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Income and Health Care Utilization Among the 50+ in Europe and the US

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Abstract

This study addresses the question how income affects health care utilization by the population aged 50 and over in the United States and a number of European countries with varying health care systems. The probabilities that individuals receive several medical services (visits to general practitioner, specialist, dentist, inpatient, or outpatient services) are analyzed separately using probit models. In addition to controls for income and demographic characteristics, controls for health status (both subjective and objective measures of health) are used. We analyze how the relationship between income and health care utilization varies across countries and relate these cross country differences to characteristics of the health care system, i.e., per capita total and public expenditure on health care, gate-keeping for specialist care, and co-payments.

Keywords: Health care demand; Socio-economic status; HRS; SHARE.

JEL classification: J14, C14, C33

1. Introduction

Ensuring socio-economic equity and reactivity of health care systems is often considered a high priority in health care policy [1]. In the United Kingdom for example, equitable access to health care is an explicit goal of government policy [2]. The ministers of health from Chile, Germany, Greece, New Zealand, Slovenia, Sweden, and the United Kingdom have formed an international forum on matters relating to access to health care services, to sustain the goal of equitable access to good quality health care [3]. Policy makers should have insight in the inequality changing effects of various health care systems, as lack of access and quality may cause or at least reinforce the positive association between socio-economic status (SES) and health, the so-called SES gradient in health [2].
SES is a comprehensive concept based on income, education, occupation, and sometimes wealth. Income is a commonly used measure of SES because it is relatively easy to report for most individuals and easier to compare across countries than, for example, education level. For this reason we choose income as the measure for SES, and refer to income and SES interchangeably, in spite of the broader meaning that SES entails. In this study we compare the relationship between SES and health care utilization in countries with very different health care policies, exploiting the large cross-country variation in health care systems to analyze which policies are effective to make the utilization of health care more equitable.
The share of the total European population older than 65 is set to increase - from 16.1% in 2000 to 22% by 2025 and 27.5% by 2050 [4]. People 65+ represented 12.4% of the United States (US) population in the year 2000 but are expected to grow to be 20% of the population by 2030 [5][1]. These numbers will certainly pose big challenges to existing health care systems, asking for economic health care policies aimed at reducing the burden of aging populations on society and at the same time ensuring the availability of health and social services for older persons, promoting their continued participation in a socially and economically productive life. Aging may not be the main factor in driving up rising health-care costs over the coming decades: the demographic shift is also accompanied by a changing

[1] US Department of Health and Human Services, Administration on Aging, www.dhhs.gov.

health profile, with an increasing incidence of chronic diseases among older persons. This asks for policies aimed at containing the prevalence of chronic diseases associated with population aging, and at dedicating more resources to preventive measures (such as, for example those aimed at reducing smoking and excessive alcohol consumption). There is ample evidence that mortality and morbidity, the relative incidence of a disease or condition that alters health and the quality of life, are inversely related to SES correlates such as income, education, or wealth [2]. Moreover recent literature has emphasized the positive relationship between health conditions and SES, the "health-SES gradient" [6,7,8], and the stylized fact that wealthier individuals (who also tend to have higher income) live longer.

Although most OECD countries aim at ensuring equitable access to health care and offer basic health care to the complete population irrespective of their SES, the utilization of many health care services is associated with SES, and the nature of this association varies across countries with widely varying arrangements in terms of co-payments and deductibles for services and prescribed drug treatments, private health insurance and private health facilities, quality differences across hospitals and other health care facilities, private and public insurance for specific treatments such as dental care, policies for promoting preventive health care, etc. Most likely the relationships between SES and health care use and the various types of health care services are different. For example, it is likely that the higher the SES, the better one can find one's way in the health care system, obtain a surgical treatment when needed, and the easier it is to obtain a referral to a specialist. On the other hand, general practitioners (GP) are usually more accessible to all individuals, irrespective of their SES. Disproportionate use of specialist care among the higher socio-economic status groups can be due to the association between education and health knowledge, making the higher SES groups better informed about access to and usefulness of care. Health itself also plays a role here, since the fact that low SES is associated with poor health implies that the needs of health care are higher for the low SES groups. Social policy initiatives are needed to provide access to health care on the basis of need and in order to gain control over escalating health care costs.

By analyzing the relationship between SES, health, and health care use for a variety of developed countries, this paper addresses several questions: What is the

nature of the relationship between SES and health care use among the 50+ population? Does the relationship vary with different types of health care services, such as primary care, specialist care, or in- and outpatient care in a hospital? What are the socio-economic factors driving the use of health care services: income, wealth and/or education?

While the policy relevance of the relationship between SES and health care utilization seems obvious and is emphasized in the existing literature on the debate on "health equity" (cf., e.g. [3]), it should be mentioned that there is an ongoing debate on the theoretical and operational targets. Sen [9] discusses health equity in the broader framework of social justice, and argues that since health is central to not only quality of life but also the ability to do what one has reason to do, health equity is crucial for social justice and equitable access to health care is more important than, for example, equitable access to luxury consumption. Although there seems to be general consensus about its importance, there is an open debate on what health equity means and what the targets are that should be aimed at. Oliver and Mossialos [3] mention three principles of equity in health and health care: equal access to health care for those in equal needs; equal utilization of health care for those in equal need; and equal (or, rather, equitable) health outcomes. They conclude that only the former is a reasonable policy target, but what is meant by equal access and equal need is not well-defined. Moreover, access to health care is hard to measure, which is why the focus is often on equal utilization of health care services as an observable proxy. Differences in preferences may well imply that equitable access does not lead to equitable utilization.

Health and health care equity has often been seen as in conflict with health care efficiency. Culyer [10] argues that there is not necessarily a conflict between the two. He uses the concept of an efficiency frontier in health production - health care efficiency implies that health care production must reach the Pareto frontier such that it is impossible to improve health care services for one group without harming another group. Health care equity has implications for which Pareto efficient allocation is attained. The debate agrees upon the fact that this point must imply some basic level of health care utilization for everyone who needs it irrespective of their SES, but not on what this basic level exactly is.

The contribution of our paper is empirical and determined by the nature and quality of our data, in the spirit of earlier studies by, for example, Van Doorslaer et al. [1], who also focus on the relationship between SES and health care utilization keeping the need for health care constant. We consider health care utilization as a proxy of health care access, since we have data on the former and not on the latter. We investigate the mechanisms that lead to a relationship between SES and health care utilization and often interpret differences in utilization as differences in access.

The remainder of this paper is organized as follows. In the next section, we provide a conceptual framework and the empirical strategy it implies.
In Section 3 we discuss the main features of the health care systems in the countries we study. Section 4 describes the data and Section 5 presents the associations between SES (measured by income) and health care utilization by country. Section 6 links the findings in Section 4 to those in Section 5 to analyze the implications of health care policy for the association between SES and health care utilization. Section 7 concludes.

2. Framework

The relevant framework is the model of Grossman [11] and its extensions; see, e.g., [12]. While the original study presents a precisely defined model in which theoretical predictions are possible, we focus on the extended framework which adds empirically relevant realistic features, though at the cost of reducing its value for using the theory to predict empirical relationships. Individuals maximize lifetime utility, where utility in a given period depends upon consumption and the stock of health. Health has the nature of a capital good, which deteriorates over time but can be increased by investments, requiring health inputs. The main inputs are health care (preventive or curative) and health related behaviors ((not) smoking, (not) drinking, exercising, healthy diet, etc.). The marginal return on investment in health care depends upon the current status of health, which is why most people seek health care if they have a health problem.
The demand for health care can therefore be seen as an input demand function. It will depend on the (effective monetary) consumer price of health care and, if this is nonzero, on the available income, since the individual has to trade off investing

in health against consumption. The effective price depends on co-payments and may be low in case the individual has health insurance. There are also other, non-monetary, costs involved with seeking health care, particularly the time needed to acquire health care (opportunity costs of time, which will be particularly relevant for workers, but also the disutility of spending time in waiting rooms). Thus even if the effective monetary price for the consumer is zero due to health insurance, seeking health care comes with a cost. In addition, the demand for health care will depend upon (and probably decline with) health, since the marginal return will depend on (and decline with) health. In principle the marginal return of health care investments may also depend on other inputs such as (not) smoking or exercising, but keeping health constant it is not so clear whether this effect should play a big role or what sign it should have. Finally, the demand for health care will depend upon access to information (though this may be particularly important more for preventive forms of health care that are not commonly known if people are not automatically referred to them by their GP, than for the health care services that are considered here. See, for example, Avitabile et al. [13]).

In this framework, the health care system and health care policy affect the use of health care services by low and high SES groups through several mechanisms. The effective (monetary) costs will be more important for low income than for high income groups. Non-monetary costs such as waiting times may play a larger role for those with high opportunity costs of time (workers, and particularly workers with high SES). Access to information on health care availability will depend on education and social networks. All these features of the health care system can be influenced by health policy, and better understanding these mechanisms can help to adjust the health care system so that it better accommodates health care needs rather than willingness or ability to pay.

What does this theoretical framework imply for our analysis of how SES impacts health care use by adults aged 50+ across countries? First take current health, information access, and insurance status as given. Now consider the effective (out of pocket) price the consumer has to pay, accounting for co-payments. Excluding the unlikely case of a Giffen good, we can predict that demand falls if the price rises, keeping other factors constant. Since prices directly depend on whether co-payments apply and how large they are, this also leads to the prediction that demand is lower in countries with higher co-payments, ceteris paribus.

