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Abstract

This paper studies the performance of immigrants relative to natives, in terms of their health status, use of health care services, lifestyles, and coverage of health expenditures. We base the analysis on international evidence that identified a *healthy immigrant effect*, complemented by empirical research on the Portuguese National Health Survey. Furthermore, we assess whether differences in health performance depend on the personal characteristics of the individuals or can be directly associated with their migration experience.

Keywords: Migration, health status, health care, healthy immigrant effect, Portugal.

1. Introduction

Do immigrants have different health needs when compared to natives in a host country? In particular, do immigrants have a different health status to natives and, if yes, in what dimensions? Is it possible to identify different patterns of usage of health care services in the destination place and of the coverage of health-related expenditures? Are there visible distinctions in lifestyles, and in preventive and risky health behaviours undertaken by immigrants? The answer to these questions lacks comprehensive evidence, but is essential to design informed policies on one of the most key determinants of the pattern and quality of an individuals' life, their health. This paper tries to contribute to the debate, adding new empirical and sound evidence from a developed net migration receiving country, Portugal.

The right to health is recognized by many international law treaties and conventions (e.g., Universal Declaration of Human Rights; International Covenant on Economic, Social and Cultural Rights; the International Convention on the Protection of the Rights of All Migrant Workers and Members of their Families) ratified by many countries around the world. In practice, however, it is still not clear whether this right, if fully implemented and in equal terms between foreigners and nationals in a country, is in proportion to their needs. So far there have been some country and regional cases addressing this theme. In this paper, we not only review some of the cases, but we also add evidence from a comprehensive, nationwide survey applied to residents in Portugal from 2005-2006. Portugal is an interesting case study for two main reasons. First, because so far no other similar research has been done with such large population scope for this country. Second, Portugal defines the right to health in its constitution, has an universal and public health care system available to all residents, regardless of their nationality, legal status, or economic situation. Still, it may be possible that under such context of formal accessibility, there are less visible but real barriers to immigrants. This paper tries to fill the gap, providing answers to the questions posed in the previous paragraph, by documenting differences in health status and practices across different immigrant groups in Portugal.

On immigrants' health outcomes, some patterns have been identified in the literature. The first one relates with a *healthy immigration effect*, according to which immigrants are healthier than natives in the destination country, with similar personal characteristics (e.g., Antecol and Bedard,

2005; Jasso et al., 2004). The main explanation so far has been of a positive selective effect: since migration has costs, only the healthier are able to change residence. In our results, we find that immigrants from some countries are healthier than natives. Since we have a cross section dataset from the destination place, we are not able to distinguish whether such a health advantage is due to selectivity or to an individuals' past healthy behaviour.

Several papers emphasize that migration can be a stressful process, with individuals subject to many pressures and uncertainties. These pressures and uncertainties may have a negative impact on their mental health, particularly in indicators such as anxiety, nervousness and depression (e.g., Carballo and MBoup, 2005; Deb and Seck, 2009). On the opposite side, with better living conditions and services in the destination country, migration can be associated with an improvement of mental health indicators (e.g., Stillman et al., 2007). In this paper, we also find mixed results on this dimension, linked with different countries of origin.

The use of health care services by immigrants may become a politically sensitive issue because it relates with the discussion of whether immigrants create a disproportionate pressure on public health care services. Such potential burdens are more likely to happen in countries where the backbone of the health system is a national health service, as in Portugal. Therefore, this country becomes a natural testing ground for the sort of health effects we want to study.

Literature is not unanimous on the patterns of use of health care services: some articles report that immigrants tend to have more visits to physicians (e.g., Garcia-Gomez, 2007), but others do not find a significant effect (e.g., Muñoz de Bustillo and Antón, 2009). However, the general consensus is that migrants tend to use more emergency rooms, either due to urgent situations, or easier access in these facilities. Overall, in this paper, we do not find significant differences in terms of the use of health care services. When significant differences exist, immigrants tend to use health care services less.

In this paper we do not provide a causal explanation nor an estimate of selectivity bias. However, to the current literature on migration and health we add analysis in several new dimensions, which we believe has not been previously explored. The first new dimension is the health-related behaviour of immigrants. It is often considered that long-term health status depends, to a large extent, on preventive care or risky behaviour (such as the consumption of less healthy

substances). It is therefore relevant to assess whether these two aspects differ substantially between immigrants and natives.

The second new dimension of analysis concerns the voluntary contract of additional health insurance and out-of-pocket health expenditures. The National Health Service in Portugal is universal, and these extra coverages and expenditures are additional. In cases where immigrants are more likely to have these additions, this may represent different preferences. Conversely, the presence of barriers in accessing the public health care is a reason of higher policy concern.

Studying migrants' health, it is also necessary to recognize the importance of individuals' genetics and a history of past health behavior while in the region of origin, the so-called health *footprint* (e.g., Hallyday, 2008). The process of migration, in particular the way it occurs, and the living conditions in the destination country additionally influence the physical and mental health of those who move (Carballo and Mboup, 2005; Carballo, 2007). Our data is primarily a cross section, but we do have information on personal characteristics of individuals (e.g., age, education, work, income), lifestyle and personal habits (e.g., eating, smoking, drinking), and their migration experience. By considering these characteristics in our analysis, we address what MacPherson and Gushulak (2004) termed as post-arrival determinants of health. Consistent with what has been found in the literature (e.g., Antecol and Bedard, 2005; Jasso et al., 2004; Muñoz de Bustillo and Antón, 2009; Chiswick et al., 2006) we also find that: age has a negative impact on health; women tend to score worst in terms of health status; being employed is associated with better health, while the opposite is true for retirement; and civil status also influences the health outcomes, with married individuals reporting better health. In terms of the use of health care services, income is negatively associated with visiting emergency rooms facilities and visiting a general practitioner (GP), while positively associated with going to a specialist doctor. Similarly, retired people, the elderly, and those benefiting from a public health subsystem are associated with a higher probability of visiting a specialist rather than a GP.

This paper is organized as follows. In the next section we present a general review of the literature in the topic of migration and health, covering several case studies available for different countries. Section 3 presents the historical and institutional context of migration and

health in Portugal. Section 4 explains the main characteristics of the sample used for the empirical analysis of this paper and the variables taken into consideration. In Section 5, we present the results for the several research questions. Section 6 concludes, presenting an overall discussion on the main findings.

2. Literature Review

The literature on the relation between migration and health has focused on two main themes: migration's impact on the physical and mental health of migrants, and the effect of health on the migration decision and the possible selectivity effect. As we explain in this literature briefing, the two areas of research are very much inter-related.

An initial branch of literature inquires whether migrants' health status is substantially different from natives, while in the host society. Starting with the seminal theory of Raymond-Duchosal (1929), recent case studies found evidence that young immigrants are healthier than natives during initial years after arrival (even controlling for age and other socio-economic conditions), but with time this difference decreases and may even disappear. This so-called *healthy immigrant effect* (HIE) has been documented for several different migration destination societies and origins. Antecol and Bedard (2005) studied HIE inthe United States, using annual cross sections of the National Health Interview Survey between 1989 and 1996. They find that immigrants enter healthier than American natives with similar ethnic and socio-economic characteristics, but within a decade, the health status of immigrants converges to the lower levels of natives. Jasso et al. (2004) also focus on the United States with panel data from the New Immigrant Pilot Survey utilizing information on foreigners entering legally in 1996.They confirm the health advantage. However, this advantage differs according to the origin of foreigners. Hispanics present lower age-adjusted death rates for several chronic conditions when compared to white non-Hispanics. Asian-Pacific Islanders have overall lower mortality rates, especially related with heart diseases and diabetes. For Mediterranean immigrants going to Europe (mainly Moroccans in France and Turkish in Germany), Khlat and Darmon (2003) argue for a similar pattern of foreigners' mortality advantage compared with natives in destination countries. For the United Kingdom, as well as Canada, Australia and the United States, the

evidence on the presence of a HIE found by Kennedy et al (2006) is larger for immigrants coming from developing countries than from developed ones.

The two main recurrent findings of a HIE, initial relative health advantage of young immigrants and convergence towards the lower levels of natives' health, may be seen as a paradox. Because in many cases immigrants come from countries with worse health conditions than the ones found in destination. The literature has presented some potential explanations for the puzzle.

Migrants' health advantage upon arrival may reflect their prior favourable habits and behaviours in the source community, as argued by Kennedy et al. (2006). This is consistent with the evidence that the pattern of health advantage differs among immigrants in the same destination, but from distinct origins (e.g., Jasso et al., 2004; Chiswick et al., 2006; Hernandez-Quevedo and Jimenez-Rubio, 2008).

Nevertheless, regarding the puzzle of young immigrants being healthier than natives, the main argument present in the literature is the positive selectivity effect: migrants are generally from the top end of the distribution of the population in the country of origin, per health status. Since migration is a process with costs, both monetary (e.g., fees paid to enter in a country) and non-monetary (e.g., separation from social and cultural networks of origin community), only those expecting high benefits from migration are able to afford the move. Being healthier is associated with a higher probability of success in the destination labour market, and, therefore, a natural dimension influencing individuals' decision to migrate. The argument of selectivity is defended, not only by all the studies previously mentioned, but also in the cases of Spain by Hernandez-Quevedo and Jimenez-Rubio (2008), of Australia by Chiswick et al. (2006), and of United Kingdom by Norman et al. (2005). In Chiswick et al. (2006) the evidence shows that selectivity also occurs among different types of immigrants, and the healthiest are those who come due to economic purposes. For Norman et al. (2005), the main conclusion obtained from the data is the inverse relationship between health selectivity and deprivation in origin locations: healthier immigrants come from more deprived communities. Because distance may also be a symptom of cost to move, Jasso et al. (2004) found that immigrants from closer source countries tend to be less healthy than those from more distant origins. Selectivity on health may also be present in internal migration, as seen by Halliday and Kimmit (2008) for the case of the United States, and by Lu (2007) and Muhidin et al. (2007) for Indonesia.

Another potential explanation for the health advantage of immigrants linked with selectivity is the *salmon bias* effect. This argument relates with the moment of measuring the immigrants' health status. As it happens with salmons who return home when they fall ill, the explanation is that only healthier foreigners are able to stay in the destination country and therefore the findings of a HIE depend on the timing of measuring those differences. However, there seems not to be a great consensus about the existence of a salmon bias effect (e.g., Khlat and Darmon, 2003), it is indeed recognized that the timing of the analysis and the age of migration influences the conclusions of how immigrants score on health. For a study of 11 European countries, Sole-Auro and Crimmins (2008) looked at immigrants 50 years or older inquired by the Survey of Health, Aging and Retirement in Europe for 2004/2005, and did not find a health advantage for immigrants at older ages. This may happen because of two main reasons. First, at older ages the benefits associated with migration are usually no longer linked to expectations on labour market performance, but more to the proximity to social and family networks. As Hallyday and Kimmit (2008) document for the case of internal migration in US, unhealthy men above 60 years are more likely to move, so that they can benefit from the assistance and support of their relatives. Second, as emphasized above, the advantage of immigrants in terms of health is usually registered only during the initial years upon arrival in the host society.With time (which also determines age) there is a convergence towards natives' levels.

This leads us to the second puzzle of HIE, which is the deterioration over time of immigrants' health status. In the literature, there have been five main explanations for detioration: the experience in resettlement; patterns of assimilation; the change in perceptions and diagnosis; regression to the mean; and barriers in access to health care services.

While not all migration experiences may be successful, even in the cases where they are, resettlement may involve several challenges in terms of the new working and housing conditions, and the adaptation to new environments, culture and sometimes even language. At an immediate and short-term horizon, it is possible that these changes have a negative health impact, namely in terms of symptoms like anxiety and nervousness (e.g., Carballo and Mboup, 2005). As Carta et al. (2005) explain that the migratory process has a psycho-social component of loss and change associated with seven possible griefs (losses): family and friends, language, culture, homeland, status, contact with ethnic group, and physical risks. The reception in the destination community has a key role to complete and elaborate the grief process in a more or less successful way. A

positive example is given by Stillman et al. (2007), who conclude that the migration experience of Tongan immigrants in New Zealand is associated with an improvement in migrants' mental health indicators.

Besides the impacts of resettlement on mental health, the new housing and working conditions of immigrants in the destination community, their access to water and sanitation and the exposure to different environments more or less polluted also influence their pattern of physical health. Some of the effects may, however, appear only over a longer time horizon.

The second argument for deterioration of immigrants' health over time is assimilation (e.g., Fennelly, 2005). In the destination place, immigrants may adopt different and less healthy behaviours in terms of exercise, diet, and smoking, which have a negative health impact in the medium to long term.

Parallel with assimilation and acculturation to the new society, immigrants may also change their relative perception of health status. In more developed societies immigrants learn about new diseases and more sophisticated medical diagnosis that enabls them to learn about unknown health problems. This is a third possible explanation for the convergence of immigrants' health (e.g., Kennedy et al., 2006).

A fourth justification for immigrants' negative performance over time is the regression to the mean. As discussed by Jasso et al. (2004) immigrants may seem healthier because, as a group, they have not fallen ill at the entry. However, the probability of having their deteriorating health in any future year is the same as that of natives. Thus their health indicators would eventually converge after some time.

The last reason in the literature for convergence relates to access to medical services, This is a negative argument. Even if migrants move to countries and communities where the supply of health care services is better than at origin, they may lack access to it. The barriers in access may be formal, *de jure,* when public health care providers are limited and migrants' jobs may not provide health insurance (e.g., Fennelly, 2005, for the case of United States); or informal, *de facto*, due to language and cultural differences, or the fear of being detected in the case of irregular immigrants (e.g., Kennedy et al., 2006; Van Houtven et al., 2005; Fonseca et al., 2007).

Given the importance of immigrants' wellbeing and, therefore, of the communities and countries where they live, several recent studies look at immigrants' usage of health care services. The ultimate goal is to identify whether, in case of smaller use, this may be linked with barriers in accessing, or in case of more intense use, what are the fiscal and economic consequences (if any).

In Spain, and for the case of visits to general practitioners (GPs), Muñoz de Bustillo and Antón (2009) find no significant differences between foreigners from other EU15 countries and natives. However, differences were identified for visits to specialist medical appointments and emergency rooms. The authors conclude that immigrants are less likely to go to specialists than natives, but more likely to use emergency rooms facilities. Similar results were found by Garcia-Gomez (2007) regarding immigrants also in Spain, but for the Catalonia community. Given that Spain has a national public health care system which is free and open to all residents, regardless of their legal status, these opposite results from visits to specialist and emergency rooms may be a symptom that immigrants only go to health care services in extreme situations due to possible informal barriers to access.[1]

In Portugal and for a sample focused in one of the poorest neighborhoods of Lisbon, it was detected that immigrants' use of healthcare services is different according to the country of origin and years of residence. In particular, the interviews for Fonseca et al. (2007) show that immigrants from Portuguese-speaking African countries (PALOPs) who lived longer in the country, were the community with higher use of health care services, while Eastern European and Brazilian individuals were not only the most recent immigrants, but also the ones with more reduced use of health facilities.

Relative to this literature, we add several new dimensions. First, we add new evidence from a national survey in Portugal. Until now, there has been no systematic study on how immigrants score in terms of health status in Portugal, as a whole, to assess whether the patterns in using

[1] In Spain, the use of public health system is conditional on the registry in the municipal governments, the *padrón*. All residents may register, regardless of their legal status as migrants, conditional on showing any document that can attest residency in the municipality, e.g., housing contract, receipt of an electricity bill.

healthcare services are significantly different between immigrants and natives. Second, we add two new dimensions of analysis: i) healthy behaviours, making the contrast between preventative and risky conducts; and ii) health coverage of payments, both in terms of contracting an additional voluntary health insurance, and making out-of-pocket expenditures. Given that Portugal has a public and (almost) free National Health Service, the evidence on health coverage would allow us to identify whether immigrants may have different preferences or constraints in using the publicly available health care providers. The pattern of preventive and risky health behavior may detect not only long-term health outcomes for immigrants, but also possible sources of moral hazard risk for the providers of health services.

3. Institutional context

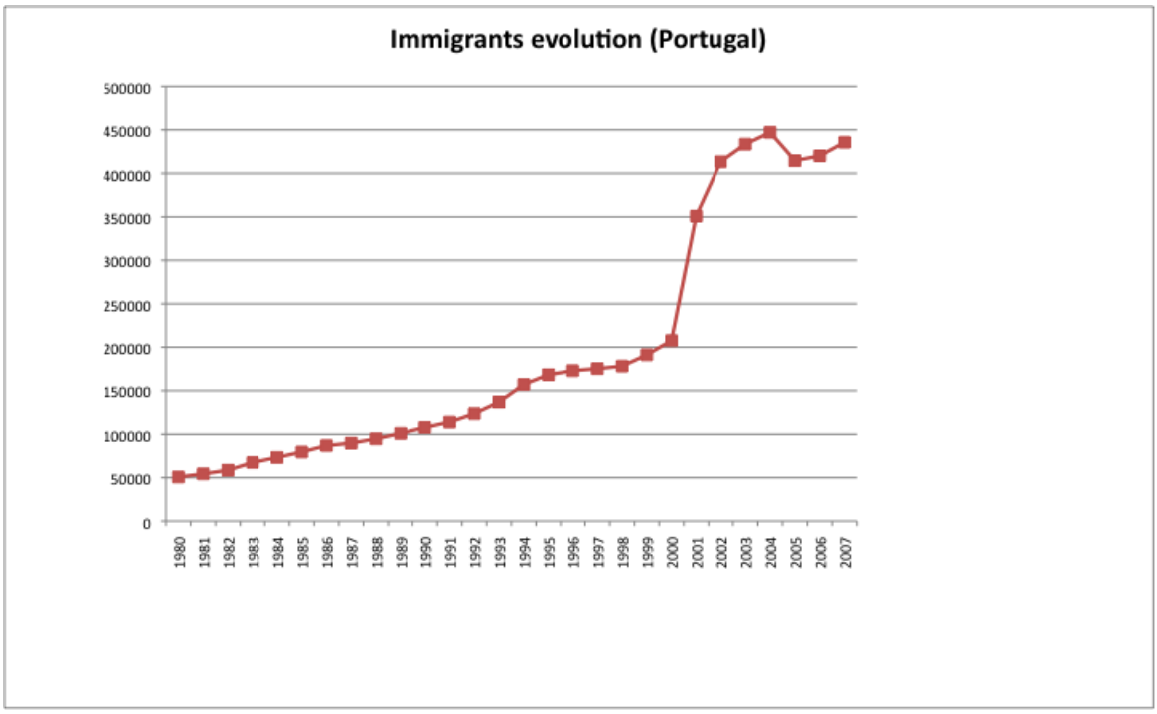
In an historical perspective, Portugal has been a net sending country since 15th century, when it started the Portuguese period of the overseas endeavour. Between mid 19th century and end of 1950s, it is estimated that around two million Portuguese went to the New World countries of Brazil and the United States (Malheiros, 2002). With the end of World War II, the increase in labour demand in central and northern European countries, and the beginning of the war in the Portuguese colonies in Africa, many nationals migrated towards Europe. During 1960s and until the political revolution of 1974, more than 1.5 million Portuguese workers emigrated, mostly to low-skilled and low-wages jobs.

In 1974, with the end of the dictatorial regime and the independence of African colonies, many Portuguese returned home, either ending their political exile or running away from the political and military instability of the Portuguese-speaking African countries (PALOPs, the ex-Portuguese colonies). In addition to the Portuguese military forces serving in PALOPs and their families, the decolonization meant that around half a million of "returned" people entered Portugal with the new political regime.

In 1986, when Portugal became a member state of the European Union (EU), it started a new migration phase (Figure 1). The favourable economic perspectives also associated with the possibility to settle in other EU countries, attracted many foreigner workers, and Portugal shifted from a net sending country to a net receiving one. The majority of immigrants, until the end of 1990s, came first from PALOPs and later from Brazil. The former mainly occupied low skilled

jobs in construction and domestic services, while the later worked ina more diverse set of occupations (e.g., dental surgeons or marketing personnel, as well as low skilled jobs in commerce and hospitality).

