

The London School of Economics and Political Science

Inequalities and Inequity in utilisation of health care among the
older people in Greece

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Declaration

I certify that the thesis I have presented for examination for the MPhil/PhD degree of the London School of Economics and Political Science is solely my own work other than where I have clearly indicated that it is the work of others (in which case the extent of any work carried out jointly by me and any other person is clearly identified in it). The copyright of this thesis rests with the author. Quotation from it is permitted, provided that full acknowledgement is made. This thesis may not be reproduced without my prior written consent. I warrant that this authorisation does not, to the best of my belief, infringe the rights of any third party.

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Abstract

Thirty years have passed and five major reforms have followed since the establishment of the Greek National Health System (NHS) in 1983 on universal coverage as an elementary policy goal, and the Greek NHS is still insufficient with regard to organisation, coverage, funding and delivering health services. The primary objective of the thesis is to employ quantitative empirical methods to explore some key aspects of equity in the receipt of health care in Greece among the older population via two nationwide and one urban setting datasets. This thesis comprises three essays which shed light on the equity issue before and after NHS major reforms of 2001-4 and 2005-7.

The findings of this thesis suggest that inequalities in health care exist mainly for the probability of specialist and dentist private visits. Income-related inequalities are less apparent in probability of inpatient admissions and probability of outpatient visits, favoring the less advantaged. Income itself is not the only contributor. The findings indicate intra and interregional inequalities in most of health care services use except for probability of GP visits, favoring residents of thinly-populated areas. Compared to Athens region, regional disparities-inequalities are not apparent for inpatient care, as well. Furthermore, the findings suggest that even though we signify territorial disparities in the probability of specialist visit favoring the better off, once the positive contacts of specialist visits are included, the elderly have equal probability to make a specialist private visit, irrespective of their income and their region of residence.

In addition, this thesis finds that inequalities are apparent among the Social health insurance funds (SHIFs) in use of most health care types, except the probability of inpatient admissions. Non Noble Farmers OGA SHIF - who tends to be less advantaged - has a more pronounced pro poor contribution to overall inequity in the probability of specialist private visit than the Noble SHIFs, revealing an unfair relationship. This thesis also finds that OOP expenses constitute a significant financial burden to inpatient and outpatient care. There is a regressive trend in OOP amount for inpatient admission in terms of ability to pay and region of residence favoring residents of thinly-populated areas and Central Greece region- who tend to be less advantaged. For outpatient care, there is a progressive trend in OOP amount in terms of ability to pay, SHIF coverage and region of residence.

The thesis provides useful tools for understanding and measuring inequalities in the use of health care among the older population, who are the most constant consumers of health services. It urges policy makers to review the governance of primary health care by setting conditions and implements measures for improving efficiency, unifying SHIFunds, eliminating geographical inequalities and control the role of OOP expenses as significant barriers to access health care, especially during the current period of economic crisis.

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Abbreviations

CI	Concentration Index
CSDH	Commission on Social Determinants of Health
CT	Computed Tomography scanners
DRG	Diagnosis-related group
DYPEs	Regional Health Administrations
EC	European Commission
ECHP	European Community Household Panel
ELSTAT	Hellenic Statistical Authority
EOPYY	National Organization for Healthcare Provision
EPY	Central Committee of Health Supplies
EU	European Union
FFS	Fee-for-Service
GALI	limited in general activities
GDP	Gross Domestic Product
GNHIS	Greek National Health Interview Survey
HCCs	Health Care Centers
HI	Horizontal Inequity
ICUs	Intensive Care Units
ISCED	International Standard Classification of Education
LPM	Linear Probability Model
LTI	suffering from long term illness
MoD	Ministry of Development
MoF	Ministry of Finance
MoH	Ministry of Health
MoL	Ministry of Labour
MRI	Magnetic Resonance Imaging
NHS-ESY	National Health System
Noble SHIF	Noble OAEE for the self-employed and small businesses
OAEE	
Noble SHIF	Noble OPAD for civil servants
OPAD	
Non Noble OGA	Non Noble OGA SHIF for farmers
Non Noble IKA	Non Noble SHIF IKA blue-collar employees
SHIF	
NSPH	National School of Public Health
NUTS	Nomenclature of Territorial Units for Statistics
UHC	Universal Health Coverage
ODIPY	Organization for the Management of Health Care Financial Resources
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Square
OOP	Out-of-Pocket
OOPPs	Out-of-Pocket Payments

Patra's HIS	Patra's Health Interview Survey
PEDY	National Health Network for Primary Care network
PeSYPs	Regional health and welfare authorities
PHC	Primary Health Care
PI	Private Insurance
RHAs	Regional health Authorities
RHAs / YPE	Regional Health Authorities
SADH	self-assessed dental health
SAH	self-assessed health
SHARE	Survey of Health, Ageing and Retirement in Europe
SHI	Social Health Insurance
SHIF	Social Health Insurance Fund
VHI	Voluntary Health Insurance
WHO	World Health Organisation
2PM	Two-part model

Structure of the research questions

This thesis conforms to the requirements of a doctoral thesis from the London School of Economics and Political Science. Guidelines state a minimum of three papers of publishable standard—in addition to introduction and conclusion chapters—not exceeding 100,000 words. Accordingly, this thesis presents an introduction – conceptual framework chapter, where background, conceptual framework and evidence are given. The Chapter two presents the methodology we follow, an overview of research questions and data, the data and methodology limitations are given. The Chapter three provides an overview of the health status and socioeconomic profile of older population in Greece, as well as a detailed description and discussion of the healthcare system in Greece. Chapters four, five and six are three essays based on two nationwide and one urban setting datasets that constitute the survey tools of the thesis. Chapter four is about PatraHIS survey, Chapter five is about GreekNHIS survey and Chapter six is the SHARE survey. Chapter seven presents the summary of the findings, policy recommendations, limitations and future research agenda.

Chapter One

1. Conceptual Framework - Motivation

This chapter summarizes the conceptual approaches, frameworks and principles that underpin the recommendations for action in recognizing and eliminating inequalities in use of health care. The challenges and relevant evidence that the Greek health care system faces are presented in relation to health care use among the elderly.

1.1 Equity in health care

In order to present the conceptual framework of the study for examining the inequity in utilisation of health care among the elderly, we need firstly to define what equity in health care is. There are at least four distinct conceptual approaches/schools concerning the equity term in health care, each of which are connected to the role played by both the State and the individual freedom in this policy area: (a) egalitarianism, (b) libertarianism, (c) the utilitarian, (d) rawlsianism approach.

According to the *egalitarianism* school, equity in health care means: Equality of public expenditure, in cases- for instance- that no attention was paid to differences in health status or need for health care. Another interpretation focuses on equality of outcome, that is, the distribution of health itself. The egalitarian approach mainly concentrates on the burdens to explain what the school defines as equity into valid policy recommendations (Mooney, 1992a, 1992b). The egalitarian explanation or interpretation we choose to follow in this research, considers the concept of need for health care services and consequently equality of treatment for equality need, financed health care according to ability to pay (Wagstaff & Van Doorslaer, 2000). It definitely doesn't mean equalising health outcomes. Additionally, it can be translated into more specific policy recommendations.

Libertarianism preserves personal liberty and connects equity in terms of distribution to entitlement. This implies entitlement to what the individual possesses considering it was acquired rightly. Nozick proposed that such possessions are based on earnings, inheritance or are obtained by government of holdings redistribution which was acquired illegally (Pereira, 1993). In a nutshell, regarding a situation as equal fully depends on the way or process used to get to it. It becomes obvious that the libertarian approach differs greatly from any equity statement in the policy area in most European countries. To sum up, for libertarians the market is an extra source of fairness. For this school, access to health care

is a privilege- not a right-- and only when the individual obtains it through the market, it could be considered to have a right over it. (Williams, 1993). The interest in the libertarian approach is connected to the redistribution and the state role is seen as unjust in itself.

The *utilitarian* school pays attention to maximisation principles, according to which resources should be allocated to maximise total or aggregated utility. This is related to the maximisation of health gain by means of provision of health care services. There is no possibility of redistribution and no role for State action is prioritised as well. There are several technical and methodological handicaps and limitations in applying the utilitarian approach. If such an approach is to be used, we must answer questions like: “whose utilities matter?” “How should we attempt to measure them?” “How can we actually compare interpersonal utilities?” “How should we proceed in the aggregation of such utilities?” Those questions are still in the core of the debate among health economists.

Rawls’ *maximin* and the veil of ignorance imply that social policies should try to maximise the position of the least well-off. Rawls’ standing point has been criticised greatly (Le Grand, 1987a; 1987b). How should the most disadvantaged group be defined? How can we tell whether inequalities are to their advantage or not?

It is worth mentioning that the libertarian and egalitarian views on equity differ highly due to the equity-efficiency trade-off. The libertarian viewpoint focuses on a “private” system, and the level of access relies upon the ability and willingness to pay. On the other hand, the egalitarian view suggests a publicly financed system where “equal opportunity of access for those in equal need would be the determining rule” independently “of who is paying for the care.... The success criterion in the egalitarian system is the level and distribution of health in the community” (Williams, 1993). Therefore, the debate between the libertarian and egalitarian perspective is not resolved in practice and illustrates the obvious impact that equity of access to health care has on the design and performance of the health system. *Overall*, the approach used in this research is a pro-egalitarian view of equity, which assesses the extent to which health care is for practical reasons distributed according to need, and financed according to ability to pay (Van Doorslaer et al., 1993). More specifically, egalitarians may judge equity by evaluating whether individuals, who could be ranked as in equal need- as a result of sharing a similar health status (as measured by ill-health indicators)- receive equal treatment as measured by the use of health care types (Van Doorslaer et al., 1993). There are various reasons for such a choice. In a similar way, as it happens with other European countries, in Greece there is a mixed system providing health care, but the egalitarian viewpoint appears to prevail. Moreover,

according to the findings of a lot of empirical work on equity in health care this egalitarian standpoint, for the purpose of comparative research, one could argue in favour of this approach. Being aware of the relevance of this approach, due to the universal coverage conditions in Greece, this research has focused on utilisation equality. In health care delivery conceptual framework three –very significant- equity principles have been used: equality of health, allocation with regard to need and equality of access. The conceptual framework of this study will adopt the principles of health care allocation according to need and equality of access.

1.2 A feasible working definition of equity in health care

Additionally, in order to clarify a feasible working definition of equity for policy-makers, Whitehead (1991) builds on Mooney's proposed seven equity principles in order to develop an operational definition involving the three dimensions of accessibility, acceptability and quality, as displayed by Allin S. et al (2009).

1. Equal access to available care for equal need – entails equal entitlements (i.e. universal coverage); fair distribution of resources throughout the country (i.e. allocations on basis of need); and removal of geographical and other barriers to access.
2. Equal utilization for equal need – to ensure use of services is not restricted by social or economic disadvantage (and ensure appropriate use of essential services). This implies differences in utilization arising from individuals who exercise their right to use or not use services according to their preferences. This is in line with the definition of equity based on personal choice, for example, an outcome is equitable if it arises in a state in which all people have equal choice sets (Le Grand 1991).
3. Equal quality of care for all – that is, care allocated on the basis of need ; same professional standards for everyone (such as consultation time, referral patterns); finally, care regarded as acceptable by everyone.

In a similar effort to define equity under the perspective of health policy-makers, Oliver & Mossialos (2004) argue that “equal access for equal need is the most appropriate definition, because it outlines health care and respects the plausible acceptable reasons for differentials in health-care utilization”. Moreover, unequal access across groups defined by income or socio-economic status is the most appropriate starting point for directing policy and is consistent with many governments’ aims to provide services on the basis of need rather than ability to pay (Oliver & Mossialos 2004). Most governments’ policy documents and a number of European-level strategies underlie and share the goal of equal (or less unequal) health outcomes. Moreover, at EU level, since the European Union Lisbon

summit in March 2000 and the Open Method of Coordination for social protection and social inclusion, a number of European-level strategies have been developed to underlie and support the improvement in equity of access (Atkinson et al. 2002). During that period the commitment to improve equality in health was less evident (Gulliford 2002).

However, since the Reform Treaty in Lisbon on 19 October 2007, the EU stressed the overarching goal of reducing health inequalities. One of the key issues pointed out by the EU Health Strategy (2008-2013) was to strengthen the measuring of health inequalities, monitoring, evaluation and reporting by “improving the data and knowledge base and mechanism determinants to implement effective action in relation to particular population groups and determinants” (COM,2007). Moreover, the main principle of universal health coverage (UHC), as introduced by the WHO Health Report 2010 and WHO-CSDH (2013) and adopted by the Greek Government is that UHC embodies one of the ultimate goals of health systems and intermediate objectives associated with effective coverage, financial protection and improved health system performance: that all people obtain the health services they need (i.e. equity in service use relative to need) and that these services are of sufficient quality to be effective. Given the definition of UHC, however, fully achieving UHC is impossible for any country (Kutzin J, 2013). Even countries that succeed in attaining universal financial protection have shortfalls in effective coverage.

1.3 Distinction between access and utilisation

From Hulka B.S. and Wheat JR. (1985) to Dixon et al. (2007) several theoretical approaches of health care utilization have been formed in an attempt not only to understand from different perspectives (economic, psychosocial, behavioural, epidemiological, etc.) why health care utilization patterns differ from one person to another, but also which are the barriers and to what extent (geographical, financial, and socio-cultural) account for affecting health care.

Utilization means obtaining the health care provided by the health care services in the form of health care contact (Fernandez-Olano C. et al, 2006). One thing we should take into account is the distinction between utilisation and access as identified by Culyer A, et al (1991) and Mooney G, et al. (1991). *Equality in terms of access* means that all individuals in need can have equal opportunities in health service use; *equality of utilisation* demands that they really use the service. For reasons we have accepted (i.e. various socio-cultural and individual preferences), people in equal need and with equal opportunities to health care may not use those opportunities equally. These acceptable reasons should not be confused with unacceptable reasons for differential use of health care. The difficulties in

giving actual outcomes to choices or to factors beyond individual control are obvious. As a consequence, most researchers in the field have focused simply on the differences in utilisation. For this, they have claimed that any differences result from inequalities in access and not from free choice. Thus, inequality in utilisation is considered to be inequitable, either because it is inequitable in and of itself, or because it is a proxy for access inequalities. We will accept this last interpretation through this research: that is, we regard observed inequalities in utilisation as proxies for inequalities in access and hence as inequitable.

In our research we will also follow the conceptual approach that “variations and inequity in utilisation is present almost everywhere, even in the universal health systems that provide the majority of services free at the point of delivery” (Dixon et al., 2007; and Allin S. et al, 2007). As the existing evidence points out, people in more vulnerable population groups- who have more need for health care (e.g. worse health status), do not always receive this care because their knowledge on services’ availability is poor and because they face barriers to access (financial, socio-cultural, geographical etc) that incommensurately influence the lower socioeconomic groups (Dixon et al., 2007; EC, 2008; Allin S. et al, 2007).

1.4 Definition of Need

Although the debate concerning need in the years since Bradshaw’s analysis has been great (Doyal L, Gough I., 1991), there is still great disagreement about what constitutes “need” for health care, and it is obvious that understanding, defining, measuring, and comparing the needs coming from individual health problems or illnesses, will be a complicated and hard task (Oliver A., Mossialos E., 2004). There must be a lot of effort to develop a generally accepted definition of need for health care, but two components- sometimes contradictory to one another- are highly important (Oliver A., Mossialos E., 2004):

- a) There is a tendency to equate need for health care with ill-health ,i.e. as the sicker patients are given more care to recover - currently treated by most clinicians (Culyer and Wagstaff, 1993).
- b) It equates as the individual’s capacity to benefit from health care (need defined as “the amount of resources required to exhaust the capacity to benefit”) currently embraced by most health economists (Wagstaff and Van Doorslaer, 1998; Culyer AJ., 2001). In practice it is too difficult to measure capacity to benefit. The research reviewed in this paper directly or indirectly defines need in terms of health status. On the other hand, although these two components of need will sometimes conflict with one another, they are possibly

important (Oliver A., Mossialos E., 2004). Overall, as Allin et al (2009) highlight “no definition of equity can involve the multiple supply- and demand-side factors which affect the allocation of effective, high-quality health care on the basis of need” (p.198). Definition of equity is highly complex and requires a comprehensive set of information about individuals, their contacts with health care, the organizational characteristics of the system as well as the application of strong methodological techniques in order to evaluate and assess

1.5 Health Equity and Social Determinants of Health

Over the last decade there has been a considerable European and International focus on the issue of health inequalities. Addressing health inequalities was a key action of the EU Health Strategy “Together for Health: A Strategic Approach for the EU (2008-2013)”.¹ In 2008, the European Commission established an Expert Working Group on Social Determinants and Health Inequalities.² Under mandate by EU in order to address these health inequities within and between countries, the WHO’s *Commission on Social Determinants of Health (CSDH)* published the WHO Global CSDH Review on health inequalities in 2008 (WHO - CSDH, 2008). The Commission collected, collated and analysed evidence from around the world about the social determinants of health and the policies that affect them. Based on this evidence, the report of the CSDH –WHO (2008) and the subsequent strategic European Review on Health Inequalities (WHO, 2013) have provided a robust framework and evidence for action emphasizing the link between social conditions, social inequalities, inequities in health and health status. Globally, the Commission (CSDH) conceptualized the social determinants of health as the conditions in which people live their daily lives and the structural influences on these conditions that ultimately reflect the distribution of power and resources within and between countries. Simply put, the Commission concluded that societal inequities in health arise from social inequalities. Reducing inequities in health and thereby improving overall population health requires action to address the processes that promote relative disadvantage and social exclusion by building a fairer society. The Commission proposed three principles of action to tackle inequities in health:

- improve the conditions of daily life – the circumstances in which people are born, grow, live, work and age;

¹ White Paper: Together for Health: A Strategic Approach for the EU 2008-2013 - EU Health Strategy: Brussels, 23.10.2007 - COM(2007) 630 final http://ec.europa.eu/health-eu/doc/whitepaper_en.pdf

² Meetings of the EU Expert Group on Social Determinants and Health Inequalities
http://ec.europa.eu/health/social_determinants/events/index_en.htm

- tackle the inequitable distribution of power, money and resources – the structural drivers of these conditions of daily life – globally, nationally and locally;
- and measure the problem, evaluate action, expand the knowledge base, develop a workforce that is trained in the social determinants of health and raise public awareness about the social determinants of health.

According to the WHO-CSDH, the conditions of daily life that are influenced by structural drivers, include: economic arrangements, distribution of power, income, gender equity, policy frameworks and the values of society, as well as the immediate, visible circumstances of people's lives, such as their access to health care, schools and education; their conditions of work and leisure; their homes, communities, and rural or urban settings; and their chances of leading a flourishing life. In addition, these structural determinants influence how services are provided and received and thereby shape health care outcomes.

Following, the Commission adopted in 2009 a joint Communication by DG SANCO and DG EMPL entitled: "Solidarity in Health: Reducing Health Inequalities in the EU", which aimed to reduce health inequalities by supporting action by Member States and stakeholders, and through EU policies, via issuing a number of Reports and Working Documents. Health Inequalities have also been addressed by the Council of the European Union since 2013. EC via addressing health inequalities reflects that "a lot can be done by the health sector in terms of raising and maintaining awareness and ensuring that health systems are based on the core values of universality, access, goods, equity and solidarity" (EquityAction, 2013). While the general relationship between social factors and health is well established, the relationship is not precisely understood in causal terms (WHO, 2010). In this framework, models have been developed by the WHO-CSDH (2008) to reflect the deep-rooted, interrelated and cyclical causes of health inequalities. The conclusions and recommendations across the 53 countries of the WHO-EU of this review have informed development of the European health policy framework Health 2020 (WHO, 2012a) in the Europe 2020 strategic plan (EC, 2014) with the main vision - goal: "To improve the health and well-being of populations, to reduce health inequities and to ensure sustainable people - centred health systems". Following, the more recent *WHO global strategy on people-centred and integrated health services* (WHO, 2015b and 2016) emphasizes the importance of integration and sets strategic priorities on strengthening health systems "to become more people-centred in order to accelerate health gains, reduce health inequalities, guarantee financial protection and ensure an efficient use of societal resources". At the same time, universal health coverage (UHC) is considered both an instrumental and

intrinsic goal of health systems³. According to the WHO-CSDH (2008) recommendations and WHO people-centred strategy (2015b) “One response to addressing health inequities open to all is to ensure universal coverage of health care”. In promoting universal health coverage, the states aim to narrow the gap between health needs and utilization, improve the quality of care, ensure financial protection and enhance equity by identifying and protecting vulnerable and marginalized groups. Moreover, in order to progress towards UHC, “regular measurement of equity is paramount. Average levels of the indicators are critical measures of overall progress but must be supported by disaggregated measurements to redress inequalities across different population groups. This includes disaggregation by income/wealth, education, sex, age, place of residence (e.g. rural/urban), migrant status and ethnic origin (e.g. indigenous groups)” (WHO, 2012).

1.6 Ageing and Health Equity Challenges

Considering ageing and health equity, a lot of international and EU policy instruments have guided action on healthy ageing since 2002 with the United Nations *Political declaration and Madrid international plan of action on ageing* (UN, 2002) and WHO’s Organization’s policy framework on active ageing (WHO, 2002); the WHO-CSDH (2008 and 2013 Review) that adopts the life-course model with recommendations on the “fundamental stage of older age” and the most recent WHO’s *World Report on Ageing and Health* (WHO, 2015). Moreover, the importance of reducing health inequities at older age has been recognized by the European Council and European Parliament through its designation of 2012, as “the European year of active ageing and solidarity between generations”. These documents identify the importance of health in older age, both in its own right and flag several key issues that include among other “promoting health and well-being throughout life; and ensuring universal and equal access to health-care services to reduce health inequities at older age” (WHO-CSDH, 2013 Review). Therefore, ensuring access to appropriate health services will be essential to overcoming these inequalities for the growing older population. However, there are few key challenges – barriers, related to current ineffective public-health approaches to population ageing that need to be overcome, if improved access is to be the most important determinant of health, especially for vulnerable groups, such as the elderly (WHO, 2015). They include:

³ Starting with the 58th World Health Assembly resolution in 2005³, which called for countries to plan for the transition to UHC, till the United Nations Resolution A/67/L36/2012 on universal health coverage and the recent Joint WHO/World Bank report with the first global monitoring report on tracking UHC (WHO, 2015), a broad consensus regarding the importance of UHC has been steadily building.

- Despite the fact that *older people's right to health is enshrined* in international law, yet people often experience *age discrimination in terms of age-based rationing of health care* on the notion that health services must be allocated to achieve the greatest good for most people. However, there is no clear association between chronological age and health.
- Although *health inequities* are apparent in the health status of older people due to the health dynamics of older age, the *association with the demand for, and utilization of, health services is less clear-cut*. It is likely that disadvantaged older people are caught between their greater need for health care and having less access to, or less use of, appropriate services, even in high-income countries.
- Although the world is experiencing a rapid transition towards ageing populations, *health systems generally have not kept pace*:
 - ✓ Most health services have been designed to cure acute conditions than to manage and minimize chronic states prevalent in older age. For long-time, *paying attention to long-term health and functioning was not a priority*.
 - ✓ All too often, older people are rendered invisible in policies and plans. Health systems are poorly aligned with the needs of the older populations they serve.
 - ✓ Consequently, many *older people suffer from gaps in the coordination of their care* across treatment levels, as the health systems leave the burden on the older person or their family to communicate relevant health information when needed.
- Considering *the economic implications of population ageing*, common perceptions and assumptions exist, as following:
 - ✓ There is a common *assumption that aging population presents a major economic barrier to the health system's effectiveness*. Despite the evidence for income inequalities in demand for health care, the link between age and health-care expenditures is not linear, as it is influenced by the health system itself (ie incentives to providers, interventions in frail older people, cultural norms etc). Therefore, it seems that aging population does not present a major economic barrier.
 - ✓ According to evidence, ageing has far less influence on health care expenditures than other factors, including the *high costs of new medical technologies*.
- About current evidence, there is *a lack of data* in addressing and measuring equity in health care use among the older population, despite older people being by far the highest consumers of health services.

- ✓ Older people likely face potentially greater difficulties in accessing health care services than their younger counterparts: greater financial difficulties due to reduced income, geographical barriers may arise from limitations in mobility, and lengthy waiting times may present a greater health burden than younger.
- ✓ Within the older population it is probable that those who are more better off financially would likely experience less barriers than those who are less educated and on lower income. As a result, one would expect to observe inequitable patterns of service use across income groups within the elderly.

1.7 Health Equity and Ageing in the Greek health care system

The conceptual approaches and key policy challenges that the Greek health care system faces for ensuring access to health services to overcome health care inequalities among the elderly, are presented as following.

1.7.1 Constitutional Right to health and health care

According to Greece's political system⁴, the Parliament undertakes legislative tasks that apply to the whole of the country. *Health is consolidated in the Greek Constitution* of 1975 (revised in 1986, 2001 and 2008) as a social and individual right (Hellenic Parliament, 2008) via general principles and three provisions that guarantee a set of fundamental rights of social protection and social security. In particular, the Articles 5§5, 21§3 and 21§6 define healthcare and social rights; Article 22§5 establishes social insurance rights for all workers and employees -including the health branch of the Social Security Funds; finally, Article 25§1, which was introduced during the Constitutional revision of 2001, places these rights under the larger principle of a “Welfare State Rule” (Hellenic Parliament, 2008). The relevant principal health-related provisions - Articles, as revised by the parliamentary resolution of May 27th 2008 of the VIIIth Revisionary Parliament are the following:

- “All persons have the right to the protection of their health and of their genetic identity. Matters relating to the protection of every person against biomedical interventions shall be specified by law” (Article 5§5);
- “The State shall care for the health of citizens and shall adopt special measures for the protection of youth, old age, and disability for the relief of the needy”. (Article 21§3);

⁴ Greece's political system is a parliamentary democracy established by the 1975 Constitution (as amended in 1986, 2001 and 2008), following a seven-year military dictatorship regime (1967–1974).

- “People with disabilities have the right to benefit from measures ensuring their self sufficiency, professional integration and participation in the social, economic and political life of the Country” (Article 21§6); and
- “The State shall care for the social security of the working people, as specified by law” (Article 22§5). It includes the health branch of the Social Security Funds;
- “The rights of the human being as an individual and as a member of the society and the principle of the welfare state rule of law are guaranteed by the State. All agents of the State shall be obliged to ensure the unhindered exercise thereof” (Article 25§1).

The above provisions enshrine the right to the protection of citizens' health. The state has a legal obligation to undertake the effort through the appropriate bodies to provide citizens the protection of their health, namely to protect this social right. According to civil law authors, the above constitution provisions (“right to the protection of their health” –Art. 5.5 and “care for the health of citizens” – Art.21.3) indicate that the State ensures the protection of citizens' health in a general and abstract wording, without specifying particular protection framework. It seems that, the provisions emphasize more the objective nature of health protection (Anthopoulos C.,1993; Dagtoglou P.,1991; Vegleris F.,1982; Kremalis K. ,1987). Moreover, there are two main principles of entitlement. One is entitlement on the basis of citizenship and the other is entitlement on the basis of occupational status and insurance contributions.

Government decisions also have to be enacted by the law or by lower level regulations for which the executive has received delegated powers from the legislative: presidential decrees, ministerial decisions and decisions of the social security administration, with the prior approval of the supervisory ministry or body. Therefore, the social and individual right to health in the way that is enshrined in the Constitution (“protection” and “care”) cannot have direct effect before the adoption of a special law. Indicatively, the enactment of Law1397/1983 on the Greek NHS - ESY was occurred eight years after the adoption of the Constitution of 1975, indicating that ultimately it is a matter purely of the State whether a right will be activated, to what extent and degree, or to delay its implementation.

In any case, *the founding law of the Greek National Health System (NHS) or ESY in 1983 (Law 1397/1983)* encompasses the Constitutional social and subjective right of citizens to health services provided by the rules, and up to date is considered to be the most significant attempt to make a radical change in the health sector, which would gradually lead to a comprehensive public health care system. The philosophy of the law was based on the principle that health is a social good and that all citizens, irrespective of their

socioeconomic status or location of residence, should have equal *rights to access to healthcare services*. Its aim was to expand coverage and reduce inequities, particularly in finance, access and resource allocation (Mossialos E. et al, 2005). According to the Law 1397/1983, five keystones express the fundamental principles of NHS-ESY and the stated objectives of the *health system that it should be: comprehensive, equal, with universal coverage, of high quality and free of charge at the point of delivery*. Therefore, the establishment of the ESY aimed at comprehensive and universal coverage of the population based on the principle of equity. Following the establishment of the NHS-ESY in 1983 (L.1397/1983) five major reforms (1992, 1997, 2001-4, 2005-7 and 2011 – today) including a number of legislative acts were undertaken, in the same philosophy of universal coverage of the population: 1992 (L.2071/1992); 1997 (L.2519/1997); 2001-4 (L.2955/2001; L.3172/2003; L.3235/2004); 2005-7 (L.3329/2005, L.3370/2005, L.3457/2006, L.3580/2007) and 2011 – today (L.3863/2010, L.3918/2011, L.4025/2011, L.4052/2012, L.4368/2016). These reforms and the relative legislation are presented briefly in the overview of the Greek health care system Chapter, below. The universal coverage of the population has been a major policy goal, taking for granted that all citizens must have access to health care services in accordance to need, not their ability to pay; to diminish inequity. More recently, the Greek government passed legislation (a number of Ministerial Decrees and Law 4368 /2016) that set out entitlement of uninsured people and their families to access primary and inpatient health services, and pharmaceutical care.

1.7.2 A fragmented welfare state as the origin of the Greek health care system

The institutional peculiarities of the Greek health care system are strongly related to the way the Greek Welfare state has developed in the post-authoritarian era since 1974. Welfare provision is not a right associated with citizenship, but a quality associated with the participation in the labour market. The Greek Welfare system since its onset is characterized by the fragmentation of funds, heterogeneous measures for treating specific issues and a complete lack of overview and planning. It is divided between overprotected insiders (stable participants to labour market) who have access to welfare programmes, and under protected outsiders (part-time workers, young unemployed) who do not. Fragmentation and incomplete coverage are evident in all areas of social security. (Venieris, 1997: 268; Mylonas and Maisonneuve, 1999, Petmesidou, 2001; O' Donnell and Tinios, 2003: 264-8; Sotiropoulos, 2004: 269). As a result, the relatively high level of social spending in Greece has paradoxically not been translated into effective social transfers, and the inequalities based on occupational status and political affiliations are

further exacerbated (Guillen and Matsaganis, 2000: 122). What makes the Greek case exceptional is the degree of inequity implicit in present arrangements. Moreover, despite the successive reforms, the current crisis and the successive bailout agreements since 2010 have put into question the sustainability of the system (even in the medium-term), mainly due to the fast decreasing revenues of social insurance funds, in addition to the over 50% losses on their bond holdings that incurred in spring 2012. The recession, extensive contributions evasion, undeclared labour and demographic ageing constitute a perilous mix that puts at stake the system's viability. Drastic downward pension adjustments for current and future retirees increase insecurity.

1.7.3 Current features - challenges of the Greek Health Care System

Despite success in improving the health of the population, the Greek health care system still faces structural problems concerning the organization, financing and delivery of services. Four decades after the establishment of the NHS in 1983, the system hardly reached the state of a fully-fledged national health service, in the face of sustained opposition to most of the major changes proposed (Mossialos and Davaki, 2002; Economou, 2010; Economou, 2015). Both in terms of funding and service delivery a mixed system continued to operate until recently: a fragmented, occupation-based health insurance system was combined with a national health service, while, in parallel, private provision expanded rapidly until the eruption of the crisis. The health system still functions within an outmoded organizational culture dominated by clinical medicine and hospital services, without the support of an adequate planning unit or adequate, accessible information on health status, utilization of health services or health costs; with a regressive system of funding including extensive user charges and informal payments; inefficient allocation of resources based on history rather than needs, perverse incentives for providers; a heavy reliance on unnecessarily expensive inputs, and without being proactive in addressing the health needs of the population through actions in public health and primary health care. As a result, the public is generally dissatisfied with the health care system and many of the major players in reforms appear puzzled at the relative failure of successive well-meaning reform efforts, influenced by clientelism, political particularism, conflict between political parties and economic interests, resistance by the medical status quo and absence of consensus (Mossialos and Davaki, 2002, Mossialos et al, 2005). The most significant of the problems regarding health policy in Greece is the gap between declared objectives, enactment and implementation of legislation. Future reforms need to focus on high-priority areas, including: restructuring of primary health care, pooling of

financial resources, changing the payment system of providers, introducing new managerial and administrative methods, adopting cost-effective and monitoring mechanisms, and developing policies for better allocation of resources.

1.7.4 Peculiarities/characteristics of the Greek health care system in terms of health care provision to the ageing population

In terms of the overview of health care policy and health care provisions available to older people, *Greece's peculiarities* include the following characteristics:

- Absence of specialist geriatric assessment services. Due to this fact, other services such as internal medicine, cardiology and psychiatry are placed under considerable pressure, because older people require longer than average periods of hospitalisation. Moreover, lack of support and limited resources in terms of the availability of alternative care provisions, such as rehabilitation care, sometimes leads to older people being “abandoned” in hospital resulting in inappropriate and costly care, as studies in Athens revealed and recognised in reports (Mestheneos E., et al, 2004; Lamura G., 2003; Sissouras A, et al, 2002).
- Older people have the same access to healthcare provisions as the rest of the population under the common fear “that the development of separate services for older people could create a two-tier system, in which care of the elderly would be given lower priority - thus leading to poorer services” (Lamura G., 2003 p.10; Triantafillou and Mestheneos, 1994).
- Since the creation of the NHS-ESY in 1983, Greece has lacked a GP-based comprehensive, integrated primary health care system, with gatekeeping functions, particularly in urban areas. Thus most people attending a primary health care centre, without access to a GP or family doctor, continue to be attended by specialists. This inadequacy results in older patients and their families to have a “consumer” approach of “shopping around” for specialist services as they perceive them to be necessary.
- Given that there is no universal statutory scheme for LTC and integrated care still remains a neglected subject, there is a gap in long-term care for older persons (EC, 2014). This determining factor for the (under) development and scarce organisation of public services consists also a potential source of inequalities among the elderly.
- There are no structures in place within the health care services to respond to the priorities of more disadvantaged or vulnerable groups, as the elderly. The coordination between the health, the social care sector and care services for the elderly is not adequate.

- The low percentages of elderly hosted in residential homes (about 3%) or receiving home care, show that providing elderly care is mainly based on the family, and much less on formal services, given that LTC is not statutory established. The family generally plays the central role in the process of care and in many instances it is considered as the most effective institution for offering the “integrated” balance of health and social care to the older person (Rodrigues R. et al,2012; Lamura et al.,2008 and Leichsenring K.,2003).
- Moreover, the central role of the family lies in the traditional principle of reciprocity which rules the Greek society. Under such circumstances, it is not surprising that the financial situation of both cared for and caring persons represent one main factor of inequality among elderly people in Greece (Lamura et al., 2008; Tinios P. & Zografakis, S.,2001).
- So far, Greece, although stated in governmental strategy documents (National Action Plans for Public Health 2008-2013, 2014-2020; Health in Action Initiative, 2012 etc) has never really implemented any successful strategy for healthy ageing. Major barriers include: focus on curative services; lack of cooperation of municipalities with health centres; fragmented and uncoordinated PHC system; significant cuts due to the economic crisis.
- The fact that older people have the same access to healthcare provisions as the rest of the population, and in order to describe the way that health care services are provided to the Greek elderly and examine whether this could be a source of inequalities, we need, after presenting the health and socioeconomic profile of the Greek elderly, to describe the features of the Greek health care system, as in Chapter Three below.

1.8 Framework of health access barriers

The factors that potentially affect diverse access to health care across different groups should also be taken into consideration. With the information and data we currently possess, we cannot easily disentangle them and be led to a fully understandable and coherent policy response (Goddard M. and Smith P., 2001). A searching in the literature for studies in utilisation and receipt of health care reveals that barriers to access can be present at different points between the supply and demand. A barrier to access frequently relies upon the complex interaction of supply and demand-side factors and both factor types will determine the extent to which access to health care is equitable (Mossialos E. and Thomson S., 2003). Barriers involve both structural factors relating to the costs and organisation of services and problems with knowledge, cultural beliefs and attitudes

regarding medical conditions, and patient preferences and priorities regarding treatments. In order to explain the impact of non-need factors/potential barriers on inequity in utilisation of health care among the elderly, the framework we are going to use is related and based on the framework of health access barriers by Wörz/Foubister/Busse/Mossialos et al. (2006). This framework comes from the HealthACCESS European project which aimed at investigating access to health services in 10 Member States of the European Union both within and among countries. In this framework, hurdles for obtaining accessible, appropriate and acceptable health services are formulated as a filter that consists of six layers of barriers to access health care, as in the figure 1 below. Moreover, it should be mentioned that one descends the filter, individual preferences gain importance.

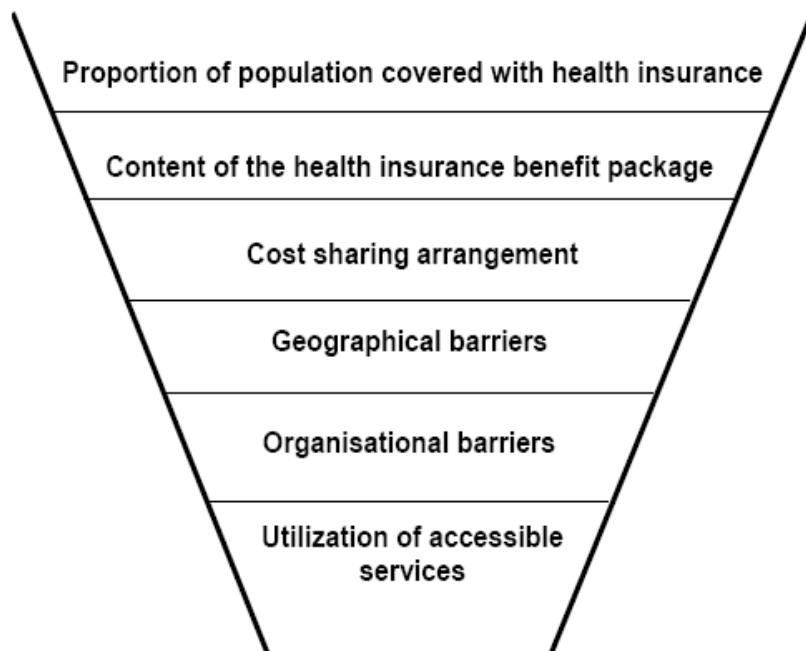
The layers of barriers are the following:

- The first barrier – the proportion of population having health insurance – deals with the extent to which citizens are legally entitled to care under systems of health care coverage (e.g. Statutory Health Insurance, National Health Service or more specific systems of coverage). Here, the structure of the different systems of coverage which exist within one country (including health and long-term care coverage) is also examined. However, if health insurance is offered, then the relevant benefit has to be included under the insurance scheme in question (in the case that someone cannot pay out of pocket health care).
- The second barrier - the content of the health insurance benefit package - refers in detail to the actual benefits under the systems of health care coverage and the issue of possible differences in benefits coverage between systems within countries. Given these two conditions one can distinguish four more barriers depicted in Figure 1, which are in a way more interrelated and also cannot be set in chronological order. These are cost sharing arrangements, geographical and organisational barriers and accessible services utilisation.
- The third barrier – the cost sharing arrangement - refers to cost-sharing demands for covered health services in the systems described in the two first items above. These cost-sharing demands are separated into different kinds of health services (e.g. inpatient, outpatient, pharmaceuticals etc.). The introduction of cost sharing arrangement affects the utilisation of accessible services (Wortz et al, 2006).
- The fourth barrier – the geographical barriers - refers to potential regional differences with regard to supply of health care facilities and personnel and urban/rural disparities

(concerning flows of patients across internal borders). Finally, it refers to provision of ambulance services and their performance concerning time limits.

- The fifth barrier – the organisational barriers - refers to the introduction of waiting lists which prevents access and it is an important motive for flows of patients. In addition, it refers to other plausible organisational barriers in the system, such as differing reimbursement rates.
- The last barrier – the utilisation of accessible services – concerns a significant distinction regarding access to health services: the availability of services and their actual utilisation. It also entails differences in utilization detected in relation to several socio-demographic categories (socio-economic status, sex, age, ethnicity etc.).

Figure 1.1 The health access barrier filter



Source: Wörz/Foubister/Busse/Mossialos *et al.* (2006)

1.9 Emerging points or why a thesis addressing inequalities in health care use among the older population in Greece?

Given the above characteristics of the current situation, investigating and understanding the underlying determinants of health inequalities among older people is a great challenge for the Greek health care system. This study comes at an important moment in Greek health care system. Emerging points of the current situation include:

- Greece has a dramatically increased ageing population (the fourth highest proportion in OECD 42 countries and the EU28), leading possibly to additional demands for, and utilisation of health and care services.
- Although it is often difficult to assess the relationship between health care expenditure and ageing owing to many projection methodology differences - Greece has not recently gathered official data – older data reveal that a significant proportion of public health expenses – more than 30% are devoted to the health treatment of the elderly which is mainly due to the fact that their health cost per capita is on average 4.3 times higher (for those over 75 years of age: 5.9% higher) than for the younger population (MoH, 1999: 14).
- These demographic changes create new challenges in inequalities in health care use, especially during the period of the crisis that Greece experiences since 2009, with the cuts in public health and social care expenditure. In particular:
 - ✓ The economic recession in Greece and Europe, the longer life expectancy, the strain on social support services and increasing economic pressures on families and older people via severe cuts in salaries and pensions, lead to negative effects, particularly for those most at risk of vulnerability, especially in terms of increased restrictions on access to quality health and social care, affecting their health status (Rechel et al., 2011).
 - ✓ The general approach of cost-containment measures has taken the form of horizontal cuts, rather than a more strategic approach targeting resource allocation. This highlights the fact that, so far, cost-containment and greater efficiency have not been achieved via the introduction of necessary and major structural reforms. Beyond the inefficiencies of the NHS-ESY, other areas that have not been included in the health reform agenda include: measures to ensure continuity of care, establishing palliative care services and the integration of health and social care services.
 - ✓ In addition, they have put into question the sustainability of whatever public care structures have been developed since the early 1980s (Matsaganis M, LeventiC, 2014; Economou C et al, 2014; Mitrakos T, 2013; SimouE., KoutsogeorgouE., 2014; Zavras D et al, 2013; KaitelidouD, Kouli E.,2012).
- The health system needs to be capable of using evidence and monitoring effects to ensure the effectiveness of actions undertaken, to allow policy refinement and knowledge development about other actions and the impacts they might yield.

- Little attention has also been paid to investigating and measuring equity in the use of health care among the elderly in a systematic way, since they are the consumers who, though they receive high health services (Allin S. and Mossialos E., 2005). Although there is a plethora of indicators of outcomes, evidence-based interventions are not sufficient for addressing health care inequalities.
- In Greece, there are no clear policy frameworks relating to health inequalities in health and health care (CHRODIS JA, 2014). Equality in health is mentioned in a number of recent documents⁵, usually in terms of access to care, but it is described in the narrow sense of geographical distribution of services and financial obstacles, with little mention of other factors affecting access to services or health in general.

Overall, the aforementioned challenges – inefficiencies of the Greek NHS that aims at offering a universal and equal healthcare, the fragmented inefficient welfare state with the non-exist LTC or elderly care, in conjunction with: the demographic ageing; the new challenges of the continuing economic crisis; the limited or incomplete evidence in the inequalities in health care use among the increasing older population in Greece; and the need for a clear understanding of inequalities in health care use in order to transform the NHS system for serving its foundation principles of equity in access and universality - are *my main motivation* for this thesis.

Under this framework, the following paragraphs highlight the nonsystematic approach that Greece has investigated the existence of barriers to access and inequalities in using health care focused on the general population and the older population with an incomplete way.

1.10 Evidence for inequity in utilization of health care in Greece

Therefore, we collect, organize and appraise existing evidence according to the following search and selection strategy for a systematic review.

(A) Search and selection strategy for systematic literature review

A systematic literature review was conducted. Literature published in English before August 2016 was searched via three possible sources: 1) four electronic databases (MEDLINE (PubMed), Scopus, IBSS; Global Health); 2) Grey literature was searched using a targeted search of London School of Economics – LSE Library Collections and 3) references in selected articles. The search was developed combining terms referring to outcome: “health care utilization”; exposure: “income-inequalities”, “socio-demographic

⁵ A National Action Plan to ensure access to health services for all the citizens- adopted by the Greek Ministry of Health in 2013

inequalities”, “regional inequalities”, “Out of pocket payments” and participants: “older population”, “general population”. Search terms included combination of the keywords in the systematic search, as presented in Table 1.1. Titles and abstracts of all references identified in the search were screened applying exclusion and inclusion criteria according to the definitions of the concepts of the systematic search and the type of study, as presented in Table 1.1. The lists of references of the resulting studies were checked to ensure that all relevant articles were included in the search. The findings of the studies included in this review were synthesized in a narrative format, and the data were extracted using a customized template including the items: author, year, source of data, method, subject, exposure, result/outcome, measure of outcome, as displayed in Appendix - Tables 1.2 - 1.5. Only studies in English language based on evaluation of primary data were considered. Overall, 1,573 papers were found, and 24 papers were found via bibliographic search in reference lists of eligible articles, resulting in a total of 1,597 studies. After exclusion of 982 studies not focusing on Greece, 615 studies remained. Out of these studies for Greece, 557 studies not focusing on health care use but mainly on medical and health status issues were excluded and 58 studies remained containing relevant information concerning the factors displayed at Table 1.1. Overall, out of these 58 studies included, are 9 longitudinal and 41 cross-sectional surveys. Seventeen (17) studies use econometric estimation methods for measuring inequalities and 29 studies are purely descriptive out of which 18 studies concern determinants of health care use or unmet health care needs. Our review is structured as in the following paragraphs.

Table 1.1: Search and selection strategy for systematic literature review: Keywords and selection criteria

Concept	Keywords	Inclusion criteria	Exclusion criteria
Outcome/ result: "health care utilization"	"health care use"[All Fields] OR "Access" [All Fields] OR "hospital care"[All Fields] OR "inpatient care"[All Fields] OR "GP"[All Fields] OR "Any medical care" [All Fields] OR "any physician" [All Fields] OR "specialist" [All Fields] OR "Family doctor" [All Fields] OR "outpatient"[All Fields] OR "Primary Health Care"[All Fields] OR "EOPYY" [All Fields] OR "Dental care"[All Fields] OR "social insurance fund" [All Fields] AND "Greece"	Studies estimating the outcomes	Excluded: studies not centred on the outcome of interest (i.e.health status, health risk behaviours, cognitive impairment etc)
Outcome/ result: "inequalities"	"inequalities" [All Fields] OR "inequities" [All Fields] OR "variances" [All Fields] OR "disparities" [All Fields] OR "discrepancies" [All Fields]	Studies estimating the outcomes	Excluded: studies not centred on the outcome of interest
Participant: "Older population"	"old population" [All Fields] OR "elderly"[All Fields] OR "old age" [All Fields] OR "aged 50" [All Fields] OR "aged 60" [All Fields] OR "ageing"	Studies focused on older population; Studies on general population with estimates of health care use provided for selected old age groups	Excluded: studies not focused on older or general adult population
Participant: "General population"	"Adults" OR "population not elderly" OR "Not old ages"	Studies with estimates of health care use on general population	Excluded: studies not focused on older or general adult population
Exposure: "income-inequalities"	"income-inequality" OR "income" OR "determinants of health care"	Analysis considering any of these factors	Macro level analysis
Exposure: "socio-demographic inequalities"	"socioeconomic factors" OR "socioeconomic determinants" OR "socioeconomic position" OR "education" OR "housing tenure" OR "household" OR "social insurance" OR "private insurance" OR "sex" OR "gender" OR "marital status"	Analysis considering any of these factors	Macro level analysis
Exposure: "regional inequalities"	"rural"[All Fields] OR "Urban" [All Fields] OR "region of residence" [All Fields] OR "regional variances" [All Fields] OR "geographical discrepancies" [All Fields] OR "rural"[All Fields] OR "Urban"[All Fields] OR "geographical proximity"	Analysis considering any of these factors	Macro level analysis
Exposure: "OOPPs"	"out of pocket payments"[All Fields] OR "informal payments" OR "direct payments"[All Fields] OR "financial barrier"	Analysis considering any of these factors	Macro level analysis
Type of study		English, quantitative studies, qualitative studies, reviews	Conference abstracts, reports and editorials

(B) Systematic literature review results

We identify in total, evidence of 58 studies for inequity and variations in utilization of health care in Greece focused on the general population (41 studies) and older population (17 studies) in the following directions:

- (a) Overall, fourteen (14) comparative studies conducted at an EU-level with the participation of Greece, focused on general population which are distinguished between:
 - (ai) income-related inequity studies in health care (8 studies) using data mainly of the European Community Household Panel (ECHP) and (aui) financial and other barriers (cost sharing, geographical proximity, waiting times etc) to access (6 studies) in health care and unmet medical needs; and
- (b) Overall, twenty five (27) Greek studies conducted in Greece –in a nationwide (21 studies), regional (2 studies) and urban (4 studies) settings - that examine determinants of health care use including income or socioeconomic status (SES) in the general population as well as the responsiveness of the Greek health care system and unmet medical needs.
- (c) We also detect few (17 studies) at EU-level comparative studies with the participation of Greece for older population, in their analysis.

The design, methods, measures and main findings of these comparative and Greek studies for the general and the older population in Greece are displayed in Tables 1.2 to 1.5 in the Appendix. The following paragraphs include summarized the main findings of our systematic review and highlight the approach that Greece has investigated the existence of barriers to access and inequalities in using health care focused on the general population and the incomplete way for investigating inequalities among the older population.

1.10.1 Inequity in GP/HCC physician visit

It is worth mentioning that when we interpret findings of income-related equity in GP/HCC physician visits, it is important to keep in mind that given that there is undersupply of GPs in HCCs and oversupply of specialists, individuals in Greece usually refer to different specialists for their health problems according to their need. Moreover, in some cases, people consult a single provider – specialist regularly (or not often a GP at HCCs) and they consider him as their “personal” or “family” doctor. Therefore, in reality the question of GP/HCC physician or SHIF physician visits may be answered as a specialist visit, indicating caution in the interpretation of the findings.

1. We identify *evidence for pro-poor and weak pro-poor* inequity in probability of GP or HCC physician visit:

 - (a) Few *EU comparative studies* of European Community Household Panel (ECHP) *with the participation of Greece* that indicate pro-poor inequity: (i) studies with pooled analysis of 1994-2001 ECHP data for Greece of Bago d'Uva T., et al (2009, 2007); Bago d'Uva T. & Jones A. (2009); (ii) studies of Van Doorslaer et al, 2006; and Van Doorslaer & Masseria (2004) using data of the ECHP 2000 for Greece, that found pro-poor inequity for the probability of GP visit.
 - (b) *Studies by Greek researchers*: (i) a recent cross-sectional nationwide survey study of Zavras D et al, (2014) based on examined determinants of PHC services in Greece during 2006 using WHO methodology for assessing PHC (Üstün et al., 2001) and found that people with lower income report increased PHC services; (ii) two other cross-sectional nationwide mail surveys conducted in Greece 2001 - 2002 of Geitona et al, (2007) and Kyriopoulos et al (2002) that examined the determinants of PHC and hospital care utilization and found that the number of PHC visits is affected by income only for poor population, whereas they are mail studies with significant limitations on design method.
 - (c) *Urban setting and regional studies by Greek researchers*: (i) a regional study in Thessaly has been carried out (North Greece) and found pro poor inequity in PHC visits (Lahana E. et al, 2011); (ii) a cross-sectional urban study in the broader Athens area of Pappa E. and Niakas D. (2006) - for determinants of health care use-finds pro-poor inequity for SHIF physician visits; (iii) a cross-sectional urban setting study of Sissouras A, Karokis A et al (1996) in the third largest urban area of Patras', within the Phase II framework (1993-1997) programme of W.H.O. European Healthy Cities, that indicated more conditional SHIF visits from those in lower SES, although these local studies have small sample.
 - (d) *Elderly population study* of Majo M. & Van Soest A. (2012) based on SHARE Wave1 data of 2004 that GP visits reveal pro-poor income related inequity.
2. On the other hand, there is *evidence for slightly pro-rich* inequity in probability of GP or HCC physician visit:

 - (a) *EU comparative studies* of ECHP *with the participation of Greece* that indicate pro-rich inequity: (i) two studies of Van Doorslaer et al (2004; 2002) using ECHP 1996 data for Greece that found slightly pro-rich inequity for the probability of GP visit; (ii) a recent study based on ECHP data concluded that in Greece higher SES users

report average total number of GP and specialist visits three times larger than that of the lower SES users (i.e. predicted total number of GP users is 1:3.06) (Bago d'Uva et al., 2009);

- (b) *Studies by Greek researchers:* a nationwide study that finds pro-rich family physician visit but once family physicians are not established in Greece - due to inexistence of GPs- individuals may consider a specialist as their “personal” or “family” doctor. Thus, the results should be treated in caution (Tountas et al, 2011).
- (c) *Elderly population study* of Allin S. & Masseria C., (2006) based on SHARE data indicated that GP visits are slightly positively associated with income.

1.10.2 Inequity in outpatient visit (or any medical visit)

Given that “any medical consultation” by definition includes emergency and outpatient visits and excludes dentist visits and inpatient nights”, in our review for evidence of inequity in outpatient visit, we include results of studies for any medical visit provided in the wider PHC framework, as well.

1. We identify evidence for *no clear association of income with outpatient visits*:
 - (a) *Studies by Greek researchers:* (i) two studies for the general population evaluating cases treated in the emergency department of a Greek general hospital -that reported increased outpatient visits not associated with income - and revealed that almost one in three patients in specific surgical specialties could have been managed by a GP, as could 40% of orthopaedic cases (Marinos et al., 2009; Vasileiou et al., 2009); (ii) two studies that found no association of socioeconomic characteristics with informal payments in public hospitals for inpatient or outpatient admissions (Siskou et al, 2008; Liaropoulos et al, 2008).
 - (b) *Urban setting study* in Athens for the general population, that doesn't find any income association for outpatient care (Pappa E. & Niakas D., 2006).
 - (c) *Elderly population studies* of: (i) Majo M. & Van Soest A. (2012) based on SHARE data indicating that outpatient care does not increase with income.
2. On the other hand, there is *evidence for pro-poor* inequity in outpatient visits by the cross-sectional urban setting study of Sissouras A, Karokis A et al (1996) in Patras' the third largest urban area, within the Phase II framework (1993-1997) programme of W.H.O. European Healthy Cities, that indicated more conditional outpatient visits from those in lower SES (pro poor) – mainly for having diagnostic tests and medication

prescribing. However, this is an older study conducted before the NHS-ESY reforms of 2001.

3. Moreover there is evidence of *slightly pro-rich inequity* for any physician visit for *older population* based on comparative SHARE Wave 1 data for Greece (Allin S. & Masseria C., 2006).

