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The Health Insurance Puzzle in Europe: The Role of Information

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Abstract
I use microdata from the Survey of Health, Ageing and Retirement in Europe to study whether the cost of acquiring health information is an important determinant of the decision to buy private hospital health insurance for individuals aged 50+, in eight European countries. I first test whether, conditional on health insurance companies' risk assessments, individuals have residual private information on insurance determinants other than their risk type. My results show that there are individual characteristics, not observed by the insurers, that are positively correlated with hospital insurance coverage and negatively correlated with the ex post probability of requiring hospital treatment. However, this opposite association is significantly different from zero only in countries with low quality healthcare systems. I then provide evidence that education and cognitive ability act as substitutes for quality of health promotion in determining the propensity to take out a voluntary private hospital insurance.

Keywords: Health Insurance, Cognitive Ability, Healthcare Quality

JEL Classification: D83, G22, I18

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1 Introduction

In most European countries the government is the main provider and source of funding for healthcare. However, a variety of macroeconomic factors (especially ageing population and budget constraints) are causing dramatic reduction in public healthcare benefits, starting from the late 1980s. As a consequence, in many countries there has been a dramatic increase in the share of out-of-pocket health expenditure. Voluntary private health insurance coverage in Europe is significantly higher in those countries where, according to objective measures and individual opinions, the quality of the healthcare system is better. There is no good explanation for this cross country variation. I use individual data from the first two waves of the Survey of Health, Ageing and Retirement (SHARE) to study whether and to what extent access to health information can explain private hospital insurance coverage among individuals aged 50-75 across eight European countries.[1]

European country governments have tried to boost the take up of voluntary private health insurance (VPHI) to complement or supplement public healthcare, by introducing tax incentives. However, the evidence suggests that the effect has been negligible.[2] Private insurance coverage in Europe on average is low and varies dramatically across countries. As shown by the top panel in Figure 1, the proportion of individuals aged 50+ who have taken out a complementary/supplementary private insurance to cover hospital treatments is higher in those countries with better healthcare quality, as measured by the density of hospital beds per 1,000 inhabitants. On the other hand, there is a negative association between the out-of-pocket expenditure of the elderly and the number of hospital beds (see bottom panel of Figure 1).[3] While in principle, the low uptake of private insurance in countries with poor quality healthcare systems might be explained by the fact that the private health sector

[1]The SHARE data collection has been primarily funded by the European Commission through the 5th framework program (project QLK6-CT-2001-00360 in the thematic program Quality of Life). Additional funding came from the US National Institute on Ageing (U01 AG09740-13S2, P01 AG005842, P01 AG08291, P30 AG12815, Y1-AG-4553-01 and OGHA 04-064). Data collection in Austria (through the Austrian Science Foundation, FWF), Belgium (through the Belgian Science Policy Administration) and Switzerland (through BBW/OFES/UFES) was nationally funded. The SHARE data set is presented in Börsch-Supan et al. (2005).

[2]See Emmerson et al. (2001) for the UK and Rodriguez and Stoyanova (2008) for Spain.

[3]These correlations are robust to alternative measures of healthcare quality, i.e. number of General Practitioners (GPs) per 1,000 inhabitants.

does not represent a valid alternative to the public one,[4] there is still a question over why in countries with low quality healthcare, individuals prefer to cover healthcare costs with out-of-pocket expenditure rather than taking out voluntary private health insurance.

The main problem in cross country studies lies in the difficulty of (defining and) observing the "price" of insurance coverage. The correlation between healthcare quality and insurance take up might potentially hide differences in insurance premiums and policy benefits, as insurance markets might work better in some countries than others.[5] However, as Figure 2 shows, the positive correlation between private health insurance coverage and healthcare quality holds across regions after controlling for country fixed effects.[6] As average policy loadings are likely to be relatively uniform within the same country, the last piece of evidence supports the hypothesis that differences in the "supply side" of insurance markets account only partially for the positive correlation between healthcare quality and insurance coverage.

The aim of this study is to show that the individual ability to acquire information about health related issues (broadly defined as factors that can affect the health risk and/or institutional features of the healthcare system) can be an important determinant of demand for private health insurance. Traditionally, physicians and health professionals have been the primary source of information for consumers in European countries. Results from Eurobarometer 2003 suggest that the majority (45.3%) of European citizens use "formal channels" (i.e. pharmacists, doctors, chemists) as sources of health information. Thus, the quality of healthcare professionals will affect the quality of the information individuals have on health.

In the classic adverse selection models (Rothschild and Stiglitz (1976) and Wilson (1977)) potential insurance buyers are assumed to have one-dimensional private information regarding their risk type. These models predict a positive correlation between insurance coverage and ex post realization of loss.[7] The positive correlation

[4] Propper et al. (2001) find that demand for private health insurance in the UK is negatively correlated to the quality of the public health sector and positively correlated to the quality of the private health sector.

[5] Mossialos and Thomson (2004) provide some descriptive evidence that across EU countries there is no systematic relation between voluntary private health insurance coverage and measures of market imperfections, such as concentration rate, loss ratios and share of administrative costs.

[6] Regions are defined using the EUROSTAT NUTS2 classification and comprises regions whose average population is 800,000-3,000,000 inhabitants.

[7] Chiappori et al. (2006) generalizes this empirical prediction to a larger class of models.

property has been tested in several recent studies producing results that are mixed and differ by markets.[8] Some recent studies provide evidence that violation of the positive correlation property might be due to the presence of multiple dimensions of private information. Finkelstein and McGarry (2006) studying the long term care (LTC) insurance market in the US find that individuals who are more risk averse are more likely to own LTC insurance and less likely to enter a nursing home. This result is consistent with the presence of multidimensional private information and advantageous selection based on risk aversion.[9] Fang et al. (2008) provide evidence that there is a strong advantageous selection in the Medigap insurance market and cognitive ability is an important source. In this work I provide evidence that the role of education and cognitive ability, as sources of private information in the decision to buy private hospital insurance in European countries, can be partially explained by the cost of acquiring health information.

I focus on the take up of private hospital insurance - defined as the coverage that gives individuals an extended choice of hospitals (and clinics) for hospital care, and/or full cover for the costs of hospital care - for three reasons. First, hospital care is the major component of healthcare expenditure in Europe (around 40%) and hospital insurance is by far the most common type of private health insurance among the individuals in my sample: coverage rate is 17% as opposed to 5% coverage for insurances that allows extended choice of doctors and specialists, and less than 1% coverage for long term care in either a nursing home or the individual's own home. Second, since the current version of the SHARE data comprises only two waves collected at two years apart, the probability of staying overnight in hospital in the two years after purchase of insurance is the only meaningful measure of risk occurrence that can be constructed. Finally, since the introduction of the third non-life insurance directive in 1992, there has been an increasing harmonization of the rules that regulate health insurance markets in EU countries. The theoretical findings in Chiappori et al. (2006) suggest that, in order for multidimensional private information to manifest itself as a violation of the positive correlation property, insurance companies should not be free to offer any insurance contract they choose. The standardization

[8] Chiappori and Salanie (2001) perform the positive correlation test for the car insurance market in France. Chiappori (2000) provides an extensive survey of the theoretical and empirical literature. See Cutler and Zeckhauser (2000) for a review of the applications in the health insurance market.

[9] Cutler et al. (2008) provide evidence on the role of risk aversion in other insurance markets.

of hospital insurance contracts in countries studied makes this market suitable for investigating the presence of multidimensional private information.

In order to test whether individuals who live in areas with better healthcare services demand more private hospital insurance because they are better informed, I first test whether, conditional on the insurance company's own assessment of an individual's risk type, there is a positive correlation between hospital insurance and the ex post probability of spending at least one night in hospital. I find no support for this in countries with high or low healthcare quality. Second, following the approach first proposed by Finkelstein and McGarry (2006), I use subjective assessment of the survival probability to show whether individuals have residual private information with respect to that collected by the insurer. My findings suggest that self-reported survival probability is positively correlated with insurance take up and negatively correlated with ex post risk. However, these opposing correlations are significantly different from zero only for individuals resident in countries with low quality healthcare. Finally, in order to test whether this asymmetric evidence can be explained by the differential costs of access to health information, I study whether the effect of education and cognitive ability on the decision to purchase private hospital insurance varies with the quality of health promotion.

My results show that years of education, extent of recall and verbal fluency are positively and significantly correlated with insurance coverage only in the sample of low quality healthcare countries. When I exploit within country variations I find that years of education and cognitive ability act as substitutes for proxies for quality of health promotion at regional level. On average one standard deviation increase in the scores for recall ability tests is associated with an increase of 1.6 percentage points in the probability of signing private hospital insurance. However, the effect is 1.2 percentage points higher in regions with low quality health care compared to those with high quality care.

To my knowledge, this is the first study that tests for asymmetric information at cross country level. This study provides two main contributions. First, it contributes to the literature on the different dimensions of individuals' unobservable characteristics which affect the decision to purchase a health insurance. Second, this analysis has important policy implications for the organization of healthcare systems. While tax incentives have proved to be not very effective in boosting private insurance take up,

government might invest more resources in health information programmes. My results can be read as evidence that these programmes can contribute to reducing health inequalities. Therefore, when evaluating their benefits/costs, governments should explicitly take account of their indirect effects on private insurance take up. The paper is organized as follows. In Section 2 I provide some background on the data and on the institutional context of private health insurance in the selected EU countries. Section 3 provides descriptive evidence and outlines the empirical strategy. Section 4 presents the findings and Section 5 concludes.

