0.085	0.001	0.010	0.000	0.002
Secondary edu	0.035	0.055	0.004	0.006	0.001	0.001
Household size	-0.026	0.018	-0.003	0.002	-0.001	0.000
Children 0-2	-0.170***	0.062	-0.020	0.007	-0.004	0.001
Children 3-5	0.027	0.054	0.003	0.006	0.001	0.001
Children 6-15	0.067**	0.027	0.008	0.003	0.002	0.001
Children 16-24	-0.022	0.026	-0.003	0.003	-0.000	0.001
EU birth	-0.171	0.136	-0.018	0.013	-0.003	0.002
OTH birth	-0.301***	0.080	-0.030	0.006	-0.005	0.001
Labour income (ln)	-0.141***	0.033	-0.017	0.004	-0.003	0.001
Homeowner	0.015	0.036	0.002	0.004	0.000	0.001
$\lambda$	0.359***	0.065	0.043	0.008	0.009	0.002
Observations	14484					
R-squared	0.068					
Log Likelihood	-4646.81					

Note: The dependent variable *limitations in activities of daily living* is an ordinal variable (1 = no, 2 = limited, 3 = strongly limited). See Appendix A Table 1 for a detailed description of regressors. Regional dummies are omitted for space reasons. The estimated cut points are not reported. Standard errors are corrected for heteroskedasticity. The symbols \*\*\*, \*\*, \* denote that the coefficient is statistically different from zero at 1, 5 and 10 percent.

Table 8. Panel B. Worker characteristics effects on LADLs

	All		Limited		Strongly limited	
	coeff.	Std. err	dy/dx	std. err.	dy/dx	Std. err
Weekly hours	-0.002	0.002	-0.000	0.000	-0.000	0.000
Experience	0.003	0.003	0.000	0.000	0.000	0.000
Permanent job	0.050	0.048	0.006	0.005	0.001	0.001
Job professional	-0.128***	0.047	-0.015	0.005	-0.003	0.001
Job skilled	0.004	0.044	0.000	0.005	0.000	0.001
Agriculture	-0.055	0.089	-0.006	0.005	-0.001	0.002
Construction	-0.061	0.068	-0.007	0.007	-0.001	0.001
Wholesale	-0.034	0.062	-0.004	0.007	-0.001	0.001
Hotels	0.015	0.097	0.002	0.012	0.000	0.002
Transport	-0.048	0.074	-0.006	0.008	-0.001	0.002
Finance	-0.054	0.102	-0.006	0.011	-0.001	0.002
Real estate	-0.039	0.081	-0.004	0.009	-0.001	0.002
Education	0.110*	0.065	0.014	0.009	0.003	0.002
Public administration	0.084	0.060	0.010	0.008	0.002	0.002
Health and social work	0.199***	0.063	0.026	0.009	0.006	0.002
Other sectors	0.084	0.062	0.010	0.008	0.002	0.002



Table 8. Panel C. Housing features, neighbourhood quality and size of municipality effects on LADLs

	All		Limited		Strongly limited	
	coeff.	Std. err	dy/dx	std. err.	dy/dx	Std. err
Number of rooms	-0.023	0.015	-0.003	0.002	-0.000	0.000
Humidity problem	0.238***	0.035	0.031	0.005	0.007	0.001
Warm problem	0.274***	0.052	0.037	0.008	0.009	0.002
Dark problem	0.134**	0.054	0.017	0.007	0.004	0.002
Noise	0.066*	0.039	0.008	0.005	0.002	0.001
Pollution	0.147***	0.043	0.018	0.006	0.004	0.001
Crime	0.158***	0.046	0.020	0.006	0.004	0.001
Densely populated area	-0.145***	0.049	-0.017	0.005	-0.003	0.001
Intermediate area	-0.094**	0.042	-0.011	0.005	-0.002	0.001
Regional dummies	Yes		Yes		Yes	

positions are associated with a higher probability to reduce health limitations in daily activities. Second, a positive association exists with education and social work sector of activities. Un increase in these variables is related around 1 percent higher probability of declaring limitations in ADLs.

The presence of housing problems and low neighborhood quality seems to be significant explanatory variables as well for LADLs. Employees who judge that dwelling presents humidity, warm and dark problems exhibit, respectively, a 3.1, 3.7 and 1.7 percent higher probability of reporting health limitations in daily activities (Column 2). Moreover, our estimates also show a positive association, significant at 1 percent, between the beliefs of pollution and crime in the area of residence and LADLs. In addition, the size of municipality in which the employees are residents is negatively and statistically correlated, at conventional level, with limitations in activities of daily living. Employees who are resident in densely and intermediate populated area have a lower probability of declaring health limitations by, respectively, 1.7 and 1.1 percent. This is probably because employees with limitations live in these area for their better accessibility. Finally, results on regional dummies (not reported) do not illustrate geographical differences statistically significant.

