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The Quality of Health Care: Evidence from Italy

Tullio Jappelli and Mario Padula

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DIPARTIMENTO DI SCIENZE ECONOMICHE - UNIVERSITÀ DEGLI STUDI DI SALERNO
Via Ponte Don Melillo - 84084 FISCIANO (SA)
Tel. 089-96 3167/3168 - Fax 089-96 3169 – e-mail: csef@unisa.it

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Tullio Jappelli[**] **and Mario Padula**[***]

Abstract

We provide evidence that the quality of health care affects health outcomes, exploiting the substantial variability in the quality of the Italian public health service. The data are drawn from the 2001 Survey of Health, Aging and Wealth (SHAW), a joint venture of the Universities of Padua, Salerno, Venice and Tilburg, providing detailed information on health status, medical expenditure and use of hospitals and other health facilities, as well as detailed demographic and economic variables, for a sample of about 2000 individuals older than 50. The correlation between quality of health care and health outcomes is also confirmed in the panel section of the 1993-95 Bank of Italy Survey of Household Income and Wealth, which allows us to measure the impact of quality by controlling explicitly for regional effects.

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[**] CSEF, Università di Salerno, and CEPR

[***] CSEF, Università di Salerno

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1. Introduction

The connection between health status and socioeconomic variables has provided a large body of research in recent years; there is ample empirical evidence that economic resources are associated with health outcomes. Studies to date consistently document that income and wealth improve such health indicators as mortality, incidence of diseases, and self-reported health status. Furthermore, the association between health and economic resources is strongest among the poor, more attenuated at high levels of income and wealth.

While the relation between health and wealth is well documented and accepted, there is considerable disagreement over its source (Smith, 1999). Labor economists have been more interested in the effect of health on wealth, arguing that poor health (disability, chronic disease and the like) affects labor market outcomes and ultimately individual resources, while medical scientists have stressed instead that background differences in income and wealth determine differences in health outcomes.

There are various reasons why economic resources can impact on health outcomes: psycho-social factors, job-related attributes, the long-lasting impact of early childhood health conditions, and the degree of income inequality. According to Smith (1999), however, the recent literature may have "too quickly dismissed the importance of more traditional factors, including the explicit and implicit ways the more well-to-do obtain access to better quality health care (p. 158)."

While the likely impact of the quality of health care on health outcomes is intuitively obvious, the effect is hard to measure. At the international level, there are substantial differences in the quality of care and in the coverage of risks. But those quality differences are correlated with other institutional and economic differences across countries, while studies exploiting micro-level data within countries seldom provide enough cross-sectional variability in the quality of health care. In both types of studies, it is very difficult to identify the independent casual effect of the quality of health care.

Our paper provides fresh evidence on the effects of wealth and the quality of health care and contributes to the literature on the geography of health care, a growing field of

research in health economics that addresses such topics as the different rates of care utilization and health outcomes in different locations.

The empirical evidence exploits the variability in the quality of health care between Italian regions. Section 2 describes the main features of the Italian National Health System. This system provides universal coverage for most risks, but its quality varies considerably between and even within regions, as witnessed by official indicators and self-reported assessments of the quality of health care. Italy therefore provides an ideal ground for testing the hypothesis that variability in the quality of health care affects health outcomes.

Until very recently little or no health information was available in Italian economic surveys. This shortcoming is at least partly remedied by the 2001 Survey of Health, Aging and Wealth (SHAW), a joint venture of the Universities of Padua, Salerno, Venice and Tilburg. It contains detailed information on health status, medical expenditure and the use of hospitals and other health facilities, as well as detailed demographic and economic variables for a sample of about 2000 individuals older than 50. Section 3 describes this new dataset and establishes the groundwork for the subsequent empirical inquiry.

Section 4 addresses measurement issues, relating self-reported indicators of health status with a set of objective health indicators. Section 5 presents ordered probit estimates for health status. The results offer evidence that health status is correlated with health-risk factors (smoking, drinking, weight, physical activities) and household economic resources, particularly for individuals in the bottom part of the wealth distribution.

In Section 6 we add regional indicators of the quality of the health system to the basic specification and show that improving the quality of health care improves health outcomes, even controlling for socioeconomic variables and risk factors. Thus, the findings support the hypothesis that inequalities in quality produce health disparities. However, the evidence provided by the regional indicators, however, cannot rule out the possibility that health status may be affected by unobserved factors that are correlated with the care quality in the various regions, rather than by genuine variations in the quality indicator. We thus provide further evidence based on the 1993 and 1995 Survey of Household Income and Wealth (SHIW), a large representative sample survey carried

out every two years by the Bank of Italy. In The 1993 Survey provided an individual, self-reported indicator of the quality of the health system, and the 1995 questionnaire elicited health status for each individual. The drawback is that the survey has no information on health risk factors, which were found to be important determinants of health status in the analysis based on the SHAW. By exploiting the panel component of the survey, however, we are able to confirm that the quality of care does affect health outcomes, even controlling for regional effects. The results are summarized in Section 7.

2. The geography of health care

The standard approach to measuring the association between health and socioeconomic variables is to regress health status (or other health indicators) on demographic information and individual resources.

Chandra and Skinner (2002) document wide variations in health care utilization within the United States and even within given states and cities, and observe that "seldom is regional information included in the analysis, for concerns of confidentiality or because it is difficult to interpret regional differences " (p. 8). They construct examples in which ignoring geographical effects dramatically biases the coefficient of race on mortality. More generally, they show that the omission of regional indicators or quality in health regressions can severely bias the impact of socioeconomic variables.

Fuchs, McClellan and Skinner (2001) find for a sample of 313 US metropolitan statistical areas (MSA) that variability in mortality and health care utilization between areas depends not only on standard risk factors such as cigarette use, obesity, education, income, age and sex, but also on regional dummies. The most plausible interpretation of these geographical effects is that they are correlated with differences in the quality of health care between states or metropolitan areas.

Introducing regional effects into health regressions is tantamount to assuming that the geographical factor operates at the level of a broad spatial aggregate such as a region. This is a strong assumption in that patients could well travel from low to high quality

health districts. However, the costs of traveling (including that of acquiring information in the new location and the travel risk) are often too high to make it feasible. Thus, Chandra and Skinner (2002) therefore conclude that most health care is "local", so that reducing geographical disparities is bound to improve health outcomes.

Geographical disparities in the quality of health care are of particular interest in Italy, which has a classical social insurance scheme. Risks are pooled in a national fund (the National Health System) and health contributions are income-related. Since 1978 membership in the national system has been compulsory for all Italian residents. The government collects health contributions, but responsibility for health care is delegated to regional governments, especially after the 1992 reform, which introduced principles of decentralization and managerial criteria in the administration of public hospitals.

The Italian health system is universal, and in principle it covers all health risks for any amount. In practice, children under 12 years of age, persons older than 65 and households with income below a given threshold are fully covered; other population groups contribute small fees for drugs and medical services. Health care is provided by the public sector through public and private hospitals and diagnostic centers.