This, however, does not say much about the relationship with the most important SES index in our analysis, which is (household) income. The question is how the income effect varies with price. If the effective price is zero, the use of health services is determined by non-monetary factors only, and we expect that the income effect is close to zero. If prices are positive, however, the sign of the income effect is theoretically undetermined without making assumptions on the form of the utility function, and empirical evidence is needed. To the best of our knowledge there is no direct empirical evidence on this, but we expect the income effect to be positive if the user price is positive, and larger if the effective price is higher. This implies that the income sensitivity of the demand for health care is larger for higher effective prices. This leads to the empirical prediction that the income gradient is larger for services and in countries where co-payments are substantial. Moreover, we expect that average effective prices are lower in countries where the health care system is to a large extent publicly funded. This leads to the prediction that there is a negative relationship between the SES gradient and the share of public health spending in gross domestic product (GDP).
On the other hand, health care services may also be costly in terms of time. In particular, for workers, the opportunity cost of time spent in, e.g., waiting rooms will increase with the hourly wage rate. This effect might dominate if the effective monetary price is low. That is, demand for health care might actually fall with SES, particularly among the younger part of the 50+ population who are often doing paid work, and in countries where waiting times in hospitals, emergency rooms, or doctor's offices are long. In any case, the compensating effect of the opportunity cost of time leads to the prediction that the SES gradient will be lower for workers than for non-workers.
Other supply side factors may also affect the use of health care and its income gradient. In particular, the way in which general physicians and specialists are remunerated differs across countries. Sometimes they get a fee for each service, sometimes for each patient, and sometimes a fixed salary. This may influence their advice to patients, and patients in different socio-economic groups may cope with this in different ways (see, for example, Fabbri and Monfardini [14]). For example, it seems plausible that higher socio-economic groups are better able to force doctors to make judgments on the basis of medical grounds rather than their own financial interest, implying that the effect of the remuneration will vary with

socio-economic status, or, equivalently, the effect of socio-economic status will vary with the remuneration system.

Public or private health insurance may obviously matter a lot for the effective price of health care. If everyone is fully insured for all health care services and co-payments are always zero, the effective price is zero. While if co-payments are substantial and many services are not covered by the insurance, the effective price can be quite high. In most European countries and in the US, the system is somewhere in between these two. Moreover, costs may be different for different types of care (GP care, specialist care, hospital visits, etc.), and this is one of the reasons why we model each type of care separately.

We encounter a complication when examining the health stock itself. Health is positively correlated with SES. Since health is likely to negatively affect the demand for health care, analyzing the relationship between health care demand and SES without controlling for health will lead to lower (more negative or less positive) estimates of the effect of SES on health care use than if health is controlled for - the lower SES groups demand more care because they need it more (or in terms of the theoretical model, because its marginal return is higher), and not because of their lower SES as such. It therefore seems better to control for health in the analysis. This is also in line with what we want to measure: health care equity refers to equitable access to health care for those in equal need, i.e., for those with the same health condition. But this of course raises the issue that health can be affected by past health care (and health behavior) choices - health is quasi-fixed in the short run, but depends on the individual's choices in the long run.

What are the implications of the theoretical framework for the empirical strategy? We run probit regressions explaining health care utilization from SES indicators (income, in the benchmark model), and the SES measure interacted with country dummies, to examine whether the hypotheses formulated above are supported or not. Complications arise because we want to control for various factors: health behavior, information about health care services, and health[2].

[2] We do not incorporate voluntary health insurance (VHI). The theoretical framework applies to the price of health care conditional on the insurance that an individual has. But VHI is often the own choice of the individual, and this choice may be related to the individual's preferences for health or health care (cf., e.g., Jones et al. [15]). It may be fixed in the short run but not in the long run.

As argued above, it is not a priori clear whether variation in health behavior would affect our findings, and if so, in which direction. We therefore do not incorporate health behavior in our main estimations. As a robustness check, however, we also estimate a version of the model that includes controls for health behavior (which are available in our data). This ignores the fact that health behavior may be potentially endogenous because it is a choice of the individual. We lack the appropriate instruments to take that into account.

Information access is difficult to measure. In our main model, we do not incorporate it in the regression but keep it in mind when interpreting the results. For example, if we find a positive relationship between health care use and SES, one potential explanation is that high SES groups have more access to information.

We also do not have the data to account for the endogeneity of health. But since controlling for health (i.e. health care needs) is crucial in our context, we control for health in the main analysis and thereby account for the potential endogeneity problems in interpreting the results as in Maurer [16]. Following Van Doorslaer et al. [1], we compare results that control for current health with results that do not. As an intermediate strategy, we also consider specifications that only control for a limited set of health variables that are plausibly exogenous (such as whether the doctor has ever told the respondent he or she has cancer, arthritis, etc.).

3. Health Care Systems in Europe and the US

Important cross-country differences exist with respect to the financing and delivery systems of health care. There is no generally accepted classification of health care systems: they are usually categorized according to their financing, but this is only one aspect of a health care system. The characteristics summarized in Tables 1 and 2 give some insight on institutional differences which may have an impact on cross-country differences in health care utilization by income level and can be of relevance when interpreting our results presented in Section 6.

Table 1 summarizes some of the characteristics of health care systems in the US and the European countries which we analyze (Austria (AT), Belgium (BE), Denmark (DK), France (FR), Germany (DE), Greece (GR), Italy (IT), the

Netherlands (NL), Spain (ES), Sweden (SE), and Switzerland (CH))[3]. Table 2 shows the type of financing and scope of the health care system in the United States in more detail. We can broadly divide countries in groups according to the organization of their health care system. The first group includes countries (Denmark, Greece, Italy, Spain, and Sweden) characterized by public health care systems (National Health System - NHS) mainly financed by taxes and providing for almost universal coverage (Beveridgean systems). In the second group are countries (Austria, Belgium, France, Germany, the Netherlands) whose health care systems are mainly financed by social contributions (Social Health Insurance - SHI) based on individual income level and which are based on coverage by social security or sickness funds (Bismarckian systems). Switzerland has a "Private mandatory insurance" system (since 1996) financed through premiums; it guarantees universal coverage by compulsory (and publicly subsidized) private health insurance. The insurance premium varies by region but is independent of income and risk.

The US is the only OECD country where voluntary health insurance is the main system for most of the population. This country has a considerable share of the population without insurance coverage: according to the Census Bureau's 2005 Current Population Survey (CPS) [17], there were 45.8 million uninsured individuals in 2004, or 15.7% of the civilian non-institutionalized population. On the other hand, almost the complete US population of ages 65 and over automatically has access to Medicare so that this part of the population is covered by a universal public health care system. In the other countries considered in this study, some population groups buy private health coverage because either they are not eligible to public coverage or they can choose to opt out of it. This is the case, for example, for the Netherlands, where a third of the population is not eligible to public health insurance coverage, and Germany, where employees with annual earnings over € 45,900 and their dependants can choose to opt out of the statutory health insurance scheme. In Belgium and France, the insured have to pay different co-payments depending on the type of service, while in other countries visits to public sector doctors are free at the point of delivery (Denmark, Germany, Greece, Italy, and Spain).

[3] The tables refer to 2004, the year in which our micro data were collected.

Secondary care rules vary from country to country: a gate-keeping system that requires the authorization of referrals to specialists by a designated primary care provider is active in some countries. However, in some countries gate-keeping can be sometimes bypassed through emergency departments of hospitals (like in Spain), whereas in other countries it is often not enforced (like in Italy and Greece). In the US there is no gate-keeping system for those aged 65+.
General practitioners are paid by capitation in Denmark, Italy, and the Netherlands; by salary in Greece, Spain and Sweden, and on fee-for-service basis in the other countries [18]. Under a capitation system, doctors are paid a fee for each patient registered with them; under a fee-for-service system, doctors are paid on the basis of the service provided; and under a salary system, doctors are employed by the state or the insurer with a salary that does not directly depend on the number of treatments or the number of patients. Remuneration of specialists is differentiated across types of specialization, but the data that we have do not allow distinguishing among these types of specialist. Specialists working in public hospitals in the European countries in the Survey of Health, Ageing and Retirement in Europe (SHARE) are mostly salaried, whereas in the US they are paid on a fee-for-service basis.
Specialist consultation requires some co-payments in most of the countries considered. In Italy a flat rate payment is required for public consultations and outpatient visits; in Spain specialist consultations are free at point of delivery. In Greece consultations are paid out-of-pocket, since private financing is very high. In the US co-payments do not apply to those aged 65+, who are covered by Medicare.
Unlike GP and specialists services, dental care is not publicly provided: dental visits are usually financed out-of-pocket, being paid the full cost in Italy, the Netherlands, Spain and Sweden, and financed through co-payments or co-insurance in the other countries.

4. Data

Van Doorslaer et al. [19] compare the SES gradient in several countries using nationally representative country specific datasets. They acknowledge the potential drawback that measures of health care use, SES, health or other controls may not be comparable across countries, and emphasize the usefulness of having

harmonized international data sets to avoid these potential comparability problems. For a selected set of European countries in the European Community Household Panel (ECHP), Van Doorslaer et al. [1] analyze the relationship between the use of primary and specialist care and SES, controlling for health. Their analysis covers the complete adult population. They find that health care use increases with SES if health is controlled for, particularly specialist care.