1.10.3 Inequity in specialist care

1. We identify *evidence of no clear association* of individuals' socioeconomic characteristics with specialist care:
 - (a) Two nationwide *studies by Greek researchers* of no association of individuals' SES characteristics with specialist private visit as an inpatient or outpatient patient (Siskou et al, 2008; Liaropoulos et al, 2008). However, the evidence of Siskou et al (2008) for the determinants of private health expenditure on health care use has a complicated study design, as they extrapolate usage characteristics of the countrywide sample on the 2005 National Household Budget Survey in order to arrive at expenditure breakdown of estimates by health care type, and the other is telephone survey with design limitations.
 - (b) *Urban setting study* in the broader Athens area that reveals almost no socio-economic association with specialist visits (Pappa E. & Niakas D., 2006).
 - (c) *Elderly population studies* of: (i) Majo M. & Van Soest A. (2012) based on comparative SHARE data indicating no clear association with SES; (ii) There is also a small comparative international regional study of Crete Islands (Vadla D et al, 2011) that explored demographic and self-rated differences in health care (specialist and inpatient) use among elderly in 8 districts in five EU countries in 2005 and found that the highest proportion of specialist visit (70% vs 40%) and hospitalisations (32% vs 20%) were encountered in Greece comparing the other 8 countries. However, given the small sample of the study, these findings should be treated in caution.
2. We identify *evidence of pro-poor inequity* for specialist care:
Nationwide cross-sectional *studies by Greek researchers*: (i) a Greek study concluded that specialist visit is equally distributed among people in lower (pro poor) socioeconomic status (SES) than those in middle SES (Tountas et al, 2011); (ii) a study of Zavras D et al, (2014) based on examined determinants of PHC services in Greece during 2006 using the methodology of the WHO (Üstün et al., 2001) which found that

people with lower income (pro-poor) report increased PHC services; (*iii*) a mail survey Geitona et al, (2007) conducted in Greece 2001 - 2002 examined the determinants of PHC and hospital care and found that the number of PHC visits is affected by income only for poor population (pro-poor). However, it is a mail study with significant limitations on design method.

3. We identify *evidence of pro-rich inequity* for specialist care:

- (i) Few *EU comparative studies* of ECHP *with the participation of Greece* that indicate pro-rich inequity: four EU comparative studies including Greece of Van Doorslaer, Koolman and Jones (2004) and Van Doorslaer, Koolman and Puffer (2002) that measured income-related inequity in specialist care in 1996; Bago d'Uvaa T. & Jones A.(2009) and a pooled analysis for 1994-2001 of Bago d'Uvaa T. et al (2009) using data of the ECHP for Greece and found significant pro-rich inequity for the probability of specialist visit.
- (ii) Nationwide cross-sectional *studies by Greek researchers*: (i) Few studies that argue pro-rich inequity for specialist visits (Tountas et al, 2011; and Mergoupis et al, 2003; Kyriopoulos et al, 2002), however in Mergoupis et al (2003) study there is no distinguish between GPs and specialists and the interpretation of results needs caution. (ii) Similarly, another nationwide telephone survey of Souliotis et al (2016) for informal payments in health care in 2012, found that more frequent visits to private health services (mainly PHC) are reported by persons with higher SES profile.
- (iii) *Urban setting and regional cross-sectional studies by Greek researchers*: (i) a regional study in Thessaly in 2006 for determinants of utilisation that indicates pro-rich specialist care (Lahana E. et al, 2011); similar with the study of Sissouras A, Karokis A et al (1996) in Patras' the third largest urban area, within the Phase II framework (1993-1997) programme of W.H.O. European Healthy Cities, that indicated pro-rich specialist visits.
- (iv) *International comparative elderly population studies* of: (i) based on SHARE comparative Wave1 data: Allin S. & Masseria C. (2006) that found slightly pro-rich inequity; whereas Allin S. et al, (2009) found that in Greece wealth-related difference in physician visits was greater than income differences. (ii) There is also a regional study of Vadla D1,et al, (2011) that explored variations in the association of rural residency within health care use (specialist and inpatient) among elderly in 8 districts in five EU countries in 2005 conducted by the Primary Healthcare (TTB)

European Network, that reveals the highest proportion of specialist visit (70% versus 40%) encountered at Crete Islands in Greece comparing to 8 other EU countries, but needs caution due to small sample.

4. We identify *evidence of accessibility problems and unmet needs for specialists*:

- a) *Comparative EU studies* including Greece: (i)The evidence of longitudinal EU-SILC dataset and third wave of EQLife (EQLS) descriptive studies show that Greece is the top one country versus EU-27 with accessibility problems for visiting a specialist – not financial barrier (Anderson et al, 2012; Eurofound, 2012). (ii) Comparing to EU-27, access in Greece has become more difficult due to cost for all income groups (bottom and top half of income) increasing inequalities (Eurofound, 2013). (iii) These findings are different from the first EQLife results by Anderson - Eurofound (2004) but similar to EU-SILC.
- b) *Comparative EU studies for unmet needs* including Greece: (i) EU-SILC longitudinal data analysis between 2007 and 2011 found that in Greece, there was a statistically significant rise of 43% of respondents reporting unmet need for medical treatment due to cost between 2007 and 2011. (ii) In addition, 31% of people reporting cost as a barrier is highest in Greece among EU, even though financial barrier is not the first reason. People on low income tend to report more enforced unmet needs than higher earners (Rodrigues et al, 2013). (iii) Another EU-SILC study in 2004 for Greece that found unmet need concentrated among the lower income groups (Koolman X, 2007). However, these studies are descriptive with a narrow set of health indicators and interpretation needs caution.
- c) Two *Greek nationwide studies for unmet needs*: (i) a study that reveals unmet needs for visiting a family doctor or a specialist due to cost, indicating pro-poor inequalities for these visits, even though this study does not distinguish between public or private PHC visit (Pappa E. et al, 2013); (ii) Another pooled analysis of EU-SILC data from 2007 to 2009, about the determinants of unmet need for medical exams indicates that unmet physician visit is not related with income and inability to afford care (Kentikelenis et al, 2011).

1.10.4 Inequity in inpatient admission

1. We identify *evidence of no income-related inequity* with inpatient admission:

- a) Two *EU comparative studies* of ECHP with the participation of Greece of Van Doorslaer, Koolman and Jones (2004) and Van Doorslaer & Masseria (2004) that

measured income-related inequity in health care and found no income inequity after standardizing for need;

- b) *Studies by Greek researchers* of literature that argues no-income related inequity (Kyriopoulos et al, 2002; Tountas et al, 2011; Geitona et al, 2007; Siskou et al 2008; a telephone interview survey of Liaropoulos et al, 2008). However, we need to treat these findings in caution because of limitations in most studies' design.
- c) *Urban setting and regional cross-sectional studies by Greek researchers:* (i) the study of Pappa E. and Niakas D. (2006) in the broader Athens area found that hospital admissions were related to need and not to any socio-economic factor; (ii) the study of Sissouras A, Karokis A et al (1996) in Patras' the third largest urban area, within the Phase II framework (1993-1997) programme of W.H.O. European Healthy Cities, that indicated no-income related inequalities in hospital admissions, although they have small sample.
- d) Comparative *elderly population studies* of: (i) Majo M. C. van Soest A. (2012) and Santos-Eggimann B. et al, (2005), based on SHARE comparative survey for older population in Greece that explored the determinants of health care use and found a negative but very weak association and no income association with inpatient admissions, although Eggimann S et al (2005) is descriptive study with methodology limitations. (ii) Another regional study of Vadla D1,et al, (2011) that explored variations in the association of rural residency within health care use (specialist and inpatient) among elderly in 8 districts in five EU countries in 2005 conducted by the Primary Healthcare (TTB) European Network, and reveals that the highest proportion of hospitalisations (32% vs 20%) encountered at Crete Islands in Greece comparing to the others, but needs caution due to small sample.

2. We identify *evidence of pro-rich income-related inequity* with inpatient admission:

- a) An *EU comparative* pooled analysis of ECHP 1994-1998 with the participation of Greece of Masseria, Koolman & Van Doorslaer, (2004) that found pro-rich inequity for inpatient care relevant to non-elective care and relevant to regional disparities favoring the densely populated urban areas of Athens and North Greece (Thessaloniki);
- b) *A study by Greek researchers* of Siskou et al (2008) that analyze determinants of private health payments by provider and type of service and indicate pro-rich inequity for the total number of private inpatient admissions, although it should be treated carefully as it has a complicated study design, as they extrapolate usage

characteristics of the countrywide sample on the 2005 National Household Budget Survey.

- c) A *Greek regional cross-sectional study* in Thessaly in 2006 of Lahana E. et al (2011) that indicates pro-rich inpatient care, but this study has a small sample.
- d) *Elderly population study* of Allin S. & Masseria C. (2006) based on SHARE Wave1 survey for elderly, which found slightly pro-rich inequity in hospital care use.

1.10.5 Inequity in dentist utilization

1. We identify significant *evidence of strong pro-rich inequity* in dental care visits:
 - a) An EU comparative study with the participation of Greece of ECHP in 2000 of Van Doorslaer E. & Masseria C. (2004) and a number of studies by Greek researchers for the general population that identify higher dentist and dental care use by individuals in high SES (Koletsi-Kounari H. et al, 2011; Pavi E, et al, 2010; Zavras D. et al, 2004; Souliotis K. et al, 2016; Kyriopoulos et al, 2002). Moreover, it is worth mentioning the study of Koletsi-Kounari H. et al, 2007 that explored the evolution of private dental health expenditure in Greece by region and income via Household Budget Surveys over a decade from 1987-1998 -using CPIIndex- and found an increase for the annual expenditure per capita of 67.2% for the higher income groups (pro-rich).
 - b) *Elderly population studies* of: (i) Majo M. & Van Soest A., 2012; Egimann S. et al, 2005; Allin S. & Mossialos, 2004 based on comparability SHARE Wave1 data with the participation of Greece that identify the significant effect of income in dentist and dental care use. (ii) Similarly the study of Listl S. (2011) based on SHARE Wave 2 data that explored income inequalities in dental care use and preventive treatment by 50+ and found significant pro-rich inequity in dental care in Greece, and higher inequalities for preventive treatment among retired individuals. (iii) An urban-setting qualitative study for elderly patients in a Public University Prosthetic Dentistry Clinic (Naka O, Anastassiadou V, 2012)that explored determinants of older Greek adults' oral health patterns found that that cost and no disease awareness are the most frequently mentioned barriers to regular dental visits. In addition, low level of income (pro-poor) and lower education are the determinants of public dental care; (iv) Moreover, a recent study of Listl S (2012) based on life-course data from SHARE (waves 1 to 3) identified pro-higher education inequalities in regular dental

attendance throughout the life-course and relatively inelastic until age of 65 years, but not thereafter due to age-related inequality decline in Greece.

2. We also find evidence of *no association or pro-poor inequity with dental care use*:
 - a) Few studies by Greek researchers of: (i) Siskou et al, (2008) found no association of income with dental care use; (ii) Two studies indicate lower levels of oral health associated with lower income and lower SES (Yfantopoulos et al., 2014; Kyriopoulos et al, 2002).

1.10.6 Evidence of accessibility problems and unmet needs for health care use among the older population

There is evidence of comparative studies:

- a) The first EQLife survey including findings for the elderly that detects no financial barrier for using health care in Greece (Anderson, 2004), although it is a descriptive study with design limitations due to validity of data for only one year.
- b) A longitudinal EU-SILC study with 2006 to 2011 data for *unmet needs* including Greece, that examined “enforced unmet needs for treatment” caused by barriers (expenses, waiting lists or distance), indicating that for the older groups aged 65+, the inability to obtain care was increased for all reasons and marked mostly in Greece compared to EU27 (Rodrigues et al, 2013), even though the EU-SILK survey is hampered by limited health information.
- c) Few studies for elderly about *forgone care* and household income based on SHARE wave 1 data of: (i) Mielck, A. et al, (2009) and Allin S. & Masseria (2006) which found that Greece has the prevalence of highest forgone care in the lowest income group as compared with the highest income group, adjusted for age and sex. (ii) Furthermore, paradoxically the highest income groups show a higher prevalence in forgoing care than the middle-income group (Mielck, A. et al, 2009; Allin S. & Masseria 2009). (iii) In addition, Litwin H. & Sapir E.V. (2009) found that the health services that most frequently forgone care include: dental care followed by medications and visits to specialists.

1.10.7 Evidence for regional disparities in utilization of health care

One determinant which potentially has greater relevance for health policy making is regional disparities in use. Literature review identifies geographical region as a significant determinant of PHC and hospital utilization. The *interregional differences* contributions have to be interpreted in conjunction with the urban-rural differences, which may be able

to capture *intra-regional differences*. The evidence below reveals regional disparities in use of health care for general population, given that evidence for regional variations in use, exclusively for older Greek population is almost absent.

1. There is evidence for regional disparities in use of *PHC services*. There is evidence for less physician visits to NHS rural PHC health services and more private or urban PHC and dental services by rural population, whereas there is evidence for increased use of Insurance Fund's (SHIF) PHC and outpatient services by urban population.
 - (a) In particular, we identify evidence that the residents of *rural regions use in total - fewer health care services* (PHC, outpatient, inpatient) comparing to urban areas (Zavras D et al, 2014; Tountas Y et al, 2011; Oikonomou N., Tountas Y, 2011; Lahana E et al, 2011; Marinos G et al, 2009). The cross-sectional nationwide survey Hellas Health I underlined that contacts with healthcare professionals (total visits) were less for residents of rural areas, given that only 20% of the rural population tend to use NHS rural PHC health services (HCCs and rural settings (RS) - practices), as their main source of PHC (Tountas Y et al, 2011; Oikonomou N., Tountas Y, 2011). This results in the majority (31.8%) of rural residents to be “forced” to travel at urban areas to visit a private physician for receiving PHC at urban areas and 15.7% to visit a private doctor contracted to SHIF; 15.3 % choose to visit hospital outpatient department at urban regions, as well; On the other hand, the majority (28.9%) of urban residents visit a private doctor contracted to SHIF or the SHIF's polyclinic (28.1%) for PHC consultation (Tountas Y et al, 2011). In addition, the study of Van Doorslaer, Koolman & Pufffer (2002) who used data from the ECHP 3d wave (1996) for Greece, found that for GP visits, the impact of standardising for regional utilisation differences is small favouring the lower income groups, whereas things are quite different for specialist visits. However, given that GPs are few in Greece the interpretation of the results needs caution. Marinos et al.(2009) study, that evaluated the medical records for patients -with mean age 65.5 years - attending the emergency departments (ED) of a big hospital in Athens, in 2005 - 2006, pointed out that 20% of ED patients came from a rural area, whereas one in every three patients could have been managed in a PHC setting.
 - (b) In addition, we identify evidence for regional disparities in *specialist private contacts*, favouring rural versus urban areas, as a result of the inadequate NHS rural PHC services.

- (i) Two EU comparative studies using the ECHP data for Greece (Van Doorslaer, Koolman & Pufffer, 2002; and Van Doorslaer and Masseria C.,2004) that measure horizontal equity achieved in GPs and specialists' visits associated with regional differences highlighted substantial pro-rich regional contributions for specialist visits that reflect discrepancies between better endowed (often the capital) regions and more peripheral regions in Greece.
- (ii) Most of the aforementioned *nationwide studies* reveal that in rural areas, the majority of residents are more likely to visit a private practitioner - not contracted to any SHIF as their primary source of health care. (Tountas et al, 2011; Oikonomou N., Tountas Y, 2011; Lahana E et al, 2011; Siskou et al, 2008; Pappa, E. and Niakas, D.,2006). It is notable - that according to Tountas et al, (2011) - 31.8% of rural population uses private doctors required OOPPs - not contracted to any SHIF - accessed in bigger urban centers as their primary source of health care, and about 65% of rural residents are less likely to be admitted to hospitals' ED, similar to the local study of Lahana et al (2011). Similarly, the mail study of Geitona et al, (2007) revealed increased GPs and specialists use by rural population comparing to urban, but has design limitations. Other study aiming at investigating private health payments by provider and type of service, found that the frequency of visiting a private doctor in rural areas is higher than in urban areas (Siskou O. et al, 2008).
- (iii) Moreover, a *regional survey* carried out in 2006 in Thessaly (Lahana E et al, 2011), the third largest region of the 13 geographic regions of Greece - subdivided into four prefectures with a mixed urban and rural environment, revealed socioeconomic inter regional disparities on the utilization of PHC and hospital care favoring the worse off residents of rural areas who were more than two times likely to visit a private practitioner accessed in bigger urban centres. About residents in the urban areas, the middle-aged were more likely to visit a private doctor and the elderly (65+) to visit a SHIF physician. Another *comparative regional study* for physicians and inpatient visits among elderly 70+ was performed in eight districts of five EU countries (Vadla D1,et al, 2011). It shows that the older population of Crete Islands reported the highest use of private specialist visits (70% vs 40%) and inpatient admissions (32% vs 20%) comparing to other EU rural regions. However, as Crete Island

is the largest and more populated island with an increased physician rate, it should be possibly examined separately from other Islands.

2. There is slightly contradictory evidence of *regional disparities in inpatient admissions*:
 - (a) *Pro-rich regional contributions in inpatient admissions* favoring residents of urban regions (Van Doorslaer and Masseria, 2004; Geitona et al, 2007; Lahana E et al, 2011 with a local study): (i) The EU comparative aforementioned study of Van Doorslaer and Masseria C. (2004) using the ECHP 2000 data for Greece that found slight pro-rich regional contributions with the Athens region (Attica) contributing most to the pro-rich pattern. (ii) The mail study of Geitona et al, (2007) found regional disparities for inpatient care favouring residents of Peloponnese region (covering a mixed urban and rural environment) who report more admissions; and (iii) the regional study of Lahana et al (2011) revealed that the wealthier residents in urban areas of Thessaly Prefecture had a higher likelihood to be admitted to hospitals compared to those with low-income in rural regions.
 - (b) On the other hand, there is evidence of *no regional disparities for inpatient care that is related to health needs and not to socioeconomic factors* (Pappa E. and Niakas D., 2006; Tountas et al, 2011; Kyriopoulos et al, 2002): (i) According to the urban-setting study in the broader region of Athens of Pappa, E. and Niakas, D., (2006), visits to hospital ED and hospital admissions were related to health care needs, and no SES factor characterized the use of those types of care. (ii) Similarly, the study of Tountas et al (2011) found that hospital admissions were not directly influenced by demographic and SES factors – including the region of residence. They were influenced by health needs. (iii) In addition, an older study of Kyriopoulos et al (2002) reveals no regional disparities for health care use in total, as well, but it is a mail study with methodology and study design limitations.
3. There is also evidence for reporting *geographical proximity* barriers in access PHC health units and inpatient care due to travel distance or transport difficulties.
 - (a) The *geographical proximity* as a barrier to access NHS-ESY PHC is pointed out by a number of studies: (i) Alber & Kohler (2004) based on Eurobarometer surveys of 1999 and 2002 found that Greek people report the most difficulties in access to GPs and hospitals in terms of geographical proximity regardless of income differences comparing to EU15, though there is a limitation with income data in Eurobarometer surveys that need to be treated in caution; (ii) Oikonomidou E. et al, (2010) mail study indicates geographical proximity as barrier for old patients to receive care by

the rural HCCs and rural settings – (practices) that result in increased number of GP home visits to older patients living in thinly populated areas; (iii) Moreover, the pooled analysis of EU-SILC data 2007 to 2009, exploring the determinants of unmet need for medical care indicates that unmet physician visit is strongly related to travel distance or transport difficulties (Kentikelenis et al, 2011).

- (b) The *geographical proximity* as a barrier to access hospital care has been highlighted by few studies: (i) A descriptive study of Eurofound (2012) on third EQLife survey, similar to Anderson (2004) on first EQLife survey, indicated that the highest proportion of difficulties in access to hospitals and physicians caused by distance barriers, is reported in Greece among the EU27. (ii) Similarly, another study conducted during a 2-year period (2006 to 2008) in two large tertiary hospitals in Greece (in Athens region and Crete Island that covers a mixed urban and rural environment) that examined proximity to health units associated with delays in treatment of acute myocardial infarction (AMI) patients, found that AMI rural patients located more than 10 km from the nearest hospital had almost 20 times greater risk of delayed hospital arrival than patients from urban areas (Brokalaki et al.,2011). (iii) A recent qualitative WHO study for barriers in access to health services using the Tanahashi framework- based on interviews and focus groups, revealed persistent regional inequalities in the distribution of health resources, posing barriers to access (for total visits) especially for the population of remote areas and islands (Economou C, 2015).
- c) There is also evidence of *geographical proximity barrier to dentist visit* favoring the residents of rural areas that have to travel to seek private dental visits at urban areas (Koletsi-Kounari H. et al, 2007; Siskou et al, 2008) and result in no inequity in private dental care with increased OOP costs (Zavras et al, 2014).

1.10.8 OOP payments as financial barrier in health care use

Greek and international evidence for the OOP payments as financial barrier in health care use is limited. We identify 8 studies by Greek researchers for the general population, and 3 comparative studies based on SHARE survey for the older population in Greece.

1. OOP and informal expenses *burden specialist private visits and outpatient visits* via a number of nationwide cross-sectional studies by Greek researchers: (i) A recent telephone survey of Souliotis et al (2016) for informal payments in health care in 2012, found that 36% of the sample report OOP and under-the-table payments for

- visits to private practitioners and dentists, and 12.2% to providers of PHC in HCCs and SHIFs' centres. (ii) Similarly, the cross-sectional study (Hellas Health I) in 2006, found that 39% of the sample paid OOP for visits to health professionals' contacts (Tountas et al, 2011). (iii) Siskou et al (2008) found that one out of three patients uses informal payments in order to receive specialist care as inpatient or outpatient in public hospitals regardless of their SES characteristics. (iv) In addition, the recent qualitative WHO study - based on interviews and focus groups discussions, revealed large increases in OOP expenditures for medical prescriptions as well as for unlisted drugs and laboratory tests (Economou C, 2015). (v) Moreover, about *elderly population*, a recent EU comparative post-death evidence for older population using pooled data of SHARElife survey detected that in 2005, 54% of the Greek sample paid OOP for receiving specialist care (Penders Y. et al, 2016).
2. Moreover, evidence is apparent for *regressive relationship in ability to pay OOP for receiving specialist care* via studies for the fairness and economic impact of informal payments: (i) Matsaganis M., Mitrakos T., Tsakloglou P, (2008) found that the top 1% of all households accounts for 37.6% of all OOP hospital expenditure, and elderly households spent 12% to 13% of their household budget shares on health. (ii) ELSTAT's (2015) analysis of Household Budget Survey for 2014 showed that the poor households spend 9% of the family budget on health expenditure higher than the corresponding percentage for non-poor households (7%). For study of Grigorakis et al (2016; 2014) the average OOPP for health care in 2013 corresponds to 10.86% of annual gross income of households.
 3. Considering *the elderly evidence* for regressive relationship of OOPP for specialist care based on SHARE data in Greece: (i) the poorest respondents state making OOP three times more than the richest ones, a reversed pattern compared to Italy and Spain (Rodridues R. et al, 2013). (ii) Similarly, Holly A. et al (2008); (iii) Børsch-Supan A. et al, (2005; 2008) found that the poorest spend a higher share of their income on OOP health expenditures than the better-off; and (iv) Scheil-Adlung, X. and Bonan, J. (2013) found that the poorest in 2003-04 pay OOP 11% of their household income versus 1% of the richest.
 4. Findings are apparent for *OOP expenses as a financial barrier for inpatient care* via studies: (i) Studies by Greek researchers who found that OOP and informal payments (hidden economic activity) concern the provision of inpatient and outpatient - specialist services, primarily to surgeons, so that patients can bypass waiting lists or

- ensure better quality of service and more attention from doctors (Souliotis et al, 2016; Kaitelidou et al, 2013; Kentikelenis A. et al, 2011; Siskou et al, 2008; Liaropoulos et al, 2008; Mosialos et al, 2005). (ii) Moreover, the nationwide telephone survey of Souliotis et al (2016) for informal payments in health care in 2012, found that approximately 32.4% of public hospital admissions accounted for informal payments, with main reason (20%) to ensure better care – similar to 24% for private clinics. (iii) Another telephone survey in 2008, reported that 36% of public hospitals' patients had made at least one informal payment (Liaropoulos, et al., 2008). Moreover, the probability of making such payments was 72% greater for people wishing to avoid a waiting list than for those following standard admission procedures, and 137% greater for patients requiring surgery.
5. Considering evidence for *older and general population facing ruinous OOP expenditure*: (i) a study by Scheil-Adlung & Bonan (2013) exploring the size and determinants of OOPPs using SHARE Wave 1 data found that OOP expenditure on inpatient care take up a significant share 6.1% of Greek household income from the lowest income quintile than 0.5% for highest income quintile. In addition, OOP expenditure on total health care results in ruinous OOP expenditure for health care that affects 5% of elderly households.(ii) Similarly, Holly A. et al (2008) and Børsch-Supan A. et al, (2005; 2008) found that the poorest Greek spend a higher income share on OOP health expenditure on all health care than the better-off. (iii) Similarly, the study of Economou, Karabli et al., (2004) of the household expenses via HBSurveys data of 1998-99, found that 2.44% of households in Greece face the danger of making catastrophic payments for health care.(iv) In addition, the study of Souliotis et al., (2016) revealed that 55.8% of those with bad or very bad financial status reported a large impact of informal payments on their income and living conditions.
 6. There is also evidence that *OOP expenses burden outpatient care to a lower magnitude than inpatient admissions* via Greek studies: (i) A mail study of Kaitelidou et al. (2008) indicated that the probability of making OOPPs was 137% greater for patients requiring surgery, with the median payment amount 15% of their aggregate monthly outlays. (ii) Other study of Siskou et al. (2008) and a study for obstetric services in four general public hospitals (Kaitelidou, Tsirona et al., 2013) found that 74.4% of the women made informal payments. (iii) The Transparency International survey in Greece with 2013 data, indicates that health care is at the top of the petty corruption list in both the public and the private sector (Transparency International,

- 2014). The amount of informal payments in public hospitals accedes from €50 to €7000 for surgery; and from €30 to €5000 for a doctor's payment.
7. Moreover, we identify findings of *regressive trend in OOP amount for inpatient care affiliated to the region of residence*, via few studies: (i) Souliotis et al (2016) and Tountas et al (2011) revealed that residents of areas (rural and urban) other than Attica use and pay OOP for private health services more than residents of urban Attica (including Athens).
 8. There is also evidence for *significant variations in OOP amounts for receiving inpatient care affiliated to the SHIF coverage* via studies: (i) the distribution of health care expenditures is related to the fragmented character of the SHI system favouring the Noble SHIFs beneficiaries and revealing a regressive relation (Liaropoulos, 1995; NSSG, 2002; INE-GSEE, 2010). (ii) Similarly, a recent study examined how well the SHI system protects individuals against catastrophic OOP payments for inpatient care in private hospitals contracted with EOPYY in three main urban centres in Greece in 2013 (Grigorakis et al., 2016; 2014). This study indicated that the SHIF- EOPYY covered only 47.3% of the total hospitalization cost; the rest 52.7% was OOP expenses with the average OOP amount €1655.24 paid to surgeons; 10% of the sample made OOP hospital payments that exceeded one quarter of their annual wage or pension income. However, this study included only private hospitals and excluded rural population – such as farmers.

Overall, in Greece, although there is a comprehensive approach that investigates the determinants of health care use, there exists a non systematic approach for the inequalities and barriers to access. Moreover, the evidence for measuring and exploring income inequity in health care among the older population in Greece is by no means comprehensive. This short overview concludes that in Greece, similar to most European countries, a debate is emerging about whether access to health care is indeed equally available to the older people. Our thesis will attempt to complement the existing literature by providing new empirical evidence with more sophisticated empirical methods, filling this way the gap of the research about Greece.

1.11 Overview of the thesis

Overall, the aforementioned evidence indicates that in Greece, there is an incomplete approach that investigates the determinants of health care use, the existence of inequalities and barriers to access for the general population. The evidence for measuring and

exploring income inequity in health care among the older population in Greece is by no means comprehensive. Moreover, the above short overview concludes that more than thirty years after the establishment of the Greek National Health System (NHS -ESY) in 1983 due to fragmented coverage, funding and delivering characteristics, a debate is emerging about whether access to health care is indeed equally available to all, and especially among the older population. This study will attempt to complement the existing literature by providing new empirical evidence for Greece. Because of the weaknesses of the system, the main hypothesis of my thesis is that the population is expected to face high inequalities in health care use, particularly the elderly who are the most constant consumers of health services. Inequalities in health care use are expected with regard to: regional disparities in health care use caused by inadequate allocation of human and infrastructure resources, variations in health care use among different social health insurance funds due to unequal health insurance coverage and resulting in increased out of pocket payments. The primary objective of the thesis is to apply quantitative empirical methods to explore some key aspects of equity in the receipt of health care in Greece among the older population, by using different survey datasets and methods. We have two nationwide and one urban setting datasets to comprehensively examine key aspects of inequalities in the utilisation of different types of health care with reference period from 2003 till 2008. The three separate datasets - survey tools with a different time reference (2003-2004; 2005 and 2008-2009) will provide robust evidence for inequalities in health care use among the older population to shed light in the whole pro-crisis period in Greece. This thesis will investigate and measure inequalities in Greece for the period from 2003 till 2008 preceding the current economic downturn since 2009. This investigation will help health policy-makers to examine findings on changes over time relative to NHS-ESY health care and social and economic policies that influence inequalities in health care use. Moreover, this new evidence will attempt to provide a clear picture of the situation relating to health inequalities and the effectiveness and impact of relevant strategies, policy measures and practices that are being taken to address it. Such information can motivate action, its social determinants and measures that are most likely to contribute to greater health equity in use among the elderly in Greece.

In this context, overall, the aim of this thesis is to investigate the inequalities in health care use among the elderly in the pre crisis period 2003-2008 attempting to provide decision-makers with insights into how to prioritize healthcare resources and manage the performance of the Greek health system in terms of inequity in use and access of health

services by those most at risk of vulnerability as the older population, by studying the past and compare the pre with post-economic crisis period. The findings of this study may contribute to effective planning of health services in Greece in times of economic crisis since they provide evidence from the past. The importance of this point lies in the fact that much of what we live within the present is a direct result of decisions made in the past (Tosh, 2000; Merriman, 2000; Ion and Beer, 2003). Understanding the past is a useful way of opening up the possibilities that may exist in the present and the future, especially when the economy slows down as in our days.

Subsequently, the research questions, the data survey tools and the quantitative empirical methods we use to explore the main hypothesis of this thesis are described in the next chapter.

Chapter Two

2. Data and Methodology

The short overview of the challenges that the Greek health care system faces related to inequalities in health care and aging population as displayed in chapter one, demonstrates that in Greece- similarly to most European countries, a debate is emerging about whether health care access is indeed equally provided to older population, and whether regional discrepancies and financial barriers are confronted in the use of health services. In order to explore this main objective of our thesis, a more sophisticated statistical methodology is crucial. This chapter initially presents an overview of the methodological measures/indicators applied in the field of health care inequalities used in the EU and the methodology we use to explore the main hypotheses of each survey tool of the thesis. Then, we describe the hypotheses, research questions, the survey tools, as well as the quantitative empirical methods we use to explore them.

2.1 Measurement methods of inequalities in health

We identify a long lasting debate on the most appropriate method of measuring inequalities in health (mortality and morbidity) as applied in most EU studies, that range from “simple” absolute measures, such as the statistical measure of the “range”, to more complex relative measures such as the Gini coefficient, the Index of dissimilarity, the Slope index of inequality and the Concentration index (Coolins & Klein, 1980; Le Grand, 1978; Mackenbach & Kunst (1997). These measures/ indicators can be very “straightforward” and “simple” such as the very well known measure of “range”. Some are related to statistical visualized techniques such as logistic regression in the case of the Odds Ratios (OR) or simple regression analysis in the case of the Slope Index of Inequality (SII), and the Relative Index of Inequality (RII). Statistical models offer more possibilities in terms of interpretation of health inequality. They are used to straightforward build and test a relation of the measured health inequality with several factors (usually social factors, SES variables). On the other hand, they appear rather complex to those researchers who are not familiar with statistics. Finally, there are some indices that are more known to the researchers involved in measuring inequalities in general, such as the Gini coefficient, and the Concentration index (CI). These offer some advantages in the visualization of

inequality level, through the Lorenz and the Concentration curve (CC). In general, the distribution of health care can be described with various types of statistical measures, such as dispersion measures, inequality measures, relative measures such as the coefficients that arise from statistical models (see e.g. Regidor E., 2004). We also detect a review for measurement of health inequalities – including analysis for inequalities in health care use for EC – DG Health and Consumers (Spinakis A. et al, 2011) that concludes to taxonomy of indicators (based on pre-selected criteria). These are displayed in Table 2.1 of selected summary measures/indicators of inequalities in health including their advantages/disadvantages based on Spinakis A. et al (2011), as following.

- (i) **Simple measures** that are easily interpreted and include: The Range ratio; Index of Dissimilarity; Inter- deciles or quintiles ratio (p_i/p_j)
- (ii) **Regression based measures** that include: The slope index of inequality (SII); the Relative Index of Inequality (RII); and Odds Ratio (OR)
- (iii) **More advanced measures** that take into account the whole distribution of health and usually satisfy many more of certain desirable properties. They include: Coefficient of variation (CV); Standard Deviation of the logs (S_{\log}); Gini Coefficient of inequality (G); Concentration index (CI); Theil's Entropy; and Atkinson index.

It is worth mentioning that different measures can give information about different aspects of health inequalities, and the interpretation of health inequality can also be quite different, depending on the measure used. The same applies for the analysis of trends in health inequalities (see Wagstaff et.al.1991). In addition, the selection of the proper approach depends on the objective(s) of the analysis. Usually, in order to have a fuller understanding of the health inequalities, it is better to use more than one measure and combine their outcomes.

Table 2.1: Selected summary measures / indicators of inequalities in health

Measures/Indicators	Character	Advantages	Disadvantages
Range	An absolute/simple measure	<ul style="list-style-type: none"> • easy to understand and calculate • It compares health indicators between top and bottom groups in a classification of individuals according to a given socio-economic variable. 	<ul style="list-style-type: none"> • Uses two extreme values of the distribution and fails to consider what happens in intermediate socioeconomic groups • It comes short to account for differences in the relative size of the groups and it ignores changes in their size. • Difficult for making international comparisons
Index of Dissimilarity	Individual-Mean differences formula	<ul style="list-style-type: none"> • Conceptually simple • It tries to measure differences between groups shares of population and groups shares of health 	<ul style="list-style-type: none"> • It fails to capture inequality present due to a socioeconomic factor, e.g., income
Inter- deciles or quintiles ratio (p_i/p_j)	An absolute/simple measure	<ul style="list-style-type: none"> • easy to understand and calculate • scale independent • widely used by the EC • Reliable tool for studying trends. 	<ul style="list-style-type: none"> • Uses only two extreme values of the distribution • Unreliable with greatly variable data
Slope Index of inequality (SII)	A relative/ simple regression-based measure	<ul style="list-style-type: none"> • It reflects the experience in health of all the population not only extreme groups; • It is sensitive to the distribution of population in socioeconomic groups; and • It reflects the socioeconomic dimension of health within the measurement of inequalities • It is sensitive to changes in mean health status 	<ul style="list-style-type: none"> • The applied modeling technique (regression) needs to insert a quantitative variable in order to estimate health inequality. This is not a natural approach in the case of SES characteristics.
Relative Index of Inequality (RII)	A relative/ simple regression-based measure	<ul style="list-style-type: none"> • It reflects the experience in health of all the population not only extreme groups; • It is sensitive to the distribution of population in socioeconomic groups; and • It reflects the socioeconomic dimension of health within the measurement of inequalities • It is sensitive to changes in mean health status 	<ul style="list-style-type: none"> • The applied modeling technique (regression) needs to insert a quantitative variable in order to estimate health inequality. This is not a natural approach in the case of SES characteristics.

Odds Ratios (OR)	An absolute/regression based measure	<ul style="list-style-type: none"> Very known to the health inequality literature link to logistic regression offers flexible physical interpretation and measurement of statistical significance Reliable for a trend analysis 	<ul style="list-style-type: none"> Less simple in concept, Unable to compare all social categories at once
Coefficient of variation (CV)	An absolute/dispersion measure	<ul style="list-style-type: none"> easy to understand and calculate scale independent extensively known statistical dispersion measure standardized measure useful for group comparisons like countries it uses the whole health distribution reliable tool for studying trends 	<ul style="list-style-type: none"> It fails to capture inequality present due to a socioeconomic factor, e.g., income As a variability measure it works satisfactory with aggregate data like mortality
Standard Deviation of the logs (S_{\log})	An absolute/dispersion measure	<ul style="list-style-type: none"> easy to understand and calculate scale independent extensively known statistical dispersion measure standardized measure useful for group comparisons like countries it uses the whole health distribution reliable tool for studying trends 	<ul style="list-style-type: none"> It fails to capture inequality present due to a socioeconomic factor, e.g., income As a variability measure it works satisfactory with aggregate data like mortality
Gini Coefficient of inequality (G)	Individual-Mean differences formula	<ul style="list-style-type: none"> Extensively used, familiar to most users Scale invariant Satisfies the transfer principle Uses the whole distribution Offers graphical interpretation of the analyzed phenomenon through the Lorenz curve 	<ul style="list-style-type: none"> Lacks sensitivity at the extremes of the distribution Decomposability is practical restricted Not sensitive to health gradients e.g. a social variable
Concentration index (CI)	A relative measure	<ul style="list-style-type: none"> Extensively used for measurement of health inequalities Take account of changes in the underlying Population distribution in the social groups over the time and use information across the entire 	<ul style="list-style-type: none"> Sensitive to the direction of the social gradient in health. Could lead to biased results Decomposability is restricted Range restricted for binary health data

		<p>range of social groups</p> <ul style="list-style-type: none"> • Satisfies the transfer principle • Uses the whole distribution • Scale invariant • Relation to concentration offers flexibility in interpretation 	
Theil's Entropy	An absolute measure	<ul style="list-style-type: none"> • Theoretically sound tools for the measurement of health inequalities • Easiness of interpretation • Symmetrical measures • Satisfies the transfer principle • Use the whole distribution • Scale invariant (especially with SES variables) • Atkinson's variant offers sensitivity to various parts of the distribution • The last is linked to welfare economics and societal preferences 	<ul style="list-style-type: none"> • First impression is characterized as complex. Not very comprehensive as the simple statistical measures, e.g inter-deciles ratio • Not very known to the health inequality literature. Lack of simplicity to the researchers in the field of health inequalities
Atkinson index	An absolute measure	<ul style="list-style-type: none"> • Easiness in interpretation Scale independent • uses the whole health distribution, • Link to statistical information theory enables the possible use of entropy variants. • Reliable for a trend analysis 	<ul style="list-style-type: none"> • Complex in a sense • not very much known to health inequality literature

Source: Adapted from Spinakis A, Anastasiou G, Panousis V, Spiliopoulos K, Palaiologou S, Yfantopoulos J. (2011) Expert review and proposals for measurement of health inequalities in the European Union – Full Report. European Commission Directorate General for Health and Consumers. Luxembourg. ISBN 978-92-79-18528-1

2.2 Measuring inequity of access to health care

Moreover, the debate for the most appropriate method of measuring inequalities in health services access (most often approximated by utilization) came out through comparisons of health-care use and health-care need by Coolins & Klein (1980); by Le Grand (1978) and presented in more detail by Mackenbach & Kunst (1997). Since then they have followed two directions, summarized by Allin S. et al (2009) and Mackenbach & Kunst (1997) and displayed in Table 2.2:

- (a) Regression models method (mainly odds – ratios)
- (b) The Concentration Index – Ecuity method

Table 2.2: Examples of summary measures of socio-economic inequalities in access to health care

Index	Interpretation
<i>Correlation and regression</i>	
Product-moment correlation	Correlation between health care utilization rate and socio-economic status (SES)
Regression on SES	Increase in utilization rate per one unit increase in SES
Regression on cumulative percentiles (relative index of inequality; Slope index of inequality)	Utilization rate ratio (RI/I) or differences (SII) between the least and most advantaged person
Regression on z-values	Utilization rate difference between group with lower and higher than average morbidity rates (x 0.5)
<i>Gini-type coefficients</i>	
Pseudo-Gini coefficient	0 = no utilization differences between groups; 1 = all utilization in hands of one person
Concentration index	0 = no utilization differences associated with SES; -1/+1 = all utilization in hands of least/most advantaged person
Horizontal inequity index	0 = no utilization differences associated with SES after need standardization; -1/+1 = all need standardized utilization in hands of least/most advantaged person
Generalized concentration index	Based on CI, but includes also mean distribution of health care

Source: Allin S. et al (2009) adapted from Mackenbach & Kunst (1997)

2.2.1 The regression models method

According to this method, we measure the independent effect of socioeconomic measures (need and non need variables) on health care use measures that include: the likelihood of contact with health services, the volume of health services used or the expenditures

incurred. This approach is based on the behavioral model of health service use developed by Andersen R. since 1960s and Andersen R. (1995). The behavioral model suggests that health-care service use is a function of need factors as well as of individual predisposition and ability to use health-care services, which facilitate or impede use, as following:

- (i) an individual's predisposition to use services (social structure, health beliefs);
- (ii) individual characteristics (income and education);
- (iii) community level (availability of services); and
- (iv) the level of need for care

Therefore, following the standard approach in the empirical literature, the regression models method regresses medical care use (y_i) on a vector of k medical need indicator variables (x_k), and a set of p non-need variables (z_p) using the equation, assuming a linear model:

$$(2) \quad y_i = \alpha + \sum_k \gamma_k x_{k,i} + \sum_p \delta_p z_{p,j} + \varepsilon_i$$

Where y_i are health care use variables (the probability of use; or the volume of health services used or the expenditures incurred), (x_k) need indicators are proxied by demographics (age, gender); health status (SAH, number of chronic medical conditions etc); and health limitations (i.e. long term illness etc) and the non- need z_p indicators – variables (income, higher educational level, marital status, social health insurance fund, region of residence etc). In addition, sample weights were used in all computations in order to make the results more representative of the country's population. Robust standard errors were also obtained using the Huber/White/sandwich estimator. According to the behavioral model of health service use inequity arises when the non - need factors strongly affect the use of health care. This approach uses a comprehensive model of utilization with explanatory variables convenient for policy-making. Thus, we identify in the literature a substantial body of empirical evidence on equity of health care that uses regression models. However, the results of the regression method cannot quantify the extent of inequity.

2.2.2 The Concentration Index (CI) - ECuity method

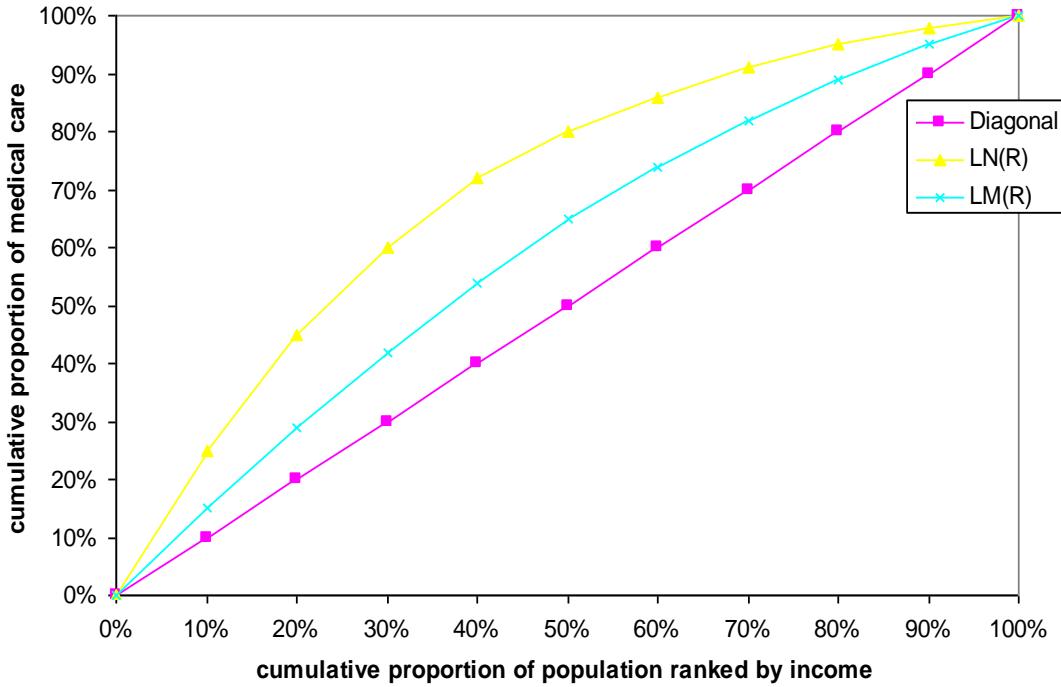
This method comes from the literature on income inequality based on the Lorenz curve and Gini index of inequality. Similar to the Lorenz curve that describes the distribution of income in a population, the concentration curve (CC) for utilization compares the cumulative distribution of healthcare use with the cumulative distribution of the population rank-ordered by income (Allin S. et al, 2009; O'Donnell et al., 2008; Wagstaff and van

Doorslaer, 2000; Kakwani et al., 1997; Wagstaff et al., 1991). Similarly with the Gini index that provides a measure of income inequality, the concentration index (CI) is a measure of income-related inequality in health care use. The CI is a measure of income-related inequality in access to health care, to estimate and quantify the level of horizontal inequity (HI index) defined as the difference between the degree of income-related inequality in actual health care use ($CI_{unadjusted}$) and the income-related inequality in need-adjusted use ($CI_{adjusted}$) and calculated from a regression approach developed by Wagstaff and Van Doorslaer in the ECuity project since the 1990s (O'Donnell et al., 2008).

Figure 1.2 below quantifies the level of horizontal inequity in health care use based on concentration curve that calculates inequity (Horizontal Inequity - HI index) by comparing the cumulative distribution of utilization (LM) with the cumulative distribution of needs-adjusted utilization (LN), ranking each individual according to their income level. We consider need-adjusted utilisation as the predicted use interpreted as “socio-economic inequality in utilization not justified by socio-economic inequalities in need” (Allin S. et al, 2007). If both the cumulative proportion of health care and the cumulative proportion of needs-adjusted utilization are equally distributed across income, the two curves would coincide with the diagonal (line of equality) that represents the horizontal inequity index, meaning that utilization of health care services is proportional to need. The farther the (LN) curve is from the (LM) and from the diagonal, the greater the degree of inequality. The value of the horizontal inequity index ranges from -1 to $+1$. After adjusting for need, when the needs-adjusted utilization concentration curve (LN) lies above the health care utilization concentration curve (LM), there is horizontal inequity favoring the rich, and the measure (HI) has a positive value. This is described as “pro-rich inequity” and actual health care utilization is more concentrated among the better-off, on the lower end of the income distribution. This implies that individuals on higher income are more likely to visit a physician than one would expect on the basis of their reported need. On the contrary, if the need concentration curve lies below the medical care concentration curve, there is horizontal inequity favoring the worse-off, so the measure has a negative value and this is described as “pro-poor” inequity. According to Wagstaff & van Doorslaer (2000), “such pro-poor inequity is interpreted as an “over-utilization” among the poorer groups, or it could be interpreted as an appropriately higher utilization due to the inability to accurately measure the greater health needs among these groups with the data available”. A zero inequity index implies that, after controlling for differences in need across income groups, all individuals have equal probability of using health services, regardless of income.

$$HI = CI_{\text{unadjusted}} - CI_{\text{adjusted}}$$

Figure 2.1: Concentration curves for utilization (LM) and need (LN) compared to the line of equality



Source: Allin S. et al (2009) p. 187

Moreover CI permits identifying the importance of each variable and calculating the contribution of each variable on the overall inequity as a separate component via the decomposition method based on the regression approach as developed by (Kakwani, Wagstaff et al. 1997; O'Donell et al, 2008; Van Doorslaer & Masseria C., 2004). The important advantages and relevant criticism of CI method are presented below.

Given that in most empirical studies – similar to our study - the levels of inequity are small in magnitude, making difficult to interpret the cumulative proportions and the relevant inequity distributions as depicted in the concentration curve figure, Kakwani and colleagues have shown that it is possible to compute the index using a convenient” regression approach based on an initial health-care demand model for quantifying the above CIs, the horizontal inequity index and perform decomposition analysis in five successive steps (Kakwani, Wagstaff et al. 1997).

Overall, the estimation method of calculating the CIs and the index of horizontal equity involves the following five successive steps as developed and presented by Kakwani et al. (1997); Wagstaff et al. (1991); Wagstaff and van Doorslaer (2000); O'Donnell et al.

(2008): (i) Calculation of the CI actual ($CI_{unadjusted}$) for unadjusted utilization (LM); (ii) Estimation of a model of the determinants of health care using the set of need and non-need related variables; (iii) Obtain the “need- standardized” or “predicted” need adjusted utilization for each individual in the sample by setting the value of all non-need variables at their sample mean in order to calculate the $CI_{need-adjusted}$ by employing standard OLS models (Van Doorslaer et al., 2004; García and López, 2007); (iv) Calculation of the concentration index ($CI_{adjusted}$) of need-adjusted utilization for the distribution of need-adjusted utilization (LN); (v) Calculation of the income related inequity or horizontal inequity (HI) as the difference between the concentration indices of unadjusted (LM) and needs-adjusted utilization (LN).

Estimation method

Empirically, the estimation method to calculate the CIs and the HI index based on the aforementioned five successive steps could be summarized as following drawn on the OECD Health Working Paper No.14 by Van Doorslaer & Masseria C. (2004) p.29-31:

- (i) Calculation of the CI actual ($CI_{unadjusted}$) for unadjusted utilization (LM)
- (ii) Estimation of a model of the determinants of health care using the set of need and non-need related variables

$$[1] \quad y_i = \alpha + \beta \ln inc_i + \sum_k \gamma_k x_{k,i} + \sum_p \delta_p z_{p,j} + \varepsilon_i$$

where y_i denotes the dependent variable (medical care use of individual i in a given period): ie probability of inpatient admission for the last 12 months etc. We also distinguish between three types of explanatory variables: the (logarithm of) the household income of individual i ($\ln inc_i$), a set of k need indicator variables (x_k) including demographic and morbidity variables, and p other, non-need variables (z_p) (ie income, education, marital status, household composition, housing tenure, SHIF coverage etc) where α , β , γ_k and δ_p are parameters and ε_i is an error term.

- (iii) Obtain the “need- standardized” or “predicted” need adjusted utilization for each individual in the sample by setting the value of all non-need variables at their sample mean in order to calculate the $CI_{need-adjusted}$ by employing standard OLS models (Van Doorslaer et al., 2004; García and López, 2007).

The predicted of “need- standardized” values of use indicate “the amount of medical care the individual would have received if s/he had been treated the same as others with the

same need characteristics” (Van Doorslaer et Masseria). The need standardization is vital in order to measure inequity, if we accept that income is strongly connected to health care need. What’s more, the need standardization is what one expects from a policy making, since it interprets inequity as the inequality remaining from non-need factors (O’Donnell et al, 2008). According to VanDoorslaer et al. (2004) and García and López (2007) we can obtain the “need- standardized” or “predicted” utilization [2] \hat{y}_i^X by employing standard OLS models (VanDoorslaer et al., 2004; García and López, 2007), as:

$$[2] \quad \hat{y}_i^X = \hat{a} + \hat{\beta} \ln \text{inc}^m + \sum_k \hat{\gamma}_k x_{k,i} + \sum_p \hat{\delta}_p z_p^m$$

with actual values of the $\sum_k \hat{\gamma}_k x_{k,i}$ variables and sample mean values of the $\ln \text{inc}$ and z_p variables.

- (iv) Calculation of the concentration index ($\text{CI}_{\text{adjusted}}$) of need-adjusted utilization for the distribution of need-adjusted utilization (LN).
- (v) Calculation of the income related inequity or horizontal inequity (HI) as the difference between the concentration indices of unadjusted (LM) and needs-adjusted utilization (LN):

$$\text{HI} = \text{CI}_{\text{unadjusted}} - \text{CI}_{\text{adjusted}}$$

The horizontal inequity or estimates of the (indirectly) need-standardized utilisation, \hat{y}_i^{IS} , could be also obtained as the difference between actual and x-expected utilisation, plus the sample mean (y^m), assuming a linear model.

$$[3] \quad \hat{y}_i^{\text{IS}} = y_i - \hat{y}_i^X + y^m$$

It is important to note that for the calculations of $\text{CI}_{\text{unadjusted}}$ and $\text{CI}_{\text{adjusted}}$ in the above steps (i) and (iii) we use, as aforementioned, the simple “convenient covariance” formula as in Van Doorslaer & Masseria (2004) and O’Donell et al (2008)

$$[4] \quad C = \frac{2}{y^m} \sum_{i=1}^n w_i (y_i - y^m)(R_i - R^m) = \frac{2}{\mu} \text{cov}_w(y_i, R_i)$$

where y^m is the weighted sample mean of y , cov_w indicates the weighted covariance and R_i is the (representatively positioned) relative fractional rank of the i th individual, defined as :

$$[5] \quad R_i = \frac{1}{n} \sum_{j=1}^{i-1} w_j + \frac{1}{2} w_i$$

where w_i denotes the sampling weight of the i th individual and the sum of w_i equals the sample size (n).

In addition, sample weights were used in all computations in order to make the results more representative of the country's population. We also test for statistical significance, confidence intervals and robust estimates for CI and its standard errors by running the convenient (weighted least squares) regression and using the Huber/White/sandwich estimator. We also use the Newey-West variance covariance matrix to correct for autocorrelation, as well as heteroscedasticity (Newey, Whitney K & West, Kenneth D, 1987; Greene W.H., 2000).

Moreover, it is worth noting the empirical evidence of Hernandez Quevedo C & Jimenez Rubio D. (2008) who indicate that calculation of equation of inequity index [3] with non linear models instead of OLS techniques – although non linear models have certain advantages over standard OLS, “it would involve a re-linearization by using either the marginal or average effects of each independent variable treated as fixed parameters and evaluated at the mean (or some other parameter)”, and we choose to use marginal effects of the variables. In our study, we also use the OLS regression instead of non-linear regression to standardize the health care variables and decompose the CIs.

Decomposition of the contribution of need and non-need measures/ variables

Following, as aforementioned, the concentration index approach enables the decomposition of the contribution of need (i.e. SAH, health status variables) and non-need (socioeconomic) variables to overall inequality in health care (O, Donell, van Doorslaer, Wagstaff et al, 2008). The decomposition method is used to measure whether socio-economic factors related to income, such as education, residence, employment status and complementary insurance coverage, contribute to the overall level of income-related inequity (Wagstaff et al. 2003). According to Allin S. et al (2009) “The contribution of each variable to inequity is a product of its impact on demand, as measured by its marginal effect on utilization multiplied by the mean value of the regressor and divided by the mean predicted probability, and its correlation with the income distribution” (p.206). For example, a positive contribution of education to dentist pro-rich inequity indicates that higher education is associated with both higher income and utilization.

For calculating the contribution of the variables by the decomposition method we use the above approach with OLS estimations, by performing equation [7].

$$[7] \quad \eta_k = \gamma_k x_k^m / y^m$$

where using the regression coefficients γ_k , we obtain the (partial) elasticities (margin effect – ME) of medical care use with respect to each determinant k , indicating the percentage change in y results from a percentage change in x_k . Moreover, y^m is the (population weighted mean) of y and x_k^m is the (population weighted) mean of x_k .

