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IMMIGRATION AND THE DEMAND FOR HEALTH IN SPAIN *

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Abstract

In Spain, the recent immigration wave (without any precedent in recent decades in OECD countries) has had important consequences in the provision of key public services. The huge population shock has caused the perception of delays or even shortages in the provision of health services, thereby increasing the perceived quality gap between the public and the private sectors. We examine the effect of the population shock on the demand for private health insurance in two samples: those covered by the Spanish Social Security (SS) system and the sample of civil servants (CS), who periodically decide the provider of care (public or private). We found that the demand for private health insurance increases due to this fact. We quantify the marginal effect at about 0.05 in the SS sample and 0.20 in the CS sample. We find evidence of direct effects even controlling for their indirect influence through the purchase of private insurance. The population shock changes the preferences for GP services of medium-high income individuals. It has not any effect on the demand for SPs since it is the gatekeeper but not the individual who decides SP visits.

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1 Introduction

In parallel with the Spanish economic boom of the last twelve years, the number of foreign immigrants in Spain grew up quickly in the last 10 years, from 0,8 million in 1998 to 2,2 in 2003, 4,0 in 2006 and 4,5 million in 2007.[1] Despite the economic impact of immigrants has been, without much doubt, positive, the sharp increase has fostered the debate on the consequences of the large immigration flows on some key markets, such as the labor and housing ones, as well as some of key programs of the Spanish Welfare State, such as education (specially at the kindergarten and primary levels), health and other social programs.

The sudden increase in the Spanish resident population (1/8 of the previous Spanish resident population) has produced a serious mismatch in the supply of these services. The consequences of these misalignments can be very varied. In some cases it has displaced previous natives residents from the access to some means-tested social services (such as access to housing services, kindergarten, and other services). In other occasions it may affect quality. Education is a good example of this case: the arrival of a large fraction of new students from various backgrounds and with very varied language skills may affect quality and even may cause some social conflict. In other cases, it may produce congestion when supply does not adjust very rapidly to the increase in demand. The housing and health sectors are good examples of this latter case. In both cases the time to built infrastructures is an important determinant of their respective supply of services, and, in the short run, it may produce shortages in the provision of services.

Particularizing in the health sector the population shock (see Table 1 for some statistics), apart from generating new demands,[2] has increased, at least temporarily, the (perception of) *congestion* at all levels of the Public Health Care System (PHCS). The fraction of people thinking that the problem of long waiting lists have become worse from past years has grow from 5 to 10 percent in the 2000-2005 period according to figures of the Barometro Sanitario, (CIS, 2006). This problem contributes to increase the perceived quality gap between the public and private sectors at least as regards the access to the system (at the extensive margin).[3]

The problem has been less severe in the primary health care level than in the secondary level (hospitals and emergency rooms), since Primary Health Care centers are less costly and they can adjust supply more quickly than hospitals. The *apparent or real* shortage of public health services has had two non-independent consequences: an increase in the demand for private health services, mainly financed through private health insurance, and the augment in the share of the health care covered by the private sector.[4]

[1] Back in the eighties, the number of immigrants was 0,2 million and 0,5 million at the beginning of the nineties, mostly non-economic immigrants

[2] The immigration flows have increased the prevalence of some diseases, such as the tuberculosis and paludismo which was practically eradicated from Spanish, and has generated new demand like treatment for tropical diseases, being the malaria a typical example. However, it is important note that the number of Spanish people traveling to countries where paludismo is endemic also increases in recent years. Also, there are studies that question about the fact that immigrants increase the incidence of tropical diseases (Grande Maria Luisa, 2008)

[3] As stated by Costa and Garcia (2003): "A quality gap may arise as a result of the uniformity of care and the access barriers that characterize National Health Services (NHS). The NHS provides uniform health care, and thus, there may be difficulties in meeting the expectations of heterogeneous groups demanding 'personalized' health care [4], greater choice and, under certain circumstances, promptness of delivery. Barriers to access (such as, inpatient and outpatient waiting lists, excessive bureaucracy, delays and the need to obtain general practitioner (GP) referrals for visits to specialists, SP) may lead to public dissatisfaction and a reduction in perceived quality among potential and current NHS users"

[4] The share of health services covered by the private sector is very difficult to quantify. According to National Accounts (INE: www.ine.es), the participation of the private sector in the total Gross Value added have increased from 35 in 1997 per cent to 38 per cent in 2005.

The data shows that indeed the public health system is used by most of the population, but the use of private services has largely increased in recent years. According to the National Health Survey carried out by the National Statistical Institute (INE), people reporting having private medical insurance (PHI) coverage increases from 7 percent in 1997 (two years after the start of the last economic boom), 8.99 percent in 2001, 9.29 percent in 2003 and, finally, 12.29 per cent in 2006. Also, the average household private expenditure on health (at 2001 constant prices have been increasing since then. The private expenditure on health accounts more than 28.6 percent of total expenditure on health in 2001. Private prepaid plans were, for the same year, 14.1 percent of private expenditure on health (WHO - 2006).

The Private Health Care Sector (PRHCS) has been growing in parallel. Around 1997 the PRHCS[5] represented a 33 percent of the employment in the health sector. By 2005 it represents 42 percent of the employment. It is important to note that the demand for health insurance and hence the growth of the private health sector has also been fueled by the sharp growth of the Spanish per capita disposable income in the last fifteen years

Naturally, the aforementioned changes have had an impact on the patterns of utilization of health care services. [6]. This is so because an increase in PHI coverage may shift the balance General Practicioners / Specialists (GP/SP) to more use of SP services on the part of people with double coverage, which do not need to go to the GP in order to get access to the SP. A recent report by OECD about Health care systems shows that Spain has a good level of equity on access to health care service in the public sector. However, the level is lower when both, the private and public sectors are taken into account, because high income families access more to specialists than low income families.

At the end of the day the aim of this paper is threefold. First, we want to document the differences in the utilization patterns between natives and immigrants and to quantify how important has been the demand increase induced by them. Second, we want to disentangle the effect of the population shock observed in the early nineties in the demand for private insurance from the effect of increasing per capita income and other factors. Third, we want to identify the likely changes in the demand for health services induced by the population shock, which can produce both direct and indirect effects. The direct effect may reflect a change in the preferences of the native born population while the indirect one may come from the likely impact of the shock in the demand for PHI.

The first purpose is important because of the observable differences between the native and immigrant populations. The pattern of demand for health services in the immigrant population corresponds basically to the needs of a young population in good health. According to the 2006 wave of the SNHS, resource utilization among immigrants can even be lower than those among natives. However, once we control for observables, do these apparent differences in utilization of health services survive? As we shall illustrate latter on, little differences remain after we control for observable characteristics.

For the second and third objectives, our identification strategy takes advantage of the large immigration flows received in Spain during the last years and its geographical distribution. As stated before, immigration has increased the population who has the right to access to the PHCS well above 10 per cent since 2000. However, the geographical distribution of newcomers has not been homogenous among the Spanish Communities: the more dynamic or exposed regions (Baleares, Canarias, Cataluña, Comunidad Valenciana, Madrid, Murcia, Navarra, La Rioja and Melilla) have

[5]Source: Sanidad y servicios sociales de mercado, Tablas Input-Output. INE

[6]Naturally, it may also have some consequences on equity in access to health services, but equity is out of the scope of the present work.

had very large increases in their respective population as well as their respective fraction of immigrants, being the order of magnitude larger than 15 percent in most cases; alternatively, the less dynamic or exposed regions have had very modest increases in the immigration flows (see Table 1). For this purpose, we consider using two different variables: the fraction of immigrants in each region and the (unanticipated) increase of population (see also Table 1). In order to gain some robustness in the analysis we explore the problem in several directions. First, we perform the same exercise using two different samples. In the first sample we consider the Spanish born population[7] covered by the Spanish Social Security System (above 97 per cent of the sample) and analyze the decision to have a private health insurance (that is, to have double coverage) while controlling for demographics, the level of income, the insurance premium and other supply controls. In the second sample (between 2 and 3 percent of the total sample), we analyze the choice of sector of coverage by Spanish civil servants. This sample offers an unique opportunity to test the effect of congestion, due to a sudden population shock, in the system balance. This is so because civil servants can choose on a yearly basis whether they are covered by the public provider of health care (the Social Security administration) or by a private provider (ie. a private insurance company). Thus, this case represents an opportunity to test the effect of the population shock while controlling for the key confounders: the insurance premium and the level of income. Second, as a complement to the previous approach, we explore the problem with aggregate data at the regional level.

Finally, we investigate the existence of any direct effect of the population shock, proxied by the fraction of immigrants (or the change in the population), in the probability of contacting GP's and SP's. Once we have controlled for any indirect effect through the demand for private health insurance, any direct effect of the population shock on the demand of health services may constitute evidence of a change in the preferences of the Spanish born population. In order to do so we estimate estimate a joint model for the demand of GP and SP services while accounting for the insurance status. In this model we explore the endogeneity of the insurance status by analyzing the problem in the unconditional as well as the conditional (to the insurance status) samples. In a final exercise we study the possibility of joint determination of the demand of health services (GP and SP services) and the insurance status in a trivariate model.

For all these purposes we use data from the 2001, 2003, and 2006 waves of the Spanish National Health Survey (SNHS) carried out every two or three years by the INE. For the first exercise, we use data from the 2006 wave, which is the only wave that has enough data for economic immigrants. For the other two exercises we use data, from all three waves, for the Spanish born population. See the data section for a description of the survey.

Our results indicate that once we control for observables (and taking aside new specific demands, such as tropical diseases) the demand for health services on the part of immigrants does not differ significantly from that of natives. More importantly, the new demands have produced some congestion in the system and they have had important consequences on the demand patterns of natives. In this sense, in the two explorations of data we find that either the fraction of immigrants or the increment of the population lead to higher demand of private health insurance (double coverage sample) or opt for a private provider of health care (in the civil servants sample). In both samples they do so to get access to specialized services and/or private emergencies. We obtain that the marginal effect of the fraction of immigrants is much larger in the CS sample (about 0.20) than in the SS sample (0.05 in our preferred specification).

Finally, regarding the demand for GP and SP services we find for individuals with double (single) coverage that the fraction of immigrants (or the rate of growth of the population) does have

[7]We restrict the analysis to the Spanish born population because of the absence of enough data about immigrants behavior in the first two waves of the Spanish National Health Survey we use for the analysis.

significant negative effects on the demand for health services for medium-high income individuals. We interpret these effects as changes in their preferences for visiting GPs. Since the gatekeeper decides on visits to SPs, the population shock does not show any effect on the demand for these services. The situation is different in the sample of civil servants where the negative effect on the demand for GP services is only observed at high income levels and at marginal significance levels.

The rest of the paper is organized as follows. In section 2 we describe the Spanish health system. In section 3 we describe the literature and the main data source. In section 4 we explore the patterns of utilization of immigrants versus natives. In section 5 we present an analysis of the determinants of private insurance as well as utilization for natives, paying special attention to the effect of immigration and/or the population shock. Finally section 6 offers some concluding remarks.

Table 1: Immigrants, population growth and PHI by Region: 2001-2006

	% Immigrants			% annual pop change			% pop change 5 years			% native with PHI		
CCAA	2001	2003	2006	2001	2003	2006	2001	2003	2006	2001	2003	2006
Andalucía	1.90	3.60	7.40	.870	1.717	1.603	2.337	5.118	7.721	5.91	4.05	8.64
Aragón	1.50	5.00	8.70	.8272	1.032	.6653	1.027	3.959	6.477	7.02	8.14	11.71
Asturias	0.90	1.80	4.70	-.115	.1312	.0242	-1.15	-.596	.1457	5.98	4.51	12.91
Baleares	7.50	12.9	18.70	3.902	3.31	1.823	15.55	18.94	13.93	25.44	23.80	25.80
Canarias	5.40	9.10	14.80	3.792	2.772	1.399	10.88	16.2	12.03	4.39	4.07	6.22
Cantabria	1.10	2.40	5.60	1.213	1.367	1.02	1.928	4.278	5.67	9.57	6.34	6.13
Castilla y león	1.00	2.60	5.50	.0123	.2933	.4847	-1.158	.1224	1.758	3.39	3.73	6.81
Castilla-la mancha	1.50	4.00	7.70	1.198	1.893	1.984	2.483	5.805	10.09	5.78	6.42	10.10
Cataluña	3.20	6.50	14.70	1.580	3.03	1.994	4.455	9.052	12.1	18.61	24.36	25.17
Valencia	4.30	9.40	15.80	1.987	3.332	2.439	4.820	11.12	14.37	7.39	6.68	10.59
Extremadura	1.10	1.80	3.30	.3703	.0795	.2300	.2931	.4193	1.210	0.46	4.28	1.95
galicia	1.20	2.00	6.20	.0375	.5013	.1928	-.3535	.974	1.265	3.48	3.86	8.30
Madrid	5.10	9.90	15.40	3.208	3.469	.7384	6.971	12.32	11.83	22.14	28.79	25.79
Murcia	4.40	8.60	14.50	3.571	3.442	2.583	8.487	13.82	15.1	4.51	7.68	7.61
Navarra	3.20	6.50	10.40	2.299	1.506	1.415	6.855	8.927	8.199	2.09	2.50	5.39
País Vasco	1.20	2.40	5.40	.1373	.1860	.415	.1631	.6468	1.53	8.31	12.80	21.71
La Rioja	2.70	8.30	12.10	2.350	2.051	1.757	2.060	9.006	13.3	2.85	12.29	8.73
Ceuta y Melilla	5.10	5.30	6.60	2.100	-1.30	1.403	12.7	8.91	-1.28	n.a.	n.a.	n.a.
Total	2.80	5.20	10.10	1.523	2.101	1.361	3.648	7.18	8.736	8.25	9.36	12.38

source: INE, Padrón de la Población Española 1996 to 2006, and SNHS 2001, 2003, 2006

2 The Spanish health care system

2.1 The National Health Service

Understanding the institutional structure of the Spanish Health Care System is important to explain the consumption of health care services in Spain. It helps to be aware of the incentives and restrictions that health care consumers face and almost partially their choices for the type and quantity of the services they use. The 1986 General Health Care Act outlines the main principles for the Spanish NHS. This system provides **universal coverage** with free access to health care (including non regular immigrants); it is publicly funded and has a regional organizational structure (European Observatory of Health, 2006) into health areas and health zones. Although there is a central authority for health planning, each region is in charge of its own managerial and policy decisions leading to significant differences between Spanish Autonomous Communities. The decentralization process, initiated in 1981 and completed in 2002, gives all planning powers and

capacity to organize their own health services in their regions to the Autonomies. The European Observatory of Health offers a complete description of the Spanish NHS (see European Observatory of Health, 2006).

2.1.1 Population coverage

As stated in the 1986 General Health Care Act, the NHS is expected to work towards both health promotion and illness prevention, by providing health care to all residents in Spain, and achieving equality of access as well as to help to overcome social and geographical differences.

Immigrants[8] rights about health care attention are recognized in the law (Ley de Extranjería and Ley de Cohesión y Calidad del Sistema Nacional de Salud) with the same conditions than for the native born individuals. The access to health care attention is guaranteed to all immigrants that can obtain the sanitary card and to all children, pregnant women and in health emergency, regardless of their legal situation. It is important to note that non regular immigrants are covered by the health system, although they do not contribute financially to it via taxes or social security affiliation.

2.1.2 Organizational overview of the NHS

According to the 1986 General Health Care Act, the NHS is integrated into health areas, defined according to geographical, socio-demographic and epidemiological characteristics, where both primary health care and specialized care services are provided in these health areas (European Observatory of Health, 2006).

In general, GP are the first point of contact between the population and the health system; they should screen patients and provide both diagnosis and treatment if appropriate. Access to SP are obtained through a GP referral and only to those which whom they are administratively linked to. Depending on the regions, referral is not hended for patients who visit either an obstetrician or a dentist. Patients having received specialist care are expected to return to the primary care physician who then assumes responsibility for follow-up treatment. Since 1984, the primary health care (PHC) sector has experienced an extensive process of institutional reform and capacity building (European Observatory of health, 2006)

A National Quality Plan for the NHS was adopted in 2003 with the aim to improve efficiency, increase the available information and reduce health inequalities. Some effort has been made to increase efficiency and decrease waiting times. The implemented actions have included contracting out private hospitals, financial compensation for doctors to shorten waiting lists and the patients right to opt for another public or private contracted-out hospital after having waited a specified time. However, accessibility problems, delays in treatment, and waiting times are still a major policy problem.*(*European Observatory of Health, 2006)

2.1.3 Activity, physical and human resources

In this section we use official data from "Estadística de Establecimientos Sanitarios con Regimen de Internado (ESCRI)"

Level of activity As it can be seen in Figure 1 and Tables 2 to 3, the level of activity has been increasing since 1995. This trend was mainly driven by an increase in the number of people that use the services but also by an increase in the average level of per capita utilization.