The first wave of the SHARE data that have become available for eleven European countries, in combination with the Health and Retirement Study (HRS) data for the US[4], offers a unique opportunity for a richer analysis of the population aged 50 and over. First, these data sets provide detailed information on health care use, including specialist visits, dental care, and in- and outpatient treatment in hospitals. Second, they contain extensive information on SES, with harmonized data on education, income, and wealth components. Third, they allow controlling for a rich set of objective and subjective health variables. Therefore SHARE and HRS represent unique data sets for the analysis of the relationship between human capital and SES on the one hand, and the use of health care facilities on the other hand, accounting for the health-SES gradient by controlling for health.

This paper uses data from 2004[5]: wave 1 of SHARE (release 2.0.1) for Europe, and wave 7 of the HRS for the US. We use data from the eleven countries that contributed to the 2004 baseline study in SHARE[6]: Austria, Germany, Denmark, Spain, France, Greece, Italy, the Netherlands, Sweden, Switzerland and Belgium. The study sample is restricted to adults aged 50 and older and we dropped observations with incomplete information on background variables[7]. Our final sample counts 26,563 individuals for SHARE and 19,084 individuals for HRS.

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[4] See Appendix for more information on these data sources. A similar source of data (The English Longitudinal Study of Ageing - ELSA) exists for England, but this unfortunately does not contain the information on utilization of health care services that we analyze in this paper.

[5] Income is collected as gross income in SHARE wave 1 and as net income in wave 2. We focus on wave 1 to make income directly comparable with the HRS, which also includes gross income.

[6] See Börsch-Supan et al. [20,21] and www.share-project.org for details on the SHARE data.

[7] The sample design implies that individuals younger than 50 years with a partner of 50 years or older are also interviewed. These respondents are not included in our analysis.

4.1 Utilization of Health Services

Health service use is measured by the following questions: "During the last twelve months[8], about how many times in total have you seen or talked to a medical doctor about your health?"; "How many of these contacts were with a GP or with a doctor at your health care centre?"; "During the last twelve months, have you consulted any of the specialists mentioned on card 12?"; "During the last twelve months, have you seen a dentist or a dental hygienist?". Similar questions were asked for inpatient and outpatient care. In this paper, we focus on the binary variables of using a given type of service at least once (variable coded as 1) or not at all (variable coded as 0) during the past 12 months[9].

Figure 1 shows a cross country comparison of the use of health care services by income class, based upon our samples from SHARE and HRS. HRS does not distinguish between GP and specialist visits, and only provides information on "doctor visits" (which includes GP, specialist, and outpatient visits). Therefore, GP and specialist use by income class are provided for the SHARE countries only. Figure 1 shows highly differentiated pictures of health service utilization rates across countries and across health services, irrespective of income class. The fraction of the 50+ population visiting a GP at least once varies across SHARE countries from hardly more than 60% in Greece to almost 90% in Belgium and France, three countries that all have almost complete coverage of their population by the public health care system. Differences for other services are even larger. The use of specialist services seems exceptionally low in Denmark, being less than 20%, and quite high in Belgium and Germany, although coverage by public health care is less complete in Germany than in many other countries. Inpatient and outpatient services seem particularly popular in the US. It must be kept in mind, however, that the US question refers to a two year period while the SHARE question refers to the past 12 months. This may explain the difference for inpatient services but cannot explain the difference in outpatient services, where the US utilization rate is more than twice as large as the utilization rate in any of the SHARE countries. Particularly in outpatient services, there is also large

[8] In the HRS, the questions refer to the last two years instead of the past twelve months.

[9] Two years in the US. This difference is not corrected for in the descriptive statistics but is captured by the US dummy in the regressions.

dispersion within Europe. Such dispersion is also found in dentist care, which is much less common in the southern European countries than in the US and the rest of Europe. Denmark and Sweden have the highest proportion of dental care users. There is also substantial variation in the income gradients across health services as well as countries. The use of doctor, inpatient, and outpatient care does not increase with income in most countries, in accordance with the fact that for basic health services most countries have achieved close to universal coverage of their population at relatively low and sometimes zero financial cost. In fact, the association between income and inpatient or GP care seems negative, which is probably due to the fact that the low income groups are less healthy and more in need of health care. This finding is in line with earlier studies like Van Doorslaer et al. [1,19]. For specialist and outpatient care, no clear positive or negative association is found. The only exception here is dental care - its use clearly rises with income in all SHARE countries and in the US.

4.2 Demographics and Health Variables

In this section we define the explanatory variables that we include in the model. Tables 3 and 4 show descriptive statistics of our working sample. The demographic variables included in the analysis are age, gender and marital status. Age is grouped into 5-year bands: 50-54; 55-59; 60-64; 65-69; 70-74; 75-79, and 80+. Marital status is categorized as married or not married (which includes "living with a partner" and "living as a single").

SES is included in the model as household income, adjusted for household size (that is, divided by the square root of the number of household members). Income is measured as the log of gross annual household income for 2003 and is derived from disaggregated income sources including labor and non-labor income, transfer income, investment income, benefit income and pension income (gross total individual income of each respondent, sum of the gross incomes of other household members and other benefits, capital assets income, excluding rent payments received and imputed rents). All amounts are in thousands of PPP-adjusted dollars[10].

[10] PPP exchange rates are taken from the OECD web-site: www.oecd.org/document/47/0,3343,en_2649_34357_36202863_1_1_1_1,00.html#historicalppp

This paper focuses on the SES gradient in terms of log income, considered a short term indicator for SES. In a sensitivity analysis, we also look at other SES indexes which can be seen as long-term indicators of SES, in particular education level and household wealth. Education level is defined according to the ISCED-97 harmonized coding for international comparisons[11], with the following three categories: non-advanced qualification, high school qualification and advanced qualification. Wealth is defined as household net worth in thousands of PPP-adjusted dollars, adjusted for household size.

Health care equity is often defined as equal access for those with equal need. The need for health care services is incorporated through several indicators of the respondent's health. We control for self-reported health status (SPHS, coded as 0 "very good/excellent" and 1 "less than very good"), and more objective measures of health. The variables "limitations with activity of daily living" (ADL) (such as dressing, bathing, or getting in and out of bed) and "mobility limitation" (MOBILIT) indicate the extent to which individuals consider themselves physically handicapped. Both variables are reclassified into two categories: no limitations with ADL (or MOBILIT) and one or more limitations with ADL (or MOBILIT). In addition, we include a variable indicating whether or not the respondent has two or more chronic diseases (CHRONIC), based upon questions that ask whether the respondent suffers from a number of chronic diseases[12]. Finally, we control for three dummies related to weight and height: underweight, overweight, and obese; the benchmark group is those of normal weight. These dummies are based upon the body mass index (BMI): weight (in kilograms) divided by height (in cm) squared. BMI categories are as follows: BMI ≤ 18.5 (underweight); $18.5 < BMI < 25$ (normal weight); $25 \leq BMI < 30$ (overweight); $BMI \geq 30$ (obese).

[11] See for details on ISCED coding: www.uis.unesco.org/ev.php?ID=3813_201&ID2=DO_TOPIC

[12] The number of chronic diseases is a count of the following diseases an individual might have: heart problems, high blood pressure, high cholesterol, cerebral vascular disease, diabetes, lung diseases, asthma, arthritis, osteoporosis, cancer, stomach ulcer, Parkinson disease, cataracts, hip fracture or femoral fracture.

5. The Income Gradient of Health Care Use

In this section, we describe the income gradient of health care use using probit models explaining the yes/no answer to the questions whether respondents have used the type of health care service at least once in the past twelve months (two years in the US). In each probit model, the independent variable of interest is log household income. The models are estimated separately for each type of care and for each country. We present the income slopes as a descriptive tool.

We distinguish three models in each case, differing in the additional factors that we control for. The first model does not control for any additional factors, the second controls for basic demographics (age, gender, marital status); the third specification adds the controls for health. Tables 5 - 10 present the country specific estimates of the coefficient on log income for each type of health care that we consider for each of the three models.

As a sensitivity analysis we check what happens when we also control for education level in the third specification of the model. The estimated effect of education on health care use is significantly positive for specialist and dentist visits, and the estimates of the coefficient of log income hardly change. Regarding doctor visits, middle and high education coefficients are positive and significant for SE, IT, GR, and US (for FR and DK only for high education). Regarding the other health care services, the education controls are generally not significant, except for the US, where they are always positive and significant. Overall, the education effects are usually in line with the log income effects but significance levels sometimes differ (for example, for doctor visits, education level coefficients are significant whereas log income is not).

In the same way, we estimate the third specification of the model adding controls for wealth (assets). This has no effect on the income coefficients and the coefficients on the wealth variables are not significant.

Similarly we test the robustness of the results with other SES measures (education level and assets) to support the choice of log household income as the measure of SES. We estimate each probit model first with assets[13], then with educational qualification[14] as independent variables reflecting SES (instead of log income).

[13] In PPP-adjusted dollars measured at household level, corrected for household size.

[14] As defined in the previous section.

Whenever the coefficients on assets or on education qualifications are significant, the sign is the same as for log income, leading to results that are qualitative similar to those obtained for log household income. Therefore the main conclusions remain unchanged when log income is replaced by another measure of SES or when more than one SES measure is used.

Tables 5 - 10 present the estimated marginal effects at the country specific means. They can thus be interpreted as 100 times the number of percentage points the probability of using the service would increase if income increased by 1%, keeping constant all other explanatory factors included in the model.