There are 1489 hospitals in Italy, and more than half (846) are public. Moreover, the vast majority of private hospitals (535) are accredited; they provide services to the national health system and are then reimbursed. Thus truly private hospitals account for only 7.2 percent of the total.[1] As a result of the wide coverage offered by the public system, private health insurance is not common. According to the Survey of Health, Aging and Wealth, which we describe in detail in the next section, only 5.9 percent of the respondents older than 50 years and 1.8 percent of those older than 70 were covered by private health insurance in 2000. And even among those covered, fewer than 8 percent reported being fully covered for medical expenditures in the previous year. So the overwhelming majority of Italians rely on health care provided directly or indirectly by the national health system.

Even though the Italian health system provides national standards, there is considerable regional variability in the quality of health care. In part, quality differences

depend on the distribution of public resources across regions. In 1999 the national average of per capita public health expenditure was € 1,100, but this figure conceals significant regional differences. In Northern regions such as Piedmont, Liguria, and Emilia per capita expenditure was close to € 1,200, while in most of the South (Sicily, Calabria, Puglia, and Campania) it was about € 1,000. The differences in the quality of health care also depend on how public resources are managed by regional administrations and local health providers. In fact, it is generally held that health management is poorer in the South than in the rest of the country.

Finding comprehensive measures of the quality of health care is difficult and complicated. In the medical literature, Jencks et al. (2000) ranks US states on the basis of whether interventions that are known to be correct were administered for conditions such as heart failure, stroke, pneumonia, and screening for breast cancer. The authors find considerable variation in quality between states. For instance, the less populous states and those in the Northeast ranked consistently high in relative performance while other more populous states and those in the Southeast low.

Lacking such detailed statistics, in this paper we rely primarily on patients' assessment of the quality of health care. Although patients' assessment is certainly bound to be affected by measurement error and might be contaminated by individual preferences and characteristics, subjective measures have the great advantage that they vary with individuals. So these measures allow easier identification of the effect of quality on health outcomes and, at least in principle, can disentangle merely geographical effects (say, pollution, climate, etc.) from genuine differences in quality.

In Figure 1 we plot histograms of the proportion of patients satisfied with medical assistance, nursing care services and health facilities in 20 Italian regions. These indicators are provided in aggregate form by ISTAT, the Italian Bureau of Statistics, in the 1999 issue of the Regional Indicators on the Health System and Population Health.[2] The figure highlights considerable *inequality in quality*. For instance, the proportion of patients that give high ranks to medical assistance in Piedmont, Lombardy, Trentino,

[1] The source is the 1998 issue of *Strutture e attività degli istituti di cura*, published by the Italian Statistical Bureau (ISTAT). The same source reports that there were 4.3 beds per 1000 inhabitants in public hospitals, 1.1 in accredited private hospitals, and only 0.1 in private hospitals.
[2] Source: ISTAT, *Sistema Sanitario e Salute della Popolazione, Indicatori Regionali*.

Veneto and Tuscany is about twice as high as in Puglia, Sicily and Sardinia. Similarly, satisfaction with nursing care and health facilities is much greater in the North.

The three indicators are not only consistent among themselves, but are also consistent with the data on the number of hospital beds, waiting lists for specific treatments, number of doctors per 1000 inhabitants, and number of hospitals. Overall, they indicate better health care in Northern regions (with a peak in Trentino) and the poorest in the South (particularly in Sicily). However, regional indicators have drawbacks of their own, in that there is considerable variability in the quality of heath care within regions, between provinces, large and small cities, and even within large cities.

This is witnessed by a self-reported assessment of the quality of health care available in the 1993 Survey of Household Income and Wealth, a large representative sample of the Italian population. Respondents were asked to rate the quality of health care in their city on the basis of their own experience. The score is coded in a scale from 1 (lowest quality) to 10 (highest). Figure 2 reports the distribution of the quality score by region. Trentino again has the highest average score (7.3), while Southern regions such as Sicily, Basilicata and Campania receive an average score below 4.

Regional figures, however, conceal considerable internal quality differences. Figure 3 reports the proportion of individuals assigning very low (3 or less) and very high (8 or more) score to their region of residence. Even in high-quality regions about 10 percent of the sample reports that the quality of health care is poor. Conversely, in low-quality regions about 10 percent of respondents report good quality. As we shall see, it is this intra-regional variation in quality that allows us to disentangle the effect of quality as such from regional effects.

3. The Survey of Health, Aging and Wealth

Until very recently, health information has been mostly absent from Italian surveys of household budgets and economic conditions. Interest in the association between health outcomes, economic resources and labor market conditions, has led a group of

researchers of the Universities of Padua, Rome, Salerno, Sassari, and Venice to fill the gap with new microeconomic data.[3]

The product of this collective effort is the Survey of Health, Aging and Wealth (SHAW). The survey was commissioned to Doxa, a leading Italian polling agency with considerable experience in the field.[4] The questionnaire and the sample design are patterned after the US Health and Retirement Survey and the English Longitudinal Study of Ageing (ELSA) project, which covers a range of matters bearing on the relations between health and wealth, aging and wealth, health and retirement.

The sample is of households whose head is over 50 years old. Focus on the elderly is warranted because major health problems are concentrated in this group and the elderly account for the largest share of medical expenditure.

The survey collects information on a total of 1068 households and 1891 individuals; it is representative of the Italian population over 50. Some of the questions refer to the household (for instance, assets). Others are posed to all household members; for instance, an overall assessment of health status is provided for each individual. Finally, more detailed questions on health status and job outcomes are put only to the respondent and spouse (if present). Thus, the main focus is on respondents and spouses older than 50. The resulting sample comprises 1678 individuals, 780 men and 898 women.

There Italian surveys that offering considerable detail on health-related variables (for instance, the ISTAT *Multiscopo* Survey) have scanty income and wealth information. On the other hand, the Bank of Italy Survey of Household Income and Wealth (SHIW) has excellent data on income and assets but only limited information on health. Health status is available only in 1995, and an indicator of the quality of health care is available in 1993. This information is used in Section 6 to corroborate the finding that the quality of health care affects health outcomes.

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[3] Agar Brugiavini of the University of Venezia, Luigi Guiso of the University of Sassari, Tullio Jappelli of the University of Salerno, Franco Peracchi of the University of Roma Tor Vergata, and Guglielmo Weber of the University of Padua coordinated the research group. Funding has came from the Italian Ministry of University and Scientific Research and by the European Union under the TMR Research Network on Saving and Pensions.

[4] In the past Doxa has handled several of the Bank of Italy surveys.

On the other hand, the SHAW elicits detailed objective and subjective information on health status and health care utilization while also containing information on household income and wealth. This makes the survey a unique source for studying the relation between socioeconomic status and health outcomes.

Table 1 compares sample means for selected demographic variables of the 2001 SHAW with the sub-sample of individuals over 50 from 2000 SHIW. The two samples are remarkably similar in age distribution, marital status, demographics and education.