Figure 1 – Number of immigrants in Portugal



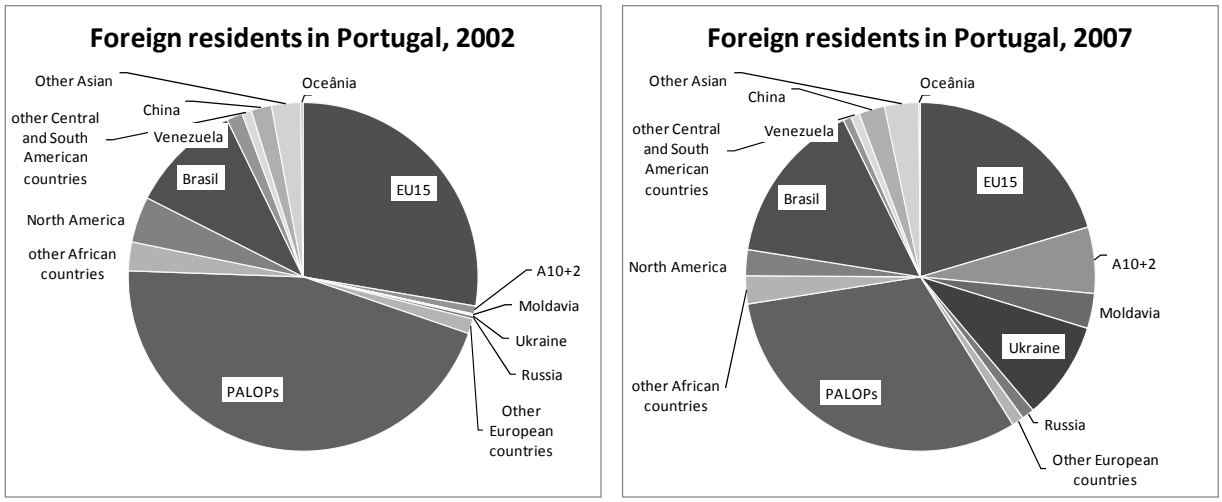
Source: SEF (2007)

A more recent immigration trend started in 2000s, with the entrance of many foreigner workers from Eastern European countries, particularly Ukraine, Moldova, Romania and Russian Federation, along with the reinforcement of the Brazilian presence among migrant workers (Figure 2).

Recent trends in immigration in Portugal suggest that immigrants from Eastern Europe "have been attracted by easy entry, abundant jobs (particularly in the poorly regulated civil construction industry) and the tolerant, indeed generally warm, welcome provided." (CFR-CDF, 2003, pp. 35). This image of Portugal as a receiving country has also been related to the many immigrants in the past two decades arriving with irregular status of permanence and later having their

situation regularized by one of the five general amnesties that took place in 1992, 1996, 2001, 2003, and 2005.

Figure 2 – Distribution of foreign residents in Portugal by country of origin, 2002 and 2007



Sources: SEF (2002) and SEF (2007)

From a political perspective, several documents defend the broad view that immigrants are not a drain of resources from the country. Almeida and Silva (2007), attempting to estimate the financial impact of immigrants in national accounts, found an overall positive effect in public finances associated with immigration. The analysis is made at the level of broad aggregates. In the health sector, the underlying assumption is that immigrants use less health care services. There is no background information provided by the authors to convincingly support the assumption. Their procedure differs, in this account, from a previous exercise (for 2003) when the authors assumed equal utilization of hospital care by immigrants and natives.

Regarding the provision of health care, Portugal created a National Health Service in 1976 with its new constitution establishing the health system as universal (covering all residents), comprehensive (in terms of the scope of care provided), and almost free at the point of consumption (when health care is needed). The National Health Service (NHS) has, however, several bottlenecks, the most relevant being visits to specialists (since a patient always needs to go first to a GP and only afterwards has access to a specialist), and the waiting lists for surgery. Given these two constraints, a considerable fraction of the population (close to 20%) has a

voluntary private health insurance. The Portuguese health system is also characterized by significant co-payments, specially for pharmaceuticals, and some difficulty in accessing drugs for poorer households.

According to current laws, immigrants have equal access to health care as Portuguese nationals.[2] Since 2001 (*Despacho do Ministério da Saúde* nº 25360/2001) the services of the NHS cannot refuse treatment based on nationality, illegal immigrant status or lack of financial means to pay for care. Thus, immigrants can demand care and expect to be treated. Under the current legal framework, and considering that Portugal's NHS is funded by general taxations, and universal, in terms of health insurance coverage of residents, access by immigrants to health care appears to be wider than in other European countries (Fonseca et al., 2007). Despite the formal equality in access of immigrants relative to nationals, there may exist informal and/or socio-economic barrier, in particular for undocumented immigrants. Fonseca et al. (2007) mention some of those difficulties associated with: lack of knowledge of the health care system, language barriers, and discrimination by health professionals. Their analysis fails to distinguish whether immigrants are different in health status and demand for health care, from comparable natives with similar incomes. This is a crucial aspect, as poorer segments of the population also have lower access to health (lower utilization relative to need) by the Portuguese health system, in general. On the other hand, Fonseca et al. (2005) report that illegal immigrants have used fake addresses and names to access health care, showing some knowledge and sophistication in using the National Health Service. This was more likely in communities with a long tradition of immigration. Still, there seems to be some denial of access in primary care to illegal immigrants.

4. Data

On methodological grounds, the analysis of the migrants' health status and their use of services should be based on longitudinal studies with complete information on their life histories and background socio-economic characteristics. In reality and practical terms, this requires a very demanding dataset, almost never available. In our case, we use a cross section sample. The data has some information on time variables, namely the duration of migration experience, which we use to control for differences over time.

[2] The current law guiding immigration in Portugal is Law nº 23/2007, of 4th July. Before it, immigration legal framework was set by Law-Decree nº 34/2003, of 25th February.

Our data comes from the Fourth National Health Survey in Portugal, collected between February 2005 and February 2006, by the National Health Institute Dr. Ricardo Jorge (INSA) together with the Portuguese National Institute of Statistics and in collaboration with the Health General Directory. The survey was implemented in all Portuguese territory, continental plus Azores and Madeira, and it was designed to be a representative sample of all resident population resident, regardless of their nationality or migrant status.[3]

The survey covers more than 41,000 individuals in more than 15,000 households. Not all questions were responded to by all individuals, either by design (e.g., self-reported health not being asked to under 15), or by non-response (e.g., income bracket of the household). Additionally, and following what is common in the literature, we do not include information on individuals below 18 because children are perceived to have very specific health behaviours that need separate analysis. Given these remarks, the actual sample used for this study is smaller than the original: 33,699 individuals, but varying from estimation to estimation. The data was provided for research purposes under a standard confidentiality agreement. A full description of the survey and descriptive statistics are available at Dias et al. (2008).

The survey has a rich set of questions on individuals' socio-economic characteristics, health conditions and behaviours, use of health services and related payments, and a section on migration experience. This information on migration is an innovation of the fourth round of the questionnaire, comparing with editions in previous years.[4]

Relevant to our purposes, the questions on migration allow us to know about an individual's country of birth, nationality, time of residence in Portugal (if born outside), and whether the individual has emigrated (if born inside) and for how long. With this data, we can define a migrant by two alternative ways: country of birth and nationality. Both definitions coincide to a large extent, but not totally. There are still a relevant fraction of Portuguese nationals born abroad, mainly in Portuguese-speaking African countries (PALOPs), before 1974, when those countries were still considered as Portuguese territory; and also a fraction of residents born in

[3] The sample of the 4th Portuguese National Health Survey is stratified, with a similar number of observations per region. Given that regions are different, the use of weights allows the extrapolation of the results for the whole country. In our analysis, we cannot use the weights because they are aggregated. Nevertheless, because the stratification of the sample is based in variables also included in our analysis as explanatories, the non application of weights has small impact in the final outcomes.

[4] The Portuguese National Health Survey has been implemented for more than a decade, with a 5-years interval.

Portugal who retain foreign citizenship, most of them again from PALOPs. We run all the models with one of the definitions in turn. In general, there is no substantive difference in the results. We choose to present only estimates based on country of birth, and to highlight particular differences, when the definition of immigrant matters, that is, when using country of birth to define immigrant status produces different results from using nationality.

Regarding the country of birth, although we have information on it, very few observations exist for many of the countries. To detect broad regularities, we consider eight different groups of immigrants, based on their origin:

- First, the individuals who were born in PALOPs: Angola, Cape Verde, Guiné-Bissau, Mozambique, and S. Tomé e Principe. Until 1974 these countries were considered Portuguese territories and, as a reflection of the extensive historical links between Portugal and PALOPs, there has always been a tradition of immigration from these countries;
- Second, the individuals born in all other African countries;[5]
- Third and fourth, we consider Brazilian and Latin American and Caribbean (LAC) immigration.[6] Treating Brazil separately is justified by language considerations, but also due to the bilateral agreements (e.g., double citizenship);
- Fifth, individuals living in Portugal but born in an "Eastern European" country, such as Ukraine, Romania, Moldova, Russian Federation and Bulgaria;
- Sixth, immigrants from developed OECD countries, which we divide into EU15 (the group of 14 countries that together with Portugal were the first 15 European Union member states: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Spain, Sweden, United Kingdom);
- Seventh, the remaining developed countries (e.g., United States, Canada, Australia, Switzerland);
- Finally, immigrants from Asian countries, Middle East countries and small Pacific islands constitute the final group of "Other countries"[7].

[5] From the other African countries, the largest communities in Portugal come from South Africa, Senegal, and Morocco.
[6] The largest country of origin in LAC is Venezuela.
[7] Among "other countries", there is a significant share of immigrants from China, Pakistan, and India.

From Table 1 below, where we present the descriptive statistics of these variables, we see that 96% of the individuals in our sample were born in Portugal, and among those born outside, the largest group is from PALOPs, followed by those born in another EU15 member state.

Another variable on migration relates with the number of years that individuals reside in Portugal. Given that we have a cross-section dataset, the main goal of this variable is to capture effects of the migration experience along the time, namely individuals' knowledge of the institutions, and adaptation to the characteristics of Portuguese society (e.g., culture, language, lifestyle) which may influence their health attitudes and outcomes. As documented in the literature (e.g., Antecol and Bedard, 2005), we consider that after 10 years of residence in the country there is no significant distinction between an immigrant and a native, regarding their knowledge adaptation to society.

Table 1 – Descriptive statistics of migration variables in the sample

			Descriptive Statistics		
Name of variable	**Description**	**Type variable**	**mean**	**nr obs**	**st dev**
Portugal (birth)	Equals 1 if individual was born in Portugal	Dummy (1,0)	0.959	33669	0.198
PALOPs (birth)	Equals 1 if born in a Portuguese-speaking Africa country (PALOP)	Dummy (1,0)	0.013	33669	0.113
other African (birth)	Equals 1 if born in other Africa country different from a PALOP	Dummy (1,0)	0.001	33669	0.039
Brazil (birth)	Equals 1 if born in Brazil	Dummy (1,0)	0.005	33669	0.073
other LAC (birth)	Equals 1 if born in other Latin American and Caribbean (LAC) country	Dummy (1,0)	0.003	33669	0.055
Eastern Europe (birth)	Equals 1 if born in an Eastern European country	Dummy (1,0)	0.005	33669	0.068
EU15 (birth)	Equals 1 if born in another EU15	Dummy (1,0)	0.010	33669	0.098
other developed (birth)	Equals 1 if born in other developed country rather than EU15	Dummy (1,0)	0.002	33669	0.042
other countries (birth)	Equals 1 if born in other country not included in any of previous categories	Dummy (1,0)	0.002	33669	0.041
emigrant	Equals 1 if an individual born in Portuguese has had residency outside the country	Dummy (1,0)	0.113	33669	0.317
years residence (≤10)	Nr of years of residence in Portugal if born outside the country and at most 10 years of residence in Portugal. Equals 10 if born in the country, or if born outside but living in Portugal for more than 10 years.	nr years: 0-10	9.926	33669	0.703

To account for the role of the social and economic background of immigrants on their health outcomes and health usage, we include several characteristics listed in Table 2 below. In our sample, 52.4% of the respondents are women, 65.3% are married, on average individuals are 50 years old (given that we only consider respondents above 18 years old as explained above), and more than 75% has at most the basic studies.

Considering job occupations, there are two possible alternative approaches. One is to use the International Standard Classification of Occupations (ISCO) 2008, by eight major groups. The other is to use broad categories of 11 industries where workers are employed. Considering the first classification, we see that around 40% work in professions related with skilled agriculture, forestry and fishery, craft and related trade, and plants and machine operators and assemblers. If we take into account the second grouping, almost half of the respondents work either in the primary sector of agriculture and fishery, in industry, or in construction. In the econometric analysis, we always run the estimation for both classifications, one each time. For matter of simplicity, we display the results with the industries, since the major conclusions do not change.

Table 2 - Descriptive statistics on the socio-economic characteristics of individuals in the sample

			Descriptive Statistics		
Name of variable	**Description**	**Type variable**	**mean**	**nr obs**	**st dev**
nr members in household	Number of members in the household	Discrete: 1-12	3.115	33669	1.421
female	Equals 1 if female	Dummy (1,0)	0.524	33664	0.499
age (adults only)	Age in years	Discrete: 18-102	49.914	33669	18.528
bmi	Body Mass Index (weight, kg / height, m2)	Continuous (7.5-128.57)	25.860	33005	4.487
school level1 (no schooling)	Equals 1 if no schooling	Dummy (1,0)	0.157	33645	0.363
school level2 (1st basic)	Equals 1 if 1st cycle of basic studies (4 years)	Dummy (1,0)	0.362	33645	0.481
school level3 (2nd basic)	Equals 1 if 2nd cycle of basic studies (2 years)	Dummy (1,0)	0.130	33645	0.336
school level4 (3rd basic)	Equals 1 if 3rd cycle of basic studies (3 years)	Dummy (1,0)	0.126	33645	0.332
school level5 (high school)	Equals 1 if high school studies (3 years)	Dummy (1,0)	0.117	33645	0.321
school level6 (pos high school)	1 if post-high school studies (professional)	Dummy (1,0)	0.005	33645	0.072
school level7 (BSc)	Equals 1 if BSc	Dummy (1,0)	0.019	33645	0.136
school level8 (Undergrad-Licenciatura)	Equals 1 if "Licenciatura"	Dummy (1,0)	0.078	33645	0.268

Table 2 (cont.1)

			Descriptive Statistics		
Name of variable	**Description**	**Type variable**	**mean**	**nr obs**	**st dev**
school level9 (Master)	Equals 1 if Masters' level	Dummy (1,0)	0.004	33645	0.060
school level10 (PhD)	Equals 1 if Doctorate level	Dummy (1,0)	0.002	33645	0.048
single	Equals 1 if civil status is single	Dummy (1,0)	0.202	33663	0.401
married	Equals 1 if civil status is married	Dummy (1,0)	0.653	33663	0.476
separated	Equals 1 if civil status is separated	Dummy (1,0)	0.010	33663	0.099
legally divorced	Equals 1 if civil status is legally divorced	Dummy (1,0)	0.037	33663	0.189
divorced	Equals 1 if civil status is divorced (either separated or legally divorced)	Dummy (1,0)	0.047	33663	0.212
widow	Equals 1 if civil status is widow	Dummy (1,0)	0.098	33663	0.298
income pcapita (in household)	Income level per capita, by mid-point of income bracket in the survey, normalized for composition of household according to OECD scale. Highest income: 3500€ month (net of taxes)	Continuous: Value in €	584.217	33669	482.588
employed	Equals 1 if currently employed	Dummy (1,0)	0.528	33669	0.499
retired	Equals 1 if retired	Dummy (1,0)	0.240	33669	0.427
prof1 - managers	Equals 1 if profession in ISCO-08 Managers category	Dummy (1,0)	0.019	33669	0.136
prof 2 - professionals	Equals 1 if ISCO-08 Professionals	Dummy (1,0)	0.048	33669	0.215
prof 3 - technicians and associated professionals	Equals 1 if ISCO-08 Technicians and associate professionals	Dummy (1,0)	0.054	33669	0.226
prof 4 - clerical support services	Equals 1 if ISCO-08 Clerical support services	Dummy (1,0)	0.056	33669	0.231
prof 5 - services and sales workers	Equals 1 if ISCO-08 Service and sales workers	Dummy (1,0)	0.078	33669	0.268
prof 6- skilled agriculture, forestry, fishery	Equals 1 if ISCO-08 Skilled agricultural, forestry and fishery workers	Dummy (1,0)	0.118	33669	0.323
prof 7 - craft and related trade	Equals 1 if ISCO-08 Craft and related trade workers	Dummy (1,0)	0.124	33669	0.329
prof 8 -plant and machine operators and assemblers	Equals 1 if ISCO-08 Plant and machine operators and assemblers	Dummy (1,0)	0.157	33669	0.364
prof 9 - elementary occupations	Equals 1 if ISCO-08 Elementary occupations	Dummy (1,0)	0.064	33669	0.244
prof 10 - armed forces	Equals 1 if ISCO-08 Armed forces	Dummy (1,0)	0.125	33669	0.331
prof 11 - other professions	Equals 1 if ISCO-08 other profession	Dummy (1,0)	0.156	33669	0.363
activity1 - agriculture or fishery	Equals 1 if working in economic sector of agriculture or fishery	Dummy (1,0)	0.219	33669	0.413
activity 2- industry	Equals 1 if Industry	Dummy (1,0)	0.123	33669	0.329
activity 3- construction	Equals 1 if Construction	Dummy (1,0)	0.118	33669	0.323
activity 4-commerce	Equals 1 if Commerce	Dummy (1,0)	0.089	33669	0.285
activity 5-restaurants and hotels	Equals 1 if Restaurants and Hotels	Dummy (1,0)	0.124	33669	0.329
activity 6-transportation and communications	Equals 1 if Transportation and Communications	Dummy (1,0)	0.052	33669	0.222

Table 2 (cont.2)

			Descriptive Statistics		
Name of variable	**Description**	**Type variable**	**mean**	**nr obs**	**st dev**
activity 7-education	Equals 1 if Education	Dummy (1,0)	0.034	33669	0.180
activity 8-home activities	Equals 1 if Home Activities	Dummy (1,0)	0.057	33669	0.232
activity 9-civil services and armed forced	Equals 1 if Civil Services and Armed Forces	Dummy (1,0)	0.036	33669	0.185
activity 10-health industry	Equals 1 if Health	Dummy (1,0)	0.071	33669	0.256
activity 11-other activities	Equals 1 if Other sectors of activity	Dummy (1,0)	0.037	33669	0.189

The last set of variables of key interest to our analysis relates to health (see Table 3 below). Despite that in Portugal the National Health Service is universal and (almost) free of charge for all residents, under their work contracts, individuals may benefit from coverage of an extra (additional) health system. In case of individuals working as civil servants or in a public institution (e.g., teacher in a public school or public university), they may have access to a public health subsystem. 15% of our sample has this type of subsystem. If working for the private sector, the hiring company may provide access to one of the private health subsystems. 3% in our sample have this subsystem. Finally, individuals may also opt to contract and additional voluntary health insurance – 7.6% in our sample.

Regarding the use of health care services, on average there was more than one visit to a doctor within the three months previous to the survey, and for 67.5% of the respondents their last medical appointment was to a GP rather than a specialist.

In terms of health preventive behaviors, more than 60% measured their cholesterol levels in the last year and more than 80% measured their blood pressure. On the side of risky behaviours, almost 80% do not smoke, and 3.4% have problems with drinking alcohol.

Regarding health status, we consider several different measures, with the first being a self-assessed health indicator ranking from 1 (very bad) till 5 (excellent). In our sample, the average subjective evaluation is above "reasonable". The limitations of using self-assessed health are well known. Nonetheless, it is a widely accessible and used outcome variable, with several papers in the literature establishing a link between self-assessed health and mortality or disease

prevalence (e.g., Massey and Shapiro, 1982; Kaplan and Camacho, 1983; Idler and Kasl, 1995; Smith, 2005). In any case, we complement the measurement of health status with two other measures: an index on chronic conditions and an index on mental health indicators. Both indicators are calculated using a principal component analysis.

Table 3 – Descriptive statistics of health related variables

			Descriptive Statistics		
Name of variable	**Description**	**Type variable**	**mean**	**nr obs**	**st dev**
voluntary health insurance	Equals 1 if coverage from voluntary health insurance	Dummy (1,0)	0.076	33610	0.264
public health subsystem	Equals 1 if coverage from public health subsystem	Dummy (1,0)	0.150	33669	0.357
private health subsystem	Equals 1 if coverage from private health subsystem	Dummy (1,0)	0.030	33669	0.171
out of pocket expenditures	Out of pocket payments in the past two weeks	Value in €	3.679	33601	23.350
visits to physicians	Nr of visits to the doctor in the past 3 months	0-30	1.118	33617	1.825
GP	Equals 1 if last visit in past 3 months was to a GP, 0 if to a specialist	Dummy (1,0)	.6750113	17656	.4683839
Emergency room	Equals 1 if last visit to a medical facility was emergency room, conditional on having a visit to a medical facility in past 3 months	Dummy (1,0)	.2342694	3846	.4235964
pharmaceutical	Equals 1 if consumed pharmaceutical products in the past 2 weeks	Dummy (1,0)	0.586	33640	0.493
Daily smoker	Equals 1 if daily smoker	Dummy (1,0)	0.186	33648	0.389
occasional smoker	Equals 1 if occasional smoker	Dummy (1,0)	0.022	33648	0.146
Non smoker	Equals 1 if does not smoke	Dummy (1,0)	0.792	33648	0.406
problems with alcohol	Equals 1 if answered yes to one of the following questions: felt the need to reduce alcohol consumption; felt problems because others criticized alcohol consumption; felt guilty about alcohol consumption	Dummy (1,0)	0.034	33669	0.181
preventive: blood pressure measure last year	Equals 1 if had blood pressure measured last year	Dummy (1,0)	0.804	8272	0.397
preventive: cholesterol measure last year	Equals 1 if had cholesterol measurement last year	Dummy (1,0)	0.637	8286	0.481
meals per day	Nr of regular meals per day	1-3	2.913	32277	0.311
Sick to work	Equals 1 if did not work in past 3 months due to sickness	Dummy (1,0)	0.024	33669	0.154
self assessed health	self-reported health	1 (very bad) – 5 (excellent)	3.213	23203	0.943

Table 3 (cont.)

