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Abstract

This working paper reports an analysis of the evolution of equity in access to health care in Spain over the period 1987-2001, a time span covering the development of the modern Spanish National Health System. Our measures of access are the probabilities of visiting a doctor, using emergency services and being hospitalised. For these three measures we obtain indices of horizontal inequity from microeconometric models of utilization that exploit the individual information in the Spanish National Health Surveys of 1987 and 2001. We find that by 2001 the system has improved in the sense that differences in income no longer lead to different access given the same level of need. However, the tenure of private health insurance leads to differences in access given the same level of need, and its contribution to inequity has increased over time, both because insurance is more concentrated among the rich and because the elasticity of utilization for the three services has increased too.

Key words

Health care utilization, health insurance, equity, Spain.

Resumen

Este documento de trabajo presenta un análisis de la evolución de la equidad en el acceso a la asistencia sanitaria en España en el período 1987-2001, coincidiendo con el desarrollo del Sistema Nacional de Salud moderno. Medimos el acceso como las probabilidades de acudir a un médico, de hacer uso de los servicios de urgencias y de ingresar en un hospital. Para estas tres medidas obtenemos índices de inequidad horizontal a partir de modelos microeconométricos, que se nutren de los datos individuales de las Encuestas Nacionales de Salud correspondientes a 1987 y 2001. Se observa que el sistema ha mejorado a lo largo de este período en el sentido de que diferencias de renta ya no conllevan diferencias de acceso a igual grado de necesidad. No obstante, la tenencia de seguros sanitarios privados sí implica diferencias de acceso a igual grado de necesidad, y su papel en la inequidad ha aumentado con el tiempo por dos motivos: por la mayor penetración de la cobertura privada entre la población rica y por el aumento simultáneo en la elasticidad del uso de los tres servicios.

Palabras clave

Utilización de la asistencia sanitaria, seguros sanitarios, equidad, España.

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C O N T E N T S

1. Introduction

SPANISH society has undergone a major overhaul in the three decades elapsed since the death of Franco. The transformation from dictatorship to a democracy and the devolution of government to the regions have combined with the sheer effect of the passage of time to transform an obsolete public sector into one comparable to that of developed countries. The health care system is one of the areas where reforms have been far reaching, and in this paper we aim to evaluate the change over time in one of the indicators that serve to assess its performance: the existence and degree of inequities in health care utilization. In particular we will evaluate whether there have been changes in the distribution of utilization for a given level of health care need. Secondly, we shall decompose the sources of inequality in utilization and explain the observed differences between 1987 and 2001. The choice of these two time periods is motivated by the fact that the most comprehensive pack of reforms for the health care system was systematized and put forward by the 1986 General Health Act, among whose main goals there are the wish to eliminate socio-economic health inequalities in access, as expressed in its *Artículo 3* and to correct inequalities in health *Artículo 12*. We shall use data from the 1987 Encuesta Nacional de Salud (Centro de Investigaciones Sociológicas [CIS], 1987) to assess the degree of income related utilization inequality in the Spanish population shortly after this important law. We choose the 2001 edition of the same survey (CIS, 2001) in order to deal with comparable information. The comparison of two cross sections of the Spanish population has a limited ability to reflect the causal effect of a multi-faceted package of reforms. Nevertheless, our contention is that the implementation of these reforms should change the joint distribution of utilization and socio-economic characteristics after controlling for health care needs, and in this paper we set out to measure such change.

Our results show that by 2001 the system has improved in the sense that differences in income no longer lead to different access given the same level of need. However, the tenure of private health insurance leads to differences in access given the same level of need, and its contribution to inequity has increased over time, both because insurance is more concentrated

among the rich and because the elasticity of utilization for the three services has increased too.

Section 2 briefly summarizes the main characteristics of the health system and the reforms that have taken place in the recent past and provides a brief review of previous relevant studies. Section 3 presents the methodology that we adopt for the measurement of inequities in health care utilization and the explanation of their changes over time. Section 4 presents the empirical results and section 5 discusses the implications of our results.

2. The Transition of the Spanish Health Care System and Previous Literature on Inequities in Utilization

AT the end of the dictatorship in 1975, the Spanish health system was based on a social security scheme paid by employers and employees and complemented by a network of health care centers owned by different organizations. One of the characterizing features of the pre-democratic system was a strong bias towards hospital care. While the 70's had witnessed the creation of a public network of modern hospitals, primary and preventive services in the public network were underdeveloped: general practitioners were typically available for two and a half hours per day at isolated outlets which lacked administrative and diagnostic support (European Observatory on Health Care Systems [EOHCS], 2000). The arrival of democracy unleashed the latent demand for a better health care system and important legislative and managerial changes ensued. The Ministry of Health was created in 1977 and the 1978 Constitution consecrated public coverage for all citizens. Momentum gathered after 1983 when the government started a set of reforms to integrate the different networks. By 1986 the General Health Act transformed the social security system into a National Health System.