The general picture of Tables 5 - 10 is that the SES gradients are very heterogeneous across health care services and across countries, but less across model specifications. Once basic demographics are controlled for, controlling for health often raises the income coefficient (from negative to zero, or from zero to positive, etc.), in line with the notion that lower income groups have more health problems, and health problems obviously increase the use of health care.

Table 5 presents the results for doctor visits, combining GP, specialist and outpatient visits[15]. Particularly when health is controlled for, the income slope is positive in six countries, including the US, but there is large variation in size and significance levels across countries, and in some countries the income slope is essentially zero. To understand these differences, it seems better to look at the more disaggregate level where GP services, specialist services, and outpatient services are distinguished, presented in Tables 6, 7 and 8, respectively.

For GP use (Table 6) the sign of the income effect is negative or insignificant for the majority of the countries if health conditions and demographics are not controlled for. Controlling for health conditions changes the picture, with insignificant income effects in all countries except SE where, surprisingly, the income slope becomes significantly positive and quite large, whereas in a country like DK, with a health care system which is in many respects similar to that in SE, the slope is zero. Part of the explanation suggested by the theoretical framework might be that DK has no co-payments while in SE very modest co-payments exist (Docteur and Oxley [22], pp. 54-55). Other possible explanations for the

[15] GP and specialist visits are distinguished in the SHARE data only, nevertheless we are able to analyze outpatient service use separately both in SHARE and HRS.

differences might be differences in the extent to which health care is publicly funded and whether the GP acts as a gate-keeper to other forms of care.

The picture for specialist use is quite different (Table 7): the income gradient is positive and significant in most SHARE countries, with or without controls for demographics and health conditions. Particularly in CH, the income gradient of specialist access seems very large, in line with what we saw in Figure 1. In SE, DK, and ES, the income effect is insignificant but still positive once demographic characteristics and health conditions are controlled for.

For outpatient use (Table 8) we find significant positive income effects for the US and SE. In the US, outpatient care is more important (both in absolute terms and compared to inpatient care) than in the European countries (see Figure 1) and it seems that particularly the richer groups make much use of this. An explanation for this may be that co-payments on typical outpatient hospital treatments like X-rays and pathology are higher in the US than in Europe (Docteur and Oxley [22], Table 7). Co-payments cannot explain the strong positive income effect in Sweden; perhaps this is because outpatient care can substitute specialist care in this country, since Sweden is one of the few countries where we find no SES gradient in specialist care (see Table 7).

The results for inpatient care are presented in Table 9. Without controls for demographic characteristics and health conditions, income effects vary from significantly negative in the US, DE, and SE, to insignificantly positive in the other European countries. Once all the controls are added, the income effect is usually small and positive (with a few exceptions) and never significant at the 5% level. According to Docteur and Oxley [22], most countries have no or a modest co-payment for every day spent in the hospital, except in the US where co-payments can be substantial. Possible explanations for a positive effect of income might be that hospitals get higher fees for treatments of higher income groups covered by different type of insurance (cf. Van Doorslaer et al. [19]) or that access barriers (such as information acquisition or an appointment with a specialist) mainly hamper the lower income groups[16].

[16] Stargardt [23] compares the costs of a hip replacement, a common operation for the elderly, across selected countries. He finds that Spain is much cheaper than other countries, whereas Italy is quite expensive. There is only a weak correlation between these costs and the income effects in

The strongest effect of income is in dentist and dental care use (Table 10): we find a positive effect of income for all countries (even when controlling for health, except GR), and the effect is significant at the 5% level in nine of the twelve countries. The costs of dental care are often not covered by basic insurance in most of the countries we considered. Higher income apparently leads to easier access and better chances to purchase an adequate and affordable level of private coverage. It is interesting to compare the ranking of the income gradients here with the ranking of the costs of a standard treatment - dental fillings across countries, given by Tan et al. [24]. They find the highest costs of treatment in England, Italy and Spain, and much lower costs in Germany, the Netherlands and, particularly, Denmark and France (unfortunately they provide no information on the other SHARE countries). If higher costs of treatment lead to higher prices for health care consumers (in the form of co-payments or because treatment is not covered) one would expect a positive relationship between the income effect and the cost. This is not what we find for ES, which has rather low income effects compared to the other countries considered, though it is one of the most expensive countries for dental care. IT has a higher income effect than all the countries mentioned in the study by Tan et al. [24], except DK.

6. Health Care Use and Health Policy

In the previous section we found substantial differences in the relationship between income and health care utilization across countries. In this section we analyze the cross-country correlation between the income gradient that we estimated in the previous section and differences in health care policy across countries. Table 11 presents the characteristics of the health care systems. These are the policy instruments that can affect the income gradient of health care services. The variables per capita total expenditures on health care and per capita public health expenditure[17] (here defined as percentage of total expenditure on health) are measures of health care funding. How this affects the income gradient obviously depends on how the funding is allocated. More public health expenditures can benefit the poor if they increase access to basic services, but they

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the same countries, which probably should be expected since patients hardly ever end up paying this themselves.

may also be used for less basic services that are more than proportionally used by the higher income groups. Per capita health expenditures per year vary from slightly less than US $ 2,000 in GR to more than US $ 6,000 in the United States. They are much lower in the Southern European countries than in the rest of Europe and much higher in the US than in any of the European countries - the difference between the US and Switzerland, the European country where these expenditures are highest, is still more than 50%[18].

The third macro-variable reflecting differences in health care policy is a dummy for whether the general physician acts as a gate-keeper (GK) for access to other types of health care such as specialist care (excluding dentists). We expect that general physicians do not base their referral decisions on income and therefore may reduce the importance of other determinants of using specialist care, such as its price. Since visiting a GP does not substantially depend on income, gate-keeping may also reduce the gradient due to information access: the information on specialist services provided by the GP will be less related to the patient's SES than information collected by the patients themselves. On the other hand, those who are more informed may push their GP harder to refer them to a specialist. Moreover, it seems plausible that gate-keeping increases the time effort needed to obtain specialist care, making it less attractive for individuals with high opportunity costs, e.g. higher wage earners. All these scenarios lead to the hypothesis that gate-keeping reduces the income gradient of specialist care and other types of care to which gate-keeping applies, such as many types of inpatient care which often start with referral to a specialist.

The relationship of gate-keeping with outpatient care is not so clear; some outpatient care requires referral but other types do not (particularly emergency care). We expect that gate-keeping increases utilization of GP services, and to the extent that higher SES groups want more specialist services, that gate-keeping also has the indirect effect of increasing demand for (referrals through) GP visits.

Table 11 also shows the more common type of remuneration for doctors in every country[19]: fee-for-service (F) where doctors are paid on the basis of the service

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[17] Expressed in US $ using purchasing power parity [25].

[18] Similar results are obtained if the ratio of health care expenditures and GDP is used.

[19] We use the same remuneration types as Jimenez-Martin et al. [26], where the types are defined for doctors and GPs.

provided, capitation (C) where doctors are paid a fee for each patient registered with them, and salary (S) where doctors are employed by the state or the insurer with a salary that does not directly depend on the number of treatments or the number of patients. In countries with a fee-for-service payment scheme, doctors may tend to lengthen the duration of the treatments, which makes visits to a specialist more likely than in countries where other types of remuneration apply. As discussed in Section 2, under plausible assumptions about underlying preferences, co-payments are expected to increase the SES health care utilization gradients since they increase the effective price of the services. Co-payments vary across services, sometimes refer to amounts, and sometimes are a percentage of the total cost of a specific service. As a consequence, specifying a co-payment amount for each broad type of health services in our analysis is not possible. We therefore only work with a dummy variable on whether co-payments apply. Table 11 shows that co-payments for GP care are common in five out of twelve countries considered. In all these countries except GR, co-payments also apply to specialist and in- or outpatient services, while there are several countries where co-payments apply to some of these services but not to GP care. Co-payments are very common for dentist services - DE and NL are the only countries where they do not apply.

For the empirical analysis, we ran similar probit models as in the previous section, pooling all countries and interacting log income with the five policy indexes discussed above defined at the country level[20]. Furthermore we included only one or two macro-variables at a time. The identifying assumption in these models is that the cross-country differences in income slopes are exclusively driven by the macro-variables included in that regression, while differences in the levels of health care utilization can also be due to the other macro-variables and other

[20] Per capita total health expenditure (PCPHE), per capita public health expenditure (PCPUBHE), doctors type of remuneration (CAP, SAL, with FFS being the base category), a dummy for whether the GP acts as a gate-keeper (GK; gate-keeping refers to a system where the primary care provider coordinates patient care and refers patients to specialists, hospitals and other medical services), and a dummy for whether the health service requires co-payments (COPAYS). We also included country dummies, but no interactions between log income and country dummies. The country dummies also accounted for the difference between the US and the SHARE questions: the former asks about using the health care services in the past two years, the latter about the last 12 months. While this would affect the levels, we assumed it had no effect on the income slopes.

factors (economic, institutional, or cultural). Unfortunately, the number of countries appeared not to be large enough to disentangle the effect of each macro-variable on the income gradient separately, neither in a multivariate regression context nor when including one macro variable at the time - we tried both specifications but results were inaccurate and insignificant (details are available upon request).