			Descriptive Statistics		
Name of variable	**Description**	**Type variable**	**mean**	**nr obs**	**st dev**
mental score	principal component from a set of questions related to mental health: nervousness, depression, feeling of calm and relax, sadness and hopeless, happiness.	Continuous	-0.027	23201	1.843
Score chronic conditions	principal component from a set of 19 chronic conditions: osteoarthritis, osteoporosis, glaucoma, retinopathy, cancer, stones in kidney, kidney failure, chronic anxiety, chronic wounds (with scabs) or leg ulcers, emphysema, stroke, obesity, major depression, heart attack, diabetes, asthma, chronic pain, high blood pressure, and other chronic conditions	Continuous	-0.000000003	33516	1.534

In the Annex, we present the descriptive statistics of these variables but disaggregated by country of origin (Table 22 till Table 29), as well as the linear correlation between the migration variables and the remaining ones (Table 31). From this, we observe that self-assessed health is negatively correlated with being born in Portugal, while positive correlated with being born outside. If we consider the chronic conditions index, *chronic score*, the conclusion is more mixed, with a positive correlation only with being born in Portugal or African countries different from PALOPs, and negative for the remaining ones. On the side of mental health indicators, there is a negative correlation with being born in Portugal or in a PALOP country, and positive with remaining countries. These initial explorations indicate that there may be a HIE for immigrants of different origins.

In terms of using health services, there seems to be a negative correlation between being born in Portugal or Brazil and having voluntary health insurance, and a positive correlation between being born in Portugal or non-PALOPs African countries and the number of recent visits to doctors.

Despite the interest of this initial descriptive analysis of the data, we shall not consider it as very solid evidence for any of the effects we are trying to analyse in this study, since none of the measures controls for the heterogeneity of respondents' characteristics. In the following section we present a more sound econometric approach to conduct our analysis, and we present the main estimation results.

5. Econometric analysis

As explained, we look for empirical evidence on several unknowns in health-migration questions. The first of the queries relates to identifying whether there are significant differences in the health outcomes of immigrants relative to natives in a country, as Portugal, which is not only developed but also has a public National Health Service available for all residents. For this analysis, we look at several different measures of health status: self-assessed health, chronic conditions of migrants, and how migrants score in terms of mental health indicators.

The second dimension that we study relates to the use of health care services in the three months prior to the survey. In particular, we look at the number of visits to doctors, whether the last visit was to a GP or to a specialist, and whether the last medical visit was to an emergency room facility.

The third aspect of the analysis focuses in immigrants' lifestyle, both preventive and risky health behaviors. The fourth dimension of comparison between immigrants and natives highlights health coverage in terms of contracting an additional voluntary health insurance, and out-of-pocket health expenditures in a recent past.

Last, and for the same health dimensions, we conclude on emigrants' health performance and health usage, in comparison with natives who never had resided outside the country.

For each question, we present and use the most appropriate regression technique. This means that, depending on the query we may apply different econometric approaches: i) a probit, when the outcome of interest is the probability of a certain health-related variable (if the dependent variable is dichotomous we use a binary probit, if it has several discrete values with an implicit ordering we use a ordered probit);[8] ii) a linear regression, when the dependent variable is continuous as in the case of the mental health score; iii) a zero inflated negative binomial to study the demand for visits to doctors, given that the process explaining a zero number of visits may be different from the one related with the intensity of visits; iv) and a tobit regression, when

[8] Estimation of a logit model, which puts more probability weight on the tails of the distribution gives essentially the same results.

the dependent variable is continuous but non-negative, as in the case of out-of-pocket expenditures.[9]

Health status of immigrants

In comparing the health status of immigrants and natives in other hosts countries, some conclude that immigrants tend to be healthier (e.g., Antecol and Bedard, 2005; Fennelly, 2005; Kennedy et al., 2006). In this section, we test for the presence of such a *healthy immigrant effect* in Portugal.

Since our data is from the host country, we do not address the selectivity issue, which would require information on the origin country.

Physical health

Our first piece of evidence is an ordered probit analysis of the self-assessed health status. In a naive approach, presented in Table 4, we only control for the immigration experience of the individuals. After, we take into account differences in several other observable characteristics. Several interaction terms are also included, namely in terms of gender differences. This more complete analysis is shown in Table 5.

Table 4 – Self assessed health, controlling only for immigration

	ordered probit regression		ordered probit regression	
	nr observ	23203	nr observ	23203
	self assessed health= 1 very bad, 5 excellent		**self assessed health= 1 very bad, 5 excellent**	
	Coef.	P>|z|	Coef.	P>|z|
immigrant (birth)	0.4931262***	0	..	..
years of residence (<=10)	-0.0853989***	0	-0.0818111***	0
PALOPs (birth)	..	..	0.2810802***	0
other African (birth)	..	..	0.7971794***	0
Brazil (birth)	..	..	0.5514451***	0
other LAC (birth)	..	..	0.7582281***	0
Eastern Europe (birth)	..	..	0.5066672***	0.001
other countries (birth)	..	..	0.6418072***	0
EU15 (birth)	..	..	0.59537***	0
other developed (birth)	..	..	0.946507***	0

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%.
The reference group is formed by individuals born in Portugal.

[9] On the methodological issues associated with the several regression models see, for example, Wooldridge (2002).

From this first estimations, whether we consider all immigrants as a unique group, *imm_birth*, or we disaggregate them by country of birth, the evidence favours the conclusion of a *HIE*, i.e., residents in Portugal who were born outside the country are healthier than natives.

We analyse here the convergence effect by using the information on how many years the individuals lived in Portugal. Given the negative coefficient associated with this variable, this means that more recent immigrants have better health than past ones. This is consistent with a convergence effect over time of immigrants' average health status towards natives'. Nevertheless, some caution must be taken on the strength of this conclusion, since our data is cross-sectional. In fact, the effect relies heavily on recent immigrants from Brazil and Eastern Europe, who are healthier than the existing population.[10] On this account, since the pattern of immigration has changed considerably over the last decade, namely in terms of origin, we can actually question the interpretation in terms of the convergence hypothesis.

When we control for the observable characteristics of individuals, the *HIE* seems to maintain, but this time only for a reduced set of countries of origin. As shown in Table 5 below, only immigrants from developed countries (EU15 or other developed) are more likely to report a better health than natives. All the remaining immigrants do not show significant differences in their assessment of their own health.

Women in EU15, do not exhibit a higher probability of being healthier, and actually their health status is more likely to be worse than natives.

[10] Removing the variable "years_residence" from the analysis, results in statistically significant and positive coefficients associated immigrants from Brazil and Eastern Europe.

Table 5 – Self assessed health with complete set of controls

	ordered probit regression	
	nr observ	19033
	self assessed health= 1 very bad, 5 excellent	
	Coef.	P>|z|
PALOPs (birth)	-0.149942	0.145
other African (birth)	0.3850416	0.255
Brazil (birth)	0.1010615	0.577
other LAC (birth)	0.1554373	0.629
Eastern Europe (birth)	0.1080552	0.562
other countries (birth)	-0.0541257	0.854
EU15 (birth)	0.4308514***	0.002
other developed (birth)	0.7169699**	0.011
emigrant	-0.0688605***	0.005
years residence(<=10)	-0.0844026***	0
nr members in household	0.011647*	0.085
female	-0.4454681***	0
age (adults only)	-0.0400966***	0
age squared	0.0001865***	0
bmi	-0.0173569***	0
school level2 (1st basic)	-0.6692453***	0
school level3 (2nd basic)	-0.496686***	0
school level4 (3rd basic)	-0.4239765***	0
school level5 (high school)	-0.3313091***	0.001
school level6 (pos high school)	-0.3227006**	0.029
school level7 (BSc)	-0.3965186***	0
school level8 (Undergrad-Licenciatura)	-0.2849792***	0.004
married	-0.0572908**	0.041
divorced	-0.0072397	0.864
widow	0.0023535	0.955
income pcapita (in household)	0.0002245***	0
employed	0.194074***	0
retired	-0.2292069***	0
sick to work	-1.205382***	0
activity1 - agriculture or fishery	-0.0302588	0.529
activity 2- industry	-0.2773394***	0
activity 3- construction	-0.1902246***	0
activity 4-commerce	-0.152956***	0.003
activity 5-restaurants and hotels	-0.0298652	0.516
activity 6-transportation and communications	-0.1006947*	0.059
activity 7-education	-0.1063547*	0.059
activity 8-home activities	-0.0560338	0.303
activity 9-civil services and armed forced	-0.132314**	0.029
activity 10-health industry	-0.0664199	0.212
activity 11-other activities	-0.0166926	0.767
public health susbsystem	0.0187285	0.537
private health subsystem	0.0366857	0.438
daily_smoker	-0.0013156	0.953
occasional smoker	-0.0161524	0.76
meals per day	0.0740166***	0.003
problems with alcohol	-0.1731401***	0
women * age	-0.0009721	0.384
women * schooling	0.0173616***	0
women * PALOPs	0.1190369	0.372
women * other African	-0.0290081	0.947
women * Brazil	-0.1255027	0.54
women * other LAC	-0.0670612	0.86
women * East Europe	-0.4910798**	0.029
women * other countries	0.4518858	0.233
women * EU15	-0.4084677**	0.016
women * other developed	-0.3406475	0.356

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%. Reference groups are individuals with the following characteristics: born in Portugal, who never migrated, male, with no schooling, a master or a PhD, single, unemployed, who did not miss work due to sickness in the past 3 months, who do not smoke, who do not have problems with alcohol.

Additionally, when we estimate a similar ordered probit regression with the complete set of controls, but for two separated sub-samples defined by age groups, 18 – 45 years and 46 – 75,[11] the health advantage of immigrants only persists for the older sub-sample and immigrants from EU15.

An alternative and more objective measure of health status takes into account the existence of chronic conditions. For that, we define a dichotomous variable, *HS2*, taking value 1 if at most two chronic conditions are present, and 0 if more than two conditions (a higher value means a better health status). The association of immigrant status with presence of chronic conditions is done by estimation of a probit model and the results are in Table 32 in the Annex.

In the case of chronic conditions, the results provide some support of the HIE hypothesis, but again this is not common to all immigrant groups. Immigrants originating from Africa but non-PALOPs appear to have better health status than Portuguese-born residents, and the same is true for immigrants from Eastern European and developed-non-EU15 countries. In the same estimation related with chronic conditions, the variable reflecting the time of immigration in the host country (provided it is below a decade) has a negative coefficient. Since one of the main origins of recent immigrants has been Eastern Europe, the results may be capturing a cohort effect.

Regarding the analysis of the remaining socio-economic and behavioural characteristics of individuals, the results are broadly consistent between the estimations based on self-assessed health and chronic conditions. These conclusions point to patterns already seen for other countries (e.g., Chiswick et al., 2006; Hernandez-Quevedo and Jimenez-Rubio, 2008; Fonseca et al., 2007): women, older, retired, or people with risky alcoholic behaviours have a higher probability of a worse health status; while a higher income or being employed is associated with better health.

An additional significant result obtained is the role of job occupation. In fact, the evidence seems to show that individuals working in the construction sector have a lower probability of better health status. This outcome is of particular concern if migrants tend to take lower skilled jobs, which in many cases belong to this specific economic sector.

[11] The definition of the age groups is similar to the one in Lu (2007), for comparability purposes.

Mental health

The second set of results on health status corresponds to the mental health indicator. In this case we use a simple OLS regression.

As before, we initially consider a naïve estimation controlling only for immigration status and years of residence in the country (Table 6). In this case, immigrants as a group seem to have an advantage in mental health indicators compared to natives, but when we disaggregate by countries of origin, this advantage is not significant for natives of Brazil or Eastern Europe.

Table 6 – Mental health indicator, controlling only for immigration

	OLS regression		OLS regression	
	nr observ	23201	nr observ	23201
	mental score		**mental score**	
	Coef.	P>|t|	Coef.	P>|t|
immigrant (birth)	0.375586***	0	..	..
years of residence (<=10)	-0.0186865	0.363	-0.0394596	0.175
PALOPs (birth)	..	..	0.1966029*	0.065
other African (birth)	..	..	0.6265414*	0.072
Brazil (birth)	..	..	0.3357445	0.132
other LAC (birth)	..	..	0.5533873*	0.052
Eastern Europe (birth)	..	..	0.030087	0.903
other countries (birth)	..	..	0.9598559***	0.002
EU15 (birth)	..	..	0.4341185***	0.001
other developed (birth)	..	..	0.7142274**	0.015
constant	0.144303	0.483	0.3520346	0.227

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%.
The reference group is formed by individuals born in Portugal.

When we introduce the remaining set of individuals' observable characteristics as explanatory variables, the conclusions are somewhat different. As displayed in Table 7 below, immigrants from PALOPs and Eastern European countries seem to have a health experience that is opposite to the one from developed non-EU15 countries. While the first two groups show evidence of a worse score in mental health-related symptoms, the latter seem associated with a better score. These patterns of mental health scores, differing between immigrants coming from developing and developed countries, may be a symptom that migrating from less developed countries can be a more stressful experience.

In the literature, there is an argument that better mental health scores for immigrants can be associated with the economic gains of migration (e.g., Stillman et al., 2007). In order to assess whether a similar conclusion can be drawn from our results, Figure 7 below presents a second set of estimations, including two additional regressors that interact immigration status with income and being employed. In our case, the results are also consistent with the fact that immigrants with higher income have better mental health score, but the coefficient is very small (despite of significant and positive).

Some of the remaining effects are according to what has been found in other studies (e.g., Booth and Carroll, 2005): being married, with higher income, or employed are associated with better mental health; while being divorced, widowed, or being a daily smoker is linked with a worse mental score.

Table 7 – Mental health indicator, with complete set of controls

	OLS regression		OLS regression	
	nr observ	19032	nr observ	19032
	mental score		**mental score**	
	Coef.	P>|t|	Coef.	P>|t|
PALOPs (birth)	-0.2217184*	0.092	-0.3649674**	0.043
other African (birth)	0.4627908	0.106	0.1886345	0.535
Brazil (birth)	-0.1186601	0.571	-0.2774718	0.268
other LAC (birth)	0.0586797	0.905	0.0220461	0.966
Eastern Europe (birth)	-0.6871207***	0.002	-0.7972528***	0.003
other countries (birth)	0.132274	0.693	-0.0737004	0.829
EU15 (birth)	0.1518758	0.323	-0.0466285	0.806
other developed (birth)	0.4828756**	0.048	0.3063097	0.267
emigrant	0.0788705**	0.044	0.0788947**	0.044
years residence(<=10)	-0.0356584	0.127	-0.0442849*	0.06
nr members in household	0.027972***	0.008	0.027975***	0.008
female	-1.062975***	0	-1.059163***	0
age (adults only)	-0.0463731***	0	-0.0463256***	0
age squared	0.0004021***	0	0.0004015***	0
bmi	0.0027943	0.363	0.0027902	0.363
school level2 (1st basic)	-0.0570566	0.641	-0.0539626	0.659
school level3 (2nd basic)	0.0728464	0.545	0.0783293	0.515
school level4 (3rd basic)	0.1290671	0.269	0.1369618	0.241
school level5 (high school)	0.2264546**	0.048	0.2343721**	0.041
school level6 (pos high school)	0.3110703*	0.085	0.3163883*	0.082
school level7 (BSc)	0.1301254	0.308	0.140735	0.27
school level8 (Undergrad-Licenciatura)	0.0909322	0.41	0.0988152	0.371
married	0.0776938*	0.062	0.0767086*	0.065
divorced	-0.3156178***	0	-0.3168998***	0
widow	-0.3922513***	0	-0.3932029***	0
income pcapita (in household)	0.0002544***	0	0.0002411***	0
employed	0.3281859***	0	0.3335153***	0
retired	-0.0975334*	0.096	-0.0934136	0.111
sick to work	-1.148964***	0	-1.149096***	0
activity1 - agriculture or fishery	0.175284**	0.012	0.1764089**	0.011
activity 2- industry	-0.0272719	0.713	-0.0287627	0.698
activity 3- construction	-0.0379061	0.573	-0.0376227	0.576
activity 4-commerce	-0.0824297	0.265	-0.0816178	0.269
activity 5-restaurants and hotels	0.0744638	0.251	0.0756028	0.243
activity 6-transportation and communications	0.0554431	0.475	0.0574884	0.458
activity 7-education	0.0095008	0.908	0.0108196	0.895
activity 8-home activities	0.0926207	0.229	0.0921297	0.232
activity 9-civil services and armed forced	-0.0445906	0.644	-0.0450539	0.64
activity 10-health industry	0.1761529**	0.018	0.1751943**	0.019
activity 11-other activities	0.1516531*	0.061	0.1484153*	0.067
public health susbsystem	-0.0155794	0.73	-0.0128249	0.776
private health subsystem	0.0517513	0.449	0.0517771	0.447
daily smoker	-0.2015999***	0	-0.2023379***	0
occasional smoker	-0.1042822	0.161	-0.105642	0.156
meals per day	0.2971833***	0	0.2968505***	0
problems with alcohol	-0.0847985	0.119	-0.0850266	0.119
women * age	-0.000651	0.692	-0.0006573	0.689
women * schooling	0.0411007***	0	0.0406504***	0
women * PALOPs	0.2855806	0.123	0.305879*	0.098
women * other African	-0.485281	0.281	-0.4005018	0.373
women * Brazil	-0.0189675	0.948	-0.0384066	0.896
women * other LAC	-0.0121286	0.984	-0.1294979	0.829
women * East Europe	0.2907196	0.297	0.257257	0.352
women * other countries	0.6069057	0.166	0.6281039	0.133
women * EU15	-0.0675822	0.749	-0.0165185	0.938
women * other developed	-0.3913266	0.314	-0.3204584	0.41
immigrant * income	..	..	0.000303***	0.007
immigrant * employed	..	..	-0.0986481	0.444
constant	0.7287875**	0.021	0.8148986***	0.01

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%. Reference groups are individuals with the following characteristics: born in Portugal, who never migrated, male, with no schooling, a master or a PhD, single, unemployed, who did not miss work due to sickness in the past 3 months, who do not smoke, who do not have problems with alcohol.

Use of health care services

Visits to the doctor

The use of health care services, namely visits to physicians, can be addressed in a two-part model: a zero-inflated negative binomial. This type of model is a powerful technique when the data is over-dispersed, there is an excess of zeros and the theoretical assumption of two different processes to generate the date – one for the *zeros* and the other for the positive values of the outcome. In our setting, the two different processes of the model correspond to a situation where, first, the patient initiates the first contact (which explains the *zeros* and may be interpreted as a symptom of additional barriers in access) and, second, the decisions of the physician determine the subsequent visits (positive number of the outcome).

As before, we start by presenting the estimation only explained by the immigration status of the individuals and the number of years they are residents in Portugal (Table 8). From this set of results we obtain that immigrants, as a whole, are more likely than natives to have zero visits. When we disaggregate by country of origin, however, this effect disappears and no significant difference – comparing with natives – is detected.

Regarding the intensity of visits, conditional on having at least one, immigrants as a group are not significantly different from natives. When considering separate origins, Eastern Europeans tend to have smaller number of visits, while those coming from developed-non-EU15 countries are more likely to have higher number of visits.