Following the above, Wagstaff, Van Doorslaer and Watanabe, 2003, have shown that the total concentration index can then be written as:

$$[8] \quad C = \eta_r C_{\ln inc} + \sum_k \eta_k C_{x,k} + \sum_p \eta_p C_{z,p} + G C_\epsilon k p$$

where the first term denotes the partial contribution of income inequality, the second the (partial) contribution of the need variables, and the third the (partial) contribution of the other variables. The last term is the generalized concentration index of the error term ϵ . We should also mention that we test for statistical significance, confidence intervals and robust estimates for standard errors by running the convenient (weighted least squares) regression and using the Huber/White/ sandwich estimator.

2.2.3 Advantages and criticism

Concentration Index method has many advantages empirically presented in the literature (O, Donell, van Doorslaer, Wagstaff et al, 2008; Wagstaff, Paci and van Doorslaer, 1991):

- (a) “seizes” the socioeconomic dimension of health care (and health) inequalities;
- (b) It uses information from the whole income distribution rather than just the extremes;
- (c) It permits visualizing inequalities in use via the concentration curves and identifying their extent;
- (d) It permits decomposing the contribution of the various need and non-need components (socioeconomic variables) as determinants of inequity and their relative importance that drives inequity.

On the other hand, criticism has been developed for the method of measuring equity, summarized as following:

- (a) Inefficiency in the linear models of utilization (OLS) used on the estimation methods for the CIs and decomposition analysis due to the count nature of some utilization variables (i.e. conditional number of inpatient admissions) (Jones, Rice, Bago d’Uva et al., 2007).
- (b) Possible endogeneity derived from the causal impact of health service use on need – health care status.

(c) For the critical problem (a), in order to restore the mechanics of the decomposition, what has been suggested is to turn actual use into propensity to use, as an approximate. However, there is strong evidence that horizontal inequity measures (HIs) calculated by standard OLS techniques do not differ to those obtained by non linear methods (Van Doorslaer et al., 2000; Van Doorslaer & Masseria C., 2004; Hernandez Quevedo & Jimenez R, 2009; AllinS. & Hurley, 2009; Jones, Rice, Bago d'Uva et al., 2007). Therefore, in our study- similar to others- we use the OLS regression instead of non-linear regression to standardize the health care variables and decompose the CIs.

For the critical problem (b) of possible endogeneity among health service use and need-health status, there is strong empirical evidence that this effect is minimal, provided that nearly all empirical studies of HI in health care utilization, when measuring need, use a combination of demographic and health status indicators such as SAH status, the presence of chronic conditions and activity limitations, and not limited need information that may be affected by the causal impact of health service use (Bado D'Uva, Jones & Van Doorslaer, 2007 and O'Donnell et al, 2008).

2.3 Data and Research Questions

As aforementioned, because of the weaknesses of the system, the *main hypothesis of my thesis* is that the population is expected to face high inequalities in health care use, particularly the elderly who are the most constant consumers of health services. Inequalities in health care use are expected with regard to: regional disparities in health care use caused by inadequate allocation of human and infrastructure resources, variations in health care use among different social health insurance funds due to unequal health insurance coverage and resulting in increased out of pocket payments. The primary objective of the thesis is to apply quantitative empirical methods to explore some key aspects of equity in the receipt of health care in Greece among the older population, by using different survey datasets and methods. Our survey tools are two nationwide and one urban setting datasets to comprehensively examine key aspects of inequalities in the utilisation of different types of health care with reference period from 2003 till 2008. The three separate datasets - survey tools with a different time reference (2003-2004; 2005; and 2008-2009) will provide robust evidence for inequalities in health care system among the older population to shed light in the whole pro-crisis period (2003-2008) in Greece. Under this framework, this thesis consists of three essays and adds to the existing limited

literature for older population in Greece, by providing new empirical evidence and introducing more sophisticated statistical methodology.

The first essay uses the sample of individuals 50 years and above from the cross-sectional *Patra's Health Interview Survey (Patra's HIS)* - a survey for the general adult population conducted in 2005 at Patras' municipality- the third largest urban area in Greece and the regional capital of Western Greece in the north western part of the Peloponnese peninsula. The Patra HIS was designed and conducted from June to July 2005, by the research team of University of Patras and the Municipality of Patras within the Phase IV framework (2003-2008) programme of W.H.O. European Healthy Cities Network based on the respective W.H.O. Questionnaire, adapted for Greece that covers a wide variety of health status, health care and background topics. The WHO Healthy Cities' approach seeks to put health high on the political and social agenda of cities and to build a strong movement for public health at the local level. It strongly emphasizes equity, participatory governance and solidarity, intersectoral collaboration and action to address the determinants of health in an urban setting level (WHO, 2013). However, although in Greece similar to most EU countries, local authorities play an important role in making decisions and implementing policy on the social determinants and improving social welfare for citizens in the EU (EC, 2007), at the same time, in Greece, in the health care sector, regional and prefectural authorities are only administratively responsible. The role of regional and local governments in health care planning, organization and provision is limited. Moreover, given the reference time of the Patra-HIS survey with reference time 2004-05, it will permit us to explore the main hypothesis of this thesis, shedding light on the equity issue of the first NHS-ESY decentralization reform attempts of 2001-2004 for the region of Patras that consists the chair of 6th Regional Health Authority of Peloponnese, Epirus, the Ionian Islands and Western Greece. In addition via the information for OOP payments in health care, this study allows to evaluate the extent to which social health protection system offers adequate protection to the elderly. Therefore, building on the Patra's HIS, *this study aims* at: (i) exploring income-related inequalities on utilization of health care among the population over 50 years old in an urban-setting in Greece and explaining some of the contributors (ii) examining the role of out of pocket payment (OOPP) mechanism in health care use by the elderly aged over 50, on the basis of fragmented social health insurance coverage, and discussing their policy implications. Based on the features of the Greek health care system and the existing literature in order to achieve these objectives, we address the following empirical research questions (RQs), guided by the following

theoretical hypotheses (THs). THs: (i) The inequalities in use of health care are derived from the different socioeconomic characteristics of the older population who use the health services; (ii) Higher income individuals are more likely to use health care services than lower income comparators; (iii) Individuals with “Non Noble” social health insurance coverage are more likely to pay OOP for using health care than comparators with “Noble” social health insurance coverage. Guided by the THs, we address the following *research questions (RQs)*: (i) What is the extent and contributors of inequity in the use of health care among people over the age of 50 in an urban-setting level in Greece? (ii) What are the determinants of OOPPs as a payment mechanism of the utilization of health care among the older population over the age of 50 in Greece? The Patra’s HIS aims at providing new evidence at an urban-setting level and fills the gap in the research for Greece.

The second essay uses the sample of individuals 50 years and above, from the first wave of the nationwide, multidisciplinary longitudinal Survey *Greek National Health Interview Survey (GNHIS)* that embedded the European Health Interview Survey (EHIS) modules for the general population (over 15 years), that was conducted by the Greek Statistical Authority (ELSTAT) during November and December 2009 with reference time in 2008-2009. The GNHIS covers a wide variety of health status, health determinants, health care and background topics - as launched and implemented in 17 Member States⁶ driven under the coordination of Eurostat, with a periodicity of 5 years, according to the Regulation 1338/2008 on Community statistics on public health. Therefore, given that GNHIS data are the first nationwide, multidisciplinary evidence in Greece focused on health and socio-economic issues with reference time in 2008-2009, gives a unique opportunity for our sample of individuals 50+ to explore the main hypothesis of this thesis, shedding light on the equity issue of the latest regionalization attempt of NHS-ESY in the period 2005-2008 after 2005 elections and change in government, via the reform attempts of 2005 (Law3329/2005 and Law3370/2005 for reorganizing public health services); 2006 (Law3457/2006 on the regulation of pharmaceuticals) and 2007 (Law3580/2007 about the creation of a Central Committee of Health Supplies -EPY). These Laws (Law 3370/2005; Law 3457/2006; Law 3580/2007) were never or partially implemented. Only the Law 3329/2005 is still active. This Law3329/2005 is the latest regionalization attempt that inactivated most of the 2001 and 2003 Regional Structure of Health Care Services

⁶ Belgium, Bulgaria, Czech republic, Germany, Estonia, Greece, Spain, France, Cyprus, Latvia, Hungary, Malta, Austria, Poland, Romania, Slovenia and Slovakia.

(PeSYPs) legislated measures, renamed the PeSYPs as “Regional Health Administrations - RHAs” (DYPEs or YPEs) and reduced RHAs from 17 to 7 in order to “achieve economies of scale”. However, although the Law 3329/2005 is still active, any real decentralization of competences or independence from central government for DYPEs (or currently YPEs) to develop health services according to the needs of their populations has not yet been achieved. The management and control of the health care system still remains with the Ministry of Health. Therefore, building on the GNHIS – Wave1, *this study aims*: (i) to explore income-related inequalities on utilisation of health care among the population over 50 years old in Greece (ii) Among the contributors, to explore national regional inequalities in access of health care use by the older population aged over 50 and discuss their policy implications. Building on the features of the Greek health care system and the existing literature and evidence, in order to achieve these objectives, we address the following empirical research questions (RQs), guided by the following *theoretical hypotheses (THs)*. THs: (i) The inequalities in use of health care is derived from the different socioeconomic characteristics of the older population who use the health services; (ii) Individuals on higher income are more likely to use health care services than lower income comparators; (iii) Individuals in densely-populated areas are more likely to use more health care services than comparators in intermediate and thinly – populated areas. Guided by the THs we address the following *research questions (RQs)*: (i) What is the extent and contributors of inequity in the use of health care among people over the age of 50 in Greece? (ii) What is the extent in national regional variations and inequalities in accessing health care services among the older population over the age of 50 in Greece?

The third essay uses the Greek sample of the nationwide, multidisciplinary longitudinal 1st wave of Greek survey of *Survey of Health, Ageing and Retirement in Europe (SHARE)* for people aged 50 years or over that embedded the SHARE modules focused on health and socio- economic issues related to ageing. The specific data tool that was conducted in 2004/2005 with reference time in 2003- 2004, will permit us to explore the main hypothesis of this thesis - that the older population is expected to face high inequalities in health care use, shedding light on the equity issue of the NHS-ESY initial decentralisation reform of 2001-2004. This NHS-ESY period includes the major reform acts of 2001 (Law 2889/2001) on the Regional Structure of Health Care Services and reform act of 2003 (Law 3106/2003) on the Regional Structure of Welfare Services, that divided the country into 17 regional health and welfare authorities (PeSYPs). The specific reform – even

though partially implemented till today - is a milestone in the development of the ESY at the structural level. Building on the multidisciplinary SHARE survey for Greece, *this study aims at*: (i) exploring income-related inequalities on utilisation of health care among the population over 50 years old in Greece and explaining some of the contributors (ii) Among the contributors, to explore national regional inequalities in access of health care use by the older population aged over 50 and (iii) detecting the role of out of pocket payment mechanism (OOPP) in health care use by the elderly aged over 50, on the basis of fragmented social health insurance coverage and discussion about their policy implications. Building on the features of the Greek health care system and the existing literature and evidence, in order to achieve these objectives, we address the following empirical research questions (RQs), guided by the following *theoretical hypotheses (THs)*. THs: (i) The inequalities in use of health care is derived from the different socioeconomic characteristics of the older population that uses the health services; (ii) Individuals on higher income are more likely to use health care services than lower income comparators; (iii) Individuals in densely-populated areas are more likely to use more health care services than comparators in intermediate and thinly – populated areas; (iv) Individuals with “Non Noble” social health insurance coverage are more likely to pay OOP for using health care than comparators with “Noble” social health insurance coverage. Guided by the THs we address the following *research questions (RQs)*: (i) what is the extent and contributors of inequity in the use of health care among people over the age of 50 in Greece? (ii) What is the extent in national regional variations and inequalities in accessing health care services among the older population over the age of 50 in Greece? (iii) What are the determinants of OOPPs as a payment mechanism of the utilisation of health care among the older population over the age of 50 in Greece?

2.4 Why we select the specific survey tools

Moreover, in order to explain why we select the specific survey tools and our strategy, we need to clarify the following issues related to the availability and survey design of the databases in Greece and our thesis’ objective that is to explore health care inequalities for the older population aged 50 years and over during the pre crisis period of 2003-2008 using different survey tools in different times.

- Given that SHARE survey is exclusively designed for population aged 50+, we decided to use data only from Wave1 SHARE with reference time 2003-04 and not Wave 2 due to the fact that Wave 2 is focused on re-contacting respondents from the Wave 1 to go

into longitudinal dimension by using the same data with Wave 1 for specific variables (ie SHI coverage), that is unlike with our thesis' objective of a cross-sectional study. In addition, we decided not to use Wave 3 SHARELIFE data with reference time in 2007-2008 because SHARELIFE has a different focus than the regular waves and is unrelated to our thesis' objectives. It contains all areas of the respondents' live histories, ranging from childhood conditions, financial history to health and health care history. Unfortunately, after Wave 3 SHARELIFE, Greece has not participated in the SHARE database Wave 4 (reference time 2009-2010) and Wave 5 (reference time 2011-2012) for funding reasons. Therefore, SHARE Wave 1 dataset is the most suitable available survey tool for a cross-sectional study exclusively for older population in Greece corresponding to our thesis' objectives.

- In addition, it is worth mentioning that we address similar or the same research questions among the three survey-tools given that we have similar framework for examining the same objectives with the same theoretical hypotheses based on the available data for each data survey, but with a different reference period. The fact that each dataset provides evidence supplementary to the other two datasets, results in a robust evidence for inequalities in health care system among the older population to shed light in the whole pre-crisis period of 2003-2008 of the NHS-ESY health system in Greece.
- In particular, the sample of older 50+ population of the Patra-HIS survey (reference time 2004-05) provides evidence for the degree and extent of inequalities of health care use at an urban-setting level shedding light on the equity issue of the NHS-ESY decentralization reform attempts of 2001-2004 to supplement the evidence of the first nationwide health interview survey GNHIS (reference time 2008-09) that covers the NHS-ESY period 2005-2008 and SHARE evidence (2003-04) on a nationwide setting exclusively for older population for the NHS-ESY initial decentralisation reform period of 2001-2004.
- Under this framework, the investigation and measurement of inequalities in health care use among the older population in Greece for the period from 2003 till 2008 preceding the current economic downturn since 2009, will help health policy-makers to examine findings on changes over time relative to NHS-ESY health, social and economic policies. In this context, our thesis' evidence of the inequalities in heath care use in the pre crisis period 2003-2008 will provide decision-makers with insights into how to

prioritize healthcare resources and manage the performance of the Greek health system by studying the past and compare the pre with post-economic crisis period. Our findings may also contribute to effective planning of health services in Greece in times of economic crisis since they provide evidence from the past. The importance of this point lies in the fact that much of what we live within the present- especially when the economy slows down - is a direct result of decisions made in the past (Tosh, 2000; Merriman, 2000; Ion and Beer, 2003).

2.5 Comparing the Surveys Design and Data

It is worth providing the strengths or advantages and limitations or disadvantages of the survey tools of this thesis as an attempt to compare the data, to identify commonalities among the surveys and assess their influence - contribution on our research analysis.

2.5.1 Strengths /Advantages

- From the survey datasets as presented above, it is clear that all the surveys (the nationwide SHARE, GNHIS and the urban-setting PatraHIS) have a very rich set of self-reported morbidity measures, which better allow for need variables when measuring variations due to non-need factors such as income. They also have a rich set of common health services utilisation measures such as: medical contacts, contacts with GPs, with specialised physicians, visits to dentists, inpatient and outpatient visits (only for SHARE and PatraHIS). Most of them were based on a twelve months recall, except in PatraHIS with a three month recall.
- Moreover, the information of the PatraHIS similar to SHARE survey on SHI fund, private health insurance, and OOP payments is very important not only for identifying and measuring the inequalities in utilisation of health care, but also because it allows to explore in depth the role of the Greek fragmented social health insurance system to the inequalities in utilisation of health care. This information gives us the chance to examine the relation between the SHIFs and the burden of OOP payments, as well. We examine which insurance group bears the greater burden of OOP and informal payments to access.
- Furthermore, the information of the GNHIS on regional variations in health care use and SHARE survey on regional variations and OPP payments are important as they permit not only to identify the extent of regional disparities, but also to explore the relation between the regions of residence, health care services, and the burden of OOP

payments. Therefore using the specific information, we have the opportunity to examine which region of residence faces the greater OOP expenses for different health care services.

- Another advantage is the fact that all the datasets are household surveys, collecting information on all members of respondents' households, except PatraHIS, which is particularly useful in including information of living arrangements in the analysis (ie household composition; housing tenure etc), a factor that has been ignored in most of the studies that measure health services utilisation among the elderly. In case of Greece, there is no such evidence.
- As far as it concerns income measure, all the survey datasets except PatraHIS have accurate income definition. We describe this issue, below.

2.5.2 Comparing limitations/Weaknesses on data source

While we think that this research will add considerably to the body of knowledge on the equity achievements of the Greek health care system by focusing on specific subpopulation as the elderly, it is not without important limitations. Therefore, our findings need to be interpreted under the following comparing limitations mainly on data source and methodological issues.

(i) Weaknesses in survey design

Any attempt to compare the findings of the three surveys needs to be made under the scope of the differences in the survey design. GNHIS is a nationwide survey of the general population, whereas SHARE is a nationwide survey of the population over 50 years old. On the other hand, PatraHIS is an urban-setting survey for the general population. Moreover, they include measures of health care use and explanatory variables with different definition and reference period as well as, they have significant differences in income measure which may lead to response variations, as we display below.

- Even though the GNHIS has a rich set of self-reported morbidity, health care use and regional location measures, it has no information about the SH Insurance coverage and the perceived financial barriers to access leading to a less stronger survey tool for measuring inequalities in health care in comparison with the other two PatraHIS and SHARE surveys.

- On the other hand, the fact that the other two surveys (SHARE and PatraHIS) include financial barrier information from different sources leads to inability to compare the relevant findings. Furthermore, PatraHIS study includes information for OOP expenses about inpatient, outpatient admissions, SHIF physician visit and specialist private visit with a rather small number of observations that led to a limited analysis. However, SHARE study includes OOPP expenses information for inpatient and outpatient visit but with different components than PatraHIS OOPP measures.
- Even though all surveys have rich set of self-reported morbidity, health care use and regional location measures (for GNHIS and SHARE), as well as SHARE and PatraHIS survey data include information for the financial barrier to access, they provide little possibilities to account for potential differentials in quality. However, SHARE includes the reference to regional location and barriers to access which are one small step in the direction of allowing for such quality differences.

Common limitations

(i) Selective survival and its effect on health inequalities

Due to the fact that this thesis focuses on the older population, it is important that we consider the selection effect limitation: the selective survival – that is, people who have survived at older ages are healthier than those who have not survived. We would expect health inequalities to be reduced with age. We could carry out longitudinal analysis to measure this effect considering that it is not possible to measure the extent of this effect with cross-sectional surveys, especially with the small PatraHIS urban-setting survey.

(ii) Institutionalization of older population and its effect on health care use

The limitation of exclusion of institutionalized individuals from the survey is similar to the majority of the health and socioeconomic surveys. There is an argument that the exclusion of institutionalized individuals will underestimate the overall level of socioeconomic inequalities in morbidity, provided that an association between poverty and institutionalization exists but is not included in the analysis (Arber & Ginn, 1993). However, according to the Greek Statistical Authority (2011) “if we subtract from the general Greek population the conscripts and the imprisoned, the actual percentage not covered by the survey procedure, accounts for 2% of the total population, and in its major part concerns economically non-active persons”.

(iii) *Recall bias*

Self-reported utilization may also be biased due to effects of social desirability or recall bias, especially for older age groups. In the three surveys of our study the time period varies from “the past 12 months” to “the past 4 weeks”. Some researchers believe that self-reporting of physicians visits may be unreliable versus recall for hospital visits that is generally better (Barer et al. 1982; Roberts et al. 1996). However, there is evidence about the recall of utilisation among older people which proved that reporting error was relatively minor for contacts with physician but found greater error for the data in the number of visits (Glandon, Counte & Tanceri, 1992; Cleary, 1984).

2.6 Methodology in our thesis

Overall, in order to address the research questions in our thesis, we apply both methods as aforementioned in paragraph 2.2.: The Regression models (mainly odds – ratios); and the Concentration Index – Ecuity method, by following the same steps for each study separately.

1. First, I calculate concentration indices to quantify and decompose income – related inequity in the likelihood of using health care, based on the Horizontal Inequity Index approach, as developed by Van Doorslaer and colleagues (Van Doorslaer E., Masseria C.(2004); van Doorslaer E., Masseria C., Koolman (2006); O'Donnell et al (2008); and secondly, in order to increase the credibility of our analysis, we use regression model to measure the effect of socioeconomic indicators on the contact likelihood with health care services, and adopt the standard method in the empirical literature, by regressing medical care use on a vector of medical need indicator variables and a set of non-need variables using the equation, assuming a linear model, as displayed in 2.2 methodology paragraph. As far as it concerns the estimation method, we need to consider the following issues:

- ✓ In the PatraHIS and SHARE study that health care variables included in the analysis, have count nature only for probability of use, we run logistic model for the probability of use.
- ✓ In the GNHIS study, since the health care use variables have count nature not only for probability of use, but also for total and conditional number of use, we run logistic model for the probability of use, a generalized negative binomial model for total consumption, and a truncated negative binomial model for the conditional positive use (Deb & Trivedi, 2006; Masseria C. & Van Doorslaer, 2004).

- ✓ In addition, sample weights are used in all computations in order to make the results more representative of the country's population. Robust standard errors are also obtained using the Huber/White/sandwich estimator.
2. In order to define and measure the extent of regional inequalities on the likelihood of using health care, in GNHIS and SHARE study, we use the results of the inequity decomposition method.
 3. In order to identify the determinants and explore the role of OOPP mechanism in health care, in PatraHIS and SHARE study, we use the regression model that measures the effect of socioeconomic indicators on the likelihood of paying out of pocket (OOP) for using health care following the standard approach in the empirical literature, by regressing OOP payments on a vector of medical need indicator variables, and a set of non-need variables, assuming a linear model.
- ✓ In particular, for the PatraHIS study that the OOP expenses variables have a count nature (the probability of facing OOPP for the last inpatient admission, outpatient visit, SHIF physician visit and the OOP amount for the last specialist private visit), we run logistic model for the probability of facing OOPPs for inpatient, outpatient and SHIF physician visit. Moreover, given that for the last specialist private visit we have information for the OOP amount, in order to examine the determinants of the OOP amount for a specialist private visit we perform logistic analysis in stages: First, we perform regression analysis for the likelihood of facing OOP amount for the specialist visit ($\geq 1\text{€} = \text{yes}$ versus $0\text{€} = \text{no}$) to describe the proportional effect of each single variable. Second, for the OOP conditional, positive amount ($> 0\text{€}$), we run a logistic model for the probability of facing higher ($> 40\text{€}$) versus lower ($1\text{€}-40\text{€}$) median OOP amount (as 40€ is the median OOP amount), to assess to what extent OOP conditional payments are more likely to occur within certain subgroups. Third, we examine to what extent payments toward specialist private care are related to ability to pay as expressed by income, as well as whether OOP amount varies among the SHIFs coverage, using both cases of OOP amount (including 0€) and conditional amount ($> 0\text{€}$).
 - ✓ For the SHARE study that the OOP expenses variables have a count nature, (the OOP amount for inpatient admission and outpatient visit), in order to examine the determinants of the OOP amount, we perform logistic analysis in stages: First, we perform regression analysis for the likelihood of facing OOP amount for inpatient admissions and outpatient care ($\geq 1\text{€} = \text{yes}$ versus $0\text{€} = \text{no}$) to describe the proportional

effect of each single variable. Second, we compare higher OOP versus lower OOP amount. We perform logistic analysis for the probability of facing OOP conditional amount ($>0\text{€}$) dichotomized in OOP conditional median amount of 672.6€ for inpatient care and 194.4€ for outpatient care. In particular, we run a logistic model for the probability of facing OOP conditional amount $>0\text{€}$ for inpatient care dichotomized in ($>672.6\text{€}$) versus ($1\text{€}-672.6\text{€}$) where 672.6€ is the median of OOP positive amount for inpatient care. We also run a logistic model for the probability of facing OOP positive amount $>0\text{€}$ for outpatient care dichotomized in ($>194.4\text{€}$) versus ($1\text{€}-194.4\text{€}$) where 194.4€ is the median of OOP conditional amount for outpatient care. Third, we have the chance to explore to what extent OOP payments for inpatient and outpatient care are related to ability to pay as expressed by income, as well as whether OOP payments vary in terms of SHIF coverage, and region of residence. Therefore, we examine the mean OOP conditional ($>0\text{€}$) amounts by income quintile, by SHIF, by degree of urbanization and region of residence.

Overall, in our analysis, following the standard approach in the empirical literature, the need variables are those that ought to affect the use of health care, whereas non-need variables are those that should not affect current health care use, as described in conceptual framework (Gravelle, Morris, and Sutton, 2006). Therefore, we measure need variables as a variety of demographic and morbidity indicators via general self-assessed health status; suffering from long term illness (LTI); limited in general activities (GALI); and number of chronic conditions (proxied by health status and health limitations) whereas we measure non-need indicators via the variables of income, education, marital status, household composition, housing tenure, region of residence, degree of urbanization, Social Health Insurance Fund (SHIF) coverage.

2.7 Methodological limitations

The common methodological limitations that the three analyses face - additional to each separate empirical study - are derived from limitations in measurement and limitations by the empirical use of CI and decomposition analysis.

- (i) Common difficulty in measuring need for health care
- (ii) Potential Biases for self-reported health status measures
- (iii) Limitations under estimation of income variable/measure
- (iv) Limitations of OOP financial burden variable/measure

- (v) Difficulty in identifying an accurate measure of socio-economic indicator at older age leading to causation and underestimation of differences in health care use
- (vi) Decomposition analysis detects only correlation of health care (health) and socioeconomic indicators, not causal relationship

(i) Common difficulty in measuring need for health care

The first limitation concerns the fact that there is no broad agreement on the definition of “need” in health care that results in difficulty in measuring need for health care. In the income-related inequity method, as aforementioned, it is assumed that health status is a sufficient proxy for need in the case of individuals whose health is worse than others and need more health treatment. There are many potential problems concerning this assumption (e.g. Oliver and Mossialos 2004), for instance, the argument that urban residents and old people are more likely to underestimate their health status (Oliver and Mossialos 2004; Allin et al, 2010). Nevertheless, in our analysis we were able to include more objective measures of health status in every study that have affluent information about representing need for health care for all essays.

(ii) Potential Biases for self-reported health status measures

There are several potential biases in literature for self-reported health status measures that should be addressed:

- Errors in self-reporting have been found to vary systematically across socio-economic groups (O'Donnell and Propper 1991), which is consistent with the finding that lower socioeconomic groups tend to underreport longstanding illness (Adamson et al. 2003). This might lead to underestimation of inequalities across income groups.
- Research reveals that older people often rate their overall health as good, suggesting a bias towards optimism (Dening et al. 1998; Black et al. 1995). Therefore, one must interpret the results of the inequity analyses with caution, since all the need-related variables were based on self-report. In its defence, several studies have supported the validity of self-reported health status, demonstrating significant relationships with other measures of health status including physician assessments and utilisation data (Mossey and Shapiro 1982; Blaxter 1985) which means that self-assessed health is possibly the best available proxy for need for health care.

(iii) Limitations with estimation of income variable/measure

Provided that in this thesis we use three survey datasets in order to quantify and explain income-related inequity in the use of health services, the issue of measuring income is

fundamental. Thus, when we interpret our findings it is important to take into consideration the following issues related to the difference in definition of income variable and the relevant modifications we undertake.

Comparing the income definition

The differences in the income definition among the surveys are focused on the following issues:

- (a) *Gross versus net income*: In PatraHIS and GNHIS surveys, income is taken to approximate the concept of monthly net total household income. The latter is derived as the sum from any source per equivalent member added up, after tax and social security contributions, versus the SHARE income variable taken to approximate the concept of annual gross total household income, which derives as the sum over all household members of the individual – level values from any added up source. The fact that in PatraHIS income question there is not a sharp distinction between gross and net for certain components of income, can lead to response burden.
- (b) *Imputed rent*: The SHARE income takes into account, owner occupation housing (through imputed rent – net of mortgage interest payments) unlike PatraHIS and GNHIS, as well as tax and social security contributions (SSC) paid, by using information external to the survey.
- (c) *PatraHIS income measure weak definition*: The PatraHIS income is a categorical variable with 11 values/income bands and an open-ended top band, of disposable (after tax and social security contributions) household monthly income without defining the different components of income. Thus, the PatraHIS categorical income may overestimate the level of pro-poor inequity or that of pro-rich inequity. On the other hand, GNHIS and SHARE are more accurately measured, given that they define different components of income (even capital assets income). GNHIS income is defined in two ways: There is both continuous income measure and a categorical measure derived from a variable with 10 values –deciles – income bands and an open-ended top band of disposable (after tax and social security contributions) household monthly income. SHARE income is consistently accurately measured regarding, it is derived from the sum of different components, some incomes at the individual level and some at the household level at a gross annual level from any source added up.

It is also important to mention that in order to include the income variable - as it is available from the three survey datasets – we have *undertaken the following modifications*: (a) we equalized the household total gross annual income adjusting for the household's size and the age of its members according to the modified OECD scale⁷. (b) We also construct a continuous estimate as a natural logarithm of equalized household total gross annual (monthly) income using methodology as suggested by MEA Institute for SHARE and suggested by the Eurostat for GNHIS survey.

Missing information for income

It is worth noting that the PatraHIS survey has only 5.2% missing data on income; the GNHIS survey has 16.5% missing data and SHARE survey has 17.4% non-response rate for income information. These high rates of item non-response for income measure are a common problem for household surveys that we dealt with. For the two datasets GNHIS and SHARE, the missing values are replaced by imputed values (i.e., observed values of other respondents that are similar to the respondent considered in certain relevant aspects), prepared and disposed centrally by Eurostat for GNHIS and by the MEA Institute for the SHARE. For the PatraHIS, given that any unfolding brackets questions are not included and the item non-response for income measure is only 5.2%, we made the analysis by keeping in mind that the results will not be influenced by this small rate of missing values for income variable.

(i) Limitations with estimation of OOP financial burden variable/measure

Weaknesses in the use of OOP expenses for the evaluation of progressivity in health care finance are derived from the following issues.

- The examination of all sources of health sector funding- not simply those payments that are made exclusively for health care- are required in order to evaluate progressivity and development in health care finance. Sources of health care finance which should be taken into consideration are: direct taxes, indirect taxes, social insurance, private insurance, and OOP payments (O'Donnell O. et al, 2008). However, it is unlikely that data for OOP expenses provide complete information on household tax and insurance payments. As O'Donnell O. et al (2008) points out “income tax payments or social insurance contributions may not be explicitly identified, and payments through sales taxes almost certainly will not be reported”

⁷ Where equivalised household size is a sum of weights attributed to each member of the household according to the modified OECD equivalence scale: 1.0 to the first adult; 0.5 to the second and each subsequent person aged 14 and over; 0.3 to each child aged under 14.

(p. 188). Several approximation strategies are required. For instance, the distribution of the sales tax burden could be calculated by applying product specific tax rates to disaggregated data on the pattern of household expenditure.

- Estimates of OOP payments from survey data are potentially subject to both recall bias and small sample bias, due to the fact that paying OOP does not concern a systematic behavior. Therefore, OOP expenses could be misreported and measure in the wrong way the distribution of payments and their real influence on progressivity of health care finance. O'Donnell O. et al (2008) claims that the restriction of the aggregate level mismeasurement can be confronted via the application of a macro weight that provides the best indication of the relative contribution of OOP to total revenues. Nevertheless, estimates of the OOP payments distribution are not biased if we verify that reporting of OOP payments is related systematically to ability to pay (ATP).

(ii) Difficulty in identifying an accurate measure of socio-economic indicator at older age

This limitation concerns the argument of possible causation and underestimation of inequalities in health care use for older population due to the difficulty to identify an accurate socioeconomic indicator of older population, provided that income and activity status are not such significant indicators mainly for those over 65 age, who are retired. There is also evidence that education and housing tenure indicators are more important than income and activity status (Van Ourti, 2003). There is an argument that the inaccurate socioeconomic indicators lead to causation and underestimation of inequalities in health care use for older population. However, according to evidence from studies having attempted to correct the potential endogeneity of income, the effect of income on health neither changes nor becomes significant (Allin et al, 2011; Lecluyse and Van Ourti, 2005; Lindahl, 2005; Meer et al., 2003).

(iii) Decomposition analysis detects only correlation of health care (health) and socioeconomic indicators and not causal relationship

This limitation concerns the argument that, although decomposition analysis detects the association of the distribution of health care (health) and socioeconomic indicators, it detects only correlation and not causal relationship between health care and socioeconomic factors i.e. health care and education. For instance, income and education are determinants of ill health and hence of use of health care services. In addition, there is evidence that the relationship between health care and SES may be bidirectional and the two processes are not mutually exclusive, leading to difficulty to

disentangle a causal relationship (Costa-Font and Hernandez-Quevedo, 2012; Allin S. et al, 2009). A suggested way which could possibly disentangle causation and selection is the carrying out of a longitudinal analysis (Allin S. et al, 2009).

Overall, the empirical findings of these essays provide useful tools for understanding, exploring and measuring inequalities in the use of health care among the older population in Greece. In addition, this thesis goes further than the existing studies of equity by discussing the policy context in which inequalities in use arise.

Moreover, under the aforementioned framework, the investigation and measurement of inequalities in health care use in Greece for the period from 2003 till 2008 preceding the current economic downturn since 2009, will help health policy-makers to prioritize healthcare resources and manage the performance of the Greek health system in terms of inequity in use and access of health services by those most at risk of vulnerability as the older population. The findings of this study provide evidence for studying the past and compare the pre with post-economic crisis period. The importance of this point lies in the fact that understanding the past is a useful way of opening up the possibilities that may exist in the present and the future, especially when the economy slows down as in our days (Ion and Beer, 2003). The fact that older people have the same access to NHS-ESY healthcare provisions as the rest of the population, and in order to examine whether the provision of health care services could be a source of inequalities in utilisation, we need, after presenting the health and socioeconomic profile of the Greek elderly, to describe the features of the Greek health care system.

Chapter Three

3. The Health Care System and Ageing Population in Greece

As aforementioned, the fact that older people have the same access to healthcare provisions as the rest of the population and in order to describe the way that health care services are provided to the Greek elderly as a source of inequalities in utilisation, we need to describe the features of the Greek health care system. However, first, after the geography characteristics of Greece, we display the health and socioeconomic profile of ageing population, given that inequities in older people's health and well-being relate to a considerable extent to accumulation of advantage and disadvantage that takes place across their life-course (WHO, 2014). Therefore, in order to explore the cumulative effect of underlying social determinants on inequities in health care use among older people, it would be helpful to elaborate on the health and socioeconomic profile and well-being of Greek older adults. It is also important to present briefly how the profile of the elderly is interacted with the available elderly care and Long Term Care (LTC) provided in Greece. Following this information, we display the main characteristics of the Greek health care system.

Geography

Greece is located in south-eastern Europe. About 80% of the country is mountainous or hilly. Greece features a vast number of islands, between 1,200 and 6,000, out of which 169 are inhabited. Greece consists of 13 administrative regions (peripheries), nine of which belong to mainland Greece and four insular. These regions correspond to the NUTS 2 level as in Figure 3.1 and comprise of 76 prefectures and 1034 municipalities with a high coefficient of variation (2.6) in population size. The total population of Greece was approximately 10.8 million in 2011 according to the last Census of 2011 (National Statistics Authority, 2014). In fact, rural population is 38.5% of total population in 2011, whereas 45% of the total population accommodates in the urban regions of Attiki - the metropolitan region of Athens. Athens is the nation's capital and largest city with 3.8 million inhabitants (35% of total population) and Thessaloniki in Central Macedonia is the second biggest urban region of (with 10% of inhabitants). There are large differences among the NUTS II regions in terms of development level and regional economic

structures, reflected in varying employment structures and inequalities in regional GDP per capita. The poorest regions with the lowest regional GDP per capita are Epirus, Western Greece and Thessaly and those with the lowest Gross Value Added are North Aegean, Epirus and Ionian Islands and East Macedonia & Thrace (Table 3.8). On the other hand, the richest ones include Attika (Athens) and Central Macedonia (Thessaloniki), according to the National Accounts as presented by the Hellenic Statistical Authority (ELSTAT, 2014).

Figure 3.1: Political Map of Greece with 13 administrative regions (peripheries) in NUTS 2 level



<http://www.mapsofworld.com/greece/greece-political-map.html>

It is used with permission of MapsofWorld.com.

3.1 Demographic determinants and health profile - challenges of Greek elderly

In this section, first, we present the demographic, epidemiological and health risk factors that define the general state of health of the Greek elderly. As individuals age, non communicable diseases become the leading causes of morbidity, disability and mortality, and multiple morbidities become more common.

The ageing of Greece's population reflects a combination of declining birth rates, increasing life expectancy due to increasing survival in older age and falling fertility rates, leading to rapidly increase the percentage of ageing population. This increase may reflect a mixture of better health care, public-health initiatives and the differences in the lives that people lived earlier during their life course (WHO , 2015).

According to all international and Greek data, the Greek population is a rapidly ageing population, as the population aged 65 years and over has dramatically increased over the last decade, both in size and as a percentage of the total population. In 2014, the *share of those aged 65 or over* accounts for more than one-fifth of the total population (OECD, 2016). Greece has the fourth highest proportion (20.5%) of elderly population over 65 as a % of the total population, above OECD 34 (15.9%) and OECD 42 countries (12.1%) and the EU28 (18.2%). Moreover, 5.7% of the Greek population is over 80 years near the EU average (5.1%), and approximately 25.3% of Greek population is aged less than 25 – below the EU 28 average (27.1%). At the same time, it is expected that that there will be a considerable increase in the share of the proportion over 65 – that is predicted to rise to around 25.6% by the year 2030 (EU28: 23.9%) and an unexpected growth of the share of *people aged 80+* in the Greek population from 5.7% to 15.2% i.e. to more than double in the period 2013-2060 (EU-28: 5.1%-11.8%), with most of the growth happening after 2030 (EU Ageing Report. 2012). The demographic change and the rapid growth of ageing lead to additional demands for health and long-term care services⁸ and create new challenges, especially during the period of the crisis with the cuts in expenditure.

⁸ According to EU Ageing projections “Under an assumption of no policy change the Ageing Report scenario suggests that public expenditure as share of GDP would rise from 1.4% to 2.8% (EU-27: 1.8%-3.6%)” (EU. 2014 p. 123).

Table 3.1: Key demographic facts for Greece from OECD Health Statistics 2014

	Greece		OECD average		Rank among OECD countries*
	2012	2000	2012	2000	
Health status					
Life expectancy at birth (years)	80.7	78.2	80.2	77.1	20 out of 34
Life expectancy at birth. men (years)	78.0	75.5	77.5	74.0	20 out of 34
Life expectancy at birth. women (years)	83.4	80.9	82.8	80.2	17 out of 34
Life expectancy at 65. men (years)	18.1	16.2	17.7	15.6	16 out of 34
Life expectancy at 65. women (years)	21.0	18.7	20.9	19.1	20 out of 34
Mortality from cardiovascular diseases (age-standardised rates per 100 000 pop.)	343.6 (2011)	532.8	296.4	428.5	8 out of 34
Mortality from cancer (age-standardised rates per 100 000 pop.)	193.5 (2011)	213.9	213.1	242.5	27 out of 34

Source: OECD – Health Statistics 2014

Health status Profile

In a nutshell, the data displayed at Figures 3.2 – 3.4 and Tables 3.3 – 3.6 indicate that most health outcomes in Greece are fairly favorable in international comparison, even though improvements (ie healthy life expectancy) have slowed recently. Cardiovascular diseases and cancers are the two main causes of death. Moreover, from 2005 to 2012 the *healthy life expectancy* for men and women decreased by 1.1 and 2.7 years, respectively. In particular as in Figure 3.3, there is a significant decrease in *healthy life years (HLYs)* for males 50+ leading to the crucial question of whether projected gains in longevity are accompanied by increases in illness, disability, vulnerability and thus higher use of services, that is crucial for policy development in terms of demands for health, long-term and social care (WHO, 2015). Given the complexity of these changes, comparable information on morbidity is more limited and confusing than for mortality, as the primary sources of data are diverse, conflicting, include registries, surveillance systems, hospital records, and their interpretation is controversial in the Greek system. As a result, till the 1st National Health Survey in Greece conducted by National Statistical Authority (ELSTAT) in 2009 and 2014, primary sources of data for burden of disease especially for older population in Greece are incomplete and diverse, based mainly on factors affecting health status for the general population, and cannot be displayed.

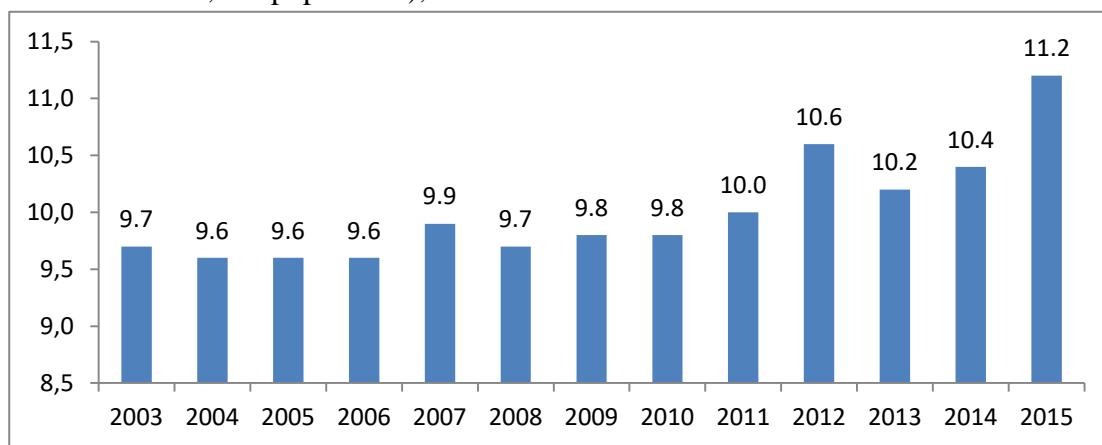
Table 3.2: Background Statistics for older population in Greece (EL)

Demography																		
Elderly population as % of total population ⁽¹⁾	2013			2030			2045			2060			P.p change (2013-2060)					
	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F			
65+	20.1	18.2	21.9	25.6	23.0	28.0	32.5	29.8	35.1	33.1	30.6	35.5	13.0	12.4	13.6			
80+	5.7	4.7	6.6	8.0	6.7	9.3	11.2	9.3	13.0	15.2	13.1	17.3	9.5	8.4	10.7			
85+	2.4	1.9	2.9	4.0	3.2	4.7	6.0	4.8	7.1	8.9	7.3	10.5	6.5	5.4	7.6			
80+/65+	28.3	25.9	30.2	31.4	29.3	33.1	34.3	31.2	36.9	46.0	42.7	48.7	17.7	16.8	18.5			
85+/65+	11.9	10.2	13.2	15.6	14.0	16.8	18.4	16.0	20.3	26.9	23.7	29.5	15.0	13.5	16.3			
Elderly population as % of total population ⁽¹⁾	EU-28																	
	2013			2030			2045			2060			P.p change (2013-2060)					
Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F				
65+	18.2	15.8	20.5	23.9	21.5	26.2	27.6	25.2	30.0	28.4	26.0	30.7	10.2	10.2	10.2			
80+	5.1	3.6	6.4	7.1	5.6	8.5	10.0	8.2	11.7	11.8	9.8	13.7	6.7	6.2	7.3			
85+	2.3	1.5	3.2	3.5	2.5	4.4	5.3	4.0	6.5	7.0	5.5	8.5	4.7	4.0	5.3			
80+/65+	27.8	22.9	31.4	29.7	26.2	32.5	36.1	32.5	39.0	41.5	37.7	44.5	13.7	14.8	13.1			
85+/65+	12.9	9.3	15.5	14.5	11.8	16.7	19.2	16.0	21.8	24.6	21.1	27.6	11.7	11.8	12.1			
Old-age dependency ratios % ⁽²⁾	Greece																	
	2013			2060			P.p			2013			2060			P.p change		
Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	
20-64	33.4	29.7	37.0	67.1	60.0	74.6	33.7	30.2	37.6	29.9	25.4	34.4	55.3	49.2	61.6	25.3	23.7	27.2
20-69	22.7	19.8	25.5	50.5	44.6	56.6	27.8	24.8	31.1	19.9	16.2	23.5	39.9	34.7	45.2	19.9	18.5	21.6
Health status																		
Life expectancy ⁽³⁾	Greece (EL)																	
	2010			2060			Change (years)			2010			2060			Change (years)		
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		
years of Birth	77.8	82.8	84.9	88.3	7.1	5.5	76.7	82.5	84.6	89.1	7.9	6.5						
years at 65	17.9	20.2	22.6	24.6	4.7	4.4	17.2	20.7	22.4	25.6	5.2	4.9						
Healthy life expectancy	2005			2012			Change (years)			2005			2012(EU-28)*			Change (years)		
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		
years at 65	9.7	10.0	8.6	7.3	-1.1	-2.7	8.6	8.9	8.4	8.5	-0.2	-0.4						
Healthily life expectancy as % of the life expectancy ⁽⁴⁾	2005			2012			P.p change			2005			2011(EU-28)*			P.p change		
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		
at 65 (%)	56.7%	52.1%	47.7%	34.6%	-9.00	-17.5	52.1%	44.5%	48.8%	40.4%	-3.8	-4.1						
Expeniture on long-term care																		
Total public expenditure on long-term care as % GP(5)	2010			2060			P.p change			2010			2060			P.p		
	1.4			2.8			1.4			1.8			3.6			1.7		

Source: EC (2015) Ageing Report

However, we reproduce estimates from the Global Burden of disease (GBD) project⁹ that during the last decade in Greece the decline in *HLYs* is related with increased *disability-adjusted life-years (DALYs)*. In particular, Table 3.3 shows a summary measure (by GBD project) that combines the impact of illness, disability and mortality on population health and identifies the leading 25 causes of healthy life lost due to disability in Greece in 1990 versus 2010, ordered by the absolute number of DALYs, ranked from left to right with greatest burden on the left. The numbers indicate the rank for each cause in terms of age-standardized DALY rates, with 1 as the best performance and 15 as the worst. The top five leading causes of years lived in disabilities (YLDs) in Greece - based on 1990 versus 2010 data - are low back pain, major depressive disorder, falls, neck pain, and other musculoskeletal disorders. Moreover, Greece does not perform well for some indicators of risk factors to health. The highest burden of disease in Greece is caused by tobacco smoking, followed by high blood pressure and dietary risks. There is a prevalence of inactivity for exercise, sports and other physical activity and obesity rate among older adults over 55 years higher than EU average. Moreover, there is a significant increase in HIV incidences- more than 2.5 times since 2010. These risk factors contribute to premature mortality accompanied by an increased prevalence of disease, as well. Nevertheless, WHO documentation since 1996 and up to the last Special Eurobarometer survey of 2014, indicate the healthcare system is still significantly unable to meet the Greek population's expectations, given that 74% of Greek respondents declare that healthcare quality in Greece is "total bad" (versus 27% of EU28) and 73% that it is worse than that of other EU28 Member States (WHO, 1996; Eurobarometer, 2014).

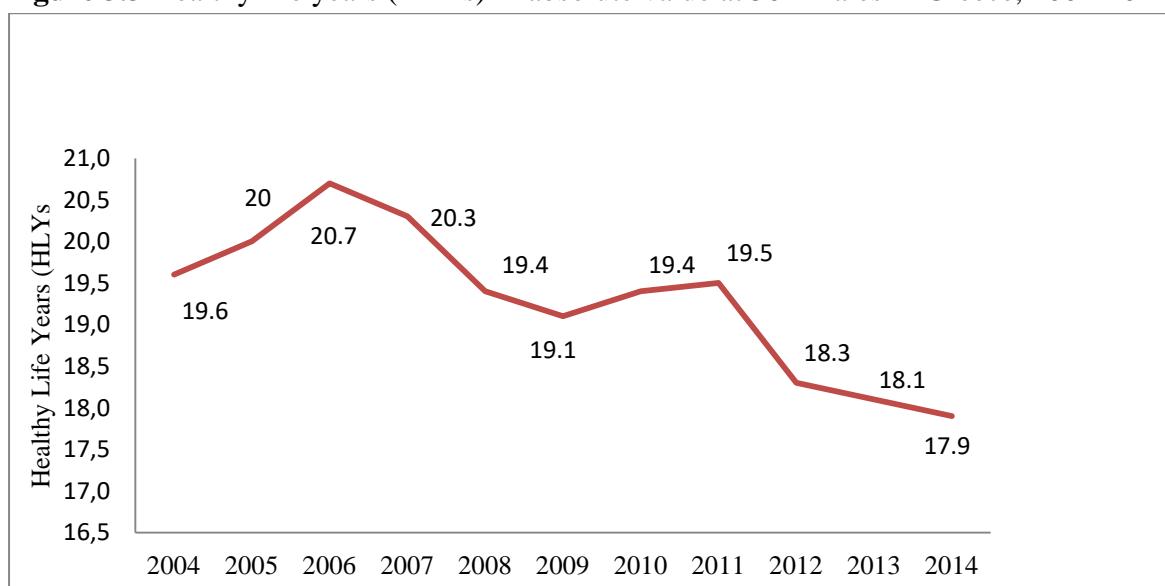
Figure 3.2 Crude death rate in Greece, 2003-2015 (age-standardized death rate per 100,000 population), *Eurostat*



Source: ELSTAT and Eurostat, data derived 14/07/2016.

⁹ In GBD project in 2013 conducted by the Institute for Health Metrics and Evaluation (IHME) at the Univ. of Washington, *healthy life years (HLYs)* are related with the increased *disability-adjusted life-years (DALYs)* during the last decade in Greece.

Figure 3.3 Healthy life years (HLYs) in absolute value at 50+ males in Greece, 2004-2014



Source: Eurostat. Data derived 14/07/2016.

Table 3.3 : Ranking of leading age-standardised rates of disability adjusted life years (DALYs) in Greece, 1990 vs 2010

Ranking of leading age-standardised rates of DALYs in 1990

ischemic heart disease	7	9	13	9	11	10	10	14	3	9	2	12	7	10	9	4	5	12	3	6	4	9	11	3	8	10	6	4	9	3	4	7	11	10
Low back pain																																		
Stroke																																		
Lung cancer																																		
Major depressive disorder																																		
Falls																																		
Road injury																																		
COPD																																		
Neck pain																																		
Other musculoskeletal																																		
Diabetes																																		
Congenital anomalies																																		
Anxiety disorders																																		
Alzheimer disease																																		
Chronic Kidney disease																																		
Migraine																																		
Other Cardio & circulatory																																		
Breast cancer																																		
Lower respiratory infection																																		
Stomach cancer																																		
Colorectal cancer																																		
Osteoarthritis																																		
Pancreatic cancer																																		
HIV/AIDS																																		
Drug use disorders																																		
Alzheimer disease																																		
Cirrhosis																																		
Liver cancer																																		
Other hearing loss																																		

ischemic heart disease	13	13	11	14	11	12	12	8	15	7	3	9	2	12	7	10	9	4	5	12	3	6	4	9	3	4	7	11	10				
Low back pain																																	
Stroke																																	
Lung cancer																																	
Major depressive disorder																																	
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Colorectal cancer																																	
Osteoarthritis																																	
Pancreatic cancer																																	
HIV/AIDS																																	
Brain cancer																																	

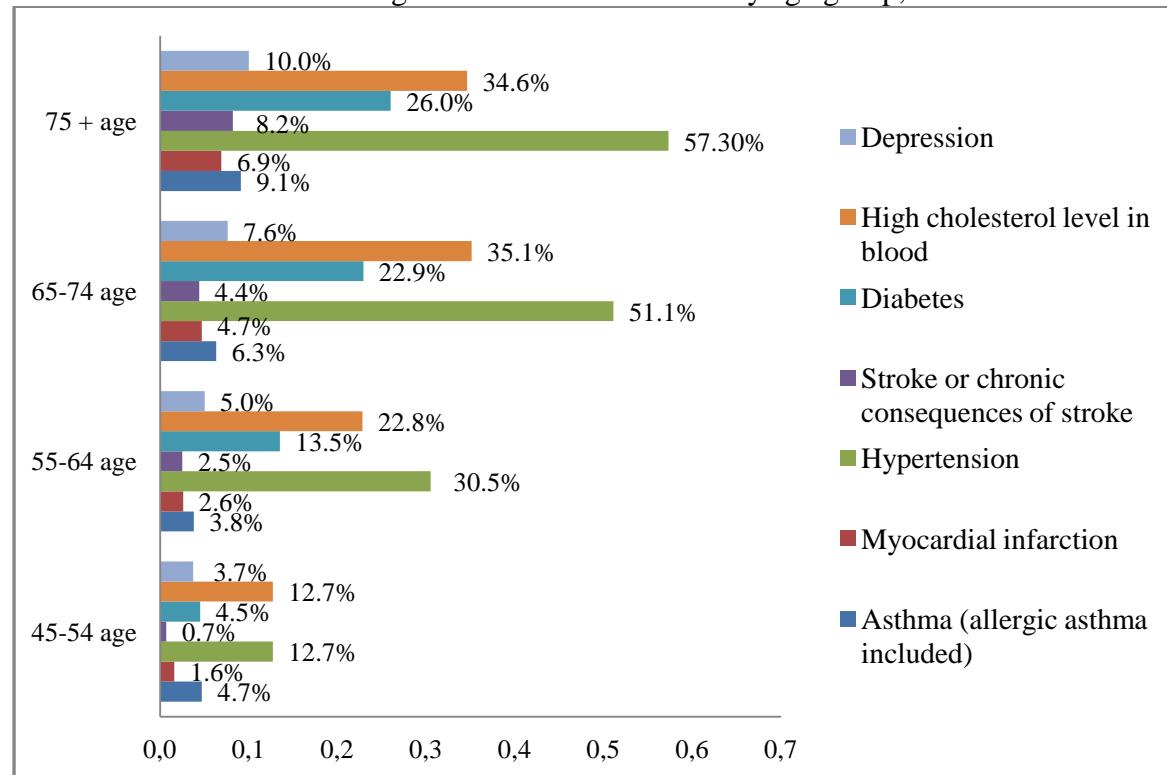
Source: GBD (2013) The Global Burden of Disease Profile: Greece. Institute for Health Metrics and Evaluation

Table 3.4 : Persons (Count and %) reporting health problem or disability by type of main problem and selected older age group 45+ in Greece, 2014

	Total		45-64 years old		65+ years old	
	Count	%	Count	%	Count	%
Problems with arms or hands (which includes arthritis or rheumatism)	47,64	2.9	14,019	3.0	26,66	2.7
Problems with legs or feet (which includes arthritis or rheumatism)	235,807	14.2	56,529	11.9	159,344	16.1
Problems with back or neck (which includes arthritis or rheumatism)	92,458	5.6	38,111	8.0	37,67	3.8
Difficulty in seeing (with glasses or contact lenses if worn)	75,507	4.5	17,511	3.7	39,343	4.0
Difficulties in hearing (with hearing aids or grommets. if used)	20,508	1.2	3,813	0.8	13,665	1.4
Speech impediment	4,61	0.3	1,643	0.3	987	0.1
Skin conditions. including severe disfigurement. allergies	24,928	1.5	8,551	1.8	4,08	0.4
Chest or breathing problems. includes asthma and bronchitis	104,853	6.3	26,383	5.6	69,044	7.0
Heart, blood pressure or circulation problems	598,743	36.0	161,853	34.2	415,771	42.0
Stomach, liver,kidney or digestive problems	90,883	5.5	28,445	6.0	52,141	5.3
Diabetes	107,309	6.5	29,404	6.2	71,925	7.3
Epilepsy (include fits)	6,789	0.4	2,325	0.5	1,717	0.2
Mental. nervous or emotional problems	92,867	5.6	30,25	6.4	26,438	2.7
Other progressive illnesses (which include cancers NOS. MS. HIV. Parkinson's disease)	56,933	3.4	17,796	3.8	30,555	3.1
Other longstanding health problems	101,939	6.1	37,051	7.8	40,398	4.1

Source: ELSTAT, 2014

Figure 3.4: Prevalence of chronic diseases/conditions: Distribution (%) of population aged 45+ suffering from chronic conditions by age group, 2014



Source: ELSTAT, 2014

Table 3.5 :Top 10 risk factors and associated burden of disease (2013)

Risk Factors	Disability-adjusted life-years (DALYs - average rate per 100.000population)
Female	
High systolic blood pressure	3726
High body mass index	2948
Dietary risks	2765
Tobacco smoke	2194
High fasting plasma glucose	1980
Low glomerular filtration rate	1613
High total cholesterol	1345
Low physical activity	1074
Air population	793
Alcohol and drug use	518
Male	
Tobacco smoke	6193
High systolic blood pressure	4525
Dietary risks	4229
High body mass index	3344
High fasting plasma glucose	2147
Alcohol and drug use	2135
High total cholesterol	2103
Low glomerular filtration rate	1416
Air population	1322
Low physical activity	1164

Source: GBD (2013) Institute for Health Metrics and Evaluation

Table 3.6: Health determinants and behaviour of population over 45+ years by age group in Greece, ELSTAT 2014

	Age Groups			
	45-54	55-64	65-74	75+
Smoke daily	37.20%	28.40%	14.90%	6.30%
Have never smoked	40.20%	44.70%	55.20%	68.30%
Daily or almost daily consumption of alcholic drinks	6.20%	10.70%	11.40%	10.60%
From Friday to Saturday they consume alcoholic drinks the 2 of the 3 days	30.60%	31.70%	28.00%	19.60%
Do not carry out sports, fitness or recreational physical activities	79.80%	84.20%	91.50%	97.40%
Carry out sports, fitness or recreational physical activities 1-4 days per week	14.00%	11.20%	4.90%	0.80%
BMI - Underweight men	0.3%	1%	0.9%	0.4%
BMI- Normal Weight - men	24.8%	24.1%	24.5%	28.9%
BMI - Overweight - men	51.2%	50.3%	51.9%	54.6%
BMI - Obese -men	23.7%	24.6%	22.7%	16.1%
BMI -Underweight - women	2%	0.7%	0.6%	2%
BMI - Normal Weight - women	44%	35.8%	29.8%	33.2%
BMI - Overweight - women	35.4%	40%	41.8%	45.2%
BMI - Obese - women	18.6%	23.5%	27.8%	19.6%

Source: ELSTAT (2016)

3.2 Socioeconomic profile of the older population

3.2.1 The Framework: A fragmented and ineffective welfare state under successive reforms as the origin of the Greek health care system

In sum, considering the Greek social protection system that defines the socioeconomic profile of older population, it is characterized, since its onset on 1950s, by fragmentation of the social security funds, a highly inefficient social welfare system where social care services represent one of the most neglected areas that were developed under a complete lack of a rational planning considering the complex needs of their potential users (ie elderly) (Karamesini & Moukanou E, 2007; Petmesidou & Mossialos 2006; Amitsis, 2001). The social care services still are developed to provide support mainly to the most disadvantaged or vulnerable who are also in economic hardship via “social assistance in the limited sense” (Stathopoulos, 1996) or “social services in the narrow sense” (Amitsis, 2001) and informal care, with the fundamental role of the family. Despite the successive reforms, the social expenditure still remains concentrated on old-age mainly pensions driven by demographic factors, and healthcare expenditure, while non-pension social transfers, such as social benefits, form a smaller proportion of the Greek social expenditure. Overall, public expenditure on pensions keep increasing as percentage of GDP from 2003 till 2014 - higher than the EU average, while the poverty profile has been shifting significantly. In the fragmented Greek welfare state, the social benefits have a limited redistributive effect. Moreover, the inefficiency of the system is related to the paradox that - since 1990s and 2000s until the crisis and up to 2011- despite the noticeable trend of convergence of per capita social expenditure, in Greece though social needs enormously increased (ie high unemployment rate), per capita (total) social spending did not improve as fast as per GDP and public social spending in real terms were plunged by about 18%. Successive pension reform laws were introduced before the economic crisis till 2016. Due to significant delays in implementing the reforms approved in 2010 and 2012 that speeded up since the second half of 2015, challenges still remain as the gross replacement rates still are above the OECD average (OECD, 2015).