[8]We define as immigrants those who do not have Spanish nationality (economic and non economic immigrants)

Figure 1: Measures of utilization of health services. 1997=100

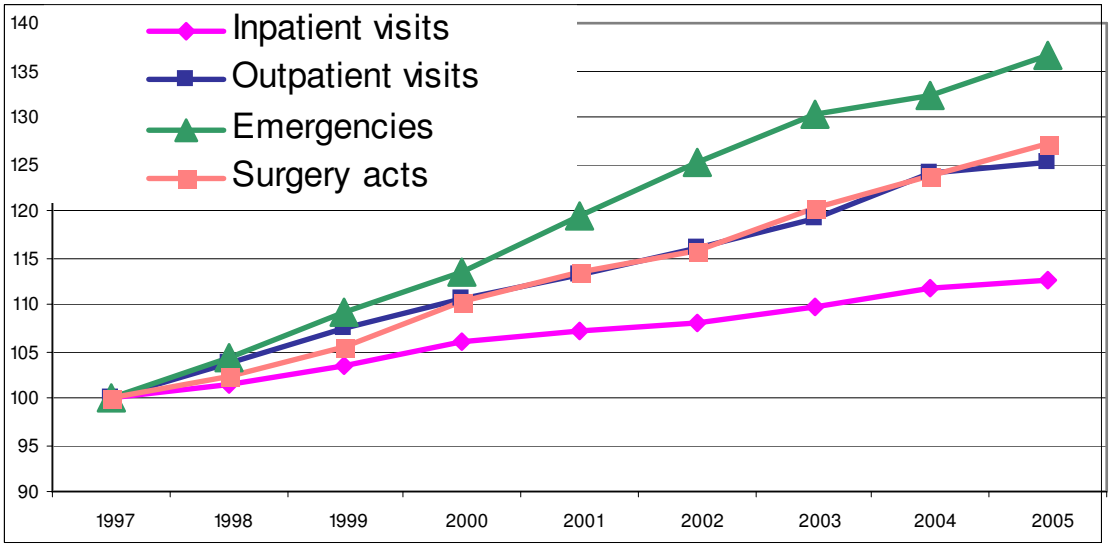


Figure 1 shows the evolution of various measures of utilization (inpatient visits, outpatient visits, emergencies and surgeries). All the type of health services considered show an increasing trend, being emergencies the one with the largest rate of growth in the period considered. In 2005 emergencies received 24.4 MM of visits in comparison to 17.8 MM in 1997 (relative variation: 36 per cent). Outpatient visits and surgery acts follow a similar trend, increasing from 57.2 MM and 3.3 MM in 1997 to 71.6 MM and 4.2 MM in 2005, respectively; Inpatient[9] have increased the less during the period (13 per cent or 0.57 MM between 1997 and 2005). The same conclusions arise if the utilization per 1000 inhab is analyzed instead.

Table 2: Hospital activity indicators per 1000 inhab

Total (Public + Private)	**1995**	**1999**	**2000**	**2002**	**2005**	**1995-2000**	**2000-2005**
Discharges	108.82	118.10	120.05	118.35	117.43	10.32%	-2.18%
Outpatient visit	861.46	1,107.30	1,155.81	1,203.55	1,270.59	34.17%	9.93%
Emergencies	414.55	491.22	508.05	540.89	562.14	22.56%	10.65%
Surgery acts	75.61	88.17	91.74	93.09	97.31	21.33%	6.07%
Public Sector*							
Discharges	75.77	81.75	82.45	80.59	79.74	8.82%	-3.29%
Outpatient visit	668.71	866.83	900.44	928.34	969.59	34.65%	7.68%
Emergencies	320.33	371.22	380.77	399.40	410.65	18.87%	7.85%
Surgery acts	46.25	54.36	55.37	56.25	59.35	19.71%	7.19%
Private Sector							
Discharges	33.05	36.35	37.60	37.77	37.68	13.76%	0.21%
Outpatient visit	192.75	240.47	255.37	275.21	301.00	32.49%	17.87%
Emergencies	94.22	120.00	127.28	141.49	151.49	35.09%	19.02%
Surgery acts	29.35	33.81	36.37	36.85	37.96	23.90%	4.37%

Source: ESCRI

[9]More than 60 per cent of the inpatient visits were to public hospitals. In 2005, more than 75 per cent of the inpatient visits were financed by the NHS, regardless of whether the hospital was public or private. This percentage was smaller than the one observed in 2001.

Physical and human resources As mentioned before, decentralization has shifted health policy and planning to the autonomous communities. Therefore, the overall infrastructure and planning of health care resources are defined at that level. This organizational structure may generate differences between regions in the available capacity of the health care system.

In 2005, the National Health System has *2,840* health centres and 751 hospitals (37 hospitals less than in 1999), of which 296 belonged to the NHS. In 2005 Catalonia was the region with the highest number of hospitals (175), followed by Andalucia (92) and Madrid (72). Since differences in size between hospitals exits, the number of beds might be a better indicator of the capacity of the system. In 2005 the total number of hospital beds available was 145,853 (almost 3.4 beds per 1000 inhabitants). Catalonia was the region with the highest number of beds (29,845) and the only region for which this indicator that has slightly increased since 1999 (see Table 5). Naturally, an increasing population combined with a declining number of hospitals and beds lead to a decline in the relative indicators of capacity (hospitals per 100,000 inhabitants, hospital beds per 1000 inhabitants, operating rooms per 1MM inhab, childbirth rooms per 1 MM hab, incubators per 1MM hab) in all the Spanish Communities since 2000. The larger decrease in hospital beds per 1000 inhab was observed in those regions with greater affluence of immigrants (Baleares, Madrid, Canarias, Valencia and Andalucia). However, it is important to note that this decrease has been mainly driven by changes in the area of specialization for some hospital[10], as well as the delay in investment decisions due to the decentralization process that finished in 2002.

Productivity indicators and occupation ratios have increased in many regions, mainly due to important technological changes that have been observed in the last two decades (major ambulatory surgery is a good example). The average length of stay decreased from 10.46 days to 8.47 days. La Rioja, Castilla y León, Navarra, Extremadura, Baleares and Madrid were the autonomies with a greater improvement (see Table 4).

The productivity improvement joint with a change in managerial duties but also an increase in the delays in treatment and waiting times may help explain the huge increase in utilization levels during the period from the supply side.

Unfortunately, reliable information about delays in treatments is not available for different years. However, different reports (European Observatory of Health, 2006, Health Consumer Powerhouse for 2007) put emphasis in waiting lists as one of the major problems of the Spanish Health care system, " Waiting lists are indeed the main cause of patient dissatisfaction with the NHS (more than a third of complaints by health system users result from this issue). From 2000 to 2004, patients' perception of this issue has worsened: in 2000, 32 percent of the population thought that the problem was "in the process of improving", a proportion that in 2004 dropped to 24.2 percent. Perceptions regarding the accessibility of an appointment with the doctor and waiting times to enter the doctor's office once the patient is on the premises have also worsened, both in PHC and specialized care" (European Observatory of health (2006)).

Information on the number of physicians and doctors is shown in Figure 2. The number of active physicians increased from 123,300 in 1997 to 174,000 in 2006 (40 percent). At the same time the number of inhabitants per physician decreased from 321 to 255 in the same period. Although these numbers show a relative improvement comparing with the situation observed in 1997, the imbalance between the demand and supply of specialists has been documented in recent years (Gónzalez López Valcarcel, Barber Perez and Rodriguez (1998), Gónzalez López Valcarcel (2000) and López Valcarcel and Barber Perez , 2007). According to López Valcarcel and Barber Perez (2007) estimations Spain has physicians deficit in anesthesiology, radiology, general surgery and

[10]For example, the aging of the population and the increase in chronic illnesses have changed the needs of the native population. As a consequence, some acute hospitals have changed to be long term daily living centers.

Table 3: Hospital beds per 1000 hab

CCAA	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
AndalucÍa	2.94	2.93	2.86	2.77	2.68	2.64	2.55
Aragón	4.32	4.26	4.19	4.13	4.09	4.01	3.93
Asturias	3.70	3.80	3.57	3.72	3.61	3.52	3.56
Balears (Illes)	4.12	3.95	3.87	3.67	3.50	3.42	3.28
Canarias	4.87	4.50	4.32	4.12	4.02	3.95	3.88
Cantabria	3.97	3.82	3.87	3.83	3.80	3.73	3.72
Castilla - La Mancha	2.93	2.86	2.80	2.75	2.67	2.63	2.55
Castilla y León	4.30	4.35	4.33	4.17	4.13	4.08	3.91
Cataluña	4.68	4.64	4.54	4.55	4.35	4.41	4.27
Comunitat Valenciana	2.87	2.77	2.66	2.62	2.53	2.53	2.45
Extremadura	3.51	3.60	3.55	3.61	3.63	3.44	3.43
Galicia	3.67	3.63	3.60	3.53	3.47	3.61	3.56
Madrid	3.74	3.60	3.39	3.30	3.19	3.12	3.14
Murcia	3.45	3.31	3.28	3.00	2.99	3.07	3.09
Navarra	4.33	4.25	4.13	3.96	3.87	3.85	3.79
País Vasco	3.97	3.91	3.86	3.85	3.78	3.79	3.82
Rioja (La)	3.33	3.24	3.27	3.15	3.11	3.34	3.11
Ceuta y Melilla	3.27	3.14	2.92	2.96	2.98	2.71	2.74
Spain	**3.78**	**3.70**	**3.61**	**3.54**	**3.47**	**3.43**	**3.38**

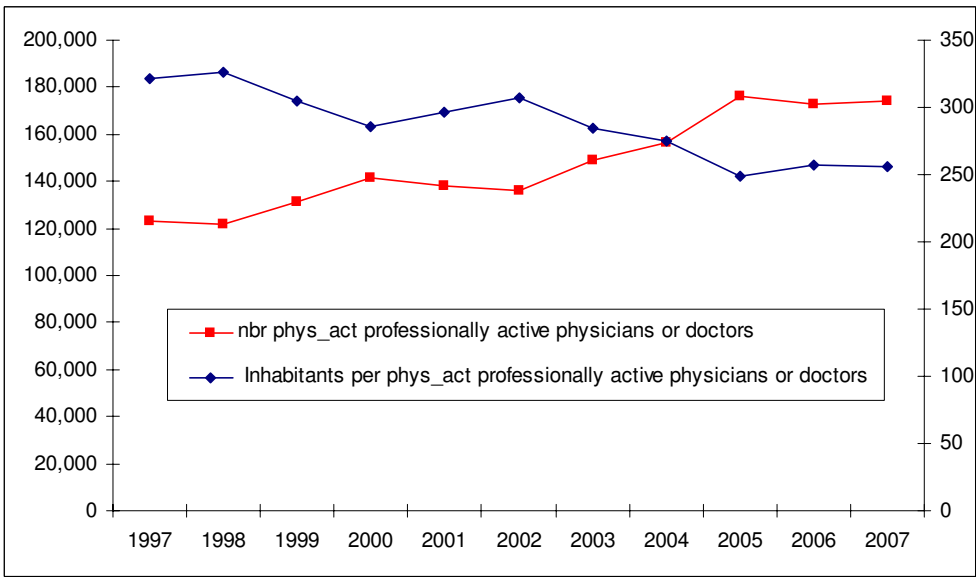
Source: ESCRI

Table 4: Hospital productivity indicators

	Average capacity			Avg length of stay			Turnover Index			occupation rate		
CCAA	1995	2000	2005	1995	2000	2005	1995	2000	2005	1995	2000	2005
Andalucía	284.3	275.9	239.1	8.74	7.63	7.11	31.88	36.05	39.99	76.30	75.37	77.89
Aragón	228.8	211.7	199.9	11.33	10.11	9.32	25.18	29.30	32.08	78.13	81.19	81.92
Asturias	196.8	225.3	217.2	10.47	9.38	8.79	28.61	31.25	33.49	82.04	80.31	80.67
Balears	185.4	152.3	161.2	8.02	6.92	6.19	35.53	40.87	46.32	78.11	77.46	78.50
Canarias	171.8	180.9	179.9	14.30	12.43	11.41	20.88	23.79	26.92	81.80	81.05	84.14
Cantabria	272.0	272.3	247.1	13.39	11.07	11.02	22.76	27.22	28.92	83.50	82.54	87.33
Castilla y León	245.6	218.5	254.3	13.35	10.46	9.56	21.71	27.29	30.20	79.40	78.24	79.07
Castilla-La Mancha	192.2	178.6	191.5	10.00	8.30	7.49	29.24	33.60	38.48	80.08	76.39	78.91
Cataluña	180.5	172.6	177.9	11.49	10.28	10.05	26.40	29.85	30.47	83.13	84.10	83.89
Comunitat Valenciana	226.5	207.7	209.5	8.07	6.67	6.40	33.85	42.04	44.83	74.81	76.86	78.55
Extremadura	255.6	226.2	217.9	11.83	9.87	8.84	24.99	27.67	30.76	80.98	74.84	74.52
Galicia	181.8	213.0	222.2	10.94	9.59	9.32	26.32	30.43	32.29	78.88	79.97	82.41
Madrid	317.8	309.9	288.9	10.37	8.93	8.18	26.85	33.24	36.87	76.26	81.30	82.67
Murcia	180.4	167.8	169.8	9.06	8.09	7.84	31.85	35.17	37.93	79.08	77.91	81.48
Navarra	194.8	177.7	179.5	10.73	8.38	7.91	26.80	33.30	35.09	78.77	76.41	76.09
País Vasco	179.7	176.2	188.7	10.37	8.76	8.65	27.66	33.63	35.02	78.61	80.71	82.96
La Rioja	189.6	238.0	194.6	12.27	9.92	8.62	25.82	29.96	31.50	86.77	81.44	74.40
Ceuta y Melilla	126.2	136.0	108.7	6.81	6.35	6.57	34.28	33.92	37.81	63.98	59.05	68.07
Spain	217.7	211.2	209.5	10.46	8.98	8.47	27.59	32.37	34.95	79.05	79.63	81.11

Source: ESCRI

Figure 2: Trends in physicians per inhabitant. 1997-2006



pediatrics. Also, the aging structure of some specialities may increase the unbalance in next years.

2.2 The private health care sector

The private health care sector still plays a secondary but increasing role in Spain. It has a complementary function in the health system and in specific cases it plays a substitutory role. The latter is, for instance, the case of (central government civil servants, who have the right to choose between a public (the Social Security administration) and a private (insurance companies) provider on a yearly basis. In general, it covers services that the NHS does not cover (dental care) and gives a wider range of quality services (hospital hotel facilities or waiting list avoidance) that helps to fulfill the preferences of heterogenous groups. Although the Gross added value of the private health care sector grows 32 per cent between 1997 and 2006, the participation of the private sector in the total Gross Value added increase only from 35 per cent to 38 per cent.

Two dimensions about private provision are relevant. One, is related to whether services are paid by the public sector or by the private health care user. Another, is related to the ownership of the production resources (Iversen, 1997).

In the first case, according to the National Health Survey, up to 12 percent of the Spanish population had supplement private health coverage in 2006. In 1997 this percentage was 7 percent. Most of the privately insured individuals are concentrated in high income regions and big cities: 25 per cent, 26 percent and 27 percent of the population of Baleares, Cataluña and Madrid respectively are covered through supplementary voluntary insurance. "Up to 1999, a 15% tax relief in the personal income out of total private health expenditure was directly promoting private expenses on health care, including the purchasing of private health insurance..... ". (López Casasnovas, Costa-Font and Planas, 2004).

The average household private expenditure on health (the most important components of which are insurance purchases and medicines) at 2001 constant prices have been increasing from €427 in 2000 to €518 in 2005. Also, the number of households with positive expenditures on health increases.

The public sector helps to develop the private health care market. Since mid-1990s, hospitals outside the NHS, regulated through agreements or contracts ("conciertos"), has tended to increase the provision of services to the NHS, owing to the emphasis given to reducing waiting times (European Observatory of health, 2006). The implementation of such a policy promotes an expansion of private health care network , which has grown quickly since 2000. In 2007 almost 40 per cent of hospitals are privately owned.

3 Literature review and data description

3.1 The literature

The literature about immigrants health differentials and their determinants is ample. As immigration to Spain is a "new" phenomenon, we focus on the part of the literature that deals with differences in the initial level of health.

Related to the differences between health status and health care use between immigrants and natives, the evidence show that "new immigrants" have better health compare to native born population but this gap is negatively related with the time of permanence of the immigrant in the host country (Chen et al (1996),Parakulam et al (1992); Dunn & Dyck (2000); Hyman (2007); Meadows et al (2001); Ali (2002); Perez (2002); Newbold & Danforth (2003); McDonald & Kennedy (2004), Wu and Schimmele, (2005); Jasso, (2004)). Less evidence exists for the differences in health care utilization between immigrants and natives. However, the studies that test this hypothesis for Spain and other countries found that there are not significant differences between the utilization of these two groups when observables as age, sex, education and income are control for (Laroche, (2000); Sohn and Harada (2004) ; Jasso (2004) ; Sanz , Torres et al. (2000); Jansa JM and García de Olalla P. (2004) ; Carrasco-Garrido, De Miguel et al. (2007) ; Rivera et al. (2008)).

Several hypothesis emerge to explain these facts. A self-selection explanation argue that healthier, younger, better educated and wealthier individuals are the ones that are most likely to migrate. But also, those individuals that self-select into migration may be those who are most forward looking, their time discount rate may be less and also may invest more in human capital (Jasso, 2004). Finally, in some countries, a health screening process due to immigration offices also selects on observables like education.

