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# ECONOMIC, HOUSING CONDITIONS AND HEALTH OF OLD PEOPLE IN ITALY: EVIDENCE FROM EU-SILC

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## ABSTRACT

*Economic and demographic factors are key determinants of health status in old age. Although, in recent years, there has been an increasing interest in the evaluation of the relationships between these factors and individual health status in Italy, limited attention has been devoted to the link between housing and health. In this paper, we explore the associations between economic and housing statuses and self-reported health among the elderly, i.e. people aged 65 or over. We analyze data from EU-SILC, the new Eurostat project on Community Statistics on Income and Living Conditions, wave 2006. Results confirm the positive socioeconomic status-health gradient usually found in literature and show that housing conditions have an important role in affecting the health status of the oldest in Italy. These findings increase the need of incorporating socioeconomic and housing factors into health policies in a long term perspective.*

**Classification JEL:** I10, I12, I14, J14

**Keywords:** socioeconomic status, housing, self-perceived health, elderly.

## 1. INTRODUCTION

Economic and demographic factors are key determinants of health status among the population. Over the years there has been a significant and increasing interest in estimating how such factors affect individual health. Much evidence has been found on the positive relationship between health and socioeconomic status (SES from now onwards), the *health-SES gradient*, even in many industrialized countries with similar levels of economic welfare and health care technology (Adda et al., 2003; Cutler et al., 2008). Furthermore, the interest of many scientists has been increasingly attracted by the relation between housing conditions and health (Ineichen, 1993; Marsh et al., 1999; Healy, 2002). It has been stated that understanding the links between SES, housing and health at the individual

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level is an important prerequisite for successful health related policies (WHO, 2004).

Empirical evidence suggests that SES is a multidimensional concept, whose dimensions relate to health in different ways. Various indicators of SES may act through different mechanisms. For instance, fluctuations in income might have temporary effects on health, while education tends to exert its effects throughout the life (Cutler et al., 2008).

Housing itself is a multidimensional concept. According to the WHO definition (2004) housing is the conjunction of the dwelling, the home<sup>1</sup>, the immediate environment and the community (Bonney et al. 2003). The majority of empirical studies show that living in good housing conditions lowers the risk of health problems (Healy, 2002; British Medical Association, 2003).

In this work, we consider SES and housing as distinct multidimensional concepts and make the basic assumption that their effect on health varies across dimensions and across individual life-cycle (Smith, 2004). Empirical evidence shows that individual socioeconomic conditions in early life play a crucial role in determining the evolution of health throughout adulthood (Currie, 2009; Contoyannis and Dooley, 2010). Focussing on the elderly, Deaton and Paxson (1998) and Smith (2004) analyze a specific component of SES, that is income, and show that in the US the correlation between income and health increases over the life-cycle until about age 60 and then decreases. This might mean that economic resources have an impact up to retirement age that decreases when people retire. However, the relationship between health and income in old age could be altered by important feedbacks from health to economic status or by health conditions at earlier stages of life (Smith and Kington, 1997). Furthermore, the strength of the association between SES and health might decrease at older ages due to a “survivor effect” (the intrinsically stronger survive until old ages) or because public health systems usually provide the elderly with free services (or at a reduced cost) thus reducing the link between the ability to pay and access to health care. In general, conflicting results have been reported in the epidemiologic and economic literatures on the link between health and SES at old age with economists usually sustaining the role of economic factors on health among the oldest (Salas, 2002).

In the international literature studies on the relationships between housing and health among the oldest are quite rare (Florian et al., 2003), but the large majority of them seem to show a positive gradient (WHO, 2004 and 2007). Furthermore, it is reasonable to think that housing status is very important for old people, because they spend much of their time at home.

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<sup>1</sup> The dwelling represents the physical shelter where an individual lives and can be expressed by proxy variables such as heating adequacy and maintenance of the structure. The home consists of all individuals living under the same roof and can be expressed by family size, lifestyle of household residents, etc. (Bonney et al., 2003).

Focussing the research on the oldest is important in terms of health policies. In fact, efforts and resources are better allocated to solve the specific problems and fulfil the needs of a particular share of the population which needs support. For policy makers an elderly population in good health limits the pressure on health systems and/or carers and increases the contribution to society made by older people through paid or voluntary work (European Commission, 2007). These considerations are particularly important in Italy, where the ageing of the population has consequences on many aspects of social and economic life, especially in terms of state expenditure for health services that are mostly consumed by the oldest.

While many studies have been carried out in Italy on the relationships between socioeconomic conditions and health of old people (Egidi, 2003; Fiorillo and Sabatini, 2011; Pirani and Salvini, 2012), research on the link between housing status and health is quite rare (Healy, 2002; Bonnefoy et al., 2003). This is mostly due to the lack of suitable data on economic, housing status and health at the same time.

This paper aims to fill this gap studying the associations between SES, housing conditions and health of old people in Italy, that is people aged 65 or over. Empirical analyses are based on EU-SILC data. EU-SILC is the only survey currently available in Italy that collects detailed data on economic, housing conditions and health. In particular, information about different kinds of income are collected: earnings, pensions and other social benefits, private transfers, scholarships.