4. Measurement issues

Health status is an intrinsically unobservable variable. Researchers generally seek to measure it using household surveys or medical-administrative records. Currie and Madrian (1999) suggest eight different categories of health indicator: (1) subjective health status; (2) health limitations to the ability to work or to carry normal activities; (3) functional limitations on normal activities; (4) chronic disease; (5) permanent disability; (6) health care utilization; (7) nutritional status, as measured by the body mass index, (8) expected mortality. The SHAW has information on most of these measures and accordingly, provides a good means of checking whether these measures are mutually consistent and whether health outcomes can be foretold from subjective feelings about health status.

While objective health measures are less likely to be affected by measurement error and therefore more reliable, subjective data – self-reported health status – do describe individual perceptions[5] and self-reported health status is often the only available health indicator in general-purpose surveys.

Table 2 describes the health indicators that can be constructed using the SHAW. Each individual is asked to assess his or her health status on a scale ranging from 1

[5] In different contexts, self-reported health status might be even more relevant than objective health indicators. For instance, the theory of precautionary saving suggests that people should save more in the presence of health risks. It is the perception of such risks (not necessarily their actual presence) that determines saving decisions.

(excellent) to 5 (very poor). Individuals are also asked if they suffer from chronic disease and disability, if they have experienced health problems in the last 12 months, if those problems limited their ability to work and live normally, and how many days they have spent in bed for illness in the previous year.

The survey also elicits indicators of health care utilization (surgery, medical treatments, check-ups and nursing homes) for both private and public institutions. Finally, individuals report weight and height, and those under 66 years give their estimated probability of surviving to past age 75.

Table 2 reports selected statistics for some of these indicators. The distribution of self-reported health status indicates that 9 percent view their health as excellent, 49 percent as good, 27 percent as fair, 11 percent as poor and 3 percent as very poor. Chronic diseases affect over one third of the sample, and 13 percent report some form of disability (such as blindness, deafness or disabilities limiting mobility). A third of the sample had health problems in the previous year and over half of those have their normal activities affected. Health problems kept people in bed for an average of about one month in the previous year.

Overall, these indicators suggest that serious health problems affect a considerable share of the elderly, between a third and half. This is confirmed by the average number of surgery, medical treatments or check-ups in the year (11.5), which implies that respondents use health care services about once a month. Finally, around 1.5 percent of the elderly had been in a nursing home in the previous year.[6]

Table 3 reports the distribution of self-reported health status by the other indicators. The last column shows the sample correlation of the variable in each row to the self-reported health status indicator. It is apparent that all the indicators are strongly correlated. For instance, the percentage with chronic disease increases from 9 percent for those reporting excellent health to almost 90 percent for those reporting very poor health. Similarly, the number of days in bed goes from 1 for those in excellent health to over 100 for those in very poor health. The other indicators show similar patterns.

[6] Since the survey does not sample individuals in nursing homes, it does not provide an estimate of the share of population in such institutions.

In the rest of this paper we rely on self-reported health status. As mentioned, this indicator is also available in the 1995 SHIW, which makes possible interesting cross-sample comparisons and a validation of our finding that the quality of health care affects health outcomes. Furthermore, results obtained using subjective measures of health status are more easily comparable with other studies linking socioeconomic variables to health outcomes (e.g., Smith, 1999). As a sensitivity test for the robustness of the results using alternative indicators, however, we also perform factor analysis on the available health indicators (see Section 5).

The medical literature suggests that health status is associated with specific risk factors. On this front, the 2001 SHAW contains interesting information, not available in other Italian socioeconomic surveys with high quality income or wealth data. As Table 4 shows, over one third of the sample are smokers; among smokers, their average number of years smoking is almost 30 with more than 12 cigarettes a day. Almost 5 percent of respondents report drinking wine or alcohol outside meals. Only a minority (less than 40 percent) engage in some physical exercise, including light activities such as walking. Finally, almost 15 percent of the sample are obese, i.e. their body-mass index is greater than 30.

5. Health-risk factors and the health-wealth gradient

As a preliminary step, in this section we relate health status to socioeconomic variables and risk factors. Given the quality of asset information in the SHAW, we are in a good position to study the widely documented association between health status and economic resources.

In Table 5 we estimate an ordered probit for self-reported health status as a function of age, sex, marital status, number of years smoking and of whether the respondents is engaged in some physical exercise, is obese and drinks. Standard errors are robust to the

presence of cluster effects coming from the fact that some individuals belong to the same households.[7]

The results in the first column are largely consistent with previous evidence. Poor health status is positively related to age and, for given age, men report better health than women. Marital status is not correlated with health status. All risk factors have the predicted sign and are statistically different from zero, except for the dummy variable "drinking".

There is a vast body of evidence that economic resources are associated with health outcomes. For instance, Smith (1999) calculates median net worth against self-reported health status and age in the U.S. Survey of Consumer Finances and finds that net worth is strongly associated with health status, even controlling for age.

Figure 4 plots self-reported health status against wealth deciles and gender in three age classes (51-60, 61-70, and over 70).[8] The figure shows that health improves with wealth in each of the three age-groups (since excellent health status is coded as 1, and very poor health is coded as 5, the health-wealth locus is negatively sloped and formally we have a negative correlation). Furthermore, for given wealth and age, the health status of males is generally better than that of females. As we shall see, these correlations are confirmed by regression analysis.

The second column of Table 5 adds to the basic specification two dummies for educational attainment (high school and college), and three for wealth quartiles. The regression confirms that there is a systematic relation between wealth and health outcomes: other things equal, individuals in the lower wealth quartiles report the worst health conditions. Interestingly, the relation between health and wealth is non-monotonic, a feature that is documented in other studies as well (e.g., Smith, 1999). In fact, the coefficients of the first two wealth quartile dummies are larger than that of the third, implying that the association between health and wealth weakens as wealth increases.

Education is associated with better health status (as above, in formal terms the correlation is negative), possibly because better-educated individuals pay more attention

[7] Standard errors are computed using the Huber-White procedure.
[8] Wealth is defined as the sum of real and financial assets. The survey relies on unfolding brackets to minimize non-response. Details on the construction of the wealth variable are given in the Appendix.

to health conditions and have better and less unhealthy jobs. The difference between high school and junior high school graduates is greater than between university and high school graduates.

6. Health outcomes and the quality of health care

In Figure 5 we plot health status against the proportion of patients who are satisfied with medical assistance, one of the three regional indicators reported in Figure 1. Each point in the graph corresponds to an Italian region. Southern regions, such as Calabria, Puglia, and Sicily, are located in the upper right corner, while Northern regions, such as Piedmont, Lombardy and Trentino, fall in the lower left. Thus, moving from South to North both health status and the quality of heath care improve.