Thus, there are two main structural reforms with a potential impact on socio-economic inequalities in access to health care occurred during the period studied in this paper. Firstly, the system finally was consolidated as a tax-funded, universal coverage National Health System within which individuals are entitled to a comprehensive set of benefits including not only primary and specialized inpatient and outpatient care, but also subsidized medicines with zero co-payments for specific groups such as pensioners or disabled persons and reduced co-payments for drugs for chronic diseases including AIDS. Secondly, primary care has been totally reformed by means of

substituting the obsolete outlets mentioned above by team based practices staffed by doctors and nurses who have received specific training in family medicine and whose activities not only included curative care, but also preventive care, health promotion, follow up of patients and services targeted to particular population groups such as the mentally ill, drug users etc. The implementation of the primary care reform all over Spain was slow: while it was planned as far back as 1984 and turned into law in 1986, only 50% of the population was covered by the new system in 1992 and the proportion reached 81% by 2000 (European Observatory on Health Care Systems, 2000). This is in fact the most important reform taking place during the period under study. For these reasons it seems appropriate to evaluate the change between 1987 and 2001.

In this study we intend to pay special attention to the role of private health insurance (PHI) as a determinant of inequities in health care. PHI in Spain essentially provides *duplicate* or *double* coverage in the sense that it covers services that are concurrently provided by the public network. Nevertheless there are some features, such as the possibility of by-passing the GP before consulting a specialist or the access to better hospital amenities, which confer PHI a degree of supplementarity in the sense of Mossialos and Thomson (2002). The concern about the equity effects of PHI in Spain is justified by the fact that expenditure on PHI has received public subsidies in the form of tax bonuses. Prior to 1999 the subsidy operated via personal income tax: individuals received a 15% rebate on insurance premia (as well as on any other expenditure on health care). Currently, it operates via corporate tax: premia are considered tax free in kind salary and companies can substract from profits the cost of collective policies (thus obtaining a 35% tax bonus on their cost). These subsidies might potentially induce undesired effects in terms of equity, because PHI alters the patterns of utilization, as shown by Rodríguez and Stoyanova (2004). Moreover, for the particular case of specialist visits, Jones, Koolman and Van Doorslaer (2007) and Van Doorslaer, Koolman and Puffer (2002) have obtained evidence that supports the notion that PHI in Spain actually generates pro-rich inequity in access.

Apart from the studies cited above, there is a growing body of literature on the evaluation of the reforms in the Spanish National Health system since the Health Act of 1986 in terms of inequities in utilization. The pioneering work of Rodríguez, Calonge and Reñé (1993) offered evidence, with data from 1987, on the degree of inequity in public health care consumption as measured by the expenditure devoted to doctor visits and hospitalizations in the public network. A similar method was followed by Abáso-

lo (1998) with data for 1993. More recently, Urbanos (1999, 2001) has considered the dynamics of inequity and analyzed data for 1987, 1993, 1995 and 1997 within a unified methodological framework. Urbanos actually considers consumption data (number of visits and inpatient days) as well as an expenditure aggregate and her results suggest a decrease in inequity during the period 1993-1995. Moreover, for 1997 she finds that the inequity indices for visits to GPs and specialist and inpatient days are not statistically significant. In contrast, she finds that there is a significant degree of pro-rich inequity in emergency visits. These results contrast with the results by Van Doorslaer, Koolman and Puffer (2002), who find a significant degree of pro-rich inequity in specialist visits and pro-poor inequality in GP visits using data from the 1996 Spanish wave of the ECHP. Van Doorslaer and Koolman (2004) again find that there is a significant degree of pro-poor inequity in both the probability of visiting and the conditional number of visits to a GP whereas there is pro-rich inequity in both the probability of contacting a specialist and the conditional number of visits. Van Doorslaer, Koolman and Masseria (2004) obtain point estimates that would suggest evidence of pro-rich inequity in hospital admissions using data from the ECPH, but the null of no statistical significance cannot be rejected from these estimates.

This paper contributes in a series of fronts to the existing literature. First, unlike Rodríguez, Calonge and Reñé (1993) and Urbanos (1999, 2001), we do not restrict the analysis to publicly provided health care. As discussed above, the reason is that privately provided health care and PHI have received public subsidies during the period considered. Secondly, most of the existing studies do not address the equity effects of PHI, and this paper offers some methodological advantages with respect to those that do so, such as Van Doorslaer, Koolman and Puffer (2002), which will be discussed later on. A third contribution consists in using two comparable health surveys with rich information on health status spanning 14 years since the General Health Act. Despite the obvious limitations of all before-after evaluations, this is a plausible empirical strategy to approximate the effects of the evolution of the system on equity.

3. Methods

3.1. Measuring and decomposing inequalities in health care utilization

The operational concept of inequity used in the recent literature is socio-economic inequality in utilization not justified by socio-economic inequalities in need. Therefore it is necessary to compute measures of socio-economic inequality in utilization, decompose these measures and subsequently decide which components might be justified by unequal needs. The literature on health inequalities has recently adopted a standard tool for the measurement of socio-economic inequalities in health or health care utilization: the concentration index (*CI*) (Waggstaff, Van Doorslaer and Paci, 1989). The concentration index has a similar interpretation to the more familiar Gini index for pure inequality. In fact, the two inequality measures differ in the fact that the ranking variable is a measure of socio-economic status (usually income) (*CI*) rather than health/utilization (Gini). The *CI* ranges between –1 and 1. A value of –1 would mean that all health/health care utilization is concentrated in the poorest person, whereas a value of 1 would result if all health/utilization were concentrated in the richest person. A value of zero would mean that health/utilization is equally distributed over income in the sense that the pth percentage of the population ranked by income has exactly the *pth* percentage of total health/utilization for any *p*.