The paper is organized as follows. Section 2 and Section 3 present, respectively, a review of recent studies on SES and health in Italy and on the links between housing conditions and health. Section 4 illustrates data, methods and research hypotheses. Results are discussed in Section 5, while section 6 provides conclusions and future research prospects.

## 2. THEORETICAL BACKGROUND

Economists recognize health as an important component of human capital since a long time (Becker, 1964). Based on the human capital theory, Grossman (1972a and 1972b) provides a formal model to analyze health capital. According to Grossman (1972b), health is a durable capital stock whose output is healthy time. Each individual is provided with an initial amount of such stock that depreciates increasingly with age (at least after some stage in the life-cycle) and can be increased by investments (e.g. education, good health behaviours and avoidance of bad ones, use of medical care). Individuals are assumed to invest in the health production until the marginal costs of health production equal the marginal benefits of improved health status. As a consequence, the level of individual health (except for the amount at birth) is not exogenous, but it depends, at least partially, on the resources allocated to its production.

The main market goods used to produce health are health care services. This provides theoretical foundation for the positive relationship between SES and health, because people with higher economic resources can afford to purchase more health care services and produce more health capital. The depreciation of health is negatively correlated with age during the early stages of the life cycle and begins after some point in the life-cycle, as the manifestation of ageing. The health status of the oldest is mainly determined by the stock of health capital and the rate of depreciation. Elements such as current income, recent changes of risky behaviours are unlikely to have great influence, while historical factors such as past life styles, permanent income, educational level usually exhibit larger effects (Grossman, 2000).

The Grossman's model had great influence on many subsequent studies. Rosenzweig and Schultz (1983) introduced two sets of elements in the health production function. The first one includes individual choices, while the other one comprehends exogenous elements that can be considered as given in the function.

Kenkel (1995) gave an alternative proposal that includes individual life styles in the production function (e. g. eating correctly, practising sport, sleeping well, among others). Among life styles, housing conditions are included. The inclusion of housing status among life styles is sustained by WHO (2004) that recognizes that housing cannot be separated from behavioural aspects, as the design of spatial environment is known to affect the residents' behaviour.

A large number of empirical studies follow the theoretical approaches outlined above (Smith and Kington, 1997; Smith, 2004; Navarro et al. 2010). In general, there is a wide consensus in the international literature on the positive relation between SES and individual health. However, empirical evidence can vary according to the variables used to measure SES or the context analyzed.

Several studies have been carried out on the association between health perception and socioeconomic conditions in Italy, with a focus on whether differences in health vary systematically according to socioeconomic variables, such as education or income.

Egidi et al. (2007) measured SES using education, socio-professional class, self-perceived economic conditions and housing status. They showed that very educated individuals, people belonging to high social classes and living in good quality houses are less likely to perceive a bad health.

Fiorillo and Sabatini (2011) analyzed the relationship between a large number of socioeconomic features and self-reported health among all age classes. Among economic elements they include income and found that it is positively, but slightly associated with individual health. The availability of income data on health interview surveys in Italy is rare and the authors were able to include income information by matching variables from two different surveys.

Pirani and Salvini (2012) studied inequalities in self-rated health of elderly people: in particular, they explore the contextual effect among Italian areas. The authors gave a definition of SES that includes housing, differently from that stated in section 1. They measured SES by three components: financial resources, housing conditions and social capital. Due to the lack of suitable income data, they measure financial resources by the subjective assessment of the respondent. The authors confirmed the existence of the positive health-SES gradient and of large differences across geographical areas.

A large number of epidemiological studies have been carried out with the same aim in Italy and they mostly show that, among the elderly, disadvantaged economic conditions are usually associated with a bad perceived health (Marinacci et al., 2002; Vannoni et al., 2002).

In this study we take into account all the dimensions of SES and, in particular, we are able to explore the link between subjective health and income, because EU-SILC collects data on different kinds of income: earnings, pensions and other social benefits, private transfers, education-related allowances. Moreover, special attention will be paid to housing status that is considered distinct from SES. This allows us to evaluate whether the various dimensions of SES and housing separately have different roles in subjective health.

Early studies in the literature assumed a unidirectional line of causation that went from socioeconomic status to health. However, economic status and health are clearly in a reverse cause-effect relation. On the one hand, a good health status allows for the accumulation of human capital, market participation and income gaining. On the other hand, a good economic position permits to prevent and heal diseases and sickness, because rich individuals can afford better medical care, live in healthier environments, and so on. Moreover, the link between health and economic conditions is influenced by the access to health care. If all people are fully covered by health insurance, those with low income can consume health care services as rich individuals: this implies that contextual and institutional elements should be considered in the SES-health relation. Then, further unobservable factors may determine both health and economic resources, such as "attitude to healthy living" (Salas, 2002), genetic endowment, social background. This leads to a case of endogeneity between health and SES (Adda et al., 2003; Michaud and van Soest, 2008). However, due to the transversal nature of the survey and the applied model, in this work we do not comment our results in terms of relations, that could imply a cause-effect relationship, but of associations among variables.