Instead, we follow a more descriptive approach, showing how the income slopes relate to the different macro-variables described above. Figure 2 shows the results. It should be kept in mind here that the correlations are based upon 11 or 12 points (11 or 12 countries, depending on whether the US is included or not) only, and can be driven by a few of these countries. The most salient finding is a positive association between aggregate health care expenditures and the income gradient of the use of health care services. Positive association is found for doctor visits, specialist services, outpatient services, and dental care, irrespective of the measure for public health expenditures that is used. This suggests that the extra services provided in countries with relatively large health expenditures mainly benefit the richer part of the (older) population. For GP visits, the sign of the association depends on which measure of health care expenditures is used. For inpatient services, we find a negative but very weak association. For these services, the fact that larger health care expenditure may increase access for the poor could compensate the effect of providing extra services mainly used by the richer part of the population.

Gate-keeping is positively associated with the income gradient in doctor visits, GP visits, and outpatient services, but negatively with specialist visits. The latter effect is as expected, since the need of referral through a GP may make a specialist visit more dependent on medical need and less on other factors such as income or access to information networks. The positive associations with GP visits are in line with the fact that their greater demand for specialist services induces high income groups to visit their GP if they need a referral. The positive association with outpatient services may (again) be explained by substitution of specialist visits by outpatient hospital treatment.

The association between co-payments and income is largely as expected. It is positive for doctor visits, specialist visits, outpatient services, and dental care. It is zero or even negative for GP visits and inpatient services. Like the associations

with the level of public health expenditures, this is consistent with the notion that specialist, outpatient, and dental care services contain more non-basic "luxury" services where the patients have a choice and make a tradeoff between costs and benefits. Higher (monetary) costs induced by co-payments are more often an impediment for low income groups than for higher income groups.

7. Conclusions

We have analyzed the relationship between income as a measure of SES and the use of several health care services for the 50+ population in the US and a number of European countries. Using a health production framework, we have analyzed the potential income effects and how they vary with prices and other institutional features. This leads to predictions for empirical work - for example, the association between the consumer price and the income effect is expected to be positive, while the effect is predicted to be negatively correlated to quality aspects such as waiting times. Health policies that change the effective price of health care services, or change other factors that make the services less or more accessible to low or high SES groups, are therefore expected to influence the relationship between the use of the health care service and socio-economic status. Since equal access to health care services for people with equal health problems is an explicit policy target in many countries, it is important to analyze which aspects of health policy lead to such a gradient.

We find clear evidence of a positive income gradient for several health care services, particularly for specialist visits, outpatient services, and dental care. These are also the services for which we find the clearest positive association between the income gradient and public expenditure on health care at the aggregate (country) level. These services probably contain more non-basic services than the other types of health care use that we consider, implying that whether or not to use them is a choice of the consumer. For low income groups, the cost may weigh more heavily and limited access to information about available health care possibilities may play a role as well. In any case, our results suggest that countries with higher public health expenditures do not automatically get closer to the policy goal of health care equity, i.e. equal access for those with the same needs. On the contrary, our results suggest that the extra services that the

extra money can buy disproportionally benefit the richer part of the (older) population.

Validating the theoretical predictions requires more detailed insight in the prices and characteristics of various types of health care services than is currently available. There is interesting recent work on price indicators based upon specific treatments [7] but this covers only a limited set of countries and focuses more on the production costs and reimbursements to doctors and hospitals than on the prices for the patients. Additionally future research on what is covered by which insurance is needed.

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Reference list

1. Van Doorslaer, E., Masseria, C., Koolman, X.: Inequalities to access in medical care by income in developed countries. Canadian Medical Association Journal 174, 2, 177-183 (2006)

2. Deaton, A.: Policy implications of the gradient of health and wealth. Health Affairs 21, 2, 13-30 (2002)

3. Oliver, A., Mossialos, E.: Equity of access to health care: outlining the foundations for action. Journal of Epidemiology and Community Health 58, 655-658 (2008)

4. European Commission: The future of health care and care for the elderly: guaranteeing accessibility, quality and financial viability. Commission of the European Communities, Brussels (2001)

5. US Department of Health and Human Services: Healthy People 2010: National health promotion and disease prevention objectives. US Department of Health and Human Services, Public Health Service, Washington, DC (2000)

6. Banks, J., Marmot, M., Oldfield, Z., Smith, J. P.: The SES health gradient on both sides of the Atlantic. IZA Discussion Paper 2539 (2007)

7. Busse, R., Schreyögg, J., Smith, P. C.: Variability in healthcare treatment costs amongst nine EU countries - Results from the HealthBASKET project. Health Economics 17, S1, S1-S8 (2008)

8. Smith, J. P.: Healthy bodies and thick wallets: the dual relationship between health and economic status. The Journal of Economic Perspectives 13, 2, 145-166 (1999)

9. Sen, A.: Why health equity? Health Economics 11, 8, 659-666 (2002)

10. Culyer, A. J.: The bogus conflict between efficiency and vertical equity. Health Economics 15, 11, 1155-1158 (2006)

11. Grossmann, M.: On the concept of health capital and the demand for health. The Journal of Political Economy 80, 2, 223-255 (1972)

12. Grossmann, M.: The human capital model. In: Culyer, A. J. and Newhouse, J. P. (eds.) Handbook of Health Economics, pp. 347-408. Elsevier, Amsterdam (2000)

13. Avitabile, C., Jappelli, T., Padula, M.: Screening tests, information, and health-education gradient. CSEF Working Paper 187 (2008)

14. Fabbri, D., Monfardini, C.: Public vs. private health care services demand in Italy. Giornale degli Economisti e Annali di Economia 62, 1, 93-123 (2002)

15. Jones, A. M., Koolman, X., Doorslaer, E. van: The impact of supplementary private health insurance on the use of specialists in selected European countries. Annales d'Economie ey Statistique 83/84, 251-275 (2006)

16. Maurer, J.: Modelling socioeconomic and health determinants of health care use: a semiparametric approach. Health Economics 16, 967-979 (2007)

17. US Census Bureau: Income, poverty, and health insurance coverage in the United States: 2005. Washington, DC (2005)

18. OECD: OECD Health Data 2004: A comparative analysis of 30 countries. Organisation for Economic Co-operation and Development (OECD), Paris (2004)

19. Van Doorslaer, E., Wagstaff, A., Burg, H. van der, Christiansen, T., De Graeve, D., Duchesne, I., Gerdtham, U., Gerfin, M., Geurts, J., Gross, L., Hakkinen, U., John, J., Klavus, J., Leu, R. E., Nolan, B., O' Donnel, O., Propper, C., Puffer, F., Schellhorn, M., Sundberg, G., Winkelhake, O.: Equity in the delivery of health care in Europe and the US. Journal of Health Economics 19, 553-583 (2000)

20. Börsch-Supan, A., Brugiavini, A., Jürges, H., Mackenbach, J., Siegrist, J., Weber, G.: Health, Ageing and Retirement in Europe - First results from the Survey of Health, Ageing and Retirement in Europe. Mannheim Research Institute for Economics of Ageing (MEA), Mannheim (2005)

21. Börsch-Supan, A., Jürges, H.: Health, Ageing and Retirement in Europe - Methodology. Mannheim Research Institute for Economics of Ageing (MEA), Mannheim (2005)

22. Docteur, E., Oxley, H.: Health-care systems: lessons from the reform experience. OECD Health Working Paper Series 9 (2003)

23. Stargardt, T.: Health service costs in Europe: cost and reimbursement of primary hip replacement in nine countries. Health Economics 17, S9-S20 (2008)

24. Tan, S. S., Redekop, W. K., Rutten, F. H.: Costs and prices of single dental fillings in Europe: a micro-costing study. Health Economics 17, S83-S93 (2008)

25. OECD: OECD Health Data 2007. Organisation for Economic Co-operation and Development (OECD), Paris (2007)

26. Jimenez-Martin, S., Labeaga, J. M., Martínez-Granado, M.: An empirical analysis of the demand of physician services across the European Union. European Journal of Health Economics 5, 2, 150-165 (2004)

27. WHO: World report on knowledge for better health: strengthening health systems. World Health Organization (WHO), Geneva (2004)

Table 1 - Characteristics of health care systems in SHARE countries and US (2004)

	COVE-RAGE TYPE	ELIGIBILITY FOR PUBLIC COVERAGE	%THE ON PHI	%THE ON OOP	%POP WITH PUB/ MAND	%POP WITH VPHI	TYPES OF PRIVATE COVERAGE
AT	Social Insurance	Almost all labor force participants and retirees are covered by a compulsory statutory health insurance. 1% are without coverage.	7.3	17.5	99.9	0.1; 31.8	Primary (Substitute); Complementary, Supplementary
BE	Social Insurance	Compulsory statutory health insurance includes one scheme for salaried workers and one scheme for self-employed. The latter excludes coverage of 'minor risks' such as outpatient care, physiotherapy, dental care, and minor operations.	n.a.	19.7	99	57.5	Primary (Substitute); Complementary, Supplementary
DK	Public Tax Financed	All population is eligible to public coverage financed by State, County and Municipal taxation.	1.6	15.3	100.0	28.0 (1998)	Complementary, Supplementary
FR	Social Insurance	The social security system provides coverage to all residents. 1% of the population is covered through Couverture Maladie Universal (CMU).	12.7	9.8	99.9	92.0	Complementary, Supplementary
DE	Social Insurance	All employed people (not self-employed) are covered by statutory health insurance coverage. Employers with an income above a threshold can opt out of the social sickness found system.	12.6	10.4	90.9	9.1	Primary (Substitute); Complementary, Supplementary
GR	Public Tax Financed	All population is eligible to public coverage financed by a combination of taxation and social health insurance contributions.	n.a.	n.a.	100.0	10.0	Duplicate, Supplementary