At this point, the evidence for Spain is very scarce. To our knowledge only a few papers describe the health characteristics and health services utilization of immigrants.

Rivera et al., 2008 using the 2003 wave of the SNHS found that there are not significant differences between the health care demand of natives and immigrants, except for those who respond to their age and health status. For example, childbirth is the most frequent inpatient cause between immigrants. The authors also try to give a measure of non satisfied demand. They found that being an immigrant increases the probability of non satisfied health care demand in 0.48%. The main problem of this study is the low fraction of immigrants in this survey which severely hampers any statistical inference with respect to the health status and the utilization of health care services on the part of immigrants. However, the results for the preliminary descriptive analysis were in line with the expected results.

Carrasco-Garrido et al. (2007) carry out a descriptive, cross-sectional, epidemiological study analyzing the health profiles and lifestyles of the immigrant population in Spain and their use of health resources using the SNHS 2003 wave. They found that the percentage of immigrants hospitalized in the preceding 12 months was higher than that of the autochthonous population

(11.4 vs. 8.2 %, $P < 0.05$), but no significant differences were observed in the use of other health-care services.

To our knowledge there is no explicit evidence on the effect of immigration, as a demand shock, on the quality of the health care system and its implications on the demand of health services. However, this line of research can be contextualized in the literature of quality and/or congestion. The rationing by waiting lists and its implications have been largely studied in the literature (Lindsay and Feigenbaum (1984), Iversen (1997), Feldman and Lobo (1997), Jofre (2000) Ma and Riordan (2002)). For example, in Lindsay and Feigenbaum (1984), the greater the length of the waiting lists are the lower the utility of the consumption of the particular good considered[11]. Given the lower utility on the consumption of the public good, more consumers may choose to double the coverage by buying private medical insurance. In other words, one way to avoid these delays in the public sector is opting for the private health care system. Besley et al (1999) study empirically this interaction for the UK and found a positive correlation between waiting lists in the UK National Health Service and private insurance.

Specifically for the Spanish case, the demand for private insurance has been largely studied in the last 10 to 15 years from various perspectives, but none of them analyze the choice of provider on the part of civil servants. Regarding the demand for private insurance, González (1995) and Murillo et al. (1996) studied the main socioeconomic determinants of the demand for private medical insurance, the existence of moral hazard has been studied in Szabó (1997) and Vera-Hernández (1999). More recently and more related for the purposes of the present work, Jofré analyzed the effect of the waiting times in the public network in the demand of private medical insurance and the NHS; Costa-Font and García (2002), following Propper (1993), studied the relationship between private health insurance using Spanish data; and, finally, Costa-Font and Garcia (2003) studied, in a pseudo structural context the relationship between quality and private medical insurance. They found that the perceived gap between quality of private and public health care, income and insurance premium are among the determinants of demand for private health insurance (PHI). In our case, we test this hypothesis taking advantage of the increase in the protected population, which may hurt the (perceived) quality of public services.

As regard the joint demand of health services and the demand of private health insurance Srivastava and Zhao (2008) investigate the determinants of individuals choice between public and private hospital services in Australia, in particular, the impact of private health insurance status. They estimate a recursive trivariate probit system model with partial observability that allows for endogeneity of private insurance participation and potential selection bias as they only observe individuals public/private choices for those who have visited a hospital in the past 12 months.

Finally, specifically for the Spanish case, we want to mention Rodríguez and Stoyanova (2004) who studied the effect of private insurance on the demand for GP and SP services. They found that differences in insurance access is the main determinant of both, the choice of sector and the kind of physician contacted, giving rise to very different patterns of consumption for GP and specialist visits". They find that people with only public insurance go 2.8 times to the GP per one time that they visit a SP; individuals with duplicate coverage have a ratio of GP/SP visits equal to 1.4 (the combination being public GP and private SP) and people with only private insurance access actually have an inverted pattern of visits: they contact SPs more often than GPs.

[11] In our framework, delays in the delivery of health care services might have a negative consequence on health.

3.2 The Spanish National Health Survey

We mainly use data from the National Health Survey for the years 2001, 2003 and 2006. The data from years 2001 and 2003 is used in the insurance analysis only. Alternatively, the data for 2006 is used in both the comparison of health care utilization by natives and immigrants (see section 4) and the analysis of the demand for private health insurance on the part of native born individuals (see section 5). This is so because of the first two waves of the survey are not representative for (economic) immigrants.

The Spanish National Health Survey (SNHS) is a cross section biannual research aimed at families and conducted by The Spanish Ministry of Health and the National Statistics Institute (INE). The survey is carried out in the whole country and its main purpose is to collect data on the health status, utilization and its determining factors. The survey has three questionnaires: a household questionnaire, an adult questionnaire and a kids questionnaire. The INE uses a direct personal interview to collect the data for persons aged 16 and over. However the mother or the father are asked in the case of persons aged below 16. (21,120 adults were interviewed in 2001, 21,650 in 2003 and 29,478 in 2006). A methodological change was introduced in the SNHS-2003 and the questionnaire was further revised in 2006. These changes make it difficult to establish inter-annual comparisons for some of the variables of interest, for example the probability of contacting a physician. In the latter case, for 2001 and 2003 the questionnaire asked for any visit in the last two weeks. In 2006 the respondent was asked about any visit in the last month. However, we believe that, after making the appropriate corrections , these changes do not affect significantly our qualitative results.

Representative information on immigrants is only available for 2006, where 7.05 percent of the interviewed persons (1807 individuals) were classified as immigrants. This number underestimates the fraction of immigrant population, at almost 10 percent, for the year 2006. Thus, we would run into problems if this sample is not representative of the immigrant population. However, prospective comparison with a more representative sample, such as the Labor force Survey (EPA, INE) denies this possibility. In the first two columns of Table 5 we present some demographics for the sample of immigrants in the SHNS sample (first column) and the 2nd quarter of the EPA 2006 (second column). We detect some differences in the age structure of the population and its educational composition. However, the labor force status distribution is very similar.

Table 5 also compares some socioeconomic characteristics of the Spanish immigrants and the Spanish born population. In our sample immigrants are, on average, younger and more educated (39.9 percent of immigrants report having secondary school in comparison with 29.7 percent of native born population. Alternatively, there are no important differences between these two groups at the college level.

4 Utilization of health care services by immigrants and natives

In this section we analyze the health and health care utilization in terms of visits to General practitioner, specialists, hospitalizations and emergencies of first-generation of immigrants to those of the Spanish born population aged 21 to 65 years old using data from the 2006 wave of SNHS.

Table 5: Natives vs Immigrants socioeconomic characteristics. 2006.

VARIABLES	Immigrants (NHS)	Immigrants (EPA)	Natives
Age: less than 30	25.71	38.34	11.65
Age: between 31-50	62.60	48.16	56.02
Age: between 51-65	11.68	13.50	32.33
Female	52.38	50.41	54.89
Single	33.90	38.42	25.74
Married	57.27	52.81	64.19
Widowed divorced	8.83	8.77	10.07
Primary	40.79	24.35	50.50
Secondary	39.96	60.25	29.68
College	19.25	15.39	19.82
Inactive	20.72	21.44	28.52
Self-employed	9.41	7.10	13.73
Employed	61.28	62.10	49.79
Unemployed	8.58	9.36	7.96

source: SHNS 2006 and EPA 2006

4.1 Unconditional differences in the utilization of health care services between immigrants and natives

The main purpose of this section is to compare Spanish-born population and immigrants in terms of health use and health characteristics using data from the 2006 wave of the SNHS. We have 23823 observations for the native born population and 1807 for the immigrant population.

Table 6 presents the key health indicators for both groups of the population. As it can be easily detected, the Spanish population presents in general worse health indicators (weight, smoking, general health condition) than the immigrants counterpart and they show greater health use indicators, being the use of emergency rooms an exception. The latter can be easily explained because emergency rooms are the back door of the system, specially for those that are non-formally covered (uninsured people and illegal immigrants, which even in this situations should be attended in emergency rooms by indication of law).

However, a large fraction of the differences in health status indicators and health utilization indicators are due to the fact that immigrants constitute, on average, a much younger population. Since the correlation between health and age is strong we present the descriptives stratified by age. As we shall show latter on, many of the sample mean differences disappear once we control by age.

Conditioning on age and using the self-reported levels of general health status (see the top panel of Table 7), the foreign-born population aged 22-40 years old appears to be in slightly worse health than the equivalent group for the native-born. This difference disappears for people aged 41-50 and becomes in favor of immigrants for those aged 51–60 years old. However this measure has to be taken with caution since the individual answers can be subject to different health perceptions (response heterogeneity).

The picture is a bit different when comparing indicators of self-reported chronic illnesses (see the intermediate panel of Table 7). The message we get from this table is crystal clear: across all conditions and in almost every age category, the prevalence of diseases is much lower for foreign born population than for native-born population, being the differential larger the younger the population groups. This is so because of immigrants are a self-selected group of their respective native population, so the effect is much more evident the younger is the immigrant since it is less likely of being in Spain for a long period.

Nevertheless, as individuals may differ among other things in their underlying health that we

Table 6: Natives vs Immigrants health and health use characteristics. 2006.

VARIABLES	**Immigrants (SNHS)**	**Natives**
Demographics		
Normal weight	49.0	44.8
Over weight	32.1	35.1
Obese	12.1	14.0
Weight missing	6.8	6.1
Chronic illness	30.0	42.5
Smoke every day	27.9	31.0
Smoke not every day	6.0	2.9
Do not smoke but in the past	15.2	22.9
Never smoke	50.9	43.2
Very good health	22.2	15.3
Good health	50.8	54.0
Fair health	22.7	22.9
Bad health	3.3	5.8
Very bad health	1.1	2.1
Privately insured	10.6	15.1
Utilization measures		
GP visit during last month	22.9	29.6
Specialist visit during last month	11.2	16.4
Hospitalization	8.8	8.8
Emergencies	32.6	27.5
Surgery	37.4	45.6
Diagnosis	13.7	15.3
Treatment	8.6	14.1
Childbirth	28.8	18.3
Other	11.5	6.6
European Union	28.3	—
Other in Europe	4.2	—
Canada or EEUU	1.0	—
Other in America	48.5	—
Asia	2.7	—
Africa and Oceania	15.4	—

source: SNHS 2006

are not controlling for, these results are only descriptive and we cannot extract any inference from them. At this point we have to note that these differences may be affected by underreporting of specific health conditions in the foreign-born population. This may appear because immigrants has less contact with the diagnosis of diseases in the host country and also due to culture and language that may affect what people know and what they report about illnesses (Jasso, 2004).

Differences in utilization rates between immigrants and the native born population The bottom panel of Table 7 presents a comparison of utilization rates between immigrants and natives. We observe that, on average and regardless of age, immigrants report less visits in the last month to GP or SP than native born-citizens do, being the differences larger for the age group 41-50.

Unconditional results also indicate that there are no significant differences between immigrants and non-immigrants in hospitalization rates (8.7 per cent of immigrants report being in hospital at least once within the last 12 month compare with 8.9 per cent of natives). Finally, we found that immigrants use emergency services most frequently than natives (with the expenditure and following implications that this first contact with the system carry with).

The observed differences in utilization may be due to different observable and unobservable factors: education, income, level of health, opportunity costs of time, barriers in access to the health system, etc. In a universal system such as the Spanish one there may exist other barriers such as language, culture, legal status, and "ignorance" about how the system works which may affect the level of utilization of health services.

4.2 Conditional differences in the utilization of health care services between immigrants and natives

In this section we estimate discrete choice models for health utilization in order to identify the potential differences between natives and immigrants using data from the 2006 wave of the SNHS. We estimate the probability for contacting a GP, a specialist, being in hospital, or a emergency room in the last month using a probit model. The variable of interest takes value one if the individual visit each one of these services during the last month and zero otherwise. As explanatory variables we include socio-demographic characteristics such as age, sex, education, civil status, income, occupation, household size, health status, and a set of dummies controlling the origin of the immigrant. We define three groups of immigrants according to their region of origin: (i) European Union, United States (US) and Canada; (ii) other American countries; and, (iii) Asia, Africa and Oceania. The first group typically represents non-economic immigrants, while the rest represent (more recent) economic immigrants. As the level of income, the insurance status and being female (which are more likely to be non primary immigrants because of the family grouping policy) may have different effects for immigrants and natives we have included (and tested) interactions between these variables and being an economic immigrant. In the estimation we also control for regional dummies to take into account differences in the supply of health care services at the regional level.

The results of these exercises are reported in Table 8. We find that, as a rule, the conditional probability of using any of these services is similar for natives and all origins (if any, we find that non-economic immigrants visit less frequently both the GP and the SP). These results are in line with previous evidence for Canada that show that immigrant out-patient utilization is not significantly different from non-immigrant use (Laroche, 2000) and also with recent results for Spain (Rivera et al., 2008).

As regards the interactions between private insurance, income and female we find that the effect

Table 7: Health Status and prevalence of chronic conditions by age

		Age group				
		22-30	31-40	41-50	51-65	Total
	Health Status by immigration status					
Foreign Born						
	Very Good (%)	30.9	19.9	18.8	15.8	22.4
	Good (%)	48.4	52.6	49.7	47.9	50.3
	Fair or Poor (%)	20.7	27.5	31.5	36.4	27.4
	# Observations	444	597	340	165	1,546
Born in Spain						
	Very Good (%)	24.3	19.4	13.6	8.5	15.1
	Good (%)	57.7	59.0	56.9	44.9	53.9
	Fair of Poor (%)	18.0	21.6	29.5	46.6	30.9
	# Observations	2097	4702	4438	4934	16,171
	Prevalence of chronic conditions by immigration status					
Diabetes						
	Spanish Born	0.7	1.5	3.0	10.3	4.5
	Foreign Born	0.7	2.2	2.1	6.7	2.2
Asthma						
	Spanish Born	8.1	5.4	3.8	5.7	5.4
	Foreign Born	4.7	4.0	5.3	4.9	4.6
Hypertension						
	Spanish Born	4.7	7.3	15.2	35.1	17.6
	Foreign Born	6.3	7.0	14.4	27.3	10.6
Anemia						
	Spanish Born	6.4	7.2	8.9	8.1	7.9
	Foreign Born	6.3	7.0	6.8	6.1	6.7
Cholesterol						
	Spanish Born	4.4	9.0	17.2	29.9	17.0
	Foreign Born	3.4	5.9	9.7	20.6	7.6
Depresion and Anxiety						
	Spanish Born	9.6	13.6	19.8	25.1	18.3
	Foreign Born	7.7	11.4	15.6	18.8	12.0
Limit Health activities						
	Spanish Born	26.4	27.5	29.5	35.3	30.7
	Foreign Born	25.9	21.1	24.3	28.4	24.0
	Utilization					
General Practitioner						
	Spanish Born	22.5	23.2	27.8	39.4	29.8
	Foreign Born	20.3	22.6	22.8	32.1	23.2
Speciallist						
	Spanish Born	12.8	15.0	16.1	19.2	16.4
	Foreign Born	7.9	11.6	10.7	16.9	11.0
Hospitalization						
	Spanish Born	8.6	10.2	6.8	9.3	8.7
	Foreign Born	10.1	9.0	6.6	10.3	8.9
Emergency						
	Spanish Born	37.7	30.1	23.8	24.5	27.3
	Foreign Born	37.3	35.9	28.3	22.3	32.8

Source: SNHS

of all of them (jointly of separately) are statistically insignificant. Similar results are obtained when interactions are constructed for other regressors [Detailed results are available upon request]. Thus, once we control for observables, we are unable to find any systematic and significant difference between the utilization rates of natives and economic immigrants.

The results for the rest of the variables are, as a rule, in line with previous results in the literature on differences in utilization rates. In particular, the impact of age, marital status, labor status, income, subjective level of health have all the expected sign, and, more importantly, no significant differences between immigrants and non-immigrants are observed. As expected, reporting bad health, being obese or over-weighted increases the probability of utilization of each one of these services. Being self-employed or eventually employed reduces the probability of contacting a GP or a specialist. Likewise college has a negative effect on the probability of using either GP or Specialist services. As pointed by many authors, this is likely to reflect the better level of health of this group of individuals. Finally, having children increases the probability of being in hospital and the probability of using the emergency rooms.

All in all, it seems clear that the condition of economic immigrant does not alter significantly the balance (or proportionality) of the system since they use health services as often as native-born of similar characteristics do. The only adjustment needed comes from the fact that the age and gender structure of the immigrant population is different than the one of native-born population.

5 The effect of immigration on the demand for medical health insurance and physician services

As stated before, the demographic shock we have documented has likely produced an increase in the level of congestion of the Spanish Health system. Congestion may increase the length of waiting lists or reduce the duration of the spell of attention to patients, thereby affecting negatively the perceived level of quality of the services. The perceptions of the Spanish population as reported by the Barometro Sanitario[12] confirms this view. Although the perception about the system continues to be good, the dissatisfaction with the waiting lists to get an appointment, to be admitted for surgery, or to perform common diagnostic tests has increased by a large fraction (23 basic points or 49 per cent from 2000 to 2006). These responses are indicating a deterioration not at the intensive margin of the system (specialized services) but at the extensive margin, i. e., in access to the services that are normally regulated through waiting lists.[13]

The analysis of waiting lists in a mixed public-private health care system is at least controversial. For example, Iversen (1997) points out *"Without rationing of waiting-list admissions, the effect of a private sector on the public sector waiting time is in general indeterminate. If the demand for public treatment with respect to the waiting time is sufficiently elastic, the introduction of a private sector will result in an increase in the public sector waiting time."* Nonetheless, it seems pretty clear that waiting lists in the Public network increase the demand for private health coverage as well as services in the private sector.