### 3. HOUSING AND HEALTH

In this work we follow WHO definition (2004) and define healthy housing “the provision of functional and adequate physical, social and mental conditions for health, safety, hygiene, comfort and privacy. It is (...) a residential setting (...) including all standards and best practice knowledge”<sup>2</sup>.

A conceptual model for housing and health interaction was proposed by Shaw (2004) (see Figure 1).

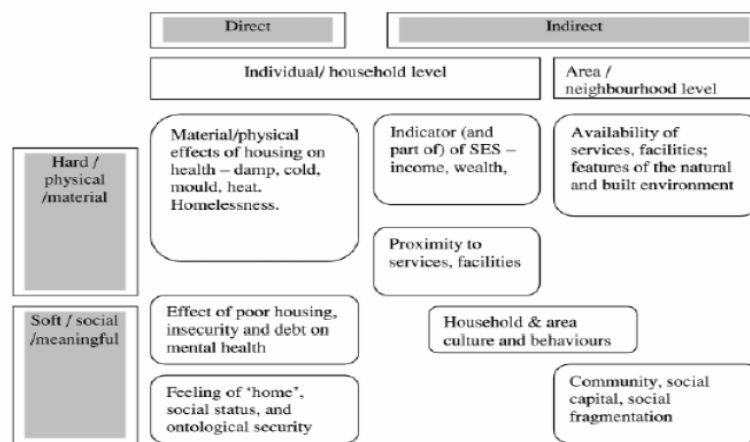


FIGURE 1. – *Conceptual model for housing and health interactions.*  
Source: Shaw 2004.

Inadequate housing can clearly provoke direct problems for physical health. Problems with indoor temperature in winter and transient seasons are significantly associated with acute bronchitis and pneumonia. Furthermore, thermal problems in winter are associated with throat illness, multiple allergies, asthma attacks. Indoor air quality has important consequences on physical health: damp, condensation and mould might provoke asthma, bronchitis or pneumonia.

Overcrowding and the lack of some basic hygiene can have bad consequences on health by increasing the risk of infectious and respiratory disease. Ongoing residence in a crowded home interferes with individuals’ capacity to manage stressors and maintain socially supportive relationships, leading to increased levels of psychological distress and other negative outcomes. Difficulty in accessing to the house could cause problems to children, elderly and people with physical constraints.

Homeownership may contribute to health improvements by fostering greater self-esteem, increased residential stability and sense of security and

<sup>2</sup> The consideration of adequacy varies from country to country, because it depends on specific cultural, social, environmental and economic factors (WHO, 2004).



control over one's physical environment. In fact, homeowners have a greater ability to control their physical environment, leading to both reduced stress and increased life satisfaction. Moreover, owner-occupied homes are generally more well-built and well-maintained, thus reducing exposure to allergens and risk factors for accidents in the home, including falls and burns (Lubell et al., 2007). The incidence of home ownership among the elderly is particularly important, because affordable housing may help them to achieve better health outcomes by making easy the delivery of medical care and accommodating physical disability (British Medical Association, 2003).

Having an adequate home provides a variety of direct psychosocial benefits. Having a safe space into which one can always retreat provides the feeling of safety, calm and security. A study by WHO (2007) shows that, especially for the elderly, the home has an important value and provides them with a sense of control and safety. Important factors affecting feelings of safety and fear of crime include having windows that close properly, being able to escape in case of fire, having adequate and working lights in the common areas (WHO, 2004).

The immediate housing environment represents the "extended" living space of an household and shapes the residential quality of life. Among the most relevant residential factors there are noise from traffic, neighbors and public areas, the perception of fear and crime indicating the social dimension of the neighborhood, the availability of residential amenities such as parks and playgrounds, and the general level of maintenance of the residential area (graffiti, pollution, etc.). In this respect the importance of social capital should be considered. Empirical evidence shows that people that are able to count on relatives or friends, with high social support and civic participation usually declare better health (Ziersch et al., 2005; Petrou and Kupek, 2008). Connected to the lack of recreational areas, there is a general issue with the physical activity within neighborhoods. WHO data (2007) provide evidence that, among adults, the residential environment and its perceived quality are associated with physical activity and – to some extent – with the prevalence of obesity in adults.

It is widely recognized that older people living in a high-quality house have better health, because, when people age, they spend a large part of their time at home. Housing status is considered to be a promising socioeconomic indicator among the elderly, since it reflects the accumulation of income and wealth during the life course (Dalstra et al., 2006). Although many studies are devoted to the investigation of the relationship between housing quality and health, much needs to be done to attain a satisfactory appreciation of the nature of such association. Most research on this topic is on UK and US and provides evidence of the negative impact of poor housing on health (Marsh et al., 1999; British Medical Association, 2003; Lubell et al., 2007). Studies including Italy are quite rare (Healy 2002; Bonnefoy et al., 2003), mostly due to the lack of

data on both housing conditions and health. Some studies on socioeconomic situation and health include housing tenure status and conditions as covariates and show that not being an owner and living in a low equipped house favour the perception of bad health (Salvatore and Spizzichino, 2008; Fiorillo and Sabatini, 2011). The EU-SILC project is the only survey currently available in Italy that provides data on housing through a set of indicators on the presence of basic amenities, density and problems in the dwelling, exposure to vandalism and crime (Eurostat, 2006). The analysis of EU-SILC data makes our study a significant contribution to the literature on housing and health.