Suppose we are interested in calculating the *CI* for a measure of health care utilization on income using individual data from the population of interest. Let y_i denote a measure of utilization for the i^{th} individual, $i = 1, 2, \ldots N$, and R'_i denote the cumulative proportion of the population ranked by income up to the i^{th} individual (their *relative income rank).*

The *CI* of utilization on income is given by (see e.g. Van Doorslaer and Jones, 2003),

$$CI = \left(\frac{2}{\bar{y}}\right) \text{cov}\ (y_i, R'_i) \tag{3.1}$$

where $\bar{y} = E\ (y_i)$.

We consider three types of health care utilization: visits to doctors, use of emergency services and hospitalisations. For each of these services, our measure of access consists in the probability of utilization at least once within a given time period. In the case of visits to doctors the time period is fifteen days whereas for the other two services, the time period is one year. For 2001, we are able to consider separately the probabilities of having visited a GP or a specialist, since the survey provides information on the speciality of the doctor in the last visit. While the health surveys offer information on the number of events for each of the three services, we abstain from considering measures of equity in the number of events. This is motivated by the fact that the distributions for the numbers of events are concentrated on 0 and 1. For instance, less than 5% (6% for 2001) of individuals report more than one visit to the doctor and less than 2% (1% for 2001) report more than two. The case of hospitalizations is even more extreme in this sense, as only for 2001 we do find individuals reporting more than one event, and these individuals make up for less than 2% of the sample. Furthermore, the studies that have considered both the probability of contact and the conditional number of events have found that, where there are inequities, these operate in the same direction for both dimensions of utilization (Van Doorslaer et al., 2004).

For each of the three types of health care, we specify a Linear Probability Model (LPM) in the following way

$$y_{ji} = \alpha^j + \sum_k \beta_k^j x_{ki} + \varepsilon_i^j \tag{3.2}$$

where $y_i = 1$ (individual i reports at least one episode of health care j). It follows that

$$P(y_{ji} = 1) = \alpha^j + \sum_k \beta_k^j x_{ki} \tag{3.3}$$

Our choice for the LPM is justified on the grounds that the linearity in parameters is particularly useful for our purposes of decomposing inequalities in the probability of utilization (this property has been exploited by Van Doorslaer et al. (2004) in their study of inequity in the utilization of inpatient services). In particular, as shown by Waggstaff, Van Doorslaer and Watanabe (2003), if the probability of utilization is described by equation (3.3), then an inequality index for the probability of utilization is given by

$$CI^j = \sum_k \left(\beta_k^j \frac{\bar{x}_{ki}}{\bar{P}^j} \right) CI'_k = \sum_k \eta_k^j CI'_k \tag{3.4}$$

The term in brackets is the elasticity of P with respect to x_k evaluated at the population means and CI'_k denotes the concentration index of x_k against income. Thus this inequality measure can be usefully broken down into the contributions of individual explanatory variables. Moreover, if we define the estimated health elasticity with respect to determinant k as

$$\eta_k^j \equiv \frac{\beta_k^j \bar{x}_k}{\bar{P}^j} \tag{3.5}$$

then we can rewrite the decomposition in a way such that the CI is just a weighted sum of the inequality in each of its determinants, with the weights equal to the elasticities, as expressed in the last part of equation (3.4). As mentioned by Van Doorslaer and Koolman (2004), the decomposition also clarifies how each correlate of health contributes to total income-related utilization inequality: this contribution is the result of (i) its impact on health, and (ii) how unequally distributed over income it is.

Measures of horizontal inequity are easily obtained from the decomposition of income related inequality in utilization (Van Doorslaer et al., 2004; Gravelle, 2003). All that is required is an agreement on what variables in the model of utilization can be considered as legitimate determinants of unequal access from a normative point of view. Assume that the vector $x = (x_1, \ldots x_k)$ can be partitioned into non-need and need variables $x = (x^{nn}, x^n) = (x_1, x_2, \ldots x_{k1}, x_{k1+1} \ldots x_k)$. An index of horizontal inequity is given by the part of socio-economic inequality in utilization not justified by socio-economic inequalities in need. That is

$$HI^j = CI^j - CI_n^j = CI_{nn}^j = \sum_{k=1}^{K} \eta_k^j CI'_k - \sum_{k=k_{1+1}}^{K} \eta_k^j CI'_k = \sum_{k=1}^{k_1} \eta_k^j CI'_k \tag{3.6}$$