The third regression in Table 5 adds to the baseline specification the regional quality indicator. The coefficient is negative and statistically different from zero at the 1 percent level, suggesting that a quality improvement is associated with better health status, even controlling for demographic variables, risk factors, education and wealth.[9]

To assess the economic significance of the correlation between quality of health care and health outcomes, we calculate how much the probability of excellent health status responds to changes in health-care quality for a representative individual.[10] If the proportion of patients satisfied with medical assistance increases from 25 percent, the value of the quality indicator corresponding to the 10^{th} percentile, to 55 percent, that of the 90^{th} percentile, the probability of excellent health outcomes increases by 7.6 percentage points (that is, from 15.8 to 23.4 percent, or 39 percent of the initial value). This and similar tests indicate that the quality effect is not only statistically significant but also quantitatively important.

[9] Replacing the quality indicator with the other two indicators reported in Figure 1 (satisfaction with health facilities and nursing care) yields qualitatively similar results.
[10] The baseline scenario is one of a male aged 61-70, with a high school degree, non-smoker, non-obese, non-alcoholic and in the third wealth quartile.

As a sensitivity test, we check whether the results are robust to the choice of the particular health indicator. As relying on self-reported health status might be arbitrary, we summarize the health indicators presented in Table 2 using factor analysis to determine their principal components. We single out four variables, namely self-reported health status, chronic disease, permanent disability, and inability to work for reasons of health and compute their linear combination using the factor loadings as weights.[11] We then regress the overall health indicator on the same set of regressors as in Table 5. The results are highly similar. In particular, the coefficient of the quality indicator is negative (-0.0044) and statistically different from zero at the 1 percent level.[12] Overall, this test suggests that at least in or sample self-reported health status can be used to describe the determinants of general health conditions.

A more fundamental criticism of the results in Table 5 is that the regional quality indicator may be correlated with omitted regional effects that could have an independent effect on health outcomes and, as the indicator varies only by region, we cannot test for an independent effect of regional dummies.

In order to disentangle quality from regional effects, we use data from the 1993-95 Bank of Italy Survey of Household Income and Wealth (SHIW). The 1995 survey has data on health status (on the same scale as the SHAW), while the 1993 wave has a self-reported indicator of the quality of public health care.

As explained in Section 2, in 1993 respondents reported an assessment of the quality of health care in their city (on a scale from 1 to 10). The question was posed only to *household heads*, so we have a total of 7835 valid responses. This variable is merged with data on 23,924 *individual* records on self-reported heath status available in 1995. Only a subset of the 1993's wave was re-interviewed in 1995. Furthermore, for comparison with the 2001 SHAW we focus on household heads and spouses (if present) older than 50. Therefore the resulting 1993-95 sample has complete records for 3346 individuals (of which 1751 are women). Matching the household quality indicator for 1993 with individual health status in 1995 requires two quite reasonable assumptions: that between 1993 and 1995 quality has not changed, apart from effects common to all

[11] Interestingly, the weight of self-reported health status is almost 60 percent.

individuals, and that the quality indicator for the household head is the same as for the spouse.

The first regression in Table 6 reports ordered probit estimates for health status on the sample so constructed. There are three important differences with respect to the specification of Table 5 for the SHAW. First, it does not include any of the health risk factors, because they are not available in the SHIW. Second, Table 6 includes a full set of regional dummies. Finally, we replace the regional quality indicator with the individual assessment.

The effects of age, gender and education are qualitatively similar to those of Table 5. We again find a strong association between wealth and health outcomes, particularly for the poor (i.e. individuals in the first wealth quartile).

The coefficient of the quality index is negative (-0.0206) and statistically different from zero at the 1 percent level, as in Table 5. To lend content to this coefficient, we compute how the probability of excellent or poor health status changes with the quality of health care for a representative individual.[13] We find that raising the quality of health care from 3 to 5 (approximately the difference between the poorest quality regions and the sample average) increases the probability of excellent health outcomes by 1.1 percentage points (that is, from 17.5 to 18.6 percent). Further raising quality from 5 to 7 (about the difference between the average and the highest-quality districts) increases the probability of excellent health status by another percentage point. The main implication of this result is that the effect of quality on health status cannot be attributed to omitted regional effects.

It also of interest to compare results with and without regional dummies. If the dummies are dropped, as in the second regression of Table 6, the coefficient of quality increases in absolute value and the Wald test rejects the null hypothesis that the regional dummies are jointly equal to zero. However, the two coefficients of the quality indicator are not statistically different from each other in the regressions with and without regional dummies. This implies that the correlation between health status and the regional quality

[12] The magnitude of this coefficient is not comparable with that of Table 5, where the dependent variable is ordinal.
[13] Again, we consider a male aged 61-70, with high school degree and in the third wealth quartile.

indicator documented in the regressions of Table 5 with the 2001 SHAW is unlikely to be driven only by omitted regional differences.

In the third column of Table 6 we replace wealth quartiles with consumption quartiles, as an alternative proxy for permanent resources. The sensitivity of health status to economic resources is stronger in the first consumption quartile (a coefficient of 0.43), confirming the results using wealth quartiles. Also in this case the statistical association between quality and health survives when regional effects are conditioned upon in the regression (the estimated coefficient is –0.0254). When the regional dummies are omitted, the quality coefficient increases in absolute value (–0.0334) and the Wald test rejects the hypothesis that the regional dummies are jointly equal to zero. However, as with the ordered probit using wealth quartiles, one cannot reject the hypothesis that the coefficients of the quality indicators in the two regressions with and without regional dummies are equal.

7. Conclusions

The impact of the quality of health care on health outcomes is difficult to measure using cross-country data, because quality differences are inextricably correlated with other institutional and economic differences. A promising approach is to detect the effect of quality within countries, exploiting state or regional variability in the quality and provision of health care. In this respect, the Italian data offer interesting possibilities. The quality of health care varies considerably between Italian regions and even within regions. This allows us to identify the effect of quality on health outcomes, even controlling for regional effects. The empirical results indicate that the quality of health care does affect individual health outcomes.

We first document the determinants of health outcomes using a new microeconomic survey, the 2001 Survey of Health, Aging and Wealth. This is a representative sample of about 2,000 individuals over 50, and elicits detailed information on health outcomes, such as chronic disease, disabilities and self-reported health status,

and on their likely determinants, such as health risk indicators, demographics, income and wealth. The empirical results confirm the well-known correlation between economic well-being and good health status, even controlling for the influence of demographic variables and risk factors.

We then provide evidence on the impact of the quality of health care on health outcomes. We match the microeconomic data with regional indicators of the percentage of patients who are satisfied with medical assistance, and find that higher quality is indeed associated with better health outcomes. This evidence, provided by the regional indicators, however, cannot rule out that health status is affected by unobserved regional factors correlated with the quality of health care, rather than with genuine variations in the quality indicator. We thus provide further evidence based on the panel section of the 1993-95 Survey of Household Income and Wealth, which contains a quality indicator that varies at the individual level. Regression analysis on this sample confirms that the quality of health care affects health outcomes, even controlling for regional effects.