We expect a positive association between health and housing conditions, as a consequence of a reverse cause-effect relation. For a healthy individual it is more likely to have a good-quality house, and, conversely, good housing conditions enhance the overall health status. In line with what stated in the previous section, in our work we explore associations among variables and not cause-effect relationships.

#### 4. DATA, VARIABLES AND RESEARCH HYPOTHESES

The analyses are based on data of the third wave of the EU-SILC survey, 2006.

EU-SILC is the new Eurostat project on Community Statistics on Income and Living Conditions. It is an instrument aiming at collecting timely and comparable cross-sectional and longitudinal micro data on income, poverty and social exclusion. EU-SILC includes information on demographic characteristics, economic resources and labour force activity, health, housing type and conditions, housing facilities and problems, expenditures for the house and for medical care. We select a sample of individuals aged 65 or over at the time of interview whose size is 11,262<sup>3</sup>.

The main housing dimensions relevant for individual health have been synthesized by means of multiple correspondence analysis (MCA). The multidimensionality of the housing concept is expressed by a set of observed items provided by EU-SILC. MCA allows to reduce the multidimensionality on a factorial plane of reduced dimension. Among active variables we include the following items that express the dwelling and the home dimensions of housing definition by WHO (see section 3): dwelling type, tenure status, rooms' number, a number of dummy variable indicating whether the house has a living kitchen, two or more bathrooms, a terrace, a garage, a cellar, a garden, leaking roofs or rotten windows, damp in the walls, whether it is dark, whether the household has arrears on utility bills and the financial burden of the total housing costs. Then, we cluster individuals in homogenous groups with respect to the synthetic housing

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<sup>3</sup> EU-SILC does not include institutionalized people (i.e. living in nursing homes or homes for the elderly).

dimensions originated by MCA. By doing so, we create a categorical variable that classifies individuals according to their housing conditions in good, medium and bad housing status.

In order to analyze the associations between health and individual socio-economic and housing status, a logistic model has been applied in line with Egidi et al. (2007).

The dependent variable of the logistic model is the subjective and self-reported health status. Such variable has been found to be a good proxy for objective health, a good predictor of future mortality and health care and to have a predictive value for decline of functional ability among the general population and the elderly (Kaplan et al., 1988; Eurostat, 2002; Egidi et al., 2007). The subjective health status is a multinomial variable whose modalities can be sorted hierarchically as follows: “very bad”, “bad”, “fair”, “good” and “very good”. The response variable of the logistic model is a binary variable with the following categories: “being unhealthy”, which refers to individuals that state they are in bad or very bad health (it takes the value 1) and “being healthy” which includes the individuals that are in fair, good or very good health conditions (it takes the value 0). In fact, results of past empirical studies showed that individuals in very good, good and fair health status are homogenous in terms of individual characteristics and the same is true for individuals in bad and very bad health (Egidi et al., 2007 and Navarro et al. 2010).

Covariates included in the logistic models are the following.

*Age.* Respondents' age is coded 65-69, 70-74, 75-79 and 80 or over. As individuals grow older, their health status gets worse. In the Grossman's model (1972a and 1972b) age is a factor that determines the depreciation rate of the stock of health. This is explained not only by biological constraints, but also by the fact that social and economic conditions are worsening with age. After 65 years, individual incomes are lower, because earnings are substituted by pensions that, on average, are lower than job wages. Hence, material conditions can get worse (for instance, housing status or food quality). Furthermore, social contacts and relationships might become limited. Even though our sample is restricted to those aged 65 or over, age variation within the sample can affect differences in health. We expect that, with increasing age, the health status gets worse.

*Gender.* Gender is one of the most important determinant of health status. It is well known that women live longer on average, but they have a worse health status than men (Eurostat, 2002). The survival advantage of women is founded biologically as well as behaviourally (Vallin, 2005; Egidi et al., 2007). We expect that women are more likely to be in a worse health status than men.

*Stock of pre-existing health.* We include this factor in line with Grossman's (1972a and 1972,b) theoretical model . We express it by two variables: the presence of chronic illness and whether the respondent has disability problems. In EU-SILC people are asked whether they have any chronic

(long-standing) illness or condition or are hampered in daily activities by any ongoing mental or physical health problem, illness or disability. A distinction is made of three levels of severity (strongly limited, limited, not limited)<sup>4</sup>. Empirical evidence shows that people with chronic diseases or limited in daily activities are in a worse health status than others (Egidi et al., 2007). We expect a similar result for our sample.