2 Background

2.1 SHARE

I draw on information from the two waves of SHARE, which surveyed the 50+ population, in 2004 and 2006. This survey is multidisciplinary and uses a cross-sectional panel database with a wide range of topics, including physical health, socioeconomic status, income and intensity of social interaction. Some questions refer to households (e.g. income), others are addressed to all eligible members within a household and their partners: for instance, indicators of health status and behaviour. SHARE also includes a section with questions on preferences, beliefs, attitudes and other items. There are detailed questions about the purchase and type of health insurance, and health related out-of-pocket expenditures. The first wave of the survey covered more than 30,000 individuals in 11 countries. Data from the second wave are still preliminary for some countries. Of the original 11 countries covered by SHARE, I exploit data on 8 for the econometric analysis. I exclude Switzerland and France since it is not possible to follow most individuals over time, due to the provisional version of the second wave data.[10] I also exclude the Netherlands because of the institutional features of that country's healthcare system and the recent reform in the statutory healthcare system. Until January 2006, Dutch healthcare combined Social Health Insurance (SHI), which guaranteed basic insurance cover for low-income earners, with a Private Health Insurance (PHI) scheme for high earners who could opt out of SHI.

[10]Moreover, the regulatory framework of the health insurance market in Switzerland differs substantially from those in the remaining countries.

As result, only 72% of the Dutch population was covered by the statutory health insurance (the average for the other countries is above 90%). The 2006 Healthcare Act scrapped the division between SHI and PHI and introduced a single insurance regime.

With the exception only of Germany and Austria, individuals aged over 75 are not able to buy private hospital insurance and contracts for older people are usually on an annual basis. My final sample includes 5,676 males and 6,597 females in Austria, Belgium, Denmark, Germany, Greece, Italy, Spain and Sweden, aged between 50 and 75.

2.2 Institutional Setting

This section provides some basic detail on the regulatory framework of private health insurance in selected countries. There are different types of VPHI, but they can be classified into three major types according to how they integrate the public system: *duplicate*, *complement* and *supplement*. I do not deal with *duplicate* coverage in this work. *Complementary* private insurance provides full or partial cover for services that are excluded or not fully covered by the statutory health care system. It is available for the whole population, albeit in different forms, in all the countries in our analysis. *Supplementary* health insurance serves to increase consumer choice and access to different health services, guaranteeing faster access to treatment and increasing the quality of accommodation and amenities. In most cases, *supplementary* private insurances increases choice of provider and benefits. Individuals with *supplementary* insurance may be treated in private hospitals, buy private treatment in public hospitals, or receive benefits in cash rather than in kind. *Supplementary insurance* sometimes is described as "double coverage".

In most European countries there is universal basic coverage, but there are a few exceptions. In Germany about 9% of the population is covered by primary private insurance (the self-employed who are excluded from the social security system, employees above an income threshold who opt for private insurance, and public employees, for the portion of health care expenditure not directly reimbursed by the government). Similarly, in Belgium, Spain and Austria there are small percentages of the population (mainly comprising self-employed and civil servants) who are not

covered by primary health insurance.

I now describe the methods used to set private insurance premiums and the variables used in risk ratings as these are essential for the "positive correlation" test presented in the next section. Risk rating is the method most commonly used by insurers in the EU to set prices for complementary and supplementary VPHI. It is used to varying degrees and for different types of VPHI in all the countries in this analysis. Table 1 provides examples of the variables used to set premiums. These include age, sex, occupation, household size, medical history, family history. Group rating is used in Denmark, Greece, Italy and Sweden mainly for group policies. In Belgium mutual associations can sell policies with flat rate premiums, but these are not widespread. Insurers that use health status as a variable in risk rating premiums require applicants to complete a medical questionnaire. This questionnaire can include questions about a family's history of disease.[11] The use of medical examinations to set premiums is not widespread in the countries analysed.[12]

Tax incentives are in place in most countries in my sample with some important differences. In Denmark and Spain there are no deductions for employees, but firms can deduct employer based premiums from tax. In Germany, Greece, Italy and Sweden there are tax provisions for individuals, but not for employers.

There is no systematic evidence on the market structure of private health insurance across EU countries. In 2005, Italy and Spain had the highest number of health insurance companies (respectively 93 and 87) and Austria and Sweden had the lowest (respectively 7 and 6). Mossialos and Thomson (2004) collecting data from different sources find evidence that market concentration, measured by the market shares of the three largest insurers, is particularly high in Austria (84%), Sweden (80-90%) and Greece (70.4%). Concentration rates are much smaller in Belgium (49%) and Italy (33%). Data on the administrative costs of voluntary health insurers are limited, although the available evidence suggests that these costs are high compared to those in the statutory healthcare system. Voluntary health insurers' administrative costs range between 10 per cent in Germany to as high as 25 per cent in Austria, Belgium and Italy.

[11] According to Mossialos and Thomson (2004) family history of disease is required only in Greece.

[12] While Austria explicitly forbids insurers to conduct medical examinations, in Belgium they are common practice for commercial policies.

3 Empirical Analysis

3.1 Descriptives

Figure 3 shows the proportion of individuals aged 50-75 covered by private hospital insurance. Belgium and Austria are the countries with the highest take up, while Italy, Sweden and Greece have the lowest. The high coverage in Belgium is partly due to the special regime for the self-employed, which accounts for about 6% of the total population in this older age group. The statutory health insurance scheme does not cover self-employed people for 'minor risks', which include minor operations.[13]

In order to understand how the quality of the healthcare system affects the propensity to sign a private health insurance I split the sample by quality of the country's healthcare system. Identifying a universally accepted indicator of healthcare quality is almost impossible. For the purposes of this work the number of hospital beds is the best measure of the potential benefit from taking out a voluntary private insurance to cover the costs of hospital care.[14] The average number of hospital beds is significantly higher in Austria, Belgium and Germany than in the other countries in our analysis. In the main specification I refer to Germany (with an average of 8.6 beds per 1,000 inhabitants), Austria (7.8) and Belgium (7.5) as the *high quality* countries and Greece (4.7), Italy (4), Denmark (3.8), Spain (3.4) and Sweden (3) as the *low quality* countries. While separate statistics on beds in private hospitals are not available, it should be remembered that hospital private insurance allows policy holders to purchase services in private hospitals as well as amenities in public ones, such as private rooms. Reassuringly, an alternative widely used measure, number of GPs, produces the same categories. Belgium and Austria have the highest number of GPs (respectively 2.1 and 1.5 per 1,000 inhabitants), Sweden and Greece the lowest (0.6 and 0.3). In Section 4.4 I test for the robustness of my results using an alternative measure for healthcare quality.

In order to define the individual accident probability, I use the following question: "During the last 12 months have you been in a hospital over night?". Figure 5 plots the average probability of being in hospital overnight in the 12 months before the 2006

[13] However, the hospital insurance coverage does not vary significantly between self-employed and employed people in Belgium.

[14] According to Eurobarometer (2003) in 2003 27.5% of citizens in Austria were dissatisfied with the healthcare system vs 78.1% and 65.5% respectively in Greece and Italy.

interviews of subjects interviewed in the 2004 wave. The high quality healthcare countries on average display a higher average probability of entering hospital, but while in Austria the probability is much higher for those covered by private hospital insurance, in Belgium and Germany the probability is slightly higher for those not covered by insurance. Among individuals living in low quality healthcare countries the risk of entering hospital is much higher for those not covered by hospital insurance. The difference between insured and not insured is particularly striking in Italy and Sweden, providing evidence of some advantageous selection.

In order to measure whether individuals have residual private information with respect to the risk assessment exercises performed by insurance companies, I use the self assessed survival probability. In SHARE 2004 the question is worded: "What are the chances that you will live to be age T or more?". The target age, T, contained in this question was chosen conditional on the respondent's age, and the distance between current age and target age varied from 10 to 24 years.[15] Guiso et al. (2005) provide evidence based on SHARE that up to age 60, respondents' subjective survival probabilities and their life-table counterparts correspond very well for males but that females tend to underestimate their survival rates. For older people, especially males, there is some evidence of overstatement relative to the life tables.

One well-known problem with self reported probabilities is the propensity of respondents to report round figures such as 0,50, 100 (see Hurd and McGarry (1995) and Gan et al. (2005)). As emphasized in Finkelstein and McGarry (2006), if individuals use probabilistic information in their decision to buy insurance, but are unable to translate their latent probability into numbers, the estimates are likely to be underestimates of the extent of individual information. Figure 5 plots the self-assessed probability of being alive at age 75 for individuals aged 50-65 in the 2004 wave. While individuals living in low quality healthcare countries seem more 'optimistic' about their survival probability, there are no substantial differences in the degree of rounding between the two groups.