The empirical results suggest that differences in the quality of health care contribute to explain inequality in health outcomes. This carries important policy implications for the design of health care systems. If the goal of national and regional policy is to improve health standards, the government should explicitly target the quality of the health system, rather than such other indicator as per-capita health expenditure. Furthermore, to promote equality of opportunities and reduce health disparities, one should seek to improve the standards of districts that display poor quality of health care.

Appendix

The 2001 Survey of Health, Aging and Wealth

The Doxa Institute carried out the Survey of Health, Aging and Wealth between September 15 and October 24, 2001. The sample includes 1068 households in which the head is over 50 years old. Individuals were selected from the electoral register of 103 towns all over Italy according to region and town size strata. The number of interviews in each stratum was proportional to the distribution of individuals over 50 years old in that stratum. Sampling units (towns, town areas, and individuals) were chosen within each stratum by a three-stage selection process: choice of town, choice of town area, choice of individuals. The resulting sample is therefore representative of the Italian population aged 50 and up.

The method of interview is the Computer Assisted Personal Interviewing (CAPI). The questionnaire was tested in July 2001 with a pilot survey on a sample of 100 households from all over the country.

The questionnaire is divided into eight sections: (A) interviewer's notes, (B) household structure at the end of 2000, (C) work and income, (D) wealth and dwelling, (E) household health, (F) individual health, (G) health and work, (H) expectations. The questions in sections B, D and E are addressed to each household member, while questions in sections C, F, G and H are addressed to the head and to his/her spouse. Information on asset amounts relies on unfolding brackets for both real and financial assets.

A detailed study by Fort (2002) indicates that the demographic characteristics of the sample and the income and wealth measures of the survey are broadly consistent with the figures of the 2000 Survey of Household Income and Wealth, the main Italian survey with asset and income data.

Wealth is the sum of 10 types of financial assets (including 4 categories of transaction accounts, 3 categories of government and private bonds, stocks, mutual funds and other managed investment accounts) and real assets (real estate, firm, company or business activity and consumer durables). For each of these asset categories respondents are asked whether they hold any assets in this category. If so they are asked to give a value for their total holdings in the category. Respondents who refuse to respond or answer “don’t know” at this stage are then routed into unfolding brackets – a short series of follow-up questions of the form “Is it more or less than…?”.

For instance, those who do not report their bank account balance are asked if the amount is larger or smaller than € 5,000. If it is larger, they are asked if it is larger than € 7,500. For each class, we then impute the median bank account balance of those who report amounts. We proceed in a similar way for all asset categories.

The 1993-95 Survey of Household Income and Wealth

The primary purpose of the Bank of Italy Survey of Household Income and Wealth (SHIW) is to collect detailed data on demographics, households’ consumption, income and balance sheets. The SHIW surveys a representative sample of the Italian resident population. Sampling is in two stages, first municipalities and then households. Municipalities are divided into 51 strata defined by 17 regions and 3 classes of population size (more than 40,000, 20,000 to 40,000, less than 20,000). Households are randomly selected from registry office records. From 1987 onward the survey has been conducted every other year and covers about 8,000 households, defined as groups of individuals related by blood, marriage or adoption and sharing the same dwelling. See Brandolini e Cannari (1994) for more details on the survey.

Health status (very poor, poor, fair, good, excellent) is available only in 1995 for each individual. The *quality of health care* in the city of residence (on a scale from 1 to 10) is available for each household head in 1993. In other years health questions were not repeated. Our analysis therefore relies on the panel section of the SHIW: 45 percent of the sample interviewed in 1993 was in fact re-interviewed in 1995.

In the panel component, the sampling procedure is also two-stage: (1) selection of municipalities (among those sampled in the previous survey); (2) selection of households re-interviewed. The net response rate (the ratio of responses to families contacted net of ineligible units) in 1993-95 was 77.3 percent. Since we focus on heads and spouses older than 50 years, the number of individuals in the panel is 3346.

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Table 1

Demographic characteristics of the 2001 SHAW and 2000 SHIW

	2001 SHAW	2000 SHIW
Age	63.51	64.38
Male	0.47	0.48
Family size	2.58	2.59
Married	76.37	76.73
Single	6.01	4.76
Divorced	3.83	2.46
Widow	13.79	16.05
Less than primary school	9.54	11.57
Primary school	40.83	44.71
Lower secondary school	25.03	24.15
Upper secondary school	18.77	13.78
University	5.83	5.80
Sample size	1646	7356

Note. In both surveys the sample includes only head and spouses over 50 years old.

Table 2

Health indicators available in the 2001 SHAW

Health indicators	Survey questions
Self-reported health status	Would you say that at the end of 2000 your general health was: very good (9.36%), good (48.99%), fair (27.23%), poor (11.32%), very poor (3.10%)
Presence of chronic disease	Do you have any long-term illness that could be described as chronic illness? (34.51%)
Disability	Do you have any disability, such as limited mobility, blindness, deafness or any other disability? (13.24%)
Health limitations to the ability to work or to carry normal activities	In the past 12 months did you have any illness or health problem? (36.00%) Of these, 54.97% declared that the health problem affected their usual activities, and reported staying in bed for an average 31.46 days.
Health care utilization	In the past 12 months did you use any health care service, such as surgery, medical treatments, and check-ups? The average number of visits was about one per month (11.50%). 1.53% reported being in a nursing home in the past 12 months.
Survival probability	The question posed to all those younger than 66 is: What are your chances of surviving past age 75? The average reported probability is 70.07%

Note. The sample includes 1,646 individuals over 50 years old. Source: 2001 Survey of Health, Aging and Wealth.

Table 3

The distribution of self-reported health status by health indicators

	Self-reported health status					
	Excellent	**Good**	**Fair**	**Poor**	**Very poor**	**Correlation**
Chronic disease	9.15	15.39	52.44	82.79	86.67	0.52
Disability	1.31	4.92	15.11	44.62	55.56	0.39
Illness or health problem in 2000	5.73	13.99	56.02	91.58	96.16	0.60
Number of days in bed	0.80	0.57	6.59	47.21	122.13	0.42
Number of clinical visits	10.07	10.61	11.87	14.23	16.73	0.22
Nursing home	0.00	1.09	1.53	5.26	5.77	0.11
Survival probability to 75 (if younger than 66 years)	77.77	72.49	68.95	60.68	53.33	-0.16

Notes. The last column reports the correlation coefficient between each variable and self-reported health status. All correlations are statistically different from zero at the 1 percent level. Data are drawn from the 2001 Survey of Health, Aging and Wealth. The total number of observations is 1646.

Table 4

Health risk indicators

Indicators for health risk behavior	Survey questions
Smoking	The proportion of those currently smoking is 37.49%. Of these, the average number of cigarettes is 12.32, and the number of years smoking is 28.74.
Drinking	4.77% reports drinking wine or alcohol occasionally or regularly outside meals.
Physical exercise	39.91% report engaging in some physical activity (including light activities)
Obesity	14.40% are obese, i.e. their body mass index (defined as weight in kilograms divided by square of height in meters) is greater 30

Notes. Data are drawn from the 2001 Survey of Health, Aging and Wealth. The total number of observations is 1646.