This method differs in an important way from the method of *indirect standardization* by Waggstaff and Van Doorslaer (1996). The method of indirect standardization consists in first computing the concentration index of actual utilization and then substracting from it the concentration index of predicted utilization, where predicted utilization is obtained from the estimation of an econometric model for utilization as a function of need variables. This procedure has been criticised on the grounds that the omission of variables which, despite not qualifying as need indicators from a normative point of view are nevertheless associated to utilization, can lead to biased estimation (Schokkaert and Van de Voorde, 2004; Gravelle, 2003). This is particularly relevant for the purposes of this study. Since we wish to evaluate the impact of PHI on utilization, and since PHI tenure is strongly associated

to income and other socio-economic characteristics, omission of income—a non need variable—from the utilization equation can lead to biased estimates for the impact of PHI. The existing studies for the case of Spain mostly rely on the indirect standardization method. Indeed, only Van Doorslaer et al. (2004) use the method discussed above, but their analysis does not consider the effect of PHI.

In relation to the point discussed in the previous paragraph, we must note that the literature on utilization generally treats PHI as an endogenous variable (see Vera-Hernández 1999 for the case of Spain). This is motivated by the recognition that unobserved factors that affect the purchase of PHI are correlated with unobserved factors that affect utilization (adverse selection bias). Our steps to address this issue consist in enriching the specification for utilization with an ample set of health status indicators in an attempt to capture all relevant risk factors. This should purge the estimate for the effect of PHI from biases arising from the omission from the utilization equations of health factors that simultaneously drive the propensity to purchase PHI. In any case, the results obtained by Jones, Koolman and Van Doorslaer (2007) reveal that correlation between unobservables seems to operate in the way of making low risk/low utilization individuals more likely to purchase PHI. In these circumstances, should our strategy not fully purge the estimate for the PHI effect from adverse selection bias, this estimate would provide a lower bound for the true effect.

3.2. Decomposing inequity over time

The previous section shows how horizontal inequity in utilization can be expressed as the contribution of non-need variables to an index of socio-economic inequality in utilization. It is then straightforward to use the approach proposed by Waggstaff, Van Doorslaer and Watanabe (2003) in order to decompose the difference in inequity between two periods. The method is a derivation of the well known Oaxaca decomposition whereby the difference between the *CI*'s of the population at period t and period $t-1$ can be written as

$$\Delta HI^{j} = CI^{j}_{nnt} - CI^{j}_{nnt-1} = \sum_{k=1}^{k_1} \eta_{kt}(CI'_{kt} - CI'_{kt-1}) + \sum_{k=1}^{k_1} CI'_{kt-1\ kt-1}(\eta_{kt} - \eta_{kt-1}) \quad (3.7)$$

Then, the contribution of any variable to the difference in inequity is given by:

$$\Delta CI_{nnk} = \eta_{kt}\ (CI'_{kt} - CI'_{kt-1}) + CI'_{kt-1}\ (\eta_{kt} - \eta_{kt-1}) \quad (3.8)$$

In practice, we shall compute the differences in inequity (and contributions toward such difference) between 2001 and 1987. Moreover, in order to assess the relative importance of the inequality versus the health elasticity component in the contribution of each variable, we also compute the relative excess elasticity compared to year 1987, i.e. $(\eta_{k2001} - \eta_{k1987}) / \mid \eta_{k1987} \mid$, and the relative excess inequality, $(CI_{k2001} - CI_{k1987}) / \mid CI_{k1987} \mid$

3.3. Statistical inference

Many of the statistics that we are going to report are non-linear functions of the data whose sampling distributions are hard to obtain. For this reason we shall use bootstrapping methods in order to derive standard errors. The bootstrap estimates for standard errors are computed following the five-step approach used by Van Doorslaer and Koolman (2004). The number of replications has been set to 500.

3.4. Data and variable definitions

We use the 2001 and the 1987 editions of the Encuesta Nacional de Salud (CIS, 1987, 2001). These are nation wide surveys collecting information on health and socioeconomic characteristics of individuals. The surveys contain separate adults (16+) and children samples. The analysis in this paper is based on the adult samples. The sampling scheme is a multi-stage stratified process whereby primary strata are Autonomous Communities (2001 edition) or Provinces (1987 edition). Within primary strata, sub-strata are defined according to residence area population size. Within substrata, municipalities (primary sampling units) and sections (secondary sampling units) are selected according to a proportional random sampling scheme. Finally, individuals are randomly selected from the sections. The survey documentation includes weighting factors that correct for the fact that the number of observations within the primary strata is not proportional to actual population. We use these weights whenever a nationwide statistic is computed. The information contained in the data files do not allow the identification of all the primary sampling units (because municipalities with a population below 100,000 are not identified). Similarly, information about the secondary sampling units is omitted so it is impossible to control for cluster effects at either the municipality level or the section level.