Table 8 - Visits to physicians, controlling only for immigration

	Zero-inflated negative binomial regression		Zero-inflated negative binomial regression	
	nr observ	17834	nr observ	17834
	nr visits to the doctor past 3 months		**nr visits to the doctor past 3 months**	
visits	Coef.	P>|z|	Coef.	P>|z|
immigrant (birth)	-0.1104271	-1.84	..	..
years of residence (<=10)	..	..	-0.0044095	0.948
PALOPs (birth)	..	..	-0.0627067	0.842
other African (birth)	..	..	0.0460766	0.778
Brazil (birth)	..	..	-0.0241831	0.927
other LAC (birth)	..	..	0.1538947	0.512
Eastern Europe (birth)	..	..	-0.4202497**	0.041
other countries (birth)	..	..	-0.278705***	0.001
EU15 (birth)	..	..	-0.3835455	0.261
other developed (birth)	0.1209204	15.4	0.1209204***	0
inflate zeros	nr observ	15783	nr observ	15783
immigrant (birth)	21.27527***	0.01	..	..
years of residence (<=10)	..	..	0.8186223	1.000
PALOPs (birth)	..	..	30.97838	1.000
other African (birth)	..	..	31.25796	1.000
Brazil (birth)	..	..	32.18222	1.000
other LAC (birth)	..	..	32.78768	1.000
Eastern Europe (birth)	..	..	13.3661	1.000
other countries (birth)	..	..	18.63074	1.000
EU15 (birth)	..	..	30.97268	1.000
other developed (birth)	-23.086***	-0.01	-32.31842	1.000

Vuong test of zinb vs. standard negative binomial: z = 1.28 Pr>z = 0.0997

Vuong test of zinb vs. standard negative binomial: z = 1.48 Pr>z = 0.0699

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%.
The reference group is formed by individuals born in Portugal.

Making a more complete analysis and trying to avoid the undesirable effects of omitted variables, we extend the set of explanatory variables. For that, we consider that the major factors influencing the access to care (the *zeros*) are: income, additional health insurance coverage (be it a public or a private subsystem), age, country of birth and years of residence in the country if born outside Portugal. After the initial visit, random sickness episodes, eventually associated with individual risk factors, determine the intensity of visits to physicians. Again, we distinguish immigrants according to the country (or set of countries) of origin.

The results in Table 9 below show some interesting features:

- First, immigrants do not have significant differences in the access to visits to a physician, compared with natives;
- Second, being a resident for longer periods of time seems to be associated with a higher probability of having at least one visit to the doctor. This can be a symptom that, over time, individuals learn about the function of the system and tend to use it more;
- Third, when individuals visit a physician, there is no evidence that immigrants do it in a more intensive way than natives, except for the case of Eastern Europeans. However, migrant women from Eastern Europe tend to do it less intensively.

Regarding the remaining features: older individuals have a higher probability of going to the doctor and, on average, do it in a more intense way; retired people and women, when they go to the doctor, tend to do it more often; employed people, on the other hand, visit a doctor less than unemployed people.

Table 9 – Visits to physicians, with complete set of controls

	Zero-inflated negative binomial regression	
	nr observ	14209
	nr visits to the doctor past 3 months	
visits	Coef.	P>|z|
PALOPs (birth)	0.0352016	0.747
other African (birth)	0.0058239	0.988
Brazil (birth)	0.2173404	0.327
other LAC (birth)	0.0061019	0.983
Eastern Europe (birth)	0.8742247**	0.046
other countries (birth)	-0.116385	0.691
EU15 (birth)	-0.1917401	0.177
other developed (birth)	0.1243979	0.738
emigrant	0.0038774	0.877
years residence(<=10)	0.0296634	0.377
nr members in household	-0.0524076***	0
female	0.7849925***	0
age (adults only)	-0.0097269**	0.012
age squared	0.0001178***	0.001
bmi	-0.0002359	0.902
school level2 (1st basic)	-0.2706589***	0.008
school level3 (2nd basic)	-0.2933283***	0.004
school level4 (3rd basic)	-0.2167139**	0.029
school level5 (high school)	-0.2511653***	0.01
school level6 (pos high school)	-0.3453008**	0.022
school level7 (BSc)	-0.1982986*	0.064
school level8 (Undergrad-Licenciatura)	-0.1825377*	0.058
married	0.2238937***	0
divorced	0.1709921***	0
widow	0.1695183***	0
income pcapita (in household)	-1.28E-06	0.952
employed	-0.0606175**	0.034
retired	0.1492385***	0
sick to work	0.8082562***	0
activity1 - agriculture or fishery	-0.0179333	0.708
activity 2- industry	-0.0431644	0.397
activity 3- construction	0.10504**	0.024
activity 4-commerce	0.0089803	0.863
activity 5-restaurants and hotels	-0.0033628	0.942
activity 6-transportation and communications	-0.0543356	0.315
activity 7-education	0.051262	0.355
activity 8-home activities	0.0449834	0.408
activity 9-civil services and armed forced	-0.0246056	0.694
activity 10-health industry	0.0426461	0.421
activity 11-other activities	-0.0299224	0.597
public health susbsystem	-0.0204469	0.534
private health subsystem	0.1780797***	0
daily smoker	-0.0644231***	0.005
occasional smoker	0.0645336	0.242
meals per day	0.0781341***	0.003
problems with alcohol	0.0609597	0.155
score chronic conditions	0.2592321***	0
women * age	-0.0113097***	0
women * schooling	-0.0018357	0.679
women * PALOPs	0.0626021	0.651
women * other African	-0.1235373	0.775
women * Brazil	0.0714715	0.759
women * other LAC	-0.3184985	0.334
women * East Europe	-0.794881**	0.031
women * other countries	-0.0275399	0.943
women * EU15	0.1113467	0.516
women * other developed	-0.3208682	0.501
constant	-0.2357752	0.524
inflate zeros	nr observ	13569
PALOPs (birth)	-2.235797	0.256
other African (birth)	0.6366154	0.842
Brazil (birth)	-2.32573	0.288
other LAC (birth)	0.4466403	0.744
Eastern Europe (birth)	0.2291399	0.901
other countries (birth)	-1.359542	0.607
EU15 (birth)	-0.8075809	0.364
other developed (birth)	1.371844	0.131
years residence(<=10)	-0.4535344*	0.073
age	-0.0935583***	0
income	-0.0012313*	0.061
public health susbsystem	-1.197528	0.161
private health subsystem	0.0650831	0.903
constant	5.69416**	0.033

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%.

To complement the analysis, we take a non-parametric approach. Conditional on each household income bracket, we compare the number of visits to the doctor of immigrants and natives using a matching estimator. The "treatment" is the immigrant status. In our procedure, matching involves finding the three closest individuals in the control group (Portuguese-born individuals) to each observation in the treatment group (immigrants). Table 10 reports the average treatment effect on the treated (immigrants).

Effects are reported for the main groups of immigrants and by monthly household income range. These show that, for similar characteristics, immigrants from Africa with smaller incomes (0-500€ for all African immigrants, and 501-700€ for non-PALOPs immigrants) have higher number of visits to a physician, compared with natives. For all the remaining poorer immigrants, they seem to have a similar pattern of visits to the doctor compared to natives. Regarding immigrants from Brazil, other Latin American countries, and Eastern Europe the major finding is that a smaller amount use health care at upper income ranges of monthly household income (generally, above 1200€).

Table 10 - Matching estimators for visits to the doctor, average treatment effect on the treated

income bracket \ immigrants	PALOPs_ country of birth	other African_ country of birth	Brazil_ country of birth	other LAC_ country of birth	Eastern Europe_ country of birth	other countries_ country of birth	EU15_ country of birth	other developed_ country of birth
0-500 euros	0.6850388*	2.505051**	-0.024153	0.5827157	-0.3124092	-0.2751145	0.1114009	0.2940183
P>|z|	[0.083]	[0.046]	[0.941]	[0.128]	[0.23]	[0.268]	[0.596]	[0.588]
501-700 euros	-0.0328099	0.36***	-0.2034379	-0.2278525	0.5723398	-1.3991	-0.0734573	-0.658825***
P>|z|	[0.921]	[0]	[0.224]	[0.481]	[0.589]	[0.114]	[0.775]	[0.009]
701-900 euros	-0.0964661	-0.0191873	0.7935807	-0.486027	-0.2688127	-0.288194	0.1729207	-0.6870789
P>|z|	[0.582]	[0.964]	[0.152]	[0.144]	[0.173]	[0.415]	[0.532]	[0.474]
901-1200 euros	-0.1408042	2.121851***	0.0679673	-0.0582441	-0.1542473	-0.4312098	-0.1271336	0.6928002**
P>|z|	[0.5]	[0.001]	[0.803]	[0.815]	[0.46]	[0.392]	[0.496]	[0.035]
1201-1500 euros	0.1672618	0.3169898	-0.8087019***	0.1377549	-0.6754208	-0.2670949	-0.3943274**	-0.4538245
P>|z|	[0.377]	[0.645]	[0.001]	[0.673]	[0.217]	[0.765]	[0.047]	[0.306]
1501-2000 euros	0.1555777	0.2784325	1.026495	0.1090749	-0.3918887**	0.3097237	-0.2771513	1.107711
P>|z|	[0.527]	[0.677]	[0.172]	[0.685]	[0.02]	[0.394]	[0.148]	[0.135]
above 2000 euros	0.0351823	-0.0864523	0.1717591	-0.5090478*	-0.6646562	-0.3366472	0.0247745	-0.4084119**
P>|z|	[0.91]	[0.817]	[0.429]	[0.092]	[0.207]	[0.251]	[0.905]	[0.049]

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%.
The reference group is formed by individuals born in Portugal.

General practitioners vs. specialists, and use of emergency room services

Table 11 shows the estimation of a probit regression for the relative access to GPs and specialists, and for using emergency room facilities, conditional in having at least one visit to a doctor on the past three months prior to the survey.[12]

Table 11 – Visits to a GP or to a specialist, and use of emergency room facility, controlling only for immigration

	probit regression		probit regression		probit regression		probit regression	
	nr observ	17656	nr observ	17656	nr observ	3846	nr observ	3846
	GP=1 if last visit to GP, 0 if specialist		GP=1 if last visit to GP, 0 if specialist		Emergency=1 if last visit was to emergency room, 0 otherwise		Emergency=1 if last visit was to emergency room, 0 otherwise	
	Coef.	P>|z|	Coef.	P>|z|	Coef.	P>|z|	Coef.	P>|z|
immigrant (birth)	-0.1843406***	0.002	..	..	0.0496	0.711	..	..
years of residence (<=10)	-0.048232**	0.036	-0.0846728***	0.008	0.0234	0.716	0.0689	0.605
PALOPs (birth)	..	..	-0.0974	0.264	..	..	0.0944	0.856
other African (birth)	..	..	-0.3478	0.218	..	..	-0.1157247*	0.063
Brazil (birth)	..	..	-0.5493089***	0.006	..	..	0.9050	0.325
other LAC (birth)	..	..	-0.2040	0.398	..	..	0.4507	0.823
Eastern Europe (birth)	..	..	-0.4028	0.156	..	..	0.1629	0.747
other countries (birth)	..	..	-0.2593	0.291	..	..	-0.1983	0.254
EU15 (birth)	..	..	-0.1813506*	0.085	..	..	-0.3360	0.693
other developed (birth)	..	..	-0.3664	0.196	..	..	0.2952	0.345
constant	0.9405319***	0	1.30494***	0	-0.9597	0.135	-1.414561*	0.053

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%. The reference group is formed by individuals born in Portugal.

When the only explanatory variables are the countries of origin, immigrants as a whole are less likely to visit a GP (more likely to visit a specialist) and there is no significant difference with natives in using an emergency room. When we disaggregate immigrants by origin, the only significant differences come from Brazilian and EU15 immigrants, who are less likely to visit a GP, and African-non PALOPs who tend to visit less emergency room facilities.

Taking into consideration the more complete set of controls (Table 12), we do not find a significant effect associated with immigration status. The only exception is for women from Brazil, who are less likely to see a GP than all others, but statistically the effect is only significant at the 10% level.

Thus, overall, access to specialists vs. GPs does not differ according to country of birth or nationality. Any different access that may exist is due to other characteristics. In particular a higher probability of visiting a specialist occurs when: there is coverage by additional public health subsystem, income is higher, individuals are older, or they reside in the country for longer time.

[12] Due to survey design, here we consider the last visit made to the doctor.

In a related work, Dias et al. (2008) surveyed immigrants on the use of the National Health Service, making a broad distinction between hospitals and primary care centers. Our results are broadly in line with theirs. Dias et al. found that length of stay in the country, years of education and being employed have a positive gradient on the use of health care provided by the National Health Service. Nonetheless, since only immigrants were inquired, the authors cannot make statements on whether, or not, immigrants behave differently or have different access/utilization relative to natives. With our dataset, we fill this gap.

Table 12 – Visits to a GP or to a specialist, and use of emergency room facility, with complete set of controls (only controls for which coefficients are significant)

	probit regression		probit regression	
	nr observ	14135	nr observ	2873
	GP=1 if last visit to GP, 0 if specialist		**Emergency=1 if last visit to emergency room, 0 otherwise**	
	Coef.	P>|z|	Coef.	P>|z|
PALOPs (birth)	0.0239033	0.873	0.1026567	0.772
other African (birth)	-0.0757772	0.863	0.4838501	0.598
Brazil (birth)	0.032316	0.913	0.8799369	0.185
other LAC (birth)	0.1490594	0.691	0.3574371	0.588
Eastern Europe (birth)	-0.0796917	0.845	-4.717824***	0
other countries (birth)	0.1369007	0.728	0.3654506	0.625
EU15 (birth)	-0.1440062	0.448	-0.3452403	0.46
other developed (birth)	-0.3369267	0.413	0.0392298	0.957
emigrant	0.0415556	0.244	0.0540094	0.515
years residence(<=10)	-0.0750376**	0.028	0.1081322	0.243
nr members in household	-0.024489**	0.014	0.0270691	0.257
age (adults only)	-0.0144755***	0.004	-0.0547771***	0
age squared	0.0001375***	0.003	0.0004769***	0
school level2 (1st basic)	0.5540937***	0	5.200499***	0
school level3 (2nd basic)	0.3883966***	0.004	5.331136***	0
school level4 (3rd basic)	0.4128169***	0.002	5.161037***	0
school level5 (high school)	0.3174581**	0.016	4.959273***	0
school level6 (pos high school)	0.3288672*	0.095	4.566342***	0
school level7 (BSc)	0.0872641	0.544	5.030244***	0
school level8 (Undergrad-Licenciatura)	0.1692727	0.189	5.023789***	0
widow	0.1334189**	0.025	-0.0010331	0.994
income pcapita (in household)	-0.0002215***	0	-0.0001506**	0.038
retired	-0.1071198**	0.028	-0.0928879	0.413
sick to work	-0.4823945***	0	-0.3375948**	0.021
activity1 - agriculture or fishery	-0.0122377	0.847	0.3234024*	0.061
activity 2- industry	0.2883625***	0	0.2897582	0.109
activity 6-transportation and communications	0.0901013	0.213	0.3069444*	0.096
activity 8-home activities	0.2768731***	0	0.330894*	0.083
activity 10-health industry	0.2019518***	0.004	0.1717735	0.37
public health subsystem	-0.2173489***	0	-0.0393133	0.703
women * schooling	-0.0160876***	0.006	0.0015553	0.921
women * Brazil	-0.6074855**	0.066		
constant	1.239997***	0.002	-5.897204	.

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%. Reference groups are individuals with the following characteristics: born in Portugal, who never migrated, male, with no schooling, a master or a PhD, single, unemployed, who did not miss work due to sickness in the past 3 months, who do not smoke, who do not have problems with alcohol. Standard errors are clustered at the household level.

Some studies find that immigrants tend to use emergency room service more often, perhaps due to lack of knowledge of the health system in the host country (e.g., Muñoz de Buston and Antón, 2009). We assess this effect in our sample, estimating the probability that an individual goes to an emergency care provider (either at the hospital or at the primary care centre), conditional on a positive demand for care. The right-hand side of Table 12 reports the results. Overall, there is no evidence that immigrants use emergency care more often than natives, once all other

characteristics are taken into account. The only significant immigrant effect is associated with Eastern European origin, but even in this case the result is the opposite of what is expected – they are less likely to use emergency rooms. This may either be a symptom of some barriers in access or simply less need of health care (as we reported above, immigrants from Eastern Europe are more likely to have fewer chronic conditions).[13]

Lifestyles

Preventive health care

To analyse the active preventive dimension, we use questions about measuring blood pressure and cholesterol assessment, in the year prior to the survey. In econometric terms, we use a probit regression.

Considering a naïve approach and only controlling for the country of birth, the only significant difference between immigrants and natives comes from Eastern European origin (Table 13). Those residents are, on average, more likely to have had a preventive health behavior, both in terms of blood pressure and cholesterol.

Table 13 – Preventive health behavior, controlling only for immigration experience

	probit regression		probit regression		probit regression		probit regression	
	nr observ	8272	nr observ	8272	nr observ	8286	nr observ	8286
	prevention_hypert=1 if measured blood pressure in last year, 0 otherwise		prevention_hypert=1 if measured blood pressure in last year, 0 otherwise		prevention_cholest=1 if measured cholesterol in last year, 0 otherwise		prevention_cholest=1 if measured cholesterol in last year, 0 otherwise	
	Coef.	P>|z|	Coef.	P>|z|	Coef.	P>|z|	Coef.	P>|z|
immigrant (birth)	-0.1002693	0.256	..	..	-0.0951071	0.237	..	..
years of residence (<=10)	0.1289141***	0	0.2182783***	0	0.1069312***	0	0.1526238***	0
PALOPs (birth)	..	..	0.0330635	0.819	..	..	-0.0306062	0.811
other African (birth)	..	..	-0.0123446	0.974	..	..	0.0510495	0.883
Brazil (birth)	..	..	0.4206168	0.207	..	..	-0.0489975	0.859
other LAC (birth)	..	..	-0.4028252	0.123	..	..	-0.1092192	0.667
Eastern Europe (birth)	..	..	0.8485376***	0.01	..	..	0.5459913*	0.075
other countries (birth)	..	..	0.1320632	0.712	..	..	0.4056033	0.225
EU15 (birth)	..	..	-0.2077398	0.147	..	..	-0.2661131**	0.048
other developed (birth)	..	..	-0.6155583	0.114	..	..	-0.3998871	0.295
constant	-0.4186173	0.101	-1.312259***	0.002	-0.7067453***	0.006	-1.163672***	0.003

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%. The reference group is formed by individuals born in Portugal.

When we conduct a more solid analysis and control for the individual characteristics, the results associated with migration are somewhat similar. As shown in Table 14, immigrants from Eastern Europe are still more likely, on average, to have measured blood pressure, compared to natives.

[13] Some immigrants groups had no visits to the doctor. The respective dummies for group identification have been omitted in estimation.

However, for measuring cholesterol, there are no significant differences. Another very clear result comes from the higher probability of blood pressure control from immigrants of "other countries". Given that Asian immigrants are a significant share in this group, the result is actually consistent with the findings of Jasso et al. (2004) that Asian-Pacific immigrants reported smaller mortality rates in terms of heart-related conditions.

With possible higher policy implications, it is important to emphasize that the estimated coefficient for years of residence is positive, in both types of preventive behaviour. The concern comes if this result means that, only with time, immigrants are more likely to have good knowledge of the health system and incentive to take preventive care actions.