Table 3.7 : Structure of Esspros social expenditure in Greece 2001- 2012 (%), ELSTAT

Functions	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Sickness	25.9%	26.3%	26.5%	26.5%	27.8%	28.7%	28.1%	29.0%	29.1%	29.2%	25.9%	21.4%
Disability	5.0%	5.2%	5.1%	5.0%	4.9%	4.7%	4.9%	4.7%	4.7%	4.7%	4.9%	4.5%
<i>Old age</i>	48.3%	47.3%	47.5%	47.4%	47.8%	43.2%	43.6%	42.4%	41.4%	42.3%	44.0%	51.3%
<i>Survivors</i>	3.3%	3.4%	3.3%	3.5%	3.4%	8.1%	8.4%	8.3%	8.2%	7.8%	8.1%	8.0%
Family	6.7%	7.0%	7.3%	6.9%	6.4%	6.2%	6.2%	6.3%	6.7%	6.4%	6.2%	5.5%
Unemployment	5.7%	6.1%	5.7%	5.9%	5.1%	4.6%	4.5%	5.1%	5.9%	6.1%	7.4%	6.3%
Housing	2.8%	2.4%	2.3%	2.3%	2.2%	2.2%	2.0%	2.0%	1.8%	1.4%	1.2%	0.8%
Social exclusion	2.3%	2.3%	2.3%	2.4%	2.3%	2.3%	2.3%	2.2%	2.1%	2.2%	2.3%	2.1%

Source: Hellenic Statistical Authority (ELSTAT) (2015) Living conditions in Greece. 31 December 2015

3.2.2 Socioeconomic profile, poverty and income inequality, living arrangements and life circumstances of the older population

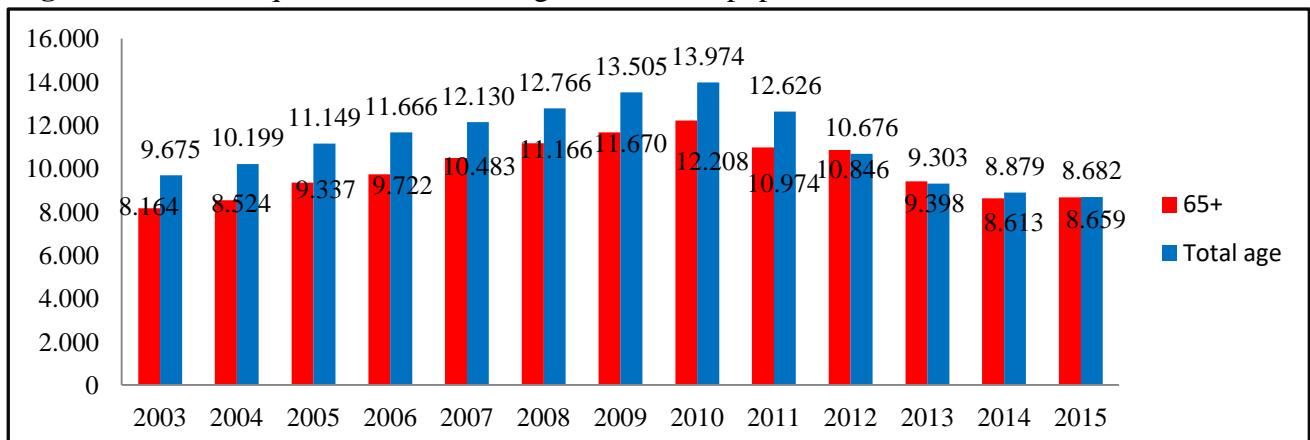
It is worth mentioning that in Greece till recently there has been a lack of solid, systematic statistical data for older population. The following Tables 3.8–3.16, Figures 3.5 -3.8, Chart 3.1 with data retrieved by ELSTAT and Eurostat, present the trends of economic profile, pensions and living arrangements of older people, as key determinants with implications in terms of demand for LTC, for elderly care, for social expenditure for the ageing population and policy making. In elaborating these data, we draw the following information and implications:

- During the entire period *prior economic crisis* from 2003 and up to 2012, incomes of elderly 65+ increase on a stable rate, but are on average lower than those of the total population. Comparing with EU27, although pension expenditure was always higher than EU-27, the Greek elderly income was always lower than EU27 elderly.
- Since the beginning of *economic crisis*, the successive reforms and new regulations have led to *drastic cuts in pensions* that significantly reduced present day retirees' pension-income (by about 40% to 50% for certain pension income categories) (Petmesidou, 2014), that corresponds to more than twice lower versus EU27. It is estimated to reduce future retirees' income more than 50%.
- About *poverty and income inequality of elderly*, we derive the following:
 - ✓ The combined at-risk-of-poverty and/or social exclusion (AROPE) aggregate rate for total population was 32.9% in 2003 reached to 34.6% in 2012 (over 3.5 million people in Greece; EU-27:24.8%), then kept increasing to 35.7% in 2015. The stable increase of this indicator is very serious. In addition, women and residents of Epirus, North Aegean, Ionian Islands, and Thrace face higher risk of AROPE.

- ✓ However, since 2003 there was a significant decline in poverty rate for older and retired population of 65+ comparing to the total population, given that older people on low incomes, though not fully protected, suffered lower income losses than other groups, due to: increase in social expenditure as a percentage of GDP (2005: 24.9%, 2010:29.1%); lower cuts in pensions; increases in minimum pensions and the Social Solidarity Pension Supplement (EKAS) (Petmesidou, 2014).
- ✓ About inequality, Gini index, deprivation and the S80/S20 income quintile ratio for 65+ has persistently been higher in Greece versus EU-27. The wealthiest 20% of the 65+ population has a 6.4 times higher income than the poorest 20% in 2003, then it fell till 2011, increased to 6.6 times in 2012 and remained stable.
- About the *labour and employment status of elderly* it was higher than EU MS up until 2003, whereas over the last decade till 2014, the employment rate of people aged 55 to 64 has significantly declined in Greece by 5.8%, versus most OECD, EU-28 and EU-19 MS that increased (8.3%). Since 2014, Greece belongs to the cluster with the worst performers in terms of both poverty results and employment and to the cluster with low employment and low social outcomes among EU-MS (Chart 3.1).
- About *household composition*, it is much more common for older people to live with a partner plus other people (children or other constellations) mainly in rural areas, whereas the single households of elderly are constituted by females in rural areas.
- About *social contacts*, elderly similar to total population in Greece tend to be among the most ‘social’, on a daily and weekly basis contacts, significantly higher than EU27 according to pro-crisis data. This higher intensity of contacts with relatives arises from the strong cultural tradition of family support in Greece for its older members.
- However, during crisis, recent indicators of *social interaction* show inverse shares, given that a high percentage (16%) of 50+ declared not to have anyone to rely on in case of need, twice below the EU28 average, with increased isolation for the oldest.
- The majority of Greeks 50+ years in 2013 reported a medium level of *satisfaction with their personal relationships*, and high regional variations lower than the EU28.
- About *marital status*, almost 60% of Greece’s population 50-59 is married, with the majority of the older elderly being females widowed, as expected.
- For *housing tenure*, over than three quarters (75.6 %) of the Greek population live in an owner -occupied home, higher rate than EU-18 and EU-27 population.
- About the *highest educational level*, overall for persons 50+ age is Primary school ISCED1, and the second level is higher secondary level ISCED 3. By age groups, the

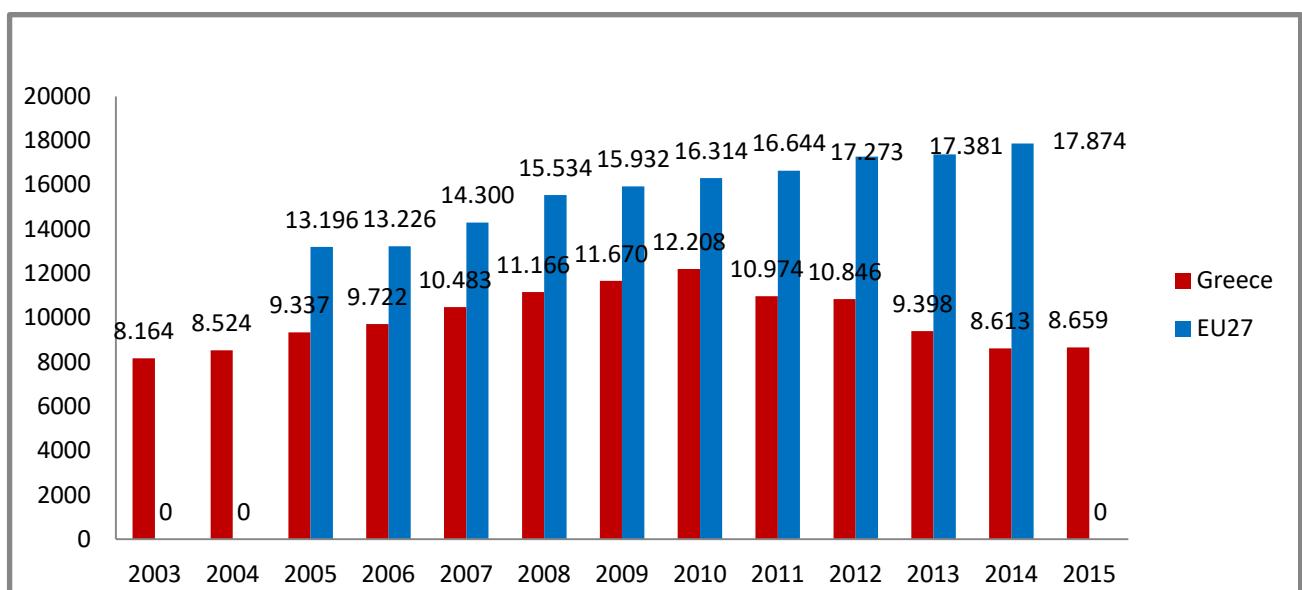
majority group 50-59 has graduated from university ISCED5, whereas those who have not graduated from High School ISCED3 add up to 52%. Illiteracy and early drop-out in the entire Greek population constitutes in total 9% and refers almost exclusively to persons 70+ years old. Moreover, about life-long educational chances, there are very few offers for further education focusing on the elderly in Greece.

Figure 3.5 :Mean equivalanced of 65+ age versus total population in 2003-2015 in Greece



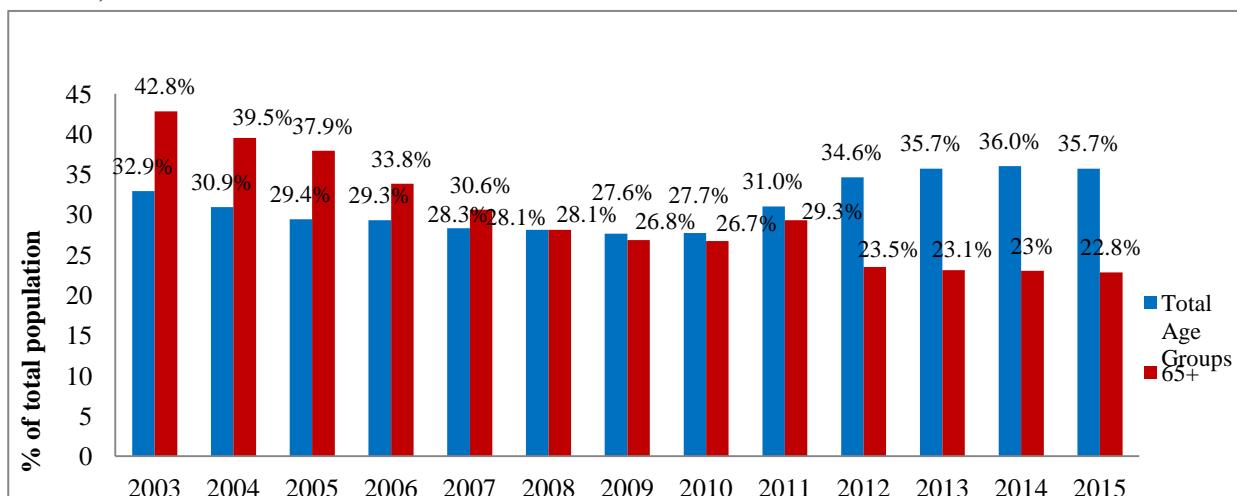
Source: Eurostat and ELSTAT (2016) Income and Living conditions database retrieved at 01/07/2016

Figure 3.6 :Mean equivalanced net annual income of 65+ population in 2003-2015 in Greece and EU27



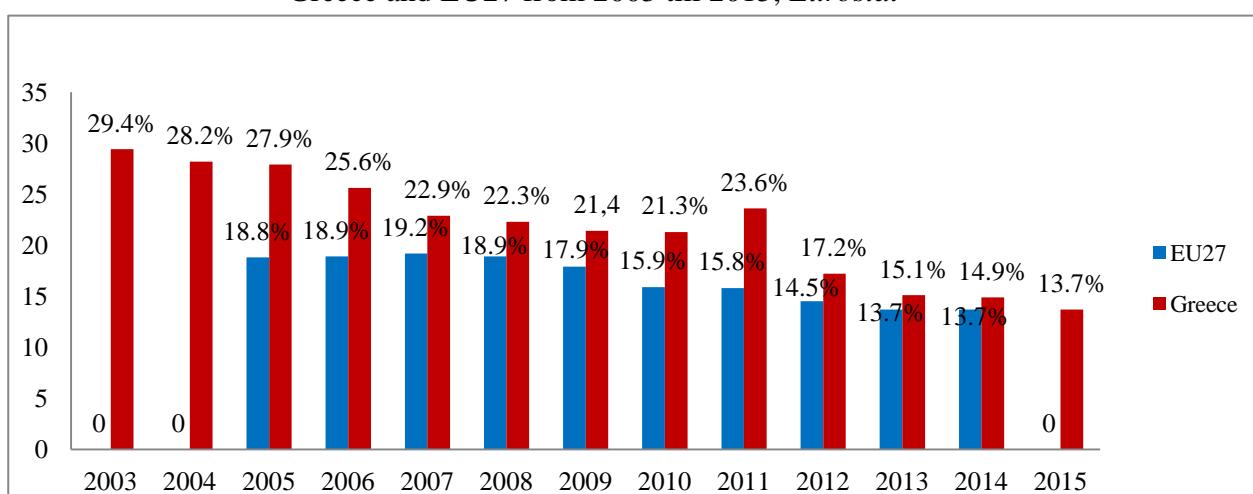
Source: Eurostat and ELSTAT (2016) Income and Living conditions database retrieved at 01/07/2016

Figure 3.7: Trends in Poverty and social exclusion of total age groups versus 65+ age in Greece, 2003-2015



Source: Eurostat (2016) and ELSTAT Income and Living conditions database retrieved at 01/07/2016

Figure 3.8: At-risk-of-poverty rate (AROPE) by poverty threshold for 65+ population in Greece and EU27 from 2003 till 2015, *Eurostat*



Source: Eurostat (2016) and ELSTAT Income and Living conditions database retrieved at 01/07/2016

Table 3.8 :Trends of Regional variations among people at risk of poverty or social exclusion (AROPE) by NUTS1 regions in Greece 2004-2015 (% of total population)

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Greece - total	30.9	29.4	29.3	28.3	28.1	27.6	27.7	31.0	34.6	35.7	36.0	35.7
North Greece ¹ (including Thessaloniki)	36.5	34.4	34.6	33.5	32.6	33.6	32.2	34.2	36.8	37.0	36.7	35.6
Central Greece ²	35.0	35.6	35.1	31.7	32.3	31.4	32.0	34.2	39.7	37.7	40.6	40.4
Attiki (including Athens)	24.0	21.2	21.8	22.7	22.4	21.2	23.1	29.1	30.6	34.0	31.6	31.5
Aegean Islands & Kriti	32.9	32.4	27.6	27.5	26.2	26.6	23.9	21.3	31.3	33.7	39.4	39.4

Source: Eurostat data.07/06/2016. <http://appsso.eurostat.ec.europa.eu/nui/setupDownloads.do>

Note1: North Greece includes: Eastern Macedonia and Thrace, Central Macedonia (and Thessaloniki), Western Macedonia, Epirus; Note 2: Central Greece includes: Thessaly, Ionian Islands, Western Greece, Central Greece, Peloponnese

Table 3.9: Poverty rate, and inequality of income distribution among the Greek elderly and total age in selected years 2003-2015,Greece & EU27

		2003			2005			2008	2009	2011	2012	2013	2014			2015		
		Total	Male	Female	Total	Male	Female	Total	Total	Total	Total	Total	Total	Male	Female	Total	Male	Female
At risk-of-poverty (65+) (cut-off point: 60% of median equivalised income after social transfers) (% of total population)	Greece	29.4%	27.2%	31.2%	27.9%	25.2%	30.0%	22.3%	21.4%	23.6%	17.2%	15.1%	14.9%	13.3%	16.1%	13.7%	11.9%	15.2%
	EU-27				18.8%	15.8%	21.0%	18.9%	17.9%	15.8%	14.5%	13.7%	13.7%	11.2%	15.7%			
At risk-of-poverty (75+) (cut-off point: 60% of median equivalised income after social transfers) (% of total population)	Greece	36.0%	36.2%	35.8%	32.7%	32.4%	32.9%	28%	23.9%	27.5%	20%	17.2%	16.1%	12.3%	19%	15.1%	11.2%	18.1%
	EU-27				21.7%	18.7%	23.6%	21.4%	20.4%	17.8%	15.7%	14.8%	15.1%	11.6%	17.6%			
At risk-of-poverty for pensioners (65+) (% of total retired population)	Greece	32.3%	27.4%	38.3%	29.0%	24.8%	34.1%	22.9%	21%	22.4%	15.7%	13.4%	13.1%	11.9%	14.6%	12%	10.4%	14%
	EU-27				17.0%	15.5%	18.3%	17.7%	16.8%	14.7%	13.5%	13%	13.1%	11.1%	15%			
Poverty or/and social exclusion - AROPE (65+) (% of total population)	Greece	42.8%	38.7%	46.0%	37.9%	33.7%	41.3%	28.1%	26.8%	29.3%	23.5%	23.1%	23%	21%	24.7%	22.8%	20.4%	24.7%
	EU-27				25.5%	21.6%	28.4%	23.3%	21.7%	20.3%	19.2%	18.1%	17.7%	14.5%	20.1%			
Relative median income ratio (65+) - compared to persons less than 65 yrs	Greece	0.79	0.81	0.78	0.79	0.83	0.78	0.86	0.86	0.81	1.01	1.04	1.00	1.03	0.98	1.04	1.09	1.01
	EU-27				0.86	0.89	0.84	0.85	0.87	0.9	0.92	0.93	0.94	0.98	0.91			
Several Material Deprivation 65+ (% of total population)	Greece				19.4%	15.3%	22.7%	14.8%	12.1%	13.1%	14.3%	13.7%	15.5%	13.8%	16.9%	15.2%	13.7%	16.5%
	EU-27				10.0%	8.2%	11.3%	7.5%	6.8%	7.2%	7.5%	6.8%	6.2%	4.9%	7.1%	6.3%	5.3%	7.1%
Relative Poverty Gap - Median at risk of poverty gap (65+) (cut-off point: 60% of median equivalised income) (% of the threshold)	Greece	27.6%	25.4%	28.0%	23.7%	22.0%	24.7%	20.8%	14.7%	21.1%	14.8%	13.7%	17.3%	18.5%	16.8%	17.3%	18.9%	15.5%
	EU-27				17.8%	17.6%	18.0%	17.1%	16.7%	16.8%	16.1%	15.9%	16.5%	16.3%	16.8%			
Inequality of income distribution S80/S20 (income quintile share ratio) for <i>retired 65+</i>	Greece	5.7	5.7	5.7	5.0	4.9	5.1	4.5	4.1	4.5	4.5	3.9	4.1	4.2	4.0	4.1	4.2	3.9
	EU-27				4.1	4.1	4.0	4.2	4.1	4.1	4.0	3.9	4.1	4.1	4.0			
At risk-of-poverty (Total Age) (cut-off point: 60% of median equivalised income after social transfers) (% of total population)	Greece	20.7%	19.90%	21.40%	19.60%	18.3%	20.9%	20.1%	19.7%	21.4%	23.1%	23.1%	22.1%	22.2%	22.0%	21.40%	21.5%	21.2%
	EU-27				16.5%	15.7%	17.1%	16.5%	16.4%	16.8%	16.8%	16.7%	17.2%	16.7%	17.7%			
Poverty or/and social exclusion - AROPE (Total age)	Greece	32.9%	31.1%	34.7%	29.4%	27.1%	31.6%	28.1%	27.6%	31.0%	34.6%	35.7%	36.0%	35.3%	36.7%	35.7%	34.8%	36.6%
	EU-27				25.8%	24.5%	27.1%	23.7%	23.3%	24.2%	24.7%	24.5%	24.4%	23.5%	25.2%			
Inequality of income distribution S80/S20 for total population	Greece	6.4	6.4	6.3	5.8	5.7	5.8	5.9	5.8	6.0	6.6	6.6	6.5	6.6	6.3	6.5	6.8	6.2
Gini coefficient of equivalised disposable income (%)	Greece	34.7%			33.2%			33.4%	33.1%	33.5%	34.3%	34.4%	34.5%			34.2%		
	EU-27				30.6%			31.0%	30.6%	30.8%	30.4%	30.5%	30.9%					

Source: Eurostat data accessed on 03/07/2016 - <http://appsso.eurostat.ec.europa.eu/nui/>. Note: The indicators are defined in Annex

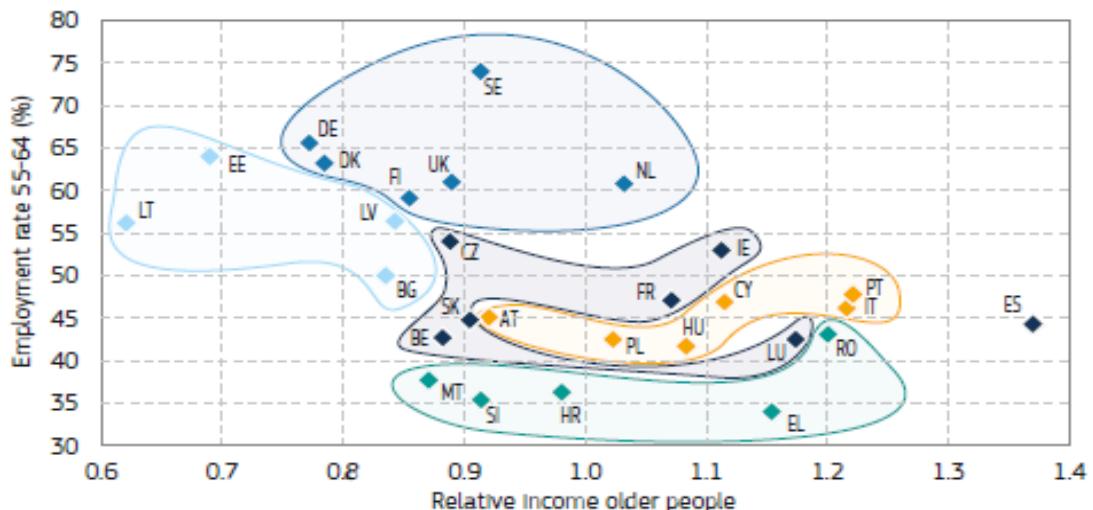
Table 3.10: Labour market – employment status of older people

	GREECE		EU-27	3 BEST MS
	2000	2009	2009	2009
Employment rate women aged 55-64 (%)	24.3	27.7	37.8	61.4
Employment rate men aged 55-64 (%)	55.2	57.7	54.8	70.4
Employment rate women aged 55-59(%)	30	36.3	51.4	75.5
Employment rate men aged 55-59 (%)	69.2	71	69.1	83
Employment rate women aged 60-64 (%)	20.3	19.6	22.8	47
Employment rate men aged 60-64 (%)	44.6	43.7	38.5	59.6
Employment rate women aged 65-69 (%)	6.5	5.8	7.4	20.6
Employment rate men aged 65-69 (%)	16.8	15.2	13.2	28.3
Average exit age from the labour market women (years)		61	60.8	64
Average exit age from the labour market men (years)		61.9	62	34.7
Inactive for health reasons population aged 50-64 (%)	4.7	7.4	21	48.4
Internet use population aged 55-64 (%)		10	44	75

Source: EC (2011) Demography report 2010 – Older, more numerous and diverse Europeans.

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Figure 3.9 : Employment and social outcomes (and AROPE) of older people in 2012, clusters of countries, EC(2016) p.329



Sources: EC (2016) Employment and Social Developments in Europe 2015 p.329 - based on Labour market and Labour force survey (LFS) statistics and EU-SILC

Table 3.11 :Size of households with members aged 65+ in total Greece in 2011 versus 2001 and urban/rural variations, ELSTAT 2014

Total No of households with members age 65+		No of members 65+ in households					
		0	1	2	3	4	5+
2011	No of Households	2,613,662	989,370	520,357	10,446	624	81
	Percent share of Households	63.2%	23.9%	12.6%	0.3%	0%	0%
	Members 65+	0	989,370	1,040,714	31,338	2,496	435
	Percent share of members 65+	0%	47.9%	50.41%	1.52%	0.1%	0%
	Total No of households with members age 65+ :	Members 65+: 2,064,353 or 19.5% of total population					
	1,520,878 or 36.7% of total households						
Total No of households with members age 65+		No of members 65+ in households					
		0	1	2	3	4	5+
2001	No of Households	2,381,650	846,603	434,574	10,742	721	91
	Percent share of Households	64.8%	23%	11.8%	0.3%	0%	0%
	Members 65+	0	846,603	869,148	32,226	2,884	482
	Percent share of members 65+	0%	48.3%	49.6%	1.8%	0%	0%
	Percent share of Households with members 65+ in <i>urban areas</i> - total: 73.95%	69.44%	20.79%	9.53%	0.22%	0.01%	0.00%
	Percent share of Households with members 65+ in <i>rural areas</i> - total: 26.05%	51.69%	29.42%	18.35%	0.50%	0.04%	0.00%
Total No of households with members age 65+ :		Members 65+: 2,064,353 or 17% of total population					
1,292,731 or 35.2% of total households							

Source: ELSTAT (2014) 2011 and 2001, Population and Housing Census – Demographic characteristics –

Table 3.12: Living arrangements of people aged 65+ years (% of population), EU-SILC, 2007

	Living alone		No partner, living with other people		Living with just a partner		Living with a partner, plus other people	
	Men	Women	Men	Women	Men	Women	Men	Women
Greece	7.9	28.7	4.1	21.7	53.6	33.4	34.4	16.3
EU25	19.5	42.1	4.7	13.5	60.5	37.3	15.3	7.0
NMS	18.6	43.0	7.9	24.7	50.8	23.8	22.8	8.5

Source: Iacovou M. & Skew A.in Atkinson A. & Marlier E. (2010) Income and living conditions in Europe. Eurostat. 2010

Table 3.13 :Frequency of contacts with relatives and friends (Total population by gender and share (%) of the population 65+), Eurostat, 2006

Frequency of contacts with relatives					Frequency of contacts with friends				
	Frequency of contacts	TOTAL	Female	Male	aged 65+	TOTAL	Female	Male	aged 65+
Greece	No relatives / friends	0.1	0.1	0.1	0.3	1.1	1.3	0.8	3.5
	Daily	48	52.1	43.6	50.9	48.5	46.6	50.5	30.6
	Every week (not every day)	30.7	29.6	31.9	27.4	31.1	31.2	31.1	31.8
	Several times a month (not every week)	11.8	10	13.7	10.1	11.1	12	10.1	15.7
	Once a month	5.3	4.8	5.9	5.5	4	4.3	3.6	7.7
	At least once a year (less than once a month)	3	2.5	3.6	4.1	2.1	2.1	2	4.7
	Never	1.1	0.9	1.3	1.7	2.2	2.4	1.9	6
EU27	No relatives/friends	0.5s	0.5s	0.5s	0.7s	1.9s	2.2s	1.6s	4.3s
	Daily	22.7s	26.8s	18.1s	23.5s	21s	20.5s	21.7s	10.5s
	Every week (not every day)	41.9s	43.1s	40.6s	40.5s	36.3s	37.4s	34.9s	29.8s
	Several times a month (not every week)	16.7s	15.3s	18.3s	15.8s	18.9s	19.2s	18.6s	20.2s
	Once a month	8.6s	7s	10.3s	7.8s	9s	8.8s	9.2s	10.9s
	At least once a year (less than once a month)	5.5s	4.3s	6.9s	5.9s	5.7s	5.3s	6.2s	9.5s
	Never	4.2s	3s	5.4s	5.8s	7.1s	6.5s	7.8s	14.8s

Note Flag: s for Eurostat estimate. Source: Eurostat 2006 ad-hoc module “Social participation” data retrieved, 02/08/2016

Table 3.14 :Resident population of adults 50+ by age group and marital status. ELSTAT 2014 (Number of older adults 50+ and % of total population)

	TOTAL - older adults 50+	Single	Married, under registered partnership and separated	Widowed and Widowed from registered partnership	Divorced and Divorced from registered partnership
Age group 50+	Number (N) % of total of older population adults 50+ n	N %	N %	N %	N %
50-59	1.391.854 12.87%	107.188 2.54%	1.124.690 59.14%	67.844 31.34%	92.132 46.43%
60-69	1.134.045 10.48%	57.888 1.37%	888.654 34.46%	138.447 19.44%	49.056 21.71%
70-79	1.017.242 9.40%	41.580 098%	675.256 18.82%	277.383 35.09%	23.023 6.94%
80+	583.334 5.39%	23.388 055%	247.656 5.99%	305.825 37.28%	6.465 1.95%
Total population	10.816.286	4.227.476	5.436.265	820.527	332.018

Source: ELSTAT 2011 Population and Housing Census - revision of 20/03/2014

Table 3.15 Distribution (%) of population by housing tenure status in 2007-2014
(Greece & EU)

Housing Tenure	Owner (with mortgage or loan & no outstanding mortgage or housing loan)			Tenant (Rent at market price & rent at reduced price or free)		
	Greece	EU 18	EU27	Greece	EU 18	EU27
2007	75.6	71.2	72.9	24.4	28.8	27.1
2008	76.7	71.5	73.3	23.3	28.5	26.7
2009	76.4	71.6	73.2	23.6	28.4	26.8
2010	77.2	66.6	70.5	22.8	33.4	29.5
2011	75.9	66.7	70.4	24.1	33.3	29.6
2012	75.9	67	70.5	24.1	33	29.5
2013	75.8	66.6	69.9	24.2	33.4	30.1
2014	74	66.7	69.9	26	33.3	30.1

Source: Eurostat and ELSTAT, data extracted on 24/6/16

Table 3.16 :Educational level of adults 50+ by age group and educational level. 2011
(% of total population)

Age Groups	TOTAL - older 50+	ISCED 0: No education + Pre-school education	ISCED1: primary education	ISCED2: Lower secondary education	ISCED3: Higher secondary education	ISCED4: Post secondary. non-university education	ISCED5: University education	ISCED6: Post Graduate studies
	% of total population	%	%	%	%	%	%	%
50-59	13.73%	1.85%	15.54%	14.70%	13.84%	13.77%	16.27%	12.11%
60-69	11.18%	2.67%	20.52%	8.84%	7.26%	7.07%	8.90%	6.39%
70-79	10.03%	9.68%	21.63%	5.87%	4.39%	3.23%	4.49%	2.75%
80+	5.75%	7.81%	13.36%	2.45%	1.84%	1.07%	1.73%	0.95%
Total		9%	29%	14%	25%	6%	15%	2%

Source: ELSTAT - Hellenic Statistical Authority 2011 Population Census, own calculations, data extracted on 24/6/16, www.statistics.gr

3.3 Overview of the health care system

Since 1980s, the Greek health system is characterized by a mix of public and private funding and service delivery incorporating principles of different organizational patterns where in practice a National Health Service – system (NHS - ESY) coexists with a social health insurance system via a major unified social health insurance fund (EOPYY: National Organisation for Health Care Provision) and few other social health insurance Funds (SHIFs), with an expanding private sector to a lesser extent. Health has been constitutionally guaranteed in the Greek constitution. Entitlement to NHS services is on the basis of citizenship (excluding illegal immigrants). Entitlement to social health insurance Funds (SHIFs) services is on the basis of occupational status and insurance contributions, whereas the membership of a SHIF is compulsory for all employees.

3.3.1 Historical overview and reform attempts of the health care system

This section briefly presents the major reform attempts of the Greek health care system during its historic evolution till today. Table 3.17 presents the most important reform initiatives introduced between 2001 and 2014 and indicates the extent to which they have been implemented.

Before NHS (ESY) establishment (up to 1983)

The health system before the establishment of the NHS – ESY in 1983, comprised of a large number (more than 300) of social security organisations that provided health services packages as well as pension upon retirement. They were established and operated (till today) on the basis of occupational status and were characterized by significant discrepancies in funding and provision.

NHS (ESY) establishment in 1983

In 1983, under Law 1397/1983, Greece established a national health service - system (NHS -ESY) in order to reform the old fragmented health care system. The Law was based on the principle that all citizens, irrespective of their socioeconomic status or location of residence, should have equal rights to access to healthcare services. Its aim was to expand coverage and reduce inequities, particularly in finance, access and resource allocation (Mossialos E. et al, 2005). The main priorities of the NHS – ESY were to exercise control over the private sector, to increase public health resources, to decentralize and administratively reorganize the health system, to develop regional capacities for the provision of health services and even unify SHIFs into a single purchasing body.

Reform attempts after ESY establishment in 1983 till today

- We examine the historical evolution of the Greek NHS in 3 periods (1983-1999; 2000-2010; 2010 till today). During these periods from 1983 up today, five major reforms of NHS – ESY were undertaken:
- ***The first period of 1983-1999*** (Law 1397/1983: National Health System (E.S.Y.); Law 2071/1992: Modernisation and Organisation of the Health System; Law 2194/1994: Re-establishment of the national health system and other provisions; Law 2519/1997: Development and modernization of the national health system- in relation to PHC, the establishment of GPs, PHC networks, payment of doctors on a capitation basis were foreseen;- is characterized by an effort to expand public primary health care (PHC) in rural areas with the creation of about 200 rural and semi-urban PHC centres (HCCs) .
- ***The period 2000-2010*** is characterized by “200 points of reform” proposed and a number of initiatives undertaken through: ***the NHS-ESY reform of 2001-2004*** (via the major reform acts of 2001 Law 2889/2001 on the Regional Structure of Health Care

Services and reform act of 2003 Law 3106/2003 on the Regional Structure of Welfare Services) that divided the country into 17 regional health and welfare authorities (PeSYPs). ESY hospitals became decentralized subsidiary units of each PeSYP. They also initiated the regionalization of the system, new management structures and new employment conditions for hospital doctors, prospective reimbursement (Law 2955/2001 for supplies of hospitals), modernization of public health services (Law 3172/2003) and reorganization of primary health care (Law 3235/2004), which was partially implemented and abolished after 2005 elections and change in government¹⁰.

The NHS-ESY reform of 2005-2008, via the following reform acts of 2005, 2006 and 2007. Law 3329/2005 inactivated most of the 2001 and 2003 Regional Structure of Health Care Services (PeSYPs) legislated measures, renamed the PeSYPs as “Regional Health Administrations - RHAs” (DYPEs or YPE) and reduced RHAs from 17 to 7 in order to “achieve economies of scale”. Consequently, any real decentralization of competences or independence from central government for DYPEs to develop their health services according to the needs of their populations has not been achieved. The management and control of the health care system remain with the Ministry (ESCG, 2005). The other important laws of this period – that were partially or are still in the process of implementation include: Law 3370/2005 for reorganizing public health services; Law 3457/2006 on the regulation of pharmaceuticals; and Law 3580/2007 about the creation of a Central Committee of Health Supplies (EPY). The specific reforms – even though partially implemented till today - are a milestone in the development of the ESY.

- ***The period since 2010 till today*** is characterized by the Law 3852/2010 to establish a new architecture of 13 regions and reduction of municipalities to 370 - known as the “Kallikratis” Plan - and about health care, to provide for the PHC competences of DYPEs to be transferred to municipalities, which is not fully implemented yet. In addition, a series of initiatives have been launched and partially implemented based on the provisions of the Memorandum of Understanding (MoU) that Greece signed with creditors IMF/EU/ECB. They include: The financial independence of SHIFunds (Law 3863/2010); Establishment of EOPYY “the National Health Services Organisation” (Law 3918/2011); Partial merge of public hospitals; Establishment of a National Health Network for Primary Care (PEDY) in 2014 not yet fully implemented. Other reform initiatives include: containment of pharmaceutical expenditure with a diffusion of

¹⁰ Two other Laws (3172/2003) on public health and Law 3235/2004 on primary health care were abolished after the elections of 2004.

generics; improvement in the governance of ESY, in the management of hospital procurement and in the cost-accounting system of public hospitals; better control of prescriptions (through e-prescribing & e-referrals); and revision of the system of compensation of health providers and pharmacists.

3.3.2 Major and successful reform attempts

Overall, via the aforementioned reforms after the establishment of NHS, two major reform attempts have changed the organizational model and the structure of the health care sector in Greece, as following: (i) the regional organization of the ESY and modernization of hospital management principles, (ii) the establishment of the unified health fund (EOPYY) that merges the four biggest health insurance funds (IKA, OAEE, OPAD, OGA).

(i) Regional organization of the NHS-ESY – decentralization process

As mentioned above in...., the period since the onset of ESY (Law 1397/1983), three (3) major initiatives of regional organization of ESY have been established:

- The Laws 2889/2001 & Law 3106/2003 that divided the country into 17 regional health and welfare authorities (PeSYPs). ESY hospitals became decentralized subsidiary units of each PeSYP. Following, the Law 3329/2005 inactivated most of the 2001 and 2003 legislated measures, renamed the PeSYPs as “Regional Health Administrations - RHAs” (DYPEs or YPE) and reduced RHAs from 17 to 7 in order to “achieve economies of scale” (Figure 2.2.).
- More recently, the Law 3852/2010 (known as the “Kallikratis” Plan) established a new structure for 13 administrative regions and 370 municipalities. It was planned that till 2012, the PHC competences of seven (7) DYPEs to be transferred to municipalities (Figure 2.3). However, this initiative has not been implemented, yet.

However, following these major decentralization reform attempts of the regional authorities, only theoretically enjoy real independence for planning and co-ordinating regional resource allocation. Since their establishment, PESYs renamed DYPEs and YPEs still operate as another bureaucratic organisation that play an advisory role for the MoH and supervise implementation of its policy (Econ. & Soc. Council of Greece, 2005). Table 3.18 and Figures 3.9 and 3.10 present the Regional Health Administrations/ Authorities division (7 DYPE/YPEs/ RHAs) and the administrative division of Greece in 13 NUTS2 Units according to the legislation from 2001 till today.

(ii) Establishment of EOPYY “National Organization for Healthcare Provision” – Unification of major SHIFs

The fragmentation of health care system due to the multiplicity of sickness funds and the absence of a fully pooling mechanism is still one of the main problems of the system that exists before the establishment of NHS, despite several reform attempts:

- The 2001 reform attempt failure (Law 2889/2001) to establish an Organization for the Management of Health Care Financial Resources (ODIPY) by unifying five largest social health insurance funds (SHIFs) and create an internal market.
- Only under the Law 3655/2008, the largest 30 funds were merged into 13 SHIFs, with the following establishment of the financial and accounting independence of health funds, under Law 3863/2010.
- The establishment of EOPYY (“the National Organization for Healthcare Provision”) by merging the healthcare sectors of the four largest social insurance funds (IKA SHIF; OAEE SHIF; OPAD & OGA SHIF)¹¹ under the fiscal adjustment requirements via Law 3918/2011. However, EOPYY was initially expected to coordinate primary care between the different institutions and providers (SHIFs and NHS-ESY), to manage and control the funding, and regulate contracting with all health care providers and set efficiency standards with the broader goal to have bargaining power in the market for drugs and services (Petmezidou, 2012; and OECD 2011).
- More recently, under the Law 4238/2014, EOPYY was planned to transfer its responsibility for PHC provision to RHAs (YPEs) and be converted to a single purchaser of health services, although in 2015, EOPYY does not fully operate as a single purchaser, yet.

Overall, the Greek healthcare system the last thirty years is in a continuous process of structural and organizational changes. However, most of the health care reforms have been only partially implemented, or not at all. As Mossialos et al (2005) point out “the inability to bring about change in the Greek health system is a consequence of the prevailing political conditions, unresolved conflict between political parties and economic interests, substantial resistance by the medical status quo and the inability of the public health system bureaucracy to introduce managerial reforms” (p.S152).

¹¹ Non Noble IKA blue- collar employees covers 50.3% of the population; Non Noble OGA for farmers people in agriculture (covers 19.5%); Noble OAEE for the self-employed and small businesses covering 12.9% and Noble OPAD for civil servants covering 11.7% of the population.

Table 3.17: Major health care reform laws 2001-2014

Law	Content	Implementation
2889/2001	Decentralization of the health care system and the introduction of autonomous hospital management	Implemented (but hospital reforms later reversed)
2920/2001	Creation of SEYYP	Implemented
2955/2001	Creation of a new legislative framework for hospital procurements	Partially implemented
3029/2002	Reform of the social security system. Among other things, the law establishes the framework for the creation and operation of professional insurance funds for supplementary insurance coverage.	Implemented
3106/2003	Reorganization of welfare services with decentralization and better management	Implemented
3172/2003	Reorganization and modernization of services relating to public health	Not implemented
3235/2004	Changes to primary health care services, including the introduction of family doctors, the transformation of polyclinics owned by social insurance funds into urban health centres, and the establishment of new services for home care, post-hospital care and rehabilitation	Not implemented
3329/2005	Changes to the regional administration of the ESY and to hospital management, reversing the 2001 reform that had professionalized senior management structures	Implemented
3370/2005	Reorganization of public health services: establishment at the Ministry of Health and Social Solidarity of: (a) the General Secretariat for Public Health, (b) the General Directorate for Public Health, (c) the Health Coordination Command Centre, (d) the National Public Health Council and (e) the Body of Public Health Officials. Reorganization of the Hellenic Centre for Infectious Diseases Control	Implemented
3457/2006	Reform of pharmaceutical care, abolishing the positive list and introducing recovery prices	Implemented
3580/2007	Centralization of procurement procedures for public hospitals	In the process of Implementation
3655/2008	Merge the 30 social insurance funds into 13 major funds and merge health insurance funds and health branches.	Implemented
3852/2010	New Architecture of Local Government and Decentralized Administration – The Kallikratis Plan - Transferring the health care competences of DYPEs to the new municipalities	Not implemented
3863/2010	Pension reform law established the financial and accounting independence of health funds	In the process of Implementation
3918/2011	Establishment of a unified health fund (EOPYY) “the National Health Services Organisation” that merges the four biggest health insurance funds – IKA, OAEE, OPAD & OGA	Partially implemented (not equalized contribution rates)
4025/2011	Create of the map of welfare organisations for merging a number of health and welfare centres	Implemented – partially implemented
4052/2012	Reform of hospital organisations for merging hospital facilities	In the process of Implementation – partially implemented
4238/2014	Restructuring the primary healthcare system by establishing the primary national health network - creation of Electronic Health Records for all Greek citizens	Not implemented

Source: Based on Economou C. (2010) p.138.

Table 3.18 Administrative and Regional Health Authorities Division (including population distribution)

17 Regional health and welfare authorities (PeSYPs) (Law 2889/01)		7 Regional health Administrations (YPE or DYPE) (Law 3329/05)	Population Distribution (2012)	Administrative Division - 13 Units NUTS2 structure (NUTS Statistical Regions of Europe – Law 3852/2010)	Population Distribution (2012)
1. Eastern Macedonia & Thrace	610.254	1 st RHA –1 st YPE Attica (& Athens)	3.068.694	1. Eastern Macedonia & Thrace	611.067
2. A' Central Macedonia	786.963	2 nd RHA - 2 nd YPE Piraeus & Aegean Islands	1.359.244	2. Central Macedonia	1.871.952
3. B' Central Macedonia	1.074.954	3d RHA – 3d YPE Macedonia (& Thessaloniki)	1.972.123	3. Western Macedonia	301.522
4. Western Macedonia	302.750	4 th RHA – 4 th YPE Macedonia & Thrace (& Thessaloniki)	811.983	4. Epirus	353.820
5. North Aegean	204.158	5 th RHA – 5 th YPE Thessaly & Central Greece	1.359.217	5. Thessaly	753.888
6. Epirus	352.420	6 th RHA – 6 th YPE Peloponnese & Ionian Islands & Epirus & Western Greece	1.791.628	6. Ionian Islands	212.984
7. Ionian Islands	214.274	7 th RHA – 7 th YPE Crete	601.131	7. Western Greece	740.506
8. Thessaly	754.393			8. Central Greece	605.329
9. Western Greece	739.118			9. Attica	3.761.810
10. Central Greece	607.855			10. Peloponnesus	638.942
11. A' Attiki	1.062.945			11. North Aegean	206.121
12. B' Attiki	1.509.417			12. South Aegean	302.686
13. C' Attiki	1.189.448			13. Crete	601.131
14. Peloponnesus	632.955				
15. A South Aegean	111.181				
16. B South Aegean	190.564				
17. Crete	601.159				

Source: Law 2889/2001- PESYPs; Law 3329/2005- DYPE; EC (2003) Regulation EC No 1059 & Eurostat (2007) - NUTS2 Regions & Law 3852/2010

Figure 3.10: Seven (7) Regional Health Administrations(DYPEs/YPEs)
REGIONAL HEALTH AUTHORITY OF GREECE



- 1st RHA – 1st YPE Attica (& Athens)
- 2nd RHA - 2nd YPE Piraeus & Aegean Islands
- 3d RHA – 3d YPE Macedonia (& Thessaloniki)
- 4th RHA – 4th YPE Macedonia & Thrace (& Thessaloniki)
- 5th RHA – 5th YPE Thessaly & Central Greece
- 6th RHA – 6th YPE Peloponnese & Ionian Islands & Epirus & Western Greece
- 7th RHA – 7th YPE Crete

http://www.esdy.edu.gr/files/009_Oikonomikon_Ygeias.pdf

Figure 3.11: Administrative Division - 13 Units NUTS2 structure (Nomenclature of territorial units for statistics - NUTS Statistical Regions of Europe)



Source: Eurostat-Nomenclature of territorial units for statistics (NUTS) Statistical Regions of Europe

3.4 The current Greek health care system – Provision of services

The Greek health system is characterized by a multiplicity and complexity in: (a) organisation; (b) funding and (c) service delivery where a National Health Service – system (NHS - ESY) coexists with a social health insurance system and private sector to a lesser extent. Figure 3.11 illustrates the funding and provision structure of health care in Greece up to 2012 including the establishment of EOPYY according to Mossialos et al (2005) chart. First we present the three subsystems that provide inpatient and primary health services. The financing of the health system is presented in paragraph 3.5.

Overall, it is worth mentioning that, health care provision is mainly focused on hospital-based acute care with the preventive and primary care been underdeveloped until recently.

3.4.1 Inpatient care

Inpatient (secondary and tertiary) care is provided via three legal entities- settings:

- (a) *NHS-ESY Hospitals* - financed by MoH state budget and SHIFs revenues - with about 32058 beds (31/12/2014) that operate under the co-ordination of seven (7) regional RHAs or DYPES/YPEs¹² administered by MoH. They include the following types:
 - (i) 120 public hospital facilities: (93 general divided into 7 subgroups according to bed capacity- including 17 with less than 100 beds in isolated areas; 19 specialized ESY hospitals more than 400 beds in large urban areas including 5 prior SHIF IKA hospitals merged to ESY since 2012; and 8 teaching University hospitals that provide tertiary inpatient and outpatient care staffed by permanent personnel reimbursed by salary.
 - (ii) About 210 primary health care centres–HCCs in rural and few HCCs in semi-urban areas and other rural posts in thinly-populated areas administered by NHS-ESY hospitals that provide outpatient care covering about 25% of the Greek total population.
 - (iii) 15 non NHS-ESY military hospitals administered by Ministry of Defense, 2 prisoners' hospitals administered by Ministry of Justice, and 3 “special status hospitals” – ex legal entities co-operating with ESY under special contraction, that in 2014 were absorbed in ESY.
- (b) *Non NHS-ESY hospitals connected with ESY* that include: 15 military hospitals administered by Ministry of Defense; 2 prisoners' hospitals administered by Ministry of Justice; and 3 “special status hospitals” –ex legal entities of private law under special contraction with ESY, which in 2014 were absorbed in NHS-ESY. They have a total capacity of about 4500 beds or about 7% of total hospital beds (Economou et al, 2010).

According to OECD (2014) as presented below in detail, these two groups of general and specialized hospitals have a total capacity of 38115 beds for 2010 – that is, 69.6% of total hospital beds. All public hospitals have also *outpatient departments*, which operate on a rotation basis, as well as, they operate emergency services that

¹² Table 3.18 and Figures 3.9 and 3.10 present the Regional Health Administrations/ Authorities division (7 DYPE/RHAs) and the administrative division of Greece in 13 NUTS2 Units according to the legislation introduced from 2001 till today.

complement the functions of the National Centre for Emergency Care (EKAV) (Economou, 2010).

(c) *Private Health Clinics (for profit and not for profit)*

In February 2014 there were 161 private health clinics (MoH, 2014) comprised of: private for-profit clinics; private non-profit clinics; private psychiatric clinics; private rehabilitation Centers; and supplier of disability non-profit clinics – with 26% of total bed capacity for 2010 (Economou, 2010). They consist of two types:

- (i) Clinics with small size of less than 150 beds contracted with EOPYY and SHIFs that during the last years they were gradually reduced due to their low reimbursement rates for hospitalization by EOPYY or SHIFs.
- (ii) Few hospitals and clinics with up to 400 beds with a high degree of concentration mainly in capital Athens and Thessaloniki, offering high-quality services to private patients and those with private insurance, holding a higher share of the Greek private hospital market (Boutsioli, 2007). However, despite the rapid growth of the private sector during the last decade, public hospitals are used more than private hospitals by the population mainly due to almost free provision to insured population and better reputation of public specialized hospitals than private ones.

Therefore, the above figures of beds capacity, rates of hospital activities and the occupancy rate indicate that the last decade beyond better clinical practices, there has been a trend to increase productivity in hospitals.