The ranking variable is equivalised total monthly income earned by the household (income hereafter). In the ENS this is measured as a categorical variable with 12 response categories in 1987 and 6 response categories in 2001. In order to obtain a continuous measure for income and also overcome the fact that for both editions there is a substantial proportion of item non-response, we specify an interval regression model using a wide range of explanatory variables referring both to the respondent and the head of household. These variables are relationship between interviewee and head of household, education of head of household, occupation of head of household, employment status of head of household, tenure of private health insurance, age and sex of the head of household and regional dummies. Except for the upper quantiles, the distributions for the predictions of income compare well with data from the continuous household expenditure survey (ECPF) of 1987 and data from the Spanish sample of the 2001 wave of the European Community Household Panel. The evolution of income inequality as measured by the Gini index also compares well with external sources.

The initial 1987 ENS sample included 29,647 individuals. From the initial sample, 5 observations were dropped as income could not be predicted, and after deleting those not responding to one of the relevant questions the final sample contains 29,185 observations in the visits to doctors estimation, 28,849 in hopitalisation and 29,122 in use of emergency services. On the other hand, the initial 2001 ENS sample included 21,067 individuals from all the Autonomous Communities, although the observations from Ceuta and Melilla were dropped as there were not individuals from these two regions in the 1987 sample. From the remaining 20.748, after deleting those not responding to one of the relevant questions the final sample contains 20,644 in the visits to doctor estimation, 20,635 in hospitalization, 20,636 in emergency visits, 20,644 in GP visits, 20,644 in specialist visits.

4. Empirical Results

As discussed in section 3.1, we specify and estimate LPM for the probability of visiting a doctor during the last fortnight, hospitalization over the last 12 months and emergency services utilization over the last 12 months. The explanatory variables in the models are:

i) the logarithm of equivalent household income;

ii) 14 age-sex categories corresponding to age groups 16-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80+ for men and women (the omitted category corresponds to a woman aged between 16 and 19);

iii) 4 marital status categories: single, married, divorced, widowed (single or divorced are the omitted categories);

iv) 5 categories of self assessed health: very good (omitted category), good, fair, bad, very bad;

v) 5 chronic illness: cholesterol, high blood pressure, diabetes, bronchitis or asthma, heart diseases and allergy;

vi) whether daily activities or leisure had been limited by any of the chronic diseases in the last 12 months;

vii) whether daily activities or leisure had been limited because of pain in the last two weeks;

viii) whether the individual had to stay in bed for more than half day in the last two weeks;

ix) whether the individual had an accident in the last year;

x) tenure of private insurance.

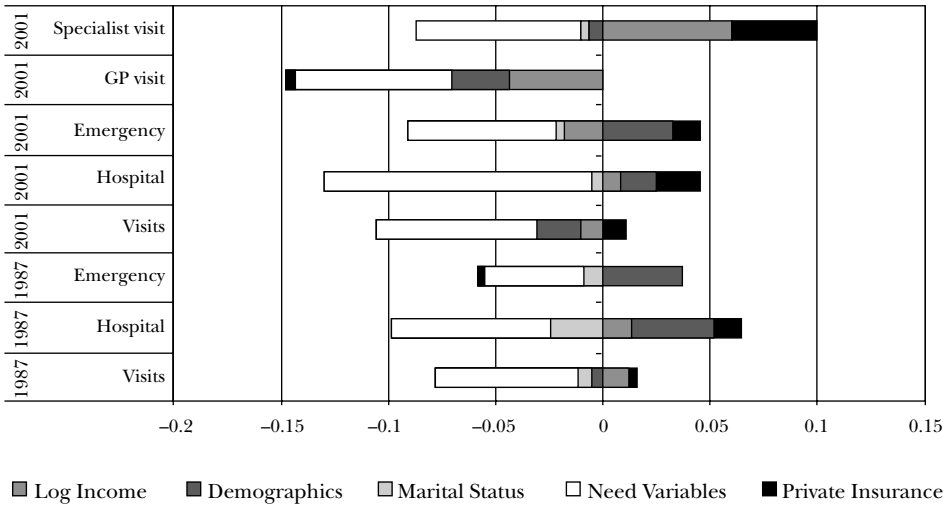
Table 4.1 contains the parameter estimates for the equations corresponding to each of the services by OLS. The estimates for the models permit the calculation of the inequality measures presented in table 4.2. Note that in both 1987 and 2001, the utilization of the three types of services (visits to doctors, emergencies and hospitalizations) is unequally pro-poor distributed. The concentration indices are statistically significant and the point estimates are greater for 2001, revealing that the degree of pro-poor inequality is exacerbated over time. Graphic. 4.1 presents the contribution of each

TABLE 4.1: Linear Probability Model results for the probability of doctor utilization in 1987 and 2001