Waiting lists are one of the major caveats of the Spanish health care system.[14] A recent report

[12]The Barometro Sanitario is a survey conducted by the Ministry of Health about the perceptions of the citizens about the public health system.

[13]A recent report by the Fundación Pfizer also points in this line [source: Fundación Pfizer: estudio sobre la inmigración y el sistema sanitario español. 2008].

[14]In Spain the information on waiting lists is still scarce. However, starting 2007 the Ministry publishes the main indicators of the performance of the system ("Indicadores clave del SNS"), including average waiting times for non-urgent surgery and visits to the specialist. (see Table 9 for details).

Table 8: Marginal effect for health care utilization-Probit regressions

	GP	**Specialist**	**Hospital**	**Emergency**
Private insurance	-0.034**	0.053***	0.029***	0.017
Private insurance*IMMIGRANT	0.018	-0.002	-0.032	-0.026
IMMIGRANTS FROM EU, US, Canada	-0.068**	-0.044**	-0.007	-0.034
IMM. FROM OTHER AMERICAN COUNT.	-0.074	0.001	0.021	0.065
IMM. FROM ASIA, AFRICA, OCEANIA	-0.071	0.019	0.007	0.067
FEMALE	0.059***	0.067***	0.026***	0.018
IMMIGRANT FEMALE	-0.016	-0.015	0.055*	0.063*
FEMALE AGED MORE THAN 50	0.015	-0.029**	-0.034***	-0.014
AGE: BETWEEN 31-50	-0.025*	-0.002	-0.031***	-0.135***
AGE: BETWEEN 51-65	0.009	0.002	-0.009	-0.185***
MARRIED	0.022*	0.015	0.002	0.008
VIDOWED DIVORCED	0.022	0.003	0.008	0.024
SECONDARY	0.004	0.029***	0.007	0.007
COLLEGE	-0.025*	0.028**	0.006	-0.000
CHILDREN	-0.002	-0.004	0.039***	0.042***
SELF-EMPLOYED	-0.035**	-0.031***	-0.019**	0.003
EMPLOYED	-0.017	-0.010	-0.014**	0.011
EVENTUALLY EMPLOYED	-0.039**	-0.016	-0.024***	0.021
UNEMPLOYED	-0.004	-0.008	0.003	0.034*
CITY MORE THAN 400000	-0.021	0.010	-0.003	0.004
CHRONIC ILLNESS	0.080***	0.066***	0.009*	0.062***
VERY GOOD HEALTH	-0.092***	-0.046***	-0.018**	-0.058***
FAIR HEALTH	0.173***	0.110***	0.077***	0.163***
BAD HEALTH	0.281***	0.272***	0.241***	0.338***
VERY BAD HEALTH	0.342***	0.357***	0.333***	0.389***
OVER WEIGHT	0.026**	0.004	-0.001	0.005
OBESE	0.053***	0.002	0.002	0.014
WEIGHT MISSING	0.021	-0.020	-0.001	-0.020
MONTHLY INCOME 600-900	-0.013	0.011	-0.002	-0.029
MONTHLY INCOME 900-1200	-0.026	0.012	0.014	-0.001
MONTHLY INCOME 1200-1800	-0.003	0.031*	0.012	0.007
MONTHLY INCOME +1800	-0.010	0.037*	0.014	0.019
MONTHLY INCOME MISSING	-0.056**	0.028	0.011	-0.006
IMM MONTHLY INCOME 600-900	0.116	-0.028	-0.030	-0.020
IMM MONTHLY INCOME 900-1200	0.074	-0.002	-0.027	-0.005
IMM MONTHLY INCOME 1200-1800	0.104	-0.036	-0.024	-0.055
IMM MONTHLY INCOME MORE 1800	0.091	0.013	-0.040	0.002
IMM MONTHLY INCOME MISSING	0.157	-0.050	-0.017	-0.021
SMOKE EVERY DAY	-0.027**	-0.024***	0.000	0.011
SMOKE NOT EVERY DAY	0.026	-0.010	0.004	0.024
DO NOT SMOKE BUT IN THE PAST	0.017	0.033***	0.023***	0.021*
HOUSEHOLD SIZE: 2	0.010	-0.006	-0.006	-0.015
HOUSEHOLD SIZE: 3-4	-0.003	-0.013	0.004	-0.026
HOUSEHOLD SIZE: MORE THAN 4	-0.027	-0.032**	-0.006	-0.062***
REGIONAL DUMMIES	YES	YES	YES	YES
N	17590	17590	17590	17590
chi2	1964.88	1530.02	1052.65	1434.10
ll	-9555.65	-6947.62	-4724.52	-9649.99
Testing interactions for immigrants				
Test Income=0 (chi2(5))	4.01	3.55	2.89	2.70
Test Income=0 + Other variables (chi2(7))	4.61	4.05	12.57	6.09

note: Robust standard errors. *, **, *** significant at 5, 1 and .1 per cent levels

carried out by The Health Consumer Powerhouse for 2007 points out the bad performance of Spain in waiting times compare with other European countries. Spain has a poor score in direct access to specialists, waiting times for major non- acute interventions and magnetic resonance imaging (MRI) scan examination. The grade is intermediate in visiting the primary doctor today and in time to get radiation or chemotherapy after treatment decision. The conclusion of the study about Spain is that it still seems that going for private health care is needed if patients want real excellence *(Health Consumer Powerhouse, 2007)*

The aim of this section is twofold. On the one hand, we want to test whether the decrease in the perceived quality at the extensive margin in the public health system is likely to increase the demand for private coverage in order to compensate it. We carry this exercise in two different samples: the sample of individuals with Social Security coverage, which are taking the decision of getting a private health insurance on the top of the public coverage; and, the sample of civil servants, who decide on a yearly basis whether they are covered by the public sector or the private sector. In this context, the variables which are proxying the population shock constitute good instruments (at least in the short run when the supply has not adjusted yet) of the increased level of congestion of the public system which is likely hurting the quality of services. On the other hand, we aim at testing whether the demand for specialized health services has been affected by the change on the level of congestion of the system. We want to test whether the balance on the use of GP/SP services has changed once we control for any effect of private insurance coverage. In particular we want to assess whether the population shock has affected the agent's preferences as regard the demand of these services.

Table 9: Waiting Lists - (Dec2007)

Waiting times for non-urgent surgery	**Days**
Traumatology	**82,80**
Cardiac Surgery	73,30
Angiology and Vascular surgery	69,40
General surgery	68,00
ORL	66,10
Ophthalmology	63,90
Urology	61,30
Gynecology	60,60
Waiting times for specilist	
Gynecology	**73,50**
Ophthalmology	61,40
Cardiology	52,10
Dermatology	44,40
Traumatology	44,30
Digestive	43,10
Urology	40,40
General surgery	38,80
ORL	33,30

Source: NHS

5.1 A basic demand model for private health insurance

In this section we describe the theoretical background for the demand of private health insurance or double coverage problem as well as the choice of sector of coverage (for the CS sample). Following Besley et al (1999) and Costa and García (2003) we consider an individual who has access to publicly provided (free) health care and also can gain access to a private competitive market for health care.

Table 10: Double insurance coverage and premium by region. In percentage. 2001-2006

	Double coverage						Insurance premium		
	2001		2003		2006		2001	2003	2006
	all	indiv.	all	indiv.	all	indiv.			
ANDALUCIA	5.92	4.02	4.05	na	8.64	6.02	380	436	502
ARAGÓN	7.03	5.68	8.15	na	11.7	7.87	360	347	376
PRINCIPADO DE ASTURIAS	5.98	3.65	4.51	na	12.9	4.10	260	328	418
ILLES BALEARS	25.4	24.9	23.8	na	25.8	24.9	440	523	623
CANARIAS	4.40	3.02	4.08	na	6.23	3.89	390	427	520
CANTABRIA	9.58	7.46	6.34	na	6.13	5.36	300	348	391
CASTILLA-LA MANCHA	3.39	2.34	3.74	na	6.82	4.63	350	419	504
CASTILLA Y LEÓN	5.79	3.71	6.43	na	10.1	5.25	390	441	516
CATALUÑA	18.6	14.8	24.4	na	25.2	20.5	340	443	551
COMUNIDAD VALENCIANA	7.39	3.78	6.68	na	10.6	8.15	280	507	611
EXTREMADURA	0.47	0.47	4.28	na	1.96	1.70	390	456	522
GALICIA	3.48	2.61	3.87	na	8.30	5.19	400	436	483
COMUNIDAD DE MADRID	22.1	16.5	28.8	na	25.8	21.1	420	477	558
MURCIA	4.51	4.18	7.68	na	7.62	5.95	370	423	518
COMUNIDAD FORAL DE NAVARRA	2.10	1.88	2.50	na	5.39	2.71	120	159	326
PAÍS VASCO	8.31	3.85	12.81	na	21.7	13.1	340	382	492
LA RIOJA	2.85	2.05	12.30	na	8.74	6.22	330	326	392

source: SNSS 2001, 2003, 2006; source of premia data:ICEA

The choice between the public and the private provision depends on the quality gap between these two sectors. Risk averse individuals maximize their expected utility, quality is exogenously determined and health is assumed to be a normal good. PHI will be purchased if the perceived quality gap between the private and the public provision is wide enough to justify the income lost through payment of the insurance premium. The main difference between these two models is that Costa-Font and García (2003) include the out of pocket alternative to purchase private health care jointly with the NHS option. This specification of the model leads to an indeterminate effect of income on the probability of purchasing PHI, although Besley et al. (1999) found a positive effect. Both found a positive effect of the quality gap between the private and the public sector provision on the probability of purchasing PHI.

We follow Besley et al (1999) with the difference that the perceived quality in the public sector (and also the private sector) depends, in a given period, on the ratio of the number of users (n_t) and the capacity (c_t) of the system. Let us call this ratio ϱ_t. Capacity in the short run adjusts following the law of motion $c_t = c_{t-1}\,\kappa$, where $\kappa = E_{t-1}(n_t/n_{t-1})$ is the expectation of the ratio of the population covered in the current period to the population covered in the past period. We consider the policy fixed in the short run. After a shock , for example, $n_t > E_{t-1}(n_t)$, then an underadjustment of the system is observed. So, the quality gap widens affecting the probability of choosing the private option.

Individuals are assumed to be risk averse and expected utility maximizers and they obtain utility from income (inc_t) and health ($h_t(q)$). Health depends only on the quality of care that each individual receives in case he/she becomes sick, which happens with probability π. The optimal level of health is $\bar{H}$ and it is normalized to 1. To recover a healthy state ($\bar{H}$), when the individual becomes sick has to consume one unit of care (a treatment). The quality of the treatment has to be higher than a minimum ($b_t q$) to ensure that the individual health recovers to the initial level ($\bar{H}$) but can be less than the maximum of all possible treatment qualities ($= q$). Treatment is available in the private health insurance market at quality q_t and price p_t or from the public sector at zero price and quality ($Q_t(\varrho_t)$), where $\frac{\partial Q}{\partial \varrho} < 0$. Thus, we assume that unexpected population shocks hurt quality and widens the quality gap between the private and public health care sectors.

Let $U(inc_t, 1)$ denote the utility function of the individual when healthy. The utility $U(.)$ depends positively on income at a decreasing marginal rate ($U_y(.) \geq 0$) and ($U_{yy}(.) < 0$)). Let $u(inc_t, h_t(q))$ denote the utility function of the individual when sick who receives treatment of quality q. As when healthy, $u(.)$ depends positively on income at a decreasing marginal rate.

Quality of care is also assumed to be a normal good; $(u_{inc}(inc_t, h_t(q)) \geq 0)$, $(\partial u_{yy}(inc_t, h_t(q)) < 0))$ and $u_{q,inc}(inc_t, h_t(q)) \geq 0$

A competitive private insurance market in which the maximum quality of care $(= q)$ is provided in equilibrium is assumed. The premium (p_t) is fair and equal to the probability of being sick (θ). For simplicity we assume that individuals are fully insured and are reimbursed for all their medical expenditures $(p_t^* \bar{q})$.

The decision to purchase PHI (or the choice of sector for civil servants) will be driven by the comparison between the expected utility if he/she purchases the PHI and the expected utility if he/she does not.

If the individual purchases PHI, the expected utility (V_{PHI}) is:

$$V_t^{PHI} = \theta u(inc_t - \theta p_t \bar{q}, h_t(\bar{q})) + (1 - \theta) * U(inc_t - \theta p_t \bar{q}, 1) \tag{1}$$

and if the individual does not purchase PHI, the expected utility V_t^{NHS} is defined as:

$$V_t^{NHS} = \theta u(inc_t, h_t(Q(\varrho_t))) + (1 - \theta) * U(inc_t, 1) \tag{2}$$

Therefore, the consumer will purchase a private health insurance when universal coverage is available if

$$V^{PHI}(\theta, p_t, \bar{q}_t, inc_t) \geq V^{NHS}(\theta, Q(\varrho_t), inc_t) \tag{3}$$

For this inequality to hold it might be the case that the perceived quality gap between the public and private health sectors in a given year is sufficient to compensate the income lost due to insurance premium payment.

As it can be seen in the simplified model, the main determinants of insurance purchase in a given year are: income, individual and household characteristics jointly with the differential in quality between the private and public provision of care. In our case, quality is affected by the ratio of users to capacity. For a slow adjusting supply, an unexpected increase in n may hurt the quality (increased waiting time, decreasing time spent on each patient, etc.) of key health (specialized) services, thereby reducing the utility of the consumption of the public good. As health is assumed to be a normal good, an increase in the differential of the quality between the private and the public provision will, most likely, increase the demand for private health insurance (and for civil servants would increase the fraction choosing a private provider). Note that one prediction of our model is the decline in the demand for private health insurance as soon as the population shock gets reduced and/or it is anticipated. Recent data for 2007 from the Barometro Sanitario (which unfortunately is out from our sample period), seems to confirm it, since the problem of waiting lists is perceived less severe and the preference for the private sector has stabilized.

The income effect is, ex-ante, ambiguous. However, assuming that health is a normal good, an increase in the level of income should increase the probability of choosing for the better quality services. Therefore, as in Besley et al (1999) we expect selection into private insurance by income, ie, an increase in income will rise private health insurance demand if the quality is greater in this sector.

5.1.1 Descriptive evidence on private health insurance and utilization

In this section we present the descriptive statistics about private health care insurance demand as well as utilization of GP and SP by the native population for two samples: the SS and the CS samples. The first sample, which includes most of the population, will allow us to study the double

coverage decision. The second sample will allow us to study the choice between the public health care system and the private one. This is so because of central government civil servants can choose on a yearly basis whether they have medical coverage provided by the SS or by private providers (in a similar fashion as a private medical insurance, but paid by the Central government).

Our sample has 60,446 observations of native population between 16 years old and 104 years old: 18152 for 2001, 18491 for 2003 and 23823 for 2006. After dropping those that do not respond to one of the relevant questions, we get 57288 for the double coverage analysis and 2942 observations for the choice of sector of coverage analysis. Table 11 reports the descriptive statistics of the sample used both in the insurance and utilization exercises for both samples by insurance status.

Choice of private health insurance (double coverage)

Table 11 relates insurance purchase to a number of individual and household characteristics. An examination of socioeconomic characteristics of those with private medical insurance indicates that the distribution is heavily skewed towards higher socioeconomic groups. A simple analysis shows that individuals with higher income are much more likely to have medical insurance than individuals with a lower level of income. This is consistent with the existing literature for insurance demand which shows a positive and significant effect of income on insurance purchase. Being middle-age, married, reporting higher education level, and working as employee seems to be positively correlated with having private medical insurance coverage: people with double insurance are concentrated in the range of age between 30 and 50 years old (53 per cent of the double coverage sample), tend to be permanently employed (38 per cent in this sample vs 25 per cent in total sample) and more educated (29 per cent in this sample vs 13 per cent of university degree in total sample). Those reporting poor health are more likely to purchase medical insurance because they would have a greater probability to become ill in the future. A breakdown of PHI coverage by gender shows that 51 per cent are women but only 9.74 per cent of them have additional private insurance in own name in comparison to 11.02 per cent of men. This could be due to the fact that on average men tend to have jobs that are more likely to provide medical insurance as a benefit, and this medical insurance may cover other family members. These percentages are reduced to 7.86 per cent and 8.04, respectively, for those aged more than 50 years old.

Most of the individuals with double coverage live in rich regions such as Madrid (21 per cent), Cataluña (16 per cent), Baleares (8 per cent) and País Vasco (7 per cent). Not surprisingly, except for the case of País Vasco, these regions are the ones with the large percentage of immigrant population (see again Table 1), and hence the ones with the greater increase of the protected population. This association makes difficult to isolate the effect of immigration on the demand for private medical insurance from the effect of income. In principle the time variation present in data allows us to separately identify these two effects. However, we shall put some extra effort in checking the robustness of our results to the variation in the identifying assumptions.