Finkelstein and McGarry (2006) and Cutler et al. (2008) stress the role of risk aversion as the explanation for rejection of the "positive correlation" test. The 2006 wave of SHARE elicited information on risk aversion. Individuals were asked to

[15] E.g. for individuals in the age group 51-55 the target age is 75; for individuals in the age group 71-75 the target age is 85.

choose, from four statements, which was closest to the level of financial risk they would be willing to undertake over savings or making an investment.[16] Figure 6 displays the distribution of this measure of risk aversion for the samples of both low and high quality healthcare countries: almost 80% of respondents in both groups declared they were not willing to take any financial risk. A Kolmogorov Smirnov test fails to reject the null hypothesis that the two samples are drawn from the same distribution, supporting the hypothesis that risk aversion does not explain the large cross country variation in hospital insurance take up.

Table 2 reports how average years of education and cognitive abilities vary across countries. Germans and Austrians, on average, are the best educated (respectively with 13.8 and 13.3 years of education). In order to construct the memory indicator, respondents were shown a list of ten words and then asked to recall them. The indicator is constructed by counting the number of words recalled, and ranges from 0, in the case that a respondent was not able to remember even one word, to 10. In the rest of the paper, I use the terminology from the cognitive psychology literature and refer to this indicator as memory recall, or simply recall. Recall scores are highest for Denmark and Germany (respectively 5.8 and 5.6). Executive function is measured by asking the respondent to name as many animals as possible in exactly one minute. Each respondent is given a score, which is equal to the number of animals that she or he is able to name. I refer to this indicator as verbal fluency, or simply fluency. The fluency score, defined over the range 0-100, peaks for Sweden and Austria (respectively 24.4 and 22.7), with the lowest values for Italy, Spain and Greece (all below 16). Recall and fluency are commonly regarded as proxying for the ability to acquire information.

The indicator for numeracy measures the ability to perform basic numerical operations. SHARE respondents were asked to perform the following simple calculations: (1) find 10 percent of a number; (2) find one half of a number; (3) find the number for which another known number represents two thirds; (4) find 10 percent of another number. Each of the questions refers to a specific economic or financial situation. On the basis of these four questions I constructed a numeracy indicator, which ranges from 1 to 5.[17] The numeracy indicator varies between 1 and 5 and the highest values

[16] The statements are: 1) Take substantial financial risks expecting to earn substantial returns; 2) Take above average financial risks expecting to earn above average returns; 3) Take average financial risks expecting to earn average returns; 4) Not willing to take any financial risks.

[17] The same indicator is used by Christelis et al. (2005).

are for Sweden and Germany (both around 3.8).

3.2 Empirical Method

The first step of my analysis is to perform the "positive correlation" test introduced by Chiappori and Salanie (2001). For this purpose I estimate the following bivariate probit:

$$Prob(Hosp = 1) = \Phi(\mathbf{X}'\beta_1) \quad (1)$$

$$Prob(HIns = 1) = \Phi(\mathbf{X}'\beta_2) \quad (2)$$

where $Hosp$ is a binary variable that takes the value 1 if the individual has spent at least one night in hospital in the 12 months preceding the 2006 interview. $HIns$ is binary variable that takes the value 1 if the individual had hospital insurance cover in 2004. $\mathbf{X}$ is a vector of the covariates to control for the risk classification that would be assigned to an individual by an insurance company in 2004. All the regressions control for country fixed effects.

Following Chiappori and Salanie (2001), the key parameter is the correlation between the error terms in equations (1) and (2). A unidimensional model of asymmetric information predicts that the residuals of the two equations are positively correlated (ρ>0) and do not reject the null hyphotesis that $\rho = 0$ would represent a failure to reject the null of symmetric information.[18]

In order to test whether the individual has *residual* private information I estimate the model in equations (1) and (2) by including individual self reported survival probability as elicited from the 2004 wave of SHARE. Finkelstein and McGarry (2006) use the self-reported probability of nursing home use 5 years in the future to test for the presence of asymmetric information in the long term care insurance market. The coefficients of interest in this case are: those for survival probability in (1) and (2)[19] and the correlation coefficient, ρ. If the coefficients of survival probability are

[18] A second approach proposed by Finkelstein and Poterba (2004) consists of estimating a probit for accident risk as a function of private insurance cover, controlling for risk classification. The results of this alternative approach are not presented here, but are consistent with those that are.

[19] In a bivariate probit model the marginal effect is a function of the coefficient as well as of the derivative of the conditional density functions. For notational simplicity, I sometimes use the

significantly different from zero, there are two possible scenarios. On the one hand, if ρ is positive and statistically significant it might be concluded that individuals detain private information on their own risk type. On the other hand, failure to reject the null hypothesis automatically points to the existence of other sources of unobserved heterogeneity which offset the positive correlation between insurance cover and risk occurrence.

The validity of my private information test relies on the ability to condition on the risk classification of the individual by insurance companies. Using information in Mossialos and Thomson (2004) and from insurance applications to numerous insurance companies, I can determine which are the individual characteristics that insurance companies observe when setting the price of a hospital insurance policy. As mentioned in the previous section, all companies collect a set of demographic characteristics - age, gender, marital status, age of the partner, family size, residence in a metropolitan area - as well as detailed information on current and past health. The same information is gathered by SHARE, whose data on current health and medical history are extremely rich and detailed. Therefore, I can replicate insurers' information. Finkelstein and McGarry (2006) proposes two alternative methods to control for insurers' risk classification. The first consists of the actuarial prediction of individuals' risk types, because this is the measure used to generate the insurance premium.

In this paper I use the alternative "application information" approach since I do not have information on the actuarial model used by insurers. In this specification I attempt to control for all the aspects that insurance companies might observe about an individual. I include a full set of single year age dummies, all the demographic information that insurance companies collect in their applications (sex, marital status, age of spouse, household size, occupational status, residence in a metropolitan area) and indicator variables for each of the detailed current health and health history characteristics. These indicator variables include: limitations to each of three activities involved in daily living and two instrumental activities of daily living; low body mass index; high body mass index; a smoker or not; incidence of depression in the previous four weeks; subject to diabetes, hypertension, cholesterol, arthritis, asthma; history of stroke, cancer, heart attack, lung disease; medication for a heart

coefficient when referring to the marginal effect.

condition, high blood pressure, diabetes; consultation in the previous 12 months with a GP, a specialist. To be conservative, I also control for household income and wealth terciles, although from my research it emerged that few insurance companies would ask individuals to classify themselves as high, medium or low income.

4 Results

4.1 Baseline results

The standard test for asymmetric information, based on a positive correlation between insurance cover and risk occurrence conditional on insurance companies' risk classification, has been applied across a variety of insurance markets with differing results. In the case of health insurance, Cutler and Zeckhauser (2000) review an extensive literature and find mixed evidence.

Table 3 shows the results of this standard test, for the hospital insurance market, for eight European countries. The first row presents the correlation of the residuals estimated from the bivariate probit. I am unable to reject the null hypothesis of zero correlation. In order to gain some insights into how the operation of the insurance market is affected by the quality of the healthcare system I estimate separate bivariate probit models for the subsample of individuals living in countries with high quality healthcare (Austria, Belgium and Germany) and those living in countries with low quality healthcare (Denmark, Greece, Italy, Spain and Sweden). While the correlation coefficient is positive for both samples, it is never statistically different from zero. In textbook adverse selection models, where individuals have only private information about their risk type, this result would imply that there is no asymmetric information. On the other hand, if other sources of private information are allowed, failure to reject the null hypothesis does not rule out the existence of asymmetric information.

I augment the model in equations (1) and (2) by including the self reported survival probability. Columns 1 and 2 in Table 4 report the results for the bivariate probit model estimated for the full sample. I find that, after controlling for the insurers' risk classification, the survival probability is negatively and significantly correlated with the probability of an overnight stay in hospital in the succeeding 2 years. The survival probability is positively, but not significantly correlated with the probability

of signing a private hospital insurance. Nevertheless, the correlation coefficient for the residuals of the two equations is in line with that estimated above and is not significantly different from zero.

In countries with low quality healthcare systems, the survival probability is negatively and significantly correlated with the probability of an overnight stay in hospital: a 10 percentage points increase in the survival probability reduces the probability of being in hospital over night by 3.9 percentage points. For individuals living in low quality health care countries, the survival probability is positively and significantly (at the 5% level) correlated with the probability of signing up for a hospital insurance: a 10 percentage point increase in the survival probability is associated with a 2.3 percentage point increase in the probability of signing up for a hospital insurance. It is beyond the scope of this work to give a causal interpretation of this correlation. While survival probability might have a direct effect on the decision to take out a private insurance, there might be other factors correlated with both aspects. Nevertheless, the correlation coefficient of the residuals in the two equations, although positive, is not statistically significant. This result can be read as evidence that individuals do not have additional private information on their own risk type.

The results are quite different for the model estimated for the sub-sample of high quality healthcare countries. The correlation between survival probability and hospital insurance is small and not significantly different from zero. The marginal effect of survival probability on accident probability is negative: a 10 percentage point increase in the survival probability reduces the probability of being in hospital by 5.7 percentage points but is marginally significant at 10% level. Also, in this case, there is no evidence of a positive and significant correlation between the error terms in the two equations.

As expected both household income and total wealth are positively and significantly correlated with the probability of having a hospital private insurance, irrespective of the quality of healthcare system. In a few countries insurance companies are allowed to collect information on the family history of certain diseases. While this information is not available in SHARE, I estimate an alternative specification that controls for whether parents are still living and, if not, at what age they died. The results are in line with those presented above. Overall, these results suggest that in countries with low quality healthcare there are unobserved individual characteristics

that are positively correlated with hospital insurance cover and negatively correlated with accident risk, as measured by the ex post probability of being in hospital over night. This opposite correlation offsets the positive association between risk type and insurance coverage.