	1987			2001				
	Total visits	**Hospital**	**Emergency visits**	**Total visits**	**Hospital**	**Emergency visits**	**GP visits**	**Specialist visit**
Log Income	0.0078*	0.0034	0.0005	–0.0098	0.0027	**–0.0143**	**–0.0288**	**0.0189**
F20_24	**0.0239**	**0.0288**	–0.0041	0.0093	0.0106	0.0194	–0.0059	0.0152
F25_29	**0.0283**	**0.0467**	0.0033	–0.0030	**0.0523**	0.0060	–0.0188	0.0158
F30_34	–0.0167	0.0030	–0.0098	–0.0079	**0.0561**	–0.0059	–0.0265*	0.0186
F35_39	–0.0005	–0.0026	–0.0236*	–0.0229	0.0152	**–0.0736**	–0.0220	–0.0009
F40_44	–0.0204	**–0.0443**	**–0.0607**	–0.0091	**–0.0255**	**–0.0798**	**–0.0359**	**0.0268**
F45_49	–0.0195	**–0.0626**	**–0.0681**	0.0260	**–0.0352**	**–0.1108**	–0.0050	**0.0310**
F50_54	0.0003	**–0.0623**	**–0.0657**	0.0284	–0.0209	**–0.0703**	0.0030	0.0254*
F55_59	–0.0171	**–0.0711**	**–0.0636**	–0.0037	**–0.0490**	**–0.1162**	–0.0116	0.0078
F60_64	–0.0059	**–0.0688**	**–0.0713**	**0.0482**	–0.0239	**–0.1423**	0.0252	0.0231
F65_69	0.0278*	**–0.0739**	**–0.1048**	0.0370*	**–0.0343**	**–0.1013**	0.0231	0.0139
F70_74	**0.0630**	**–0.0824**	**–0.1117**	**0.0718**	–0.0278*	**–0.1415**	0.0402*	**0.0316**
F75_79	–0.0005	**–0.0800**	**–0.0981**	0.0338	–0.0272	**–0.1630**	0.0421*	–0.0084
F80	–0.0190	**–0.0793**	**–0.1264**	0.0261	**–0.0514**	**–0.1660**	0.0505*	–0.0244
M16_19	–0.0109	–0.0066	0.0026	–0.0335*	0.0059	–0.0246	**–0.0388**	0.0053
M20_24	–0.0209*	–0.0077	0.0052	**–0.0654**	–0.0077	–0.0303	**–0.0590**	–0.0064
M25_29	–0.0215*	**–0.0197**	–0.0146	**–0.0625**	–0.0113	–0.0325*	**–0.0493**	–0.0132
M30_34	**–0.0372**	**–0.0476**	**–0.0388**	**–0.0428**	–0.0179*	**–0.0564**	**–0.0414**	–0.0014
M35_39	**–0.0365**	**–0.0522**	**–0.0491**	–0.0340*	–0.0056	**–0.0690**	**–0.0325**	–0.0015
M40_44	**–0.0326**	**–0.0422**	**–0.0558**	**–0.0505**	–0.0229*	**–0.0886**	**–0.0474**	–0.0031
M45_49	**–0.0340**	**–0.0555**	**–0.0698**	**–0.0403**	0.0020	**–0.0798**	**–0.0427**	0.0024
M50_54	**–0.0413**	**–0.0388**	**–0.0624**	**–0.0413**	–0.0173	**–0.0933**	–0.0337*	–0.0076
M55_59	–0.0188	**–0.0365**	**–0.0800**	–0.0354	–0.0191	**–0.1329**	**–0.0507**	0.0154
M60_64	–0.0027	**–0.0635**	**–0.0833**	–0.0201	–0.0132	**–0.1339**	–0.0212	0.0011
M65_69	–0.0154	**–0.0456**	**–0.0943**	0.0446*	0.0111	**–0.1267**	0.0312	0.0135
M70_74	0.0124	**–0.0426**	**–0.0820**	0.0221	–0.0034	**–0.1246**	–0.0086	0.0307*
M75_79	0.0275	**–0.0348**	**–0.0751**	0.0303	0.0003	**–0.1145**	0.0319	–0.0016
M80	0.0027	–0.0039	**–0.0657**	–0.0147	0.0277	**–0.1056**	0.0116	–0.0263
Married	**0.0263**	**0.0520**	**0.0295**	0.0117	**0.0198**	**0.0169**	0.0055	0.0062
Widow	**0.0359**	**0.0362**	**0.0228**	0.0013	–0.0019	0.0077	–0.0015	0.0028
Cholesterol	**0.0347**	–0.0123*	–0.0103	0.0167	–0.0127*	0.0100	**0.0339**	**–0.0172**
High Blood Pressure	**0.0647**	–0.0106*	0.0006	**0.0465**	–0.0067	0.0074	**0.0584**	–0.0119*
Diabetes	**0.0508**	0.0126	0.0159	**0.0298**	0.0185*	0.0007	**0.0482**	–0.0184*
Bronquitis o Asma	**0.0383**	0.0034	**0.0265**	0.0260*	0.0165	**0.0653**	**0.0318**	–0.0059
Heart	**0.0458**	**0.0582**	**0.0681**	0.0267*	**0.1011**	**0.1038**	–0.0154	**0.0422**
Allergy	0.0166	–0.0044	**0.0263**	**0.0297**	**–0.0293**	0.0116	**0.0223**	0.0074
Limited by Cronic	**0.0219**	**0.0687**	**0.0649**	**0.0293**	**0.0558**	**0.0901**	**0.0260**	0.0033
Limited by Pain	**0.1849**	0.0082	**0.0316**	**0.2564**	0.0024	**0.1102**	**0.1877**	**0.0687**
Sah Good	**0.0242**	**0.0134**	**0.0215**	**0.0505**	**0.0170**	**0.0333**	**0.0295**	**0.0210**
Sah Fair	**0.1304**	**0.0440**	**0.0510**	**0.1530**	**0.0926**	**0.1364**	**0.0783**	**0.0747**
Sah Poor	**0.2114**	**0.1461**	**0.1273**	**0.2073**	**0.2029**	**0.2102**	**0.0948**	**0.1125**
Sah Very Poor	**0.1717**	**0.1786**	**0.1866**	0.0231	**0.1032**	0.0544*	–0.0189	0.0419
Bed	**0.2016**	**0.0385**	**0.0700**	**0.1780**	**0.0603**	**0.0420**	**0.1216**	**0.0564**
Accident	**0.0663**	**0.0830**	**0.2985**	**0.0580**	**0.0651**	**0.4220**	0.0082	**0.0498**
Private Insurance	0.0101	**0.0160**	–0.0041	**0.0441**	**0.0328**	**0.0423**	–0.0119*	**0.0560**