Table 14 – Preventive health behavior, with complete set of controls

	probit regression		probit regression	
	nr observ	6787	nr observ	6802
	prevention_hypert=1 if measured blood pressure in last year, 0 otherwise		**prevention_cholest=1 if measured cholesterol in last year, 0 otherwise**	
	Coef.	P>|z|	Coef.	P>|z|
PALOPs (birth)	-0.1721455	0.419	-0.1193374	0.554
other African (birth)	-0.4912655	0.332	-0.4360119	0.381
Brazil (birth)	0.6064471	0.186	0.0104298	0.979
other LAC (birth)	0.0047164	0.991	0.3995875	0.353
Eastern Europe (birth)	0.893619**	0.025	0.5672815	0.123
other countries (birth)	6.343256***	0	0.5678184	0.314
EU15 (birth)	-0.2478669	0.263	-0.1902812	0.38
other developed (birth)	-0.6109609	0.233	-0.6170856	0.262
emigrant	-0.0653089	0.315	0.0067751	0.901
years residence(<=10)	0.2059586***	0	0.1196188***	0.004
nr members in household	-0.0414373***	0.005	-0.0052358	0.695
female	0.7772785***	0	0.5015126***	0.001
age (adults only)	0.041742***	0	0.0404713***	0
age squared	-0.0002424***	0.004	-0.000247***	0
bmi	0.0195284***	0	0.0180792***	0
school level2 (1st basic)	-0.6995635**	0.014	-0.359699	0.118
school level3 (2nd basic)	-0.4834951*	0.086	-0.2046596	0.37
school level4 (3rd basic)	-0.4053036	0.144	-0.1348851	0.548
school level5 (high school)	-0.2423799	0.378	-0.0071548	0.974
school level6 (pos high school)	-0.5651388*	0.099	-0.2071092	0.487
school level7 (BSc)	-0.1342107	0.657	0.0723022	0.766
school level8 (Undergrad-Licenciatura)	-0.0791928	0.772	0.0429726	0.845
married	0.1897422***	0.001	0.1668998***	0.002
divorced	0.0197043	0.852	-0.0150745	0.869
widow	0.1158004	0.355	0.0370139	0.694
income pcapita (in household)	0.0000979**	0.045	0.0001439***	0.001
employed	0.0209179	0.737	0.0293482	0.595
retired	0.1900244*	0.061	0.1451403*	0.067
sick to work	0.5279581***	0.004	0.4551295***	0.001
activity1 - agriculture or fishery	0.1024727	0.338	-0.0087936	0.927
activity 2- industry	-0.0206537	0.86	-0.1974754*	0.055
activity 3- construction	0.2412701**	0.023	0.0441654	0.638
activity 4-commerce	0.0596535	0.588	-0.121899	0.227
activity 5-restaurants and hotels	0.1697563*	0.095	0.0029269	0.974
activity 6-transportation and communications	0.2270149*	0.056	0.0621756	0.557
activity 7-education	0.2534169*	0.058	0.1807249	0.128
activity 8-home activities	0.1807934	0.164	0.0953449	0.394
activity 9-civil services and armed forced	0.0717883	0.657	0.0378431	0.782
activity 10-health industry	0.1010653	0.412	0.0568535	0.602
activity 11-other activities	0.4659821***	0.001	0.1010493	0.39
public health subsystem	-0.0060107	0.935	-0.0538664	0.394
private health subsystem	0.1759424	0.152	0.1846676*	0.074
score chronic conditions	0.2723604***	0	0.1864226***	0
daily smoker	-0.2319964***	0	-0.1782026***	0
occasional smoker	0.1635034	0.192	0.0074429	0.946
meals per day	0.0833534	0.17	0.1008358*	0.058
problems with alcohol	0.1061211	0.334	0.0146093	0.878
women * age	-0.0056396**	0.047	-0.005297**	0.023
women * schooling	-0.0279231***	0.01	-0.0123574	0.178
women * PALOPs	0.2833984	0.354	0.1602903	0.553
women * other African	..	..	1.293685	0.109
women * Brazil	0.0396823	0.938	-0.0566008	0.903
women * other LAC	0.0755803	0.895	-0.2673282	0.622
women * East Europe	0.2026862	0.673	-0.0779788	0.863
women * other countries	-6.793163	.	-0.4631147	0.525
women * EU15	0.1788508	0.568	-0.0569953	0.845
women * other developed	0.25954	0.761	0.5993229	0.48
constant	-2.994698***	0	-2.904874***	0

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%. Reference groups are individuals with the following characteristics: born in Portugal, who never migrated, male, with no schooling, a master or a PhD, single, unemployed, who did not miss work due to sickness in the past 3 months,

who do not smoke, who do not have problems with alcohol. Standard errors are clustered at the household level.

Drinking and Smoking

The mirror image of preventive care is the adoption of risky behaviors. In this respect, two of the more relevant ones are tobacco consumption and drinking. Engaging in such behaviors may also be associated with mental health status, which we have already documented above.

Table 15 – Risky health behaviours, controlling only for immigration

	probit regression		probit regression		probit regression		probit regression	
	nr observ	33669	nr observ	33362	nr observ	33648	nr observ	33648
	alcohol=1 if problems with alcohol, 0 otherwise		**alcohol=1 if problems with alcohol, 0 otherwise**		**daily smoker**		**daily smoker**	
	Coef.	P>|z|	Coef.	P>|z|	Coef.	P>|z|	Coef.	P>|z|
immigrant (birth)	0.0055167	0.943	..	..	0.2590907***	0	..	..
years of residence (<=10)	0.0201914	0.39	-0.0206595**	0.039	0.0083864	0.496	0.0265626	0.142
PALOPs (birth)	..	..	0.2091539		..	..	0.3825037***	0
other African (birth)	..	..	..	0.418	..	..	-0.2647685	0.25
Brazil (birth)	..	..	-0.1929508	..	..	..	0.0438524	0.76
other LAC (birth)	..	..	..	..	..	..	0.0206922	0.886
Eastern Europe (birth)	..	..	..	0.941	..	..	0.7062895***	0
other countries (birth)	..	..	-0.0236826	0.942	..	..	0.1630474	0.376
EU15 (birth)	..	..	0.0097167	0.433	..	..	0.3013449***	0
other developed (birth)	..	..	-0.313572	0.471	..	..	-0.105562	0.597
constant	-2.025321***	0	-1.616813***	0	-0.98817***	0	-1.169932***	0

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%. The reference group is formed by individuals born in Portugal.

Using a probit analysis (Table 15), immigrants (as a whole) are not significantly different from natives in terms of drinking alcohol, but are more likely to be daily smokers. Once disaggregating by country of origin, we detect that immigrants from PALOPs, Eastern Europe and EU15 have a higher probability of smoking regular smoking. For these groups of immigrants, the results are similar even if we have a more complete set of explanatory variables, as in Table 16. In this more complete regression, we also find evidence that African non-PALOPs countries, Brazil, LAC, and other developed countries are less likely to be daily smokers.

In our data, there are time effects in the higher probability of becoming a daily smoker, while no such effect exists associated with drinking. The fact that immigrants are more prone to engage in risky behaviors is of great policy interest, namely in terms of targeting them under specific programs.

The adoption of unhealthy behaviors by immigrants after they reach the host country may reflect either acculturation effects or mental health issues. However, in this current study, it was not possible to establish a direct link between mental health and consumption of addictive substances (alcohol and tobacco). We have a simple cross-section, and we cannot follow decisions over time for the same individual. Nevertheless, it is possible to see that some of the immigrants' groups with lower mental health do coincide with the ones having a higher use of addictive substances (e.g., PALOPs, and Eastern Europe).

Considering the remaining variables, the data allows us to conclude that women and individuals who are employed are also less likely to have risky behaviours; while being older, divorced or widowed, and a woman with more years of completed schooling is associated with a higher likelihood of consuming the two addictive substances.

Table 16 – Risky health behaviours, with complete set of controls

	probit regression		probit regression	
	nr observ	27411	nr observ	27810
	alcohol=1 if problems with alcohol, 0 otherwise		**daily smoker**	
	Coef.	P>|z|	Coef.	P>|z|
PALOPs (birth)	0.2658061**	0.046	0.221779**	0.023
other African (birth)	..	..	-0.6918574**	0.046
Brazil (birth)	-0.1026193	0.706	-0.3649892**	0.05
other LAC (birth)	..	..	-0.3397487*	0.089
Eastern Europe (birth)	..	..	0.5346494***	0.003
other countries (birth)	-0.1526989	0.747	-0.0317788	0.903
EU15 (birth)	0.0514061	0.784	0.2463066**	0.033
other developed (birth)	-0.0903834	0.847	-0.5754655*	0.059
emigrant	0.081217*	0.07	-0.0159977	0.609
years residence(<=10)	-0.026391	0.404	0.0374*	0.053
nr members in household	-0.0607872***	0	0.0255323***	0
female	-0.6832453***	0.001	-1.045537***	0
age (adults only)	0.0531868***	0	0.0602345***	0
age squared	-0.0005886***	0	-0.0007928***	0
bmi	-0.0017983	0.651	-0.0410689***	0
school level2 (1st basic)	1.0664***	0.006	0.3930416***	0.001
school level3 (2nd basic)	1.047184***	0.008	0.46646***	0
school level4 (3rd basic)	1.003637***	0.01	0.524754***	0
school level5 (high school)	0.753522*	0.054	0.2675024**	0.015
school level6 (pos high school)	1.22368***	0.004	0.0306372	0.847
school level7 (BSc)	0.8660811**	0.033	0.0189746	0.877
school level8 (Undergrad-Licenciatura)	0.8142523**	0.037	-0.002291	0.983
married	0.0953215*	0.084	-0.0426987	0.146
divorced	0.2914857***	0	0.4566852***	0
widow	0.2651888***	0.007	0.1408403**	0.03
income pcapita (in household)	-0.0000231	0.558	0.000017	0.452
employed	-0.1352961**	0.013	-0.0802412***	0.01
retired	-0.0934129	0.197	-0.043856	0.368
sick to work	-0.1007613	0.361	-0.0272642	0.718
activity1 - agriculture or fishery	-0.1661169*	0.067	-0.2254307***	0
activity 2- industry	-0.0227144	0.807	-0.2523447***	0
activity 3- construction	0.0634315	0.446	-0.1171481**	0.02
activity 4-commerce	0.0137377	0.871	0.0387367	0.453
activity 5-restaurants and hotels	-0.0329225	0.69	-0.0864162*	0.073
activity 6-transportation and communications	-0.1042615	0.309	0.0349479	0.534
activity 7-education	-0.0662687	0.48	-0.1065049*	0.074
activity 8-home activities	0.1567998	0.171	-0.1101761*	0.072
activity 9-civil services and armed forced	-0.1335658	0.482	-0.1904563**	0.026
activity 10-health industry	-0.0031353	0.975	-0.0461784	0.423
activity 11-other activities	-0.0914944	0.486	0.042982	0.494
public health subsystem	-0.1502378**	0.034	-0.066432*	0.065
private health subsystem	0.2047453**	0.015	0.0120447	0.824
score chronic conditions	0.1304285***	0	-0.003748	0.664
women * age	-0.014252***	0	-0.0041166***	0.008
women * schooling	0.029251**	0.011	0.0518459***	0
women * PALOPs	-0.0311345	0.909	0.060332	0.666
women * other African	..	..	0.2985571	0.555
women * Brazil	..	..	0.3616245	0.127
women * other LAC	..	..	0.2128126	0.479
women * East Europe	..	..	-0.1246742	0.576
women * other countries	..	..	0.3477313	0.356
women * EU15	0.9133933	0.165	-0.0532346	0.738
women * other developed	0.4158032	0.148	0.6473926	0.136
constant	-2.954911***	0	-1.040961***	0

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%. Reference groups are individuals with the following characteristics: born in Portugal, who never migrated, male, with no schooling, a master or a PhD, single, unemployed, who did not miss work due to sickness in the past 3 months, who do not smoke, who do not have problems with alcohol.

Health care coverage

Since Portugal has a National Health Service, all residents in the country, regardless of their migration status, have access to it. As briefly described above, additional health insurance coverage may take the form of health subsystem (occupation-based health insurance) and/or voluntary health insurance. These additional layers of health insurance coverage are often seen as facilitating access to health care providers. We address in this section whether, or not, immigrants have a different pattern of such additional health insurance coverage.

We also look at the out-of-pocket expenditures on health care. If immigrants have less knowledge about the workings of the National Health Service, or they fear the risk of detection in case of being illegal immigrants, they may have higher out-of-pocket expenditures, contributing to less use of the public health care services and, eventually, to a poorer health.

Voluntary private health insurance

Private health insurance can be bought as an individual risk-rated contract or within group-rated schemes, when offered as part of a compensation package by companies. Unfortunately, we do not have such information. Only the self-report of an insurance coverage is available, without distinction of the underlying type of contract.

Table 17 - Voluntary health insurance, controlling only for immigration

	probit regression		probit regression	
	nr observ	33610	nr observ	33610
	insurance=1 if voluntary health insurance		**insurance=1 if voluntary health insurance**	
	Coef.	P>|z|	Coef.	P>|z|
immigrant (birth)	0.433932***	0	..	..
years of residence (<=10)	0.0719942***	0	0.0228279	0.289
PALOPs (birth)	..	..	0.3736543***	0
other African (birth)	..	..	0.2824776	0.22
Brazil (birth)	..	..	0.0932699	0.584
other LAC (birth)	..	..	0.3255527**	0.04
Eastern Europe (birth)	..	..	-0.3609471	0.143
other countries (birth)	..	..	0.45221**	0.024
EU15 (birth)	..	..	0.595556***	0
other developed (birth)	..	..	0.5798222***	0.002
constant	-2.172284***	0	-1.680622***	0

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%. The reference group is formed by individuals born in Portugal.

Computing a simple probit model of having or not having private health insurance and controlling only for immigration (Table 17), we observe that as a group foreign residents are more likely to have voluntary health insurance. Considering the different origins, this higher likelihood is significant for those who were born in PALOPs, LAC countries different from Brazil, developed countries (either EU15 or not), and "other countries" (namely from Asia, Middle East, and Pacific).

By including a more comprehensive set of explanatory variables (Table 18), we still observe that immigrants from EU15 and other developed countries are more often associated with further layers of insurance coverage. In contrast, those coming from Brazil and Eastern Europe have a lower probability of having extra insurance coverage.

The decision to have private health insurance can either be a proxy of access to health care or a symptom of preference towards the different health services provided. In the case of immigrants from more developed countries, it is likely that the determining factor to contract extra health insurance relates to its opportunity cost and non-preference for some of the National Health Service characteristics, such as the waiting lists.

African-born residents do not have significant differences with natives, regarding coverage by an additional insurance. However, this is one result sensitive to the definition of immigrants. Once we consider the concept associated with nationality rather than country of birth (right hand-side of Table 18), the result is reversed and nationals from African countries are less likely to contract private health insurance. The change in the results for African immigrants reflects an older population, born before 1974, who lived in the former colonies, and returned to Portugal. This is actually the only point of our analysis where the definition of immigrant makes a difference to the results.

On the other side, the pattern of Eastern European and EU15 immigrants continue to be the same as before. Years of residence, as a proxy to integration into the country, does not have an impact.

There are gender effects, with women being less likely to have an additional health insurance, except if they completed more years of schooling, or if they were born in LAC, which revert the results.

The coefficients for the remaining variables are according to what would be expected: older individuals, higher income, and being employed is associated with a higher likelihood of having an additional and voluntary health insurance.

Table 18 – Voluntary health insurance, with complete set of control variables and with the two alternative definitions of immigration – country of birth and nationality

	probit regression		probit regression	
	nr observ	27778	nr observ	27778
	voluntary health insurance		**voluntary health insurance**	
	Coef.	P>|z|	Coef.	P>|z|
PALOPs (birth)	0.145927	0.23	..	..
other African (birth)	-0.4048606	0.351	..	..
Brazil (birth)	-0.4982783**	0.033	..	..
other LAC (birth)	-0.3326316	0.29	..	..
Eastern Europe (birth)	-0.9201985***	0.01	..	..
other countries (birth)	-0.0363395	0.897	..	..
EU15 (birth)	0.4355164***	0.001	..	..
other developed (birth)	0.6116736**	0.018	..	..
PALOPs (nationality)	..	..	-0.4075765*	0.086
other African (nationality)	..	..	-1.165273**	0.029
Brazil (nationality)	..	..	-0.3580602	0.135
other LAC (nationality)	..	..	-0.1400462	0.536
Eastern Europe (nationality)	..	..	-0.8448437***	0.009
other countries (nationality)	..	..	0.0901442	0.786
EU15 (nationality)	..	..	0.5722611***	0
other developed (nationality)	..	..	0.2625691	0.207
emigrant	0.0133195	0.774	0.0000471	0.999
years residence(<=10)	0.0012926	0.96	0.0031249	0.912
nr members in household	-0.0288304**	0.035	-0.0290462**	0.034
female	-0.3120055***	0.001	-0.31468***	0.001
age (adults only)	0.0513574***	0	0.0507528***	0
age squared	-0.0005855***	0	-0.0005826***	0
bmi	-0.0028114	0.373	-0.0028061	0.374
school level2 (1st basic)	-0.9057441***	0	-0.9210668***	0
school level3 (2nd basic)	-0.7246427***	0	-0.7403088***	0
school level4 (3rd basic)	-0.4931778***	0	-0.5060022***	0
school level5 (high school)	-0.3047405***	0.009	-0.3197095***	0.007
school level6 (pos high school)	-0.118812	0.479	-0.1364647	0.418
school level7 (BSc)	-0.1094723	0.384	-0.1197597	0.344
school level8 (Undergrad-Licenciatura)	-0.0681413	0.548	-0.0787301	0.49
married	0.2780546***	0	0.2823985***	0
divorced	0.1188968*	0.075	0.1187034*	0.076
widow	0.0279072	0.757	0.0289259	0.75
income pcapita (in household)	0.0004553***	0	0.0004527***	0
employed	0.2290598***	0	0.2318689***	0
retired	-0.0473922	0.476	-0.0452275	0.497
sick to work	-0.0690464	0.544	-0.0663581	0.561
activity1 - agriculture or fishery	-0.0760862	0.222	-0.0733934	0.238
activity 2- industry	-0.5810048***	0	-0.5783707***	0
activity 3- construction	-0.116149*	0.062	-0.1128566*	0.07
activity 4-commerce	-0.2245492***	0.001	-0.2198878***	0.001
activity 5-restaurants and hotels	-0.056899	0.333	-0.0538475	0.361
activity 6-transportation and communications	-0.2288302***	0.003	-0.2250253***	0.003
activity 7-education	0.1384598**	0.045	0.1401696**	0.043
activity 8-home activities	-0.5729145***	0	-0.5674445***	0
activity 9-civil services and armed forced	-0.5029342***	0	-0.4921721***	0
activity 10-health industry	-0.3351276***	0	-0.3311279***	0
activity 11-other activities	-0.3885595***	0	-0.3872317***	0
public health subsystem	-0.1187383**	0.023	-0.1192747**	0.022
private health subsystem	-0.1744563**	0.036	-0.1785726**	0.032
score chronic conditions	0.0227982**	0.034	0.0229611**	0.032
women * age	0.0021778	0.151	0.0021771	0.151
women * schooling	0.0174852***	0	0.0171815***	0
women * PALOPs	-0.0612022	0.651	0.1172512	0.3
women * other African	0.3308691	0.558	0.5000366	0.232
women * Brazil	0.1308925	0.637	-0.0302953	0.906
women * other LAC	0.6882865*	0.077	0.4202218*	0.075
women * East Europe	0.0562762	0.906	-0.079037	0.85
women * other countries	-0.0273698	0.949	-0.177468	0.662
women * EU15	-0.2449879	0.116	-0.1476049	0.312
women * other developed	-0.6287558*	0.085	-0.1957764	0.568
constant	-2.082875***	0	-2.067314***	0

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%. Reference groups are individuals with the following characteristics: born in Portugal, who never migrated, male, with no schooling, a master or a PhD, single, unemployed, who did not miss work due to sickness in the past 3 months, who do not smoke, who do not have problems with alcohol. Standard errors are clustered at the household level.

To cope with the possibility that sicker individuals may have a higher incentive to buy private health insurance, with everything else constant, we run a bivariate probit analysis. The dependent variables are the decision to have or not a private health insurance, and the health status defined as either good (the top two categories in the ordinal scale of the self-assessed health) or bad (the other three categories in the ordinal scale). Results are reported in Table 19.

Overall, the previous results still hold, with immigrants from Brazil and Eastern Europe being less likely to hold private health insurance than the local-born population, while the opposite occurs for EU15 and developed countries. Regarding the health status of immigrants, the main conclusions outlined above are not particularly sensitive to both endogeneity of the insurance decision and the re-definition of the self-reported health variable for just two categories.