It is worth noting that since 1990s, there is evidence via applying data envelope analyses (DEA) method that significant inefficiencies exist in relation to the performance of hospitals. The DEA analyses revealed variation in performance (technical inefficiency) across hospital departments (mainly cardiology and general surgery), and across ESY hospitals favoring the urban, the general and tertiary teaching hospitals resulting in increased ALOS and increased hospital spending (Giokas D, 2001; Aletras V., 1999; Athanassopoulos A. et al, 1999; Athanassopoulos A. & Gounaris C., 2001; Prezerakos P., 1999; Polyzos, 2001, NSPH, 2012). However, there is evidence that NHS-ESY small hospitals (with less than 40 beds) and medium in size hospitals (250 to 400 beds) in urban areas operated more efficiently than larger general hospitals (Prezerakos P., 1999; Polyzos N., 2002; NSPH, 2012; Polyzos. N, 2013). Similar findings are identified by a recent study of Xenos P., NektariosM, ConstantopoulosA, Yfantopoulos J (2016) that examined the efficiency of 112 Greek public hospitals in 2009 by applying two models of DEA, augmented by bootstrapping techniques in the efficiency and found that the majority of the

NHS-ESY hospitals (30.4%) score between 0.51 and 0.7, while less than a quarter (23.2%) are fully efficient, indicating that, despite the difficulties in the healthcare sector in Greece, certain NHS-ESY hospitals are leading the way to high productivity and efficiency, whereas the less productive, inefficient hospitals were almost 10%. Moreover, another study with DEA analysis for 117 NHS hospital data of 2009 – 2011 found that middle hospitals in urban centres of all YPEs except 6th YPE (Peloponnese & Ionian Islands & Epirus & Western Greece)¹³ and 7th YPE (Crete), as well as small-sized hospital in all YPEs except 2nd YPE (Piraeus & Aegean Islands) demonstrated improvement (per technical efficiency) over 80% leading to significant spending-cuts (Polyzos. N, 2013). On the other hand, they found that there is demand for efficiency interventions primarily for the large hospitals of the 2nd YPE (Piraeus & Aegean Islands) and 4th YPE (Central & East Macedonia & Thrace) as they still remain below the national average of technical efficiency (Polyzos, 2013; NSPH, 2012,)¹⁴. Similar findings of were presented by another previous study based on the UK Resource Allocation Working Party Method (Mitropoulos & Sissouras, 2000).

3.4.2 Primary Care

Overall, *primary medical care (PHC)* is provided in a fragmented - bureaucratic way with a physician-driven organizational structure by a mix of public and private health care services via four subsystems. The structure of PHC units (EOPYY ex IKA SHIF units; NHS-ESY HCCs and regional offices; outpatient ESY departments; and private units) as well as the estimated PHC personnel in total and by structure is presented in Table 3.19. Official quantification of the personnel separated in public and private structure is not provided by MoH and Greek Statistics Authority, indicating the inadequacies and gaps in the medical and statistical information sources.

(a) *In NHS - ESY facilities* via:

- (i) ESY hospital outpatient departments that provide PC specialist services in urban areas (70% of the population) within three frameworks: (a) in emergency ESY departments (EKAV) for free; (b) in morning outpatient clinics on an appointment basis for free since 01/04/2015;(c) in afternoon outpatient clinics provided by

¹³ It is worth mentioning that Epirus and Western Greece regions that are included in 6th YPE (Peloponnese & Ionian Islands & Epirus & Western Greece) are the poorest Greek regions with the lowest regional GDP per capita.

¹⁴ But, these results should be treated with caution since the consequences of the cost savings cannot be interpreted with the same way across hospitals with differences in operation procedures that may permit flexibility and allow some hospitals to operate below capacity.

doctors working in the hospital on a private, appointment-only basis (with non-reimbursable €25 for doctors in rural hospitals to €90 in university-affiliated hospitals).

(ii) 220 Health care centres (HCCs) established under the decentralization reform: mainly in rural areas (covering 30% of the population) administered by ESY hospitals- for free since 01/04/2015 (till then it was free only for OGA SHIF and agricultural beneficiaries); few HCCs in semi-urban areas; and about 1530 regional offices - rural posts of untrained physicians in thinly-populated areas administered by HCCs. The HCCs were planned to: provide a wide range of services from prevention, diagnosis, cure, prescribing, to short-day hospitalization, dental care, rehabilitation and family planning; to improve access to care for inhabitants in remote areas; and to act as gatekeepers and referees between primary and secondary health care, as well. However, despite the growing demand for HCCs, the majority of HCCs play a subordinate role as they are inadequately staffed mainly due to: oversupply of specialists but irrationally allocated (1400 or 40%); significant undersupply of GPs (500 GPs or 14%) and 2113 nurses; and 1630 rural untrained physicians for regional offices; inadequate medical technology infrastructure; absent of managerial autonomy; and inefficient allocation of resources between isolated regions versus less rural areas with transportation difficulties especially for the elderly population (Karakolias E. & Polyzos N., 2014). According to estimates, there is a lack of one-third of HCCs personnel (Economou, 2010). All these weaknesses lead to inefficient and problematic operation of HCCs that were evidenced by evaluation of HCCs with the method of DEA analyses that revealed significant inefficiencies and geographical disparities in HCCs' performance (Sissouras, Mitropoulos & Gounaris, 2000).

(b) Through *social health insurance system*

Following successive merge efforts, thirteen (13) SHIFs used to provide health services to their insures, characterized by significant variations in regulation, contribution rates, coverage, health care benefits package and conditions for access¹⁵. Since 2012, the major SHIFs are merged in EOPYY – a unified SHIF covering the 95% of the insured population - that is self-managed but under the jurisdiction of MoH

¹⁵ In terms of coverage and benefits, the SHIFs have been officially classified as “Noble” SHIFs (for civil servants, bank officers, public utility employees, lawyers, doctors etc) versus “Non Noble” SHIFs (for blue-collars employees and for farmers).

and MoF. Social health insurance sector provides primary and specialist health services via the patterns:

- (i) Till 2012, public primary and specialist care was provided via a health care nationwide network of 350 PHC medical facilities owned and financed by IKA - blue collars Fund, mainly located in urban areas covering 50.3% of the population and in rural areas covering 25%, and staffed with salaried physicians. Since 2012, the network of IKA units is operating under EOPYY. Till March 2014, the EOPYY's PHC units (ex IKA) were staffed with about 5.500 specialists and 500 GPs, most of them on a full-time or contracted on a part-time salaried basis with the allowance to work privately to their practices, as well. Since 2014, under legislation for the establishment of a National Health Network for Primary Care network (PEDY), the part-time staffed physicians were forced away from EOPYY and the management of EOPYY units was expected to be transferred gradually to the RHAs and ESY. However, two years later, the issue of ceasing part-time physician contracts has not been legally finalized. Therefore, all the above events have resulted unfortunately in limited utilisation of EOPYY PHC units and “move” to private health care services.
- (ii) As a consequence, only in theory, EOPYY (ex IKA SHIF) delivers a wide range of PHC services. Evidence provided by the IKA's Statistic Department showed that IKA's PHC services were concentrated to prescribing (60% of cases); referrals to secondary health care services; and high-cost examinations mainly for elderly people (IKA, 2011). Similarly, assessment of ex IKA units' performance, showed that only units with adequate technological infrastructure for medical tests are efficient (Zavras et al, 2002) even though being more efficient than NHS-ESY HCCs (Kontodimopoulos et al., 2007).
- (iii) Via private physician consultations with own practices, or private diagnostic centers or hospitals providing services under contract to EOPYY or other SHIFs that do not have own facilities, on a fee-for-service retrospective basis, with variations among SHIFs in the level of coverage, freedom of choice of PHC providers (including private providers), access to specialists and access to private hospitals. In December 2013, there were about 5060 specialists, 420 GPs, 2400 diagnostic laboratories and polyclinics contracted with EOPYY for PHC services (Table 3.19).¹⁶

¹⁶ It is worth mentioning that till the merge of major SHIFs to EOPYY each physician could contract with every SHIF separately leading to multiple contracts for each physician. Till 2012, ie OPAD (public sector employees) have

- (iv) via free choice for few Noble SHIFs not merged to EOPYY (ie Banks' personnel, Utilities personnel, Engineers etc), of whatever public or private professionals the insured individuals wish to consult. Patients pay the fee demanded by the doctor and are reimbursed retrospectively with a preset amount by their SHIF.
- (c) Through *municipalities* that provide PHC services within own facilities usually focused on specific population groups such as: uninsured persons, immigrants and elderly.
- (d) Through *the private sector* via: outpatient physicians' own practices; diagnostic centres; and outpatient department in private hospitals contracted on a fee-for-service basis with NHS-ESY, EOPYY and other SHIFs, or directly to patients privately by OOP payments or private insurance. It is estimated that private practices and laboratories (contracted and not contracted with NHS-ESY or EOPYY) are still more than 25000 in 2016.

The above analysis highlights the fragmented and weak physician-driven organizational structure of the PHC system that obstructs its efficiency and “forces” the patients to private care.

Therefore, the *private health care sector* plays an important role in the provision of health services, although it does not have any direct involvement in the planning, financing and regulation of the public system (Economou, 2010). The private sector provides services via: a) General and maternity profit-making hospitals; b) A significant number of private diagnostic centers; c) Independent physician (mainly specialist) practices ; d) A significant number of private hospitals and clinics, which are either contracted by EOPYY or paid directly by the patient. e) Rehabilitation Care Centers (physiotherapists etc.) and geriatric homes. All these services are financed either by EOPYY (or other SHIFs) on a contract basis or by the private insurance system (mainly supplementary insurance) or paid directly by the patient on a private basis (out of pocket payments and informal payments).

Overall, it is worth mentioning that due to the fragmented character mainly of the primary health care (PHC) system, elderly population uses NHS-ESY for receiving inpatient care and outpatient care and less Social Health Insurance system via EOPYY (PEDY-ex IKA SHIF) and other SHIFs and NHS-ESY Health Care Centres for receiving PHC. It is apparent that the elderly population is “forced” to private physicians for receiving PHC. In case that they choose the Social health insurance system for PHC the elderly are “forced” to make OOP and informal payments with important financial impact. Therefore, we could

contracts with about 20.000 physicians, OAEE-self employed Fund with 3.500 physicians and OIKOS NAUTOU (for seamen) with 3.100 physicians.

claim that PHC seems to be provided in a private framework, even via the Social health insurance structures.

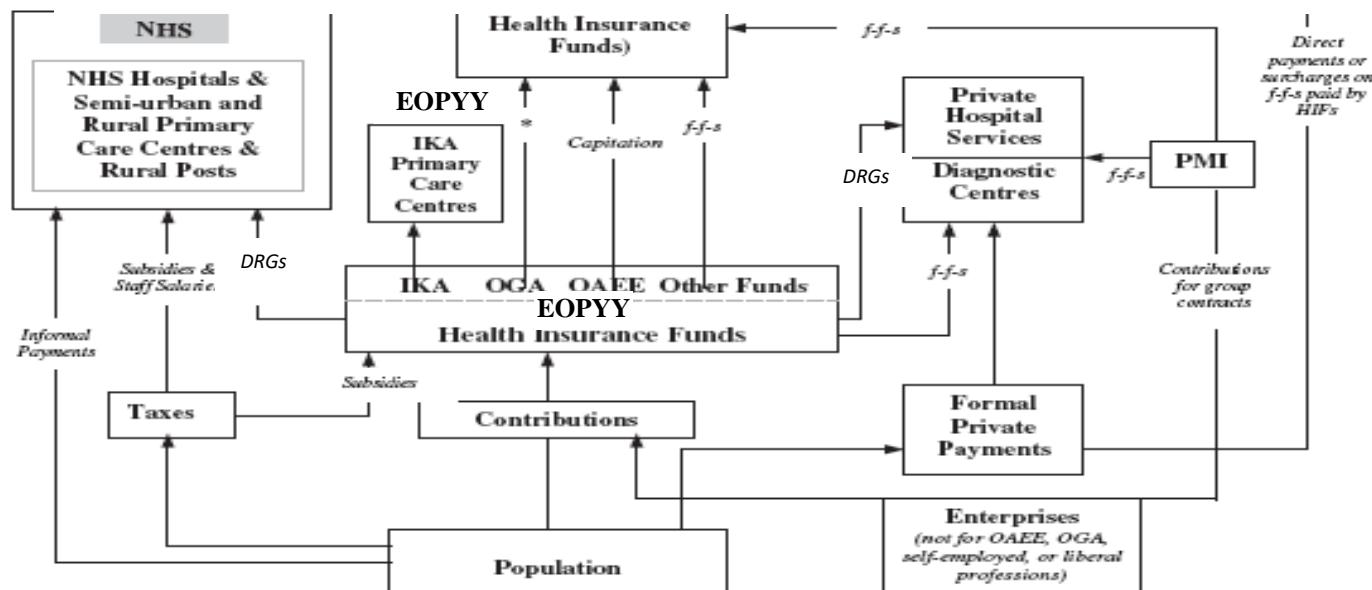
3.4.3 Dental Care

Dental care is characterized by limited coverage provided in a fragmented way via:

- (i) Through the social health insurance system that covers a limited range of services within the following frameworks:
 - a) Via a limited number of full-time dentists working in EOPYY own facilities (ex IKA SHIF) with limited quality and responsiveness; and about 1000 part-time dentists on contract with EOPYY, reimbursed under a small fixed amount. It is worth mentioning that other Non Noble SHIFs provided limited or even no coverage for dental care (ie. OGA SHIF covers only children up to 18 years).
 - b) On the other hand, there are still significant differences in dental care services provided favoring few Noble SHIFs (out of EOPYY: ie Bank employees) that still provide a wide range of services (from preventive dental services to even orthodontics) within own facilities or under contract with private dentists paid by the patients and reimbursed retrospectively a fixed amount by their SHIF.
- (ii) Through ESY via: (a) HCCs that provide limited preventive dental services for Non Noble OGA beneficiaries under the age of 18 and (b) few outpatient dentist departments of ESY hospitals that provide limited dental services.
- (iii) Through the private sector via: a high number of dentists paid directly by the patients or partially covered by private health insurance.

The fact that dental care is provided within a fragmented way and is characterized by poor social health insurance coverage, in combination with the oversupply of private dentists lead to extended use of private dental care with high dental care expenditure, especially OOPPs and informal payments. According to available estimates, the dental care is the predominant field for direct payments, with high cost-sharing over 30% of total OOP expenditure for financing dental treatment (Economou C., 2010; Siskou et al, 2008). There is also evidence of regressive interregional variations of the financial barrier for dental services favoring the residents of rural areas than residents of urban areas (Koletsi-Kounari H. et al, 2007). As Economou (2010) and Mosialos et al (2005) point out “the private sector, and out-of-pocket payments made by patients, act as a substitute for the gaps in insurance coverage of dental treatment”.

Figure 3.12 Organisation of the Greek health system: financing flows and delivery of health services



*OGA contracts private doctors for repeat prescriptions
Note: f-f-s refers to payment by fee-for-service

Source: Mossialos E. et al (2005)

Table 3.19: Manpower and units of Greek Primary Health care at NHS - ESY (not in outpatient departments) and EOPPY-based on Karakolias E. & Polyzos N. (2014) and Ministry of Health - (2013) ESY.net data

Assigned to	Payment method - relationship	PROFESSIONALS	Number	Per 1000 population
NHS-ESY staff at HCCs and regional offices				
NHS	(salaried)	GPs at health centers- HCCs and regional offices	500	0.046
NHS	(salaried)	Specialists at health centers - HCCs and regional office	1400	0.129
NHS	(salaried)	Resident and rural physicians (non-specialists)	1630	0.151
NHS – ESY subtotal physicians (HCCs and regional offices)			3530	0.326
NHS	(salaried)	Nurses at health centers - HCCs and regional offices	2113	0.195
NHS	(salaried)	Other staff at HCCs and regional offices	2325	0.215
Total NHS-ESY staff at HCCs and regional offices			7968	0.736
EOPPY's staff				
EOPPY	(contractual)	Independent GPs	420	0.039
EOPPY	(salaried)	GPs at EOPPY's units	500	0.046
EOPPY's subtotal GPs			920	0.085
EOPPY	(contractual)	Independent specialists	5066	0.468
EOPPY	(salaried)	Specialists at EOPPY's units	5589	0.517
EOPPY's subtotal specialists			10655	0.985
EOPPY's subtotal physicians			11575	1.07
EOPPY	(salaried)	Nurses at EOPPY's units	2841	0.263
EOPPY	(salaried)	Other staff EOPPY's units	1373	0.127
EOPPY	(contractual)	Physiotherapists and other health professionals	2125	0.196
Total EOPPY's staff			17914	1.656
Total professionals (excluding physicians)			10,777	0.996
Total NHS & EOPPY physicians			15,105	1.396
Total professionals			25,882	2.393
UNITS				
EOPPY	(contractual)	Diagnostic laboratories (80% solo and 20% group practice)	2402	0.222
EOPPY	(contractual)	Rehabilitation and recovery centers	40	0.004
EOPPY	(contractual)	Daycare centers	33	0.003
EOPPY	(contractual)	Polyclinics	36	0.003
EOPPY	(property)	EOPPY's units (polyclinics and medical offices)	400	0.037
Other				0.000
NHS	(property)	Health centers - HCCs (simple in rural areas, few in urban and few in special purpose)	220	0.020
NHS	(property)	Regional offices (simple, multi and special purpose)	1530	0.141
NHS	(property)	Public hospitals outpatient clinics	131	0.012
NHS	(property)	Private hospitals outpatient clinics	162	0.015
Total units			4954	0.458

Source: Karakolias E. & Polyzos N. (2014) based on Ministry of Health (2013) ESY.net unpublished data

3.5 Long Term Care and Elderly Care in Greece

As mentioned in chapter one, defining *long-term care* (LTC) and specifying what constitutes *elderly care* in Greece is a complex task, given that no universal statutory scheme for LTC exists. Elderly care combines social care and health services, and distinguishing them is complex and not always a straightforward process (EC, 2014; Karamesini & Moukanou E, 2007). One of the major confusions in this respect derives from the provision of elderly residential care by the same institutions which cater for people with chronic diseases. In general, LTC in Greece is based on a mixed in cash and in kind system comprising informal and formal care (Figure 3.12).

3.5.1 LTC services provided

The Greek system of LTC provides public services by the MoH via social welfare institutions, the SIFs and EOPYY through public institutions, NGOs (via the Church of Greece), private non-profitable organizations and private profitable organizations contracted with MoH and EOPYY. However, the formal home care arrangements provided are limited. LTC is also traditionally provided by family members. EOPYY and SIFs provide disability pensions and benefits (in cash and in kind) by social welfare institutions to three categories of people, legal residents of the country, depending on their invalidity levels (of 50%, 67% or 80%) and the type of chronic illness they suffer: (a) the elderly with high level of dependency (b) people with chronic illness or incapacity and (c) people with mental health problems. There are two types of Formal LTC: the institutional/residential care and the community and home care. In 2010: 12% of people aged 15+ in need of long-term care were in institutional care, 28% in home care, and 60% either had no access to care or were looked after by informal carers (EC, 2014). The LTC services for aging population are provided through specific settings of close and open care units, as in Table 3.20. These schemes are financed mainly by EU funding that results in insecure funding that gives priority to serve the needs of isolated and poorer dependent elderly.

Table 3.20 : Structure of LTC (care for elderly & invalid individuals)

In cash			
In Kind	Informal care	private	For profit
	Formal professional care		Not-for-profit
	Public		

Table 3.21 Formal Elderly care services Provision in Greece (Benefits in Kind)

Scheme	Public			Private		
	OPEN-DAY CARE/COMMUNITY – HOME CARE					
	Local Authorities	YPEs	Social Security Fund (EOPYY ex IKKA)	NGOs	Non-Profit (Voluntary)	For-Profit
First Social Aid (Network) - "Tele Assistance" programs (free of charge)	X	X	X	X	X	
Open Care Centres ("KAPI") free of charge & "Friendship Clubs" (only in Athens -5€ annually fees)	X					
Home Help (free of charge)	X	X	X	X (ie Hellenic Red Cross)	X	X
Daily Care Centres + Health Care Centres (in Urban Areas)	X	X		X	X (ie by the Hellenic Association of Gerontology and Geriatrics)	
Centres of Social Support and Training of Persons With Disabilities	X	X		X	X	
Centres of Physical & Social Rehabilitation (KAFKA)		X (since 2011)				
Family - mostly women relatives (unpaid) & migrant women carers (paid through pensions and/or family resources)					X	
Other - Social Tourism / Therapeutic Spa- Means Tested			X			
INSTITUTIONAL/RESIDENTIAL CARE						
Nursing Homes for the Chronically ill (fees according to means)	Few	X		X “Elderly Care Units”	X “Elderly Care Units”	X “Elderly Care Units”
Chronic Disease Clinics		X		X		X
Rehabilitation Centres		X				X
Mental Health Hospitals		X				X

Source: Own calculations based on National Legislation

3.5.2 Professional LTC workers - Informal Carers and the role of the family in ageing in Greece: intergenerational solidarity

Overall, in Greece there are no official data available for professional LTC workers. The OECD and ELSTAT data in 2014 show that Greece has a density of 19.25 workers per 1,000 population - that is one of the lowest rates among OECD countries¹⁷. From these, the professionally active caring personnel has a density of 0.84 carers per 1,000 population by far *the lowest among the OECD countries* –resulting in “an alarming shortage of nursing and (formal) care personnel in Greece” (EC, 2014 Report.125). There are no available data on the total number of informal carers, given the fact that no formal process of registering (and certifying) informal carers is in place. Most of informal carers are relatives (mainly wives, daughters and other female relatives), or paid workers (female legal or illegal immigrants, though the crisis has rendered paid help unaffordable). Data retrieved from OECD Health at a Glance 2011 (drawing upon the SHARE project), Rodrigues R. et al, 2012; Hoffmann & Rodrigues, 2010 calculations’ for informal carers in Greece, and the EUROFAMCARE study for services supporting family carers in six EU members in 2003-04 as in Lamura et al.(2008); Mestheneos E, Triantafillou J.(2005), indicate:

- ✓ Intensity of informal care in the oldest age group or inter-generational solidarity is more than six times higher in Greece than other EU countries.
- ✓ In 2007 nearly 9% of people 50+ years in Greece (about 80% of those being females) provided services of informal care (OECD-16 countries average 11.7%).
- ✓ Informal carers are predominantly women - daughters, daughters-in law or wives, even for the oldest age group (75 years and over) differently from most EU.
- ✓ About 70% of total migrants employed as informal LTC carers are employed in home care, with often, an undeclared, less regulated and professionalized position on labour market, whereas training and counselling rarely exist in Greece, except those by NGOs.

Therefore, the provision of elderly and LTC services relies more on home care and less to institutional care (EC, 2014). *The family seems to be the main provider of elderly care*. In Greece - similar to most South European countries - there is a primary responsibility of the family for the financial and practical support of dependants devolves (mainly spouses and children), with the state commitment taking a supplementary role, either when the family is unable to provide support - through social welfare schemes or, more recently, in policies

¹⁷ Retrieved on 24/07/2016 from the OECD Health Database, at http://stats.oecd.org/index.aspx?DataSetCode=HEALTH_STAT#

for the provision of direct small financial to informal family carers in the minor sense of some tax concessions¹⁸. There is a legal provision for the responsibility of the family specified in the Greek Constitution of 1975, and amended in 1986 and 2001 (Triantafillou J. et al, 2010). It is the existing social, political, and religious beliefs, as well as the prevailing social norms, that mainly determine the relations of the family members among themselves and their respective obligations to each other. Family still plays a very important role in the protection of its poor and older members. The younger people respect their elders and still accept them in certain roles. The customary family care of the elderly is still strong, and if necessary, children take care of their old parents at all stages of illness. Moreover, till recently, it was considered socially unacceptable to “abandon” a parent to an institution mainly due to cultural norms (Emke-Pouloupou I, 1999). However, a number of developments have changed the traditional family elderly care model resulting in “family care deficit” that result in to provide care for the elderly in private residential homes or by paid elderly care at home.

3.5.3 The main weaknesses of the existing formal LTC services

Overall, they could be summarized as following:

- ✓ The existing formal LTC services based on means-testing criteria are addressed to the neediest, indigent people and do not guarantee universal coverage.
- ✓ LTC services are characterized by: insufficient number of beds with uneven regional distribution with ambiguous and low quality of services, concentrated mainly in urban areas (EETA, 2011; EC, 2008); low rates paid by social insurance; insecure funding based on EU and a shrinking public budget leading to a growing private sector.
- ✓ Access to services is primarily focused on hospital acute services and clinical care, resulting in *a system that still is fragmented but oriented towards acute health care settings*. Therefore, the interaction between health and LTC does not constitute an area of significant policy concern and only seldom addressed, as they are out of the interest of the medically centered health system. As a result, *it is very difficult to balance between health and social care*.
- ✓ The lack of LTC as an individual sector has important organizational, financial (via taxation, social security contributions, voluntary private insurance or OOPPs), and delivery (home care or institutional) implications.

¹⁸ It is also worth noting that till 2000s, care for the elderly in Greece was characterized -officially- as a “family affair” by the Ministry of Health (Ministry of Health and Welfare, 1999).

- ✓ Similarly, there is a lack of data on care outside the public systems, on quality, care outcomes, value for public money, as well as a lack of overall evaluation.

These difficulties and the combination of health and social care complicate the tasks of collecting and comparing data on LTC, especially regarding coverage.

Following, *the above challenges and the current crisis* create a serious risk that in coming years, Greece - similar to other EU-MS, will not be able to meet the fast-growing demand for effective, responsive and good-quality LTC and elderly care services. As a lot of researchers point out the current severe economic crisis leaves little room for an expansion of public provision. This will leave families to carry a heavy burden of care responsibilities alone and unsupported, and put the health, dignity and quality of life of frail older people at risk while also challenging the sustainability of the public budgets (EC, 2014). However, it could be an opportunity for improving coordination of existing schemes, that provides benefits in cash and in kind, redefining the links between formal and informal care and developing support for carers (EC, 2014; Petmesidou, 2014). Moreover, Greece could follow the example of “other countries that -despite scarce resources, are addressing the challenge of translating research findings on chronic diseases and ageing into policy and practice, through multisectoral programmes for prevention and control, primary intervention and a system of integrated health and social care” (p.138) (Triantafillou J, Mestheneos E., 2013). Nevertheless, Greek policy makers have to realise that this is the opportunity to make substantial reforms towards integrated health and social care (WHO, 2015d; WHO, 2012).

3.6 Financing and Expenditure of health system

The health care system is financed by a mix of public and private resources. Public resources are based on taxes (direct tax and indirect tax revenues as defined in the state budget) and social insurance contributions by employees and employers. The third source of financing is private expenditure, mainly in the form of out-of-pocket (OOP) payments and less supplemental private health insurance. Before we present health expenditure trends and funding sources, it is important to note that for a long time, Greece had not adopted the OECD system of health accounts, resulting in scattered information and deficiencies in the breakdown of aggregate expenditure and continuous revisions of data. Only recently, in 2014, the MoH in cooperation with National Statistics Authority and Eurostat adopted the WHO system of health accounts and revised old data.

3.6.1 Health Expenditure trends

Tables 3.21 and Figure 3.13 indicate that health care expenditure has increased substantially over the last two decades (up to 2010) in per capita US\$ PPP and as a share of GDP. Greece is ranked among the ten highest health spenders of the OECD group. The proportion of total health expenditure has risen from 6.6% in 1990 to 9.7% in 2008, 10.1 in 2010 and 9.3% of GDP in 2012. However, after years of continuous growth of per annum, Greece saw double-digit percentage reductions in health expenditure in both 2010 and 2012, leaving the overall level of expenditure around 25% below its peak in 2008 (OECD, 2014) due to significant reduction in total health spending, similar to other countries. Therefore, health spending accounted for 9.3% of GDP in Greece in 2012, equal to the OECD average, but below the median of the EU average (10.1%) for first time after years (Figure 3.13). Yet, Greece's per capita GDP in public health expenditure is one of the lowest in OECD (26 out of OECD 34 countries). On the other hand, despite the significant reduction in total expenditure, Greece still has one of the largest shares of private health expenditure (mainly OOP expenses) among EU and OECD countries, given that it constitutes 34% of total health expenditure¹⁹, and private funding recorded the largest share of revenues even in the current period of austerity²⁰. Furthermore, pharmaceutical spending, in line with a number of other countries, indicates a significant reduction, but still significantly above OECD-34 average.

Examining the *expenditure of different categories of health service provision* as % of total current expenditure on health care in 2012 , as well as examining the breakdown of public and private health expenditure by type of care over the period 2009 -2012 (Tables 3.22 & 3.23 and Figures 3.14 and 3.15) we observe that the public health care system is hospital-centred versus the private sector that is focused on primary care. Greece is ranked as the first highest spender on inpatient care (47% including day care) among the EU23 countries and above the OECD-27 average in 2011. Spending is followed by medical goods (pharmaceutical) spending (27%) and outpatient care (22%) whereas long-term care (LTC) spending of 1% is significantly low, given that LTC has not been statutory established yet, as mentioned above. Over the period 2009-2012, there is a continuous increase of expenditure in hospital care provided by both the public and private sector. Public expenditure exceeds private expenditure in the hospital sector and in pharmaceutical sector

¹⁹ This share ranks Greece as the fourth highest private spender on health after Mexico and the United States.

²⁰ Increases in private expenditure may be explained by the undersupply of diagnostics and technology in the public sector, disorganised primary care, increasing informal payments in the public sector, and limited coverage of dental care (Economou, 2010).

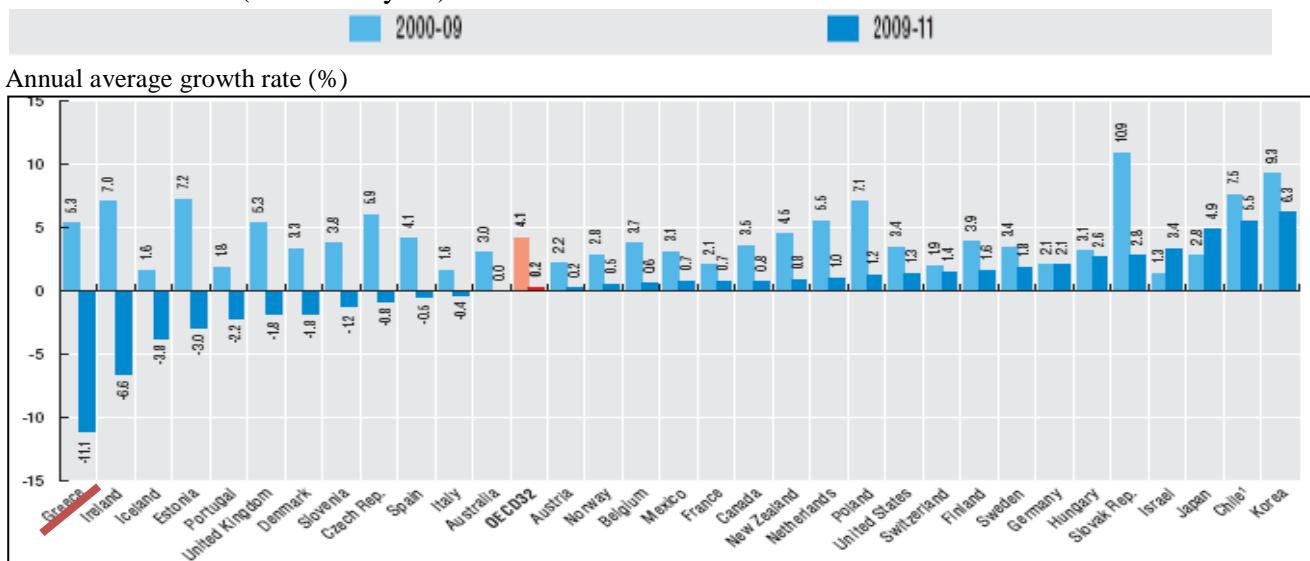
till 2011, whereas primary care (including dental care) is provided mainly by the private sector. In 2012, there was a decrease in outpatient care expenditure, both public and private, due to the significant reductions in total health expenditure. Similar trend exists for pharmaceutical expenditures. It is also worth noting that the increased share of outpatient care expenditure is further documented by analyses of the recent household budgets surveys (National Statistical Service, 2014), as mentioned below.

Table 3.22: Trends in health care expenditure, 2000-2008

	2000	2005	2006	2007	2008	2009	2010	2011	2012
Total Health expenditure per capita (US\$ PPP)	1453	2357	2612	2727	3004	2936	2585	2322	2346
Total health expenditure as % GDP	7.88	9.66	9.75	9.81	10.13	10.04	9.38	8.99	9.27
Public Health Expenditure as % Total Health Expenditure	60.01	59.29	61.20	59.57	64.73	69.48	67.85	66.07	67.51
Private health expenditure as % Total Health Expenditure	39.99	36.81	34.84	36.73	36.99	30.52	32.15	33.93	32.49
Social Security as % public health expenditure	45.93	50.34	51.56	52.45	52.45	61.04	60.09	64.02	64.02
Out of pocket payments as % private health expenditure	85.93	94.61	94.36	94.09	94.09	93.16	90.96	91.32	91.32
Out of pocket expenditure as % Total Health Expenditure	34.36	34.83	32.87	34.56	34.81	28.43	29.24	30.99	29.67
Private insurance as % private health expenditure	5.50	5.39	5.64	5.91	5.91	6.13	8.01	8.40	8.40
Government (Public) Health Expenditure as % of Total Government (Public) expenditure	10.12	12.84	13.18	12.30	12.96	12.93	12.38	11.43	11.43

Source: WHO 2014 and ELSTAT 2014

Figure 3.13: Annual average growth rates in per capita health expenditure, real terms, 2000 to 2011 (or nearest year)



CPI used as deflator. Source: OECD Health Statistics 2013, <http://dx.doi.org/10.1787/health-data-en>.

Table 3.23: Current health expenditure by functions as % of total current expenditure on health care in Greece, EU23 and OECD 27

	Greece (2012)	EU 23 (2012)	OECD 27 (2011)
Inpatient care*	47.0	31.0	29.0
Outpatient care**	22.0	31.0	33.0
Long-term care	1.0	10.0	12.0
Medical goods (pharmaceuticals other)	27.0	23.0	20.0
Prevention and administration	4.0	6.0	6.0

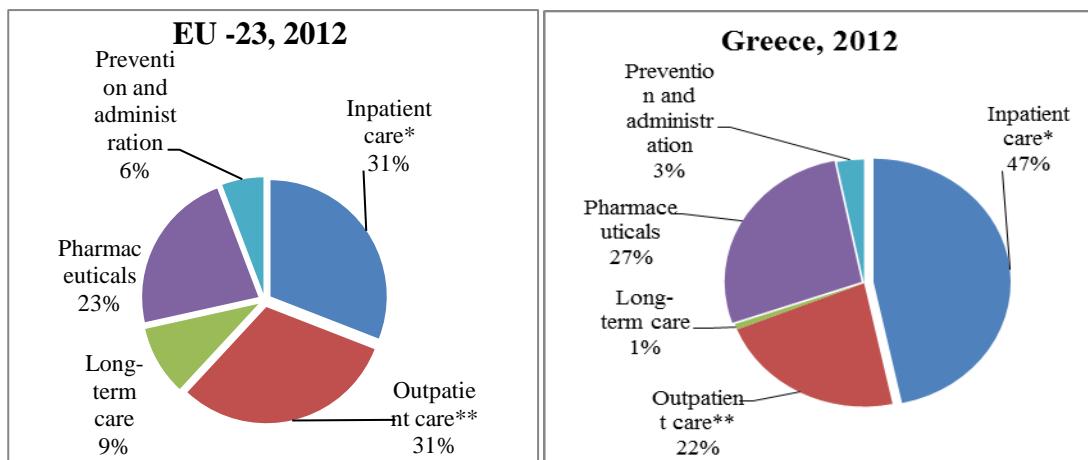
Note: Countries are ranked by curative-rehabilitative care as a share of current expenditure on health.

* Refers to curative-rehabilitative care in inpatient and day care settings.

** Includes home-care and ancillary services.

Source: OECD Health Statistics 2013, <http://dx.doi.org/10.1787/health-data-en>.

Figure 3.14: Current health expenditure by function as % of total expenditure on health care in Greece and EU



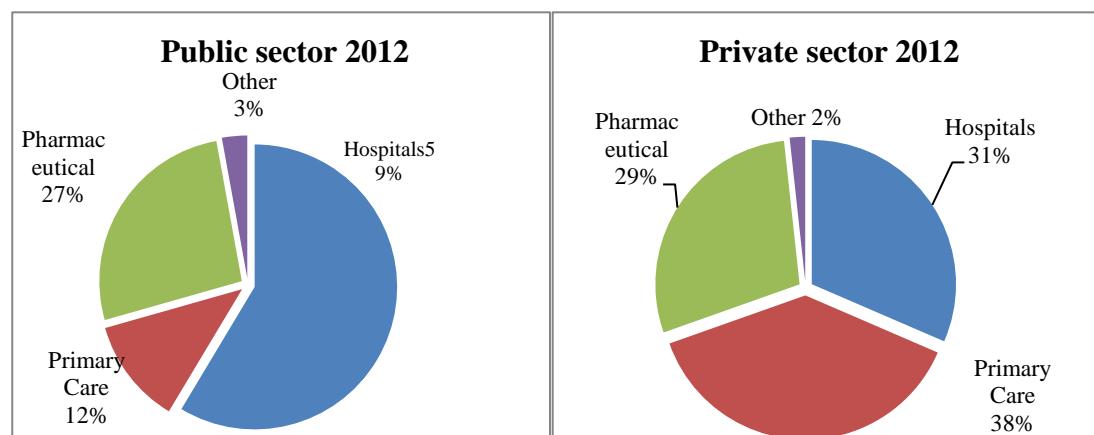
Source: OECD Health Statistics 2013, <http://dx.doi.org/10.1787/health-data-en>.

Table 3.24: Composition of health care expenditure by type of care and public - private mix in Greece as % of total expenditure on health care, 2009-2012 based on WHO - NHAs data

Type of care	2009		2010		2011		2012	
	Public sector	Private sector						
Hospitals	49%	21%	49%	24%	52%	27%	59%	31%
Primary Care	14%	56%	14%	51%	14%	47%	12%	38%
Pharmaceutical	34%	21%	35%	23%	32%	24%	27%	29%
Other	3%	2%	3%	2%	3%	2%	3%	2%

Source: WHO - National Health Accounts data 2009-2012, WHO & ELSTAT (2013)

Figure 3.15: Composition of health care expenditure by type of care and public - private mix in Greece, 2012



Source: WHO - National Health Accounts data 2009-2012, WHO & ELSTAT (2013)

3.6.2 Sources of finance

By examining in detail the sources of finance of the health care system over the period 2000-2012 in Tables 3.21, 3.24, 3.25 we observe that the main source of funding is public based on taxation and social insurance contributions. More concretely, in 2011, health care in Greece was funded through the following sources (Hellenic General Accounting Office, 2012):

- (i) The central government budget by general taxation (via direct and indirect tax revenues) constitutes 24.0% of total expenditure, of which 40.1% were direct taxes on income and 59.9% were indirect tax revenues on goods and services²¹.
- (ii) Social insurance funds (SHIFs) revenues (mainly EOPYY's revenues after 2012) constitute 42.0% of total expenditure, derived by employers and employees

²¹ The state budget covers funding of NHS – ESY infrastructure (hospitals, HCCs) and social health insurance system (SHIFs, EOPYY), the expenses of uninsured population, medical education etc.

contributions (varied among SHIFs), annual national budget subsidies and other SHIFs resources²². These data indicate also that the Greek NHS is financed mainly by social contributions and less by taxation, which is controversially to the basic principle of the NHS financing system.

- iii) Supplemental private insurance constitutes 3.0% as the third source of revenues and plays only a minor role in Greece.
- iv) Out of pocket payments (OOPPs) constitute 31.0% of total expenditure, which are the highest among EU countries. OOPPs are formal and informal and stem from user-charges, direct payments and informal payments. The high proportion of OOP payments and mainly informal payments could be a serious barrier to access health care as we examine in detail, below.

Given that the public health care system is hospital-centred, it is worth mentioning that NHS-ESY public hospitals are financed 70% from the public budget (general taxation) and cover approximately 80% of all health services, while the remaining 30 percent of public hospitals' expenses are covered on a DRG basis since 2014 (or by per diem payments till 2013) from EOPYY for the services that ESY hospitals provide to EOPYY beneficiaries.

Moreover, considering financing of LTC and elderly care “the estimation of the total cost of LTC is difficult to calculate both in the public and private sector due to the complexity of the funding system, differences in benefits provided by social security funds and the informal payments” (Mastroyiannakis T. et al, 2010, p16). It is very difficult to balance between paid care and family care; between institutional and home care; and to balance the mix of public, private and insurance financing. As a result, separate budget for LTC and distinct financial health LTC and social spending data for LTC is still not applicable for Greece and not comparative, as the social LTC expenditures are lumped in with health LTC. However, estimates for the EC (2012) Ageing Report, calculate the expenditure for LTC in Greece to be approximately 1.4% of GDP (ECFIN, 2009; EC, 2014). Considering sources of funding formal care, according to EC (2014) in 2010, public spending on institutional care was estimated to be negligible (0.13% of GDP; EU-27 average: 0.80%), while spending on home care and cash benefits estimated to 1.27% (EU-27 average: 1%). It is obvious that Greece is a low-spending country with high percentage of limitations in

²² Since 2012, the resources of EOPYY are derived from: contributions of insured - employer - retired in their SHIFs, from pharmaceutical rebates, clawback mechanism in private clinics, asset management, as well as from the annual national budget subsidy (0.4% of GDP).

daily activities of over-75s (69.2% for 75+ and 41.4% for 65-74 years based on EC (2014 and EUSILC 2013).

Table 3.25: Health care Expenditure Trend by source of financing in Greece (percentage % of expenditure) 2009-2012 (Eurostat, 2014)

	2009	2010	2011	2012
General Government	27.0	26.7	28.1	28.7
Social Security Funds	42.4	41.0	40.1	39.3
Total Public Current Expenditures (% total expenditure on health)	69.5	67.7	68.3	68.0
Private Insurance	1.9	2.6	2.7	3.0
Private OOPPayments Expenditure	28.4	29.4	28.8	28.8
Total Private Current Expenditures	30.5	32.3	31.5	31.9
Other Expenditures (Church, NGOs etc)	0.2	0.3	0.7	0.14

Source: ELSTAT & Eurostat, 2014

Table 3.26 Expenditure on health by sources of financing in Greece, 2011 (% contribution of current expenditure) - OECD (2013)

	2011	OECD 34 countries
General Government	24.0	35.0
Social Security	42.0	37.0
Total Public Current Expenditures (% total expenditure on health)	66.0	72.0
Private Insurance	3.0	6.0
Private OOPPayments	31.0	20.0
Total Private Current Expenditures	34.0	26.0

Source: OECD Health Statistics 2013, <http://dx.doi.org/10.1787/health-data-en>.

3.6.3 Out-of-pocket payments (OOPPs)

OOPPs are formal and informal and stem from user-charges, direct payments and informal payments, as following:

- i. Varied formal user-charges (fixed rates and flat co-payments) on pharmaceuticals, on laboratory-diagnostic tests, per hospital and HCCs, outpatient visits, on dental care, specific medical procedures etc as structured in Table 3.26. These user-charges and co-payments are considered to be low except those on pharmaceuticals that vary depending on the severity of chronic disease and patient's income status;
- ii. Direct payments for using services not covered by SHIFs mainly for dental visits or for private (primary and specialist) medical visits for a 2nd opinion. It is worth mentioning that limited or even no coverage of dental care by Non Noble SHIFs or partial coverage by private insurance, makes dental care the predominant field for direct payments. High

cost -sharing for financing dental treatment is estimated over 30% of total OOP expenditure (Economou C., 2010; Siskou et al, 2008).

- iii. Informal payments (hidden economic activity) that represent a high proportion of OOPPs.

OOPPs for health care cause a heavy burden on individual and household incomes. According to recent OECD data, during the period of significant reduction in health spending in 2011, the share of household consumption allocated to OOP medical spending represents 3.8% in Greece –the sixth highest percentage of OOP payment comparing to OECD-34 average (2.9%) (OECD, 2013). Furthermore, according to Household Budget surveys since 1980s there is a marked increase of family health expenditure as percentage of total private consumption, from 4.8% in 1974, to 6.8% in 1998 and 9.0% in 2013 (National Statistical Department, 1996; ELSTAT., 2014).

Table 3.27: User charges (as in 2014)

Categories of goods and services	User charges – Flat copayments
Public hospital outpatient departments and health care centres (HCCs) visits	Flat copayment of €5
Afternoon NHS- ESY Hospitals outpatient visits	Flat rates: From €25 (for MDs in rural small hospital) to €90 (for Prof. MDs in University Hospitals).
Pharmaceuticals Public hospital extra medical care (e.g. rooms with better hotel facilities or other health care services)	1€ participation fee per medical prescription Direct payments not reimbursed by SHIF
Private visits to primary care physicians and diagnostic centers	a) Private visits for a 2 nd medical opinion with reimbursement by SHIFs, or b) Private visits reimbursed retrospectively with a fixed amount (smaller than market price) by few Non SHIFs.
User charges – Fixed Rates	
Preventive medicine	0%
Laboratory –diagnostic tests	15 - 30%
Dental care services	up to 40%
Orthodontic care	0% for children (up to 13–14 years old) covered by Noble SHIFs
Health consumable materials	25%
Costed medical procedures	20% or 45%
Physiotherapy	0% (annual ceiling)
Speech therapy	0% (monthly ceiling)
Psychotherapy	0% (monthly ceiling)
Additional care and therapeutics	25%
Nursing in private hospitals	5% or 10%
Pharmaceuticals	Almost uniform for all SHIFs in 2014: 25%-30% exception: a) Low-income pensioners and specific chronic diseases (ie cardiovascular): 10% b) Severe chronic diseases: 0% contribution c) For inpatient care: 0% contribution

Source: EOPYY (2013)*Instructions to Beneficiaries*. EOPYY, Athens; 2013 (in Greek)

3.6.4 Informal payments

Although the provision of NHS-ESY services is free of charge, there is Greek evidence that informal payments (hidden economic activity) in health care concern the provision of inpatient and outpatient - specialist services and payments to physicians, primarily surgeons so that patients can bypass waiting lists or ensure better quality of service and more attention from doctors (Kaitelidou et al, 2013; Kentikelenis A. et al, 2011; Siskou et al, 2008; Liaropoulos et al, 2008; Mosialos et al, 2005). As a lot of authors have pointed out, given the incomprehensive and uneven development of health coverage, and the lack of a rational pricing and remuneration policy, informal payments were developed as complement to public funding (Brian -Abel Smith et al,1994; Mosialos et al, 2005; Liaropoulos et al, 2008). Informal payments are related with tax evasion and “black economy” and constitute a serious problem of the Greek health care financing system as they represent one of the main sources of the regressive redistributive effects of the tax system in Greece. In addition to these studies, there is evidence of informal payments in the Greek hospitals (public and private) over the period 2007 to 2013, by the Transparency Int'l Office in Greece. According to the relevant Report, informal payments are significantly increased over 2007-2010, whereas in 2011 -2013 a decline can be easily observed (Table 3.27). It also worth noting that, informal payments' percentages are significantly different between the public and private hospitals. Public hospitals report higher percentages in surgeries, as well for having faster access, whereas higher percentages are more prominent in the amount of informal payments, as expected. It is worth mentioning that among the theoretical frameworks that were developed for explanations of informal payments, the Greek researchers (Souliotis K et al, 2016; Yfantopoulos J.,2014; Siskou et al, 2008; Liaropoulos et al, 2008) claim that the theoretical concept that could explain better the persistence of informal payments in Greece, is the “alternative politics” described by Cohen et al. (2004) – related to the “culture” of informal payments in Greek public sector in general. According to the concept of “alternative politics” the informal payments can be attributed to a variety of structural inadequacies and weaknesses in the organization, operation and the financing of health services – that are derived by the broader “culture” of informal payments that characterizes the Greek public sector in general, and used as an alternative means of improving public product and service provision. In particular, a current study by Yfantopoulos J. (2013) on a pooled cross section-time series analysis the period 1958-2011, revealed that overall, more than one quarter to one third of Greek economic activities

have been either unrecorded or hidden from official statistics – valued from 24.66% (sd. ± 2.8) to 30.13% of the GDP with a significant percentage attributed to health care. Similarly, the current study of Souliotis K et al (2016) that explored informal payments for 2012 found about €1.5 billion or 0.8. % of GDP to account for a hidden economy in the health sector, leading to more than €0.5 billion in tax evasion, similar to an older study for the hidden economy of 0.9 % of GDP in 2005 (Siskou O. et al, 2008).

Overall, the high proportion OOP and mainly informal payments for health care is a serious issue, as it undermines the constitutional guarantee of free access to health services and causes a heavy burden in individual and household income²³. It also increases inequities in the distribution of the burden of financing health services among social groups, as the older population. Therefore, OOP and informal payments could be a serious barrier to access that impacts negatively on households' living conditions, especially during the current fiscal economic crisis that containment of health care expenditure has become imperative, putting additional pressure on healthcare systems (Souliotis K. et al, 2016; Economou C., 2015). It is also worth noting the results of a recent cross-sectional nationwide telephone survey in 2012 for exploring informal payments by Souliotis K et al (2016) that performed an analysis of household budget surveys from 2008-2012 and revealed the substantial increase of household payments to public hospitals as a percentage of total household health expenditure, which has risen by 86 % (from 4.2 % in 2008 to 7.8 % in 2012) (Souliotis K et al, 2016). In addition, as far as it concerns the older population, this burden is increased if we consider the fact that as LTC for elderly is not statutory available and the state expenditure is less than 0.3% of GDP, other costs are likely to arise from the inappropriate use of acute health-care services, that include OOPPs to fund a large portion of LTC resulting in significant adverse impact on the disposable income of older people and their families. Thus, although government expenditures on long-term care may appear to be low, these are likely to have been shifted, at least in part, to the health sector (EC, 2014). A core policy issue is how these costs can be equitably shared across societies.

²³ According to Household Budget surveys since 1980s there is a marked increase of family health expenditure as percentage of total private consumption, from 4.8% in 1974, to 6.8% in 1998 and 9.0% in 2013 (National Statistical Department, 1996; ELSTAT., 2014).

Table 3.28: Percentage of informal payments and corruption in Greece in the years 2007-2013 in the healthcare sector (Transparency International Greece, 2014)

Years	Hospitals (% by the total of services/categories examined for corruption)	Hospitals (% by the corruption instances/cases)	Surgery (% by the corruption instances/cases)	Informal payments to the physician (% by the corruption instances/cases)	Informal payments to receive better quality services (% by the corruption instances/cases)	Informal payments to receive faster access (% by the corruption instances/cases)	301€-1000€ (amount of informal payments by % of people who were asked to pay)	301€-1000€ (amount of informal payments of % of people who answered payment of specific amount)
Public Hospital sector								
2007	2.9	34.2	56.3	2.3	4.7	0.0	28.4	42.0
2008	3.3	34.5	61.5	3.0	3.0	0.5	32.5	50.4
2009	3.1	33.5	65.8	4.2	1.6	1.1	29.5	44.4
2010	2.5	35.4	61.9	6.5	0.0	0.6	36.1	49.6
2011	3.1	41.9	60.6	3.0	4.0	10.0	36.9	45.8
2012	2.8	45.0	45.8	8.2	13.1	17.5	33.2	40.0
2013		50.0	32.4	7.7				
Private health sector (hospitals/doctors/private medical practices)								
		Hospitals & Clinics						
2007		19.9	42	2.5		3.7	13.6	
2008		22.8	46.8	0		2.1	13.8	
2009		19.2	61.3	1.1		0.0	29	
2010		22.5	47.1	4.7		1.2	22.4	
2011		21.1	54.3	2.2		5.1	26.8	
2012		19.4	39.1	8.7		14.8	34.1	
2013		17.4	34.2	15.8		22.4		

Source: Transparency International Greece, 2014

3.6.5 Budgeting process in the public health sector

According to the current budgeting process, the annual budgets of NHS-ESY and EOPYYY with imposing ceiling are set by MoH and MoF for covering annual expenditures and paying suppliers as well as EOPYYY for paying ESY and other private providers for the care that their beneficiaries receive. The budget ceilings are set on past performance – on a historical and political negotiation basis and not on actual needs of the population. In addition, EOPYYY and SHIF's budgets depend on demand of their beneficiaries that is unpredictable and imposing a ceiling is not feasible. Therefore, ESY hospitals and EOPYYY

exceed their total health budget and result in deficits. Hospitals exceed the initial budget due to delays in hospitals' reimbursement from EOPYY; overestimation of the DRGs-KEN prices; or EOPYY exceeds the initial budget due to transfer of previous deficits of the SHIFs merged; the under-financing and low-liquidity problems due to the economic crisis; potential revenue shortfall; and supplier induced demand. As a consequence, the successive deficits of EOPYY and public hospitals result in delay payments to their suppliers and in a vicious cycle of deficits that need additional ex post subsidies by the MoH²⁴. Therefore, the MoH by providing successive subsidies, contributes to the inefficient management of hospital supplies.

3.6.6 The role of EOPYY within the health care financing

Following failure to establish an Organization for the Management of Health Care Financial Resources (ODIPY) that would act as a third party payer and purchaser for primary and hospital services, EOPYY's establishment in 2011 (law 3918/2011) is characterized as "the most promising reform of the last decades in Greek health insurance" (Polyzos et al, 2014; Niakas, 2013). EOPYY ("the National Organization for Healthcare Provision") unified the healthcare sectors of the four largest social insurance funds (IKA SHIF; OAEE SHIF; OPAD & OGA SHIF) covering over 95% of the insured population²⁵. EOPYY is self-managed but under the jurisdiction of MoH and MoF. It has multiple missions: To provide health services to its beneficiaries registered to the merging SHIFs; to coordinate PHC between the different providers; to act as a unique buyer of medicines and health care, regulate contracting with all health care providers with the broader goal to have bargaining power in the market in order to increase competition between hospitals and PHC providers (Petmezidou, 2012; and OECD 2011, p.77). Under the current Law 2438/2014 EOPYY is planned, to transfer the responsibility for PHC provision to RHAs, to separate its purchasing and provider functions and become a sole purchaser with monopsony power, in order to place pressure on providers to improve efficiency and drive the prices down. However, the multipayer system still exists, the law is partially implemented, the monitoring systems are poor, and the operation of an internal market is absent. Therefore, given the fact that every year EOPYY creates successive deficits,

²⁴ Outstanding debts of ESY hospitals, military hospitals and EOPYY were calculated more than 1 billion€ in the end of 2014. EOPYY's deficit was 374 million€ in the end of September 2014 (EOPYY, 01/10/2014). Furthermore, Greek hospitals received 493 million€ grants from state budget during 2014, as well as 400 million€ grants from previous years (MoH,01/10/2014).

²⁵ Non Noble IKA blue- collar employees covers 50.3% of the population; Non Noble OGA for farmers people in agriculture (covers 19.5%); Noble OAEE for the self-employed and small businesses covering 12.9% and Noble OPAD for civil servants covering 11.7% of the population.

EOPYY's performance in 2012–2014 doesn't seem to have met the expectations of Greek society and Greek state yet (Polyzos et al, 2014; Niakas, 2013).

3.6.7 Payment and remuneration system

The payment methods for health care providers (ESY, EOPYY and health professionals) are presented in Tables 3.28 and 3.29. There is criticism and evidence that the retrospective reimbursement system of providers does not offer incentives for improving productivity and effectiveness.