#### 5.4. Discussion

The findings from estimates point out that meetings with friends is a significant predictor in promoting health, positively associated with the probability of declaring good health and negatively correlated with the likelihood of suffering from chronic limitations. No relationship statistically significant is found with limitations in activities of daily living. The overall results seem to indicate that the channels of health information, mutual assistance and

above all “buffering effect” are important for health state such as self-perceived health and chronic illness of employees but do not work for LADLs.

However, there are several reasons for treating these findings with caution. First, self-perceived health, chronic condition and limitations in activities of daily living are self-assessed by the respondents as well as meetings with friends and thus exposed to common method bias. As explained by Fujiwara and Kawachi (2008), common method bias occurs when personality characteristics, such as negative affectivity, influence health status.

The cross-sectional design of the study is another limitation which requires us to be cautious in advancing a causal interpretation of the estimates. More generally, the nature of the phenomena we are dealing with exposes the analysis to endogeneity problems in two ways. First, the frequency of meetings with friends are results of individual choices, which depend on individual, specific and unobservable preferences. Hence, they are by definition endogenously determined. Unobservable individual characteristics such as personal interests or unexpected shocks may be correlated with both health measure and the individual propensity to social interaction. Second, the possibility of a reverse causality must be taken into account: individuals in poor health state may be forced to reduce their social participation against their will.

The results on control variables support and reinforce the claims about the existence of health disparities in Italy based on socio-economic status (Fiorillo and Sabatini 2011a, b). Less educated (only for SPH), poorer, older, separated and/or divorced, with children aged 6-15, and unskilled employees are exposed to a higher probability of reporting poor health conditions. Moreover, living in house with humidity, warm and dark problems and in area with low neighborhood quality strongly damage health of workers. These last results confirm and strengthen previous evidence on the Italian whole population (Bilger and Carrieri 2012). On the other hand, being parents of young children (aged 0-2) is found to be a significant predictor of good health. This finding supports the hypotheses on the relational incentives towards healthy behaviour: as pointed out by Folland, “responsibility to others requires at a minimum that one stay alive and healthy” (2007, 2345).

## **6. Conclusions**

In this paper, we analysis the health of workers and we investigate the effect of a measure of social relations, meetings with friends, on three different health outcomes of workers: self-perceived health, chronic conditions and limitations in activities of daily living. We address the self-selection of individuals in labour market using an Heckman selection model. We use

data from income and living conditions survey carried out in 2006 by the Italian Statistical Office (IT-SILC). We find that meetings with friends is positively correlated with self-perceived health, negatively associated with chronic condition but not related to limitations in activities of daily living.

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Appendix A. Table 1. Variables description

<i>Variable</i>	<i>Description</i>
<i>Dependent variable</i>	
SPH	Self-perceived health, coded so that 1=very good, 5=very bad
CC	Dummy=1, if the respondent suffers from a chronic (long-standing) illness or condition; 0 otherwise
LADLs,	Respondent's self-assessment whether hampered in daily activity by any health problem, coded as that 1= not limited, 3=strongly limited
<i>Key independent variable</i>	
Meetings with friends	Dummy, 1 if the respondent get together with friends every week during a usual year; 0 otherwise
<i>Demographic and socio-economic characteristics</i>	
Male	Dummy, 1 if male; 0 otherwise. <b>Reference group: female</b>
Married	Dummy, 1 if married; 0 otherwise; <b>Reference group: single status</b>
Separated	Dummy, 1 if separated; 0 otherwise
Divorced	Dummy, 1 if divorced; 0 otherwise
Widowed	Dummy, 1 if widowed; 0 otherwise
Age	Age of the respondent between 16 and 64
Pre primary edu	Dummy, 1 if the respondent has no education; 0 otherwise. <b>Reference group: tertiary education</b>
Primary edu	Dummy, 1 if the respondent has attained primary education; 0 otherwise.
Secondary edu	Dummy, 1 if the respondent has attained secondary education; 0 otherwise.
Household size	Number of household heads
Children 0 -2	Number of own children ages 0 - 2 years old. <b>Reference group: no children</b>
Children 3 -5	Number of own children ages 3 - 5 years old
Children 6 - 15	Number of own children ages 6 - 15 years old
Children 16 -24	Number of own children ages 16 and 24 attending school
EU birth	Dummy, 1 if the respondent was born in any European union country; 0 otherwise. <b>Reference group: country of residence</b>
OTH birth	Dummy, 1 if the respondent was born in any other country; 0 otherwise
Labour income (ln)	Natural log of annual net labour income
Homeowner	Dummy, 1 if the respondent owns the house where he /she lives; 0 otherwise
<i>Housing feature</i>	
Number of rooms	Number of rooms of dwelling available to the household
Humidity problem	Dummy, 1 if the respondent judges that the dwelling has humidity problems; 0 otherwise
Warm problem	Dummy, 1 if the respondent has not the ability to pay to keep the home adequately warm; 0 otherwise
Dark problem	Dummy, 1 if the respondent feels the dwelling to dark, not enough light; 0 otherwise