Continued on next page

Table 1 - Continued from previous page

	COVERAGE TYPE	ELIGIBILITY FOR PUBLIC COVERAGE	%THE ON PHI	%THE ON OOP	%POP WITH PUB/MAND	%POP WITH VPHI	TYPES OF PRIVATE COVERAGE
IT	Public Tax Financed	All population is covered by the National Health Service system, financed by general taxation.	0.9	22.3	100.0	15.6 (1998)	Duplicate, Complementary, Supplementary
NL	Social Insurance	Eligibility to statutory health insurance is determined by income. Individuals above a threshold are not covered (28.9% in 2000).	15.2	10.1	72.0	28.0; 64*	Primary (Principal); Supplementary
ES	Public Tax Financed	Almost all the population is covered by the National Health Service system, financed by general taxation. A minor group of self-employed liberal professionals and employers are uncovered.	3.9	23.6	97.3	2.7; 10.3	Primary (Substitute, Principal); Duplicate, Supplementary
SE	Public Tax Financed	All population is covered by a statutory social health insurance system, financed by local taxes and state grants.	n.a.	n.a.	100.0	negl.	Complementary, Supplementary
CH	Private Mandatory	All permanent residents are mandated to purchase basic health insurance.	10.5	31.5	100.0	80.0	Supplementary
US	Private Voluntary	Individuals eligible to public programs include the above 65 and several disabled (Medicare), poor or near poor (Medicaid) and poor children (SCHIP). Eligibility thresholds to Medicare are set by state.	35.1	13.3	24.7	71.9	Primary (Principal); Complementary, Supplementary

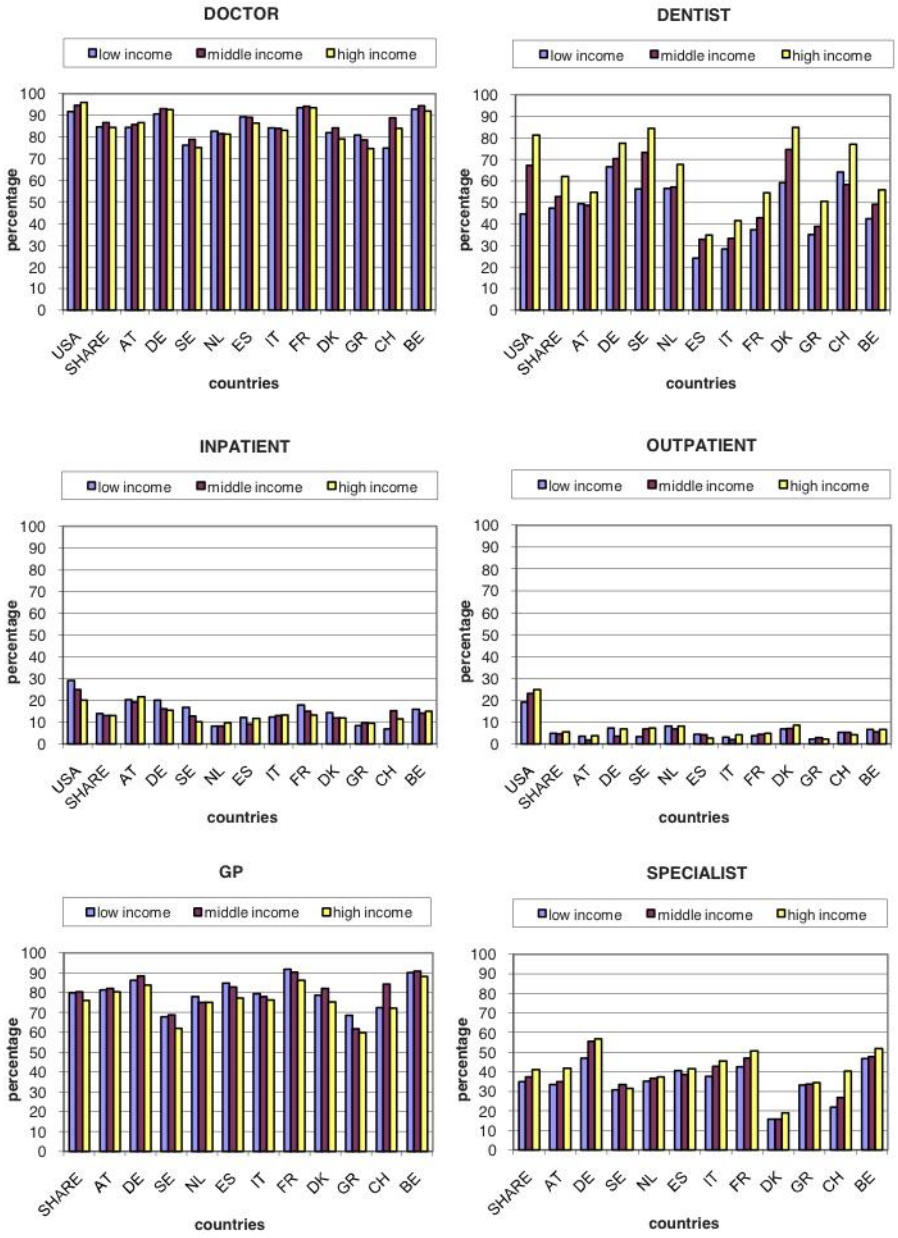
Source: OECD [18]. Notes: 'negl.' indicates a proportion covered of less than 1%; 'n.a.' indicates not available; * estimated. THE: total health expenditures; (V)PHI: voluntary private health insurance; OOP: out of pocket expenditures; POP: population; PUB/MAND: public/mandatory.

Table 2 - United States: Type of health financing and scope

VOLUNTARY HEALTH INSURANCE	Private Health Insurance schemes financed through employers' and employees' premiums, but about 40% of all employers pays the full premium for their employees; Predominantly middle-class and higher class population.
MEDICARE	Federal health insurance program, financed through taxes (75%) and contributions (25%) paid into Social Security; People aged 65+, people with disabilities, people with End-Stage Renal Disease, also middle-class population.
MEDIGAP	Medicare supplemental health insurance policy sold by private insurance.
MEDICAID	Join federal and state program; People with low income (11%) or with no insurance (15%).

Source: WHO [27], Country profiles, www.who.int.

Figure 1 - Health care use by income



Notes: Weighted statistics based on 2004 SHARE and HRS data.

Table 3 - Income by country

Country	Mean	Std. Dev.	Variance	p25	p50	p75
AT	33349.96	32660.75	1.07e+09	14016.92	23764.62	40091.64
DE	37770.06	37923.73	1.44e+09	15074.41	26333.00	47071.98
SE	38381.26	27373.97	7.49e+08	20920.06	31029.11	47179.50
NL	41507.49	38940.71	1.52e+09	16867.77	30720.52	53432.91
ES	20488.52	29284.59	8.58e+08	6,334.11	11786.35	23682.49
IT	22402.76	24733.75	6.12e+08	8,790.07	15341.92	27475.69
FR	37575.93	46804.90	2.19e+09	13412.86	22966.36	41115.70
DK	38521.71	32883.28	1.08e+09	16510.29	30612.65	48494.54
GR	18075.29	17192.18	2.96e+08	8,329.86	13319.43	23183.83
CH	47892.35	44345.83	1.97e+09	16627.12	35185.15	64482.54
BE	38751.76	54288.86	2.95e+09	12768.93	21519.57	43268.27
US	40839.25	70786.93	5.01e+09	13056.00	24878.85	46325.39
Total	36678.92	54398.61	2.96e+09	12662.87	23489.34	43314.55

Notes: Authors' calculations based on 2004 SHARE and HRS data. Income is measured as gross annual household income for 2003, adjusted for household size. All amounts are in thousands of PPP-adjusted dollars.

Table 4 – Descriptive statistics of the working sample

Variable	Mean	Std. Dev.	Min.	Max.
logincome	9.962	1.345	0	15.08
assets	288314.8	924719.9	-2719208	5.46E+07
mid edu	0.306	0.461	0	1
high edu	0.296	0.457	0	1
55–59	0.162	0.369	0	1
60–64	0.166	0.372	0	1
65–69	0.162	0.368	0	1
70–74	0.130	0.336	0	1
75–79	0.098	0.297	0	1
80+	0.118	0.322	0	1
woman	0.554	0.497	0	1
unmarried	0.667	0.471	0	1
sphs	0.660	0.474	0	1
adl (1+)	0.126	0.332	0	1
mobilit (1+)	0.561	0.496	0	1
chronic (2+)	0.382	0.486	0	1
underweight	0.015	0.123	0	1
overweight	0.404	0.491	0	1
obese	0.216	0.412	0	1
N	45647			

Notes: Authors' calculations based on 2004 SHARE and HRS data.