*Household size.* This variable is coded as follows: living alone, 2, 3, 4 or more persons household. There is evidence in the literature that people living alone tend to have a worse health and higher mortality than others (Goldman et al., 1995). In this work we follow the assumption of Florian et al. (2003), according to which living with others is a resource that is frequently ignored in assessing the economic well being of the oldest. In fact, while living with others, the elderly receive care that can substitute for market-purchased care or for long-term care publicly provided. There is even some evidence that being cared for in own home, or in the home of a family member, is better for health outcomes than institutional long-term care. Joint living can affect health indirectly by increasing the amount of economic resources that allow purchasing better health services on the market (Hurd, 1990). Then, we expect that individuals not living alone report a better health than those living alone.

*Education.* We introduce education as one dimension of SES. Education, together with health, is a form of human capital. It is often used as a proxy for socioeconomic position. Highly educated individuals manage existing conditions more effectively (e.g. diabetes or hypertension) and are more likely to use safety devices (e.g. seat belt). In general, they are better equipped to recognize, understand and access new disease knowledge and medical technologies, they have more control over one's lives and are less depressed (Cutler et al., 2008). Education increases the efficiency of the health production process, because more educated individuals produce health less costly and, hence, lower the shadow price of health, which in turn increases the health demand (Grossman, 2000). Education is a variable with several desirable characteristics. It is better suited than occupation-related indicators as it remains constant even in retirement and it is less influenced by health problems that could occur in old age (Preston and Ilo, 1995). Furthermore, education is a better indicator than income of some important factors for health, such as preventive behaviour and access to health care (Dalstra et al., 2006). In this paper education is coded: low (no education, pre-primary and primary school), medium (junior high school), high (high school diploma, university degree, PhD). Typically, the lower the educational level, the worse the health status (Preston and Ilo, 1995; Eurostat, 2002; Vallin et al., 2005). We expect a similar result, because high educational attainment is usually associated to better

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<sup>4</sup> The set of questions on self perceived health, chronic illness and limitations in daily activities constitutes the Minimum European Health Module (MEHM).

economic conditions and diffused knowledge, that implies a better capacity to preserve own well being and health.

*Professional position.* This variable represents our second dimension of SES and expresses the main profession practiced until retirement. Items are classified as such: bourgeoisie (legislators, managerial professions, professional and executive occupations); petty bourgeoisie (technical, sales, clerks); working class (craft, trade workers, operators and other manual workers); housewife (so considered independently from whether they worked in the past); unable to work or other inactive condition<sup>5</sup>. Many studies document that high prestige jobs are usually associated with positive health status. People with prestigious jobs are usually better educated than others and earn higher wages. Their better health can be related to mechanism that act dependently with education and income: more information, more prevention, more access to health care, better behaviour (diet, exercise, smoking, etc.) and capacity to use health services in optimal way, higher possibility to save money for the future. However, further elements are specifically related to the professional position: jobs in higher rank are usually less risky than others (e.g. legislators vs. agricultural operators), they are practiced in safer environments and are positively associated with a sense of control over one's health and one's work, job satisfaction and social support (Cutler et al., 2008). We expect that individuals having practiced high-grade jobs report better health than others.

*Income* is an important dimension of SES. Empirical evidences on the link between income and health are not unanimous. In fact, a positive association between them is often found (Deaton and Paxson, 2004; von Gaudecker and Scholz, 2007), but there is also some result on potential negative connections between income and health (Cutler et al., 2008; Hupfeld, 2011).

High income allows the access to health care services, best doctors and timely medical treatments; it enhance access to information on healthy behaviour and prevention. Much evidence has been found on the positive income-health link in samples of older individuals in developed countries (Smith and Kington, 1997, Marmot, 2002).

We employ equivalent household income and include information on a household's total net real income per equivalent adult<sup>6</sup>. In order to reflect

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<sup>5</sup> This classification follows the one proposed by Schizzerotto (1993).

<sup>6</sup> The equivalent household income in EU-SILC is computed as the sum - for all household members - of net (of income tax at source and of social contributions) personal income components: employee income (cash or non-cash); cash benefits or losses from self-employment; value of goods produced for own consumption; unemployment, old-age, survivors' benefits, sickness, disability benefits and education-related allowances plus net income components at household level (imputed rent; income from rental of a property or land, family/children related allowances; social exclusion not elsewhere classified, housing allowances; regular inter-household cash transfers received; interests, dividends, profit from capital investments in unincorporated business; income received by people aged under 16), minus interest paid on mortgage,

different profiles at different income levels, we use a disaggregation by income quintiles. In our sample most individuals over 65 years are retired, so that pension income is prevailing. Since a high income allows a secure access to health services and is generally associated with better education and life styles, we expect that with increasing income health status improves.

*Housing conditions.* Housing conditions are expressed by the categorical variable built by MCA and cluster analysis (Appendix A). It summarizes the *dwelling* and *home* dimensions of the WHO housing definition. It takes the values: good, medium and bad housing conditions. As discussed in the previous section, good housing conditions can favour health and well being by direct consequences on health and also thorough social participation and inclusion. There is a general consensus in the literature that a scarce and inadequate housing status has a negative influence on health across space and time (Marsh et al., 1999; Shaw, 2004; WHO, 2004). This is particularly true for the oldest that usually spend most of their time at home (Florian et al. 2003). We expect a similar result for our sample.