The choice of civils servants: private or public coverage

Table 11 also relates the choice of coverage by civil servants to a number of individual and household characteristics. On average, the distribution of income, age, gender and place of living is similar to the SS sample. However, Civil Servants are more educated, have a greater probability of having children and being married. Civil Servants report greater levels of overweight and obesity comparing with the SS sample. Non significant differences are observed in other health variables (self-reported health and chronic conditions).

The characteristics of the subsample of Civil Servants who choose private coverage are pretty similar to the ones with double coverage in the SS sample. However, we can observe some minor differences. For example, the percentage of women with PHI and the percentage of women 50+ are a bit greater. The most important differences between these two samples are in the distribution by employment status, being the fraction of employed or inactive much larger in the subsample of civil servants.

Utilization of health services

As we have already documented, the SNHS collects data about utilization of different types of health services: medical visits, hospitalizations, dental visits, emergencies services, etcetera. However, as we are interest in analyzing the effect of having double coverage on the decision to visit a GP or a SP, we focus only on these two services.

As stated before comparing the health care data from different waves of the survey is not straightforward. To do so we have to make some assumptions. For the 2001 and 2003 waves of the survey the question asked by the interviewer was about the number of visits during the last 14 days, and in the 2006 wave the question was about the number of visits during the last month. To make possible the comparison between 2001-2003 and 2006 we can follow two different procedures. The first, to assume a uniform distribution of GP and SP visits in a given period a period of time. The major problem of doing this is that we are assuming that the distribution of the propensity of GP or specialists visits of those who use these services is uniform in time but also, the propensity of those that do not use these services is always zero. The second approach is to estimate the relevant parameters for 2001 and 2003 and predict the probability of contact to a GP or specialist using the explanatory variables of 2006. We follow this second procedure. The estimation results on the probability to contact a GP or Specialist for 2001 and 2003 are shown in Table A.1 of the Appendix.

Once we have predicted figures for 2006, we provide in Table 12 the different patterns of health care use for individuals with and without double coverage. The utilization is increasing in time both for GP and SP but also individuals with double coverage tend to use more the specialists services than those who does not have it (11.15 vs 6.8 per cent for 2001 , 12.1 per cent vs 6.44 per cent for 2003 and 22.92 per cent vs 8.52 per cent in 2006) and use less GP services (14.43 vs 14.97 per cent for 2001 , 15.88 per cent vs 25.15 per cent for 2003 and 11.37 per cent vs 27.21 per cent in 2006). Finally, the relative difference is also increasing in time.

5.2 Econometric models for insurance choices and demand for services

Demand of health insurance

Let us consider an individual i, living in region j at time t thinking in having a private medical insurance. As we have obtained above this decision is driven by equation 3, that is when:

$$y^*_{ijt} = V^{PHI}(\theta, p_t, \bar{q}_t, inc_t) - V^{NHS}(\theta, Q(\varrho_t), inc_t) \geq 0$$

where y^*_{ijt} can be understood as the (latent) demand for private health insurance. Assuming both linearity in V(.) and that valuations are observed with error, we can express:

$$y^*_{ijt} = \alpha X_{ijt} + \tau P_{ijt} + \varphi S_{jt} + \beta Q_{jt} + e_{ijt} \tag{4}$$

Table 11: Descriptive statistics by insurance coverage: Social Security and Civil Servants samples

	SS sample N=57288			CS sample N=2942		
	No Double Coverage	**Double Coverage**	**Total Sample**	**Choose SS Coverage**	**Choose PI Coverage**	**Total Sample**
PRIVATE INSURANCE	—	—	0.102	—	—	0.648
SPECIALIST	0.074	0.174	0.084	0.085	0.115	0.105
GENERAL PRACTITIONER	0.237	0.137	0.227	0.130	0.150	0.143
FEMALE	0.537	0.507	0.534	0.480	0.514	0.502
FEMALE +50	0.254	0.182	0.247	0.181	0.215	0.203
$30 < Age <= 50$	0.391	0.534	0.405	0.480	0.468	0.472
$50 < Age <= 65$	0.195	0.189	0.194	0.208	0.207	0.207
$Age > 65$	0.249	0.130	0.237	0.152	0.161	0.157
MARRIED	0.469	0.521	0.474	0.452	0.531	0.504
WIDOWED DIVORCED	0.152	0.110	0.148	0.105	0.103	0.104
SECONDARY	0.208	0.307	0.218	0.246	0.272	0.263
COLLEGE	0.113	0.292	0.131	0.426	0.410	0.415
CHILDREN	0.257	0.349	0.267	0.285	0.332	0.315
SELF-EMPLOYED	0.086	0.167	0.095	0.041	0.035	0.037
EMPLOYED	0.232	0.387	0.248	0.492	0.472	0.479
TEMP. EMPLOYED	0.097	0.077	0.095	0.052	0.042	0.046
UNEMPLOYED	0.063	0.039	0.060	0.036	0.024	0.028
INCOME:601-900	1.108	1.237	1.121	1.149	1.165	1.159
INCOME:901-1.200	0.094	0.113	0.096	0.079	0.090	0.086
INCOME:1.201-1.800	0.366	0.315	0.361	0.254	0.313	0.292
INCOME: + 1.801	0.118	0.179	0.124	0.187	0.172	0.177
INCOME MISSING	0.263	0.191	0.255	0.184	0.190	0.188
CITY + 400000	0.076	0.045	0.073	0.037	0.040	0.039
BEING IN HOSPITAL	0.022	0.016	0.021	0.012	0.012	0.012
CHRONIC ILLNESS	0.331	0.328	0.330	0.309	0.327	0.321
HEALTH: EXCELENT	0.133	0.096	0.129	0.070	0.084	0.080
HEALTH: REGULAR	0.097	0.061	0.093	0.071	0.060	0.064
HEALTH: BAD	0.164	0.079	0.155	0.081	0.068	0.073
HEALTH: VERY BAD	0.178	0.124	0.173	0.153	0.143	0.146
OVERWEIGHT	0.181	0.190	0.182	0.213	0.229	0.223
OBESE	0.140	0.321	0.159	0.346	0.360	0.355
WEIGHT MISSING	0.191	0.243	0.196	0.167	0.173	0.171
SMOKE: EVERY DAY	0.249	0.268	0.251	0.227	0.219	0.222
SMOKE: NOT EVERY DAY	0.023	0.030	0.024	0.022	0.020	0.021
SMOKE: IN THE PAST	0.179	0.217	0.183	0.203	0.232	0.222
SMOKE: MISSING	0.069	0.081	0.070	0.105	0.073	0.084
HOUSEHOLD SIZE: 2	0.258	0.243	0.257	0.212	0.217	0.215
HOUSEHOLD SIZE: 3-4	0.237	0.264	0.239	0.243	0.250	0.248
HOUSEHOLD SIZE: + 4	0.371	0.384	0.372	0.418	0.415	0.416
ANDALUCÍA	0.098	0.050	0.093	0.089	0.107	0.100
ARAGÓN	0.076	0.071	0.076	0.097	0.079	0.085
E ASTURIAS	0.041	0.033	0.040	0.048	0.018	0.029
ILLES BALEARS	0.029	0.079	0.034	0.030	0.033	0.032
CANARIAS	0.047	0.026	0.045	0.049	0.034	0.039
CANTABRIA	0.051	0.035	0.050	0.053	0.032	0.039
CASTILLA-LA MANCHA	0.106	0.045	0.100	0.098	0.145	0.128
CASTILLA Y LEÓN	0.044	0.033	0.043	0.041	0.052	0.048
CATALUÑA	0.063	0.162	0.073	0.061	0.055	0.057
COMUNIDAD VALENCIANA	0.063	0.047	0.061	0.051	0.052	0.052
EXTREMADURA	0.030	0.008	0.027	0.016	0.037	0.030
GALICIA	0.095	0.058	0.091	0.090	0.082	0.085
COMUNIDAD DE MADRID	0.069	0.208	0.083	0.094	0.126	0.115
REGIÓN DE MURCIA	0.052	0.031	0.050	0.057	0.065	0.062
NAVARRA	0.050	0.020	0.047	0.042	0.026	0.032
PAS VASCO	0.053	0.069	0.055	0.039	0.042	0.041
LA RIOJA	0.034	0.024	0.033	0.046	0.016	0.027

Table 12: GP and Specialists demand by type of coverage and year (in percentage). 2001-2006

	General practitioner		Specialist	
	Public Insured	Double Coverage	Public Insured	Double Coverage
SS sample				
2001	16.13	13.44	6.45	11.78
2003	25.31	16.04	6.22	12.01
2006 (*)	26.94	12.31	9.00	23.70
CS sample				
2001	8.35	11.69	8.86	13.63
2003	20.71	16.56	6.37	11.27
2006 (*)	13.13	15.33	10.1	10.42

source: SNSS 2001, 2003, 2006

where X is a vector of covariates, including income as well as individual and household characteristics, P denotes the price of the insurance, S denotes a vector of supply controls, DQ is the differential of quality of the public health system with respect to the private sector, and e is an error term. The quality differential is unobservable but is assumed to be determined as:

$$Q_{jt} = \bar{Q}_j - \delta\varrho_{jt} + \xi_{jt}, \qquad \delta \geq 0$$

since we have no information for ϱ we replace it in regression by either the fraction of the percentage of immigrants in region j at time t, I_{jt}, or the annual rate of growth of the population in each region in time t. [15] That is, we assume $\varrho_{jt} = \theta I_{jt} + \varpi_{jt}$. Replacing this in equation 4 yields:

$$y^*_{ijt} = \alpha X_{ijt} + \eta I_{jt} + \phi_j + v_{ijt}, \qquad \eta = \beta\delta\theta \tag{5}$$

where $\phi_j = \bar{Q}_j + \omega_j$ denotes regional effects that control for fixed differences between regions not captured by other variables in the model. In this context the variable I_{jt} captures time deviations from the regional mean. Therefore the coefficient for this variable reflect the importance of immigration on the private health insurance demand, a proxy of the differences in quality between both sectors. Finally the error term is given

$$v_{ijt} = e_{ijt} + \beta\xi_{jt} - \delta\rho\varpi_{it}$$

where v_{ijt} is a normally distributed error term. In this context, the individual purchases private insurance $y_{ijt} = 1$ if $y^*_{ijt} > 0$.

The same model can be applied, with minor modifications, to the choice of sector by civil servants. We have just to consider now that y^{CS}_{ijt} takes the value 1 if the civil servants chooses a private health coverage and zero in case she choose to be covered by the social security. Note that in this case the insurance premium should play no role because of civil servants do not have to pay any premium to get private insurance coverage[16]

Thus, in the SS sample, we estimate a Probit model of whether or not an individual has double coverage. Alternatively, in the CS sample, we estimate a Probit model of the probability of choosing the private coverage.

[15] In our empirical exercise we have also considered proxying the population shock by the 5-years change in the population and the difference in the fraction of immigrants.

[16] The private insurance contracts for civil servants have to cover everything covered by the Spanish Social Security system. Some companies offer some extras for free (in order to attract individual to their rolls), and some other offer complementary services at a reduced fee.

Demand for health services

We finally turn to the utilization models. Let us define w_{ijt}^{s*} as the demand of health services per unit of time, where $s = GP, SP$. Then we consider

$$w_{ijt}^{s*} = \alpha_s X_{ijt} + \gamma y_{ijt} + \eta_s I_{jt} + \phi_j^s + v_{ijt}^s, \quad s = GP, SP \tag{6}$$

That is, we assume that the demand for GP or SP services depends on the presence of private health insurance or the coverage by the private sector (for the CS sample). In this context, the expected increase in the covered population may have two effects on the demand for physician services: a direct one and an indirect one. The indirect one comes through the private medical insurance that facilitates the direct access to the SP for those individuals that are covered by the private medical insurance. The direct one can be justified by a change in individual's preferences in order to avoid congestion in the system caused by the demographical shock.

On the econometric side, we allow for the possibility that the errors v^{SP} and v^{GP} to be correlated, with correlation coefficient ρ. Thus, we estimate a bivariate probit model and test for the null hypothesis that $\rho = 0$. We estimate the model for the whole sample and two conditional subsamples: those without private insurance coverage and those with private insurance. In both conditional subsamples we test for sample selection. In order to test it we first use the estimates from the insurance model to construct Heckman's lambda, and second estimate the bivariate probit demand for health model incorporating the estimate of the correction term. In this context either a likelihood ratio test or two z-statistic significance tests can help us to evaluate the relevance of the selection mechanism.

In a final exercise, we further consider the possibility that the errors in the demand for services equations to be correlated with the error in the private insurance equation (or the choice of sector of coverage equation for the CS sample), and estimate a joint probit model with covariance matrix

$$\begin{bmatrix} 1 & \sigma_{I,GP} & \sigma_{I,GP} \\ & 1 & \sigma_{GP,SP} \\ & & 1 \\ & & \end{bmatrix}$$

Explanatory variables and exclusion restrictions

In all the specifications we include the following common demographics: age, gender, education, marital status, labor activity, self-assessed health, prevalence of chronic conditions, and controls related to obesity and smoking. Related to the household, we include the number of household members, the dummies controlling the size of the town of residence, and household income. See Table A.2 in the Appendix for definitions and sources of the variables employed.

In our exercise the introduction of supply side data at the regional level constitutes an important source of identification. We include the lag of insurance premium (except for the equation for the choice of coverage by civils servants), the lag of real public expenditure on health, the lag of hospital daily beds per 1000 inhab, the lag of health sector workforce per 1000 inhab.

Our main interest is to characterize the effect of the population shock, proxied either by the fraction of immigrants and/or the annual rate of growth of the population, on the demand for private health insurance as well as the demand for health services. To define these variables we use aggregate official data from the Padrón de Habitantes (INE). Since the fraction of immigrants only takes positive values we transform it using the logistic transformation (log(x/1-x)). The same transformation is not necessary for the change in the population which can take negative values.

5.3 Basic results for the insurance model

Table 13 reports the main results for the basic insurance models for the two samples we have considered. Columns (1) to (4) present the results with the SS sample, who decide about having double coverage. Columns (1) and (2) present the results using the logistic transformation of the fraction of immigrants. Alternatively, columns (3) and (4) present the results using the rate of growth of the population in a given region. Columns (5) to (8) present the results obtained using the CS sample which is composed of individual deciding the sector of coverage. The structure of the columns replicates the one for the SS sample.

5.3.1 Results with the sample of individual covered by the SS

The first two columns of Table A present a summary of the estimates for the proxies of the effect of the population shock on the probability of being insured. In all cases we report marginal probabilities at mean values of the other explanatory variables. All results include regional dummies, which can be important since they may capture fixed differences in health policy among regions. We find that the coefficient of the immigration variable is statistically significant and positive in all the specifications. It implies that a one percent change in the fraction of immigrants in total population increases the average probability of being insured in between 0.035 - 0.045 per cent, depending on the specification of the model (without and with year effects). The results using the rate of growth of the population are qualitative the some, although the implied elasticities are lower, between 0.013 and 0.015. This is not a surprising result for are least two reasons. First, the rate of growth of the population is smoother; and, second, while the number of immigrants has grown in all periods and regions, the population can either increase or decrease depending on the region, because of the internal immigration movements of natives (Asturias is a good example of this).

Table A. Effect of immigration and the population shock on private insurance coverage from SHNS individual data

		Social Security sample		**Civil Servants sample**	
Variable	stat	**N0 TD**	**TD**	**N0 TD**	**W TD**
immigration	mfx	.035	.047	.251	.204
	(SE)	.007	.010	.0574	.080
rate growth population	mfx	.013	.015	.065	.046
	(SE)	.002	.002	.017	.018

note: All statistics are derived from the results in Table 13

In order to reinforce the validity of our results we have conducted a fixed effects linear regression of the percentage of individual with private insurance on the percentage of immigrants (both variables expressed in the logistic transformation) plus other controls, using aggregate data at the regional level obtained from various sources. Our aggregate database[17] contains information at province level on the percentage of people with private insurance coverage (it does not include civil servants), total population, percentage of immigrants, percentage of people by age categories (less 19, between 20-50, between 50-65 and more than 65), percentage of single, married, widowed

[17]Except for the information on private insurance coverage which was obtained from "Investigación Cooperativa entre Entidades Aseguradoras" (ICEA), all the statistics are obtained from the Spanish National Statistical Institute (INE).

or divorced people and percentage of physicians. The sample covers the period 2000 to 2006, with a final sample size of 350 observations. We obtain also a positive and significant effect of immigration on the demand of private health insurance (double coverage). The implied elasticity is smaller, 0.08, against much higher values with disaggregated data, but the qualitative results support the previous evidence obtained with microdata. The detailed results from this exercise are available on request, although we have to be cautious in interpreting them because of potential aggregation bias.