4.2 The Importance of Health Information

In this section I test whether the ability to acquire information about health related issues is a potential explanation for the opposite correlation documented above. On the one hand, better informed individuals are more likely to purchase private insurance. There is well established evidence that more informed individuals are more likely to buy more sophisticated retirement saving plans.[20] Gertler et al. (1994), using direct measures of information, find that imperfect information affects the demand for supplemental Medicare insurance. Jin and Sorensen (2006) use data on the enrolment decisions of federal pensioners in the US to show the influence of publicized ratings on health plan choices. Paccagnella et al. (2008), using SHARE data, provide evidence that, while the main determinants of voluntary private health insurance vary across countries, education and cognitive abilities have a strong positive effect on holding a VPHI policy in most countries. On the other hand, better informed individuals are less likely to engage in risky behaviours (e.g. drinking, smoking) and are more likely to undergo preventive screening.[21] To acquire their health information consumers use formal (health professionals) or informal (newspapers, books, the Internet, friends) sources of information.[22]

Different types of health related information might be relevant. Individuals might be more informed about health risk factors and the benefits of early screening. All else being equal, they might simply be better informed about the healthcare system's functioning and its quality standards: for instance, individuals aware of the poor quality of the public hospitals might sign a private insurance in order to secure faster

[20] Duflo and Saez (2003) provide evidence on the role of information and social interactions on Retirement Plan Decisions using field data from a sample of university staff.

[21] Kenkel (1991) finds that more informed individuals tend to display healthier life styles. Kenkel (1990) provides evidence that poorly informed consumers tend to underestimate the productivity of medical care in treating illness.

[22] Bundorf et al. (2004) report that in 2001 38% of Americans looked for or obtained information about their personal health from a source other than their doctors.

and cheaper access to a private hospital. One limitation of my analysis is that I cannot identify these differences among health information contents. I present two pieces of evidence to assess whether the ability to acquire health related information is an important determinant of health insurance take up.

First, I test whether the correlation between the proxies for individual ability to acquire health information and the decision to buy hospital insurance is higher in low quality than high quality healthcare countries. The rationale behind this test is straightforward: if the average cost of acquiring health information from health professionals is inversely related to healthcare quality, the individual ability to acquire information through alternative channels should be systematically more important in low quality than in high quality countries.[23] I estimate separate probit models for the dummy for having private hospital insurance in 2004 on different proxies for the ability to acquire information, for the low quality and high quality healthcare country groups. The results are reported in Table 5.

The upper panel in the table shows the effect of years of education, memory recall score and verbal fluency score on the probability of signing private hospital insurance in the sample of low quality healthcare countries. For each cognitive skill variable I estimate two specifications. The first includes the main socio-demographic characteristics and the dummies for the main risky behaviours, i.e. smoking, obesity, lack of physical exercise. In the second specification I include controls for the individual's health history and healthcare utilization, namely whether they have consulted a doctor at least once in the last 12 months and if they have been in hospital over night in the 12 months prior to the 2004 interviews. A one standard deviation increase in years of education significantly increases the probability of buying a private hospital insurance by about 1.5 percentage points. In a sample of elderly people, in particular, education might not reflect current ability to acquire information. Memory recall and verbal fluency scores are positively and significantly correlated with the probability of signing a private hospital insurance in the sample of low quality healthcare countries. A one standard deviation increase in the memory recall score increases the probability by 1.9 percentage points, while a one standard deviation increase in the verbal fluency score increases the probability by 1.5 percentage points. The lower panel in

[23] According to Eurobarometer (2003) 20.1% of European citizens use either books or magazine/newspapers as their main sources of health information.

Table 5 presents the results for the sample of high healthcare quality countries. The size of the effect of years of education is in line with the result for the low healthcare quality countries, but is not statistically significant. The marginal effects of recall and fluency are both small and not statistically different from zero.

Second, I exploit variations in the average quality of health promotion across EU regions to study whether the effect of education and cognitive ability on insurance purchase varies with the average quality of health related information. The ratio of the test is in line with that presented above: given the same healthcare organization, the ability to acquire health information through "informal" channels should matter less in those regions where the cost of acquiring information from "formal" sources is lower. In particular, a common feature of the countries considered in this study is that regional governments are largely independent in their allocation of health care resources. Therefore, within the same country the quality of health promotion can vary dramatically across regions.

Using information on respondents' region of residence (105 regions in total), I construct different measures for quality of health promotion. My preferred indicator is the proportion of individuals aged over 65 who have been advised to have a flu vaccination. Vaccination against flu has been proved to be a cost effective way to reduce the incidence of respiratory diseases and is offered free of charge to people over 65 in most EU countries. Unlike other preventive treatments, it can be offered and administered by doctors, pharmacists and nurses. The reason for my focus on the percentage advised to have the vaccination rather than on effective take up is that the former is a better proxy for the quality of supply of health promotion, while the latter could be considered as an equilibrium outcome that potentially can be affected by other factors.

Denoting V_j as the proportion of individuals aged 65 or over who have been advised to have the flu vaccination in region j, I estimate the following model:

$$HIns_{ij} = \alpha + \beta_1 E_i + \beta_2 V_j + \beta_3 E_i * V_j + \gamma' X_{ij} + u_{ij} \tag{3}$$

where $HIns_{ij}$ takes the value 1 if an individual i in region j was covered by a hospital insurance in year 2004, E_i controls for education (cognitive ability) of individual i. X_{ij} controls, among other things, for demographic characteristics, individual's

health history, socio-demographic characteristics of region of residence, and a full set of country dummies.

To the extent that health related information explains hospital insurance decisions, I expect β_1 to be positive and β_3 to be negative. I estimate the model in equation (3) using both a linear probability and a probit model. Estimation results for the probit model are reported in Table 6. For each proxy for the ability to acquire information I estimate two specifications, where the second one includes controls for regional characteristics: proportion of people aged over 65, proportion of women, dummies for the terciles of regional wealth and waiting time for outpatient treatment.

My results show that years of education and cognitive abilities are all positively correlated with the probability of signing a private hospital insurance. On average an extra year of education increases the probability of signing a private hospital insurance by 0.5 percentage points. However, the effect declines significantly as the regional quality of health promotion improves. There is a potential risk that the proportion of people aged over 65 that have been advised to have a flu vaccination is not a proxy just for the quality of the health promotion, but acts as a measure of the overall healthcare system. It is reassuring that when I control for other regional characteristics, the marginal effects of the interaction terms do not vary. The results in columns 3 and 4 of Table 6 show that the substitutability between the ability to acquire information and the quality of health promotion is particularly strong when the former is measured by the score reported in the recall test. A one standard deviation increase in the score for the recall test is associated with an increase of 1.6 percentage points in the probability of signing a private hospital insurance.

The marginal effects on the interactions are hard to interpret. In order to provide a measure of the magnitude of the substitutability between recall and regional quality of health promotion, I undertake the following. I investigate what is the differential effect of a one standard deviation increase in the recall score for a person living in a region with low quality healthcare promotion compared to the effect for a person living in a high quality health promotion region. I classify as low (high) quality health promotion those regions where the average proportion of individuals aged 65 plus that are advised to have a flu vaccination is one standard deviation below (above) the mean.[24] The effect of one standard deviation increase in the recall test is 1.2

[24]The average proportion is 0.63 and the standard deviation is 0.23.

percentage points higher in regions with low quality healthcare promotion compared to regions with high quality promotion.

In section 3.1 I referred to the SHARE survey collecting information on the ability to perform mathematical operations, i.e., the numeracy indicator. According to the cognitive psychology literature this is a proxy for the ability to process as opposed to the ability to acquire information. While the literature shows that numerical ability is positively correlated with the propensity to buy more complex retirement plans and invest in the stock market,[25] I do not expect any significant substitutability between the ability to perform mathematical operations and the regional quality of health promotion. I find consistently that while the average effect of numeracy is strong and significant, the marginal effect on the interaction term is negative, but not significantly different from zero.

The findings provide evidence supporting the hypothesis that individuals with a greater ability to acquire health information through informal sources need to rely less on the information provided by formal sources in deciding whether to buy a health insurance.

4.3 Econometric concerns

So far, I have argued that the fact that the effect of education and cognitive abilities on the probability of taking out a hospital insurance declines as the quality of health promotion increases, is evidence that the cost of health information matters in the decision to buy a private health insurance. Identification of the information channel effect might be confounded by the possible presence of factors that are correlated with the variables of interest. Decomposing the error term in equation (3) into two components $u_{ij} = \epsilon_{ij} + \mu_j$ makes it clear that there might be omitted factors that vary at both the individual-regional and regional levels. More education and better cognitive ability might be associated with lower discount rates and higher risk aversion,[26] inducing individuals to buy more private insurance and to move to regions where the quality of the healthcare is higher. In that case I would expect the interaction

[25] See Christelis et al. (2005).