*Immediate environment.* To capture another dimension of housing, we include in the model a covariate on immediate environment that expresses whether the respondent lives in a area with pollution, grime, or other environmental problems caused by traffic or industry<sup>7</sup>. We expect that living in areas with environmental problems is negatively linked with health, because they can be sources of respiratory or auditory diseases, lack of hygiene, etc. Furthermore, pollution can prevent people to go out for a walk, or practicing sports in the area and this might be negatively related with health. Features of the immediate environment are included in the logistic model, because, as stated in section 3, they represent a distinct dimension of housing.

*Area of residence.* In the empirical literature it is usually found that health conditions in Italy differ by regions and that, in general, individual health is worst in the South than elsewhere (Marinacci et al., 2002; Lipsi and Caselli, 2002; Egidi et al., 2007). This is mostly due to socioeconomic, cultural and institutional differences among regions that imply different life styles, education, quality of life, environment and access to medical care and services. In general, educational levels, employment rates and household income in the South are lower than elsewhere and health care services are scarcer than in other regions (Pirani and Salvini, 2012). For these reasons, we expect that perceived health among the oldest is worst in the South than elsewhere in Italy.

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regular taxes on wealth, regular inter-household cash transfer paid, repayment/receipt for tax adjustments on income (Eurostat 2006).

<sup>7</sup>Due to data limitation, we cannot include variables on parking lots, green spaces around the building, etc.

## 5. RESULTS

As stated in section 4, a logistic model has been applied in order to explore the associations among SES, housing conditions and health. Results are presented in Table 1.

As expected, the probability of being in bad health rises significantly with increasing age (however, the probability for people over 80 is slightly lower than for those aged 75-79). Furthermore, we have a confirmation of the female disadvantage in health usually found in empirical analyses (Vallin, 2005).

The presence of chronic illness and limitations in daily activities diminishes the risk of being in good health. This confirms that the stock of pre-existing health is a very important factor linked with current perceived health that has to be taken into account even when other dimensions are under study.

Contrary to our expectations, the household size is not significantly linked with perceived health. We do not include it in the final model.

As hypothesized, education is positively associated with health status. In particular, highly educated individuals have a 24% probability lower of being in bad health than low educated ones.

Results confirm also our hypotheses on the professional position: people belonging to the working class, housewives and individuals unable to work (or in other unfavourable conditions) show a greater risk of bad health than others.

Income is not significantly associated with self reported health. This result is in line with many empirical studies carried out on the oldest that find little or no evidence on the link between income and health (Cutler et al., 2008; Hupfeld, 2011). It is usually thought that, for old individuals, health is a stock that is relatively impervious to small circumstances. This finding is probably due to the fact that equivalent household income includes earnings, retirement, disability, sickness and other income, so that the connection is contaminated either by within-period or long-run feedbacks from health to income. For instance, in the upper quintile of the income distribution there could be rich people able to buy expensive health services on the market (and, then, healthy), together with highly disabled individuals receiving disability benefits. Furthermore, this result could be a consequence of the cross-sectional approach of this work and highlights the need of panel data to address such issue in future research (see Smith and Kington, 1997).

Concerning housing conditions, our results show that individuals living in dwellings with structural problems (such as a leaky roof, damp in floor or windows, darkness) and that consider housing costs a heavy burden have a 38% higher rate of being unhealthy than people with good housing status.

Results on variables on the immediate environment show that living in an area without noise, pollution and violence decreases significantly the risk of bad health. This confirms our hypothesis and gives evidence of the bad

consequences on health of living in areas with environmental problems (in particular pollution, grime or other problems).

Lastly, the model points out a significant disadvantage for those living in the Centre and especially in the South and Islands compared to the North. This result is partially due to contextual factors, such the availability, efficiency and timeliness of health services that are worst in the South than elsewhere in Italy.

## 6. CONCLUSIONS

The aim of this study has been to address some basic questions on the associations among SES, housing conditions and health of old people in Italy. It gives a significant contribution to the scarce literature on such topic, particularly thanks to the richness of EU-SILC data. EU-SILC is the richest survey currently available in Italy with detailed data on economic, housing conditions and health of households, so that the analysis of EU-SILC data constitutes a strength of this paper.

Our analysis confirms many of our hypotheses. When people age, their health gets worse; people with chronic illness and limitations in daily activities usually have bad health; people living in the South are significantly less healthy than elsewhere in Italy.

Concerning the link among health and different aspects of SES, our study confirms that the various dimensions of SES act in different ways with respect to health: this suggests that it is important to take into account all the components of SES to evaluate health conditions of the oldest. Our results corroborate the positive SES-health gradient. On the one hand, being highly educated and having practiced a high-grade profession make a good health in old age more likely. On the other hand, household income is not immediately linked with health: this could partly depend on the type of income measure used to express economic resources and on long term feed-backs from past health to income. This could also be due to the fact that income has not a high variability, since after 65 years old-age income is prevailing. Such results are in line with the majority of empirical studies: in old age income does not appear to have a connection with health, while the reverse holds for education. This could depend on the fact that education has a larger influence on individual behaviours and life styles than resources<sup>8</sup> (Cutler et al., 2008).