Regarding other variables we find that the results are consistent across specifications and with most of the recent previous research (Rodriguez and Stoyanova, 2004, Costa-Font and García 2002, 2003). In the SS sample, the purchase of insurance is positively related to household income, the employment or self-employed status and to the highest educational level held by the respondent. Note that the latter variable, apart from a direct effect may capture the effect of permanent income. Households with more than two members are less likely to buy private insurance, most likely because of increased premia. We find that middle age individuals are more likely to be insured. Finally, we do not find differences by gender except for women aged more than 50 years old for which the likelihood of purchasing private insurance is greater.

Although we were expecting that those reporting poor health were more likely to purchase medical insurance because they would have a greater probability to become ill in the future and then to use medical services (adverse selection argument), we find that reporting good or very good health increases the likelihood of purchase private insurance. The most plausible explanation may be that good health is positively correlated with income and education. Another reason could be that poor health individuals face higher premiums that reduce their demand for health insurance (Rothschild and Stiglitz, 1976) or that there exists sample selection in employment-based insurance plans. Finally, another potential explanatory argument could be that insurance companies are able to screen the level of health of the individual and then to discriminate accordingly. Note that this result disappears in the CS sample. In the latter case we do not observe any difference in the probability of choosing private insurance by self-reported health status. This is due to the fact that civil servants cannot be be discriminated since health providers cannot reject any application from civil servants. However, in both cases, having a chronic illness increases the likelihood of having double coverage or choosing private insurance.

As we were expecting living in Baleares, Cataluña, Madrid or Pais Vasco increases significantly the likelihood to be privately insured.

Regarding supply side variables, only the lagged number of beds for day hospitalization is found negative and significant in all the specifications. A very disappointing results is the lack of significance of the premium variable. We believe this is so because we could not get disaggregated information of the insurance premium by individual characteristics such as age, gender and health status. In a complementary exercise [available on request] we have experimented interacting these variables with the premium. However, despite showing the correct sign, none of the variables were significant.

5.3.2 The demand of private coverage for civil servants

As stated before we have replicated the exercise above using a sample of Spanish civil servants. This sample gives us the opportunity to test the effect of congestion due to a sudden population shock in the system in a sample of individuals for which the effect of the insurance premium as well as income are *a priori* irrelevant. This is so because civil servants can choose on a yearly basis the sector of coverage. The choice have to be made at the end of the previous year, so the expectations

about congestion and waiting times is a potential important determinants of this decision. The detailed results of this exercise are also reported in table 13 and a summary of the key results for the controls of the population shock are reported in the last two columns of Table A.

The coefficient of the immigration variable is statistically significant and positive for both specifications, with and without year effects. The implied marginal effect, 0.25 and 0.20, are much greater than those obtained for the SS sample. It is a natural result since these individual are not subject to the cost faced by the rest of the population. A careful examination of variables related to income offer further support to this statement, since they are not significant in the CS sample and strongly significant in the SS sample. Results using the rate of growth of the population are qualitatively similar, but much lower in accordance with what we have observed for the SS sample.

In contrast with the result found for the SS sample, the education and income dummies do not have any significant effect. It is important to note that in this sample being a female aged more than 50 years old, having children and reporting chronic conditions increases the likelihood of choosing private insurance. Consequently, those individuals at risk, those for which skipping the gatekeeper has more value, those needing a more specialized care (for instance mammographies, pediatrics, and other specialized services), choose more frequently private coverage.

5.4 Demand for health services

In Tables 14 and 15 we present the basic estimated results for the demand for health services (GP and SP) equations. In Table 14 we present the results obtained with the sample of individuals covered by the SS. We report results using the whole sample as well as two subsamples of individuals with and without double coverage and specifications with and without time dummies. Table 15 reports the coefficients with the CS sample where as before correspond to the whole sample and the subsamples of individuals who opt for the SS or private coverage. As mentioned above, we have tested for the possibility of non random selection induced by the sample selection criteria. In the sample of individuals seeking double coverage we have clearly rejected the possibility of non random sample selection induced by the insurance status. As a consequence, we present in Table 14 the results without correcting for sample selection. Alternatively, in the CS sample choosing the sector of coverage we have found relevant sample selection in three out of four specifications (the specification with time dummies in the subsample of individuals covered by the private sector is an exception), so we have decided to present the corrected results. We have also tested (by means of a likelihood ratio test) and clearly rejected the possibility that the coefficients of the demand equations in the sample without and with double coverage are the same.

A first thing to note is the fact that having private insurance or being insured by the private sector makes the choice between both types of physicians more independent since it reduces the correlation between the error in both equations. This result should not cause any surprise in those systems, such as the current Spanish system, in which the GP is the gatekeeper for specialized services. In greater detail, we find that having (not having) double coverage decreases (increases) in absolute value the correlation between the errors in the two equations. We find that in the sample of individual covered by the Social Security having double coverage reduces the correlation from -0.34 to -0.15, while having single coverage increases it to -0.36. The results using the CS sample are qualitatively similar, since not having private coverage increases in absolute value the (negative) correlation between the two types of visits.

The evidence obtained in tables 14 and 15 demonstrates that people having double coverage increases the probability of visiting a SP and reduces the probability of contacting a GP in all samples. This result confirm previous evidence by Rodriguez and Stoyanova (2004) using data

from the 1997 wave of the SNHS. However, the evidence reported in the same tables for the effect of proxies for the population is mixing. We find some effect, specially in the SS samples, in the specifications without time dummies. However, once we control for time effects the immigration variable is not significant in any sample or subsample. It is important to emphasize the robustness of these results to the particular proxy we consider for the population shock, either the fraction of immigrants (as shown in tables 14 and 15) or the rate of growth in the population.

Since we have a genuine interest in the potential effect and because of potential misspecification of the basic specifications we decided to interact the immigration variable with the private insurance (or private coverage) and the the income variables. The results from these experiments are reported in Table 16. For each sample the first column just reproduces the specification with year effects from the previous tables; the second column adds on the top of the basic specification an interaction between immigration and the private insurance variables; the third column interacts immigration and income dummies; the fourth combines the two previous cases; finally, the fifth and the sixth columns presents the same specification than in column four for the relevant subsamples.

We got a number of interesting results, specially for the SS sample. First, in the whole sample the interaction with the immigration variable enhances the effect of having private insurance, since the effects are larger in those regions with larger fraction of immigrants. Second, in the whole sample and in the sample with double coverage we find that the population shock reduces the demand of SP services at low income levels as well as the demand for GP services at medium-high levels of income. Third, neither in the whole sample nor in the sample with double coverage the demand for SP services is affected. We interpret this as potential evidence of changes in preferences on the part of individuals. Fourth, for those who have only SS coverage, the gradient with income indicates an small increase of the demand for GP services for low income individuals and no effect for the rest.

Taking all this evidence as a whole, we have found evidence that the population shock may have affected differently different types of individuals. However, the results of the direct effect found for GP in the NHS are in line with what it is expected as those who are more likely to choose the private services are those in high income levels and higher education and therefore, in better health.

We got a number of other interesting results many of them in line with previous results in the literature. In the whole SS an well as the CS samples we find that females are more likely to visit both the GP and the SP. Specifically for the SS sample females aged 50+ are less likely to visit a specialist than males. However, this result does not hold when conditioning on having double coverage. A similar result was obtained by Rodriguez and Stoyanova (2004). They conclude that there exists a clear hint about a certain discrimination in the access of women to specialist care in the public sector. The differences we detect in the female coefficient in the sample without and with double coverage confirm this view. Compared to those who have less than 30 years, people aged 65+ tend to consult relatively more often the GP. Individuals reporting regular, bad or very bad health or having chronic health problems tend to use all kind of services more often than those in good health. Similarly, those being in hospital during the last 12 months tend to visit more often the SP.

From the comparison of the results for the conditional samples we can extract a number of other lessons. First, while income is very significant in the sample without double coverage, it is only marginally significant in the double coverage sample. Second, having children reduces the probability of contacting a physician in the sample without double coverage and has no effect in the complementary sample. Third, for civil servants, having a college degree has no significant effect in the sample of those covered by the public sector and has a positive effect in the probability of

contacting an SP in the sample of those covered by the private sector.

5.4.1 A trivariate model for the probability of having PHI and visits to the GP and the SP

As a complementary analysis, we present in Table 17 the results of estimating a trivariate probit model of the probability of having private insurance, the probability of contacting a GP as well as the probability of contacting a SP for both samples. The left panel presents the results using the SS sample for two specifications: with years effects and without them. The right panel presents equivalent specifications for the CS sample.

For the SS sample we find that in both specifications the correlations are significant as a whole. However, not all the correlations are significant. We find a negative correlation (-0.165) between the errors in the GP and SP equations (which is much smaller than the estimated correlation for the GP/SP joint model alone), and no significant correlation in the other two cases, thereby confirming the exogeneity of the private health insurance in the demand for health services equations. In the case of the CS sample we find that the set of correlation is significant as a whole, but only the correlation (-0.156) between the errors in the GP and SP equations is significant at standard levels.

The detailed results for the SS sample are qualitatively similar than those reported for the whole sample in Table 14 (first four columns), specially as regard the main variable of interest. In both specifications (with and without time dummies), we find a significant (small) negative effect of the immigration variable on the probability of contacting a SP and no effect on the probability of contacting a GP. Without much doubt, this is likely due to the fact that we are mixing two different population: those with single and double coverage.

As above, the detailed results about the coefficients of the main variables of interest using the CS sample differ from those reported in table 15. For example, the private coverage variable, which was not significant in the whole sample in table 15 is now significantly positive for the SP and negative for the GP. Similarly to what we have obtained for the SS sample, the immigration variable turns to be significantly negative for visits to the GP in the specification without year effects and non-significant in the specification with year effects. Again we point out the lack of enough variation in data as a potential explanation for this result.

As in the previous section, we have explored the effect of the interactions between the private coverage, immigration and income variables. Since the detailed results are in line with the evidence reported above and in order to keep the paper under a reasonable length we have decided not to report them but are available on request for the interested readers.

6 Concluding remarks

In this paper we have analyzed the effect of a population (immigration) shock on the demand for private health insurance as well as demand for health services using data from the SNHS. The potential impacts of the shock are very varied both in nature an in time. We have analyzed them in two different samples: the sample of individuals covered by the Spanish Social Security seeking double coverage, and the sample of civil servants, which can choose private coverage at zero cost. This exercise constitutes a novelty of the present work.

Our results indicate that once we control for observables (and taking aside new specific demands, such as tropical diseases) the demand for health services on the part of immigrant does not differ significantly from that of natives, being visits to emergency rooms an exception. More importantly, the new demands have produced some congestion in the system and they have had important

consequences on the demand patterns of natives. In this sense, in the two explorations of the data we find that either the fraction of immigrants or the rate of growth of the population lead to higher demand for private health insurance (in the double coverage sample) or to opt for private coverage (in the CS sample). We find that the marginal effect of the population shock on the choice of the private coverage on the part of civil servants is much larger than the marginal effect of the population shock on the demand of private health insurance. In both samples they do so to get access to specialized services and/or private emergencies thereby avoiding the likely collapsed primary care public system.

Finally, regarding the demand for GP and SP services, in the specification without year dummies, we have found some evidence of an stigma effect caused by the direct impact of the population shock, which has not been confirmed in the specification with time dummies. However, after exploring the interactions between the key variable of the model, We have found for individuals with double (single) coverage that the fraction of immigrants (or the rate of growth of the population) does have significant negative effects on the demand for health services for medium-high individuals. We interpret these effects as changes in their preferences for visiting GPs. For those who have only public coverage, since the gatekeeper decides on visits to SPs, the population shock does not show any effect on the demand for these services. The situation is different in the sample of civil servants where the negative effect on the demand for GP services is only observed at high income levels and at marginal significance levels.

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Table 13: Marginal effects for the Insurance Equation Models

	Double coverage choice Social Security sample				Choice of coverage Civil servants sample			
Variables	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
LogLag(Inmi/(1-Inmi)	0.035***	0.047***			0.251***	0.204*		
Increase in population			0.013***	0.015***			0.065***	0.046*
FEMALE	-0.004	-0.004	-0.004	-0.004	0.010	0.010	0.011	0.010
FEMALE AGED 50+	0.022***	0.022***	0.022***	0.022***	0.077*	0.075*	0.082*	0.079*
$30 < AGE <= 50$	0.017***	0.017***	0.017***	0.017***	-0.041	-0.037	-0.042	-0.039
$50 < AGE <= 65$	0.007	0.007	0.007	0.007	-0.101*	-0.100*	-0.102*	-0.102**
$AGE > 65$	-0.006	-0.005	-0.005	-0.005	-0.123**	-0.124**	-0.125**	-0.128**
MARRIED	0.001	0.001	0.001	0.001	0.021	0.016	0.022	0.015
WIDOWED DIVORCED	-0.004	-0.004	-0.004	-0.004	-0.006	-0.008	-0.012	-0.010
SECONDARY	0.045***	0.045***	0.045***	0.045***	0.033	0.033	0.034	0.033
COLLEGE	0.089***	0.089***	0.089***	0.089***	-0.019	-0.019	-0.018	-0.019
CHILDREN	0.011**	0.012**	0.011**	0.012**	0.074*	0.058	0.085**	0.060*
SELF EMPLOYED	0.072***	0.072***	0.072***	0.072***	-0.015	-0.006	-0.019	-0.008
EMPLOYED	0.021***	0.021***	0.021***	0.021***	-0.052*	-0.049	-0.054*	-0.048
TEMPORARY EMPLOYED	-0.010*	-0.010*	-0.010*	-0.010*	-0.082	-0.074	-0.079	-0.071
UNEMPLOYED	-0.017**	-0.017**	-0.017**	-0.017***	-0.129*	-0.124*	-0.126*	-0.120*
CITY MORE THAN 400000	0.026***	0.026***	0.026***	0.026***	0.013	0.013	0.013	0.012
BEING IN HOSPITAL	0.033***	0.033***	0.033***	0.033***	0.016	0.017	0.016	0.019
CHRONIC ILLNESS	0.006*	0.006*	0.007*	0.006*	0.062**	0.069**	0.063**	0.071**
HEALTH: EXCELLENT	0.012***	0.012***	0.012***	0.012***	-0.016	-0.013	-0.019	-0.015
HEALTH: REGULAR	-0.011***	-0.011***	-0.011***	-0.011***	-0.017	-0.019	-0.018	-0.020
HEALTH: BAD	-0.019***	-0.018***	-0.019***	-0.019***	-0.018	-0.017	-0.017	-0.019
HEALTH: VERY BAD	-0.012	-0.012	-0.013	-0.012	0.001	0.004	0.002	-0.004
OVERWEIGHT	-0.001	-0.001	-0.001	-0.001	0.025	0.026	0.025	0.025
OBESE	-0.011**	-0.011**	-0.011**	-0.011**	0.031	0.032	0.036	0.034
WEIGHT MISSING	-0.010*	-0.010*	-0.010*	-0.011*	0.006	0.013	-0.002	0.014
M INCOME:601-900	0.019**	0.018**	0.018**	0.018**	0.074	0.081	0.071	0.077
M INCOME:901-1.200	0.030***	0.030***	0.030***	0.030***	0.102	0.106	0.097	0.102
M INCOME:1.201-1.800	0.043***	0.043***	0.043***	0.043***	0.132*	0.134*	0.125*	0.129*
M INCOME:+ 1.801	0.090***	0.091***	0.091***	0.090***	0.120*	0.122*	0.115*	0.117*
M INCOME MISSING	0.056***	0.056***	0.057***	0.057***	0.119*	0.118*	0.120*	0.117*
SMOKE: EVERY DAY	0.006*	0.006*	0.006*	0.006*	0.008	0.009	0.004	0.009
SMOKE: NOT EVERY DAY	0.014	0.014	0.014	0.014	-0.012	-0.013	-0.016	-0.014
SMOKE: IN THE PAST	0.013***	0.013***	0.013***	0.013***	0.030	0.029	0.028	0.030
SMOKE: MISSING	0.039***	0.036***	0.041***	0.037***	-0.033	0.007	-0.041	0.011
HOUSEHOLD SIZE: 1-2	-0.005	-0.005	-0.005	-0.005	-0.003	0.003	-0.006	0.004
HOUSEHOLD SIZE: 3-4	-0.014**	-0.014**	-0.014**	-0.014**	-0.006	0.004	-0.012	0.005
HOUSEHOLD SIZE: + 4	-0.022***	-0.023***	-0.023***	-0.023***	-0.024	-0.013	-0.034	-0.011
LAG INS PREMIUM	-0.011	0.001	-0.007	-0.025				
LAG PUB.EXP. HEALTH	-0.082*	-0.025	0.121***	0.007	-1.005**	-0.706	0.375*	-0.447
LAG PUB.DAYHOSP. BEDS	-0.144***	-0.159***	-0.156***	-0.151***	0.107	0.190	-0.004	0.173
LAG DOCTORS NURSES	0.016**	0.013*	0.015**	0.013*	-0.003	0.026	-0.008	0.030
YEAR2001		-0.020		0.012		0.060		0.170**
YEAR2003		-0.037		0.041*		-0.019		0.220*
Observations	56058	56058	56058	56058	2927	2927	2927	2927
Wald chi2(58)	4955.30	4947.58	4929.75	4930.57	195.77	201.76	189.88	201.98
Log-l	-15837.78	-15836.04	-15827.86	-15823.50	-1796.41	-1792.85	-1799.52	-1793.05
pseudo-R^2	0.147	0.147	0.148	0.148	0.053	0.055	0.051	0.055