[26] Cutler and Lleras-Muney (2008) argue that on average people with more schooling learn to dislike risk more. However, the empirical relationship between education and risk aversion appears to be u-shaped: very high and very low education levels are associated with more risk taking, whereas individuals with moderate amounts of schooling are the most risk averse.

between education (cognitive abilities) and proportion of individuals in a region who have been advised to have a flu vaccination to be positive. If anything, my results should represent a downward biased estimate of the degree of substitutability.

Even in the absence of endogenous sorting, if the measures of the ability to acquire information are positively correlated with risk aversion, my results potentially might be explained by the fact that more risk averse individuals are more likely to buy private insurance as a response to the poor quality of the public healthcare. In order to rule out this hypothesis, I test whether the effect of education and cognitive abilities increases with the average waiting time in the region. The marginal effect of the interaction terms, while always positive, is statistically significant only when I take the interaction of the fluency score with the dummy for the highest tercile (see Table 7).

The proportion of individuals advised to have a flu vaccination potentially might be correlated with other regional characteristics unrelated to the quality of health promotion, which might affect the take up of private insurance. Since additional health and pension coverage are often part of the extended benefits offered by employers, information on employer provided benefits might be higher in the more business oriented regions within the same country. In order to rule out this explanation I test whether the effect of education, and the proxies for cognitive ability, on the probability of having a private pension decline with my indicator for health promotion. The results in Table 8 show no evidence of a significant interaction between regional quality of health promotion and proxies for the ability to acquire information, in the decision to subscribe to a private pension plan.

So far, I have assumed that the only relevant type of information is health related, but this might not necessarily be the case. Private health insurance might be part of a broader package that includes other types of insurances, e.g. life insurance, home insurance. Therefore, individuals might be more likely to buy private hospital insurances in those regions where the quality of the financial information is better. In order to test this hypothesis, I study whether the effect of education and cognitive abilities is lower in those regions where there is a higher percentage of individuals aged 50 or over who are stockholders. While the regional proportion of stockholders is positively associated with the propensity to buy a private hospital insurance, its correlation with hospital insurance purchase does not vary significantly with education

and cognitive ability (see Table 9).

4.4 Robustness checks

Central to my analysis of residual private information is how countries are classified as high or low healthcare quality. As an alternative criterion, I use per-capita health expenditure in constant dollar values, as measured by the World Health Organization. In 2002 Germany had the highest health expenditure in Europe, with 2,817$ per capita, while Spain had the lowest with 1,640$. Based on this criterion, Austria, Belgium, Denmark, Germany and Sweden would be categorized as high quality healthcare countries; Greece Italy and Spain would be classified as poor healthcare countries. I test separately for the effect of survival probability on the probability of buying a private hospital insurance and on the accident risk at time $t+1$ (see Table AI). In line with my previous results, survival probability has a positive and significant effect on the propensity to buy a hospital insurance only in poor healthcare quality countries. When I test whether education and cognitive abilities have a differential effect on the probability of signing a health insurance, I find that the effect is positive and statistically significant only for poor healthcare quality countries (see Table AII).

I test equation (3) using an alternative measure for regional healthcare promotion. According to medical guidelines colonoscopy should be recommended to individuals aged 50 or over, independent of the individual's health history. Unlike the flu vaccination, the test is usually advised by a specialist or a GP, and only in a few countries is free of charge for the over 50s. As an alternative measure for the quality of healthcare promotion I use the regional proportions of individuals aged 50-85 that have been advised to have a colonoscopy. The results in Table AIII are in line with those presented in Table 6.

5 Conclusions

This paper presents evidence from the first two waves of SHARE to identify whether differential costs in accessing health information can explain partially cross country variation in the take up of private health insurance.

While, on average, health insurance coverage in European countries is very low, it is higher in those countries which, according to many criteria, have better healthcare systems. In this paper I focus on private hospital insurance to study whether individuals who live in areas with better healthcare quality are more likely to buy insurance because they have better health information. Using individual self assessments of survival probability, I first test whether individuals have private information on insurance determinants not observed by insurers. I find that the individual survival probability is positively correlated with the probability of signing a hospital private insurance and negatively correlated with the ex post probability of admission to hospital. This opposite association is strong and significant only in countries with low quality healthcare system. However, there is no evidence of a positive correlation between insurance coverage and individuals' risk experience, in either high or low quality countries.

To seek for possible explanations for this result, I looked at the role of health information. As more informed individuals are more likely to buy private insurance and less likely to experience health risk, I tested whether individuals who live in better healthcare quality countries are better informed. Exploiting both cross country and within country variations in quality, I provide evidence that, when deciding to buy a private insurance, individuals who are more able to acquire health information from informal sources, i.e. the Internet, newspapers, books, rely less on the information provided by healthcare professionals.

My results provide evidence of significant substitutability between the individual ability to acquire information and the quality of healthcare promotion. While tax incentives have proved to not be successful in boosting the take up of private health insurance, these findings can be read as evidence that investments in health promotion can have positive indirect effects on the propensity to buy private insurance. Therefore, when evaluating the benefits and costs of health promotion programmes government should take explicit account of their indirect effects.

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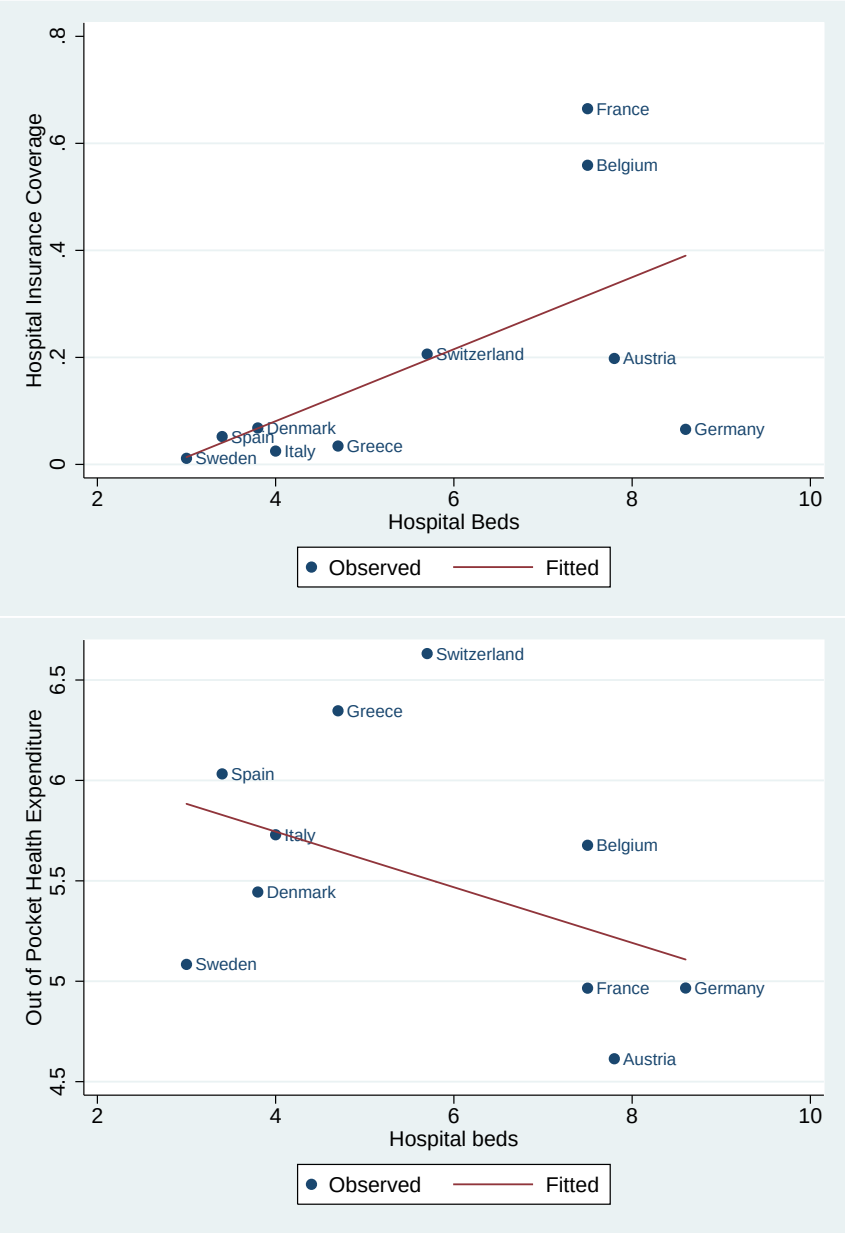
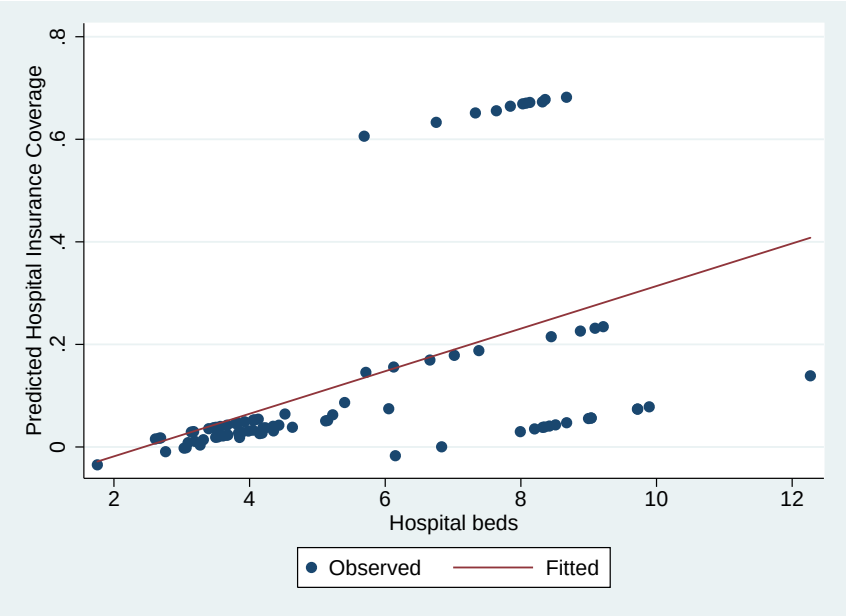
Figure 1: The Health Insurance Puzzle in Europe