Note: values significantly different from zero (at $P < 0.05$) in bold typeface. * (at $P < 0.10$).

GRAPHIC 4.1: Contributions to Concentration Indices



group of variables to the overall *CI*. These figures reveal that a very large portion of the *CI* is explained by need, which is concentrated among the poor.

TABLE 4.2: Concentration indices, inequity indices and changes over time

	1987			2001				
	Visits	**Hosp.**	**Em. visits**	**Visits**	**Hosp.**	**Em. visits**	**GP visits**	**Spec. visit**
CI	**–0.0626**	**–0.0342**	**–0.0219**	**–0.0959**	**–0.0847**	**–0.0465**	**–0.1478**	0.0121
HI	**0.0146**	**0.0246**	–0.001	–0.0002	0.0281	–0.0065	**–0.0479**	**0.0991**
Income	0.0115*	0.0125	0.0011	–0.0102	0.0078	–0.0182	**–0.0439**	**0.0602**
PHI	0.0031	**0.0121**	–0.0021	**0.0099**	**0.0203**	**0.0117**	**–0.0039**	**0.0388**

	Change over time (2001-1987)		
	Total visits	**Hospital**	**Emergency visits**
$CI_{2001} - CI_{1987}$	**–0.0333**	–0.0504*	–0.0246
$HI_{2001} - HI_{1987}$	–0.0149	0.0035	–0.0055
Relative Excess Elasticity Income	–2.0125	–0.2870	–20.1116
Relative Excess Elasticity *PHI*	1.8760	0.4902	6.1485
Relative Excess Inequality Income	**–0.1293**		
Relative Excess Inequality *PHI*	**0.1141**		

Note: values significantly different from zero (at $P < 0.05$) in bold typeface. * (at $P < 0.10$).

The second row of table 4.2 presents the inequity measure for each of the services as defined in section 3.1. For each of the services, *HI* (inequity

index) is the part of the *CI* (inequality index) explained by income and tenure of private health insurance (i.e. the non-need and non-demographic variables in our specifications for the probability of utilization).

Note that in 1987 the *HI* indices for total visits and hospitalizations reveal a significant degree of pro-rich inequity. In these cases, both income and tenure of *PHI* contribute positively to the *HI* index. This means, in 1987, that while overall utilization is concentrated among the poor, rich individuals and/or individuals who enjoyed private health insurance (who tend to be richer than average) had more chances of using these health services than poor individuals and/or individuals without *PHI* **at the same level of need.** In contrast, the *HI* indices for the three services are statistically not different from zero in 2001, implying that for a given level of need, there are neither pro-rich nor pro-poor differences in the chances of utilization explained by income or insurance status.

In order to analyze with more detail the changes over time for these indices it is useful isolate the sources of their changes. As discussed in section 3.2, the contribution of each covariate to the index is given by the product of the elasticity of the probability of utilization and the concentration index of the covariate. So, it might be the case that the impact of income, say, on the chances of using a particular service do not change but income becomes better distributed. This would lead, ceteris paribus, to a reduction in the contribution of income to the degree of pro rich inequality in the chances of utilization. The bottom panel of table 4.2 presents the relevant decompositions for the two non-need covariates that we have used in the specification. The table offers a clear indication of the direction in which the relevant magnitudes have evolved over time. First note that the distribution of equivalised household income has become more equal. Relative to 1987, the concentration index of log equivalised household income is 13% smaller in 2001. The tenure of *PHI*, however, has evolved in the opposite direction. Relative to 1987, the distribution of *PHI* is 11% more pro-rich.

Doctor visits: as seen in table 4.2, the *HI* for the probability of visiting a doctor is positive and significant in 1987, with both income and *PHI* contributing positively. In 2001 the *HI* index is not statistically significant, but this is the result of two antagonistic effects. While in 2001 the contribution of income is negative (and not significant), the contribution of *PHI* is still positive and significant. In the bottom panel of the table we can see that the change in the contribution of income is driven by a 200% reduction in the size of the elasticity of the probability of utilization (as well as the decrease in income inequality). In contrast, as well as becoming more concentrated among

the rich, the tenure of *PHI* exerts a greater impact on the probability of utilization. The relative change in elasticity is 180%.