*significant at 5 per cent; ** significant at 1 per cent

note: Robust standard errors. Significance stars: *, **, *** significant at 5, 1 and .1 per cent levels

Table 14: Insurance and demand for health services in the Social Security sample: GP and Specialist bivariate probit models. Estimated coefficients

	Whole Sample				NO Double coverage				Double coverage			
	SP	**GP**	**SP**	**GP**	**SP**	**GP**	**SP**	**GP**	**SP**	**GP**	**SP**	**GP**
Private insurance	0.545***	-0.105***	0.546***	-0.105***								
log(Inmi/(1-Inmi)	-0.001	0.030*	-0.182**	0.093	-0.035	0.069***	-0.202*	0.087	0.283***	-0.466***	0.139	-0.154
FEMALE	0.277***	0.166***	0.272***	0.171***	0.245***	0.174***	0.240***	0.180***	0.415***	0.108	0.419***	0.111
FEMALE AGED 50+	-0.225***	0.112***	-0.223***	0.108***	-0.238***	0.108***	-0.236***	0.104***	-0.096	0.135	-0.101	0.139
30<Age<=50	0.093**	-0.090***	0.089**	-0.089***	0.078*	-0.085**	0.077*	-0.083**	0.267**	-0.148	0.248**	-0.146
50<Age<=65	0.161***	-0.036	0.165***	-0.040	0.142**	-0.039	0.145**	-0.043	0.310**	-0.012	0.310**	-0.022
$Age > 65$	-0.124*	0.168***	-0.112*	0.159***	-0.142**	0.159***	-0.134*	0.151***	-0.003	0.256*	0.021	0.240*
MARRIED	0.085***	0.215***	0.104***	0.201***	0.087***	0.218***	0.098***	0.203***	0.053	0.189**	0.115	0.174**
WIDOWED DIVORCED	-0.103**	0.144***	-0.094**	0.138***	-0.083*	0.159***	-0.078*	0.153***	-0.225*	-0.049	-0.198*	-0.056
SECONDARY	0.130***	-0.102***	0.128***	-0.101***	0.109***	-0.102***	0.108***	-0.101***	0.192**	-0.104	0.204**	-0.104
COLLEGE	0.263***	-0.129***	0.264***	-0.129***	0.267***	-0.131***	0.267***	-0.129***	0.294***	-0.158*	0.313***	-0.163*
CHILDREN	-0.105***	-0.088***	-0.078*	-0.116***	-0.125***	-0.108***	-0.109**	-0.136***	0.013	0.123	0.084	0.089
SELF-EMPLOYED	-0.337***	-0.144***	-0.341***	-0.140***	-0.265***	-0.154***	-0.269***	-0.150***	-0.554***	-0.073	-0.555***	-0.070
EMPLOYED	-0.078**	-0.050*	-0.079**	-0.048*	-0.097**	-0.041	-0.097**	-0.040	-0.042	-0.066	-0.055	-0.059
TEMPORARY EMPLOYED	-0.085*	-0.049	-0.088*	-0.046	-0.101*	-0.050	-0.103*	-0.047	0.019	0.035	0.002	0.044
UNEMPLOYED	-0.176***	0.037	-0.184***	0.043	-0.195***	0.035	-0.199***	0.041	-0.089	0.092	-0.123	0.106
INCOME:601-900	0.147***	-0.049*	0.143***	-0.045	0.137***	-0.062*	0.134***	-0.059*	0.142	0.231	0.144	0.240
INCOME:901-1.200	0.208***	-0.149***	0.200***	-0.143***	0.204***	-0.159***	0.197***	-0.154***	0.109	0.018	0.095	0.033
INCOME:1.201-1.800	0.317***	-0.116***	0.307***	-0.111***	0.293***	-0.134***	0.286***	-0.130***	0.358**	0.170	0.340*	0.188
INCOME:+ 1.801	0.351***	-0.249***	0.340***	-0.242***	0.327***	-0.296***	0.319***	-0.291***	0.376**	0.192	0.353**	0.213
INCOME MISSING	0.192***	-0.106***	0.206***	-0.115***	0.168***	-0.116***	0.178***	-0.124***	0.183	0.183	0.215	0.170
CITY MORE +400000	0.141***	-0.086***	0.138***	-0.083**	0.138***	-0.078**	0.134***	-0.075**	0.135*	-0.139*	0.141*	-0.141*
BEING IN HOSPITAL	1.064***	0.048*	1.065***	0.047*	1.098***	0.050*	1.098***	0.050*	0.955***	0.050	0.965***	0.051
CHRONIC ILLNESS	0.175***	0.478***	0.161***	0.489***	0.160***	0.484***	0.150***	0.495***	0.253***	0.446***	0.224***	0.468***
HEALTH: EXCELENT	-0.296***	-0.273***	-0.306***	-0.262***	-0.228***	-0.275***	-0.235***	-0.264***	-0.481***	-0.264**	-0.495***	-0.252**
HEALTH: REGULAR	0.714***	0.816***	0.715***	0.818***	0.630***	0.823***	0.631***	0.824***	1.139***	0.764***	1.143***	0.769***
HEALTH: BAD	1.219***	1.295***	1.224***	1.292***	1.170***	1.303***	1.173***	1.300***	1.555***	1.222***	1.585***	1.216***
HEALTH: VERY BAD	1.465***	1.284***	1.470***	1.281***	1.420***	1.270***	1.423***	1.265***	1.732***	1.510***	1.737***	1.517***
OVERWEIGHT	-0.038	0.073***	-0.037	0.073***	-0.034	0.076***	-0.033	0.076***	-0.048	0.028	-0.043	0.026
OBESE	-0.129***	0.185***	-0.125***	0.184***	-0.138***	0.180***	-0.135***	0.179***	-0.056	0.237**	-0.051	0.235**
WEIGHT MISSING	-0.110**	-0.048*	-0.136***	-0.022	-0.104**	-0.049	-0.120**	-0.023	-0.165	-0.036	-0.215*	-0.011
SMOKE: EVERY DAY	0.024	-0.143***	0.021	-0.140***	0.019	-0.139***	0.017	-0.136***	0.056	-0.208**	0.050	-0.205**
SMOKE: NOT EVERYDAY	-0.049	-0.024	-0.053	-0.023	-0.097	0.001	-0.100	0.002	0.201	-0.267	0.197	-0.263
SMOKE: IN The past	0.282***	0.058**	0.275***	0.063**	0.271***	0.064**	0.266***	0.069**	0.318***	-0.010	0.309***	-0.003
SMOKE: MISSING	0.293***	0.393***	0.235***	0.450***	0.287***	0.457***	0.254***	0.516***	0.455**	-0.330*	0.254	-0.259
HOUSEHOLD SIZE: 2	0.047	-0.048	0.037	-0.039	0.075*	-0.029	0.069	-0.021	-0.049	-0.241**	-0.076	-0.240**
HOUSEHOLD SIZE:3-4	-0.041	-0.070*	-0.056	-0.058*	-0.024	-0.039	-0.033	-0.026	-0.123	-0.398***	-0.165	-0.392***
HOUSEHOLD SIZE:+ 4	-0.054	-0.027	-0.072	-0.011	-0.006	-0.002	-0.015	0.015	-0.310**	-0.286**	-0.376***	-0.271**
Year=2003			-0.003	0.071			0.043	0.106			-0.313	-0.095
Year=2006			0.251*	-0.070			0.246	0.000			0.045	-0.441
CONSTANT	-2.825***	-1.113***	-3.388***	-0.953***	-2.849***	-1.015***	-3.388***	-1.010***	-1.869***	-2.563***	-2.112**	-1.595*
REGIONAL DUMMIES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	56058		56058		50295		50295		5763		5763	
Wald(58)	17837.3		18473.4		16176.8		16910.3		1955.6		2044.8	
Log-l	-34631.8		-32592.4		-28949.6		-28924.2		-3460.9		-3443.1	
$\rho_{SP,GP}$	-0.343***		-0.35***		-0.356***		-0.359***		-0.149***		-0.146***	

note: Estimated coefficients with robust standard errors. Significance stars: *, **, *** significant at 5, 1 and .1 per cent levels

Table 15: Choice of sector and demand for health services in the civil servants sample: GP and Specialist bivariate probit models.

	Whole Sample				Covered by the public sector				Covered by the private sector			
	SP	**GP**	**SP**	**GP**	**SP**	**GP**	**SP**	**GP**	**SP**	**GP**	**SP**	**GP**
Private sector	0.180*	0.062	0.181*	0.041								
log(Inmi/(1-Inmi)	-0.115	-0.116	-0.059	0.314	0.238	-0.264	0.354	0.091	-0.111	-0.332**	0.086	-0.157
FEMALE	0.247*	0.229*	0.248*	0.231*	0.676***	0.188	0.680***	0.154	0.097	0.192	0.101	0.202
FEMALE AGED MORE 50	0.004	0.205	0.004	0.194	0.125	0.216	0.140	0.396	0.242	-0.136	0.256	-0.092
30<Age<=50	-0.090	0.058	-0.092	0.076	-0.621**	0.395	-0.626**	0.357	-0.014	0.127	-0.028	0.115
50<Age<=65	0.049	0.212	0.049	0.218	-0.594	0.535	-0.612	0.381	-0.021	0.462*	-0.042	0.409
Age¿65	-0.286	0.562***	-0.285	0.567***	-1.017*	0.790*	-1.033*	0.585	-0.421	0.909***	-0.447	0.845**
MARRIED	-0.136	0.089	-0.132	0.029	-0.061	0.113	-0.058	0.057	-0.074	-0.032	-0.065	-0.045
WIDOWED DIVORCED	-0.063	0.109	-0.063	0.089	-0.436	0.443*	-0.445	0.398	-0.004	0.024	-0.002	0.006
SECONDARY	0.007	0.070	0.008	0.077	0.018	-0.033	0.023	0.041	0.127	-0.015	0.134	0.006
COLLEGE	0.187	-0.007	0.189	-0.023	-0.262	-0.144	-0.264	-0.208	0.333**	0.124	0.329**	0.109
CHILDREN	-0.030	0.074	-0.015	0.009	0.551*	-0.283	0.575*	-0.213	0.023	-0.194	0.052	-0.180
SELF-EMPLOYED	0.077	-0.181	0.068	-0.113	0.152	-0.150	0.141	-0.116	-0.031	-0.073	-0.037	-0.056
EMPLOYED	-0.066	0.120	-0.070	0.129	-0.256	0.069	-0.266	-0.006	-0.198	0.366**	-0.211	0.340*
TEMPORARY EMPLOYED	-0.249	-0.030	-0.255	0.032	-0.910*	-0.549	-0.927*	-0.550	-0.374	0.483	-0.394	0.454
UNEMPLOYED	-0.024	0.296	-0.030	0.334	-0.782	0.234	-0.793	0.129	0.011	0.927**	-0.020	0.860**
INCOME:601-900	-0.035	-0.337	-0.044	-0.297	0.565	-0.116	0.573	0.045	-0.120	-0.786**	-0.106	-0.717*
INCOME:901-1.200	0.176	-0.419*	0.169	-0.376	0.418	-0.322	0.434	-0.107	0.341	-0.917**	0.362	-0.831**
INCOME:1.201-1.800	0.143	-0.279	0.137	-0.240	0.744	-0.142	0.763	0.140	0.239	-0.936**	0.268	-0.836*
INCOME:+ 1.801	0.080	-0.506**	0.075	-0.464*	0.680	-0.455	0.698	-0.200	0.140	-1.111***	0.167	-1.019**
INCOME MISSING	0.067	-0.519**	0.064	-0.531**	0.639	-0.192	0.656	0.013	0.156	-1.260***	0.183	-1.182***
CITY MORE +400000	0.206	-0.172	0.208	-0.181	0.441*	-0.145	0.443*	-0.101	0.220	-0.223	0.225	-0.220
BEING IN HOSPITAL	0.951***	-0.034	0.951***	-0.029	1.271***	-0.417	1.275***	-0.381	0.968***	0.056	0.969***	0.064
CHRONIC ILLNESS	0.062	0.373***	0.055	0.417***	0.335	0.295	0.343	0.482*	0.181	0.218	0.190	0.268*
HEALTH: EXCELENT	-0.158	-0.535***	-0.161	-0.507***	-0.015	-0.512*	-0.016	-0.480	-0.337*	-0.481**	-0.342*	-0.483**
HEALTH: REGULAR	0.857***	0.827***	0.859***	0.827***	0.662***	0.910***	0.660***	0.885***	0.928***	0.907***	0.925***	0.895***
HEALTH: BAD	1.259***	1.387***	1.261***	1.393***	0.886***	1.572***	0.892***	1.567***	1.345***	1.469***	1.340***	1.460***
HEALTH: VERY BAD	1.104***	1.243***	1.109***	1.268***	1.457***	1.143*	1.466***	1.252**	1.004***	1.404***	1.013***	1.399***
OVERWEIGHT	-0.053	0.016	-0.053	0.026	0.174	-0.402**	0.182	-0.333*	-0.072	0.111	-0.066	0.128
OBESE	-0.236	0.132	-0.236	0.134	0.175	-0.155	0.180	-0.057	-0.280	0.125	-0.272	0.144
WEIGHT MISSING	-0.265	-0.359*	-0.274	-0.307*	0.013	-0.463	0.007	-0.362	-0.406*	-0.379*	-0.415*	-0.356*
SMOKE: EVERY DAY	0.083	-0.120	0.083	-0.106	0.067	-0.309	0.069	-0.277	0.134	-0.090	0.135	-0.081
SMOKE: NOT EVERYDAY	0.260	-0.100	0.261	-0.073	-0.076	0.018	-0.068	0.065	0.375	-0.169	0.374	-0.158
SMOKE: IN The past	0.401***	0.074	0.400***	0.087	0.781***	0.013	0.788***	0.069	0.379**	-0.036	0.385**	-0.011
SMOKE: MISSING	0.198	0.178	0.169	0.319	-0.490	-0.164	-0.514	0.017	0.364	0.574*	0.331	0.620*
HOUSEHOLD SIZE: 2	0.089	0.019	0.082	0.057	-0.046	0.250	-0.051	0.278	0.071	-0.019	0.060	0.003
HOUSEHOLD SIZE:3-4	0.102	-0.050	0.093	0.001	-0.203	0.136	-0.214	0.167	0.133	-0.060	0.120	-0.033
HOUSEHOLD SIZE:+ 4	0.079	-0.064	0.066	-0.007	-0.424	0.093	-0.440	0.123	0.080	0.036	0.058	0.050
Year=2003			-0.092	0.014			-0.097	0.300			-0.176	0.054
Year=2006			-0.102	-0.570			-0.179	-0.326			-0.294	-0.161
lambda					-3.053**	1.077	-3.142**	0.154	0.779	-2.652**	0.922	-2.223
CONSTANT	-2.711***	-2.011***	-2.483*	-0.746	-0.596	-3.164**	-0.159	-1.932	-3.237***	0.311	-2.709	0.265
REGIONAL DUMMIES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	2927		2927		1027		1027		1900		1900	
Wald(58)	934.06		992.28		2933.86		2824.01		720.93		761.76	
Log-l	-1615.56		-1608.14		-473.52		-468.53		-1077.06		-1074.58	
$\rho_{SP,GP}$	-0.382***		-0.352***		-0.485***		-0.442***		-0.389***		-0.371***	

note: Estimated coefficients with robust standard errors. Significance stars: *, **, *** significant at 5, 1 and .1 per cent levels

Table 16: Demand for health services: GP and Specialist bivariate probit models: An exploration of the interaction between private insurance, immigration and income