- (a) From the side of hospitals and EOPYY units: (i) Hospitals and SHIFs - EOPYY do not have incentives to stay within their initial budgets; (ii) The method diagnosis-related groups (DRGs - KEN) costs' framework of 2011 is used in an adequate way for reimbursing hospitals for services provided years ago without assessment. This inefficiency leads to the overestimation of the DRGs-KEN prices and increased costs.
- (b) From the side of health professionals: NHS-ESY and EOPYY full-time physicians are paid on low salary, and the contracted physicians are reimbursed on a low fee-for-service basis with a limited number of visits per month, regardless their specialty and their performance. These methods do not have efficiency-promoting incentives. Physicians are indirectly encouraged to induce unnecessary demand for health care services, as well as, to ask for informal additional payment.

3.6.8 Procurement System

In terms of the public procurement system, till recently, each hospital was responsible for purchasing its own supplies (medical products, medicines and devices) usually without a prior tender under the guide of MoH. However, these procedures were not always transparent and did not achieve economies of scale. Supplies were bought at a higher price than market price. Since the 2007 reform, centralized public procurement procedure has been adopted via the establishment of a Central Committee of Health Supplies (EPY) and the establishment of a National Registry of Medical Devices (EKAPTY ex EKEVYL) under the jurisdiction of MoH, to help the central committee (EPY) to unify tenders via certification and control of the quality on medical devices. However, EKAPTY does not undertake systematic HTAs, and the new procurement system has been introduced slowly. A national integrated health technology assessment (HTA) system has not been established yet.

Table 3.29: Payment methods by type of provider

Health providers	Payment method	Payer
ESY hospitals	<ul style="list-style-type: none"> – Fixed budgets and subsidies – DRGs (Per diem fees till 2013) – Fixed payment per case-mix group (e.g cardiovascular surgeries) – Fee for service for diagnostic tests and afternoons outpatient clinics (fees are determined by a fixed price index) 	<ul style="list-style-type: none"> – State budget – EOPYY & Social insurance funds – Private insurance – Household budgets
Rural health centres (HCCs)	Annual budgets	State budget
Army hospitals	<ul style="list-style-type: none"> – Annual budgets – Per diem fees – Fee for service 	<ul style="list-style-type: none"> – Ministry of Defence – EOPYY & Social insurance funds
Profit-making private hospitals	<ul style="list-style-type: none"> – DRGs (Per diem fees till 2013) – Fixed payment per case-mix group (e.g. cardiovascular surgeries) – Fee for service for diagnostic tests, surgical procedures and outpatient services 	<ul style="list-style-type: none"> – EOPYY & Social insurance funds – Private insurance – Household budgets – Donations by philanthropic and other sources
Private hospitals	<ul style="list-style-type: none"> – DRGs , (Per diem fees (freely determined) till 2013) – Fee for service for diagnostic tests, surgical procedures and outpatient services (freely determined) – Fixed payment per case-mix group (e.g. cardiovascular surgeries) 	<ul style="list-style-type: none"> – Private insurance – EOPYY & Social insurance funds – Household budgets
Private diagnostic centres	Fee for service and group contracts	<ul style="list-style-type: none"> – Household budgets – EOPYY & Social insurance funds

Source: Economou (2010)

Table 3.30: Payment of health professionals

Health care personnel category	Payment method
ESY hospital doctors	<ul style="list-style-type: none"> – Monthly salary – Fee-for-service payments for the physician's contribution to afternoon outpatient clinics – Informal payments
Private hospital doctors	<ul style="list-style-type: none"> – Monthly salary – Fee for service – Extra “bonuses”
Private doctors contracted with EOPYY & other Social insurance funds	<ul style="list-style-type: none"> – Fee for service for a maximum number of visits per month – Capitation fees (in some cases) – Informal payments

Source: Economou (2010)

3.7 Physical and human resources

3.7.1 Main characteristics of physical and human resources

Tables 3.30 to 3.34 summarize the number of human resources and infrastructure (hospital beds) from 2000 till 2011, based on OECD and ELSTAT -Eurostat database. Table 3.34 and figures 3.16 to 3.18 illustrate regional allocation of resources by NUT2 regions and interregional patients' flow, as well. Examining these numbers we can observe major efforts to make health care services more efficient, especially in the public hospital sector that absorbs about 70% of total health care spending.

Hospital sector

According to OECD data, in 2009, there were 313 hospitals in Greece providing a total of 54704 beds that were increased since 2000 and reduced following economic crisis in 2010 and 2011 (53773), comprised of: 69.6% of beds belonging to the NHS - ESY; 2.6% for non-for profit private and 27.6% for profit private hospitals, as presented by type in paragraph 3.4 above. This total number of 54704 beds is equivalent to a ratio of 4.9 beds per 1000 inhabitants in 2011, compared to the EU28 (5.3). About intensive care, we have 3% of hospital capacity in ICUs, whereas the WHO recommends 8-12% as the "proper capacity"²⁶ (Greek society of ICUS, 2005). There is a significant decrease in psychiatric beds from 1980 till today, as well. In addition, there is an increase in hospital occupancy rates from 66% in 1980 to 73% in 2005 and 73.4% in 2011 lower compared to EU and OECD average of 78.2%. The average length of stay (ALOS) for acute treatment hospitals has declined from 10.2 days in 1980 to 5.4 days in 2008 and has been accompanied by an increase in hospital discharges from 160.7 per 1000 population in 2000 to 198.5 in 2008 similar to EU average.

Medical Equipment

About medical equipment, Greece with 33.9 Computed Tomography (CT) scanners and 23.4 Magnetic Resonance Imaging (MRI) per million population in 2011, is still ranked first among other 27 EU countries (20.0 for CT and 10.5 for MRI). Hence, the fact that MoH has not developed yet any formula for setting standards or national strategy in installing performance monitoring of health technology equipment has resulted in

²⁶ According to 2014 data of Greek Society of Intensive Care, there are in total 578 beds in IC units fully equipped, whereas 103 beds or 18% remain closed due to lack of personnel.

distribution not based on actual needs, in increased consumption and weak controlled supply of expensive biomedical equipment, mainly outside public hospitals. In particular, 70.6% (for 2009 and 2013) of MRI and 67.4% (for 2009) and 51.4% (for 2013) of CT scanners belong to the private sector (diagnostic centers and hospitals) (Mossialos et al, 2005; Economou, 2010). Therefore, the above figures of beds capacity, as well as the rates of hospital activities and the occupancy rate indicate that the last decade beyond better clinical practices, there has been a trend to increase productivity in hospitals.

Human resources

As far as it concerns human resources, it is worth mentioning that official quantification of the personnel separated in public and private structure are not provided by MoH and ELSTAT. Only aggregated data are officially provided, as in Tables 3.32 to 3.34 that summarize the number of health care personnel in total and by category per 1000 population from 1990 till 2011, as well as regional allocation of health personnel by NUT2 regions.

Comparisons with other EU and OECD countries reveal the oversupply of doctors, dentists and pharmacists and the under-supply of nurses. Greece has the highest ratio of doctors (6.2) almost twice than OECD (3.2) and EU28 (3.4) average, of specialists (3.6) and dentists (1.3) per 1000 inhabitants and ranked 4th in ratio of pharmacists. Conversely, Greece has the lowest ratios of GPs (0.3) and nurses (3.6) per 1000 inhabitants in 2011 less than half the EU average (8.0). The ratio of nurses to physicians is 0.57 is also the lowest in EU28 (2.33), due to the oversupply of doctors and nurse shortage. These ratios are similar with the composition of primary health care (PHC) workforce of NHS-ESY and EOPYY as estimated in table 3.34 and presented analytically in paragraph 3.4.2 above.

3.7.2 Regional allocation of human resources and hospital beds

If we examine Eurostat data on NUTS2 regional allocation of hospital beds and health professionals per 100,000 population (Table 3.34 and Figures 3.17 & 3.18), we observe major regional variations. Concretely, 62.7% of hospital beds and 65.8% of physicians are concentrated in the two most crowded regions of the country 43.6% (49.3% for physicians) in Attika/Athens - the capital and 19.1% (16.5% for physicians) in Central Macedonia/Thessaloniki) and in other urban areas with general and tertiary teaching hospitals. It is also worth mentioning that private beds are also unevenly distributed among regions, as most of them (two-thirds) are concentrated in Attiki and Central Macedonia –

Thessaloniki similar with public hospital beds (ICAP, 2006). On the other hand, the regions with the lowest density in hospital beds (Central Greece, Ionian Islands and North Aegean Islands) do not have half of the national average (484.8 beds). Central Greece with 189.4 beds has a ratio of 0.40 of the national average. Similarly, as far as it concerns regional allocation of physicians, the regions with the lowest density in doctors (Western Macedonia, Ionian Islands and North Aegean Islands) do not have half of the national average (614.4 doctors). Western Macedonia has 4.5 lower density of physicians than the national average. About the allocation of nurses, Central Greece with the lowest density in nurses (144) has 0.40 nurses of the national average of 354 nurses. Furthermore, in accordance with European studies for regional disparities, the above data indicate that Greece has the highest density of practicing physicians and the highest variation across regions, compared to OECD and EU countries (EC, 2008) as in Figure 3.18. For Greece, interregional disparities (within Greece) are greater than intra-regional disparities (among countries). Moreover, there is irrational geographical distribution even in the contracted PHC physicians, that results in a significant lack of specific categories of specialists in most rural areas except five large urban regions²⁷ (Law 3918/2011), given that the majority of contracted physicians (62%) are located in the two most crowded regions of the country (Athens and Thessaloniki) (Karakolias E & Polyzos N., 2014). Overall, the aforementioned data and ratios indicate that less privileged regions lack adequate hospital infrastructure and personnel. The regions with the lowest density of resources are the poorest regions in Greece²⁸ (Central Greece; Western Greece; Ionian Islands and North Aegean Islands) with highly mountainous and isolated areas. As a consequence, we observe high percentages of uncontrollable interregional flows of patients. According to the “Health and Welfare Map” data as estimated by National School of Public Health in 2011, (Figure 3.19), patients prefer to travel from rural and isolated areas (ie mountainous as in poor regions of Epirus, Central Greece and islands) to urban areas such as to Athens (33.2%) or to areas with large university hospitals (in Thessaloniki 42.6% or in Ioannina- Epirus 66.3%) offering expensive and high-technology services or visiting private providers (NSPH, 2012). This issue is important due to the geographical peculiarity of the regions and substantial

²⁷ The five most populous specialties corresponding to 63% of total PHC physicians include: Internal medicine, cardiology, obstetric-gynecology, general practice and orthopedics (Karakolias E & Polyzos N., 2014).

²⁸ The poorest regions with the lowest regional GDP per capita are Epirus, Western Greece and Thessaly and those with the lowest Gross Value Added are North Aegean, Epirus and Ionian Islands and East Macedonia & Thrace, according to the National Accounts by the Hellenic Statistical Authority (ELSTAT, 2014).

transportation difficulties in financial and psychological terms, especially for the elderly, given that there is a greater concentration of older people in rural areas that contribute to an increase in the need for health care as a lot of authors have pointed out (Mosialos et al al, 2005; Economou, 2010, Altanis P et al, 2008, Petmesidou M, 2006).

Overall, it is obvious that as a lot of authors have mentioned “Greece has chosen the most expensive way to produce care: through hospitals rather than outpatient care, through specialists rather GPs, through doctors rather than nurses and through diagnostic expenditures rather than clinical attention” (Mossialos et al, 2005; Economou & Giorno, 2009; Niakas D., 2013).

Table 3.31: Total Hospital Beds 2000 - 2011 (OECD, Europe Health at a Glance, 2014)

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total Number		51500	52276	51781	51762	51871	52511	53701	53888	53652	54704	54012	53773
Per 1000 population		4.72	4.77	4.71	4.7	4.69	4.73	4.83	4.83	4.8	4.89	4.84	4.83
Hospital employment-to-bed ratio (head counts)		1.52	1.54	1.63	1.66	1.65	1.61	1.59	1.57	1.59	1.59
Nurse-to-bed ratio (head counts)		0.62	0.66	0.74	0.75	0.75	0.75	0.71	0.71	0.72	0.73
Curative (acute) care Beds	Number	40874	42058	41623	42069	41969	42884	43965	44244	44417	45729
	Per 1 000 population	3.74	3.84	3.79	3.82	3.8	3.87	3.95	3.96	3.97	4.09
Psychiatric care Beds	Number	10626	10218	10158	9693	9902	9627	9736	9644	9235	8975
	Per 1 000 population	0.97	0.93	0.92	0.88	0.9	0.87	0.87	0.86	0.83	0.8
Beds in public hospitals	Number	35730	36186	36142	35814	35808	36554	37053	37574	37027	38115
	Per 1 000 population	3.27	3.3	3.29	3.25	3.24	3.3	3.33	3.37	3.31	3.41
Beds in not-for profit private hospitals	Number	629	1052	1179	1420	1548	1568	1566	1607	1597	1465
	Per 1 000 population	0.06	0.1	0.11	0.13	0.14	0.14	0.14	0.14	0.14	0.13
Beds in for profit private hospitals	Number	15141	15038	14460	14528	14515	14389	15082	14707	15028	15124
	Per 1 000 population	1.39	1.37	1.32	1.32	1.31	1.3	1.36	1.32	1.34	1.35

Source: Source: OECD Health at a Glance, 2014 (Database)

Table 3.32: Hospital beds in total and by function per 1000 population, 2000, 2005 & 2011

	Greece				EU15	EU28	EU28
	1980	2000	2005	2011	2000	2005	2011
Hospital total beds	6.2	4.72	4.73	4.9 (2011)	6.3	5.8	5.2
Curative (Acute) care - beds:	4.9	3.7	3.8	4.1 (2009)	4.4 (2002)	3.9	3.6
Psychiatric Beds:		0.9	0.8	0.8 (2009)	0.76	0.68	0.61
Curative care – occupancy rate (% available beds):	66.0%	70.2%	73.4%	73.4% (2008)	65.0%		78.2*%
Curative care – ALOS (days):	10.2	6.2	5.6	5.4 (2008)			
Hospital discharges	117.6	160.7	188.09	198.5 (2008)	174.5	173.3	172.8
Average length of stay (ALOS) - number of days - all causes	13.3	8.4	7.6	6.6 (2008)	9.6		7.8

Source: OECD Health Statistics 2014; Eurostat Statistics Database; WHO European Health for All Database.

*: OECD23

Table 3.33: Health care personnel per 1000 population, 1990-2011

	1990	1995	2000	2004	2006	2009	2011
	Practising physicians	3.40	3.86	4.33	4.88	5.35	6.17
Practising GPs	n/a	n/a	0.25	0.29	0.31	0.28	0.3
Practising specialists	2.19	2.58	3.09	3.29	3.39	3.51	3.63
Practising dentists	0.99	1.00	1.13	1.20	1.27	1.32	1.31
Practising pharmacists	0.74	0.79	0.82	0.86	0.88	0.96	1.08
Practising nurses	3.43	3.59	2.72t	3.27	3.21	3.33	n/a

Source: Source: OECD Health at a Glance, 2014 (Database)

Table 3.34: Health care resources in Greece from OECD and EU Health Statistics 2011 versus 2000

	Greece		OECD average		EU average		Rank among OECD countries*	Rank among countries*
	2011	2000	2011	2000	2011	2000		
Health care resources								
Number of doctors (per 1000 population)	6.2	4.3	3.2	2.7	3.4	3.1	1 out of 34	1 out of 28
Number of nurses (per 1000 population)	3.3 (2009)	2.7	8.8	7.5	8.0	6.7	32 out of 34	28 out of 28
Pharmacists (per 1000 population)	1.08	0.86 (2004)						
Hospital beds (per 1000 population)	4.9 (2009)	4.7	4.8	5.6	5.2	6.3	14 out of 34	17 out of 28
Computed Tomography (CT) scanners (per million population)	33.89 (2013)	25.2 (2005)	23.6		20		6 out of 29	1 out of 27
CT scanners in hospital	16.4				15.8			
CT scanners outside hospital	17.4				4.2			
Magnetic Resonance Imaging (MRI) units (per million population)	23.4 (2013)	13.2 (2005)	13.3		10.5		4 out of 28	2 out of 27
MRI units in hospital	6.8				6.7			
MRI units outside hospital	16.5				4.5			

Source: OECD (2014) Health at a Glance; Europe Health at a Glance - *Note: Countries are ranked in descending order of values

Table 3.35: Regional Allocation of Health workforce and Hospital Beds by NUTS 2 regions in 2009, 2010, 2011 (Per 100,000 inhabitants)

GEO/TIME	Medical doctors			Nurses & midwives	Dentists			Hospital Beds	
	2009	2010	2011	2009	2009	2010	2011	2008	2009
Greece	611.82	612.56	614.47	353.92	130.94	129.66	128.4	477.4	484.8
Eastern Macedonia & Thrace	456.26 (4.01%)	485.52 (4.25%)	491.84 (4.29%)	308.07 (4.68%)	92.64 (3.80%)	92.85 (3.84%)	91.17 (3.80%)	383.64 (4.34%)	371.4 (4.12%)
Central Macedonia (Thessaloniki)	571.94 <i>(16.15%)</i>	582.33 <i>(16.44%)</i>	585.31 <i>(16.48%)</i>	390.22 <i>(19.05%)</i>	132.28 <i>(17.46%)</i>	130.10 <i>(17.35%)</i>	123.68 <i>(16.66%)</i>	536.1 <i>(19.39%)</i>	535.8 <i>(19.10%)</i>
Western Macedonia	282.14 <i>(1.20%)</i>	279.37 <i>(1.18%)</i>	278.64 <i>(1.17%)</i>	256.21 <i>(1.88%)</i>	93.48 <i>(1.85%)</i>	90.51 <i>(1.81%)</i>	93.79 <i>(1.89%)</i>	435.0 (2.38%)	438.7 (2.35%)
Thessaly	480.04 (5.12%)	482.91 (5.13%)	483.68 (5.12%)	357.89 (6.60%)	116.58 (5.81%)	116.34 (5.84%)	113.64 (5.75%)	537.6 (7.38%)	556.3 (7.48%)
Epirus	603.41 (3.12%)	586.63 (3.03%)	558.32 (2.85%)	484.41 (4.33%)	102.76 (2.48%)	98.28 (2.40%)	100.0 (2.45%)	481.5 (3.17%)	476.8 (3.11%)
Ionian Islands	385.02 <i>(1.30%)</i>	378.86 <i>(1.28%)</i>	364.70 <i>(1.23%)</i>	219.76 <i>(1.28%)</i>	69.96 <i>(1.10%)</i>	69.97 <i>(1.12%)</i>	73.45 <i>(1.18%)</i>	325.6 <i>(1.40%)</i>	323.2 <i>(1.38%)</i>
Western Greece	466.04 (5.02%)	511.14 (5.50%)	515.26 (5.52%)	268.25 (5.00%)	88.88 (4.47%)	88.25 (4.49%)	87.11 (4.46%)	311.1 (4.29%)	311.4 (4.23%)
Central Greece	320.89 (2.58%)	304.97 (2.44%)	306.22 (2.44%)	144.12 <i>(2.00%)</i>	88.75 (3.33%)	84.40 (3.19%)	87.70 (3.35%)	188.2 <i>(1.95%)</i>	189.4 <i>(1.92%)</i>
Peloponnesus	375.91 (3.22%)	374.76 (3.19%)	383.90 (3.25%)	225.82 (3.35%)	98.37 (3.94%)	94.83 (3.82%)	99.71 (4.04%)	302.5 (3.34%)	314.7 (3.40%)
Attica (Athens)	845.41 <i>(50.20%)</i>	828.87 <i>(49.21%)</i>	833.61 <i>(49.36%)</i>	425.39 <i>(43.67%)</i>	174.26 <i>(48.35%)</i>	173.60 <i>(48.69%)</i>	172.00 <i>(48.72%)</i>	571.4 <i>(43.40%)</i>	582.2 <i>(43.62%)</i>
North Aegean	375.77 <i>(1.09%)</i>	411.44 <i>(1.19%)</i>	405.94 <i>(1.17%)</i>	246.35 <i>(1.23%)</i>	78.95 <i>(1.07%)</i>	77.58 <i>(1.06%)</i>	80.79 <i>(1.11%)</i>	343.8 <i>(1.28%)</i>	345.3 <i>(1.26%)</i>
South Aegean	330.26 (1.47%)	347.40 (1.55%)	357.90 (1.61%)	196.47 <i>(1.52%)</i>	88.33 <i>(1.84%)</i>	88.79 <i>(1.88%)</i>	94.69 (2.03%)	410.3 (2.34%)	484.8 (2.73%)
Crete	623.79 (5.51%)	633.11 (5.60%)	622.20 (5.50%)	354.42 (5.42%)	108.64 (4.49%)	108.21 (4.52%)	107.44 (4.55%)	472.1 (5.35%)	474.0 (5.29%)

Bold & italics:the highest number; **Bold:** the lowest number;

Source of data: Eurostat. Last update:27/1/2015 - Extracted on: 30/1/2015

Figure 3.16 - 3.18: Percentage (%) distribution of hospital beds (2009) and Physicians (2011) by NUTS 2 level - 13 regions (*Per 100.000 inhabitants*)

Figure 3.16 Distribution of hospital beds by NUTS2 regions, 2009

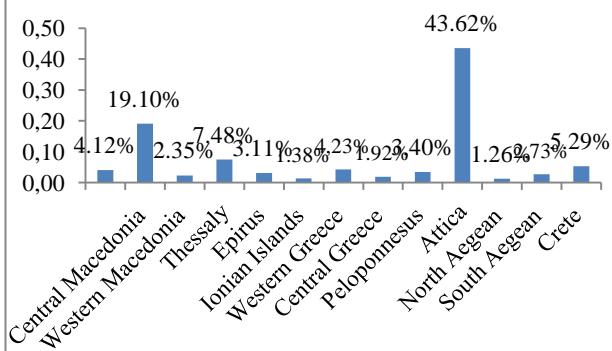
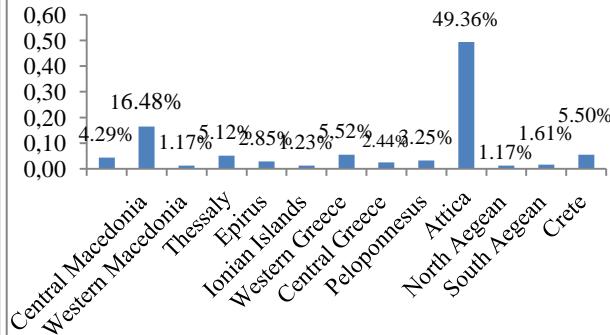
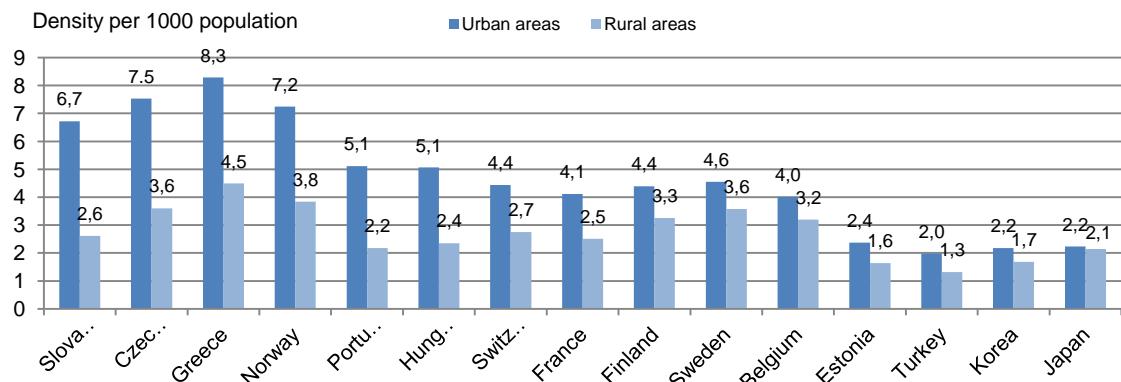


Figure 3.17 Distribution of Physicians by NUTS 2 regions, 2011



Source:ELSTAT, Eurostat, 2014

Figure 3.18: Physicians density in predominantly urban and rural regions, selected countries, 2011 (or nearest year)



Source: *OECD Regions at a Glance 2013*.

Figure 3.19: Interregional patient flow



Interregional patient flow (outside Prefectures):

- <10% normal flow; 11% - 15%: allowed; 16% - 25%: to be examined; >26%: unacceptable

Source: National School of Public Health (2012) Greek “Health and Welfare Map” – Interregional patient flow (outside prefectures) - http://www.esdy.edu.gr/files/009_Oikonomikon_Ygeias.pdf

3.8 Weaknesses/ Challenges of the Greek Health Care System: Efficiency and Equity

The Greek healthcare system at least the last twenty years is a continuous process of "transition" and ongoing structural and organizational changes. Despite successive legislation, administrative interventions, and significant investment in human and material resources, the healthcare system is characterized by a multiplicity and complexity in its organization, in the financing of health services, and particularly in the daily provision of health care that undermine the efficiency of the health care system as well as the issue of equity. These weaknesses and challenges of the Greek health care system are summarized in Table 2.23 below.

Efficiency

The aforementioned figures and evidence via DEA method of increased productivity of hospitals, increased resources of the health care system, as well as the increased level of spending, together with the variation in occupancy and performance among ESY hospitals in different regions, the relative decline in performance of PHC units, suggest that the availability of beds and resources is not a problem. A number of factors limit the efficiency of hospitals and primary health care units, as following.

3.8.1 Highly centralized decision-making and reduced autonomy of Regional Health Authorities – unsuccessful decentralization

The regulation and administration of healthcare services is centralized and dispersed throughout the government:

- MoH has the primary responsibility for planning, implementing and monitoring national health policy. MoH is responsible for the regulation of NHS-ESY and EOPYY (with MoL) for planning resource allocation and monitoring their activities as providers and purchasers of health care. It also regulates the private health sector. The Ministry of Labour (MoL) is responsible for the management of the Social Health Insurance Funds (SHIFs) that merge to EOPYY. Other Ministries are also involved: Ministry of Development, Ministry of Defence, Ministry of Education etc. In particular, Ministry of Development is responsible with MoH for the procurement system applied, calls for tenders, and for the pricing policy of medicinal products²⁹.

²⁹ Other Ministries involved are: Ministry of National Defence for the management of military hospitals; the Ministry of Education for the training of physicians in NHS University hospitals; even the Ministry of Mercantile Marine responsible for the Mariners' health insurance fund, and other public bodies related with the other SHIFs.

- Despite the establishment and operation of Regional Health Authorities (RHAs) in 2001 as PESYPs and since 2005 as Regional Health Administrations (DYPE – YPE), there is limited decentralization of competences from the central government of the MoH. The regional authorities, only theoretically enjoy real independence for planning and co-ordinating regional resource allocation given that the capital investment, recruitment policy and all the financial transactions of DYPE have to be approved by the Ministry of Health (MoH) (WHO/EURO, 2006). Neither DYPE nor the NHS-ESY hospitals have the authority to negotiate with EOPYY in setting prices for the services they provide, as well. Since their establishment in 2005 till today, DYPES operate as another bureaucratic organisation that play an advisory role for the MoH and supervise implementation of its policy (Economic and Social Council of Greece, 2005).

3.8.2 Fragmented structure, bureaucratic organization of the health care system and lack of coordination

- The public healthcare system has a fragmented structure between the NHS-ESY, EOPYY and other SHIFs and bureaucratic organization due to the existence of different subsystems and organizational models involved in administering the supply of services and manage day-to-day operations without the existence of a coordination mechanism. (Mossialos et al, 2005; Petmesidou 2006; Featherstone and Tinios 2006; Economou, 2010; WHO, 2006; OECD, 1992).
- A statutory link between NHS-ESY and EOPYY – SHIFs in order to coordinate common policies is absent. A statutory link is necessary, given that regulations and development of ESY (prices, services etc) has an impact on EOPYY and the SHIFs as potential purchasers, whereas any changes in EOPYY and SHIFs' regulations (coverage, provision, funding) has impact on ESY as a major health care provider.
- Furthermore, the PHC sector faces problematic coordination on two levels: (a) poor coordination among the large number of PHC providers with services varied in quality and extent; and (b) poor coordination between PHC providers and hospital doctors, due to the absence of a clearly defined referral system and low gatekeeping mechanism based on GPs. Lack of coordination results in significant weakness of incontinuity of care.

3.8.3 Deficient allocation of economic, human and technical resources in multiple levels

Over thirty years after the establishment of the NHS in 1983, the Greek NHS still faces significant difficulties in allocating resources rationally in multiple levels in funding and provision of services.

3.8.3.1 Inefficient allocation of funding

Implications of a multi-payer system - EOPYY as a “peculiar monopsony”

As aforementioned, one of the main objectives of the successive reform attempts and the establishment of EOPYY in 2011 was to separate the purchasing and provider functions; EOPYY to act as a third party payer and single purchaser for primary and hospital services, with the broader goal to have bargaining power. Thus, EOPYY would create a monopsony purchasing system in order to increase both efficiency and competition between hospitals and PHC providers and change providers incentives to increase productivity. However, in practice, EOPYY by unifying the four major SHIFs turned into a “peculiar monopsony”, given that it is the major purchaser of health services covering over 95% of the insured population, and at the same time it is a PHC provider owning 350 PHC units (of ex IKA SHIF). EOPYY has not been transformed to a unified national insurance body, either. Therefore, given the fact that every year EOPYY creates successive deficits, EOPYY’s performance in 2012–2014 doesn’t seem to have met the expectations of Greek society and Greek government, yet (Polyzos et al, 2014; Niakas, 2013).

Inefficient centralized budgeting process - based on historical and political criteria-results in a vicious circle of deficits

As aforementioned, the annual budgets of NHS-ESY and EOPYY with imposing ceiling are set on past performance – on a historical and political negotiation basis and not on the population needs. In reality, for number organizational and financial reasons, as well as due to the fragmented system and absence of pooling of resources at the regional level, health expenditure usually exceeds the budget limits and results in successive deficits for EOPYY and ESY hospitals which delay payments to their suppliers and need additional ex post subsidies by the MoH.

Retrospective payment and remuneration system not related to performance that does not provide efficiency-promoting incentives

The retrospective reimbursement system of providers does not offer incentives to providers for improving productivity and effectiveness. Given that ESY hospitals and EOPYY receive successive subsidies for their deficits by the state budget, there is no incentive to

stay within their initial budget and pay their suppliers on time. About physicians, the fact that MoH reimburses physicians with low salaries regardless their specialty and their performance - encourages physicians to induce unnecessary demand for health care services, as well as, to ask for informal additional payment.

Ineffective purchasing management of supplies due to absence of national HTA assessment system and extensive complex ties between the private and public sector

Given the growth of new medical technology in private sector, the NHS and EOPYY purchase high-technology services required from private providers on a contractual basis. However, the absence of a national health technology assessment (HTA) agency to undertake systematic HTAs and economic evaluation (only a National registry has been established) has resulted in increased consumption and weak controlled supply of expensive biomedical equipment via the private sector. Since the 2007 reform, a centralized public procurement system was slowly introduced with the help of a National Registry of Medical Devices and is expected to improve the efficiency of the system. Therefore, an integrated and better monitored public procurement system is developing very slowly.

3.8.3.2 Irrational resource allocation mechanisms in provision

Irrational regional allocation of human resources and infrastructure

According to the aforementioned data of regional allocation of resources (mainly personnel and infrastructure) and findings of DEA analyses evaluating hospital and few PHC units' performance, it is obvious that the majority of resources (public and private) are concentrated in the two most crowded regions of the country (Athens and Thessaloniki) and the less privileged regions lack adequate hospital infrastructure and specific categories of specialized physicians. A number of factors limit the efficient and effective geographical distribution of infrastructure and human resources, as following.

- i. The limited success of decentralization process especially in the sector of allocating resources, together with the limited managerial and financial autonomy of regional authorities DYPEs, hospitals, HCCs and EOPYY to develop their own policies and make priorities without the approval of MoH, considers an obstacle to increasing efficiency.

- ii. Given the absence of a systematic mapping of the health condition of the population³⁰, and the absence of pooling of health resources at regional level, the policy of allocating resources is made not on a rational basis (actual needs, clinical outcomes or outputs) but most times on historical basis and under political pressure (ie in order to create economic activity in regions and serve political needs).
- iii. There is significant staff shortage (ie nurses or GPs) and under-functioning of many public health units and services mainly to rural and isolated areas, due to: the hiring restrictions imposed for budgetary reasons; the absence of any policy and incentives for attracting and retaining health personnel to rural areas, in combination with the NHS-ESY and EOPYY staff's status as low paid civil servants.

Misallocation of resources and underutilization of hospital beds lead to interregional patient flows

The inefficient geographical distribution of infrastructure and human resources in combination with the lack of staff leads to underutilization of hospital beds that affects negatively hospitals' operation on: a) either full or some "closing down" of entire hospital departments especially in hospitals outside Athens (ie on islands during the summer or during the weekends); or b) full or some "closing down" of Intensive Care Units (ICUs) fully equipped due to lack of staff and especially nurses,³¹ leading to either flows of patients to other hospitals or "renting" IC beds from the private sector with inflated costs. Therefore, certain regions are incapable of meeting the health needs of their population, resulting in a flow of patients to the major urban centers of Athens and Thessaloniki or to areas with large university hospitals (ie Ioannina- Epirus) offering expensive and high-technology services or visiting private providers. However, the uncontrollable interregional flows to the ESY hospitals in urban areas exacerbate their demand pressure and the waiting lists (NSPH, 2012).

3.8.3.3 Mismanagement of resources

Absence of referral system and low quality services provided in PHC units lead to private sector, to demand pressure on ESY hospitals and waiting lists

- The provision of PHC services is negatively affected by the following characteristics: (a) the fragmented structure of PHC; (b) the lack of co-ordination among PHC services;

³⁰ Following successive reform attempts the "Health and Welfare Map" project was developed from 2010 till 2011 and financed by European Social Fund (ESF). After 2011 there is no other development.

³¹ According to current data of Greek Society of Intensive Care Medicine ,103 beds or 18% of total (578) bed capacity in ICUs of the Greek NHS-ESY remain closed even though they are fully equipped, due to lack of nurses. ti

(c) the lack of family physicians; (d) the lack of GPs and the absence of referral system. These weaknesses in the provision of PHC in combination with the aforementioned problem of irrational allocation of resources lead to inefficient with low quality services provided in PHC units. As a consequence, patients choose to visit private providers or visit the outpatient facilities of NHS-ESY hospitals as a first PHC contact, exacerbating their demand pressure.

- The demand pressure of ESY hospitals results *in long waiting lists*. Despite the lack of official statistics, there is evidence ^{32,33} that there are long waiting lists for specific hospitals and interventions (mainly for surgery interventions and specialist care for certain types of care) especially in the urban areas, that lead patients either to seek care in the private sector or to face informal payments in order to bypass the waiting list by the characterization of a patient as an “emergency case” (Liaropoulos et al, 2008), placing at a disadvantage the vulnerable populations that do not have the ability to pay.

Slow introduction of information management system in combination with an inadequate financial management system lead to inefficient control and monitoring system

- Due to slow introduction of health information systems and accounting system there were inadequate high-quality statistical techniques and systematic reporting methods on health services performance. Till recently accounting system was on a cash rather than transaction basis. Since 2011 there is a gradual development of information system and double-entry accounting system that helps improving data collections and assessment of hospitals.
- Furthermore, the control of public health spending is still exercised by a bureaucratic and too centralized way by the MoH that doesn't improve efficiency. Only recently in 2014, an integrated cost accounting system is partially implemented (on a pilot basis) for few hospitals to monitor and assess the financial position and efficiency of hospitals. It has not been applied to outpatient services (ie HCCs), yet. Medical protocols have been also slowly adapted since 2013 to control and monitor the PHC physician prescribing behavior (via e-prescribing and e-referrals), not to improve PHC operation.

³² Based on SHARE database survey for elderly, Mojon-Azzi and Mojon (2007) have estimated that 31.8% of elderly in Greece declared waiting longer than three months for cataract surgery versus 17.9% in Germany and in the Netherlands.

³³ There is evidence of waiting time of five months for an outpatient neurological visit and three months for radiotherapy or a surgery in certain Athens hospitals to treat a malignant tumour (Tanner, 2008).

However, this information is very important in order to avoid unnecessary duplication of acts, exams and prescriptions.

- There are no systematic records and disease registries to coordinate PHC with hospital care and produce incidence rate data, as well as systematic data concerning the use of outpatient services (ie HCCs). These registries will permit better co-ordination of care for persons with chronic disease. The introduction of an electronic medical file for each patient although adopted has never been issued, as well.

Equity - Implications for inequity in access

3.8.4 The Funding system is highly regressive

The *public funding* of the health sector and NHS-ESY via general taxation is progressive only in theory. In practice, the public funding has a regressive character that disproportionately burdens lower socioeconomic groups, as following:

- i. General taxation in the state budget is characterized by *heavy reliance on indirect taxation* on goods and services (ratio of indirect to direct taxes equals to 1.44 for 2011) that doesn't achieve any beneficial income redistribution (Hellenic General Accounting Office, 2012; Kaplanoglou & Newbery, 2003; Matsagganis, 2010; Mossialos et al, 2005).
- ii. There is *widespread tax evasion*. It has been estimated that income under-reporting in Greece is estimated at 10%, resulting in a 26% shortfall in tax receipts (Matsaganis M. & Flevotomou M. ,2010). Furthermore, there is evidence that there are different opportunities for tax evasion presented to different occupations favoring farming at 53% (including individuals insured in Non Noble OGA SHIF) and self-employment insured in OAEE SHIF (24%). The hidden - black economy in the health care sector was estimated at approximately €1.5 billion (14% of total health expenditure in 1999) (Tatsos, 2001), as well. In terms of region of residence, tax evasion is most pronounced in Southern Greece - Central, Western and Peloponnese (16%) and least so in Attika-Greater Athens (less than 6%). Furthermore, the hidden - black economy in the health care sector was estimated at approximately €1.5 billion (14% of total health expenditure in 1999) (Tatsos, 2001).
- iii. Despite the unification of the large SHIFs in EOPYY, *the social security contributions have not been equalized* yet and do not enhance progressivity³⁴. They are distributed in

³⁴ Since 2014, contribution rates are similar across Non Noble IKA- blue collars, Noble OAEE-professionals & self employed , Noble OPAD- civil servants (at 7.25%:); yet Noble SHIF NAT for seamen is calculated at 5.75%; other Noble

- favour of employees and pensioners of the wealthier population groups in Noble SHIFs (especially civil servants, bank and utilities' employees) who contribute with lower rates (Economou C, 2012; Petmesidou, 2012). In addition to the unequal rates, some occupational groups in Noble SHIFs used to supplement their own contribution by third-party taxes – essentially earmarked levies (Bronchi, 2001), constituting “a serious policy issue” (Matsagganis, 1998).
- iv. There is also significant *social security contribution evasion* in Greece at the equivalent of 15–20% of the total income of most SHIFs, and 30% in the case of Non Noble IKA. This issue compromises fairness, as well (European Industrial Relations Observatory, 2004).
 - v. *Private medical insurance* and especially *out-of-pocket payments (OOPPs)* that constitute formal and informal patient contributions to medical costs are clearly regressive, provided that the relative burden is higher for the poor. There is longitudinal and cross-sectional evidence of household budget surveys from 1981 till 2010 that private health care expenditure increased for all socio-economic groups, but the relative and absolute increase among low income groups was higher than middle-to high income families³⁵ (INE-GSEE, 2010; National Statistical Service, 2002; Matsaganis M. & Mitrakos T., 1999) and for low-income elderly households (with household budget shares of over 11%) (Matsagganis et al, 2008). They have also reported that the distribution of health care expenditures showed a U or J shape across age cohorts revealing important inequalities (ELSTAT., 2014; Matsagganis et al, 2008; Matsaganis & Mitrakos, 1999). Therefore, the continuous dependence on indirect taxation, coupled with the high level of private expenditure in the form of official and informal direct payments and unequal social health insurance contributions that favour the wealthier population groups, suggests that the financing system is regressive, compromising fairness.

Funds at 5.25%; and the lower rate of Non Noble OGA – farmers is 2.25% for insurees after 1993, while those insured under OGA- farmers before 1993 pay no contributions. For pensioners, the contribution rates for sickness range from 4% of IKA SHIF, 5% for banking employees Noble SHIFs, 3% for utilities employees Noble SHIFs to no contribution (0%) for OGA SHIF pensioners.

³⁵ Longitudinal analysis of Household Budget Surveys (between 1981 and 1994), other HBS(2004-2005), and HBS (between 2008 and 2010).

3.8.5 Geographical inequities in distribution of human resources and health infrastructure

Geographical inequities are one of the main problems of the system. According to the aforementioned detailed regional allocation of hospital beds and health professionals and findings of DEA analyses, wide discrepancies are apparent. The aforementioned data indicate that for Greece, interregional disparities (urban versus rural & isolated areas within Greece) are greater than intra-regional disparities (among countries). The majority of hospital beds and physicians are concentrated in the two most crowded regions of the country (Attiki/Athens and Central Macedonia/Thessaloniki). On the other hand, the regions with the lowest density of human resources and infrastructure (hospital beds) are Central Greece, Western Greece, Ionian and North Aegean Islands. This issue is important due to the geographical peculiarity of the numerous islands and the fact that there is a greater concentration of older people in rural areas that contribute to an increase in the need for health care. Naturally, these territorial inequalities result in high interregional patient flows from rural to urban areas - according to evidence of the Health and Welfare Map as presented above - with substantial travel costs, both in financial and psychological terms.

3.8.6 Differences among SHIF in coverage, benefits and services provided

Most insurance funds, separately or merged in EOPYY, provide coverage for primary, secondary and pharmaceutical care, as well as some funds cover diagnostic and laboratory tests. The multiplicity of SHIFs (till recently) give rise to fairness issue because of qualitative and quantitative differences in the range of entitlements, the level of coverage, freedom of choice of primary care providers (including private providers), access to specialists and access to private hospitals, irrespective of their contribution rates. (Economou C.,2010; Petmetzidou, 2008). This variation is related with the classification of “Noble” SHIFs (OPAD for civil servants, bank officers, public utility employees, lawyers, doctors etc) versus “Non Noble” SHIFs (IKA for blue-collars employees and OGA for farmers).

- In terms of coverage and benefits, Noble Funds provide to their beneficiaries the most comprehensive benefit packages and wider freedom of choice of medical services and providers than Non-Noble SHIFs (ie IKA SHIF; or OGA). For instance, the second largest Non-Noble Farmers OGA SHIF provides the least benefits and the minimum freedom of choice. OGA SHIF offers primary care services in rural ESY health

centres (HCCs) and outpatient NHS-ESY hospital departments and limited dental care in HCCs (only for beneficiaries under the age of 18), whereas any private consultation or private hospitalization is not covered.

- On the other hand, there is a small number of Noble SHIFs (for the banking personnel, utilities personnel, engineers etc) that provide to their insured population free choice of whatever professionals they wish to consult. Patients pay the fee demanded by the doctor and are reimbursed retrospectively with a preset amount by their SHIF.
- Furthermore, Noble SHIFs provide coverage to a large extent, for inpatient and outpatient care (specialized exams) in prestigious private hospitals, versus most Non Noble SHIFs that provide to their beneficiaries free access to public hospitals and to small private hospitals that usually provide services of poor quality (Tountas et al, 2005; Kyriopoulos et al, 2001).

Conclusively, it is important to note that there is no systematic national survey or report concerning inequalities of access in Greece. However, different sources of data, as presented above, indicate that inequalities exist. They derive from differences in relation to the funding of the system (high out-of-pocket and informal payments), uneven regional distribution of human resources and health infrastructure and variations in social health insurance coverage (stronger till 2012).

3.9 Conclusion

Thirty years have passed since the establishment of the Greek National Health System (NHS) in 1983 and five major reforms have followed (1992, 1997, 2001-4, 2005-7 and 2011 – today) on universal coverage as an elementary policy goal. However, the Greek NHS is still insufficient with regard to organisation, coverage, funding and delivering health services. These weaknesses have been caused -to a great extent- by the incomplete carrying out of changes and attempts of reform. According to a lot of authors “The most significant problem facing health policy in Greece is the gap between declared objectives and the enactment and implementation of the legislation” (Economou, 2010 p. 159; Mossialos et al, 2005; Petmesidou M., 2006; Tinios et al, 2011). The Greek health care system, as presented above, operates via several subsystems within a different framework in terms of organisation and regulation leading to fragmented health care service provision and financing. Therefore, the issue whether access to health care is indeed equally provided to all is open to debate, especially among the older population.

Table 3.36: Weaknesses / Challenges of health care system in Greece

In terms of Efficiency	
Organisation	<ol style="list-style-type: none"> 1. Highly centralized decision-making and reduced autonomy of Regional Health Authorities – unsuccessful decentralization 2. Fragmented structure, bureaucratic organization of the health care system and lack of coordination: <ul style="list-style-type: none"> • Lack of link and poor coordination between NHS-ESY and EOPYY – SHIFs • Problematic coordination in PHC sector: (a) among the large number of PHC providers; (b) between PHC providers and hospital doctors
Funding	<ol style="list-style-type: none"> 3.1 Inefficient allocation of funding <ul style="list-style-type: none"> • Multi-payer system with the absence of a strong funding coordination mechanism - <i>EOPYY as a “peculiar monopsony”</i> • Inefficient centralized budgeting process that results in a vicious circle of deficits • Retrospective payment and remuneration system – not related to the performance that does not provide efficiency-promoting incentives • Ineffective purchasing management of supplies due to: <ul style="list-style-type: none"> ✓ absence of national HTA assessment system ✓ extensive complex ties between the private and public sector
Provision	<ol style="list-style-type: none"> 3.2 Irrational resource allocation mechanisms <ul style="list-style-type: none"> • Irrational regional allocation of human resources and infrastructure • Misallocation of resources and underutilization of hospital beds lead to interregional patient flows 3.3 Mismanagement of resources <ul style="list-style-type: none"> • Absence of referral system and low quality services provided in PHC units lead to: <ul style="list-style-type: none"> ✓ private sector ✓ demand pressure on ESY hospitals ✓ waiting lists • Inefficient control and monitoring system due to: <ul style="list-style-type: none"> ✓ Slow introduction of information management system ✓ an inadequate financial management system
In terms of Equity	
Funding	<ol style="list-style-type: none"> 1. Regressive Funding Mechanisms due to existence of: <ul style="list-style-type: none"> • Heavy reliance on indirect taxation • Widespread tax evasion • Uneven social security contributions • Social security contribution evasion • High out-of-pocket and informal payments (OOPPs)
Access	<ol style="list-style-type: none"> 2. Geographical inequities in distribution of human resources and health infrastructure 3. Differences among SHIFs in: coverage, benefits and services provided

Chapter Four

4. Inequalities in health care use in Greece among the older population in Patra's urban area (PATRAHIS survey)

4.1 Introduction

WHO and the Commission on Social Determinants of Health (CSDH) have highlighted the particular role of local government and the interplay between local and national government in tackling the social determinants of health and equity in health (WHO-CSDH, 2008). Globally, the CSDH recommended improving the material conditions within which people are born, learn, live, work and age and the distribution of psychosocial wellbeing within neighbourhoods and communities that are socially cohesive and where people can exercise control over their lives³⁶. This firmly places equity in health at the heart of urban governance and planning, while many areas for action fall outside the health sector. Local authorities face several challenges as they have the potential to be key actors in taking practical action on improving the social determinants of health, improving social welfare for citizens in the EU, and reducing inequities in health (EC, 2007). As Litvack et al. (1998) have shown, reducing central influences and promoting local autonomy may lead to more flexible and efficient policies, as local authorities are better able to respond to local needs and may have greater knowledge of and sensitivity to local problems. Nevertheless, a wider legislative context creates the conditions that shape local authorities' ability to act. According to WHO analysis for the urban dimension of the social determinants of health (WHO, 2012), localization, decentralization and delegated powers may bring tension between different levels of government (vertical conflicts) or among local government agencies (horizontal conflicts). Problems in securing alignment of overall national policy objectives with subnational interventions and local project objectives may undermine coherence and synergy. Many countries are decentralizing, meaning they are transferring decision-making and spending powers from national to local governments. Grady et al. (2011) identified four important themes in local implementation of social determinants of health approach to inequities in

³⁶ The CSDH made recommendations for action in the areas of: early child development and education, the built environment and sustainable development, employment arrangements and work conditions, social protection, health care systems, health equity in all policies, fair financing, market responsibility, gender equity, political empowerment and voice, global governance and monitoring, training and research.

health: differences in governance structures and capacity levels; expenditure levels and identifying funding; wider legislative framework and accountability. In health systems of the urban setting, the difficulty is one of balancing priorities, allocation of resources, and personnel issues between central governments and local communities (Campbell & Campbell, 2006), as city and community leadership could play a growing role in health care (Bossert & Beauvais, 2002). The challenges for health systems in urban settings include accessibility to services, which is linked more to inability to pay rather than proximity to facilities. Double standards for care (i.e. the rich can afford tertiary hospital care and the poor must settle for poor quality and “free” government services) create additional barriers to health care. Moreover, social determinants influence the health of elderly as one of vulnerable groups (children, elderly and disabled) that more recently, has been given prominence in health programmes of EU countries. According to WHO/Global Age-Friendly Cities Project (WHO, 2015) the vast majority of older people live in their homes and communities, but in environments that have not been designed with their needs and capacities in mind. There has been no major systematic review of urban-rural differentials of elderly populations, though there are initiatives, e.g. the World Cities Project (2007), that attempt to identify issues related to the health, quality of life and social services of the elderly in major OECD countries. Therefore, the complex dynamics of cities, with their concentration of the poorest and most vulnerable groups, pose an urgent challenge to the health community, even within the developed countries (WHO, 2008b). Within the framework of growing health equity challenges, the question of how to practically implement change at local level is also key to action on the social determinants of health and inequities in health. However, the existing literature on implementing action to tackle the social determinants of health and inequities in health at local level is relatively weak (WHO, 2012d). Traditional quantitative and aggregated data do not include community input (opinion and attitude) and participation. Programmes such as the WHO Healthy Cities project (WHO, 2013b) have suggested over the last decade that health needs assessment should be reoriented from pure monitoring towards identifying and solving community health problems using applied research. In this framework, in Greece³⁷, similar to most EU countries, subnational governance structures via the regions and

³⁷ Following the implementation on 1 January 2011 of the [Kallikratis Plan](#), the administrative divisions of Greece consist of two main levels: the [regions](#) and the [municipalities](#). In addition, a number of [decentralized administrations](#) overseeing the regions exist as part of the Ministry of the Interior, but are not entities of local government. The old [prefectures](#) were either abolished and split up or transformed into [regional units](#) in 2011.

the municipalities which are the lowest level of government within the organizational structure of that country³⁸ – have increasing autonomy for the “administration of their local jurisdiction as it pertains to the social, financial, cultural and spiritual interests of its citizens” (Greek Municipal and Communal Code, art. 24 and Article 102 of the Greek constitution). Moreover, local authority has jurisdiction many of which relates to the social determinants of health and health equity³⁹ (housing, environment, water and sanitation, community safety and urban and rural development, including employment and business development). However, as far as it concerns the health care sector, regional and prefectural authorities in Greece are only administratively responsible. The role of regional and local governments in health care planning, organization and provision is limited. Only some large municipalities run the open care centres for the elderly (KAPIs) as well as, implement certain welfare programmes for elderly such as “Home Assistance” and a small number of health care centres (HCCs), especially in the greater area of Attica. Moreover, the positive steps in this direction over the last few years are in parallel with several attempts for decentralization in health care, that has been a key issue since the establishment of ESY in 1983 (Law 1397/1983) and especially since 2001 attempts to create robust regional health authorities. However, although decentralization of health care has been attempted via the establishment of PESYs and following RHAs since 2001, the administrative power has been partially passed to them till today. In addition, a significant problem is that the boundaries of administrative regions and health region administrations were never operated as identical. This issue seriously restricts the possibilities of coordination between the two structures and the development of an integrated health and social policy. Overall, it is argued that decentralization in health care has been impeded by many factors, especially obstruction by opposition from key interest groups, absence of policy continuity between governments, the inability to tackle the bureaucratic and highly centralized system and lack of political will. As a consequence, the health care system still remains fully dependent on the central government even for settling bureaucratic details,

³⁸ The municipalities of Greece (Greek: δήμοι, dimoi) are the lowest level of government within the organizational structure of that country. Since the 2011 Kallikratis reform, there are 325 municipalities. Thirteen regions form the largest unit of government beneath the State. Within these regions are 74 second-level areas called regional units. Regional units are then divided into municipalities.

³⁹ Article 102 of the Greek constitution outlines the mandate of municipalities and communities and their relationship to the larger State: (a) Municipalities and communities exercise administration of local affairs independently; (b) Leadership of municipalities and communities is elected by universal and secret ballot; (c) The national Greek government supervises local government agencies, but is not to interfere in any local initiatives or actions; (d) The State is required to provide funds necessary to fulfill the mandate of local government agencies.

forming an additional administrative burden for the health ministry (Athanasiadis A, et al, 2015; Economou, 2010; Mossialos E, 2005). Following Vrangbæk's typology for decentralization in health care, it could be argued that the Greek case is an attempt towards vertical de concentration, referring to the transfer of responsibility and power from a smaller to a larger number of administrative actors within a formal administrative structure (Vrangbæk 2007). Under these challenges—inefficiencies of the Greek NHS and the several abandoned decentralization occasions, a debate is emerging whether health care access is indeed equally provided to older population at an urban-setting level, and whether financial barriers (by paying OOP) are confronted in the use of health services. In addition, despite the fact that Greece has adopted a number of WHO and EU recommendations for universal and equal access to health care services, there is not any clear policy framework relating to inequalities in health care and weak evidence exists on possible reasons that prevent access to health care for the older population. Moreover, little attention has been paid to investigating and measuring equity in the use of health care among the elderly in an urban setting level, since they are the consumers who, though they receive high health services, have to deal with unfair use of service among other income groups (Allin S. and Mossialos E., 2005). Therefore, access to affordable health care among the elderly, in urban settings is a key health equity issue.

4.2 Research Questions

Drawing from the aforementioned challenges – inefficiencies of the Greek NHS and the several abandoned decentralization occasions, in conjunction with the need for a clear understanding of inequalities in health care use among the elderly, the objective of my thesis – as aforementioned – is to investigate the inequalities in health care use among the elderly in the pre crisis period 2003-2008. In order to achieve this objective, we use as a data tool the cross-sectional Patra's Health Interview Survey (Patra's HIS), carried out in 2005 at Patras' municipality the third largest urban area – municipality and the regional capital of Western Greece, conducted within the Phase IV framework (2003-2008) programme of W.H.O. European Healthy Cities approach that embedded the W.H.O. European Healthy Cities Survey modules⁴⁰. It is worth mentioning a previous study of Sissouras A, Karokis A et al (1996) with similar framework as our PatraHIS study that was

⁴⁰ It is worth mentioning that Patras' municipality participated at the Phase II framework (1993-1997) programme of W.H.O. European Healthy Cities, as well, conducted by the University of Patras and Municipality of Patras (Patras Health Profile; and Patras Health Plan) that resulted in a corresponding study for the utilization of health care services of Karokis et al (1996), as we present in the evidence section and discussion paragraph.

conducted ten years ago in 1995 in Patras' within the Phase II framework (1993-1997) programme of W.H.O. European Healthy Cities Network Survey, although it was conducted ten years ago before the major NHS-ESY decentralization health reform of 2001. We will compare the older evidence of Patra's study by Sissouras A, Karokis A et al (1996) with our findings in the discussion paragraph underneath. The WHO Healthy Cities' approach seeks to put health high on the political and social agenda of cities and to build a strong movement for public health at the local level. Moreover the Patra-HIS survey data tool fills the gap in the research in an urban setting in Greece, shedding light on the equity issue of the NHS ESY decentralization reform attempts of 2001-2004 for the regionalization of the system, in the region of Patras that consists the chair of 6th Regional Health Authority (RHA) of Peloponnese, Epirus, the Ionian Islands and Western Greece, in terms of the utilization of health services by the older population. The specific period in 2005 that PatraHIS was conducted, is important given that it includes the first ever implementation of the decentralized NHS- ESY in 2001 with the reform acts of 2001 and 2003 (Law 2889/2001 on the Regional Structure of Health Care Services - PESYPs and Law 3106/2003 on the Regional Structure of Welfare Services) that was curtailed. Moreover, it includes the major reform of 2005 (Law 3329/2005) that abolished the previous legislation and replaced PESYPs with Health Region Administrations (RHAs or DYPEs later YPEs) but without any change in the system (Economou, 2010). In addition via the information for OOP payments in health care, this study allow us to evaluate the extent to which social health protection system offers adequate protection to the elderly. Building on the Patra's HIS, we address the following empirical research questions (RQs), guided by the following theoretical hypotheses (THs). THs: (i) The inequalities in use of health care are derived from the different socioeconomic characteristics of the older population who use the health services; (ii) Higher income individuals are more likely to use health care services than lower income comparators; (iii) Individuals with "Non Noble" social health insurance coverage are more likely to pay OOP for using health care than comparators with "Noble" social health insurance coverage. Guided by the THs, we address the following research questions (RQs): (i) What is the extent and contributors of inequity in the use of health care among people over the age of 50 in an urban-setting level in Greece? (ii) What are the determinants of OOPPs as a payment mechanism of the utilization of health care among the older population over the age of 50 in Greece?