Concerning housing conditions, we find, as expected, a positive link between housing quality and perceived health. This result is in line with past empirical studies (Salvatore and Spizzichino, 2008; Fiorillo and Sabatini, 2011) and it has to be deepened in order to better investigate into the nature of the relation.

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<sup>8</sup> The mechanisms of such associations, however, remain unclear.



From our study it emerges that living in areas without environmental problems favours a better health: this is probably due to the fact that population of country areas usually enjoys better life conditions and life styles.

Evidences on the significance of SES as a risk factor at old age are important for the development of preventive health strategies for the elderly and for a proper assessment of the nature and the extent of inequalities in health. When implementing health policies, it is important to take into account socioeconomic conditions and direct efforts towards people in low economic status, because they are usually poor not only of economic resources, but also of knowledge, healthy life styles and of a supportive network of people. Furthermore, evaluating the different roles of the various dimensions of SES might render policies more effective: if policies are aimed to improve health, are public funding better spent on income transfers, education or public access health services?

The link between housing conditions and health deserves further attention in future research. Different classifications of housing status should be used to assess the role of housing conditions and evaluate the nature of its link with individual health. In fact, further evidences are needed to underline some possible implications on health care policies. The most general of these is that initiatives geared towards promoting better health among the population should not be totally circumscribed to health policies. It is important to implement broader initiatives that would take into account housing as one important determinant of health.

The improvement of research on SES, housing and health in Italy can support policies to lead to a healthy workforce and a healthy and active old population. Health conditions of old people are partly the result of past health status, risk factors and behaviours. This means that health care policies for adults are to be implemented in a long-term perspective, in order to have a healthier old population in the future and outstanding savings for public expenditures.

To monitor the evolution of health outcomes over the life cycle, it should be necessary to know the entire lifetime sequence of health stocks, health behaviours, prices and components of income and housing conditions. To this aim longitudinal data that allow the analysis of dynamic connections over time between economic, housing resources and health at micro level are needed. The EU-SILC panel survey is a useful instrument to such aim and it can pave the way to future research.

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#### APPENDIX A

The main housing dimensions relevant for individual health have been synthesized by means of multiple correspondence analysis (MCA). The multidimensionality of the housing concept is expressed by a set of observed items provided by EU-SILC. MCA allows to reduce the multidimensionality on a factorial plane of reduced dimension. Among active variables we include the following items that express the dwelling and the home dimensions of housing definition by WHO (see section 3): dwelling type, tenure status, rooms' number, a number of dummy variable indicating whether the house has a living kitchen, two or more bathrooms, a terrace, a garage, a cellar, a garden, leaking roofs or rotten windows, damp in the walls, whether it is dark, whether the household has arrears on utility bills and the financial burden of the total housing costs. Then, we cluster individuals in homogenous groups with respect to the synthetic housing dimensions originated by MCA. By doing so, we create a categorical variable that classifies individuals according to their housing conditions in good, medium and bad housing status.

Figure 2 represents the active variables on the factorial plan originated by MCA. For the analysis of the plan we dwell upon the comments of results related to the first factorial plan (constituted by the first two axes), because the amount of information provided by further plans is negligible<sup>9</sup>.

On the left side of the plan there are individuals that are mostly owner, they usually live in detached or semidetached houses, have gardens, garage, cellars, etc. Such individuals do not usually have problems to pay housing costs. On the top right quadrant, we find individuals that are mostly tenant, do not have garage, living kitchen, garden. However, housing conditions are quite good. On the bottom right quadrant there are individuals with dark and damp houses and with leaking roofs and that perceive the housing costs heavy.

After MCA, we carry out a cluster analysis to classify individuals homogeneously with respect to housing conditions. Hence, we identify three distinct groups of individuals living in good, medium and bad housing conditions. In our sample the vast majority of individuals live in high quality houses (72.5%), 10% have medium house conditions, 17.5% live in bad housing conditions.

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<sup>9</sup> The reproduced variability (or inertia) of this plan, calculated with Benzecri's formula, is 91.8%, mostly provided by the horizontal axis.