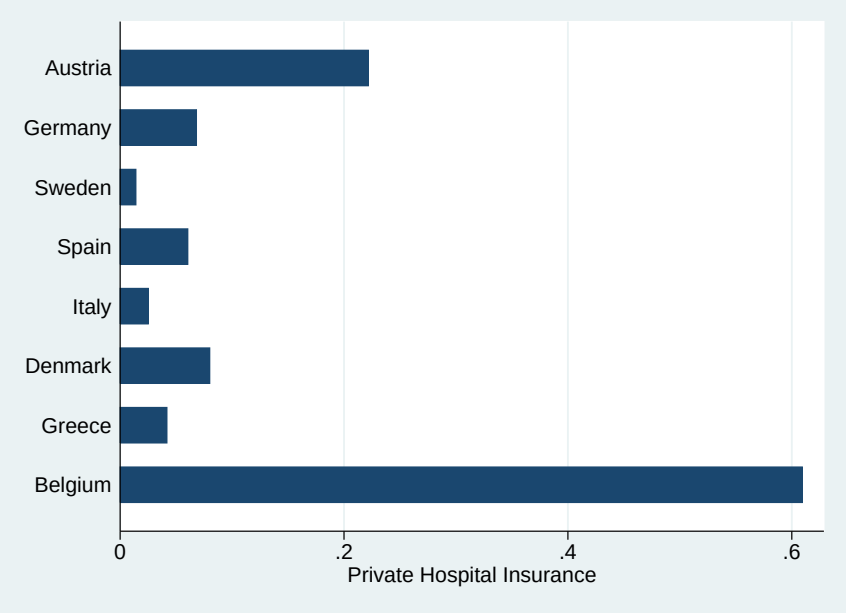
Note: The graph in the top panel plots the proportion of individuals aged 50+ covered by private insurance for hospital treatment versus the average number of hospital beds per 1,000 inhabitants. The graph in the bottom panel plots out-of-pocket expenditure (expressed in logs), calculated as the sum of out-of-pocket expenditure for impatient and outpatient treatments, versus the average number of hospital beds per 1,000 inhabitants. Private insurance cover and out-of-pocket expenditure are computed on SHARE data. The data on hospital beds are from EUROSTAT and refer to year 2004.

Figure 2: Private Hospital Insurance Coverage vs Healthcare System Quality in EU regions



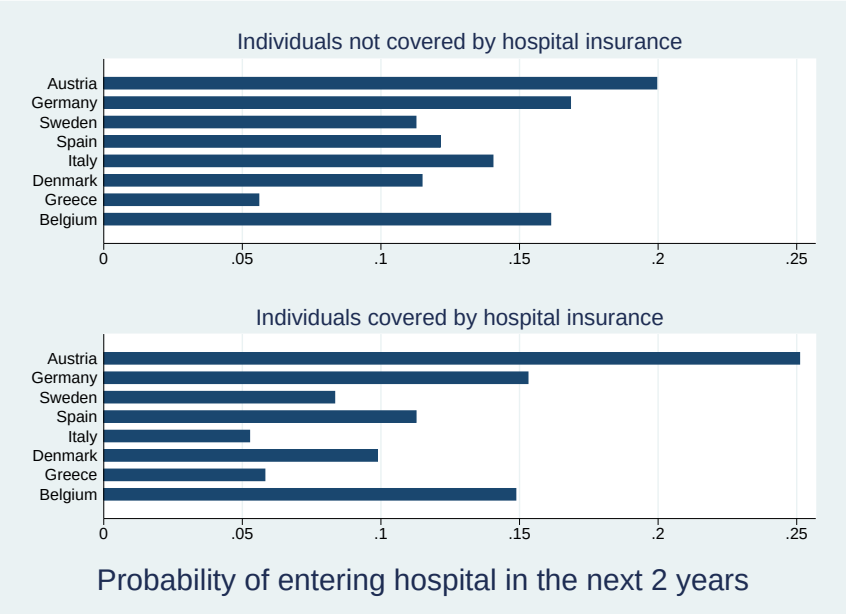
Note: The graph plots predicted private hospital insurance coverage as recorded in 2004 versus average number of hospital beds per 1,000 inhabitants in 94 regions across 8 SHARE countries. Predicted coverage is obtained from an OLS regression of regional private insurance coverage on regional number of hospital beds and country fixed effects. Data on hospital beds are from the REGIO EUROSTAT dataset. Hospital data at regional level are not available for Denmark and Sweden.

Figure 3: International Comparison: Hospital Insurance Coverage



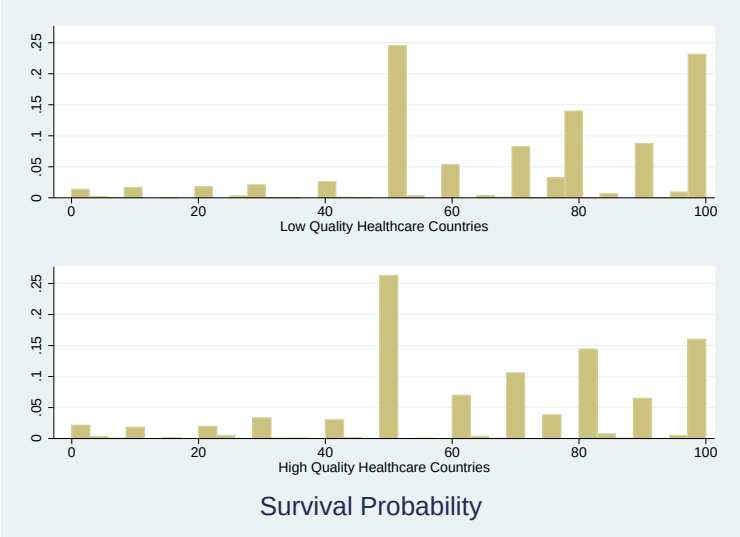
Note: The sample includes individuals aged 50-75.

Figure 4: Accident Risk by Hospital Insurance Status



Note: Accident risk is defined as the average probability of having an overnight stay in hospital in the 12 months preceding the 2006 interviews, for individuals aged 50-75 in the 2004 wave. Insurance status is defined according to 2004 responses.

Figure 5: Self-Assessed Survival Probability at the age 75



Note: The sample includes individuals aged 50-65 in the 2004 wave. The target age in the survival probability question is 75. Low Quality Healthcare Countries include Denmark, Greece, Italy, Spain and Sweden. High Quality Healthcare Countries include Austria, Belgium and Germany.

Figure 6: Risk aversion

Note: The sample includes all individuals aged 50 or over interviewed in both 2004 and 2006. Information on risk averseness was elicited in the 2006 wave and is measured by the propensity to take substantial financial risks with the expectation of earning substantial returns. 1 is the lowest level of risk aversion, 4 the highest (see text for explanations).

Table 1: VPHI rating criteria

Country	**Variables used for rating premiums**	**Medical Information** **Procedures required for application**
Austria	Age at entry, sex, marital status, individual health status	Insurers are prohibited by law from carrying out examinations
Belgium	Mutual: group rates according to the level of coverage. Commercial: age, sex, area of residence, level of coverage, level of deductible	Mutual: only some mutuals require a medical questionnaire. Commercial: medical questionnaire and/or examination
Denmark	Mutual: group rates according to the level of coverage. Commercial: age, employment status	Medical questionnaire
Germany	Age at entry, sex, health status	Medical questionnaire
Greece	Age, sex, profession, family and individual health status	Medical questionnaire, examination, x-rays
Italy	Age, sex, health status, area of residence	Medical questionnaire
Spain	Age, sex	Medical questionnaire
Sweden	Age, health status	Medical questionnaire, examination (in rare cases)

Source: Mossialos and Thomson (2004)

Table 2: Descriptives

	Austria	**Germany**	**Sweden**	**Spain**	**Italy**	**Denmark**	**Greece**	**Belgium**
Education	11.415	13.857	10.826	5.945	7.312	13.316	9.442	10.861
	(2.548)	(2.579)	(3.131)	(4.256)	(4.154)	(3.100)	(4.605)	(3.643)
Memory	5.395	5.649	5.631	3.834	4.325	5.755	5.105	5.203
	(1.751)	(1.579)	(1.536)	(1.669)	(1.552)	(1.559)	(1.505)	(1.591)
Verbal Fluency	22.895	21.404	24.491	15.524	14.715	22.667	15.158	20.628
	(9.228)	(6.846)	(6.883)	(5.353)	(5.548)	(6.657)	(4.759)	(6.152)
Numeracy	3.739	3.766	3.767	2.563	2.952	3.637	3.526	3.444
	(0.934)	(0.996)	(0.965)	(1.025)	(0.994)	(1.058)	(1.047)	(0.991)

Note: Descriptives are based on the 2004 answers of individuals aged 50-75. Standard deviations are reported in parenthesis.