Table 5 – Income gradient of health care use - Doctor (GP, specialist, and outpatient)

Country	N	(1)	(2)	(3)
AT	1789	1.041**	1.006**	0.865*
		(0.487)	(0.493)	(0.488)
DE	2899	0.412	0.42	0.715**
		(0.443)	(0.407)	(0.337)
SE	2933	1.58	2.633**	3.768***
		(0.98)	(1.029)	(1.021)
NL	2806	1.195*	1.248*	1.354**
		(0.642)	(0.64)	(0.603)
ES	2164	0.129	0.03	-0.027
		(0.406)	(0.384)	(0.337)
IT	2440	1.044***	0.826**	0.833**
		(0.395)	(0.388)	(0.36)
FR	2880	0.196	0.141	0.157
		(0.339)	(0.318)	(0.243)
DK	1568	-1.548	-0.687	-0.03
		(1.052)	(1.076)	(0.994)
GR	2608	-0.119	0.222	0.352
		(0.536)	(0.526)	(0.502)
CH	929	0.55	0.655	0.966
		(1.015)	(0.987)	(0.925)
BE	3547	-0.069	-0.014	-0.001
		(0.341)	(0.313)	(0.247)
US	19084	0.959***	0.918***	1.094***
		(0.109)	(0.104)	(0.096)

Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Marginal effects: all coefficients are multiplied by 100. Base categories: age 50-54; male; married; bmi 'normal weight'. Variables included: Log income (Column 1); Demographic characteristics (age, gender, marital status) (Column 2); Health controls (self reported health status, adl, mobility, chronic conditions, bmi) (Column 3).

Table 6 – Income gradient of health care use - GP

Country	N	(1)	(2)	(3)
AT	1789	0.836	0.887	0.736
		(0.562)	(0.572)	(0.567)
DE	2899	-1.030*	-0.668	0.016
		(0.616)	(0.597)	(0.575)
SE	2933	0.611	2.285*	3.853***
		(1.141)	(1.21)	(1.257)
NL	2806	0.671	0.776	0.975
		(0.726)	(0.729)	(0.717)
ES	2164	-0.541	-0.594	-0.641
		(0.509	(0.497)	(0.474)
IT	2440	0.731	0.484	0.591
		(0.463)	(0.46)	(0.453)
FR	2880	-0.958**	-0.994**	-0.678
		(0.48)	(0.465)	(0.417)
DK	1568	-2.257**	-1.151	-0.286
		(1.135)	(1.163)	(1.107)
GR	2608	-1.263**	-0.851	-0.854
		(0.644)	(0.648)	(0.653)
CH	929	-2.358*	-2.501**	-1.973
		(1.242)	(1.232)	(1.218)
BE	3547	-0.299	-0.23	-0.138
		(0.419)	(0.395)	(0.353)

Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Marginal effects: all coefficients are multiplied by 100. Base categories: age 50-54; male; married; bmi 'normal weight'. Variables included: Log income (Column 1); Demographic characteristics (age, gender, marital status) (Column 2); Health controls (self reported health status, adl, mobility, chronic conditions, bmi) (Column 3).

Table 7 – Income gradient of health care use - Specialist

Country	N	(1)	(2)	(3)
AT	1789	1.886**	1.844**	1.843**
		(0.771)	(0.793)	(0.805)
DE	2899	2.741***	2.662***	2.840***
		(0.859)	(0.882)	(0.903)
SE	2933	-0.49	-0.154	1.101
		(1.143)	(1.198)	(1.242)
NL	2806	2.094**	1.978**	2.452***
		(0.864)	(0.873)	(0.91)
ES	2164	1.320*	1.12	1.174
		(0.676)	(0.685)	(0.715)
IT	2440	2.344***	2.230***	2.585***
		(0.615)	(0.622)	(0.658)
FR	2880	2.617***	2.502***	2.827***
		(0.768)	(0.786)	(0.808)
DK	1568	1.408	1.248	1.974
		(1.098)	(1.2)	(1.28)
GR	2608	1.181*	1.364**	1.587**
		(0.64)	(0.651)	(0.668)
CH	929	6.951***	7.709***	7.778***
		(1.46)	(1.501)	(1.519)
BE	3547	2.105***	2.212***	2.287***
		(0.668)	(0.673)	(0.684)

Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Marginal effects: all coefficients are multiplied by 100. Base categories: age 50-54; male; married; bmi 'normal weight'. Variables included: Log income (Column 1); Demographic characteristics (age, gender, marital status) (Column 2); Health controls (self reported health status, adl, mobility, chronic conditions, bmi) (Column 3).

Table 8 – Income gradient of health care use - Outpatient

Country	N	(1)	(2)	(3)
AT	1789	-0.155	-0.22	-0.241
		(0.232)	(0.23)	(0.215)
DE	2899	0.442	0.516	0.437
		(0.417)	(0.42)	(0.416)
SE	2933	1.892***	2.203***	2.390***
		(0.691)	(0.728)	(0.736)
NL	2806	0.372	0.431	0.519
		(0.493)	(0.491)	(0.493)
ES	2164	-0.049	-0.035	-0.044
		(0.26)	(0.261)	(0.24)
IT	2440	0.375	0.349	0.358
		(0.268)	(0.267)	(0.244)
FR	2880	0.068	0.049	0.036
		(0.32)	(0.317)	(0.314)
DK	1568	0.966	0.285	0.322
		(0.812)	(0.832)	(0.846)
GR	2608	0.019	0.031	0.05
		(0.202)	(0.186)	(0.185)
CH	929	-0.16	-0.061	-0.068
		(0.598)	(0.598)	(0.486)
BE	3547	0.511	0.48	0.543
		(0.35)	(0.348)	(0.347)
US	19084	1.861***	1.908***	2.515***
		(0.238)	(0.254)	(0.269)

Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Marginal effects: all coefficients are multiplied by 100. Base categories: age 50-54; male; married; bmi 'normal weight'. Variables included: Log income (Column 1); Demographic characteristics (age, gender, marital status) (Column 2); Health controls (self reported health status, adl, mobility, chronic conditions, bmi) (Column 3).

Table 9 – Income gradient of health care use - Inpatient

Country	N	(1)	(2)	(3)
AT	1789	0.357	0.256	0.087
		(0.631)	(0.649)	(0.648)
DE	2899	-1.608***	-1.391**	-0.98
		(0.606)	(0.614)	(0.602)
SE	2933	-1.495**	-0.678	0.468
		(0.74)	(0.798)	(0.809)
NL	2806	0.696	0.601	0.717
		(0.529)	(0.53)	(0.509)
ES	2164	0.48	0.442	0.438
		(0.448)	(0.459)	(0.441)
IT	2440	0.11	-0.101	0.024
		(0.396)	(0.394)	(0.393)
FR	2880	-0.498	-0.588	-0.353
		(0.527)	(0.538)	(0.543)
DK	1568	-0.829	1.144	2.149*
		(0.849)	(1.068)	(1.115)
GR	2608	0.646	0.692	0.710*
		(0.422)	(0.432)	(0.41)
CH	929	1.235	1.328	1.653*
		(0.994)	(1.013)	(0.944)
BE	3547	-0.168	-0.065	0.009
		(0.459)	(0.461)	(0.453)
US	19084	-2.962***	-2.187***	0.032
		(0.23)	(0.243)	(0.258)

Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Marginal effects: all coefficients are multiplied by 100. Base categories: age 50-54; male; married; bmi 'normal weight'. Variables included: Log income (Column 1); Demographic characteristics (age, gender, marital status) (Column 2); Health controls (self reported health status, adl, mobility, chronic conditions, bmi) (Column 3).

Table 10 – Income gradient of health care use - Dentist

Country	N	(1)	(2)	(3)
AT	1789	0.697	1.420*	1.442*
		(0.77)	(0.809)	(0.816)
DE	2899	3.024***	2.239***	1.750**
		(0.718)	(0.739)	(0.747)
SE	2933	8.853***	7.051***	6.482***
		(1.017)	(1.051)	(1.051)
NL	2806	1.817**	2.365***	2.141**
		(0.823)	(0.853)	(0.861)
ES	2164	1.024*	1.151*	1.141*
		(0.609)	(0.602)	(0.604)
IT	2440	2.812***	3.051***	3.082***
		(0.615)	(0.616)	(0.624)
FR	2880	3.132***	3.193***	2.924***
		(0.763)	(0.784)	(0.789)
DK	1568	7.405***	4.236***	3.956***
		(1.093)	(1.146)	(1.165)
GR	2608	1.286**	1.136*	1.079
		(0.646)	(0.662)	(0.665)
CH	929	5.651***	5.623***	5.299***
		(1.339)	(1.376)	(1.376)
BE	3547	2.964***	3.015***	2.868***
		(0.668)	(0.682)	(0.685)
US	19084	10.936***	9.964***	8.491***
		(0.298)	(0.311)	(0.316)

Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Marginal effects: all coefficients are multiplied by 100. Base categories: age 50-54; male; married; bmi 'normal weight'. Variables included: Log income (Column 1); Demographic characteristics (age, gender, marital status) (Column 2); Health controls (self reported health status, adl, mobility, chronic conditions, bmi) (Column 3).

Table 11 – Health care systems in SHARE countries and US

Country	Total Health Expenditure (Per Capita US$ PPP)	Public Health Expenditure (% Total Health Exp.)	GP as Gate–keeper (GK)	Doctor's Type of Payment	Co-payments					
					DOC	GP	SPEC	DENT	INPT	OUTPT
AT	3397	0.756	NO	F	NO	NO	NO	YES	YES	NO
DE	3162	0.769	NO	F	YES	NO	YES	NO	YES	YES
SE	2964	0.846	YES	C	YES	YES	YES	YES	YES	YES
NL	3156	0.625	YES	C	NO	NO	NO	NO	NO	NO
ES	2128	0.709	YES	S	NO	NO	NO	YES	NO	NO
IT	2401	0.758	YES	C	YES	NO	YES	YES	NO	YES
FR	3117	0.794	NO	F	YES	YES	YES	YES	YES	YES
DK	3030	0.843	YES	F	NO	NO	NO	YES	NO	NO
GR	1991	0.446	NO	S	YES	YES	YES	YES	YES	YES
CH	3990	0.585	NO	F	YES	YES	YES	YES	YES	YES
BE	3311	0.731	NO	F	YES	YES	YES	YES	YES	YES
US	6014	0.447	YES	F	YES	YES	YES	YES	YES	YES

Source: Van Doorslaer et al. [1]; OECD [25]; WHO [27]. Notes: Doctor's type of payment: fee-for-service (F), capitation (C), and salary (S).