<i>Variable</i>	<i>Description</i>
<i>Worker characteristics</i>	
Weekly hours	Number of hours usually worked per week in main job
Labour market experience	Number of years, since starting the first regular job, that the respondent has spent at work
Permanent job	Dummy, 1 if the respondent has a work contract of unlimited duration; 0 otherwise
<i>Occupation</i>	
Job-Professional	Dummy, 1 if the respondent is employed in professional and/or managerial occupation; 0 otherwise; <b>Reference group: Job-No skilled</b>
Job-Skilled	Dummy, 1 if the respondent is employed in skilled occupation; 0 otherwise;
<i>Sector</i>	
Agriculture	Dummy, 1 if the activity sector is agriculture: 0 otherwise. <b>Reference group: manufacturing</b>
Construction	Dummy, 1 if the activity sector is construction: 0 otherwise
Wholesale	Dummy, 1 if the activity sector is wholesale and : 0 otherwise
Hotels	Dummy, 1 if the activity sector is hotels and restaurants: 0 otherwise
Transport	Dummy, 1 if the activity sector is transport: 0 otherwise
Finance	Dummy, 1 if the activity sector is finance intermediation: 0 otherwise
Real Estate	Dummy, 1 if the activity sector is real estate: 0 otherwise
Education	Dummy, 1 if the activity sector is education: 0 otherwise
Public administration	Dummy, 1 if the activity sector is public administration: 0 otherwise
Health and social work	Dummy, 1 if the activity sector is health and social work: 0 otherwise
Other sectors	Dummy, 1 if the activity sector is another sector: 0 otherwise
<i>Neighbourhood quality</i>	
Noise	Dummy, 1 if the respondent feels noise from neighbours to be a problem for the household; 0 otherwise
Pollution	Dummy, 1 if the respondent feels pollution, grime or other environmental problem to be a problem for the household, 0 otherwise
Crime	Dummy, 1 if the respondent feels crime, violence or vandalism to be a problem for the household; 0 otherwise
<i>Size of municipality</i>	
Densely populated area	Dummy, 1 if the respondent lives in local areas where the total population for the set is at least 50,000 inhabitants. <b>Reference group: Thinly-populated area</b>
Intermediate area	Dummy, 1 if the respondent lives in local areas, not belonging to a densely-populated area, and either with a total population for the set of at least 50,000 inhabitants or adjacent to a densely-populated area.

## Appendix B.

Table 2. Labour force participation equation

Variable	Coeff.	Robust Std. Err.
Unemployment benefits (ln)	0.039***	0.003
Disability benefits (ln)	-0.093***	0.005
Male	0.783***	0.015
Married	0.230***	0.023
Separated	0.292***	0.058
Divorced	0.412***	0.062
Widowed	0.176***	0.058
Age 30-39	0.719***	0.026
Age 40-49	0.877***	0.028
Age 50-59	0.363***	0.030
Age 60-64	-0.715***	0.041
Low secondary edu	0.260***	0.026
Upper secondary edu	0.604***	0.026
Post secondary edu	0.856***	0.038
University edu	1.056***	0.034
Household size	-0.035***	0.008
Children 0 - 2	-0.116***	0.031
Children 3 - 5	0.001	0.029
Children 6 - 15	-0.037***	0.014
Children 16 - 24	-0.112***	0.012
Homeowner	-0.004	0.017
Densely populated area	-0.142***	0.020
Intermediate area	-0.038***	0.019
North East	0.017	0.022
Centre	-0.075***	0.023
South	-0.371***	0.023
Islands	-0.462***	0.030
No. of observations	35157	
R-squared	0.225	
Log Likelihood	-18635.59	