In addition, it is worth mentioning that we address similar or the same research questions of PatraHIS with the other survey-tools given that we have similar framework for examining the same objectives with the same theoretical hypotheses based on the available data for each data survey, but with a different reference period. The PatraHIS with reference time 2004-05 provides evidence for the degree and extent of inequalities of health care use at an urban-setting level shedding light on the equity issue of the NHS-ESY decentralization reform attempts of 2001-2004 to supplement the evidence of the first nationwide health interview survey GNHIS (reference time 2008-09) that covers the NHS-ESY period 2005-2008 and SHARE evidence (2003-04) on a nationwide setting exclusively for older population for the NHS-ESY initial decentralisation period of 2001-2004. Therefore, the fact that each dataset provides evidence supplementary to the other two datasets, results in a robust evidence for inequalities in health care to shed light in the whole pre-crisis period of 2003-2008 of the NHS-ESY health system in Greece.

4.3 Sample and variables

Our study includes all individuals 50 years or above - born in 1955 or earlier. The resulting unbalanced sample involves 680 non-institutionalized individuals above 50 years old or older (40% of the total sample of the 1699 individuals). This rate is smaller, however comparable to the response rate of the European survey SHARE for the population aged 50 or over. The respective W.H.O. Questionnaire –adjusted for Greece via 130 questions covers a wide variety of topics split into six modules on: health status; estimates of health services utilisation and medicines; lifestyle and life habits; the relationship of citizens with their city and the services provided by the municipality; lastly, background demographic and socio-economic variables.

As a whole, in our study, *the dependent variables* were measured by nine separate questions. The dependent variables for health care utilization concerning the likelihood of a contact, were measured by five separate questions asking the respondent whether he or she had an inpatient admission for the last 12 months, whether he/she received outpatient care, whether he/she consulted a social health insurance fund (SHIF) physician or a specialist privately for the last 3 months, and finally a dentist for the last 5 years (“yes” versus “no” as the reference category). There was no information about the number of

contacts. The dependent variables for facing OOP expenses⁴¹ were measured by three questions whether the respondent paid any OOP expenses during the last inpatient admission within the previous 12 months, the last outpatient visit and the last SHIF physician visit the previous 3 months (“yes” versus “no” as the reference category). Facing OOP expenses for the last specialist private visit during the previous 3 months is measured by the amount of OOP expenses in two categories for the analysis: (i) OOP amount including 0€: ≥0€ and (ii) OOP positive amount >0€ dichotomized in (>40€) versus (1€-40€) where 40€ is the median of OOP positive amount, for comparing higher OOP amount (>40€) versus lower OOP amount (1€-40€) for specialist private visit.

Moreover, two other questions on the insurance coverage of the OOP expenses (with “No” as the reference category) were included- only for descriptive reasons. A detailed overview of the utilization and OOPPs as dependent variables as well as the explanatory variables with the respective questions are displayed in Appendix Table A1.1 and A1.2.

The *explanatory variables* used in the models include the following health, demographic and socioeconomic factors, based on the standard approach in the empirical literature: Age (in four dummies: 80+; 70-79; 60-69; versus 50-59 as reference); gender (male; versus female as reference) health status (need) variables associated to physical health include: (i) the EQ-5D-3L self-reported health state recorded on the EQ-5D descriptive system of health-related quality of life states consisting of five dimensions (mobility, self-care, usual activities, pain/discomfort, anxiety/depression) taking one of three levels of responses - severity (no problems; some or moderate problems; extreme problems). For the analysis we dichotomise the EQ-5D-3L in two categories: “extreme & moderate” versus “no problems” as reference category for each one of the five domains⁴². The main restriction of this measure is the possibility of being underestimated due to the fact that the number of levels on the scale is limited for chronic disabled respondents. (ii) Self-assessed health status - SAH comparing to the last 12 months in three dummies (worse; the same; better” as the reference category); (iii) a general SAH measure dichotomised with “Very Good & Good” SAH as reference category; (iv) the number of chronic medical conditions in three

⁴¹ Out-of-pocket payments represent a high percentage of health expenditure in Greece, accounting for more than half of total health expenditure. The figure depicts formal cost-sharing arrangements, direct payments and informal payments, with the latter two representing the highest proportion of out-of-pocket payments among EU countries.

⁴² The EQ-5D-3L is based on a preference-based Health Related Quality of Life (HRQOL) measure, developed since 1990 by a multidisciplinary transnational consortium of investigators, been translated into most major languages, including Greek, whereas, initial evidence on its applicability and adaptability to the Greek environment has been provided (Yfantopoulos J, 2007; Barton, G et al, 2008, The EuroQol group, 1990). More information is available at: <http://www.euroqol.org/>

dummies with "0 chronic medical conditions" as the reference category. (v)The self-assessed dental health (SADH) dichotomized with "Good" as reference is included only in the analysis for the probability of making a dentist visit. These health status variables constitute a proxy for care need. An assumption that underlies this study is that individuals with health conditions and poorer SAH have a greater need for health care, an assumption that is likely to hold in the majority of cases (Allin S. et al, 2011). Patra HIS *income* measure is derived from a variable with 11 values - income bands with a width of 500€. It is the monthly net total household income derived as the sum from any source per equivalent member added up, after tax and social security contributions. Any taxes and social contributions that have been paid, are deducted from this sum. We adjust household income to reflect differences in a household's size and composition by applying the modified OECD scale⁴³. For the regression analysis on the whole data set, the equalized income variable was calculated using quintiles leading to five (5) income categories, with the 5th richest quintile: "More than ≥901€" and the 1st Poorest quintile with range "1 up to 375€" as the reference category. Similarly, in order to quantify the effect of income on health service utilization by calculating and decomposing inequity (HI), we also construct a continuous estimate of monthly net total household income equivalised (as a Logarithm of Income Level). Moreover, variables other than need and income are included in the model, following the standard approach in the empirical literature: The highest educational qualification is included based on the standard coding of the ISCED-97 into 6 levels, grouped into three (3) categories with "No/Partial/Completed Primary school (ISCED 1)" as the reference category. Marital status was dichotomized with "never married or divorced or widowed", as the reference category; the household composition dichotomized with "living alone" as the reference category; the housing tenure information dichotomized into "homeowner" versus "Not owner: tenant/subtenant/ rent free" as the reference category. The information for *Social Health Insurance Fund (SHIF)* information is derived from a question with 7 categories of insurance funds⁴⁴. In order to examine in detail the role of the fragmented Social Health Insurance system on health care utilisation, we categorised these 4 SHIFs groups into three (3) broad groups of more generous "noble" versus "non noble"

⁴³ Where equivalised household size is a sum of weights attributed to each member of the household according to the modified OECD equivalence scale: 1.0 to the first adult; 0.5 to the second and each subsequent person aged 14 and over; 0.3 to each child aged under 14.

⁴⁴ Originally, in the questionnaire are included 7 categories of social insurance funds [0IKA (Social Security Institution); 1.OGA (Organization of Agricultural Insurance); 2.OAEE (Fund for Self - Employed); 3.OPAD (Civic Servants, employees of municipalities); Various bank employees funds 5.Public utilities: telecoms, electricity, trains, metro; 6. Other SHIF (engineers; lawyers; health professions; seamen etc) 7. no insurance].

funds, based on more “official” classification⁴⁵, as following: (i)“Non Noble IKA-SHIF” or “Social Security Institution” (IKA blue-collar and white-collar employees) that is the largest fund covering 50% of the population; (ii) “Non Noble Farmers OGA-SHIF” (OGA-Organization of Agricultural Insurance Rural Sector) the second largest fund covering 20% of the population involved in agriculture and (iii) “Noble SHIFs” (including all other SHIFs: Civil Servants, Self-Employed, Bank Employees, Health Professions etc); with the “Non Noble IKA-SHIF” as the reference category⁴⁶. The information for Voluntary (Complementary) Health Insurance (VHI) Coverage is dichotomized (Yes/No) with No as the reference category.

4.4 Results

4.4.1 Descriptive Statistics

The description of the sample is displayed in Tables 4.1 to 4.5 below. The Mean age of the sample is 63.5 years, with 47% report suffering from “moderate and extreme” self-assessed pain or discomfort, with 2.1 mean number of chronic conditions diagnosed out of 14 listed, and 43.4% of the sample declare “Less than good” (fair bad or very bad) SAH a percentage similar to other studies for the older population (Crespo-Cebada E., 2012) and slightly higher than that observed to the Greek studies for the general population, as well as, 20.5% declare “worst” SAH comparing to last 12 months and 50.9% declare “Less than good” SAdental health. Moreover, the mean monthly net total household income of the sample equalised is 738.49€ representative of a low to middle-income household of older population in an urban-setting in Greece in 2005. Considering the SHIF coverage of the sample, the majority (54%) has Non-Noble IKA SHIF coverage, 30.3% has Noble SHIFs coverage and only 9.6% has Non Noble Farmers OGA SHIF coverage, as expected, provided that our survey is urban-setting and OGA SHIF covers mainly population involved in agriculture. Only 3.2% have VHI coverage. *Overall*, about *health care use measures*, 14.9% (101 individuals) report having inpatient admission, similar to other studies for the general population. The majority (60.9%) of the sample report visiting a SHIF physician, 32.4% an outpatient visit, as well as a high rate of 22% of the sample report specialist private visit, somehow higher than Greek urban-setting study for general

⁴⁵ They are based on more “official” classification as established by experts, trade unions, authorities such as Labor Institute of Greek Workers’ Confederation - INE G.S.E.E. Observatory (Koutsampelas C., Tsakloglou P., 2010; Economou, C. & Giorno C, 2009; Mossialos, E. et al, 2005; Tountas, Y. et al, 2005)

⁴⁶ Non-Noble IKA SHIF was the largest fund covering 50% of the population, namely employees and workers in the private sector. The second largest fund was OGA, covering 20% of the population involved in agriculture.

population (Pappa E. & Niakas, 2006) and slightly lower than Greek nationwide studies for the general population (Tountas et al, 2011; Geitona et al, 2011). It is worth mentioning that the main reason for visiting a SHIF physician, as presented in Table 4.3 below, is for prescribing medicines (55.8%) and only 11.6% of the individuals make a visit due to medical symptoms, whereas for a regular medical visit (36.5%) and for a checkup (24.3%) older individuals visit a specialist privately. This evidence reveals imbalances and inefficiencies in primary health care services provided. Moreover, when suffering from a medical symptom, the majority (41.3%) chooses to make an outpatient visit. Our data distinguish between public and private inpatient admissions, but only 3 individuals report private admission, similar to current evidence. As distribution of health care use by SHIF coverage is concerned, it is worth noting that, even though Non Noble OGA beneficiaries are few in our sample, they contribute more to both inpatient and outpatient care as well as specialist private visits than the other SHIFs in a higher percentage (Table 4.4). Noble SHIF beneficiaries report the higher percentage of dental care and Non Noble IKA beneficiaries report the higher percentage of SHIF physician visit, as investigated in detail below. More detailed information about health care utilisation of the sample is presented in the Appendix. Moreover, considering OOP payments as a barrier to health care, Table 4.5 presents the proportion of the sample paying OOP for using health care use, OOP payments for specialist private visits (83.2%) and outpatient care (24.6%) contributing more to medical expenditures across the health care types, revealing important inequalities as discussed below. The high proportion of 83.2% of the older population that pays OOP for specialist visit is similar to most countries except in the European south (Börsch-Supan A. et al, 2005). On the contrary, payments for inpatient admissions and SHIF physician visit stand for very small parts of the financial burden related to medical expenditures.

Table 4.1 Need and non-need socioeconomic characteristics of the sample

Demographics	Count (N) unweighted	N % unweighted
Age 80+	56	8.2%
Age 70 – 79	142	20.9%
Age 60 – 69	203	29.9%
Ref/ Age 50-59	279	41.0%
Mean Age in years	63.5 (SD: 10.0)	
Male	301	44.3%
ref/ Female	379	55.7%

Health Status		
<i>EQ-5D Health Status</i> Sah Mobility "Extreme & Moderate Problems"	191	28%
ref/ Mobility "No Problems"	489	71.9%
Sah Self – Care"Extreme & Moderate Problems"	53	7.8%
ref/ Self – Care "No Problems"	627	92.2%
<i>Usual Activities</i> "Extreme & Moderate Problems"	89	13.1%
ref/ Usual Activities "No Problems"	591	86.9%
<i>Pain/ Discomfort</i> "Extreme & Moderate Problems"	320	47%
ref/ Pain/ Discomfort" No Problems"	360	52.9%
<i>Anxiety/Depression</i> "Extreme & Moderate Problems"	404	59.4%
ref/ Anxiety/Depression"No Problems"	276	40.6%
<i>SAH - last 12 months</i> "Worst"	139	20.5%
"The Same" last 12m	459	67.6%
ref/"Better" last 12m	81	11.9%
<i>SAH</i> "Less than Good" (fair, bad and very bad) health	293	43.4%
ref/"Very Good & Good" health	382	65.6%
<i>SA Dental Health</i> "Less than Good" (fair, bad)	407	59.9%
ref/"Good" SADH	273	40.1%
<i>Number of Chronic Conditions</i> "More than 2 conditions"	355	52.2%
"1 chronic medical condition"	165	24.3%
ref/" 0 chronic medical conditions"	160	23.5%
Mean number of chronic conditions out of 14 listed	2.1 (SD:2.1)	
<i>Marital status</i>		
Married (& registered partnership)	509	74.9%
ref/never married &widowed &divorced)	171	25.1%
<i>Education</i>		
More than secondary School (ISCED 4+5+6)	77	11.5%
Secondary School (partial & completed) (ISCED 2 + 3)	253	37.8%
ref/No & Primary School (partial &completed) (No + ISCED 1)	340	50.7%
<i>Housing Tenure</i>		
"Owner"	582	85.6%
ref/ "Not Owners" (tenant / subtenant/rent free)	96	14.4%
<i>Household Composition</i>		
"Living in Couple & Other"	582	85.6%
Ref/ "Living Alone"	98	14.4%
Monthly Net Total Household Income Equivalised per adult		
Ln Continuous – N	645	95%
Mean Income (€)	738.49€	
SD	482.95	
5th richest quintile with range - Inc5: (range 901€ and above)	121	17.8%
4th quintile with range- Inc4: (range 751€ - 900€)	112	16.5%
3d middle quintile with range: - Inc3: (range 501€ - 750€)	125	18.4%
2nd poor quintile -Inc2: (range 375€ -500€)	151	22.2%
ref./1st poorest quintile: 1€ up to 375€	136	20%
<i>Social Health Insurance Fund (SHIF) coverage</i>		
"Noble SHIFunds"	206	30.3%
"Non Noble OGA-SHIF"	64	9.4%

ref/“Non Noble IKA”	367	54.0%
<i>Voluntary (Complementary) Health Insurance</i>		
VHI Coverage (Yes)	22	3.2%
ref/ No VHI Coverage	658	96.8%

Table 4.2: Health care utilization of the sample: percentage of contacts during the last contact

Type of care	Percentage of visit (yes) (%)	N
Inpatient night admissions (last 12 months)	14.9 %	101
Outpatient day admissions (last 3 months)	32.4%	123
SHIF physician visit (last 3 months)	60.9%	414
Specialist private visit (last 3 months)	21.8%	148
Dental visit (last 5 years)	57.1%	388

*Note: For specialist private visit the percentage concerns OOP amount paid during the last visit (not the probability)

Table 4.3: Reason for visiting a physician

Disease or medical symptom (last 3 months)	Regular, scheduled visit / Doctor referral		Check up & results		Drugs prescribing	
	%	N	%	N	%	N
Outpatient	1.3	50 from 121	23.2	26 from 121	19.8	24 from 121
SHIF Physician	1.6	48 from 414	19	79 from 414	13.0	54 from 414
Specialist Private	0.4	45 from 148	36.5	54 from 148	24.3	36 from 148

Table 4.4 Distribution of health care utilisation by SHIFunds

	Noble SHIFs		Non Noble OGA		Non Noble IKA	
	%	N	%	N	%	N
Inpatient night admissions (last 12 mont)	9.8	23/235	21.9	14/64	17.4	64/367
Outpatient day admissions (last 3 months)	17.9	42/235	20.3	13/64	18.0	66/367
SHIF physician visit (last 3 months)	56.2	132/235	51.6	33/64	67.8	249/367
Specialist private visit (last 3 months)	20.0	47/235	32.8	21/64	21.3	78/367
Dental visit (last 5 years)	69.8	164/235	47.6	30/63	51.5	189/367

Table 4.5 Percentage of OOP expenses >0€ by health care type during the last contact

Type of care	Percentage of elderly facing OOP expenses >0€ (%)	N
Inpatient night admissions (last 12 months)	18.6%	19 from 101
Outpatient day admissions (last 3 months)	24.6%	30 from 122
SHIF physician visit (last 3 months)	4.6%	19 from 414
Specialist private visit (last 3 months)*	83.2%	119 from 148
Dental visit (last 5 years)		

*Note: For specialist private visit the percentage concerns OOP amount paid during the last visit (not the probability)

4.4.2 Concentration Index Method Results

Tables 4.4.1 summarizes the CI_{unadjusted (actual use)} and the CI_{adjusted Need} for the probability of health care use and the inequity index. The negative concentration indices for actual use indicate the presence of pro-poor inequality, except the positive CI_{unadjusted} for the probability of specialist visits and dentist visits indicating pro-rich inequality, which means, higher income individuals are more likely to contact a specialist and visit a dentist than lower income individuals. The negative CI_{adjusted Need} are mainly due to differences in need factors, which also show a pro-poor distribution except for probability of dentist visits. As aforementioned, the range of the horizontal index inequity is from -1 to 1. A positive (negative) value indicates a pro-rich (pro-poor) inequality. The magnitude of the HI inequity index reflects the strength of the relationship between income and the specific health care variable. For example, if we consider the 0.009 HI index of outpatient visits that demonstrates a pro-rich inequality, the 0.007 index of SHIF physician visit indicates a less pronounced pro-rich inequality. *Overall*, as displayed in Table 4.6 and Figures 4.1 and 4.2, after controlling for the unequal need distributions:

- Inequity in the delivery of health care is distributed among better off. It is distributed significantly pro-rich for the probability of specialist and pro-rich for dentist visits.
- Inequity is distributed among less advantaged- pro-poor - for the probability of inpatient admissions.
- Moreover, a parallel gradient – tendency is apparent for outpatient visit and SHIF physician visits. A weak relationship of income with the probability of outpatient and SHIF physician visits exists. The magnitude of HI index is very small for the probability of outpatient visits and SHIF physician visits (very slightly positive) indicating that income is distributed almost equally among individuals for outpatient and SHIF physician visits. All individuals have the same probability to make an outpatient and SHIF physician visit, irrespective of their income, although the magnitude of HI index reveals a more pronounced pro-rich inequality for outpatient admissions, as displayed in Figures 4.1 and 4.2.

Table 4.6: Overall Income – related inequity (HI) in *probability* of using health care

	Inpatient admission ¹	Outpatient visit ²	SHIF physician visit ²	Specialist private visit ²	Dentist visit ³
CI unadjusted (actual use)	-0.102	-0.033	-0.016	0.102	0.040
CI adjusted	-0.053	<i>-0.041</i>	<i>-0.023</i>	<i>-0.026</i>	<i>0.020</i>
HI	-0.049	0.009	0.007	0.128	0.020

Bold:p-value <0.01; bold and italics: p-value<0.05; italics:p-value<0.10

Note *1: Inpatient probability of admissions concerns “the last 12 months”

Note *2: Outpatient, SHIF physician and specialist private probability of visit concerns “the last 3 months”

Note *3: Dentist probability of visit concerns “the last 3 months”

Figure 4.1: Income-inequity in the probability of health care use types in PatraHIS

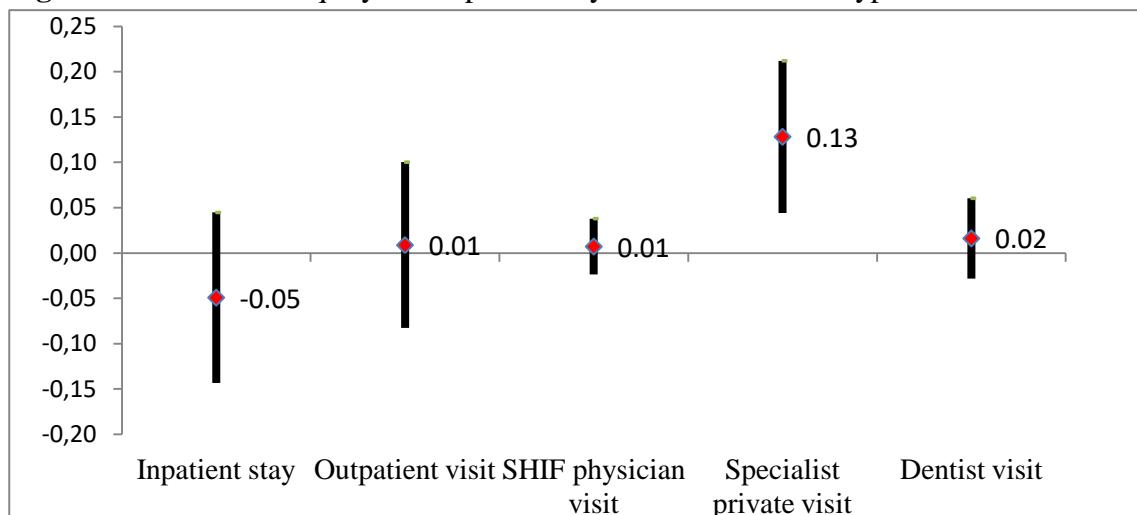
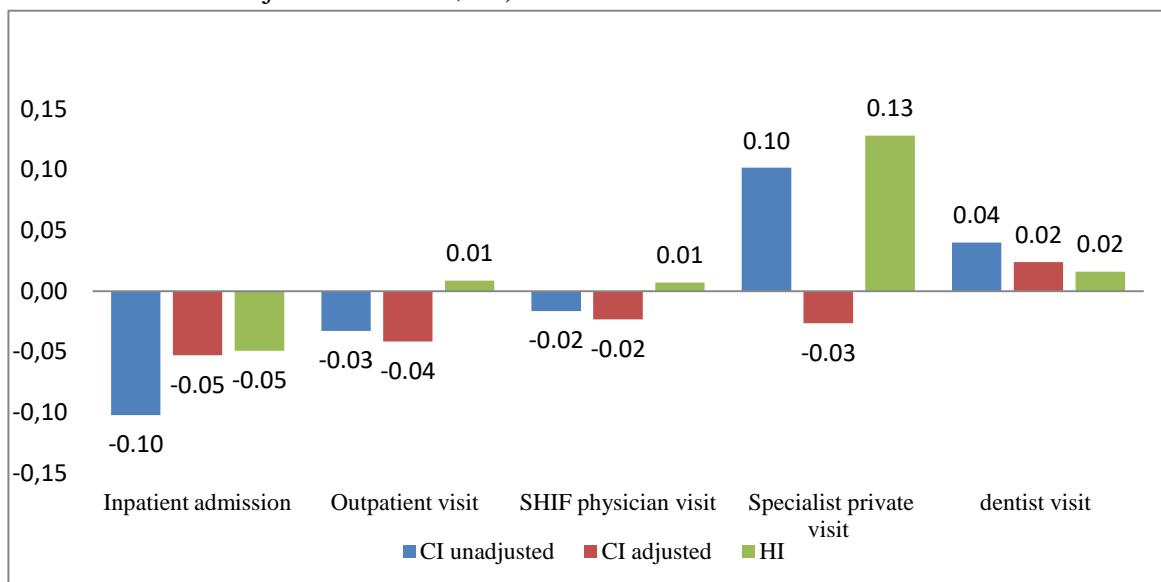


Figure 4.2: Income-inequalities in the probability of health care use types (actual use; adjusted for need; HI) in Patra HIS



4.4.3 Decomposition Analysis – Sources of inequality by type of care

The results of the decomposition analyses, as described in Methodology chapter, provide indication about the inequity drivers. The contributing factors are displayed in detail in Tables 4.7–4.10 and Figures 4.3–4.5 that report the CI_{unadjusted (actual use)} decomposition for all the health care types. Among other contributors we focus on income and SHIFs coverage in accordance with the main objectives of our study. Each Table first shows the mean values for the explanatory variables. The second column displays the partial concentration index (CI), the extent to which each contributor is distributed across income. A negative (positive) sign indicates that the variable has a pro-poor (pro-rich) distribution and is prevalent among the lower (higher) income groups. The third column indicates the demand elasticity (Marginal Effect - ME) for each contributor. Finally, the last three columns of the tables report, respectively, the absolute, the sum and % contributions to total income related inequality. The absolute contribution is the product of the elasticity (marginal effect) and the partial concentration index for each factor, so it will depend both on the impact of each variable on health care use and on its unequal distribution by income. A negative (positive) absolute contribution implies that, if only that variant determined utilization, then it would be pro-poor (pro-rich).

The Tables can be interpreted in the following way, using the example of the probability of a specialist visit (Table 4.8). The unadjusted CI_{unadjusted} of the probability of a specialist visit is positive (0.102), implying that across the income distribution, there is a proportional probability of visiting a specialist concentrated among the rich. Once need is standardized for, the level of inequity (HI) is 0.128 implying a pro-rich distribution.

- ✓ The contribution of the need factors to inequality are negative (-0.026), indicating that individuals with poorer self-assessed health and chronic conditions reduce inequity in probability of specialist visit favoring the worse off, pointing out the greatest needs of the poor, similar with most of the empirical literature (Scheil-Adlung, X. and Bonan, J., 2013; Geitona et al, 2007; Lahana et al, 2011). Suffering from chronic medical conditions has the most negative contribution - as the most important needs-adjustor, followed by general self-assessed health and self-assessed health comparing to the last 12 months.
- ✓ Gender has a negative (pro-poor) contribution to inequity, quite high, explaining a high percentage of inequity. Males seldom make a specialist visit compared to females

(Pappa & Niakas, 2006; Souliotis et al, 2016; Tountas et al, 2011; EC, 2005; Geitona et al, 2007).

- ✓ Age dummies are concentrated among the lower income groups (negative CI) and only the group of older people (80+) is less likely to visit a specialist (Lahana et al, 2011; Tountas et al, 2011; Scheil-Adlung X, 2013, EC, 2005; Majo et van Soest, 2012). This entails a slightly positive contribution to inequality, but in general, age has no effect on (almost zero) inequality.
- ✓ About the non-need contributors, the main factor is income (its positive contribution is 0.125), meaning that more advantaged (higher income earners) are more likely to visit a specialist, holding all else constant.
- ✓ The second most important non-need contributor is the SHIF coverage with final contribution -0.025 pro-poor, reducing inequity, meaning that the final effect of the Noble SHIF dummy (concentrated among the higher income groups – positive CI) and the effect of Non-Noble OGA SHIF dummy (concentrated among the lower income groups- negative CI) is to reduce overall inequity favoring the less advantaged. It is worth mentioning that the negative elasticity (-ME) of Noble SHIFs indicates that elderly with Noble SHIF coverage are less likely to visit a specialist, whereas the positive ME of Non Noble OGA proves that elderly with Non Noble OGA SHIF coverage – worse off (negative CI)- are more likely to make a specialist visit comparing to Non Noble IKA SHIF, revealing the systemic inequalities in specialist visit among the SHIFs.
- ✓ Higher level of education is the third important non- need contributor with positive (pro-rich) effect on inequity of probability of specialist visit.
- ✓ Housing tenure and marital status have a low negative contribution to inequity and VHI has a quite low contribution to inequity and household composition has no (zero) effect on inequity. Finally, the error term is small (0.0032) implying that there should be only some small effects on the probability of visiting a specialist that are related to income and not accounted for in the specific utilization model. *Overall*, Tables 4.7 - 4.10 indicate:
 - Pro-poor (negative signs) are apparent for the *contributions of need variables* to inequity for all types of care similar to the existing evidence, except the case of probability of dental care for which need-adjustment is mainly age standardized.
 - The most important determinants of health services utilization by the elderly are the indicators of health care need, mainly the existence of *chronic medical conditions*, the

EQ-5D self-assessed health (SAH) and SAH comparing to last 12 months and less age and gender. Only the EQ-5D SAH increases inequity in almost all health care types, inpatient admissions, specialist visit and dental care visits, and the SAH comparing to last 12 months increases inequity in SHIF physician visit, and reduces in inpatient admission.

- *Older individuals* till 79 years are more likely to make a SHIF physician and a specialist visit, whereas individuals 80+ are less likely to use any health care type. *Women* are significantly more likely to use all health care types, except have an inpatient admission.
- The *non-need contributors* have a non systemic effect on patterns of health care use by income groups. Income itself is not the only contributor, provided that other non-need contributors i.e. education, or SHIF coverage do not have a consistent effect.
- The unequal distribution of *income* contributes in a positive way (pro-rich) to inequity in distribution of probability of SHIF physician visit, in specialist and dentist visit.
- Income contributes in a negative way (pro-poor) to distribution of inequity in probability of inpatient admissions and probability of outpatient visits, favoring the less advantaged.
- Another important socio-economic characteristic related to both income and health care is *higher educational level* status that explains a high percentage of inequalities in almost all health care types, except for inpatient admission that reduces inequity, similar to the existing evidence (Tountas et al, 2011; Van Doorslaer et al, 2006; EC, 2005; Koolman X., 2007; Van Doorsaler & Masseria, 2004; Masseria et al, 2004).
- Social health insurance fund (*SHIF*) *coverage* has a non systemic effect, as well. Compared to Non-Noble IKA SHIF, overall, inequalities are apparent for the probability of outpatient visits, SHIF physician and dentist visits favoring the better off.
- Compared to Non-Noble IKA SHIF, inequalities are not apparent for probability of inpatient admissions, as well as for probability of making a specialist private visit favoring the less advantaged, though with a different magnitude among the SHIFs.
- Examining *the effect of each SHIF separately*, we found that compared to Non Noble IKA, Noble SHIFs strongly increase inequity in probability of outpatient and dentist visits favoring the more advantaged, whereas they strongly reduce inequity (pro –

poor) in probability of inpatient and slightly reduce inequity in specialist and SHIF physician visit.

- Elderly with Non Noble OGA SHIF coverage are more likely to use all health care types except visiting a SHIF physician. Non Noble OGA SHIF has a negative (pro-poor) contribution to inequity in probability of most health care types, stronger in magnitude in specialist visit and weaker in magnitude for probability of (inpatient, outpatient and dentist visit) favoring the worse off. OGA SHIF has a more pronounced pro-poor contribution to inequity in the probability of specialist visit than the Noble SHIFs. On the other hand, OGA SHIF increases strongly inequity only in probability of SHIF physician visit favouring the better off, revealing the minimum freedom of choice that Non Noble OGA offers to its beneficiaries compared to other Non Noble SHIFs.
- *Marital status* and *housing tenure* type have a negative contribution in inequity in most health care types with the exception of dentist visits.
- *Household composition* has no effect (zero contribution) on inequity in all health care types, only a small negative effect on inequity in probability of inpatient admissions.
- *VHI tenure* has positive effect only on inequity in probability of outpatient visits with a large contribution favoring the more advantaged, and has negative effect (pro-poor) on equity in probability of SHIF physician, of specialist and dentist visits, whereas it has no effect on inequity in probability of inpatient admissions. Figures 4.3 - 4.5 present the results of the decomposition analysis, depicting the contribution of non-need factors to income-related inequity.

Overall, our findings that the utilization of health services is determined mainly by the health needs and by several demographic, socioeconomic and structural factors of the healthcare systems are compatible with existing evidence for determinants of health care use for the general population (Phelps and Newhouse, 1974; Newhouse and Marquis, 1978; Wagstaff, 1986; Kasper, 1986; Feldstein, 1988; McGuire et al., 1988; Marmot and Wilkinson, 1999). More specifically, the existence of chronic medical conditions, the EQ-5D self-assessed health (SAH) and SAH comparing to last 12 months, older age, female gender, marital status, education, income, and insurance coverage, are considered as the most important determinants of health services use (Tountas et al, 2011, Pappa and Niakas, 2006; Economou, 2006, Geitona et al., 2007, Alexopoulos and Geitona, 2009, Bíró A., 2014).

Table 4.7: Detailed Decomposition of inequality in the probability of inpatient admissions and probability of outpatient visits

	Probability of inpatient admissions						Probability of outpatient visits					
	Mean	CI	ME	Contrib.	Sum	% Contr.	Mean	CI	ME	Contrib.	Sum	% Contr.
	-0.102						-0.033					
CI unadjusted							0.009					
HI index												
Need				-0.053	-0.053					-0.041	-0.041	
Age (80+ vs 50-59)	0.089	-0.190	-0.010	0.002		-1.91%	0.089	-0.190	-0.009	0.002		-5.13%
Age (70-79 vs 50-59)	0.216	-0.087	-0.002	0.000		-0.16%	0.216	-0.087	-0.043	0.004		-11.35%
Age (60-69 vs 50-59)	0.290	-0.005	-0.021	0.000	0.002	-0.11%	0.290	-0.005	0.106	-0.001	0.005	1.66%
Male vs female	0.441	0.107	0.133	0.014	0.014	-13.96%	0.441	0.107	-0.018	-0.002	-0.002	5.80%
Mobility:"Extreme & Moderate" vs "No"	0.280	-0.100	0.045	-0.004		4.40%	0.280	-0.100	-0.096	0.010		-29.17%
Self – Care: "Extreme & Moderate" vs "No"	0.078	-0.264	-0.018	0.005		-4.64%	0.078	-0.264	0.016	-0.004		12.59%
Usual Activities :"Extreme & Moderate" vs "No"	0.131	-0.175	0.104	-0.018		17.86%	0.131	-0.175	-0.001	0.000		-0.33%
Pain/ Discomfort:"Extreme & Moderate" vs "No"	0.480	-0.113	0.314	-0.036		34.87%	0.480	-0.113	-0.028	0.003		-9.82%
Anxiety/Depression:"Extreme & Moderate" vs "No"	0.593	-0.057	0.028	-0.002	-0.055	1.59%	0.593	-0.057	-0.090	0.005	0.014	-15.71%
"Worst" vs "Better" SAH - last 12 m	0.206	-0.169	-0.166	0.028		-27.46%	0.206	-0.169	0.083	-0.014		43.03%
"The Same" vs "Better" SAH - last 12m	0.671	0.044	-0.741	-0.033	-0.005	31.96%	0.671	0.044	-0.019	-0.001	-0.015	2.57%
SAH "Less than Good" vs "Very Good & Good"	0.446	-0.151	0.050	-0.008	-0.008	7.42%	0.446	-0.151	0.149	-0.022	-0.022	68.63%
"2 + chronic conditions" vs "0"	0.533	-0.034	0.058	-0.002		1.91%	0.533	-0.034	0.505	-0.017		51.92%
"1 chronic condition" vs "0 "	0.241	-0.024	0.000	0.000	-0.002	-0.01%	0.241	-0.024	0.162	-0.004	-0.021	12.13%
Non Need variables												
In income (x)	6.448	0.047	-0.766	-0.036	-0.036	35.19%	6.448	0.047	-0.274	-0.013	-0.013	39.36%
"More than secondary" vs "Primary"	0.117	0.540	-0.004	-0.002		2.06%	0.117	0.540	0.006	0.003		-10.10%
"Secondary" vs "Primary" Education	0.368	0.052	-0.019	-0.001	-0.003	0.97%	0.368	0.052	0.071	0.004	0.007	-11.38%
Married vs No	0.750	0.021	-0.081	-0.002	-0.002	1.70%	0.750	0.021	-0.107	-0.002	-0.002	7.02%
Housing Tenure "Owner" vs Not Owners	0.864	0.023	-0.065	-0.001	-0.001	1.46%	0.864	0.023	-0.028	-0.001	-0.001	1.94%
Household "Couple/Other" vs "Alone"	0.851	-0.001	0.400	-0.001	-0.001	0.52%	0.851	-0.001	0.337	0.000	0.000	1.36%
"Noble SHIFunds" vs "Non Noble IKA"	0.350	0.266	-0.050	-0.013		13.03%	0.350	0.266	0.079	0.021		-64.17%
"Non Noble OGA-SHIF" vs "Non Noble IKA"	0.097	-0.313	0.026	-0.008	-0.021	7.84%	0.097	-0.313	0.014	-0.005	0.016	13.85%
VHI "yes" vs "no"	0.031	0.474	-0.001	0.000	0.000	0.40%	0.031	0.474	0.023	0.011	0.011	-33.49%
Sum				-0.117	-0.117	114.93%				-0.023	-0.023	71.22%
Error					0.015	-14.93%				-0.009		28.78%

Table 4.8: Detailed Decomposition of inequality in the probability of SHIF physician visit and probability of specialist private visits

	Probability of SHIF physician visit						Probability of private specialist visits					
	Mean	CI	ME	Contrib.	Sum	% Contr.	Mean	CI	ME	Contrib.	Sum	% Contr.
CI unadjusted	-0.016						0.102					
HI index	0.007						0.128					
Need	-0.023						-0.026					
Age (80+ vs 50-59)	0.089	-0.190	-0.004	0.001	-4.44%		0.089	-0.190	-0.014	0.003	2.70%	
Age (70-79 vs 50-59)	0.216	-0.087	0.019	-0.002	10.10%		0.216	-0.087	0.027	-0.002	-2.35%	
Age (60-69 vs 50-59)	0.290	-0.005	0.029	0.000	-0.001	0.91%	0.290	-0.005	0.051	0.000	0.000	-0.26%
Male vs female	0.441	0.107	-0.015	-0.002	-0.002	9.58%	0.441	0.107	-0.177	-0.019	-0.019	-18.66%
Mobility:"Extreme & Moderate" vs "No"	0.280	-0.100	0.056	-0.006	34.09%		0.280	-0.100	-0.038	0.004	3.68%	
Self – Care: "Extreme & Moderate" vs "No"	0.078	-0.264	0.005	-0.001	8.06%		0.078	-0.264	-0.040	0.010	10.25%	
Usual Activities :"Extreme & Moderate" vs "No"	0.131	-0.175	-0.032	0.006	-34.50%		0.131	-0.175	0.070	-0.012	-12.10%	
Pain/ Discomfort:"Extreme & Moderate" vs No"	0.480	-0.113	0.030	-0.003	21.05%		0.480	-0.113	0.027	-0.003	-3.00%	
Anxiety/Depression: "Extreme & Moderate" vs "No"	0.593	-0.057	0.002	0.000	-0.005	0.82%	0.593	-0.057	-0.048	0.003	0.002	2.70%
"Worst" vs "Better" SAH - last 12 m	0.206	-0.169	0.015	-0.003	15.61%		0.206	-0.169	0.066	-0.011	-10.96%	
"The Same" vs "Better" SAH - last 12m	0.671	0.044	0.097	0.004	0.002	-26.25%	0.671	0.044	0.147	0.006	-0.005	6.35%
SAH "Less than Good" vs "Very Good & Good"	0.446	-0.151	-0.003	0.000	0.000	-3.05%	0.446	-0.151	-0.043	0.006	0.006	6.31%
"2 + chronic conditions" vs "0"	0.533	-0.034	0.431	-0.014	88.84%		0.533	-0.034	0.286	-0.010	-9.45%	
"1 chronic condition" vs "0 "	0.241	-0.024	0.150	-0.004	-0.018	22.43%	0.241	-0.024	0.052	-0.001	-0.011	-1.24%
Non Need variables												
In income (x)	6.448	0.047	0.037	0.002	0.002	-10.66%	6.448	0.047	2.672	0.125	0.125	123.17%
"More than secondary" vs "Primary"	0.117	0.540	0.012	0.007	-41.20%		0.117	0.540	0.018	0.010	9.34%	
"Secondary" vs "Primary" Education	0.368	0.052	0.007	0.000	0.007	-2.28%	0.368	0.052	0.013	0.001	0.010	0.67%
Married vs No	0.750	0.021	-0.027	-0.001	-0.001	3.52%	0.750	0.021	-0.105	-0.002	-0.002	-2.22%
Housing Tenure "Owner" vs Not Owners	0.864	0.023	-0.053	-0.001	-0.001	7.35%	0.864	0.023	-0.353	-0.008	-0.008	-7.90%
Household "Couple/Other" vs "Alone"	0.851	-0.001	0.012	0.000	0.000	0.10%	0.851	-0.001	0.345	0.000	0.000	-0.45%
"Noble SHIFunds" vs "Non Noble IKA"	0.350	0.266	-0.029	-0.008	47.67%		0.350	0.266	-0.025	-0.007	-6.61%	
"Non Noble OGA-SHIF" vs "Non Noble IKA"	0.097	-0.313	-0.033	0.010	0.003	-63.08%	0.097	-0.313	0.060	-0.019	-0.025	-18.44%
VHI "yes" vs "no"	0.031	0.474	-0.002	-0.001	-0.001	5.49%	0.031	0.474	-0.006	-0.003	-0.003	-2.70%
Sum	-0.015						0.070					
Error	-0.002						0.032					
	9.85%						68.84%					
	9.85%						31.16%					

Table 4.9: Detailed Decomposition of inequality in the probability of dentist visit

	Probability of dentist visit					
	Mean	CI	ME	Contrib.	Sum	% Contrib.
CI unadjusted	0.040					
HI index	0.016					
Need						
Age (80+ vs 50-59)	0.088	-0.181	-0.034	0.006		15.37%
Age (70-79 vs 50-59)	0.216	-0.089	-0.059	0.005		12.95%
Age (60-69 vs 50-59)	0.291	-0.006	-0.017	0.000	0.011	0.27%
Male vs female	0.442	0.106	-0.086	-0.009	-0.009	-22.85%
Mobility:"Extreme & Moderate" vs "No"	0.279	-0.097	-0.038	0.004		9.18%
Self – Care: "Extreme & Moderate" vs "No"	0.078	-0.265	-0.016	0.004		10.67%
Usual Activities :"Extreme & Moderate" vs "No"	0.131	-0.177	0.007	-0.001		-3.20%
Pain/ Discomfort:"Extreme & Moderate" vs "No"	0.479	-0.112	0.004	0.000		-1.17%
Anxiety/Depression: "Extreme & Moderate" vs "No"	0.593	-0.057	0.037	-0.002	0.004	-5.30%
"Worst" vs"Better"SAH - last 12 m	0.205	-0.166	0.007	-0.001		-2.79%
"The Same" vs "Better" SAH - last 12m	0.672	0.043	0.030	0.001	0.000	3.24%
SAH "Less than Good" vs "Very Good & Good"	0.445	-0.150	-0.055	0.008	0.008	20.68%
SADental Health "Less than Good vs Good"	0.596	-0.069	-0.085	0.006	0.006	14.76%
"2 + chronic conditions" vs "0"	0.532	-0.033	0.026	-0.001		-2.08%
"1 chronic condition" vs "0 "	0.242	-0.026	0.013	0.000	-0.001	-0.82%
Non Need variables						
In income (x)	6.449	0.047	0.428	0.020	0.020	50.13%
"More than secondary" vs "Primary"	0.117	0.539	0.035	0.019		46.93%
"Secondary" vs "Primary" Education	0.369	0.051	0.113	0.006	0.025	14.32%
Married vs No	0.752	0.020	0.114	0.002	0.002	5.76%
Housing Tenure "Owner" vs Not Owners	0.864	0.023	0.049	0.001	0.001	2.82%
Household "Couple/Other" vs "Alone"	0.852	-0.003	-0.020	0.000	0.000	0.13%
"Noble SHIFunds" vs "Non Noble IKA"	0.351	0.265	0.037	0.010		24.20%
"Non Noble OGA-SHIF" vs "Non Noble IKA"	0.096	-0.306	0.013	-0.004	0.006	-9.88%
VHI "yes" vs "no"	0.031	0.473	-0.010	-0.005	-0.005	-11.38%
Sum				0.069	0.088	171.93%
Error				-0.029		-71.93%

Table 4.10: Overall Decomposition of inequity in inpatient admissions, outpatient visits, SHIF physician visits, specialist visit, dentist visit

	Probability of inpatient admissions		Probability of outpatient visits		Probability of SHIF physician visit		Probability of specialist visit		Probability of dentist visit	
	CIndex		CIndex		CIndex		CIndex		CIndex	
CI unadjusted	-0.102		-0.033		-0.016		0.102		0.040	
HI index	-0.049		0.009		0.007		0.128		0.016	
Health Status -SAH: EQ5D+SAH _last12m+ SADH	Contrib. to Inequality	% Contrib	Contrib. to Inequality	% Contrib.	Contrib. to Inequality	% Contrib.	Contrib. to Inequality	% Contrib.	Contrib. to Inequality	% Contrib
Need	-0.053		-0.041		-0.023		-0.026			
Age	0.002	-2.17%	0.005	-14.82%	-0.001	6.57%	0.000	0.10%	0.011	28.58%
Gender	0.014	-13.96%	-0.002	5.80%	-0.002	9.58%	-0.019	-18.66%	-0.009	-22.85%
Health Status -SAH: EQ5D+SAH _last12m+ SADH	-0.067	58.57%	-0.023	71.79%	-0.003	15.83%	0.003	3.22%	0.018	46.08%
Health Status: Chronic Conditions	-0.002	1.90%	-0.021	64.04%	-0.018	111.27%	-0.011	-10.69%	-0.001	-2.90%
Ln (income)	-0.036	35.19%	-0.013	39.36%	0.002	-10.66%	0.125	123.17%	0.020	50.13%
Other Non-Need										
Education	-0.003	3.04%	0.007	-21.48%	0.007	-43.48%	0.010	10.01%	0.025	61.24%
Marital Status	-0.002	1.70%	-0.002	7.02%	-0.001	3.52%	-0.002	-2.22%	0.002	5.76%
Housing Tenure	-0.001	1.46%	-0.001	1.94%	-0.001	7.35%	-0.008	-7.90%	0.001	2.82%
Household Composition	-0.001	0.52%	0.000	1.36%	0.000	0.10%	0.000	-0.45%	0.000	0.13%
Social Health Insurance Fund	-0.021	20.87%	0.016	-50.32%	0.003	-15.42%	-0.025	-25.05%	0.006	14.32%
VHI coverage	0.000	0.40%	0.011	-33.49%	-0.001	5.49%	-0.003	-2.70%	-0.005	-11.38%
Error	0.015	-14.93%	-0.009	28.78%	-0.002	9.85%	0.032	31.16%	-0.029	-71.93%

Figure 4.3: Contribution to inequity in the probability of inpatient admission and outpatient visit

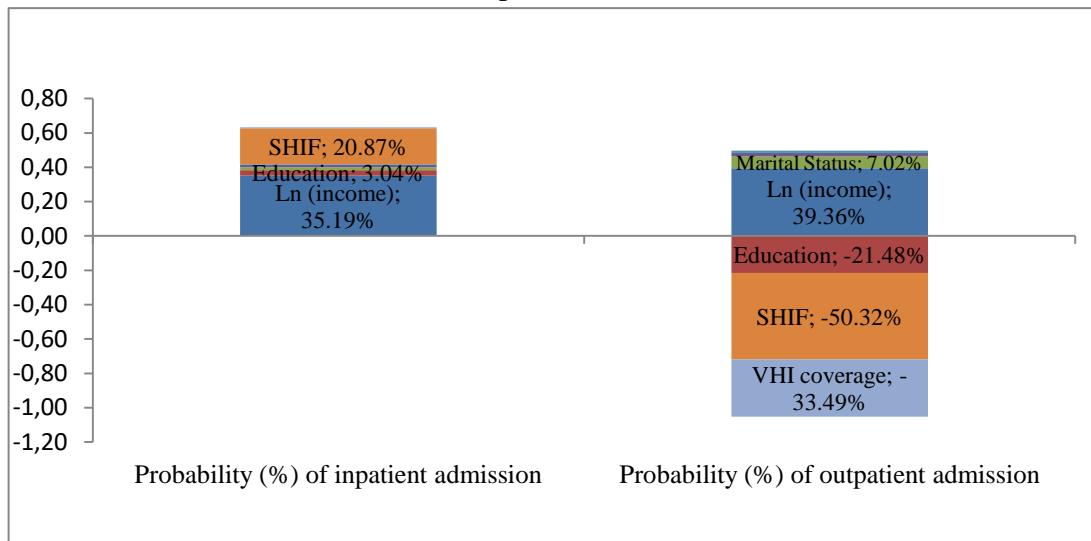


Figure 4.4: Contribution (%) to inequity in the probability of SHIF physician visit and specialist visit

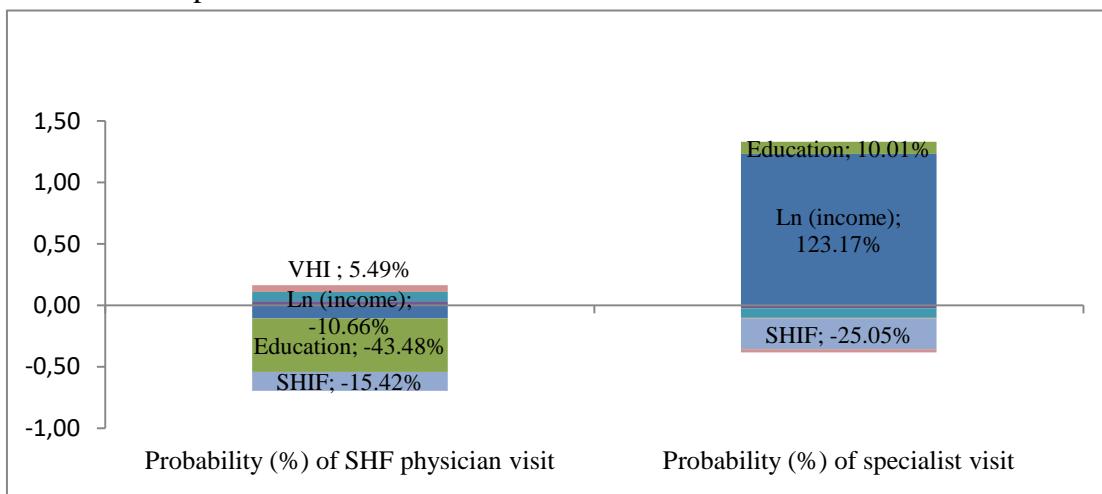
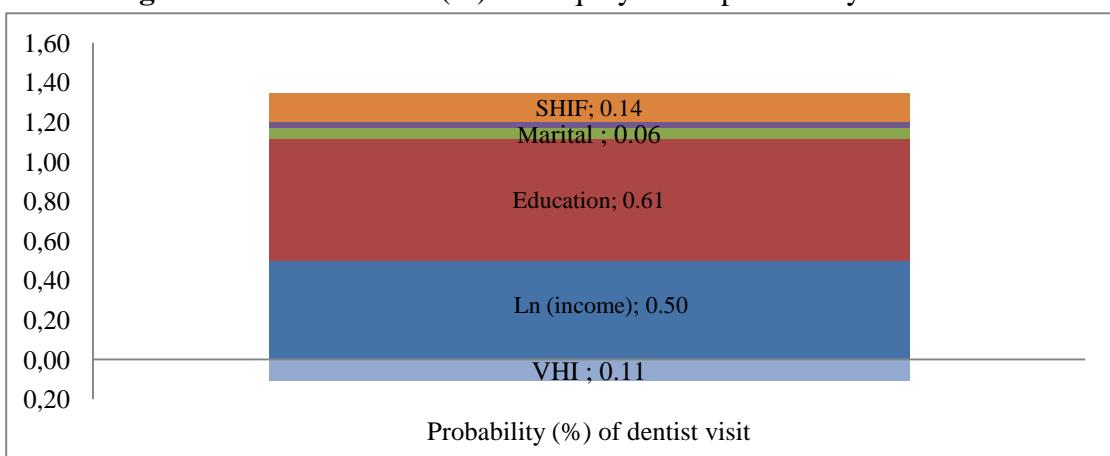


Figure 4.5: Contribution (%) to inequity in the probability of dentist visit



4.4.4 Regression Results – Determinants of use in health care

- The most important determinants of health services utilization, as presented in Tables 4.11 and 4.12, are the indicators of health care need and more specifically, the presence of chronic conditions and the EQ-5D self-assessed usual activities problems.
- Income has a significant positive association with the probability of specialist visits, similar to other studies. The more advantaged individuals are more likely to make specialist and dentist visits than those who are less advantaged.
- Income level has no association with the probability of inpatient admissions, the probability of SHIF physician visits and is insignificantly negatively associated with the probability of outpatient visits, related with the fragmented PHC system.
- Moderate educational level shows a weak negative association with the probability of inpatient visits, but it is positively related-to a great extent- with the dentist visits. It has no association with the probability of outpatient, SHIF and specialist visit.
- About the effect of SHIF coverage, compared to Non –Noble IKA, Non-Noble OGA has a non-significant positive association with the probability of using all health care types and a significant positive association with specialist visit. Older population with OGA SHIF coverage is more likely (not significantly) to use all health care types, except visiting a SHIF physician given the PHC choices that OGA provides to its beneficiaries.
- Moreover, the OGA SHIF elderly beneficiaries are significantly more likely to make a specialist visit compared to Non Noble IKA SHIF beneficiaries.
- On the other hand, Noble SHIF coverage is not significantly associated with any health care type in comparison with Non Noble IKA SHIF. Compared to Non Noble IKA coverage, Noble SHIF elderly beneficiaries are less likely to have inpatient admissions, to make a specialist and a SHIF physician visit, mainly due to better health status, whereas they are non significantly more likely to make an outpatient and a dentist visit.
- “Homeowners” are significantly negatively associated with the specialist private visit.
- Marital status has a weak positive association with the dentist visit, whereas household composition does not have significant association with any health care visit.
- VHI tenure is negatively associated with the probability of any dentist visit, whereas it has a weak significant positive association with the probability of an outpatient visit.