Figure 2 - Income gradient and institutional variables

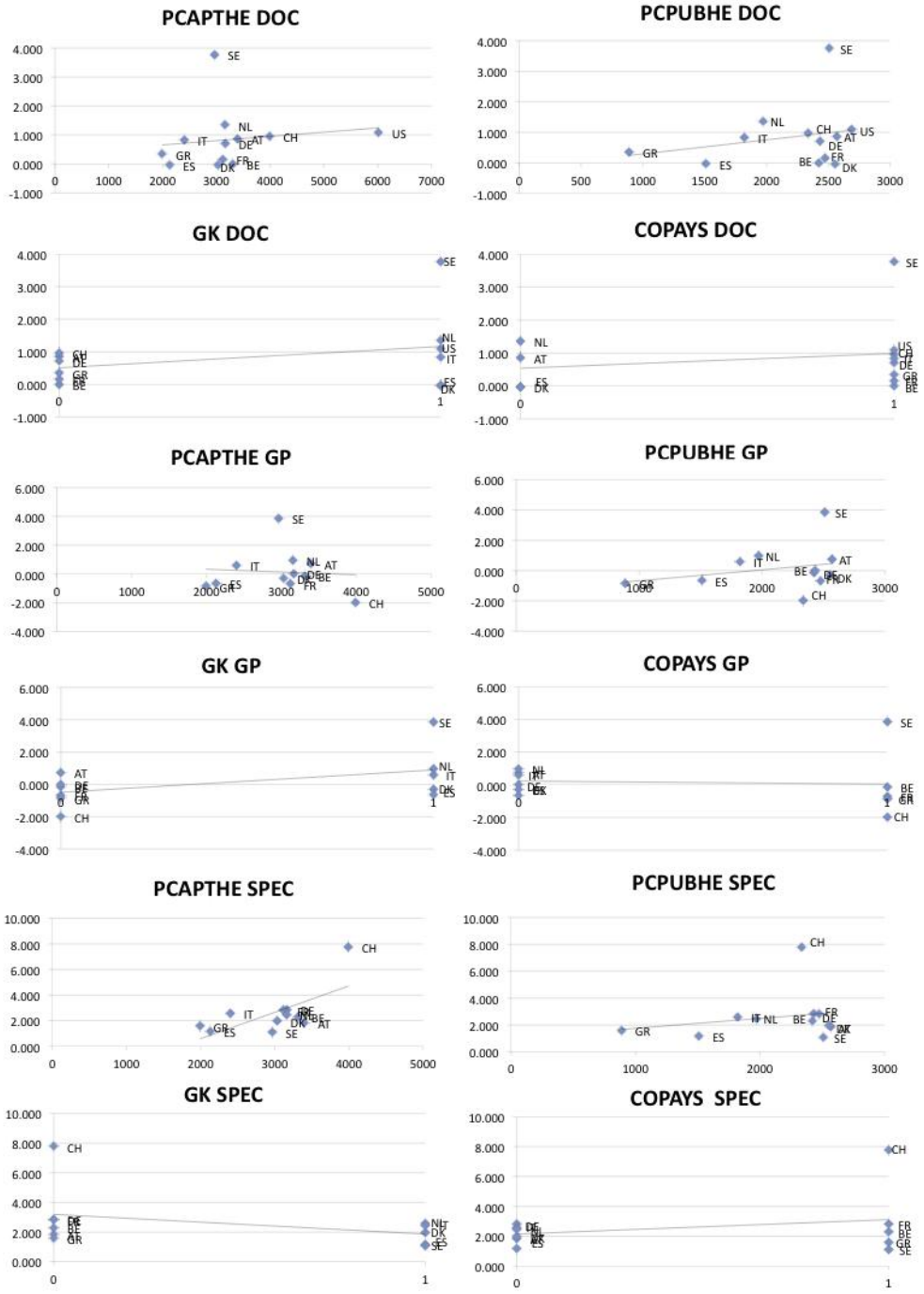
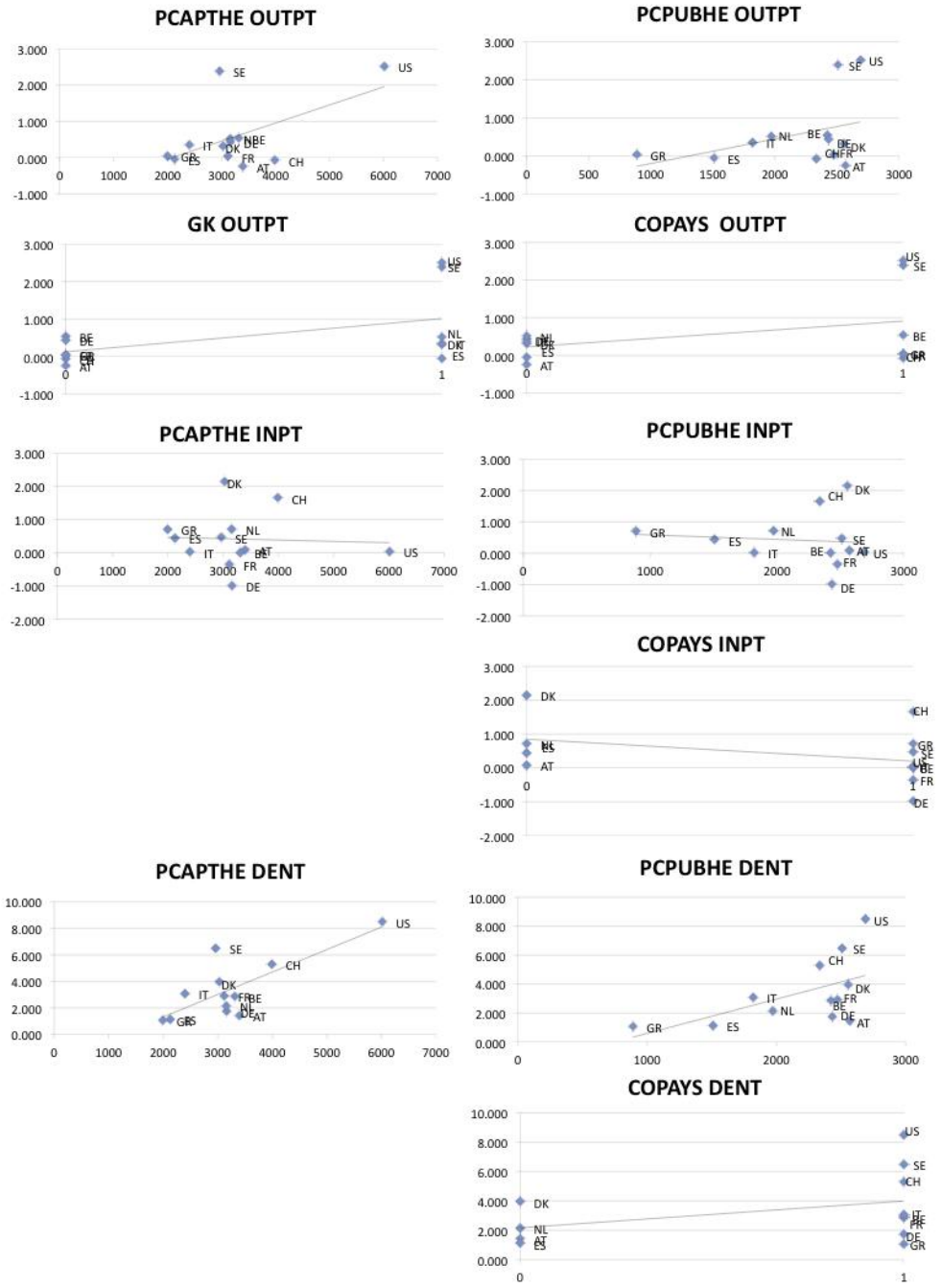


Figure 2: continued from previous page



Appendix A

Data Sources

The data used in Chapter 1 are drawn from the following surveys:

- Survey of Health, Ageing and Retirement in Europe (SHARE), wave 1 - release 2. The first wave covers eleven European countries (Austria, Germany, Belgium, Denmark, Spain, France, Greece, Italy, the Netherlands, Sweden and Switzerland); it is the first European survey that provides cross-nationally comparable micro-data on the economic, social and health situation of the 50+ population. It was launched in 2004 at present it has two waves available. However the variable income is not directly comparable across the two waves since it is gross in the first wave and net in the second wave. We selected the first wave to make it directly comparable with the Health and Retirement Survey (HRS);
- Health and Retirement Survey (HRS) which surveys Americans over the age of 50 every two years. The study paints an emerging portrait of an aging America's physical and mental health, insurance coverage, financial status, family support systems, labor market status, and retirement planning.

SHARE has been designed after HRS, which facilitates the use of these surveys for comparative purposes. Preliminary results from SHARE [20] clearly indicate that health status is positively associated with SES. Lower socio-economic groups experience poorer health status and have higher health care needs: people with lower socio-economic background and with poor health used comparatively more family physician and hospital services. In contrast, specialist services were comparatively less used by people with lower socio-economic background and with poor health.