Table 5
The determinants of health status
(2001 SHAW)

	Demographics and risk factors	**Demographic, risk and economic factors**	**Demographic, risk and economic factors, quality of public health**
Age 55-60	0.1468 (0.0888)	0.1611 (0.0891)	0.1737 (0.0888)
Age 61-65	0.3188 (0.0879)**	0.2840 (0.0892)**	0.2941 (0.0888)**
Age 66-70	0.6294 (0.0927)**	0.5678 (0.0925)**	0.5800 (0.0931)**
Age 71-75	0.7079 (0.1063)**	0.6550 (0.1087)**	0.6687 (0.1079)**
Over 75	1.0148 (0.1040)**	0.9221 (0.1045)**	0.9273 (0.1050)**
Male	-0.3618 (0.0545)**	-0.3499 (0.0554)**	-0.3890 (0.0568)**
Married	-0.0207 (0.0681)	-0.0192 (0.0681)	-0.0197 (0.0679)
Years smoking	0.0042 (0.0018)*	0.0047 (0.0018)*	0.0049 (0.0018)**
Sport	-0.2855 (0.0620)**	-0.2315 (0.0625)**	-0.2081 (0.0626)**
Obesity	0.1877 (0.0794)*	0.1522 (0.0797)	0.1432 (0.0798)
Drinking	0.0347 (0.1698)	-0.0355 (0.1745)	-0.0049 (0.1751)
High school		-0.2042 (0.0849)*	-0.2160 (0.0844)
University		-0.1660 (0.1251)	-0.2051 (0.1287)
I wealth quartile		0.2861 (0.0913)**	0.2287 (0.0926)*
II wealth quartile		0.1983 (0.0911)*	0.1654 (0.0915)
III wealth quartile		-0.0669 (0.0905)	-0.0745 (0.0899)
Quality of health care			-0.0093 (0.0028)**
Number of observations	1646	1646	1646

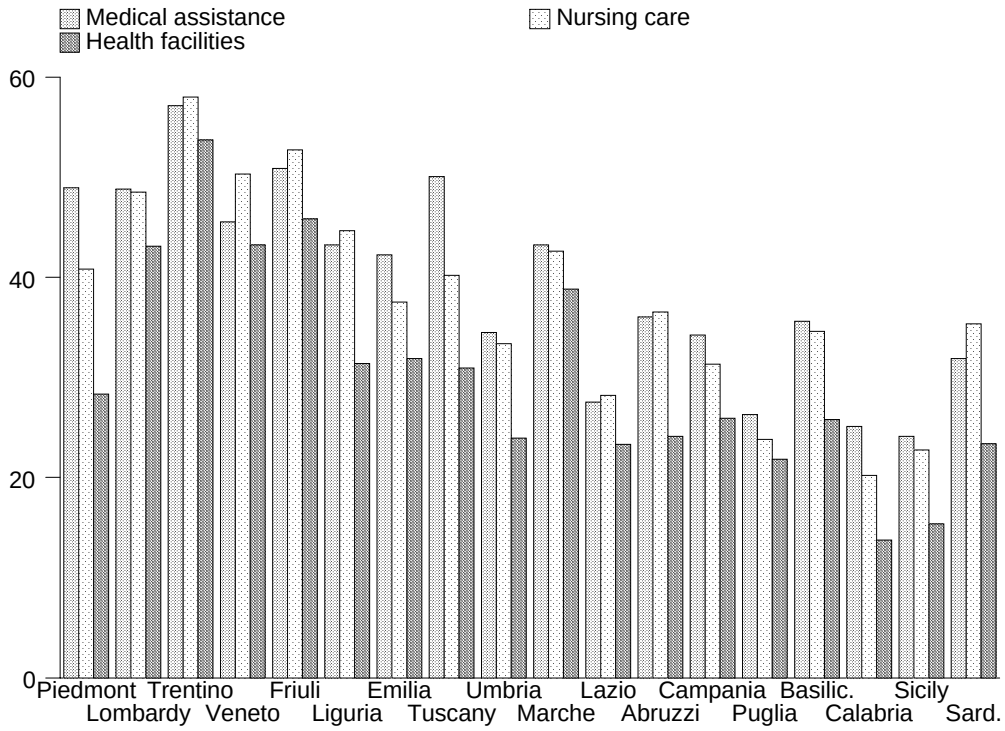
Note: Quality of health care is the percentage of patients satisfied for medical assistance in each region. Standard errors are reported in parentheses. Two asterisks indicate that the coefficient is statistically different from zero at the 1 percent confidence level (one, at the 5 percent confidence level).

Table 6
The determinants of health status
(1993-1995 SHIW)

	Regressions with wealth		**Regressions with consumption**	
	With Regional Dummies	Without Regional Dummies	With Regional Dummies	Without Regional Dummies
Age 55-60	0.2227 (0.0593)**	0.2180 (0.0592)**	0.2129 (0.0594)**	0.2038 (0.0594)**
Age 61-65	0.4852 (0.0628)**	0.4947 (0.0625)**	0.4422 (0.0632)**	0.4457 (0.0628)**
Age 66-70	0.6716 (0.0661)**	0.6842 (0.0661)**	0.6405 (0.0667)**	0.6477 (0.0668)**
Age 71-75	0.7669 (0.0750)**	0.6842 (0.0661)**	0.7040 (0.0770)**	0.6944 (0.0764)**
Over 75	1.0442 (0.0854)**	1.0432 (0.0863)**	0.9954 (0.0871)**	0.9845 (0.0882)**
Male	-0.1220 (0.0326)**	-0.1213 (0.0323)**	-0.1153 (0.0327)**	-0.1136 (0.0323)**
Married	-0.0179 (0.0550)	-0.0121 (0.0544)	-0.0041 (0.0560)	0.0008 (0.0553)
High school	-0.3264 (0.0605)**	-0.3097 (0.0595)**	-0.3365 (0.0598)**	-0.3194 (0.0589)**
University	-0.3815 (0.0955)**	-0.3740 (0.0948)**	-0.4123 (0.0983)**	-0.4034 (0.0975)**
I wealth quartile	0.5138 (0.0709)**	0.5272 (0.0693)**	0.4269 (0.0741)**	0.4533 (0.0723)**
II wealth quartile	0.2305 (0.0667)**	0.2613 (0.0647)**	0.1620 (0.0673)*	0.1748 (0.0668)**
III wealth quartile	0.1699 (0.0614)**	0.1717 (0.0610)**	0.0380 (0.0625)	0.0412 (0.0626)
Quality of health care	-0.0206 (0.0103)*	-0.0290 (0.0091)**	-0.0254 (0.0103)*	-0.0334 (0.0091)**
Wald Test		2.60 (0.0003)		2.33 0.0012
Number of observations	3236	3236	3236	3236