	SS SAMPLE						CS SAMPLE					
					SS	Double					Public	Private
	Whole Sample				cover	cover	Whole Sample				cover	cover
	SPECIALIST:											
PRIVATE INS/SECTOR	0.546***	1.089***	0.545***	1.099***			0.181*	-0.091	0.188*	-0.122		
	(21.06)	(13.15)	(20.99)	(13.00)			(2.34)	(-0.35)	(2.43)	(-0.47)		
IMMIGRATION	-0.182*	-0.177*	-0.203*	-0.188*	-0.223*	0.281	-0.059	-0.027	-0.069	-0.032	-1.529	-0.036
	(-2.22)	(-2.16)	(-2.33)	(-2.15)	(-2.39)	(1.10)	(-0.18)	(-0.08)	(-0.17)	(-0.08)	(-1.77)	(-0.05)
IMMIGRATION*PRIV INS		0.202***		0.206***				-0.090		-0.103		
		(6.34)		(6.35)				(-1.02)		(-1.17)		
IMMIG*INC601-900			0.001	-0.001	-0.001	-0.030			-0.342	-0.351	0.462	-0.878**
			(0.02)	(-0.03)	(-0.02)	(-0.17)			(-1.16)	(-1.18)	(0.90)	(-2.59)
IMMIG*INC:901-1.200			0.025	0.018	0.024	-0.051			0.162	0.167	0.805	-0.195
			(0.60)	(0.44)	(0.56)	(-0.30)			(0.61)	(0.62)	(1.65)	(-0.72)
IMMI*INC:1.201-1.800			0.052	0.038	0.052	-0.119			0.187	0.191	1.331*	-0.218
			(1.31)	(0.96)	(1.24)	(-0.80)			(0.73)	(0.74)	(2.57)	(-0.74)
IMMI*INC:+ 1.801			0.021	-0.015	-0.002	-0.146			0.148	0.153	1.141*	-0.280
			(0.52)	(-0.37)	(-0.05)	(-0.99)			(0.59)	(0.60)	(2.41)	(-1.12)
IMMI*INCOME MISSING			0.020	0.001	0.024	-0.226			-0.008	-0.001	0.947*	-0.457
			(0.48)	(0.03)	(0.54)	(-1.50)			(-0.03)	(-0.00)	(1.95)	(-1.71)
	GENERAL PRACTITIONER											
PRIVATE INS/SECTOR	-0.105***	-0.580***	-0.088***	-0.435***			0.041	0.084	0.040	0.110		
	(-3.98)	(-7.13)	(-3.33)	(-5.25)			(0.57)	(0.35)	(0.56)	(0.45)		
IMMIGRATION1	0.093	0.094	0.315***	0.312***	0.300***	0.226	0.314	0.308	0.685**	0.678*	0.122	0.455
	(1.57)	(1.59)	(5.00)	(4.95)	(4.56)	(0.96)	(1.05)	(1.03)	(1.96)	(1.94)	(0.14)	(0.61)
IMMIGRATION*PRIV INS		-0.172***		-0.125***				0.014		0.023		
		(-5.78)		(-4.16)				(0.17)		(0.28)		
IMMIG*INC601-900			-0.116***	-0.115***	-0.107***	-0.323**			-0.202	-0.202	-0.864*	-0.048
			(-4.02)	(-3.98)	(-3.62)	(-2.16)			(-0.87)	(-0.87)	(-2.13)	(-0.16)
IMMIG*INC:901-1.200			-0.285***	-0.282***	-0.281***	-0.325**			-0.234	-0.235	-0.900*	-0.048
			(-10.02)	(-9.92)	(-9.64)	(-2.23)			(-1.05)	(-1.05)	(-2.30)	(-0.17)
IMMI*INC:1.201-1.800			-0.279***	-0.273***	-0.266***	-0.386**			-0.291	-0.292	-0.875*	0.050
			(-9.74)	(-9.54)	(-8.98)	(-2.82)			(-1.40)	(-1.40)	(-2.17)	(0.17)
IMMI*INC:+ 1.801			-0.425***	-0.410***	-0.408***	-0.540***			-0.435**	-0.437*	-0.991**	-0.303
			(-13.70)	(-13.19)	(-12.37)	(-4.12)			(-2.09)	(-2.10)	(-2.77)	(-1.13)
IMMI*INCOME MISSING			-0.302***	-0.296***	-0.285***	-0.436**			-0.555**	-0.557*	-1.155**	-0.426
			(-10.25)	(-10.00)	(-9.27)	(-3.23)			(-2.51)	(-2.51)	(-3.04)	(-1.52)
N	56058	56058	56058	56058	50295	5763	2927	2927	2927	2927	1027	1900
Wald chi2	18473.38	18730.02	19019.90	19189.61	17382.73	2083.39	992.28	994.60	1012.35	1014.02	3499.44	801.43
Log-l	-32592.35	-32557.93	-32468.41	-32440.89	-28817.81	-3430.29	-1608.14	-1607.63	-1598.15	-1597.48	-456.28	-1065.06

note: We have omitted the rest of the variables considered in the specification.
Robust standard errors. Significance stars: *, **, *** significant at 5, 1 and .1 per cent levels

Table 17: A trivariate probit model for the demand of health services and private insurance

	Social Security Sample: 56080 obs.						Civil servants sample: 2927 obs.					
	SP	GP	PHI	SP	GP	PHI	SP	GP	PHI	SP	GP	PHI
PHI or Priv. Sect.	0.509***	-0.082		0.506***	-0.080		0.237	0.192		0.241	0.218	
log(Inmi/(1-Inmi)	-0.177*	0.100	0.336***	-0.037*	0.018	0.247***	-0.069	0.307	0.564**	-0.149*	-0.155*	0.712***
FEMALE	0.271***	0.171***	-0.030	0.275***	0.165***	-0.030	0.245*	0.220*	0.027	0.244*	0.216*	0.027
FEMALE AGED MORE 50	-0.222***	0.110***	0.148***	-0.224***	0.114***	0.148***	0.003	0.191	0.211*	0.004	0.204	0.217*
30<Age<=50	0.090**	-0.090***	0.119***	0.092**	-0.092***	0.119***	-0.083	0.089	-0.098	-0.082	0.072	-0.108
50<Age<=65	0.162***	-0.041	0.048	0.159***	-0.037	0.046	0.062	0.235	-0.266*	0.061	0.229	-0.269*
Age>65	-0.111*	0.158***	-0.038	-0.120*	0.168***	-0.040	-0.270	0.591***	-0.323**	-0.270	0.587***	-0.320**
MARRIED	0.097***	0.201***	0.010	0.083***	0.217***	0.009	-0.141	0.031	0.046	-0.143	0.091	0.058
WIDOWED DIVORCED	-0.098**	0.139***	-0.028	-0.104**	0.146***	-0.028	-0.074	0.096	-0.020	-0.074	0.115	-0.015
SECONDARY	0.131***	-0.105***	0.287***	0.132***	-0.106***	0.286***	0.014	0.067	0.090	0.013	0.060	0.089
COLLEGE	0.269***	-0.137***	0.494***	0.269***	-0.138***	0.494***	0.199*	-0.032	-0.056	0.199*	-0.016	-0.056
CHILDREN	-0.075*	-0.116***	0.081**	-0.095**	-0.087***	0.075**	-0.016	-0.000	0.155	-0.024	0.063	0.202*
SELF-EMPLOYED	-0.333***	-0.139***	0.408***	-0.330***	-0.144***	0.409***	0.062	-0.121	-0.011	0.065	-0.188	-0.034
EMPLOYED	-0.074**	-0.050*	0.143***	-0.073**	-0.052*	0.143***	-0.065	0.138	-0.130	-0.063	0.130	-0.138
TEMPORARY EMPLOYED	-0.085*	-0.045	-0.076*	-0.083*	-0.048	-0.075*	-0.239	0.038	-0.195	-0.237	-0.023	-0.213
UNEMPLOYED	-0.184***	0.043	-0.131**	-0.178***	0.036	-0.130**	-0.030	0.345	-0.316*	-0.027	0.307	-0.327*
INCOME:601-900	0.133***	-0.043	0.123**	0.136***	-0.047	0.124**	-0.058	-0.317	0.229	-0.055	-0.359	0.210
INCOME:901-1.200	0.193***	-0.142***	0.197***	0.200***	-0.149***	0.196***	0.151	-0.397*	0.300	0.152	-0.439*	0.288
INCOME:1.201-1.800	0.300***	-0.113***	0.274***	0.307***	-0.119***	0.273***	0.111	-0.267	0.385*	0.110	-0.307	0.379*
INCOME:+ 1.801	0.340***	-0.245***	0.508***	0.349***	-0.253***	0.507***	0.052	-0.487*	0.342*	0.050	-0.530**	0.337*
INCOME MISSING	0.201***	-0.116***	0.344***	0.191***	-0.106***	0.343***	0.041	-0.554**	0.336*	0.042	-0.542**	0.339*
CITY MORE +400000	0.141***	-0.084**	0.185***	0.144***	-0.087***	0.185***	0.214	-0.173	0.037	0.213	-0.164	0.038
BEING IN HOSPITAL	1.068***	0.044*	0.211***	1.067***	0.046*	0.211***	0.957***	-0.030	0.050	0.958***	-0.036	0.049
CHRONIC ILLNESS	0.159***	0.487***	0.042*	0.170***	0.476***	0.043*	0.044	0.407***	0.194**	0.046	0.363***	0.172**
HEALTH: EXCELENT	-0.303***	-0.261***	0.083***	-0.296***	-0.273***	0.083***	-0.159	-0.498***	-0.033	-0.158	-0.527***	-0.042
HEALTH: REGULAR	0.716***	0.818***	-0.082***	0.716***	0.817***	-0.082***	0.873***	0.833***	-0.052	0.872***	0.831***	-0.047
HEALTH: BAD	1.228***	1.296***	-0.145***	1.224***	1.299***	-0.145***	1.270***	1.400***	-0.052	1.268***	1.392***	-0.054
HEALTH: VERY BAD	1.479***	1.285***	-0.092	1.476***	1.289***	-0.092	1.123***	1.272***	0.008	1.119***	1.244***	-0.002
OVERWEIGHT	-0.039	0.072***	-0.009	-0.040	0.073***	-0.009	-0.058	0.021	0.065	-0.058	0.011	0.062
OBESE	-0.127***	0.185***	-0.082**	-0.130***	0.186***	-0.082**	-0.234	0.141	0.086	-0.233	0.138	0.082
WEIGHT MISSING	-0.137***	-0.021	-0.078*	-0.118***	-0.050*	-0.075*	-0.280	-0.311*	0.032	-0.275	-0.363*	0.015
SMOKE: EVERY DAY	0.023	-0.140***	0.043*	0.025	-0.143***	0.044*	0.089	-0.100	0.025	0.089	-0.113	0.022
SMOKE: NOT EVERYDAY	-0.052	-0.023	0.091	-0.049	-0.023	0.091	0.244	-0.077	-0.027	0.243	-0.103	-0.025
SMOKE: IN The past	0.276***	0.062**	0.087***	0.281***	0.057**	0.087***	0.392***	0.069	0.079	0.392***	0.055	0.082
SMOKE: MISSING	0.223***	0.450***	0.222***	0.267***	0.390***	0.237***	0.161	0.307	0.022	0.176	0.171	-0.087
Hsize2	0.038	-0.038	-0.034	0.046	-0.047	-0.033	0.087	0.058	0.008	0.091	0.020	-0.007
Hsize3	-0.057	-0.057*	-0.106**	-0.045	-0.070*	-0.103**	0.100	0.008	0.014	0.106	-0.042	-0.013
Hsize4	-0.073	-0.008	-0.166***	-0.060	-0.025	-0.161***	0.076	-0.001	-0.035	0.084	-0.057	-0.068
Insurance premium			0.006			-0.082						
Health workforce			0.092*			0.111**			0.075			-0.009
Day care hosp beds			-1.141***			-1.039***			0.467			0.225
Exp. prot pers			-0.173			-0.588*			-1.969			-2.874**
YEAR2	0.002	0.065	-0.151				-0.082	-0.015	0.172			
YEAR3	0.195	-0.101	-0.273				-0.131	-0.621	-0.052			
cons	-3.345***	-0.916***	-0.523	-2.907***	-1.141***	2.280	-2.509*	-0.789	13.627	-2.802***	-2.169***	20.851***
$\rho_{SP,GP}$		-0.165***			-0.164***			-0.151***			-0.164***	
$\rho_{SP,PI}$		0.021			0.023			0.035			0.035	
$\rho_{GP,I}$		-0.016			-0.017			-0.095			-0.098	
LR test all $\rho = 0$		209.43(3)			211.21(3)			13.02(3)			11.32(3)	
chi2		23952.48			22396.41			1221.39			1168.33	
ll		-48541.69			-48580.17			-3408.20			-3419.86	

note: Robust standard errors. Significance stars: *, **, *** significant at 5, 1 and .1 per cent levels

Appendix. Variable definitions and auxiliary regressions

Table A.1. Estimated models for the probability of contacting a physician in 2001-2003

Variable	SP	GP
INSURANCE	0.26***	-0.03
FEMALE	0.17***	0.15***
Fem50	-0.13**	-0.01
$30 < Age <= 50$	0.07*	0.01
$50 < Age <= 65$	0.14**	0.09**
$Age > 65$	0.00	0.20***
MARRIED	0.02	0.05**
WIDOWED DIVORCED	-0.07	0.05
SECONDARY	0.07*	-0.05*
UNIVERSITARY	0.15***	-0.11***
CHILDREN	0.01	-0.08**
SELF-EMPLOYED	-0.19***	-0.06
EMPLOYED	-0.05	-0.03
TEMPORARY EMPLOYED	-0.06	0.00
UNEMPLOYED	-0.11*	0.07
MONTHLY INCOME:601-900	0.05	-0.05
MONTHLY INCOME:901-1.200	0.10*	-0.10***
MONTHLY INCOME:1.201-1.800	0.15***	-0.07*
MONTHLY INCOME:MORE THAN 1.801	0.19***	-0.10**
MONTHLY INCOME MISSING	0.08	-0.10***
CITY MORE THAN 400000	0.08*	-0.05
BEING IN HOSPITAL	0.43***	0.01
CHRONIC ILLNESS	0.06	0.30***
HEALTH: VERY GOOD AND GOOD	-0.20***	-0.28***
HEALTH: REGULAR	0.43***	0.40***
HEALTH: BAD	0.63***	0.62***
HEALTH: VERY BAD	0.70***	0.59***
OVERWEIGHT	0.00	0.05*
OBESE	-0.04	0.10***
WEIGHT MISSING	-0.08	-0.03
SMOKE: EVERY DAY	0.00	-0.08***
SMOKE: NOT EVERY DAY	-0.02	0.02
SMOKE: IN THE PAST	0.13***	0.04
SMOKE: MISSING	0.09	0.27***
HOUSEHOLD SIZE: 3-4	0.03	0.00
HOUSEHOLD SIZE: + 4	-0.04	-0.02
2003	-0.05	0.25***
cons	-2.08***	-1.14***
REGIONAL DUMMIES	YES	YES
N	35533	35533
Observed Prob	0.0704416	0.197591
Predicted Prob	0.0581285	0.1724869
ll	-8367.01	-15687.39
chi2	1379.48	3619.83

note: Robust standard errors.

*, **, *** significant at 5, 1 and .1 per cent levels

Table A.2. Variable definition and source (SNHS, otherwise stated)

VARIABLES	DEFINITION (source
INSURANCE	Dummy=1 if double coverage
Private sector	Dummy=1 if covered by private sector
log(Inmi/(1-Inmi)	Log(%Immigrants/(1-%Immigrants) (source: INE)
FEMALE	1 if female, 0 otherwise
FEMALE AGED MORE 50	1 if female older than 50, 0 otherwise
30<Age<=50	1 if older than 30 and younger than 51, 0 otherwise
50<Age<=65	1 if older than 50 and younger than 66, 0 otherwise
Age>65	1 if older than 65, 0 otherwise
MARRIED	1 if married, 0 otherwise
WIDOWED DIVORCED	1 if widowed or divorced, 0 otherwise
SECONDARY	1 if declare secondary education , 0 otherwise
UNIVERSITARY	1 if declare universitary education, 0 otherwise
CHILDREN	1 if have children, 0 otherwise
SELF-EMPLOYED	1 if self-employed, 0 otherwise
EMPLOYED	1 if employed, 0 otherwise
TEMPORARY EMPLOYED	1 if temporary employed, 0 otherwise
UNEMPLOYED	1 if unemployed, 0 otherwise
MONTHLY INCOME:601-900	1 if monthly household income between 601-900 Euros , 0 otherwise
MONTHLY INCOME:901-1.200	1 if monthly household income between 901-1200 Euros , 0 otherwise
MONTHLY INCOME:1.201-1.800	1 if monthly household income between 1201-1800 Euros , 0 otherwise
MONTHLY INCOME:MORE THAN 1.801	1 if monthly household income more 1800 Euros , 0 otherwise
MONTHLY INCOME MISSING	1 if monthly household income missing , 0 otherwise
CITY MORE THAN 400000	1 living in a big town , 0 otherwise
BEING IN HOSPITAL	1have been in hospital at least once during the last year , 0 otherwise
CHRONIC ILLNESS	1 if reports chronic illnesses , 0 otherwise
HEALTH: EXCELENT	1if reports excellent health , 0 otherwise
HEALTH: REGULAR	1if reports regular health , 0 otherwise
HEALTH: BAD	1if reports bad health , 0 otherwise
HEALTH: VERY BAD	1if reports very bad health , 0 otherwise
OVERWEIGHT	1 if BMI between 25- 30, 0 otherwise
OBESE	1 if BMI greater than 30, 0 otherwise
WEIGHT MISSING	1 if BMI missing, 0 otherwise
SMOKE: EVERY DAY	1 if declare smoking every day , 0 otherwise
SMOKE: NOT EVERY DAY	1 if declare smoking but not every day , 0 otherwise
SMOKE: IN THE PAST BUT NOT NOW	1 if declare smoking in the past but not know , 0 otherwise
SMOKE: MISSING	1 if declare smoking is missing , 0 otherwise
HOUSEHOLD SIZE: 3-4	1 if household size 3-4 , 0 otherwise
HOUSEHOLD SIZE: MORE THAN 4	1 if household size greater than 4 , 0 otherwise
Insurance premium	lag of insurance premiums per region (source:)
Health workforce	lag of health sector workforce per 1000 inhab (source:)
Day care hosp beds	the lag of hospital daily beds per 1000 inhab (source:)
Exp. prot pers	lag of real public expenditure on health per protected person (source:)

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