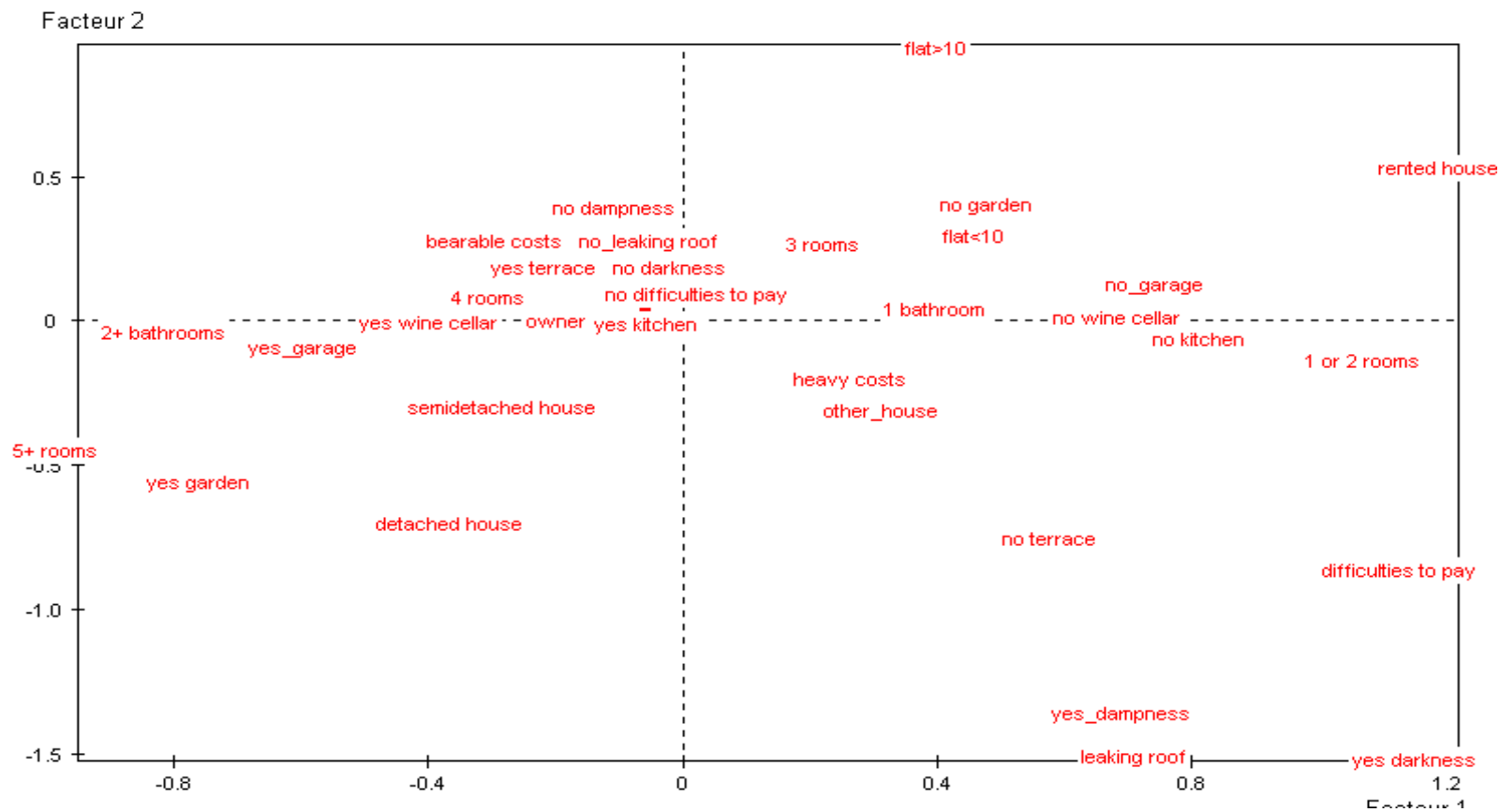


Figure 2 – Active variables on housing on the factorial plan, EU-SILC 2006

TABLE 1. – Poor perceived health (fair, bad and very bad) after 65 years of age. Odds ratios and significance. Italy 2006.

	Odds ratio	Sign.
65-69 (Ref.)	1	
<b>70-74</b>	<b>1.16</b>	*
<b>75-79</b>	<b>1.43</b>	***
<b>80 or over</b>	<b>1.32</b>	***
man (Ref.)	1	
woman	1.12	*
very limited (Ref.)		
<b>limited</b>	<b>0.14</b>	***
<b>not limited</b>	<b>0.03</b>	***
chronic illness (Ref.)	1	
<b>not chronic illness</b>	<b>0.31</b>	***
low education (Ref.)	1	
<b>medium education</b>	<b>0.82</b>	**
<b>high education</b>	<b>0.76</b>	***
bourgeoisie (Ref.)	1	
petty bourgeoisie	1.20	n.s.
<b>working class</b>	<b>1.22</b>	**
<b>housewife</b>	<b>1.24</b>	*
<b>unable to work or other</b>	<b>1.45</b>	***
hh income -I q. (Ref.)	1	
II quintile	<b>0.76</b>	***
III quintile	0.90	n.s.
IV quintile	0.89	n.s.
V quintile	<b>0.66</b>	***
good housing conditions (Ref.)	1	
medium housing conditions	1.11	n.s.
<b>bad housing conditions</b>	<b>1.38</b>	***

TABLE 1 – continued

	Odds ratio	Sign.
<i>yes environmental problems (Ref.)</i>	1	
<b>no environmental problems</b>	<b>0.88</b>	*
<i>North (Ref.)</i>	1	
<b>Centre</b>	<b>1.30</b>	***
<b>South</b>	<b>1.42</b>	***
Log-L: -4054.717 Pseudo R <sup>2</sup> =0.382		

Note: \* = p < 0.10, \*\* = p < 0.05, \*\*\* = p < 0.01.  
Source: our elaboration on EU-SILC 2006 data.

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