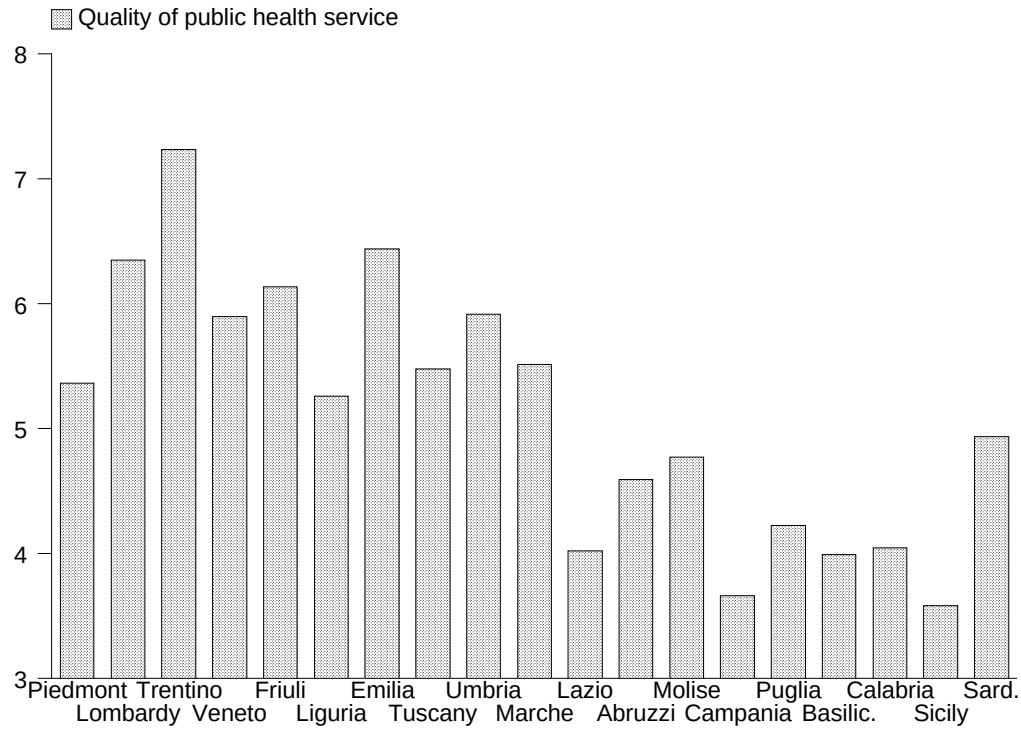
Note. Quality of health care is the individual rating of the quality of health care in the city of residence. Standard errors are reported in parentheses. Two asterisks indicate that the coefficient is statistically different from zero at the 1 percent confidence level (one, at the 5 percent confidence level). The first and third regressions include a full set of regional dummies.

Figure 1
Patients' satisfaction with medical assistance, nursing care and health facilities



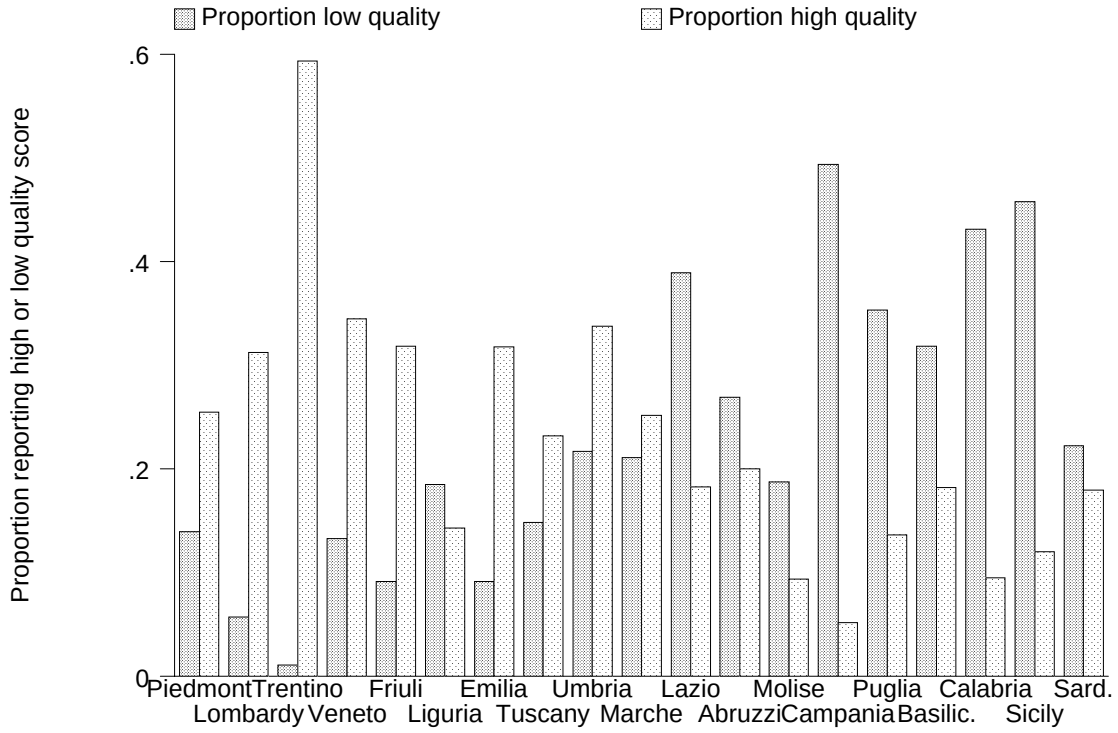
Note. Data are drawn from *Sistema Sanitario e Salute della Popolazione, Indicatori Regionali*, ISTAT (1999).