Table 19 – Bivariate probit of health status and voluntary health insurance

	Seemingly unrelated bivariate probit			
	nr observ: 27778			
	Coef.	P>|z|	Coef.	P>|z|
Voluntary health insurance			**Health status**	
voluntary health insurance	..	..	-0.4494529***	0.005
PALOPs (birth)	0.149	0.215	-0.167	0.132
other African (birth)	-0.401	0.31	0.251	0.534
Brazil (birth)	-0.4992588**	0.049	0.016	0.945
other LAC (birth)	-0.344	0.245	0.426	0.217
Eastern Europe (birth)	-0.885281***	0.004	-0.065	0.788
other countries (birth)	-0.029	0.923	-0.169	0.561
EU15 (birth)	0.4245117***	0.001	0.4722582***	0.005
other developed (birth)	0.6229244**	0.015	0.716	0.129
emigrant	0.019	0.634	-0.032	0.242
years residence(<=10)	0.001	0.969	-0.0573098***	0.009
nr members in household	-0.0271719***	0.009	0.0684981***	0
female	-0.3106611***	0.005	-1.075737***	0
age (adults only)	0.0510027***	0	-0.054697***	0
age squared	-0.0005844***	0	0.000398***	0
bmi	-0.002	0.443	-0.0072831***	0.001
school level2 (1st basic)	-0.8956369***	0	-0.4698509***	0.001
school level3 (2nd basic)	-0.7145981***	0	-0.4492846***	0.001
school level4 (3rd basic)	-0.4854631***	0	-0.3596058***	0.006
school level5 (high school)	-0.2971112***	0.004	-0.2711256**	0.037
school level6 (pos high school)	-0.102	0.518	-0.180	0.327
school level7 (BSc)	-0.101	0.373	-0.3504431**	0.011
school level8 (Undergrad-Licenciatura)	-0.062	0.54	-0.202	0.115
married	0.2776763***	0	-0.1645207***	0
divorced	0.124528**	0.05	-0.1116401**	0.017
widow	0.039	0.657	-0.2829288***	0
income pcapita (in household)	0.0004596***	0	0.000295***	0
employed	0.2304118***	0	0.2093388***	0
retired	-0.040	0.531	-0.0845049**	0.032
sick to work	-0.057	0.632	-0.1399735**	0.039
activity1 - agriculture or fishery	-0.077	0.198	-0.021	0.693
activity 2- industry	-0.5821013***	0	-0.3076742***	0
activity 3- construction	-0.1200129**	0.036	-0.2258834***	0
activity 4-commerce	-0.2271761***	0	-0.1289515**	0.023
activity 5-restaurants and hotels	-0.060	0.265	-0.043	0.405
activity 6-transportation and communications	-0.2257167***	0.001	-0.0997166*	0.091
activity 7-education	0.1417432**	0.032	-0.088	0.154
activity 8-home activities	-0.5707838***	0	-0.1257891**	0.046
activity 9-civil services and armed forced	-0.5135996***	0	-0.2658905***	0
activity 10-health industry	-0.3385395***	0	-0.1171716*	0.05
activity 11-other activities	-0.3888475***	0	-0.008	0.897
public health subsystem	-0.1155805***	0.008	-0.023	0.5
private health subsystem	-0.1775983***	0.003	-0.038	0.479
score chronic conditions	0.0243205**	0.017	-0.3268487***	0
women * age	0.002	0.241	0.0096271***	0
women * schooling	0.0177167***	0.002	0.0305827***	0
women * PALOPs	-0.072	0.676	0.133	0.365
women * other African	0.311	0.549	0.286	0.609
women * Brazil	0.103	0.751	-0.087	0.743
women * other LAC	0.6940253*	0.056	-0.179	0.668
women * East Europe	0.004	0.993	-0.053	0.851
women * other countries	-0.041	0.924	0.363	0.366
women * EU15	-0.242	0.164	-0.5837601***	0.003
women * other developed	-0.645	0.14	-0.502	0.379
constant	-2.096946***	0	3.034897***	0

athrho	0.2462029	0.004
rho	0.241346	

Likelihood-ratio test of rho=0: chi2(1) = 6.98147 Prob > chi2 = 0.0082

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%. The reference group is formed by individuals born in Portugal.

Out-of-pocket expenditures

Difficulties in access to health care may translate into higher payments in case of need. Therefore, out-of-pocket expenditures in medical care can be taken as a further indicator for barriers in access.

Table 20 - Out of pocket expenditures, controlling only for immigration

	tobit regression		tobit regression	
	nr observ	33601	nr observ	33601
	out of pocket expenditures		**out of pocket expenditures**	
	Coef.	P>t	Coef.	P>t
immigrant (birth)	2.915443	0.576	..	..
years of residence (<=10)	3.407333**	0.036	3.238799	0.153
PALOPs (birth)	..	..	10.40065	0.173
other African (birth)	..	..	2.886453	0.902
Brazil (birth)	..	..	12.98507	0.435
other LAC (birth)	..	..	-23.72416	0.209
Eastern Europe (birth)	..	..	-13.81495	0.502
other countries (birth)	..	..	-21.12542	0.396
EU15 (birth)	..	..	5.177224	0.568
other developed (birth)	..	..	-16.25841	0.501
constant	-161.7529***	0	-160.0535***	0

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%. The reference group is formed by individuals born in Portugal.

We conduct a tobit analysis taking into account the lower truncation of expenditure values to zero. The statistical analysis in Table 20 reveals that no effect seems to be associated with immigrant status. The same is true when we include a more complete set of explanatory variables, as in Table 21.

On average, women tend to have more out-of-pocket expenditures with health, except for older women. We may be capturing an effect related to maternal health expenditures since here we include all women above 18 years old.

Regarding the remaining controls, we have the expectable results that the older people, the ones with higher income, and with worse score of chronic conditions are more likely to have out-of-pocket expenditures.

Table 21 – Out of pocket expenditures, with complete set of control variables

	tobit regression	
	nr observ	27781
	out of pocket expenditures	
	Coef.	P>t
PALOPs (birth)	-11.16064	0.37
other African (birth)	-4.08656	0.899
Brazil (birth)	9.97595	0.62
other LAC (birth)	-6.200538	0.804
Eastern Europe (birth)	7.241061	0.744
other countries (birth)	-20.48083	0.533
EU15 (birth)	8.300195	0.528
other developed (birth)	-22.41807	0.538
emigrant	4.967897*	0.068
years residence(<=10)	2.95151	0.164
nr members in household	-2.997315***	0
female	43.35365***	0
age (adults only)	1.392552***	0
age squared	-0.0115283***	0.002
bmi	-0.3882994*	0.068
school level2 (1st basic)	6.684172	0.558
school level3 (2nd basic)	12.56495	0.265
school level4 (3rd basic)	14.55359	0.187
school level5 (high school)	15.69595	0.15
school level6 (pos high school)	19.45513	0.204
school level7 (BSc)	24.67761**	0.034
school level8 (Undergrad-Licenciatura)	22.8013**	0.033
married	4.018536	0.178
divorced	-3.282034	0.485
widow	-2.116632	0.66
income pcapita (in household)	0.0100276***	0
employed	5.050439	0.102
retired	1.731233	0.668
sick to work	25.57638***	0
activity1 - agriculture or fishery	-4.555485	0.354
activity 2- industry	-17.32613***	0.002
activity 3- construction	-10.30722**	0.033
activity 4-commerce	-10.59379**	0.05
activity 5-restaurants and hotels	-8.697586*	0.063
activity 6-transportation and communications	-6.124126	0.262
activity 7-education	0.537815	0.925
activity 8-home activities	-4.935403	0.366
activity 9-civil services and armed forced	-18.60845***	0.006
activity 10-health industry	-1.664648	0.758
activity 11-other activities	-25.1808***	0
public health subsystem	4.968536	0.117
private health subsystem	10.62345**	0.025
score chronic conditions	8.998148***	0
women * age	-0.5276401***	0
women * schooling	-0.2384815	0.604
women * PALOPs	23.61673	0.119
women * other African	8.578667	0.84
women * Brazil	1.113425	0.962
women * other LAC	-17.43822	0.602
women * East Europe	-32.14944	0.268
women * other countries	-7.698903	0.865
women * EU15	-8.013695	0.63
women * other developed	28.57899	0.526
constant	-183.5171***	0

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%. Reference groups are individuals with the following characteristics: born in Portugal, who never migrated, male, with no schooling, a master or a PhD, single, unemployed, who did not miss work due to sickness in the past 3 months, who do not smoke, who do not have problems with alcohol.

The health of emigrants

The Fourth National Health Survey contains information on past Portuguese emigrants, who already returned to their origin country.

All the estimates performed and reported so far include a dummy variable for returned emigrants. Overall in the different analyses, it is shown that, on average, emigrants are more likely: to have lower self-assessed health, to have a better mental health score, to have higher problems with risky alcohol consumption, and to incur more out-of-pocket health expenditures.

Unfortunately, we do not have information on the health of individuals at the date of emigration, and, therefore we cannot validate directly in our sample, the effects of selectivity and convergence over time described above. If emigrants were healthier than the rest of the population in Portugal, one should expect returned emigrants to hold a better health status than residents who never migrated. There may be two explanations why emigrations lower self-assessed status. The first is due to the challenges faced during their past migration experience. Second, it may be a symptom of the *salmon bias effect*, according to which returned emigrants tend to be the sickest ones.

There are, however, some particular characteristics of Portuguese-born emigrants that need to be taken into account. During the 1960s of the 20th Century, emigration took place for political reasons (avoid military draft for the wars in Africa), which mainly affected the young male population. This may have reinforced the selectivity effect. Second, relatively short-term, seasonal emigration also takes place. Future research can take into consideration these many aspects of Portuguese emigration in a more accurate and systematic way.

6. Discussion and concluding remarks

In this paper we look for evidence of whether migrants are significantly different from natives in the destination country in terms of health status, use of health care services, lifestyle, and health coverage.

Regarding health status, the fact that immigrants may be healthier than the host country population implies they would not pose immediate and undue pressure on the health system. This result, known as the *healthy immigrant effect*, is more plausible when migration is dictated mainly by expectations of work. In our study, we find some evidence on such health advantage in terms of chronic conditions, for immigrants with Eastern European or African non-PALOP origin.

The main area of concern is mental health, as it may be perceived that lower scores may, over time, translate into unhealthy lifestyles. In our study we found evidence of such lower scores for immigrants coming from PALOPs and Eastern Europe.

Immigrants, as an increase in population of a country, always mean a higher demand for health care services. The question is whether the demand they create is a disproportionate burden on the health care system. In this respect, the evidence of our paper does not show that the use of health care by immigrants poses a higher pressure, comparing with host-country natives. If anything, other characteristics being equal, migrants use less care. These effects do not seem to depend on cultural proximity, like working knowledge of local language, which could be a major barrier to access health care.

There is an open question. Is the relevance of the health care system of the host country in accommodating demand by immigrants? When there is a National Health Service with universal coverage, it is likely that this system is better positioned to satisfy the needs of immigrants than systems based on private health insurance.

According to our study, immigrants' coverage by additional insurance varies with the level of development of country of origin. When they come from developed countries, such as EU15, they are more likely to have extra insurance. When they come from developing countries, they are less likely to contract additional coverage. This pattern can be a symptom of how migrants differently rate the cost of waiting lists, which is and example of how they perceive public health

care services in the host society, or more problematically due to difficulties in obtaining and/or managing the contract of insurance. For policy purposes, it is not clear that reliance on private health insurance is the way to improve access to health care by immigrants.

The estimation of main links between health and immigration supports the view that some groups of foreign residents are more likely to engage in preventive health behaviours, while others engage in unhealthy lifestyles, like drinking and smoking. These practices may result from acculturation or be a consequence of lower mental health.

Future research can be extended for a characterization of health needs of emigrants, with possibly more information on the overall path of migration.

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Annex

Table 22 – Descriptive Statistics by country of birth: Portugal

	Portugal (birth)		
	mean	nr obs	st dev
emigrant	0.118	32297	0.323
years residence(<=10)	10.000	32297	0.000
nr members in household	3.110	32297	1.418
female	0.524	32292	0.499
age (adults only)	50.391	32297	18.536
bmi	25.909	31666	4.499
school level1 (no schooling)	0.162	32275	0.368
school level2 (1st basic)	0.373	32275	0.484
school level3 (2nd basic)	0.130	32275	0.337
school level4 (3rd basic)	0.123	32275	0.328
school level5 (high school)	0.109	32275	0.312
school level6 (pos high school)	0.005	32275	0.070
school level7 (BSc)	0.017	32275	0.130
school level8 (Undergrad-Licenciatura)	0.075	32275	0.264
school level9 (Master)	0.003	32275	0.058
school level10 (PhD)	0.002	32275	0.047
single	0.199	32291	0.399
married	0.653	32291	0.476
separated	0.010	32291	0.098
legally divorced	0.037	32291	0.189
divorced	0.047	32291	0.211
widow	0.101	32291	0.302
income pcapita (in household)	581.996	32297	482.055
employed	0.521	32297	0.500
retired	0.247	32297	0.431
prof1 - managers	0.019	32297	0.137
prof 2 - professionals	0.048	32297	0.215
prof 3 - technicians and associated professionals	0.052	32297	0.223
prof 4 - clerical support services	0.055	32297	0.229
prof 5 - services and sales workers	0.078	32297	0.268
prof 6- skilled agriculture, forestry, fishery	0.116	32297	0.321
prof 7 - craft and related trade	0.128	32297	0.334
prof 8 -plant and machine operators and assemblers	0.157	32297	0.364
prof 9 - elementary occupations	0.064	32297	0.245
prof 10 - armed forces	0.124	32297	0.330
prof 11 - other professions	0.157	32297	0.364
activity1 - agriculture or fishery	0.219	32297	0.413
activity 2- industry	0.128	32297	0.334
activity 3- construction	0.121	32297	0.326
activity 4-commerce	0.087	32297	0.282
activity 5-restaurants and hotels	0.123	32297	0.328
activity 6-transportation and communications	0.050	32297	0.217
activity 7-education	0.034	32297	0.180
activity 8-home activities	0.057	32297	0.231
activity 9-civil services and armed forced	0.035	32297	0.185
activity 10-health industry	0.072	32297	0.259
activity 11-other activities	0.037	32297	0.188

	Portugal (birth)		
	mean	nr obs	st dev
voluntary health insurance	0.073	32239	0.260
NHS	0.819	32297	0.385
public health susbsystem	0.152	32297	0.359
private health subsystem	0.029	32297	0.168
out of pocket expenditures	3.718	32232	23.662
visits to physicians	1.129	32248	1.823
pharmaceutical	0.592	32271	0.491
daily smoker	0.183	32277	0.387
occasional smoker	0.021	32277	0.145
non smoker	0.796	32277	0.403
problems with alcohol	0.034	32297	0.182
preventive: blood pressure measure last year	0.808	7932	0.394
preventive: cholesteral measure last year	0.642	7945	0.480
meals per day	2.847	438	0.385
self assessed health	3.191	22305	0.940
sick to work	0.025	32297	0.155
mental score	-0.043	22304	1.848
chronic1 - reumatic	0.201	32251	0.401
chronic2 - osteoporosis	0.084	32238	0.277
chronic3 - glaucoma	0.010	32286	0.098
chronic4 - retinopathy	0.008	32286	0.090
chronic5 - cancer	0.024	32291	0.152
chronic6 - stones in kidney	0.062	32289	0.242
chronic7 - kidney failure	0.016	32289	0.127
chronic8 - chronic anxiety	0.046	32289	0.210
chronic9 - chronic wounds or leg ulcers	0.012	32288	0.108
chronic10 - emphysema	0.037	32290	0.188
chronic11 - stroke	0.024	32292	0.152
chronic12 - obesity	0.034	32289	0.180
chronic13 - major depression	0.089	32288	0.285
chronic14 - heart attack	0.018	32292	0.132
chronic15 - other chronic	0.298	32284	0.457
diabetes	0.091	32286	0.287
ashtma	0.053	32293	0.224
hypertension	0.270	32279	0.444
pain	0.175	32293	0.380
score chronic conditions	0.024	32149	1.545

Table 23 – Descriptive statistics by country of birth: PALOPs

	PALOPs (birth)		
	mean	nr obs	st dev
years residence(<=10)	9.308	438	1.879
nr members in household	3.400	438	1.478
female	0.543	438	0.499
age (adults only)	42.938	438	13.240
bmi	25.032	425	4.085
school level1 (no schooling)	0.076	437	0.265
school level2 (1st basic)	0.195	437	0.396
school level3 (2nd basic)	0.160	437	0.367
school level4 (3rd basic)	0.220	437	0.415
school level5 (high school)	0.197	437	0.398
school level6 (pos high school)	0.000	437	0.000
school level7 (BSc)	0.039	437	0.194
school level8 (Undergrad-Licenciatura)	0.110	437	0.313
school level9 (Master)	0.005	437	0.068
school level10 (PhD)	0.000	437	0.000
single	0.212	438	0.409
married	0.689	438	0.463
separated	0.018	438	0.134
legally divorced	0.041	438	0.199
divorced	0.059	438	0.237
widow	0.039	438	0.193
income pcapita (in household)	608.145	438	493.279
employed	0.701	438	0.458
retired	0.073	438	0.261
prof1 - managers	0.011	438	0.106
prof 2 - professionals	0.043	438	0.204
prof 3 - technicians and associated professionals	0.084	438	0.278
prof 4 - clerical support services	0.096	438	0.295
prof 5 - services and sales workers	0.098	438	0.298
prof 6- skilled agriculture, forestry, fishery	0.164	438	0.371
prof 7 - craft and related trade	0.018	438	0.134
prof 8 -plant and machine operators and assemblers	0.158	438	0.365
prof 9 - elementary occupations	0.050	438	0.219
prof 10 - armed forces	0.164	438	0.371
prof 11 - other professions	0.112	438	0.316
activity1 - agriculture or fishery	0.196	438	0.398
activity 2- industry	0.018	438	0.134
activity 3- construction	0.062	438	0.241
activity 4-commerce	0.139	438	0.347
activity 5-restaurants and hotels	0.146	438	0.354
activity 6-transportation and communications	0.096	438	0.295
activity 7-education	0.030	438	0.170
activity 8-home activities	0.089	438	0.285
activity 9-civil services and armed forced	0.046	438	0.209
activity 10-health industry	0.071	438	0.257
activity 11-other activities	0.048	438	0.214

	PALOPs (birth)		
	mean	nr obs	st dev
voluntary health insurance	0.137	437	0.345
NHS	0.822	438	0.383
public health susbsystem	0.151	438	0.358
private health subsystem	0.025	438	0.157
out of pocket expenditures	2.564	436	12.046
visits to physicians	1.124	437	2.120
pharmaceutical	0.510	437	0.500
daily smoker	0.295	437	0.457
occasional smoker	0.025	437	0.157
non smoker	0.680	437	0.467
problems with alcohol	0.055	438	0.228
preventive: blood pressure measure last year	0.764	106	0.427
preventive: cholesteral measure last year	0.589	107	0.494
meals per day	2.840	50	0.510
self assessed health	3.484	310	0.827
sick to work	0.021	438	0.142
mental score	0.177	310	1.714
chronic1 - reumatic	0.098	438	0.298
chronic2 - osteoporosis	0.055	438	0.228
chronic3 - glaucoma	0.002	438	0.048
chronic4 - retinopathy	0.005	438	0.067
chronic5 - cancer	0.025	438	0.157
chronic6 - stones in kidney	0.048	438	0.214
chronic7 - kidney failure	0.007	438	0.083
chronic8 - chronic anxiety	0.043	437	0.204
chronic9 - chronic wounds or leg ulcers	0.002	438	0.048
chronic10 - emphysema	0.021	437	0.142
chronic11 - stroke	0.016	438	0.126
chronic12 - obesity	0.062	438	0.241
chronic13 - major depression	0.092	437	0.289
chronic14 - heart attack	0.014	438	0.116
chronic15 - other chronic	0.259	437	0.438
diabetes	0.032	438	0.176
ashtma	0.046	438	0.209
hypertension	0.210	438	0.408
pain	0.183	438	0.387
score chronic conditions	-0.272	436	1.304

Table 24 – Descriptive Statistics by country of birth: other African countries

	other African (birth)		
	mean	nr obs	stdev
years residence(<=10)	9.720	50	1.144
nr members in household	3.340	50	1.349
female	0.540	50	0.503
age (adults only)	39.580	50	14.693
bmi	25.434	47	3.796
school level1 (no schooling)	0.020	50	0.141
school level2 (1st basic)	0.100	50	0.303
school level3 (2nd basic)	0.100	50	0.303
school level4 (3rd basic)	0.240	50	0.431
school level5 (high school)	0.240	50	0.431
school level6 (pos high school)	0.000	50	0.000
school level7 (BSc)	0.060	50	0.240
school level8 (Undergrad-Licenciatura)	0.220	50	0.418
school level9 (Master)	0.000	50	0.000
school level10 (PhD)	0.020	50	0.141
single	0.380	50	0.490
married	0.520	50	0.505
separated	0.040	50	0.198
legally divorced	0.000	50	0.000
divorced	0.040	50	0.198
widow	0.060	50	0.240
income pcapita (in household)	863.570	50	594.069
employed	0.660	50	0.479
retired	0.100	50	0.303
prof1 - managers	0.040	50	0.198
prof 2 - professionals	0.080	50	0.274
prof 3 - technicians and associated professionals	0.180	50	0.388
prof 4 - clerical support services	0.160	50	0.370
prof 5 - services and sales workers	0.160	50	0.370
prof 6- skilled agriculture, forestry, fishery	0.160	50	0.370
prof 7 - craft and related trade	0.000	50	0.000
prof 8 -plant and machine operators and assemblers	0.040	50	0.198
prof 9 - elementary occupations	0.000	50	0.000
prof 10 - armed forces	0.080	50	0.274
prof 11 - other professions	0.100	50	0.303
activity1 - agriculture or fishery	0.140	50	0.351
activity 2- industry	0.000	50	0.000
activity 3- construction	0.060	50	0.240
activity 4-commerce	0.060	50	0.240
activity 5-restaurants and hotels	0.160	50	0.370
activity 6-transportation and communications	0.100	50	0.303
activity 7-education	0.060	50	0.240
activity 8-home activities	0.160	50	0.370
activity 9-civil services and armed forced	0.000	50	0.000
activity 10-health industry	0.060	50	0.240
activity 11-other activities	0.040	50	0.198

	other African (birth)		
	mean	nr obs	stdev
voluntary health insurance	0.120	50	0.328
NHS	0.780	50	0.418
public health susbsystem	0.180	50	0.388
private health subsystem	0.040	50	0.198
out of pocket expenditures	4.918	49	17.545
visits to physicians	0.840	50	1.419
pharmaceutical	0.500	50	0.505
daily smoker	0.120	50	0.328
occasional smoker	0.060	50	0.240
non smoker	0.820	50	0.388
problems with alcohol	0.000	50	0.000
preventive: blood pressure measure last year	0.786	14	0.426
preventive: cholesteral measure last year	0.643	14	0.497
meals per day	2.845	181	0.406
self assessed health	3.893	28	0.685
sick to work	0.040	50	0.198
mental score	0.595	28	1.373
chronic1 - reumatic	0.100	50	0.303
chronic2 - osteoporosis	0.020	50	0.141
chronic3 - glaucoma	0.020	50	0.141
chronic4 - retinopathy	0.000	50	0.000
chronic5 - cancer	0.000	50	0.000
chronic6 - stones in kidney	0.080	50	0.274
chronic7 - kidney failure	0.000	50	0.000
chronic8 - chronic anxiety	0.020	50	0.141
chronic9 - chronic wounds or leg ulcers	0.020	50	0.141
chronic10 - emphysema	0.000	50	0.000
chronic11 - stroke	0.000	50	0.000
chronic12 - obesity	0.080	50	0.274
chronic13 - major depression	0.060	50	0.240
chronic14 - heart attack	0.020	50	0.141
chronic15 - other chronic	0.220	50	0.418
diabetes	0.080	50	0.274
ashtma	0.020	50	0.141
hypertension	0.120	50	0.328
pain	0.120	50	0.328
score chronic conditions	-0.459	50	1.329