Table 3: Positive Correlation Test

	Full Sample	Low Quality Healthcare Countries	High Quality Healthcare Countries
Correlation Coeff. Bivariate Probit (ρ)	0.045	0.058	0.035
Likel. Ratio Test (ρ=0)	1.437	0.804	0.582
Insurers Controls	Yes	Yes	Yes
Country Dummies	Yes	Yes	Yes
Observations	5828	3641	2187

Note: *** denotes significance at 1%, ** at 5% and * at 10%. Low Quality Healthcare countries include Denmark, Greece, Italy Spain and Sweden. High Quality Healthcare countries include Austria, Belgium and Germany. The dependent variables of the bivariate probit are the dummy for whether the individual has hospital private insurance cover in 2004 and takes the value 1 if the individual has been in hospital over night in the 12 months preceding the 2006 interview. Individual characteristics were measured in 2004 survey. Insurers controls include age (in single year dummies), sex, marital status, age of spouse, occupational dummies, residence in a metropolitan area, and variables for current and past health status (see text for the complete list).

Table 4: Test for residual private information

	Full Sample		Low Quality Countries		High Quality Countries	
	Hospital Overnight	Hospital Insurance	Hospital Overnight	Hospital Insurance	Hospital Overnight	Hospital Insurance
Survival Probability	-0.047***	0.023	-0.039**	0.023**	-0.057*	0.013
	(0.017)	(0.017)	(0.019)	(0.011)	(0.032)	(0.046)
II Inc. Tercile	-0.003	0.032**	0.008	0.011	-0.025	0.058*
	(0.012)	(0.013)	(0.014)	(0.009)	(0.022)	(0.033)
III Inc. Tercile	-0.001	0.065***	-0.004	0.041***	-0.004	0.081**
	(0.014)	(0.014)	(0.016)	(0.012)	(0.024)	(0.034)
II Wealth Tercile	-0.021*	0.043***	-0.018	0.020**	-0.019	0.075**
	(0.011)	(0.013)	(0.012)	(0.009)	(0.022)	(0.034)
III Wealth Tercile	-0.012	0.072***	-0.010	0.034***	-0.007	0.129***
	(0.012)	(0.014)	(0.014)	(0.011)	(0.024)	(0.034)
Correlation Coeff. Bivariate Probit (ρ)	0.047		0.071		0.036	
Likel. Ratio Test (ρ=0)	1.499		1.159		0.588	
Insurers Controls	Yes		Yes		Yes	
Country Dummies	Yes		Yes		Yes	
Observations	5591		3463		2128	

Note: *** denotes significance at 1%, ** at 5% and * at 10%. Marginal effects from heteroskedasticity robust bivariate probit are reported. Low Quality Healthcare countries include Denmark, Greece, Italy Spain and Sweden. High Quality Healthcare countries include Austria, Belgium and Germany. The dependent variables for the bivariate probit are the dummy for whether the individual owned a hospital private insurance in 2004 and a dummy that takes the value 1 if the individual has been in hospital over night in the 12 months preceding the 2006 interview. Survival probability has been rescaled to between 0 and 1. Individual characteristics were measured in 2004. Insurers' Controls include age (in single year dummies), sex, marital status, age of spouse, occupational dummies, residence in a metropolitan area, and variables for current and past health status (see text for the complete list).

Table 5: Hospital Insurance Take Up by Healthcare Quality

Low Quality Healthcare Countries

Education	0.004***	0.003***				
	(0.001)	(0.001)				
Recall			0.009***	0.008***		
			(0.002)	(0.002)		
Fluency					0.002***	0.001***
					(0.000)	(0.000)
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes
Health History Controls	No	Yes	No	Yes	No	Yes
Country Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3645	3637	3641	3636	3634	3629

High Quality Healthcare Countries

Education	0.005	0.005				
	(0.004)	(0.004)				
Recall			0.006	0.006		
			(0.007)	(0.007)		
Fluency					-0.001	-0.001
					(0.002)	(0.002)
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes
Health History Controls	No	Yes	No	Yes	No	Yes
Country Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2184	2179	2187	2182	2180	2175

Note: *** denotes significance at 1%, ** at 5% and * at 10%. Marginal effects from heteroskedasticity robust univariate probit are reported. Low Quality Healthcare countries include Denmark, Greece, Italy Spain and Sweden. High Quality Healthcare countries include Austria, Belgium and Germany. The dependent variables of the univariate probit is the dummy for whether the individual owns a hospital private insurance in 2004. Baseline controls include age, sex, marital status, occupational dummies, household size, household income (in logs), wealth terciles, dummies for whether the individual makes moderate physical exercise, she is obese and smokes at the moment as recorded in 2004. Health history controls include limitations to activities of daily living, limitations to instrumental activities of daily living, dummies for whether the individual has been overnight in hospital and spoken to a doctor in the 12 months before the 2004 interview.

Table 6: Hospital Insurance Take Up and Quality of Health Promotion

Education	0.005***	0.005***				
	(0.001)	(0.001)				
Recall			0.009***	0.009***		
			(0.003)	(0.003)		
Fluency					0.001	0.001
					(0.001)	(0.001)
% Advised Flu Vacc.	0.022	0.001	0.011	-0.008	-0.002	-0.023
	(0.040)	(0.044)	(0.043)	(0.043)	(0.039)	(0.047)
Education*% Advised Flu Vacc.	-0.009	-0.011*				
	(0.006)	(0.006)				
Recall*% Advised Flu Vacc.			-0.028**	-0.033**		
			(0.015)	(0.016)		
Fluency*% Advised Flu Vacc.					-0.007*	-0.007**
					(0.004)	(0.003)
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes
Health History	Yes	Yes	Yes	Yes	Yes	Yes
Regional Characteristics	No	Yes	No	Yes	No	Yes
Country Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5870	5857	5869	5857	5855	5845

Note: *** denotes significance at 1%, ** at 5% and * at 10%. Marginal effects from heteroskedasticity robust univariate probit are reported. The dependent variable is the dummy for whether the individual owned a private hospital insurance in 2004. The marginal effect on the interaction term has been calculated using the method suggested by Norton et al. (2004). Standard errors are calculated using 500 bootstrap repetitions. % Advised Flu Vacc. is the proportion of individuals in the region, aged 65 or over, that have been advised by a doctor or a health professional to have a flu vaccination. Baseline controls include age, sex, marital status, occupational dummies, household size, household income (in logs) wealth terciles, dummies for whether the individual takes moderate physical exercise, is obese and is a smoker as recorded in 2004. Health history controls include limitations to the activities of daily living, limitations to the instrumental activities of daily living, dummies for whether the individual has been in hospital over night and consulted a doctor in the 12 months preceding the 2004 interview. Regional characteristics include the proportion of women, the proportion of people aged 65 or above, dummies for hospital waiting time terciles and wealth terciles.

Table 7: Hospital Insurance Take Up and Waiting Time

Education	0.005***		
	(0.001)		
Recall		0.009***	
		(0.003)	
Fluency			0.001
			(0.001)
Wait Time II	0.001	0.001	0.001
	(0.011)	(0.011)	(0.011)
Wait Time III	0.004	0.003	0.002
	(0.017)	(0.016)	(0.016)
Education*Wait Time II	0		
	(0.002)		
Education*Wait Time III	0.004		
	(0.003)		
Recall*Wait Time II		0.008	
		(0.005)	
Recall*Wait Time III		0.01	
		(0.007)	
Fluency*Wait Time II			0.001
			(0.001)
Fluency*Wait Time III			0.004**
			(0.002)
Baseline Controls	Yes	Yes	Yes
Health History Controls	Yes	Yes	Yes
Regional Characteristics	Yes	Yes	Yes
Country Dummies	Yes	Yes	Yes
Observations	5874	5873	5859

Note: *** denotes significance at 1%, ** at 5% and * at 10%. Marginal effects from heteroskedasticity robust univariate probit are reported. The dependent variable for the univariate probit is the dummy for whether the individual owned a hospital private insurance in 2004. The marginal effect on the interaction term has been calculated using the method suggested by Norton et al. (2004). Standard errors are calculated using 500 bootstrap repetitions. Wait Time II and III are the II and III terciles of regional waiting time calculated as a sample weighted average of individual responses on the number of months delay before the last outpatient treatment. Baseline controls include age, sex, marital status, occupational dummies, household size, household income (in logs) wealth terciles, dummies for whether the individual takes moderate physical exercise, is obese and is a smoker as recorded in 2004. Health history controls include limitations to the activities of daily living, limitations to the instrumental activities of daily living, dummies for whether the individual has been in hospital over night and consulted a doctor in the 12 months preceding the 2004 interview. Regional characteristics include the proportion of women, proportion of people aged 65 or over, and wealth terciles.