Figure 2
Overall assessment of the quality of health care



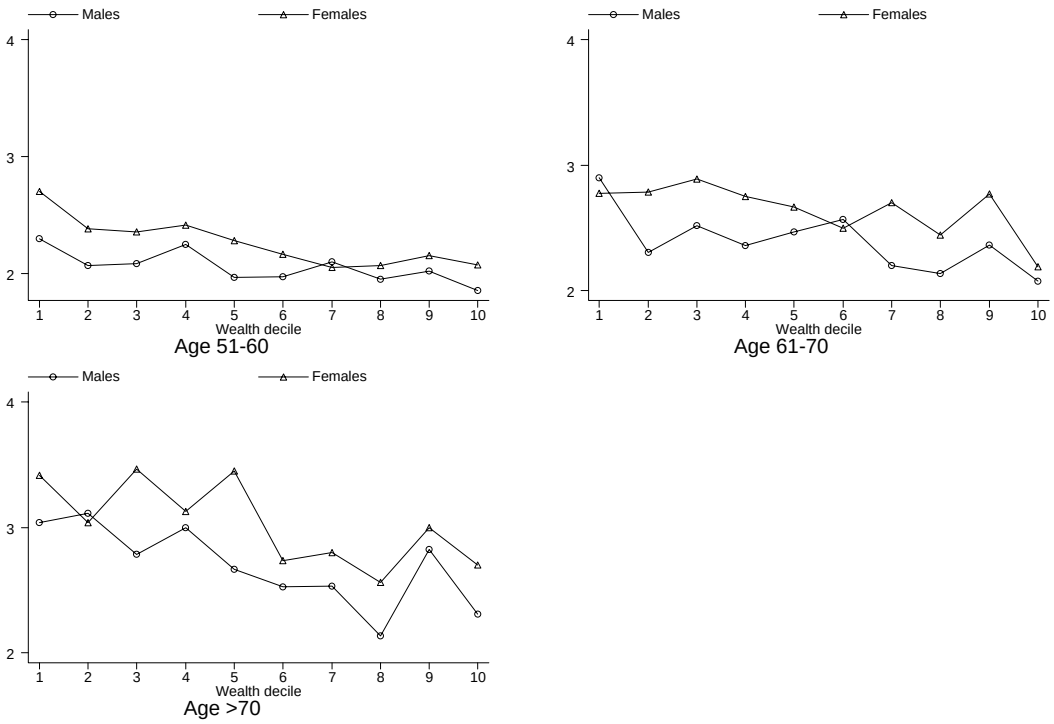
Note. The data are drawn from the 1993 *Survey of Household Income and Wealth*

Figure 3
Proportion reporting low or high quality of health care, by region



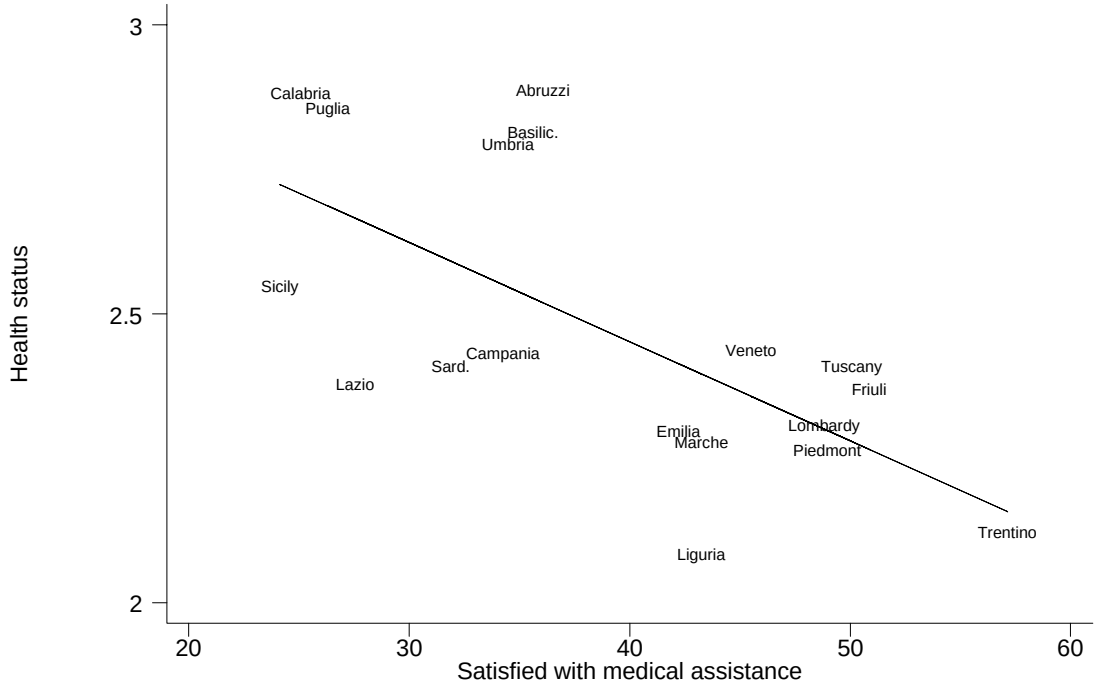
Note. The data are drawn from *Survey of Household Income and Wealth* (1993)

Figure 4
The health-wealth gradient



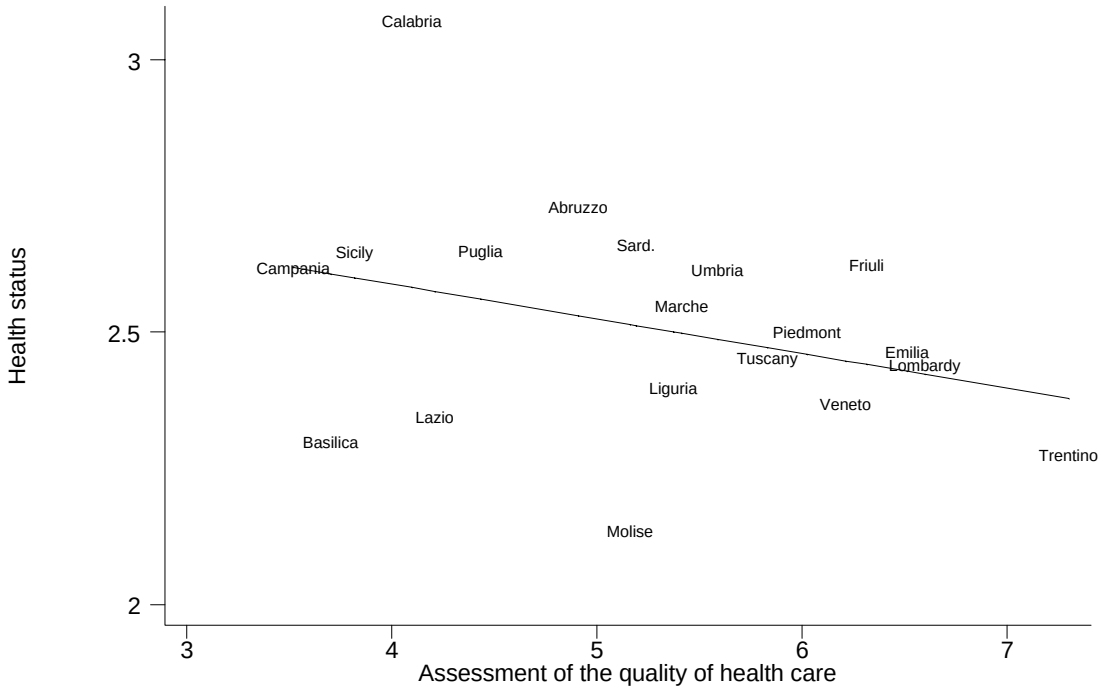
Note: Data are drawn from *Survey of Health Aging and Wealth* (2001)

Figure 5
Health status and patients' satisfaction with medical assistance



Note: Data are drawn from *Sistema Sanitario e Salute della Popolazione, Indicatori Regionali*, ISTAT (1999) and from the *Survey of Health Aging and Wealth* (2001)

Figure 6
Health status and assessment of the quality of health care by regions



Note. Data are drawn from the 1993-95 *Survey of Household Income and Wealth.*