Table 25 – Descriptive statistics by country of birth: Brazil

	Brazil (birth)		
	mean	nr obs	st dev
years residence(<=10)	4.923	181	3.508
nr members in household	2.862	181	1.365
female	0.519	181	0.501
age (adults only)	34.663	181	12.805
bmi	24.204	177	3.769
school level1 (no schooling)	0.017	181	0.128
school level2 (1st basic)	0.122	181	0.328
school level3 (2nd basic)	0.166	181	0.373
school level4 (3rd basic)	0.166	181	0.373
school level5 (high school)	0.348	181	0.478
school level6 (pos high school)	0.006	181	0.074
school level7 (BSc)	0.044	181	0.206
school level8 (Undergrad-Licenciatura)	0.127	181	0.334
school level9 (Master)	0.006	181	0.074
school level10 (PhD)	0.000	181	0.000
single	0.227	181	0.420
married	0.696	181	0.461
separated	0.011	181	0.105
legally divorced	0.055	181	0.229
divorced	0.066	181	0.249
widow	0.011	181	0.105
income pcapita (in household)	654.724	181	466.731
employed	0.779	181	0.416
retired	0.017	181	0.128
prof1 - managers	0.000	181	0.000
prof 2 - professionals	0.055	181	0.229
prof 3 - technicians and associated professionals	0.077	181	0.268
prof 4 - clerical support services	0.022	181	0.147
prof 5 - services and sales workers	0.055	181	0.229
prof 6- skilled agriculture, forestry, fishery	0.215	181	0.412
prof 7 - craft and related trade	0.017	181	0.128
prof 8 -plant and machine operators and assemb	0.210	181	0.408
prof 9 - elementary occupations	0.028	181	0.164
prof 10 - armed forces	0.204	181	0.404
prof 11 - other professions	0.116	181	0.321
activity1 - agriculture or fishery	0.204	181	0.404
activity 2- industry	0.011	181	0.105
activity 3- construction	0.061	181	0.240
activity 4-commerce	0.221	181	0.416
activity 5-restaurants and hotels	0.166	181	0.373
activity 6-transportation and communications	0.144	181	0.352
activity 7-education	0.017	181	0.128
activity 8-home activities	0.011	181	0.105
activity 9-civil services and armed forced	0.066	181	0.249
activity 10-health industry	0.006	181	0.074
activity 11-other activities	0.072	181	0.259

	Brazil (birth)		
	mean	nr obs	st dev
voluntary health insurance	0.072	181	0.259
NHS	0.856	181	0.352
public health susbsystem	0.039	181	0.193
private health subsystem	0.099	181	0.300
out of pocket expenditures	2.519	181	12.233
visits to physicians	0.878	180	2.137
pharmaceutical	0.381	181	0.487
daily smoker	0.160	181	0.368
occasional smoker	0.022	181	0.147
non smoker	0.818	181	0.387
problems with alcohol	0.028	181	0.164
preventive: blood pressure measure last year	0.550	40	0.504
preventive: cholesteral measure last year	0.350	40	0.483
meals per day	2.941	102	0.236
self assessed health	4.000	127	0.756
sick to work	0.006	181	0.074
mental score	0.498	127	1.707
chronic1 - reumatic	0.044	181	0.206
chronic2 - osteoporosis	0.022	181	0.147
chronic3 - glaucoma	0.006	181	0.074
chronic4 - retinopathy	0.006	181	0.074
chronic5 - cancer	0.011	181	0.105
chronic6 - stones in kidney	0.022	181	0.147
chronic7 - kidney failure	0.006	181	0.074
chronic8 - chronic anxiety	0.022	181	0.147
chronic9 - chronic wounds or leg ulcers	0.000	181	0.000
chronic10 - emphysema	0.017	181	0.128
chronic11 - stroke	0.006	181	0.074
chronic12 - obesity	0.039	181	0.193
chronic13 - major depression	0.055	181	0.229
chronic14 - heart attack	0.006	181	0.074
chronic15 - other chronic	0.166	181	0.373
diabetes	0.011	181	0.105
ashtma	0.044	181	0.206
hypertension	0.072	181	0.259
pain	0.061	181	0.240
score chronic conditions	-0.774	181	0.929

Table 26 – Descriptive Statistics by country of birth: other Latin American and Caribbean country

	other LAC (birth)		
	mean	nr obs	st dev
years residence(<=10)	9.676	102	1.228
nr members in household	4.216	102	2.340
female	0.520	102	0.502
age (adults only)	30.431	102	8.831
bmi	24.418	102	4.501
school level1 (no schooling)	0.000	102	0.000
school level2 (1st basic)	0.088	102	0.285
school level3 (2nd basic)	0.118	102	0.324
school level4 (3rd basic)	0.176	102	0.383
school level5 (high school)	0.343	102	0.477
school level6 (pos high school)	0.010	102	0.099
school level7 (BSc)	0.059	102	0.236
school level8 (Undergrad-Licenciatura)	0.206	102	0.406
school level9 (Master)	0.000	102	0.000
school level10 (PhD)	0.000	102	0.000
single	0.657	102	0.477
married	0.324	102	0.470
separated	0.000	102	0.000
legally divorced	0.020	102	0.139
divorced	0.020	102	0.139
widow	0.000	102	0.000
income pcapita (in household)	661.613	102	453.452
employed	0.706	102	0.458
retired	0.000	102	0.000
prof1 - managers	0.020	102	0.139
prof 2 - professionals	0.039	102	0.195
prof 3 - technicians and associated professionals	0.137	102	0.346
prof 4 - clerical support services	0.078	102	0.270
prof 5 - services and sales workers	0.059	102	0.236
prof 6- skilled agriculture, forestry, fishery	0.196	102	0.399
prof 7 - craft and related trade	0.000	102	0.000
prof 8 -plant and machine operators and assemblers	0.137	102	0.346
prof 9 - elementary occupations	0.069	102	0.254
prof 10 - armed forces	0.059	102	0.236
prof 11 - other professions	0.206	102	0.406
activity1 - agriculture or fishery	0.255	102	0.438
activity 2- industry	0.000	102	0.000
activity 3- construction	0.078	102	0.270
activity 4-commerce	0.088	102	0.285
activity 5-restaurants and hotels	0.186	102	0.391
activity 6-transportation and communications	0.108	102	0.312
activity 7-education	0.049	102	0.217
activity 8-home activities	0.098	102	0.299
activity 9-civil services and armed forced	0.020	102	0.139
activity 10-health industry	0.020	102	0.139
activity 11-other activities	0.049	102	0.217

	other LAC (birth)		
	mean	nr obs	st dev
voluntary health insurance	0.127	102	0.335
NHS	0.824	102	0.383
public health susbsystem	0.157	102	0.365
private health subsystem	0.020	102	0.139
out of pocket expenditures	1.461	102	7.962
visits to physicians	0.588	102	1.189
pharmaceutical	0.294	102	0.458
daily smoker	0.186	102	0.391
occasional smoker	0.059	102	0.236
non smoker	0.755	102	0.432
problems with alcohol	0.000	102	0.000
preventive: blood pressure measure last year	0.680	25	0.476
preventive: cholesteral measure last year	0.600	25	0.500
meals per day	2.889	153	0.355
self assessed health	3.857	42	0.814
sick to work	0.029	102	0.170
mental score	0.524	42	1.871
chronic1 - reumatic	0.029	102	0.170
chronic2 - osteoporosis	0.000	102	0.000
chronic3 - glaucoma	0.000	102	0.000
chronic4 - retinopathy	0.000	102	0.000
chronic5 - cancer	0.000	102	0.000
chronic6 - stones in kidney	0.020	102	0.139
chronic7 - kidney failure	0.010	102	0.099
chronic8 - chronic anxiety	0.000	102	0.000
chronic9 - chronic wounds or leg ulcers	0.010	102	0.099
chronic10 - emphysema	0.010	102	0.099
chronic11 - stroke	0.000	102	0.000
chronic12 - obesity	0.020	102	0.139
chronic13 - major depression	0.049	102	0.217
chronic14 - heart attack	0.000	102	0.000
chronic15 - other chronic	0.186	102	0.391
diabetes	0.020	102	0.139
ashtma	0.088	102	0.285
hypertension	0.059	102	0.236
pain	0.049	102	0.217
score chronic conditions	-0.874	102	0.709

Table 27 – Descriptive statistics by country of birth: Eastern Europe

	Eastern Europe (birth)		
	mean	nr obs	st dev
years residence(<=10)	4.097	155	1.861
nr members in household	2.845	155	1.106
female	0.484	155	0.501
age (adults only)	34.852	155	8.707
bmi	24.551	148	3.452
school level1 (no schooling)	0.000	154	0.000
school level2 (1st basic)	0.006	154	0.081
school level3 (2nd basic)	0.045	154	0.209
school level4 (3rd basic)	0.318	154	0.467
school level5 (high school)	0.364	154	0.483
school level6 (pos high school)	0.045	154	0.209
school level7 (BSc)	0.091	154	0.288
school level8 (Undergrad-Licenciatura)	0.123	154	0.330
school level9 (Master)	0.006	154	0.081
school level10 (PhD)	0.000	154	0.000
single	0.071	155	0.258
married	0.890	155	0.314
separated	0.006	155	0.080
legally divorced	0.026	155	0.159
divorced	0.032	155	0.177
widow	0.006	155	0.080
income pcapita (in household)	514.197	155	379.328
employed	0.813	155	0.391
retired	0.000	155	0.000
prof1 - managers	0.000	155	0.000
prof 2 - professionals	0.013	155	0.113
prof 3 - technicians and associated professionals	0.026	155	0.159
prof 4 - clerical support services	0.013	155	0.113
prof 5 - services and sales workers	0.000	155	0.000
prof 6- skilled agriculture, forestry, fishery	0.135	155	0.343
prof 7 - craft and related trade	0.065	155	0.246
prof 8 -plant and machine operators and assemblers	0.303	155	0.461
prof 9 - elementary occupations	0.065	155	0.246
prof 10 - armed forces	0.277	155	0.449
prof 11 - other professions	0.103	155	0.305
activity1 - agriculture or fishery	0.168	155	0.375
activity 2- industry	0.032	155	0.177
activity 3- construction	0.052	155	0.222
activity 4-commerce	0.310	155	0.464
activity 5-restaurants and hotels	0.103	155	0.305
activity 6-transportation and communications	0.168	155	0.375
activity 7-education	0.019	155	0.138
activity 8-home activities	0.026	155	0.159
activity 9-civil services and armed forced	0.084	155	0.278
activity 10-health industry	0.000	155	0.000
activity 11-other activities	0.019	155	0.138

	Eastern Europe (birth)		
	mean	nr obs	st dev
voluntary health insurance	0.026	155	0.159
NHS	0.871	155	0.336
public health susbsystem	0.026	155	0.159
private health subsystem	0.090	155	0.288
out of pocket expenditures	0.226	155	0.944
visits to physicians	0.506	154	2.498
pharmaceutical	0.229	153	0.421
daily smoker	0.361	155	0.482
occasional smoker	0.026	155	0.159
non smoker	0.613	155	0.489
problems with alcohol	0.000	155	0.000
preventive: blood pressure measure last year	0.676	37	0.475
preventive: cholesteral measure last year	0.514	37	0.507
meals per day	2.983	58	0.131
self assessed health	4.010	102	0.682
sick to work	0.000	155	0.000
mental score	0.213	102	1.459
chronic1 - reumatic	0.032	154	0.178
chronic2 - osteoporosis	0.006	154	0.081
chronic3 - glaucoma	0.000	155	0.000
chronic4 - retinopathy	0.000	155	0.000
chronic5 - cancer	0.000	155	0.000
chronic6 - stones in kidney	0.013	155	0.113
chronic7 - kidney failure	0.000	155	0.000
chronic8 - chronic anxiety	0.000	155	0.000
chronic9 - chronic wounds or leg ulcers	0.000	155	0.000
chronic10 - emphysema	0.000	155	0.000
chronic11 - stroke	0.000	155	0.000
chronic12 - obesity	0.013	155	0.113
chronic13 - major depression	0.000	155	0.000
chronic14 - heart attack	0.013	155	0.113
chronic15 - other chronic	0.084	155	0.278
diabetes	0.000	155	0.000
ashtma	0.013	155	0.113
hypertension	0.045	155	0.208
pain	0.097	155	0.297
score chronic conditions	-1.024	154	0.483

Table 28 – Descriptive statistics by country of birth: EU15

	EU15 (birth)		
	mean	nr obs	st dev
years residence(<=10)	9.359	329	1.890
nr members in household	3.155	329	1.226
female	0.578	329	0.495
age (adults only)	38.705	329	16.336
bmi	24.571	325	4.144
school level1 (no schooling)	0.030	329	0.172
school level2 (1st basic)	0.040	329	0.195
school level3 (2nd basic)	0.116	329	0.320
school level4 (3rd basic)	0.191	329	0.394
school level5 (high school)	0.353	329	0.479
school level6 (pos high school)	0.012	329	0.110
school level7 (BSc)	0.055	329	0.228
school level8 (Undergrad-Licenciatura)	0.179	329	0.384
school level9 (Master)	0.018	329	0.134
school level10 (PhD)	0.006	329	0.078
single	0.331	329	0.471
married	0.578	329	0.495
separated	0.012	329	0.110
legally divorced	0.040	329	0.195
divorced	0.052	329	0.222
widow	0.040	329	0.195
income pcapita (in household)	649.332	329	518.610
employed	0.626	329	0.485
retired	0.131	329	0.338
prof1 - managers	0.021	329	0.145
prof 2 - professionals	0.070	329	0.255
prof 3 - technicians and associated professionals	0.100	329	0.301
prof 4 - clerical support services	0.097	329	0.297
prof 5 - services and sales workers	0.143	329	0.350
prof 6- skilled agriculture, forestry, fishery	0.140	329	0.347
prof 7 - craft and related trade	0.040	329	0.195
prof 8 -plant and machine operators and assemblers	0.112	329	0.316
prof 9 - elementary occupations	0.052	329	0.222
prof 10 - armed forces	0.085	329	0.279
prof 11 - other professions	0.140	329	0.347
activity1 - agriculture or fishery	0.234	329	0.424
activity 2- industry	0.049	329	0.215
activity 3- construction	0.094	329	0.293
activity 4-commerce	0.076	329	0.265
activity 5-restaurants and hotels	0.179	329	0.384
activity 6-transportation and communications	0.067	329	0.250
activity 7-education	0.046	329	0.209
activity 8-home activities	0.085	329	0.279
activity 9-civil services and armed forced	0.024	329	0.154
activity 10-health industry	0.033	329	0.180
activity 11-other activities	0.046	329	0.209

	EU15 (birth)		
	mean	nr obs	st dev
voluntary health insurance	0.191	329	0.394
NHS	0.869	329	0.338
public health susbsystem	0.073	329	0.260
private health subsystem	0.058	329	0.234
out of pocket expenditures	4.343	329	20.783
visits to physicians	0.854	329	1.284
pharmaceutical	0.508	329	0.501
daily smoker	0.267	329	0.443
occasional smoker	0.030	329	0.172
non smoker	0.702	329	0.458
problems with alcohol	0.036	329	0.188
preventive: blood pressure measure last year	0.719	89	0.452
preventive: cholesteral measure last year	0.517	89	0.503
meals per day	2.881	59	0.375
self assessed health	3.730	211	0.950
sick to work	0.018	329	0.134
mental score	0.416	211	1.691
chronic1 - reumatic	0.088	329	0.284
chronic2 - osteoporosis	0.036	329	0.188
chronic3 - glaucoma	0.006	329	0.078
chronic4 - retinopathy	0.003	328	0.055
chronic5 - cancer	0.006	329	0.078
chronic6 - stones in kidney	0.046	329	0.209
chronic7 - kidney failure	0.000	329	0.000
chronic8 - chronic anxiety	0.030	329	0.172
chronic9 - chronic wounds or leg ulcers	0.003	329	0.055
chronic10 - emphysema	0.009	329	0.095
chronic11 - stroke	0.003	329	0.055
chronic12 - obesity	0.036	329	0.188
chronic13 - major depression	0.100	329	0.301
chronic14 - heart attack	0.021	329	0.145
chronic15 - other chronic	0.277	329	0.448
diabetes	0.036	329	0.188
ashtma	0.073	329	0.260
hypertension	0.103	329	0.305
pain	0.112	329	0.316
score chronic conditions	-0.508	328	1.134

Table 29 – Descriptive Statistics by country of birth: other developed country

	other developed (birth)		
	mean	nr obs	st dev
years residence(<=10)	9.237	59	2.409
nr members in household	2.864	59	1.181
female	0.492	59	0.504
age (adults only)	36.153	59	18.786
bmi	24.690	57	4.150
school level1 (no schooling)	0.017	59	0.130
school level2 (1st basic)	0.034	59	0.183
school level3 (2nd basic)	0.102	59	0.305
school level4 (3rd basic)	0.237	59	0.429
school level5 (high school)	0.356	59	0.483
school level6 (pos high school)	0.017	59	0.130
school level7 (BSc)	0.051	59	0.222
school level8 (Undergrad-Licenciatura)	0.153	59	0.363
school level9 (Master)	0.000	59	0.000
school level10 (PhD)	0.034	59	0.183
single	0.339	59	0.477
married	0.508	59	0.504
separated	0.000	59	0.000
legally divorced	0.119	59	0.326
divorced	0.119	59	0.326
widow	0.034	59	0.183
income pcapita (in household)	612.721	59	352.393
employed	0.576	59	0.498
retired	0.136	59	0.345
prof1 - managers	0.000	59	0.000
prof 2 - professionals	0.034	59	0.183
prof 3 - technicians and associated professionals	0.153	59	0.363
prof 4 - clerical support services	0.136	59	0.345
prof 5 - services and sales workers	0.102	59	0.305
prof 6- skilled agriculture, forestry, fishery	0.136	59	0.345
prof 7 - craft and related trade	0.000	59	0.000
prof 8 -plant and machine operators and assemblers	0.085	59	0.281
prof 9 - elementary occupations	0.051	59	0.222
prof 10 - armed forces	0.034	59	0.183
prof 11 - other professions	0.271	59	0.448
activity1 - agriculture or fishery	0.356	59	0.483
activity 2- industry	0.000	59	0.000
activity 3- construction	0.102	59	0.305
activity 4-commerce	0.051	59	0.222
activity 5-restaurants and hotels	0.136	59	0.345
activity 6-transportation and communications	0.119	59	0.326
activity 7-education	0.085	59	0.281
activity 8-home activities	0.085	59	0.281
activity 9-civil services and armed forced	0.000	59	0.000
activity 10-health industry	0.017	59	0.130
activity 11-other activities	0.034	59	0.183

	other developed (birth)		
	mean	nr obs	st dev
voluntary health insurance	0.186	59	0.393
NHS	0.915	59	0.281
public health susbsystem	0.034	59	0.183
private health subsystem	0.051	59	0.222
out of pocket expenditures	3.559	59	13.360
visits to physicians	0.610	59	0.983
pharmaceutical	0.288	59	0.457
daily smoker	0.153	59	0.363
occasional smoker	0.017	59	0.130
non smoker	0.831	59	0.378
problems with alcohol	0.017	59	0.130
preventive: blood pressure measure last year	0.500	12	0.522
preventive: cholesteral measure last year	0.417	12	0.515
meals per day	2.911	33647	0.315
self assessed health	4.025	40	0.800
sick to work	0.017	59	0.130
mental score	0.709	40	1.605
chronic1 - reumatic	0.017	59	0.130
chronic2 - osteoporosis	0.034	59	0.183
chronic3 - glaucoma	0.017	59	0.130
chronic4 - retinopathy	0.000	59	0.000
chronic5 - cancer	0.051	59	0.222
chronic6 - stones in kidney	0.068	59	0.254
chronic7 - kidney failure	0.000	59	0.000
chronic8 - chronic anxiety	0.017	58	0.131
chronic9 - chronic wounds or leg ulcers	0.017	59	0.130
chronic10 - emphysema	0.000	59	0.000
chronic11 - stroke	0.000	59	0.000
chronic12 - obesity	0.000	59	0.000
chronic13 - major depression	0.034	59	0.183
chronic14 - heart attack	0.017	59	0.130
chronic15 - other chronic	0.203	59	0.406
diabetes	0.034	59	0.183
ashtma	0.051	59	0.222
hypertension	0.085	59	0.281
pain	0.068	59	0.254
score chronic conditions	-0.719929	58.000	1.297715