Table 8: Private Pension Take Up and Quality of Health Promotion

Education	0.007***	0.007***				
	(0.001)	(0.001)				
Recall			0.006**	0.007**		
			(0.003)	(0.003)		
Fluency					0.001	0.001
					(0.001)	(0.001)
% Advised Flu Vacc.	0.003	-0.035	0.002	-0.04	-0.003	-0.045
	(0.037)	(0.038)	(0.037)	(0.038)	(0.038)	(0.039)
Education*% Advised Flu Vacc.	-0.005	-0.007				
	(0.005)	(0.005)				
Recall*% Advised Flu Vacc.			-0.017	-0.021		
			(0.012)	(0.012)		
Fluency*% Advised Flu Vacc.					-0.003	-0.004
					(0.003)	(0.003)
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes
Health History Controls	Yes	Yes	Yes	Yes	Yes	Yes
Regional Characteristics	No	Yes	No	Yes	No	Yes
Country Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5870	5870	5869	5869	5855	5855

Note: *** denotes significance at 1%, ** at 5% and * at 10%. Marginal effects from heteroskedasticity robust univariate probit are reported. The dependent variable is the dummy for whether the individual had a private pension in 2004. The marginal effect on the interaction term is calculated using the method suggested by Norton et al. (2004). Standard errors are calculated using 500 bootstrap repetitions. % Advised Flu Vacc. is the proportion of individuals in the region aged 65 or over that were advised by a doctor or a health professional to have a flu vaccination. Baseline controls include age, sex, marital status, occupational dummies, household size, household income (in logs) wealth terciles, dummies for whether the individual takes moderate physical exercise, is obese and is a smoker as recorded in 2004. Health history controls include limitations to the activities of daily living, limitations to the instrumental activities of daily living, dummies for whether the individual has been in hospital over night and consulted a doctor in the 12 months preceding the 2004 interview. Regional characteristics include the proportion of women, the proportion of people aged 65 or over, dummies for hospital waiting times terciles, and wealth terciles.

Table 9: Hospital Insurance Take Up and Stock Market Participation

Education	0.005***	0,005***				
	(0.001)	(0.001)				
Recall			0.009***	0,009***		
			(0.003)	(0.003)		
Fluency					0.001	0.001
					(0.001)	(0.001)
% Stock Market	0.302***	0,275*	0,298**	0.272	0,295**	0.268
	(0.124)	(0.161)	(0.129)	(0.158)	(0.136)	(0.155)
Education*% Stock Market	-0.009	-0.008				
	(0.014)	(0.014)				
Recall*% Stock Market			-0.004	-0.005		
			(0.032)	(0.032)		
Fluency*% Stock Market					0.007	0.005
					(0.007)	(0.007)
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes
Health History Controls	Yes	Yes	Yes	Yes	Yes	Yes
Regional Characteristics	No	Yes	No	Yes	No	Yes
Country Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5878	5878	5877	5877	5863	5863

Note: *** denotes significance at 1%, ** at 5% and * at 10%. Marginal effects from heteroskedasticity robust univariate probit. The dependent variable for the univariate probit is the dummy for whether the individual had a hospital private insurance in 2004. The marginal effect on the interaction term is calculated using the method suggested by Norton et al. (2004). Standard errors are calculated using 500 bootstrap repetitions. % Stock Market is the proportion of individuals in the region aged 50 or over that invest in the stock market. Baseline controls include age, sex, marital status, occupational dummies, household size, household income (in logs) wealth terciles, dummies for whether the individual takes moderate physical exercise, is obese and is a smoker as recorded in 2004. Health history controls include limitations to the activities of daily living, limitations to the instrumental activities of daily living, dummies for whether the individual has been in hospital over night and has consulted a doctor in the 12 months preceding the 2004 interview. Regional characteristics include the proportion of women, the proportion of people aged 65 or over, dummies for hospital waiting time terciles and wealth terciles.

Table AI: Test for residual private information - Alternative classification

	Full Sample		Low Quality Countries		High Quality Countries	
	Hospital Overnight	Hospital Insurance	Hospital Overnight	Hospital Insurance	Hospital Overnight	Hospital Insurance
Survival Probability	-0.048***	0.024	-0.029	0.061***	-0.063***	-0.004
	(0.017)	(0.017)	(0.026)	(0.017)	(0.022)	(0.026)
II Inc. Tercile	-0.002	0.032**	0.013	0.011	-0.019	0.038*
	(0.012)	(0.013)	(0.017)	(0.011)	(0.016)	(0.020)
III Inc. Tercile	-0.000	0.065***	0.029	0.050**	-0.017	0.060***
	(0.014)	(0.015)	(0.024)	(0.020)	(0.018)	(0.020)
II Wealth Tercile	-0.021*	0.043***	-0.005	0.017	-0.029**	0.057***
	(0.011)	(0.013)	(0.016)	(0.012)	(0.014)	(0.020)
III Wealth Tercile	-0.013	0.073***	-0.010	0.036**	-0.012	0.094***
	(0.012)	(0.014)	(0.018)	(0.016)	(0.016)	(0.020)
Correlation Coeff. Bivariate Probit (ρ)	0.046		0.027		0.049	
Likel. Ratio Test (ρ=0)	1.451		0.075		1.302	
Insurers Controls	Yes		Yes		Yes	
Country Dummies	Yes		Yes		Yes	
Observations	5591	5591	1913	1913	3678	3678

Note: *** denotes significance at 1%, ** at 5% and * at 10%. Marginal effects from heteroskedasticity robust bivariate probit. Low Quality Healthcare countries include Greece, Italy and Spain. High Quality Healthcare countries include Austria, Belgium, Denmark, Germany and Sweden. The dependent variables for the bivariate probit are a dummy for whether the individual had a hospital private insurance in 2004 and a dummy that takes value 1 if the individual has been in hospital over night in the 12 months preceding the 2006 interview. Individual characteristics were measured in 2004. Insurers controls include age (in single year dummies), sex, marital status, age of spouse, occupational dummies, residence in a metropolitan area, and variables for current and past health status (see text for the complete list).

Table AII: Insurance Take up and Information Acquisition by Healthcare Quality

Low Quality Healthcare Countries

Education	0.005***	0.004***				
	(0.001)	(0.001)				
Recall			0.012***	0.012***		
			(0.003)	(0.003)		
Fluency					0.002***	0.002***
					(0.001)	(0.001)
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes
Health History Controls	No	Yes	No	Yes	No	Yes
Country Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2042	2037	2034	2030	2027	2023

High Quality Healthcare Countries

Education	0.004**	0.003*				
	(0.002)	(0.002)				
Recall			0.006	0.005		
			(0.004)	(0.004)		
Fluency					0.000	-0.000
					(0.001)	(0.001)
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes
Health History Controls	No	Yes	No	Yes	No	Yes
Country Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3787	3779	3794	3788	3787	3781

Note: *** denotes significance at 1%, ** at 5% and * at 10%. Marginal effects from univariate probit. Low Quality Healthcare countries include Greece, Italy and Spain. High Quality Healthcare countries include Austria, Belgium, Denmark, Germany and Sweden. The dependent variable for the univariate probit is the dummy for whether the individual had a hospital private insurance in 2004. Baseline controls include age, sex, marital status, occupational dummies, household size, household income (in logs) wealth terciles, dummies for whether the individual takes moderate physical exercise, is obese and is a smoker as recorded in 2004. Health history controls include limitations to the activities of daily living, limitations to the instrumental activities of daily living, dummies for whether the individual has been in hospital overnight and consulted a doctor in the 12 months preceding the 2004 interview.

Table AIII: Hospital Insurance Take Up and an alternative measure of Health Promotion

Education	0.005***	0.005***				
	(0.001)	(0.001)				
Recall			0.009**	0.009***		
			(0.003)	(0.003)		
Fluency					0.001	0.001
					(0.001)	(0.001)
% Advised Colons.	0.034	0.045	0.042	0.048	0.055	0.06
	(0.057)	(0.064)	(0.060)	(0.066)	(0.061)	(0.063)
Education*% Advised Colons.	-0.003	-0.005				
	(0.011)	(0.011)				
Recall*% Advised Colons.			-0.043**	-0.043**		
			(0.023)	(0.022)		
Recall*% Advised Colons.					-0.012**	-0.012**
					(0.005)	(0.006)
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes
Health History Controls	Yes	Yes	Yes	Yes	Yes	Yes
Regional Characteristics	No	Yes	No	Yes	No	Yes
Country Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5874	5874	5873	5873	5859	5859

Note: *** denotes significance at 1%, ** at 5% and * at 10%. Marginal effects from univariate probit. The dependent variable for the univariate probit is the dummy for whether the individual owned a private hospital insurance in 2004. The marginal effect on the interaction term is calculated using the method suggested by Norton et al. (2004). Standard errors are calculated using 500 bootstrap repetitions. % Advised Colons. is the proportion of individuals in the region aged 50-85 that have been advised by a doctor to have a colonoscopy. Baseline controls include age, sex, marital status, occupational dummies, household size, household income (in logs) wealth terciles, dummies for whether the individual takes moderate physical exercise, is obese and is a smoker as recorded in 2004. Health history controls include limitations to the activities of daily living, limitations to the instrumental activities of daily living, dummies for whether the individual has been in hospital overnight and consulted a doctor in the 12 months preceding the 2004 interview. Regional characteristics include the proportion of women, the proportion of people aged 65 or over, dummies for hospital waiting time terciles and wealth terciles.