Hospitalizations: the case of hospitalizations is similar to doctor visits. There is a reduction in the contribution of income driven by a 28% reduction in elasticity (plus the reduction in income inequality) but the *PHI* elasticity of the probability of utilization actually increases by 50%. In 2001 the contribution of *PHI* is statistically significant, but the lack of significance of the income contribution renders the *HI* insignificant.

Emergencies: the *HI* index is not statistically significant either in 1987 or 2001. But while in 1987 the contributions of income and *PHI* are both insignificant, in 2001 the contribution of *PHI* is positive and significant. This change is driven by a six fold increase in the size of the *PHI* elasticity of the probability of utilization as well as *PHI* becoming more concentrated among the rich.

In addition to these three services, we have obtained evidence for the *GP* visits and specialist visits separately for the year 2001 (unfortunately the data for 1987 does not distinguish between *GP* visits and specialist visits). The results are consistent with the evidence obtained by Van Doorslaer et al. (2004), Rodríguez and Stoyanova (2004) and Jones, Koolman and Van Doorslaer (2007). That is, *GP* visits are concentrated among the poor. This is not only due to need being concentrated among the poor, since the *HI* index is negative and significant. That is, the poor and those without *PHI* have more chances of visiting the *GP* than the rich and/or *PHI* holders with the same level of need. Of course, this imbalance is compensated by the existence of a good degree of pro-rich inequity in the probability of visiting a specialist. Indeed, the inequity index for the probability of visiting a specialist in 2001 is greater than any of the other *HI* indices presented in table 4.2. Note that roughly two fifths of this index is accounted by the contribution of *PHI*.

5. Discussion and Conclusion

THE results presented in the previous section suggest that the Spanish health system seems to have achieved the goal of ensuring equal access to doctors, hospitals and emergency services for equal need. In fact, the reason why the *HI* indices for the three services are not statistically significant in 2001 is because the contribution of income is negative (total visits and emergencies) and or insignificant (all three services). With the necessary caveats derived from the fact that this is a pure before-after evaluation exercise, and at least as far as the point estimates suggest, it seems that the reforms during the period 1987-2001 have reduced the income elasticity for the probabilities of utilization of the three services. Coupled with a reduction in pure income inequality, this means that income, by 2001, does not lead to differences in utilization for the same level of need. This is clearly an improvement with respect to 1987, a year for which our estimates show a positive and significant contribution of income to inequity in the access to doctors.

On a closer look, however, we note that the contribution of *PHI* to inequality in utilization is positive and significant for the three services. The data reveal that tenure of *PHI* has become more concentrated among the rich and, simultaneously, our estimates suggest an increase in the *PHI* elasticity of the probability of utilization for the three services. This leads to a positive and significant contribution of *PHI* to our measure of inequity in 2001 for the three services. Moreover, if we consider the chances of visiting a specialist in 2001, the data reveal a substantial degree of inequity with positive contributions of both income and *PHI*.

The implications of these findings for the policy goals stated in the Health Act of 1986 depend, firstly, on whether we can interpret the estimates for the contribution of *PHI* as a non-need variable, as we have done implicitly in our calculations. Are the estimates reflecting unmeasured need or are they reflecting improved access? As Jones, Koolman and Van Doorslaer (2007) point out in the former case *PHI* should not be included within the inequity index, but in the latter case *PHI* can be normatively considered an inequity-driving factor. Our choice for the latter interpretation

relies on the fact that the information contained in the National Health Surveys allows specifications where the assumption of conditional exogeneity for the tenure of *PHI* can be justified. Moreover, Jones, Koolman and Van Doorslaer (2007) find that any remaining selection on unobservables seems to operate in the way of making low risks more likely to have *PHI*. This means that assignation of *PHI* to a randomly chosen individual might cause an increase in utilization larger than what our estimates suggest.

The second consideration is whether public policy should be concerned with the inequity effect of *PHI*. After all, the services afforded by *PHI* are privately provided. But the crucial point here is that these services are partially publicly financed through the tax bonuses to *PHI*. Must the public purse subsidize better access to some citizens? If so, does it matter that these citizens tend to be richer than the average? Obviously, equity is not the only relevant issue when assessing the adequacy of *PHI* subsidies. Other considerations include the wish to support a private sector that might introduce competition in the health care market, or the wish to deviate demand to private outlets in order to decongest the public network. Concerning the latter, the evidence for the Spanish case (López-Nicolás and Vera-Hernández, 2004) suggests that the subsidies are far from self-financing: their study shows that for each euro given away as a subsidy to the purchase of *PHI*, the public health care network experiences a reduction in utilisation worth 0,12 €. Similar evidence is available for the UK (Emmerson, Frayne and Goodman, 2001), where tax bonuses were eliminated recently.

While the overall picture obtained in this paper is that the Spanish National Health Service has advanced in the line of making access equitable, further research must find evidence to justify the subsidies to *PHI*, an element of the system that this research reveals to generate a significant degree of inequity.

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