Table 30 – Descriptive statistics by country of birth: other countries

	other countries (birth)		
	mean	nr obs	st dev
years residence(<=10)	9.207	58	2.300
nr members in household	3.103	58	1.180
female	0.517	58	0.504
age (adults only)	45.483	58	15.708
bmi	24.931	58	4.097
school level1 (no schooling)	0.034	58	0.184
school level2 (1st basic)	0.121	58	0.329
school level3 (2nd basic)	0.017	58	0.131
school level4 (3rd basic)	0.207	58	0.409
school level5 (high school)	0.276	58	0.451
school level6 (pos high school)	0.052	58	0.223
school level7 (BSc)	0.086	58	0.283
school level8 (Undergrad-Licenciatura)	0.138	58	0.348
school level9 (Master)	0.034	58	0.184
school level10 (PhD)	0.034	58	0.184
single	0.190	58	0.395
married	0.724	58	0.451
separated	0.034	58	0.184
legally divorced	0.017	58	0.131
divorced	0.052	58	0.223
widow	0.034	58	0.184
income pcapita (in household)	832.030	58	640.497
employed	0.707	58	0.459
retired	0.103	58	0.307
prof1 - managers	0.000	58	0.000
prof 2 - professionals	0.103	58	0.307
prof 3 - technicians and associated professionals	0.138	58	0.348
prof 4 - clerical support services	0.155	58	0.365
prof 5 - services and sales workers	0.086	58	0.283
prof 6- skilled agriculture, forestry, fishery	0.069	58	0.256
prof 7 - craft and related trade	0.000	58	0.000
prof 8 -plant and machine operators and assemblers	0.103	58	0.307
prof 9 - elementary occupations	0.017	58	0.131
prof 10 - armed forces	0.155	58	0.365
prof 11 - other professions	0.172	58	0.381
activity1 - agriculture or fishery	0.224	58	0.421
activity 2- industry	0.034	58	0.184
activity 3- construction	0.017	58	0.131
activity 4-commerce	0.121	58	0.329
activity 5-restaurants and hotels	0.086	58	0.283
activity 6-transportation and communications	0.086	58	0.283
activity 7-education	0.052	58	0.223
activity 8-home activities	0.017	58	0.131
activity 9-civil services and armed forced	0.017	58	0.131
activity 10-health industry	0.103	58	0.307
activity 11-other activities	0.121	58	0.329

	other countries (birth)		
	mean	nr obs	st dev
voluntary health insurance	0.155	58	0.365
NHS	0.759	58	0.432
public health susbsystem	0.207	58	0.409
private health subsystem	0.034	58	0.184
out of pocket expenditures	1.983	58	10.440
visits to physicians	0.741	58	0.928
pharmaceutical	0.414	58	0.497
daily smoker	0.224	58	0.421
occasional smoker	0.017	58	0.131
non smoker	0.759	58	0.432
problems with alcohol	0.034	58	0.184
preventive: blood pressure measure last year	0.824	17	0.393
preventive: cholesteral measure last year	0.765	17	0.437
meals per day	2.824	329	0.455
self assessed health	3.763	38	0.786
sick to work	0.000	58	0.000
mental score	0.930	37	1.379
chronic1 - reumatic	0.121	58	0.329
chronic2 - osteoporosis	0.034	58	0.184
chronic3 - glaucoma	0.000	58	0.000
chronic4 - retinopathy	0.000	58	0.000
chronic5 - cancer	0.017	58	0.131
chronic6 - stones in kidney	0.000	58	0.000
chronic7 - kidney failure	0.000	58	0.000
chronic8 - chronic anxiety	0.017	58	0.131
chronic9 - chronic wounds or leg ulcers	0.017	58	0.131
chronic10 - emphysema	0.017	58	0.131
chronic11 - stroke	0.000	58	0.000
chronic12 - obesity	0.052	58	0.223
chronic13 - major depression	0.034	58	0.184
chronic14 - heart attack	0.017	58	0.131
chronic15 - other chronic	0.207	58	0.409
diabetes	0.069	58	0.256
ashtma	0.052	58	0.223
hypertension	0.138	58	0.348
pain	0.069	58	0.256
score chronic conditions	-0.584	58	0.876

Table 31 - Correlation matrix between country of birth and remaining variables in the analysis

	Portugal (birth)	PALOPs (birth)	other African (birth)	Brazil (birth)	other LAC (birth)	Eastern Europe (birth)	other countries (birth)	EU15 (birth)	other developed (birth)	emigrant
years residence(<=10)	0.503	-0.123	0.0032	-0.470	0.005	-0.6137	0.005	-0.051	-0.0828	0.042
nr members in household	-0.019	0.034	0.0158	-0.018	0.072	-0.0345	-0.008	0.001	-0.0008	-0.087
female	-0.005	0.000	-0.0048	-0.010	0.024	-0.0209	0.006	0.027	-0.018	-0.062
age (adults only)	0.113	-0.065	-0.0155	-0.053	-0.040	-0.0633	0.004	-0.041	-0.0018	0.181
bmi	0.048	-0.018	-0.0111	-0.011	0.023	-0.0311	-0.026	-0.031	-0.0243	0.049
school level1 (no schooling)	.	.	.	.	.	.	.	.	.	.
school level2 (1st basic)	0.165	-0.072	-0.0273	-0.057	-0.045	-0.0684	-0.036	-0.094	-0.0334	0.141
school level3 (2nd basic)	0.019	-0.008	-0.0125	-0.003	0.029	-0.0312	-0.021	-0.005	0.0014	-0.034
school level4 (3rd basic)	-0.053	0.065	0.0303	-0.016	0.006	0.0379	-0.007	-0.001	0.0199	-0.050
school level5 (high school)	-0.140	0.034	0.0113	0.070	0.049	0.0617	0.036	0.098	0.0047	-0.065
school level6 (pos high school)	-0.039	-0.010	-0.0022	-0.006	-0.004	0.0339	0.056	0.020	0.0776	-0.028
school level7 (BSc)	-0.053	0.035	-0.0046	0.023	-0.008	0.0656	-0.008	0.011	-0.0056	-0.012
school level8 (Undergrad-Licenciatura)	-0.042	0.004	0.0178	0.036	-0.015	-0.0008	0.050	0.036	-0.0108	-0.062
school level9 (Master)	-0.021	-0.008	-0.0018	-0.005	-0.003	-0.0045	-0.003	0.062	-0.0022	-0.001
school level10 (PhD)	-0.007	-0.007	-0.0016	-0.004	-0.003	-0.004	-0.003	-0.006	0.1074	0.039
single	-0.033	0.012	0.008	0.035	0.004	-0.0147	0.016	0.025	0.0015	-0.107
married	-0.004	0.001	0.0019	-0.018	0.011	0.0327	-0.009	-0.003	-0.0043	0.080
separated	0.022	-0.013	-0.0029	-0.008	-0.005	-0.0074	-0.005	-0.011	-0.0036	0.008
legally divorced	-0.001	0.016	-0.0061	-0.003	-0.010	-0.0154	0.012	-0.012	0.0225	0.019
divorced	0.009	0.008	-0.0068	-0.006	-0.011	-0.0172	0.009	-0.015	0.0187	0.021
widow	0.043	-0.024	-0.0084	-0.012	-0.014	-0.0211	-0.014	-0.015	-0.0103	-0.008
income pcapita (in household)	-0.039	0.034	-0.0075	0.004	-0.011	-0.0277	0.057	0.037	-0.0097	-0.038
employed	-0.080	0.067	0.0115	0.032	0.026	0.042	-0.001	0.011	-0.0041	-0.073
retired	0.064	-0.048	0.0035	-0.040	-0.025	-0.037	0.009	-0.017	0.0267	0.092
prof1 - managers	-0.002	0.025	-0.0027	-0.007	-0.005	-0.0068	-0.005	-0.010	-0.0033	-0.006
prof 2 - professionals	-0.004	-0.010	-0.0072	-0.008	0.045	-0.018	0.007	0.019	-0.0088	0.008
prof 3 - technicians and associated professionals	-0.031	0.015	-0.0077	0.046	-0.013	-0.0193	0.023	0.015	0.015	-0.027
prof 4 - clerical support services	-0.028	0.031	0.0493	-0.022	0.004	-0.0202	0.039	0.011	0.0135	-0.040
prof 5 - services and sales workers	-0.012	0.008	-0.0098	-0.018	-0.016	-0.0246	0.013	0.040	0.0277	-0.025
prof 6- skilled agriculture, forestry, fishery	-0.017	0.011	0.0324	0.018	0.034	-0.0108	-0.006	-0.004	-0.0139	-0.002
prof 7 - craft and related trade	0.025	-0.029	-0.0092	-0.015	-0.015	0.0285	-0.015	-0.004	-0.0113	0.080
prof 8 -plant and machine operators and assemblers	0.016	-0.011	-0.0122	0.006	0.005	0.0359	-0.020	-0.038	0.002	0.019
prof 9 - elementary occupations	0.030	0.002	-0.0075	-0.020	-0.013	-0.0065	-0.013	-0.027	-0.0092	0.020
prof 10 - armed forces	-0.030	0.038	-0.0106	0.005	-0.018	0.0469	-0.018	-0.006	0.0057	-0.037
prof 11 - other professions	0.041	-0.051	-0.0126	0.004	-0.009	-0.0235	0.003	0.006	-0.0155	0.004
activity1 - agriculture or fishery	0.025	-0.038	-0.0152	0.013	-0.004	-0.0165	0.007	0.006	-0.0186	-0.005
activity 2- industry	0.028	-0.028	-0.0091	-0.015	-0.015	-0.0018	-0.015	0.012	-0.0111	0.070
activity 3- construction	0.041	-0.014	-0.0113	-0.030	-0.005	-0.0106	-0.019	-0.016	-0.0138	-0.001
activity 4-commerce	-0.045	0.020	0.0216	0.045	0.005	0.0511	-0.013	-0.003	-0.0096	0.029
activity 5-restaurants and hotels	-0.022	0.009	0.0313	-0.007	0.033	-0.0205	0.007	0.025	0.0033	-0.009
activity 6-transportation and communications	-0.030	0.019	-0.0073	0.016	0.007	0.0323	0.007	-0.017	0.0425	0.007
activity 7-education	-0.002	0.011	-0.0057	-0.015	-0.009	-0.0142	0.014	0.002	0.0251	-0.024
activity 8-home activities	0.016	-0.011	-0.0084	-0.023	0.003	-0.0099	-0.014	0.009	0.0124	-0.027
activity 9-civil services and armed forced	-0.026	0.016	-0.0053	0.017	-0.009	0.0545	-0.009	-0.007	-0.0065	-0.023
activity 10-health industry	0.011	0.031	-0.0086	-0.013	-0.014	-0.0216	0.002	-0.023	-0.0106	-0.003
activity 11-other activities	-0.019	0.014	-0.0063	0.037	-0.010	-0.0013	0.011	-0.002	-0.0077	-0.007
voluntary health insurance	-0.041	0.041	0.0161	-0.006	0.000	-0.0234	0.000	0.038	0.0301	-0.001
NHS	-0.021	0.009	0.0153	0.021	0.004	0.0024	-0.018	0.015	0.0041	0.033
public health subsystem	0.043	-0.002	-0.0136	-0.030	-0.011	-0.0342	0.012	-0.027	-0.0167	-0.031
private health subsystem	-0.041	-0.016	-0.0056	0.014	0.015	0.0651	0.015	0.024	0.0254	-0.010
out of pocket expenditures	0.022	-0.013	0.0179	-0.014	-0.008	-0.0125	0.004	-0.010	-0.0065	-0.003
visits to physicians	0.034	-0.010	0.009	-0.022	-0.007	-0.0284	-0.007	-0.015	-0.0064	0.054
pharmaceutical	0.061	-0.034	0.0075	-0.035	-0.027	-0.0589	0.019	-0.004	-0.0218	0.078
daily smoker	-0.031	0.044	0.006	-0.007	0.001	0.0286	0.001	-0.004	-0.0164	-0.035
occasional smoker	-0.002	0.015	-0.0044	-0.012	-0.007	-0.0111	-0.007	-0.002	0.0351	-0.022
non smoker	0.030	-0.048	-0.0041	0.011	0.002	-0.0232	0.002	0.005	0.0026	0.042
problems with alcohol	-0.004	0.035	-0.0066	-0.005	-0.011	-0.0164	-0.011	-0.014	0.0201	0.032
preventive: blood pressure measure last year	0.058	-0.030	-0.0068	-0.039	0.010	-0.0388	-0.002	-0.015	-0.0326	0.054
preventive: cholesteral measure last year	0.052	-0.024	0.0052	-0.037	0.006	-0.0353	0.006	-0.026	-0.0127	0.059
meals per day	0.009	-0.0096	0.009	0.006	0.0006	0.003	0.014	-0.0205	-0.008	-0.0366
self assessed health	-0.111	0.028	0.0055	0.067	0.031	0.0475	0.021	0.066	0.0395	-0.120
sick to work	0.016	-0.006	-0.0041	-0.011	-0.007	-0.0103	-0.007	0.000	-0.005	0.042
mental score	-0.043	-0.008	0.006	0.042	0.014	0.0026	0.032	0.033	0.0151	-0.024
score chronic conditions	0.077	-0.027	0.0015	-0.045	-0.024	-0.0504	-0.011	-0.029	-0.0243	0.112
chronic1 - reumatic	0.071	-0.045	-0.015	-0.041	-0.025	-0.0158	0.008	-0.028	-0.0184	0.109
chronic2 - osteoporosis	0.037	-0.023	-0.0093	-0.016	-0.015	-0.0232	0.000	-0.012	0.0095	0.069
chronic3 - glaucoma	0.016	-0.015	0.0611	-0.009	-0.006	-0.0085	-0.006	-0.012	-0.0041	0.025
chronic4 - retinopathy	0.019	-0.011	-0.0026	-0.007	-0.004	-0.0064	-0.004	-0.009	-0.0031	0.020
chronic5 - cancer	0.031	-0.012	-0.005	-0.014	-0.008	-0.0125	-0.008	-0.018	-0.0061	0.006
chronic6 - stones in kidney	0.007	0.009	-0.0083	-0.002	-0.014	-0.0096	-0.014	0.002	-0.0102	0.027
chronic7 - kidney failure	0.030	-0.018	-0.004	-0.011	-0.007	-0.01	-0.007	-0.014	-0.0049	0.002
chronic8 - chronic anxiety	0.021	0.003	0.0235	-0.020	-0.012	-0.0186	-0.012	-0.009	-0.0091	0.023
chronic9 - chronic wounds or leg ulcers	-0.010	0.005	-0.0029	-0.008	-0.005	-0.0073	0.040	0.011	-0.0036	0.016
chronic10 - emphysema	0.019	0.003	-0.0056	-0.015	-0.009	-0.0139	0.015	-0.020	-0.0068	0.028
chronic11 - stroke	0.023	-0.006	-0.0041	-0.011	-0.007	-0.0102	-0.007	-0.015	-0.005	0.024
chronic12 - obesity	-0.010	-0.002	-0.0062	0.010	0.034	-0.0155	-0.010	0.019	-0.0076	-0.009
chronic13 - major depression	0.016	-0.008	0.0129	-0.002	-0.017	-0.0261	-0.003	0.009	-0.0127	0.029
chronic14 - heart attack	0.004	0.010	-0.0038	-0.010	-0.006	-0.0095	-0.006	0.003	-0.0047	0.017
chronic15 - other chronic	0.022	-0.003	-0.0055	-0.034	0.012	-0.0339	0.021	0.003	-0.0257	0.054
diabetes	0.043	-0.014	-0.0088	-0.024	-0.015	-0.022	-0.015	-0.017	-0.0108	0.052
ashtma	0.011	-0.001	-0.007	-0.007	-0.012	-0.0176	-0.012	0.002	0.0179	0.019
hypertension	0.070	-0.024	-0.0012	-0.036	-0.010	-0.0378	-0.020	-0.036	-0.0218	0.098
pain	0.037	0.000	0.0051	-0.023	-0.012	-0.0272	-0.012	-0.023	-0.017	0.046

Table 32 – Health status regression, measured by chronic conditions and with complete set of control variables

	probit regression	
	nr observ	27847
	HS2=1 if at most 2 chronic conditions, 0 if more than 2 chronic	
	Coef.	P>|z|
PALOPs (birth)	-0.1102617	0.461
other African (birth)	5.497927***	0
Brazil (birth)	0.0664025	0.854
other LAC (birth)	-0.3331461	0.359
Eastern Europe (birth)	4.779732***	0
other countries (birth)	-0.3667717	0.246
EU15 (birth)	0.1901328	0.399
other developed (birth)	5.678231***	0
emigrant	-0.0224697	0.525
years residence(<=10)	-0.0019437	0.95
nr members in household	-0.0131743	0.166
female	-0.6106245***	0
age (adults only)	-0.0754076***	0
age squared	0.0003874***	0
bmi	-0.0296347	0
school level2 (1st basic)	0.0636888	0.689
school level3 (2nd basic)	0.0158867	0.92
school level4 (3rd basic)	0.0616369	0.694
school level5 (high school)	0.1418025	0.367
school level6 (pos high school)	0.1376624	0.581
school level7 (BSc)	0.0520824	0.757
school level8 (Undergrad-Licenciatura)	0.0932218	0.551
married	-0.0306555	0.492
divorced	-0.0104039	0.872
widow	-0.0542031	0.339
income pcapita (in household)	0.0000736***	0.006
employed	0.1208656***	0.003
retired	-0.1533395***	0.001
sick to work	-0.6250994***	0
activity1 - agriculture or fishery	-0.1151902	0.107
activity 2- industry	0.0040185	0.956
activity 3- construction	-0.1349667**	0.05
activity 4-commerce	-0.0040778	0.957
activity 5-restaurants and hotels	-0.0756423	0.27
activity 6-transportation and communications	-0.1170297	0.134
activity 7-education	-0.0342901	0.662
activity 8-home activities	0.0686359	0.415
activity 9-civil services and armed forced	-0.1363971	0.118
activity 10-health industry	-0.0137985	0.859
activity 11-other activities	-0.0902659	0.281
public health susbsystem	-0.0435397	0.32
private health subsystem	0.0080677	0.903
daily smoker	0.0275597	0.406
occasional smoker	0.0564804	0.528
meals per day	-0.0796913**	0.031
problems with alcohol	-0.2099986***	0
women * age	0.0110414***	0
women * schooling	0.0062887	0.332
women * PALOPs	0.2165308	0.304
women * other African	-5.95838	.
women * Brazil	-0.1019594	0.811
women * East Europe	-4.858199	.
women * other countries	0.4201299	0.404
women * EU15	-0.2937757	0.288
women * other developed	-5.937303	.
constant	5.266178***	0

Notes: * significant at 10%, ** significant at 5%, *** significant at 1%. Reference groups are individuals with the following characteristics: born in Portugal, who never migrated, male, with no schooling, a master or a PhD, single, unemployed, who did not miss work due to sickness in the past 3 months, who do not smoke, who do not have problems with alcohol.