Table 4.11: Regression model analysis for probability of inpatient admissions, outpatient visits, SHIF physician visits and private specialist based on Patra HIS dataset

		Probability of inpatient admission (the last 12 months)	Probability of outpatient visit (the past 3 months)	Probability of SHIF physician visit (the past 3 months)	Probability of private specialist visit (the past 3 months)
		SE	SE	SE	SE
Need					
<i>Age</i>	Age (80+ vs 50-59) Age (70-79 vs 50-59) Age (60-69 vs 50-59)	0.86 1.00 0.87	0.45 0.36 0.28	0.94 0.82 <i>1.58</i>	0.46 0.28 0.43
<i>Gender</i>	male vs female	1.53	0.42	0.95 0.23	0.20
<i>EQ-5D Health Status Measure</i>	Mobility:"Extreme & Moderate" vs "No" Self – Care: "Extreme & Moderate" vs "No" Usual Activities :"Extreme & Moderate" vs "No" Pain/ Discomfort:"Extreme & Moderate" vs "No" Anxiety/Depression: "Extreme & Moderate" vs "No"	1.18 0.75 <i>2.01</i> 2.61 1.06	0.37 0.37 0.79 0.82 0.29	0.65 1.25 1.00 0.90 0.81	0.20 0.69 0.43 0.24 0.19
<i>SAH - last12m</i>	"Worst" vs "Better" SAH - last 12 m "the Same" vs "Better" SAH - last 12m	0.43 0.29	0.16 0.10	1.62 0.93	0.64 0.33
<i>SAH</i>	"Less than Good" vs "Very Good & Good"	1.14	0.35	1.51	0.40
<i>Chronic conditions</i>	"2 + chronic conditions" vs "0" "1 chronic condition" vs "0 "	1.25 1.12	0.50 0.47	4.64 3.35	1.85 1.38
Non Need variables					
<i>Income (5 Quintiles)</i>	Income 5 (>901€) Income 4 (> 751 - 900 €) Income 3 (> 501 - 750 €) Income 2 (375 -500 €)	0.56 1.09 1.46 0.92	0.28 0.43 0.54 0.33	0.89 0.63 0.98 0.76	0.35 0.24 0.34 0.25
<i>Educational Level</i>	"More than secondary" vs "Primary" "Secondary" vs "Primary"	1.06 0.93	0.55 0.27	1.00 1.27	0.44 0.33
<i>Marital status</i>	Married vs No	0.96	0.36	0.86	0.29
<i>Housing Tenure</i>	"Owner" vs Not Owners	0.85	0.30	0.97	0.31
<i>Household</i>	"Couple/Other" vs "Alone"	1.90	0.96	1.97	0.88
<i>Social Health Insurance Fund</i>	"Noble SHIFunds" vs "Non Noble IKA" "Non Noble OGA-SHIF" vs "Non Noble IKA"	0.84 1.32	0.27 0.51	1.43 1.21	0.39 0.46
<i>VHI</i>	"yes" vs "no"	1.01	0.83	2.57	1.52

Bold:p-value <0.01; bold and italics: p-value<0.05; italics:p-value<0.10

Table 4.12: Regression model analysis for probability of dentist visit based on PatraHIS dataset

		Probability of dentist visit (the last 5 years)	SE
Need			
<i>Age</i>	Age (80+ vs 50-59)	0.33	0.14
	Age (70-79 vs 50-59)	0.47	0.12
	Age (60-69 vs 50-59)	0.82	0.19
<i>Gender</i>	male vs female	0.56	0.12
<i>EQ-5D Health Status Measure</i>	Mobility: "Extreme & Moderate" vs "No"	0.68	0.17
	Self – Care: "Extreme & Moderate" vs "No"	0.59	0.29
	Usual Activities :"Extreme & Moderate" vs "No"	1.15	0.42
	Pain/ Discomfort:"Extreme & Moderate" vs "No"	1.04	0.23
	Anxiety/Depression: "Extreme & Moderate" vs "No"	1.20	0.24
<i>SAH - last12m</i>	"Worst" vs "Better" SAH - last 12 m	1.09	0.37
	"the Same" vs "Better" SAH - last 12m	1.14	0.32
<i>SAH</i>	"Less than Good" vs "Very Good & Good"	0.71	0.16
<i>SADental Health</i>	"Less than Good" vs "Good"	0.67	0.13
<i>Chronic conditions</i>	"2 + chronic conditions" vs "0"	1.12	0.30
	"1 chronic condition" vs "0 "	1.10	0.31
Non Need variables			
<i>Income (5 Quintiles)</i>	Income 5 (>901€)	1.40	0.46
	Income 4 (> 751 - 900 €)	1.68	0.52
	Income 3 (> 501 - 750 €)	0.89	0.25
	Income 2 (375 -500 €)	1.22	0.34
<i>Educational Level</i>	"More than secondary" vs "Primary"	2.20	0.81
	"Secondary" vs "Primary"	2.25	0.48
<i>Marital status</i>	Married vs No	1.52	0.45
<i>Housing Tenure</i>	"Owner" vs Not Owners	1.19	0.32
<i>Household</i>	"Couple/Other" vs "Alone"	0.75	0.28
<i>Social Health Insurance Fund (SHIF)</i>	"Noble SHIFunds" vs "Non Noble IKA"	1.31	0.30
	"Non Noble OGA-SHIF" vs "Non Noble IKA"	1.45	0.47
<i>VHI</i>	"yes" vs "no"	0.44	0.23

Bold:p-value <0.01; bold and italics: p-value<0.05; italics:p-value<0.10

4.4.5 Regression Results – Determinants of OOPPs in use of health care

According to the above sample description, OOP payments for specialist private care across the health care types, contribute at a higher percentage to medical specialist expenditures and less for inpatient care visits and outpatient care. The determinants of the probability of paying OOP by health care type are presented in Tables 4.13 and 4.14.

- Significant associations of explanatory indicators with the probability of facing OOPPs are not apparent for inpatient and outpatient care, apart from few need indicators.
 - ✓ Only older age is significantly positively associated with the probability of OOPP for inpatient admissions.
 - ✓ Worse sah is significantly negatively associated with OOPP for outpatient care.

- ✓ Income is not associated with OOPP for receiving inpatient or outpatient care, either.
- Significant associations of explanatory indicators with the probability of facing OOPPs are apparent for the SHIF physician visits and specialist private visits.
 - ✓ The Non –Noble Farmers OGA SHIF beneficiaries are significantly less likely to face OOP expenses for outpatient care, compared to Non –Noble IKA.
- About the last SHIF physician visit, significantly more likely to meet OOPPs are:
 - ✓ older people with severe self care; and anxiety/depression problems;
 - ✓ more advantaged (in income level 4);
 - ✓ with secondary educational level and Noble SHIFs coverage
- On the other hand, significantly less likely to face OOP expenses for SHIF physician visits are elderly with health problems such as: “less than good” sah, “worst sah comparing to last 12 months”, suffering from 2+ chronic medical symptoms.
- Therefore, during their last SHIF physician visit, more advantaged individuals and Noble SHIF beneficiaries – who tend to be better off- are significantly more likely to face OOPPs than less advantaged and the Non Noble IKA beneficiaries, as expected.
- Moreover, for a specialist private visit, the determinants of the OOP amount including 0€ and conditional (>0€) OOP amount, (Tables 4.13 and 4.14) indicate that need variables are significantly associated with the OOP amount, as expected by the existing evidence:
 - ✓ All (100%) of the oldest 80+ pay OOP for a specialist visit versus other age groups.
 - ✓ A large proportion of females and those reporting extreme pain/discomfort pay OOP.
 - ✓ With regard to the income effect, it is worth noting that all (100%) of older poorer individuals in lower income quintile 1 pay OOP for a specialist visit, comparing to 70% of more advantaged in higher income quintile 5.
 - ✓ About the SHIF coverage effect, all (100%) Non Noble OGA SHIF beneficiaries - worse off- face OOPPs comparing to only 59% of the Noble SHIFs beneficiaries (Table 4.14).
- In addition the determinants of the conditional (>0€) OOP for specialist visit comparing higher median OOP amount (>40€) versus lower OOP amount (1€ - 40€), indicate that:
 - ✓ Younger elderly, with worst sah comparing to the last 12 months, suffering from chronic medical conditions as well as homeowners, are significantly less likely to pay higher OOP amount (>40€) for making a specialist private visit.
 - ✓ Compared to poorest income quintile 1, elderly in other income groups are insignificantly less likely to face higher OOP amount (>40€).

- ✓ Therefore, the poorest elderly in income quintile 1 are insignificantly more likely to pay higher OOP amount ($>40\text{€}$), revealing inequalities among income groups.
- ✓ Non Noble Farmers OGA SHIF beneficiaries –less advantaged- are insignificantly more likely to pay higher OOP amount for making a specialist visit, whereas Noble SHIF beneficiaries –better off - are less likely to pay higher OOP amount ($>40\text{€}$) than Non Noble IKA beneficiaries, revealing inequalities in ability to pay in terms of SHIF.
- In order to explore the extent of OOPPs for specialist private visit related to ability to pay by income, and by SHIF, we examine the OOP mean amount by income quintile (Table 3.15), and by SHIF (Table 3.16) for OOP amount (including 0€) and conditional ($>0\text{€}$).
- In terms of ability to pay, by income quintile (Table 3.15):
 - ✓ There is a clear trend that conditional mean OOPP amounts decrease as the income level proceeds from poorest to the richest 4th level, revealing a regressive relationship in terms of ability to pay.
 - ✓ The elderly in the richest 5th income quintile report facing higher conditional/positive ($>0\text{€}$) mean OOP amount (70.48€) than those in poorest income quintile (49.26€).
- In terms of SHIF coverage (Table 3.16):
 - ✓ Non Noble OGA SHIF beneficiaries –less advantaged – face the highest conditional mean OOP amount for a specialist private visit, slightly higher than the amount paid by Non Noble IKA beneficiaries.
 - ✓ Noble SHIFs beneficiaries –better off –seem to face significantly lower conditional OOP mean amount than the other SHIFs, thus revealing a regressive relationship.
 - ✓ Overall, for mean conditional ($>0\text{€}$) OOPP, elderly pay an amount ranking from 46.57€ to 58.08€ - higher than the median 40€- irrespective of their SHIF. However, Noble SHIF beneficiaries pay somewhat higher in magnitude OOP amount.
 - ✓ Given that beneficiaries of Non Noble OGA and Non Noble IKA SHIF tend to be less advantaged, our findings reveal a regressive relationship in terms of SHIF coverage.
- Consequently, OOP amount is an important barrier against a specialist private visit revealing a regressive relationship in terms of ability to pay, and in terms of SHIF coverage. These findings are related to the variations in coverage across the different SHIFs in financing the fragmented PHC system and the organization of NHS-ESY.

Table 4.13: Regression model analysis for probability of paying OOP for inpatient admissions, outpatient visits, SHIF physician visits, OOP amount>0 for specialist visit based on PatraHIS dataset

		Probability of OOPP for inpatient admission (yes/no) (the last 12 months)	Probability of OOPP for outpatient visit (yes/no) (the past 3 months)	Probability of OOPP for SHIF physician visit (yes/no) (the past 3 months)	Probability of OOP amount>0 for Specialist (>40€ vs 1€-40€) (the past 3 months)				
		SE	SE	SE	SE				
Need									
Age	Age (80+ vs 50-59) Age (70-79 vs 50-59) Age (60-69 vs 50-59)	1.81 6.56 2.43	2.49 6.82 2.42	4.91 3.45 3.39	6.34 3.31 2.56	27.39 2.47 3.19	33.56 2.67 2.92	0.38 0.19 0.22	0.60 0.17 0.16
Gender	Male vs female	0.63	0.49	0.94	0.55	0.39	0.27	1.10	0.74
EQ-5D Health Status Measure	Mobility:"Extreme & Moderate" vs "No Problems" Self – Care: "Extreme & Moderate" vs "No Problems" Usual Activities :"Extreme & Moderate" vs "No Problems" Pain/ Discomfort:"Extreme & Moderate" vs "No Problems" Anxiety/Depression: "Extreme & Moderate" vs "No Problems"	0.23 0.95 1.59 1.17 1.75	0.23 1.12 1.57 1.19 1.46	1.74 1.51 1.35 0.73 0.44	1.47 1.68 1.46 0.46 0.28	0.37 25.16 1.57 2.02 5.10	0.40 39.83 2.06 1.44 4.18	1.19 0.33 1.16 2.32 2.14	0.86 0.53 1.04 1.44 1.26
SAH - last12m	"Worst" vs "Better"SAH - last "the Same" vs "Better"SAH - last 12m	2.05 1.83	2.13 1.67	0.22 0.41	0.23 0.35	0.30 0.17	0.31 0.14	0.05 0.23	0.05 0.21
SAH	"Less than Good" vs "Very Good & Good"	0.38	0.33	0.33	0.23	0.11	0.13	3.23	2.02
Chronic conditions	"2 + chronic conditions" vs "0" "1 chronic condition" vs "0 condit."	1.56 0.52	1.85 0.65	3.10 2.98	3.57 3.62	0.15 0.34	0.14 0.31	0.27 0.28	0.26 0.26
Non Need variables									
Income (5 Quintil.)	Income 5 (>901€) Income 4 (> 751 - 900 €) Income 3 (> 501 - 750 €) Income 2 (375 -500 €)	0.87 0.57 1.14 0.81	1.36 0.66 1.10 0.76	0.28 0.82 0.34 1.17	0.31 0.79 0.33 0.94	4.13 6.93 0.84 2.33	4.85 8.14 0.99 2.76	0.36 0.23 0.27 0.53	0.33 0.21 0.23 0.40
Education al Level	"More than secondary" vs "Secondary" vs "Primary"	3.59 1.74	4.66 1.39	1.33 2.17	1.44 1.39	2.69 5.22	2.88 4.16	2.27 0.76	2.71 0.50
Marital	Married vs No	2.07	2.40	0.53	0.46	0.22	0.21	0.41	0.32
Housing	"Owner" vs Not Owners	1.96	1.82	1.00	0.84	1.05	0.99	0.14	0.11
Household	"Couple/Other" vs "Alone"	0.22	0.31	0.76	0.95	4.87	5.29	1.86	1.95
SHIF	"Noble SHIFs" vs "Non Noble" "Non Noble OGA-SHIF" vs	0.28 0.56	0.28 0.55	1.27 0.13	0.86 0.17	3.73 NA	2.79 NA	0.83 2.69	0.82 1.96
VHI	"yes" vs "no"	NA	NA	NA	NA	NA	NA	17.0	28.31

Bold:p-value <0.01; bold and italics: p-value<0.05; italics:p-value<0.10

Table 4.14: Univariate analysis for OOP amount for specialist private visit (including 0€:≥0) (yes/no)

	N	%	p-value
Age 80+	10/10	100.0	0.034
Age 70-79	26/31	83.9	
Age 60-69	45/50	90.0	
Age 50-59	38/52	73.1	
Gender Male	39/52	75.0	0.047
Female	80/91	87.9	
EQ-5D Mobility: "Extreme & Moderate"	39/42	92.9	0.047
Mobility "No Problems"	80/101	79.2	
Self – Care "Extreme & Moderate" vs "No Problems"	9/9	100.0	0.225
Self – Care "No Problems"	110/134	82.1	
Usual Activities "Extreme & Moderate"	23/24	95.8	0.078
Usual Activities "No Problems"	96/119	80.7	
Pain/ Discomfort "Extreme & Moderate"	70/74	94.6	<0.001
Pain/ Discomfort "No Problems"	49/69	71.0	
Anxiety/Depression "Extreme & Moderate"	73/85	85.9	0.302
Anxiety/Depression "No Problems"	46/58	79.3	
"Worst" SAH - last 12 m	30/35	85.7	0.549
"the Same" SAH - last 12m	78/94	83.0	
"Better"SAH - last 12m	11/14	78.6	
"Less than Good" SAH	61/67	91.0	0.017
"Very Good & Good" SAH	57/75	76.0	
"2 + chronic medical conditions"	78/93	83.9	0.351
"1 chronic medical condition"	26/29	89.7	
"0 chronic medical condition"	15/21	71.4	
Income 5 (>901€)	21/30	70.0	0.002
Income 4 (> 751 - 900 €)	25/31	80.6	
Income 3 (> 501 - 750 €)	20/26	76.9	
Income 2 (375 -500 €)	26/28	92.9	
Income 1(up to 374€)	23/23	100.0	
"More than secondary Educational Level"	8/17	47.1	<0.001
"Secondary Educational Level"	40/49	81.6	
"Primary Educational Level"	71/77	92.2	
Married	86/104	82.7	0.784
No Married	33/39	84.6	
"Owners"	99/118	83.9	0.758
"Not Owners"	20/25	80.0	
"Couple/Other"	103/122	84.4	0.351
"Alone"	16/21	76.2	
"Noble SHIFs"	26/44	59.1	<0.001
"Non Noble OGA-SHIF"	21/21	100.0	
"Non Noble IKA"	72/76	94.7	
VHI "yes"	3/4	75.0	0.525
VHI "no"	116/139	83.5	

Bold:p-value <0.01; bold and italics: p-value<0.05; italics:p-value<0.10;

The analysis contacted with: Chi-square test; Fisher's exact test; Chi-square test for trend

Table 4.15: Mean OOP amount during the last specialist private visit by Income Quintile

Mean OOP positive amount (>0) by Income Quintile				Mean OOP amount (≥ 0) by Income Quintile		
	Mean (€)	SE	N	Mean (€)	SE	N
Income Quintile 5: 900.01+	70.48	14.79	21	49.33	11.90	30
Income Quintile 4: 750.01 – 900.00	39.80	3.55	25	32.10	4.05	31
Income Quintile 3: 500.01 – 750.00	40.25	3.81	20	30.96	4.47	26
Income Quintile 2: 375.01 – 500.00	47.12	6.61	26	43.75	6.56	28
Income Quintile 1: <= 375.00	49.26	4.22	23	49.26	4.22	23

Table 4.16: Mean OOP amount during the last specialist private visit by SHIF tenure

Mean OOP positive amount (>0) by SHIF tenure				Mean OOP amount (≥ 0) by SHIF tenure		
	Mean (€)	SE	N	Mean (€)	SE	N
Noble SHIF	58.08	10.57	26	34.32	7.57	44
Non Noble OGA				46.57	3.78	21
SHIF	46.57	3.78	21			
Non Noble IKA SHIF	47.78	4.08	72	45.26	4.06	76

4.5 Discussion

The purpose of the present study was to explore income-related inequalities on utilisation of health care among the population over 50 years old in an urban-setting in Greece and explore the role of out of pocket payment mechanism (OOPP) in health care use as a financial barrier to access. Our findings, summarized and the contribution of our study to inequity in utilization of health care services by health care type, the role of SHIFs coverage variances, and the role of Out of pocket payments (OOPPs) as dimensions of inequalities are summarized and discussed underneath, following the comparison with existing literature for the general population.

4.5.1 Inequity in utilization of health care services by health care type

- The most *important determinants of health services utilization* by the elderly are the existence of chronic medical conditions, the EQ-5D self-assessed health (SAH) and SAH comparing to last 12 months and less age and gender. Older individuals till 79 years are more likely to make a SHIF physician visit and a specialist visit, whereas individuals 80+ are less likely to use any health care type. This is not simply due to variations in health and functional status. Our findings are related to the aforementioned literature that evidence about health care use and treatment is mixed: not all studies have

found poorer treatment for those in older ages, with patterns varying according to health condition and health care outcome considered (WHO, 2013). In addition, women are significantly more likely to use all health care services, except have an inpatient admission. An important determinant of this diversity in health-care utilization is socioeconomic status. From non need indicators education explains a high percentage of inequalities in health care except inpatient admissions, income, insurance coverage, marital status and household composition are also considered as important determinants of health services use, but not with the same strength for all health care types.

- *Inequity in utilization of health care services by health care type*
 - ✓ Pro-rich inequity in probability of specialist and dental care is supported.
 - ✓ Significant pro-poor inequity is found in probability of inpatient admissions.
 - ✓ No significant (slightly pro-rich) income-related inequity is supported for probability of outpatient visits and probability of making SHIF physician visits.
 - ✓ Income has a large positive effect on inequity – it increases inequity in probability of specialist and dentist visit, and slightly increases inequity in probability of SHIF physician visits. On the other hand, it has a less pronounced effect on inequity in probability of inpatient admissions and outpatient visits, favoring the less advantaged.

4.5.1.1 Inequity in utilization of health care services by health care type: Comparison with existing literature

By attempting to compare our findings for utilization of care among older population with the existing evidence mainly for general population, we conclude the following.

Inequity in inpatient admissions (hospital utilization)

Overall, our findings of pronounced pro-poor inequity in inpatient admissions, implying that inpatient care can meet the needs of older population, are *in line with* most of the aforementioned evidence in Chapter one and Appendix, for the general population:

- a) *in line with* two comparative EU studies of Van Doorslaer, Koolman and Jones (2004) and Van Doorslaer & Masseria (2004) that measured income-related inequity in health care using ECHP data and found no income inequity after standardizing for need studies;
- b) *in line with* almost all Greek literature that argues no-income related inequity (Kyriopoulos et al, 2002; Tountas et al, 2011; Geitona et al, 2007; Siskou et al 2008; Liaropoulos et al, 2008; and the urban setting study of Pappa E. and Niakas D., 2006). However, we need to treat these findings in caution because of limitations in their study design. For example, the evidence for the determinants of informal

payment in public hospitals (Liaropoulos et al, 2008) was a telephone interview survey and should be treated in caution.

- c) *in line with* two urban setting cross-sectional studies: (i) the study of Pappa E. and Niakas D., 2006 in the broader Athens area found that hospital admissions were related to need and not to SES factor; (ii) as well as the study of Sissouras A, Karokis A et al (1996) in Patras' the third largest urban area, under the W.H.O. European Healthy Cities Network Survey, that indicated no-income related inequalities in hospital admissions. It is important to mention that the specific study had a similar framework as our study in PatrasHIS although it was conducted ten years ago before the major NHS decentralization health reform of 2001.
- d) *in line with* the comparative cross-sectional study of Santos-Eggimann B. et al, 2005 based on SHARE survey for *older population*, who explored the determinants of health care use and found no income association of Greek elderly with inpatient admissions.
- e) *On the other hand*, our finding is *contradictory to*: (i) the study of Masseria C., Koolman X., Van Doorslaer E., 2004 with a pooled analysis of ECHP from 1994-1998 in Greece that found significant pro rich inequity for inpatient care relevant to non-elective care (ii) the study of Siskou et al (2008) to analyze private health payments by provider and type of service, which showed pro-rich total number of private inpatient admissions. (iii) A regional cross-sectional study in Thessaly in 2006 of Lahana E. et al (2011) that indicates pro-rich inpatient care, but this study has a small sample and its findings need caution. (iv) Considering the *elderly* evidence: the cross-sectional studies of Majo M. C., van Soest A. (2012) and Allin S. & Masseria C. (2006) based on SHARE survey for elderly which examined the relationship between income and health care utilization across countries and found slightly pro-rich inequity in hospital care use; (v) the study of Allin S., Masseria C. and Mossialos E. (2009) based on SHARE survey that explores income-related inequalities in use of health care by wealth versus income, and found slightly pro-rich inpatient care.

Inequity in outpatient visit

Overall, our finding of no significant (slightly pro- rich) income-related inequity among older population in the probability of outpatient visits mainly due to a medical symptom, is *in line with* few existing evidence for the elderly and general population:

- a) is *in line with* the results of the urban-setting study in Athens for the general population, that doesn't find any income association for outpatient care (Pappa E. & Niakas D., 2006)
- b) is *partly compatible* with other *Greek evidence* for general population of no association of SES characteristics with informal payments in public hospitals for inpatient or outpatient admissions (Siskou et al, 2008; Liaropoulos et al, 2008); Similarly, two studies evaluating cases treated in the ED of a Greek general hospital - reported increased outpatient visits not associated with income - and revealed that almost one in three patients in specific surgical groups could have been managed by a GP (Marinos et al., 2009; Vasileiou et al., 2009).
- c) is *in line with* the results of a study exclusively for Greek *elderly* of Majo M. & Van Soest A. (2012) based on SHARE data that outpatient care does not increase with income.
- d) *On the other hand*, our finding is *not in line with*: (i) the cross-sectional urban setting study of Sissouras A, Karokis A et al (1996) in Patras' the third largest urban area, within the W.H.O. European Healthy Cities Network Survey, that indicated more conditional outpatient visits from those in lower SES (pro poor) – mainly for having diagnostic tests and medication prescribing. However, this is a study before the NHS-ESY reforms.

Inequity in SHIF physician visit

With regard to SHIF physician visits, our findings indicate that there is almost no inequity (slightly pro-rich) for the probability of making a SHIF physician visit indicating that all individuals have the same probability to make a SHIF physician visit, irrespective of their income. Furthermore, elderly people visit a SHIF physician mainly for medicines' prescriptions and only a few make a visit due to medical symptoms. The comparison of our findings of SHIF physician visits with other international and Greek evidence needs to be treated in caution, provided that GPs are only a few and family doctors are not statutory established in Greece. Therefore, when individuals refer to SHIF physician, or GP or Family doctor, usually refer to different specialists, according to their need. However, none of the specialists bear responsibility for the patient as a whole. Therefore, people consult a single provider - specialist regularly, and consider him as their "personal" or "family" doctor, resulting in difficulty in comparing results for inequity in SHIF physician visits.

Under this framework, our finding is *in line with* the results of two cross-sectional urban setting studies: (i) of Sissouras A, Karokis A et al (1996) in Patras' the third largest urban

area, within the Phase II framework (1993-1997) programme of W.H.O. European Healthy Cities Network Survey, that indicated no-income association with SHIF physician visit. (ii) of Pappa E. & Niakas D. (2006) study in Athens for the general population, that found women, elderly, less wealthy (pro poor) and individuals with low physical health status report more visits to their contracted SHIF physician.

Inequity in specialist care use

Overall, our finding of a significant pro-rich inequity in probability of making a specialist visit, mainly for a regular medical visit and a check up, revealing the inefficiencies in PHC services with important policy implications for meeting the needs of older population, is *in line with* most existing evidence for the elderly and general population:

- (i) is *in line with* four comparative EU studies including Greece of Van Doorslaer, Koolman and Jones (2004) and Van Doorslaer, Koolman and Puffer (2002) that measured income-related inequity in specialist care in 1996; Bago d'Uva T. & Jones A.(2009) and Bago d'Uva T. et al (2009) that conducted a pooled analysis for 1994-2001 using ECHP data for Greece and found significant pro-rich inequity for the probability of specialist visit.
- (ii) is *in line with* Greek literature of Tountas et al, 2011; and Mergoupis et al, 2003; Kyriopoulos et al, 2002 that argue pro-rich inequity for specialist visits. Similarly, is *in line with* the nationwide telephone survey of Souliotis et al (2016) for informal payments in health care in 2012, that more frequent visits to private health services (mainly PHC) are reported by persons with higher SES profile.
- (iii) is *in line with* regional cross-sectional studies: (a) in Thessaly in 2006 of Lahana E. et al (2011) for determinants of utilisation that indicates pro-rich specialist care; (b) of Sissouras A, Karokis A et al (1996) in Patras' the third largest urban area, within the W.H.O. European Healthy Cities Network Survey, that indicated pro-rich specialist visits.
- (iv) is *in line with* studies for elderly of Allin S. & Masseria C., 2006 based on SHARE wave 1 data and found that wealth-related difference in physician visits was greater than income differences in Greek elderly;
- (v) *On the other hand, our finding is contradictory* to cross-sectional nationwide studies: (i) the study of Zavras D et al, (2014) that explored determinants of PHC services in Greece during 2006 using the methodology of the WHO (Üstün et al., 2001) and found that people with lower income report increased PHC services (ii) another mail survey conducted in Greece 2001 - 2002 by Geitona et al, (2007) that

examined the determinants of PHC and hospital care utilization and found that the number of PHC visits is affected by income only for poor population. However, it is a mail study with significant limitations on its design. (iii) few studies with *evidence of no association* of individuals' SES characteristics with specialist care as an inpatient or outpatient patient for the general population (Tountas et al, 2011; Siskou et al, 2008; Liaropoulos et al, 2008), with limitations in design. The nationwide study conducted by Tountas et al, (2011) concluded that specialist visit is equally distributed among people in lower socioeconomic status (SES) than those in middle SES . Similarly, the *regional* study of Pappa E. and Niakas D.,(2006) in the broader Athens area found that for specialist visits almost no (slightly pro rich) SES factor was related; (iv) a study exclusively for *elderly* of Majo M. & Van Soest A. (2012) based on SHARE data, that no clear association with SES is found.

Inequity in dentist utilization

Significant pro-rich inequity exists in probability of making a dentist visit.

- (a) Our findings that higher income has been positively associated with dental use as expected, *are in compliance with:*
 - (i) other studies for the general population that identify higher dentist and dental care use by individuals in high SES (Koletsi-Kounari H. et al, 2011; Pavi E, et al, 2010; Koletsi-Kounari H. et al, 2007; Zavras D. et al, 2004; Souliotis K. et al, 2016; Van Doorslaer E. & Masseria C., 2004; Kyriopoulos et al, 2002).
 - (ii) A study that explored determinants of older Greek adults' oral health patterns and found that that cost and no disease awareness were the most frequently mentioned barriers to regular dental visits (Naka O, Anastassiadou V, 2012)
 - (iii) for the *elderly* the studies of Majo M. & Van Soest A., 2012; Egimann S. et al, 2005; Allin S. & Mossialos, 2004 based on SHARE Wave1 data that identify the significant effect of income in dentist and dental care use; and the study of Listl S. (2011) based on SHARE Wave 2 data that explored income inequalities in dental care use and preventive treatment by 50+ and found significant pro-rich inequity in dental care in Greece, and higher inequalities for preventive treatment among retired individuals. Moreover, a recent study of Listl S (2012) based on life-course data from SHARE (waves 1 to 3) that identified pro-higher education inequalities in regular dental attendance throughout the life-course and relatively inelastic until age yrs 65+ but not thereafter, due to age-related inequality decline in Greece.

(b) Our finding is *contradictory to*:

- (i) Greek study (Siskou et al, 2008) that found no association of income with dental care use;
- (ii) Few studies that indicate lower levels of oral health associated with those in lower income and lower SES (Yfantopoulos et al., 2014; Kyriopoulos et al, 2002).

Overall, we could claim that *our evidence shows* that for inpatient and specialist care, no clear income-related association to inequalities in health care is found, comparing to outpatient and dental care that association is clearer.

4.5.1.2 Inequity in utilization of health care services by health care type: Contribution to literature - new evidence and discussion

Our study contributes to the literature of the distribution of income and other determinants in health care inequalities by the older population in the Patra's urban setting, but also explores access to affordable health care, shedding light on the egalitarian equity principle of the NHS ESY in terms of the decentralization reform attempts of 2001-2004. By introducing more sophisticated statistical methodology, we contribute to literature, given that existing evidence for inequalities in health care use in an urban setting is relatively weak and not routinely reported. This study constitutes a challenge for the Greek universal health system, provided that urbanization is a major public health issue for the 21st century, given: the rapid increase of urban population; the frequently insufficient infrastructure; and social and economic inequalities in urban areas that result in significant health inequalities (Vlahov et al., 2007). Along with urbanization, population ageing has been a challenge for the health systems that include accessibility to services, which is linked more to inability to pay rather than proximity to facilities. More recently, it is recognized that the complex dynamics of cities, with their concentration of the poorest and vulnerable groups of people – such as the elderly, pose an urgent challenge to the health community, even within the developed world WHO (2008b). Under this framework, our findings for the municipality of Patras – the third most populated urban area in Greece - contribute to understanding and acknowledgement of the social determinants of health care use inequalities, targeting the older population in a local level.

Overall, our study highlights the multiplicity and complexity of the Greek NHS-ESY health care system. In particular, *our findings of pro-poor inequity in probability of inpatient care* are in accordance with the comprehensive inpatient (secondary and tertiary) care provided to the entire population through the network of ESY public hospitals, especially, in the region of Patras that constitutes the chair of 6th Regional Health Authority (6th YPE) of Peloponnese, Epirus, the Ionian Islands and Western Greece. They are also

compatible with Greek studies that applied the data envelope analyses (DEA) method to evaluate hospital's performance and demonstrated efficient operation of small and medium in size hospitals (250 to 400 beds) in urban areas - versus larger general hospitals - in almost all regions except 6th YPE and 7th YPE for medium size hospitals, and 2nd YPE for small hospitals, (Prezerakos P., 1999; Polyzos N., 2002; NSPH, 2012; Polyzos. N, 2013), except the large hospitals of the 2nd YPE (Piraeus & Aegean Islands) and 4th YPE (Central & East Macedonia & Thrace), as they still remain below the national average of technical efficiency (Polyzos, 2012; NSPH, 2012). Similar findings are identified by another recent study of Xenos P., NektariosM, ConstantopoulosA, Yfantopoulos J (2016) that examined the efficiency of 112 Greek public hospitals in 2009 by applying two models of DEA, augmented by bootstrapping techniques in the efficiency and found that the majority of the NHS-ESY hospitals (30.4%) score between 0.51 and 0.7, while less than a quarter (23.2%) are fully efficient, indicating that, despite the difficulties in the healthcare sector in Greece, certain NHS-ESY hospitals are leading the way to high productivity and efficiency, whereas the less productive, inefficient hospitals were almost 10%. Furthermore, *our findings of slightly pro-rich (almost no inequity) in the probability of outpatient; and the probability of SHIF physician visit; and significant pro-rich inequity in probability of specialist visit;* in combination with high OOP expenses mainly for the specialist and outpatient visit comply with the way that PHC is provided in the Greek health care system. The PHC is provided via multiple subsystems in a fragmented - bureaucratic way with no coordination and a physician-driven organizational structure. As several authors point out, despite the fact that HCCs and PEDY- EOPYYY units (ex IKA) were established in order to provide a wide range of PHC services, in practice, most of the times they result in inefficient, low quality services and problematic operation, due to a number of weaknesses: the inadequate staffing in GPs and nurses and oversupply of specialists; the inadequate medical technology and infrastructure; inefficient allocation of resources between isolated regions versus less rural and urban areas; and the inability of HCCs and PEDY- EOPYYY units (ex IKA) to act as gatekeepers to secondary health care. Given the absence of a gatekeeping system, older patients choose to travel to visit private providers or the outpatient facilities of NHS-ESY hospitals as a first PHC contact, making their demand pressure worse. Nevertheless, by this way, patients tend to ask for care in the private sector or confront informal payments intending to avoid the waiting list of ESY outpatient facilities. This causes interregional patients' flow seeking for care and financial handicaps for the vulnerable populations- who are unable to pay- and increases access inequity. Furthermore, *the results of pro-rich inequity in probability of specialist visit in*

combination with high OOP expenses mainly for the specialist and outpatient visit are related to the oversupply of specialists⁴⁷ and the anachronistic retrospective remuneration system for the physicians that does not provide efficiency-promoting incentives and indirectly encourages physicians to induce unnecessary demand for health care services as well as to ask for informal additional payment. It seems that, while access to hospital care can be considered universal, the same fails to apply to primary (PHC) and specialist care, given the aforementioned weaknesses. In addition, *the finding of significant pro-rich dental care* is related to the limited coverage of dental care in the public sector and the fragmented way which is provided in NHS-ESY and SHIFs facilities (Koletsi-Kounari H. et al, 2011; Koletsi-Kounari H. et al, 2007; Zavras D. et al, 2004; Souliotis K. et al, 2016; Yfantopoulos et al., 2014; Van Doorslaer E. & Masseria C., 2004; Kyriopoulos et al, 2002; Majo M. & Van Soest A., 2012; Egimann S. et al, 2005; Allin S. & Mossialos, 2004). The poor social health insurance (SHI) coverage of dental care, in combination with the oversupply of private dentists⁴⁸ leads to extended use of private dental care sector with high dental care expenditure, especially OOP and informal payments (Koletsi-Kounari H. et al, 2011; Siskou et al, 2008). According to ELSTAT (2014) household expenditure on outpatient services of all specialties includes around 44.1% for dental services. This relates to the fact that, in reality, the Greek population is uninsured for oral health services (Economou, 2015). There is also evidence of regressive interregional variations of the financial barrier for dental services favoring the residents of rural areas (Koletsi-Kounari H. et al, 2007; Siskou et al, 2008). As a lot of authors point out dental provision, the private care and OOPPs by patients act as “a substitute for the gaps in insurance coverage of dental treatment” (Economou, 2010 p.133; Mossialos et al, 2005).

Overall, our findings reveal gaps in coverage and provision in PHC and dental care services that undermine from the one side the egalitarian principle of NHS-ESY established since 1983, of equity in health care delivery: equity of access to available care and equality of utilization for equal need – that implies equal entitlements (Whitehead, 1991; Mooney 1983 &1986); as well as the fundamental policy goal of universal health coverage (UHC). Therefore, our study by collecting the above age-disaggregated information about older people’s abilities to access health care services can facilitate reviews of the existing policies, and services provided in a local level, under the

⁴⁷ Compared to other OECD countries, Greece has the highest number (3.9) of physicians specialists and dentists (1.27) per 1000 inhabitants and the lowest number of GPs (0.31). (OECD, 2013; OECD, 2009) and in the same time there are pronounced imbalances in the geographical distribution of medical professionals.

⁴⁸ Compared to other OECD countries, Greece has the highest number (1.27) of dentists per 1000 inhabitants (OECD, 2009) and in the same time there are pronounced imbalances in the geographical distribution of dentists, with approximately 50% of all dentists employed in the greater Athens area.

framework of NHS-ESY egalitarian principles. The EU has acknowledged that subnational government can make a vital contribution by fostering exchange of good practice and measuring progress (EU, 2007). Initially, our urban-setting study addresses the need the determinants of health care use of the older population to be included as priorities across sectors in local level, as a key factor in eliminating inequalities in health care use. Moreover, given the limited role that local authorities in Greece have in health care planning, organization and provision, our findings illustrate challenges and opportunities for exploring how health and equity are considered in subnational level policy-making. These results suggest that policy design by central governance and Ministry of Health often fails to reflect the realities of the social, cultural and economic factors affecting the lives and assets of people at local level and especially those who have poor resources and are hard to reach. The result is interventions with limited impact or, even worse widening health gaps within countries (Popay J, 2002). They also point out the need for decentralization of responsibilities and accountability for policy and implementation actions related to inequalities in health care use. As Litvack et al. (1988) have shown, reducing central influences and promoting local autonomy may lead to more flexible and efficient policies, as local authorities are better able to respond to local needs, to local problems. However, localization, decentralization and delegated powers may bring tension between different levels of government (vertical conflicts) or among local government agencies (horizontal conflicts). Problems in securing alignment of overall national policy objectives with subnational interventions and local project objectives may undermine coherence and synergy. A well-established organizational development programme is necessary (WHO-CSDH, 2008), with a high level of understanding about, and monitoring of local actions to enable wider dissemination if something is seen to be working but also to determine whether a change in focus is needed if an intervention is not delivering the expected outcome. Therefore, in order local government to respond to local needs, a wider legislative context is needed to create the conditions that shape its ability to act. The success of this approach is unclear, but what is clear is that positive alignment of policy at all levels is critical in achieving the synergy and impact needed to address inequities in health and level-up the social gradient (WHO-CSDH, 2008). In addition, broader mechanisms related to the social protection system should be developed to identify and close gaps in coverage to achieving equitable access, based on key national and subnational local policies such as:

- ✓ coordination and coherence of existing social protection schemes in order to built a well-designed social safety net based on effective and efficient administration and

fiscal sustainability, possibly by the establishment of statutory LTC.

- ✓ involvement of local people and communities in defining the problem of inequalities in use and agreeing solutions and implementation approaches.
- ✓ placing more emphasis on local solutions as a key factor in shaping priorities for action on social determinants in eliminating inequalities in health care
- ✓ introduction of decentralization of responsibilities and accountability for policy and actions to promote monitoring of actions in eliminating inequalities in health care.

Moreover, we believe that the orientation of the Greek fragmented health system designed to provide acute care, to an integrated care system among levels with focus on the needs of older population is crucial to promote equitable access to care services and social cohesion.

4.5.2 Social health insurance fund (SHIF) coverage variances as a determinant of inequalities in health care use

- Inequalities are apparent among the SHIFs in use of most health care types, except the probability of inpatient admissions, favoring the less advantaged.
- Non Noble OGA SHIF has a more pronounced pro-poor contribution to overall inequity in the probability of specialist private visit favoring the worse off, than Noble SHIFs, revealing an unfair relationship with important policy implications, given the least benefits and the minimum freedom of choice of OGA beneficiaries.

4.5.2.1 Social health insurance fund (SHIF) coverage variances: Comparison with existing literature

Consequently, our findings *are in line* with the significant differences among health insurance organizations regarding the level of coverage (content, procedures and quality) and freedom of choice, as they have been confirmed and validated by most Greek and foreign experts in health care policy (Mossialos E. et al, 2005; Economou D., 2010; Economou C. & Giorno C., 2009; Petmesidou M. & Guillen A., 2008; Tountas et al, 2011; Kyriopoulos et al, 2002).

4.5.2.2 Social health insurance fund (SHIF) coverage variances: Contribution to literature - new evidence and discussion

Our findings of inequalities among the SHIFs in use of most health care types, contribute to the literature to identify gaps among the SHIFs in level of coverage, finance and provision of services, resulting in inequalities in use of services. Moreover, *our finding of pro poor contribution of Non-Noble Farmers OGA SHIF in the probability of specialist private visit favoring the worse off*, reveals an unfair relationship and has severe financial impact for the vulnerable older population insured in OGA SHIF, with important policy

implications for the progress on UHC objectives. Our findings contribute to the need for more knowledge about what works in SHIFs that have different resource constraints and different challenges in order to ensure equitable access. Overall, these inequalities result from two issues. First they result from the design of respective fragmented social protection system, given that entitlement to social health insurance (SHI) and the assignment to a SHIF depend on the occupation of the insured with variations in coverage, financing and provision of services. In addition, inequalities in SHIF coverage result from the fact that, on average, poorer people covered by Non Noble OGA SHIF, suffer from more health problems and hence need more health care. As Economou (2010) indicates, historically, although SHIFunds in Greece have played a very important role, especially with regard to the coverage, financing and provision of health-care services, their role and influence were not equally significant in the planning and regulation of the ESY, despite the fact that any development in the ESY impacted directly on them, and any significant change in the social insurance field impacted on ESY financing. There was no statutory link between these two aspects and no active institutional body to coordinate actions on common issues and problems. Our findings are summarized:

- In particular, despite the fact that Non Noble OGA SHIF is the second largest SHIF that covers 20% of the Greek population mainly less advantaged farmer people in agriculture, it provides the least benefits and the minimum freedom of choice for PHC and hospital care, compared to other Non Noble and Noble SHIFs. OGA SHIF offers primary care services in rural ESY health centres (HCCs), regional offices-rural posts, and outpatient NHS-ESY hospital departments and limited dental care in HCCs, whereas visits to PEDY-EOPYYY (ex IKA) PHC units or any private specialist consultation contracted or private hospitalization is not covered. Thus, the limited services in combination with the low quality, and problematic operation of HCCs due to significant staff shortage of GPs, and irrational regional allocation of resources, OGA beneficiaries face the long waiting lists in most outpatient ESY departments, and they are forced to visit private providers and face high OOP and informal payments in ESY sector in order to bypass the waiting list, placing at a disadvantage the vulnerable populations that do not have the ability to pay or means of transport to travel to urban areas for care (Liaropoulos et al, 2008)^{49,50}. This is also strengthened by our findings on

⁴⁹ It is calculated that households in rural areas exhibit the highest rate of health care expenditure to their total consumption expenditure (8.3 per cent) whereas Athens area has the lowest rate (6.2 per cent) among households in Greece (Petmesidou M. & Guillen A.,2008 data obtained from ESYE).

⁵⁰ Out-of-pocket payments represent a high percentage of health expenditure in Greece, accounting for 38% of total health expenditure than 21% of EU average for 2010 (OECD, 2012). The figure depicts formal cost-sharing

the financial barrier of OOP expenses that OGA beneficiaries face mainly for specialist private visits and out-patient care, leading to a regressive relationship in terms of ability to pay.

- On the other hand, PEDY- ex EOPYY IKA SHIF beneficiaries have more choices for receiving specialist care via their own network of 350 urban units, as well as via the outpatient ESY departments and the HCCs.
- Noble SHIFs provide services have all choices for care via: private physicians with own practices; via private diagnostic centers, as well as via prestigious private hospitals for outpatient and inpatient care under contract to the Noble SHIFs. As a consequence, it is obvious that Noble SHIFs beneficiaries face lower levels of informal payments comparing to Non Noble SHIFs, indicating the regressive relationship of OOP amount with specialist private visit, as it is demonstrated in our findings.

These inequalities in use of health care among the elderly indicate that social health insurance in Greece, as a social determinant of health, does not ensure comprehensive coverage of older population against the risk of illness. Our findings that reveal gaps in coverage, finance and provision of services, undermine the egalitarian principle of NHS-ESY established since 1983, of equity in health care delivery that implies equal entitlements (Whitehead, 1991; Mooney 1983 &1986). Moreover, the finding of regressive relationship of Non-Noble OGA beneficiaries in terms of ability to pay for specialist private visits and out-patient care undermine the UHC objectives of financial protection, effective coverage and health system performance, as introduced by the WHO Health Report 2010 and WHO-CSDH (2013), that all people obtain the health services they need (i.e. equity in service use relative to need), as a first step towards a more equitable health care system. This is also a matter of serious concern, as it undermines the constitutional guarantee of free access to health services, as discussed in the following section for OOP expenses barrier. Under this framework of strong inequalities in SHIFs coverage and gaps in services provided among SHIFs, in combination with the deep structural and multifaceted crisis that Greece faces since 2010, the Greek government has implemented reforms in health care system in order to protect accessibility to health care for vulnerable groups and reduce public health expenditure. The unification of SHIFunds (IKA, OGA, OAEE, OPAD) in one scheme (EOPYY) that was established in 2011 as a sole purchaser of health services with the Law 3918/2011 implementing risk-pooling, is in the right direction. The unification under EOPYY has produced major benefits for social solidarity

arrangements, direct payments and informal payments, with the latter two representing the highest proportion of out-of-pocket payments among EU countries.

by establishing a common basic package of health-care services in EOPYY, but there are still differences in eligibility conditions. However, in the current austerity-driven context, the common package was accompanied by reductions in benefits and by increases in copayments and user charges for visits to HCCs and hospital outpatient departments, pharmaceuticals and laboratory tests. Following, in spite of the magnitude of the gap in coverage created by the crisis, two ministerial decisions in 2014 and a recent Law 4368/2016 were introduced and only extended coverage of prescription drugs and inpatient care to the uninsured (estimated, between 1.5 and 2.5 million people due to unemployment) – including vulnerable elderly. Therefore, it seems that the Government developed specific mechanisms to support equitable access to needed services for vulnerable groups initially limited, slow and ineffective (Economou et al. 2015). We hope that even these mechanisms and reforms will be fully implemented, given that the most significant problem facing health policy in Greece is the gap between declared objectives and the implementation of the legislation. Moreover, we believe that the orientation of the Greek fragmented health system designed to provide acute care, to an integrated care system among levels focus on the needs of older population is crucial. In addition, the establishment of statutory LTC (including policies for coordinating health and social needs of the elderly) based on ensuring equitable access to care services will provide a real safety net for older people– and their families. It will also help to share the risk of catastrophic health-care costs, reduces burdens on families and promotes social cohesion.

4.5.3 Out of pocket payments (OOPPs) as a barrier in the health care utilisation

Our findings, summarized, reveal that OOP expenses as a financial barrier contribute to inequalities in health care use, however, not for all health care types and with a different magnitude among health care types.

- OOP expenses, as a financial barrier, affect inequalities in PHC use, primarily in probability of SHIF physician and specialist private visits and not inpatient and outpatient care.
- The OOP amount is a significant barrier to specialist private visit in terms of ability to pay by income revealing a regressive relationship, also in relation with SHIF coverage.
 - ✓ Mean conditional OOPP ($>0\text{€}$) amounts for the specialist private visit decreases as the income level proceeds from poorest to richest level, revealing a regressive relationship

- ✓ Non Noble OGA SHIF beneficiaries –less advantaged – face the highest conditional ($>0\text{€}$) mean OOP amount for a specialist private visit, slightly higher than the amount paid by Non Noble IKA beneficiaries.
- ✓ Those with Noble SHIFs coverage seem to face significantly lower OOP mean amount than the other SHIFs, revealing a regressive relationship in terms of SHIF coverage.

4.5.3.1 Out of pocket payments (OOPPs): Comparison with existing literature

Our findings are in line with most of the aforementioned evidence that was analytically presented in Chapter one and Appendix.

- a) Our finding that OOP and informal expenses *burden specialist private visits and outpatient visits* of older population to a higher magnitude than inpatient admissions, *is in line with* nationwide cross-sectional studies: (i) the study of Souliotis, Golna et al., (2016) that 36% of individuals report under-the-table OOP payments for visits to private practitioners and dentists, and 12.2% to providers of PHC in HCCs and SHIFs'centres. (ii) Similarly, the study Hellas Health I in 2006of Tountas et al, (2011) found that 39% of the sample paid OOP for visits to health professionals. (iii) Similarly, Siskou et al (2008) found that one out of three patients uses informal payments in order to receive specialist care as inpatient or outpatient in public hospitals regardless of their SES characteristics. (iv) In addition, the more recent qualitative WHO study for barriers in access to health services - based on interviews and focus groups, revealed large increases in OOP expenditures: charges for medical prescriptions as well as unlisted drugs and laboratory tests (Economou C, 2015). (v) Moreover, about *elderly population*, a recent EU comparative post-death evidence for older population using pooled data of SHARElife survey (in 2005 for Greece) detected that 54% of the sample paid OOP for specialist care (Penders Y. et al, 2016)
- b) Our findings that income is not associated with the possibility of paying *OOP for receiving inpatient, outpatient and specialist private care* *is in line with* the aforementioned studies for general and older population presented at Chapter one indicating that individuals face OOP and informal payments for receiving specialist care as an inpatient or outpatient, irrespective of their socioeconomic characteristics and SHIF coverage (Economou, 2015; Gregorakis N. et al, 2014- mainly pro-poor evidence; Siskou et al; Liaropoulos et al, 2008; Tountas et al, 2011; Kaitelidou D. et al, 2013 and Penders Y. et al, 2016; Matsaganis M., Mitrakos T., Tsakloglou P, 2008). It is worth mentioning a current nationwide telephone survey conducted in 2012 by Souliotis, Golna et al., (2015) indicating that under-the-table payments were reported for

approximately 32.4% of public hospital admissions. Similarly, another telephone nationwide survey for exploring informal payments in public hospitals in 2008 found that 36% of those treated in public hospitals had made at least one informal payment (Liaropoulos, Siskou, Kaitelidou et al., 2008). Moreover, the recent qualitative WHO study of Economou C (2015) revealed that certain users view informal OOP payments as facilitators for timely access to qualitative services, especially inpatient care.

- c) Moreover, our findings of *regressive relationship in ability to pay OOP for receiving specialist care* are *in line with* a lot of aforementioned studies for the fairness and economic impact of informal payments. Matsaganis M., Mitrakos T., Tsakloglou P, (2008) found that the top 1% of all households accounts for 37.6% of all OOP hospital expenditure, and elderly households spent 12% to 13% of their household budget shares on health. Similarly, according to 2014 Household Budget Survey data the poor households' expenditure on health is 9% of the family budget higher than the corresponding percentage for non-poor households (7%) ELSTAT (2015). Similarly, Grigorakis et al (2016; 2014) found that the average OOPP for health corresponds to 10.86% of annual gross income of households.
- d) Considering *the elderly evidence* based on SHARE data, in Greece the poorest respondents state that they make OOP three times more than the richest ones, a reversed pattern compared to Italy and Spain (Rodridues R. et al, 2013). Similarly, Holly A. et al (2008) and Børsch-Supan A. et al, (2005; 2008) found that the poorest spend a higher share of their income on OOP health expenditures on all health care than the better-off; and Scheil-Adlung, X. and Bonan, J. (2013) found that the poorest pay OOP 11% of their household income versus 1% of the rich.
- e) Last, our findings that reveal the *regressive relationship of the SHIF coverage* with health care use, given that the Non Noble OGA SHIF old beneficiaries –less advantaged – face the highest OOP mean amount for a specialist private visit than the other SHIFs, *are in line with* other analyses indicating that the distribution of health care expenditures is related to the fragmented character of the SHI system favouring the Noble SHIFs beneficiaries (Liaropoulos, 1995; NSSG , 2002; INE-GSEE, 2010). It is worth noting the study of Grigorakis N. et al (2016;2014) that examined the relationship of OOPPs and SHI funding for inpatient care in private hospitals, and found that EOPYY- SHI covered only 47.32% of total health expenditure with the remaining 52.68% as OOP.

4.5.3.2 Out of pocket payments (OOPPs) as a barrier in the health care utilization: new evidence and discussion

Overall, our findings have a major *contribution to literature* of the role of OOP payments in inequity in use of health care among the older population in an urban setting level. Our study gives the opportunity to explore the regressive relationship in ability to pay OOP, as well as the fairness and economic impact of OOPPs on the income and living conditions of older population. It allows evaluating the extent to which social health protection system – via SHIFs - offers adequate protection to the elderly against the financial risk of illness in urban setting level, an issue that we find gap in the literature. As aforementioned in Chapter 3, while population coverage for health care is universal in Greek NHS-ESY and there is significant funding in terms of GDP (9,3%), coverage for LTC is scattered and OOPPs constitute 31.0% of total expenditure for health care. Despite its regressive nature, OOP constitutes a financing mechanism in Greece in addition to tax – and contribution-based funding. Moreover, this burden is increased if we consider the fact that as LTC for elderly is not statutory available and the state expenditure is less than 0.3% of GDP, other costs are likely to arise from the inappropriate use of acute health-care services, that include OOPPs to fund a large portion of LTC (EC, 2014). Our finding of financial OOP expenses barrier, for using health care services that supports the existing literature, undermine the constitutionally guaranteed free access to health services, under the main egalitarian principle of equity in health care financing whereby individuals' payments for health care should be based on their ability to pay and therefore proportional to their income. They also undermine the main principle of UHC that embodies one of the ultimate goals of health systems – financial protection, according to *WHO The world health report* 2010. This is strengthened by our findings that the poorest elderly and the Non Noble OGA SHIF beneficiaries – who tend to be less advantaged- are more likely to pay higher OOP amount for making a specialist private visit than the better off and the beneficiaries of Noble SHIFs, revealing significant inequalities and a regressive relationship in ability to pay that could result in catastrophic payments.

OOP and informal payments (hidden economic activity) in health care concern the provision of inpatient and outpatient - specialist services and payments to physicians, primarily surgeons so that patients can bypass waiting lists or ensure better quality of service and more attention from doctors (Kaitelidou et al, 2013; Kentikelenis A. et al, 2011; Siskou et al, 2008; Liaropoulos et al, 2008; Mosialos et al, 2005). In addition, the

OOPPs are also supported by the oversupply of specialists⁵¹ and the anachronistic retrospective remuneration system for the physicians that do not provide efficiency-promoting incentives and indirectly encourage physicians to induce unnecessary demand for health care services as well as to ask for informal additional payment. Therefore, given the incomprehensive and uneven development of health coverage, and the lack of a rational pricing and remuneration policy, informal payments were developed as complement to public funding (Brian -Abel Smith et al,1994; Mosialos et al, 2005; Liaropoulos et al, 2008). Moreover, the persistence of OOP and informal payments in health sector is explained by the broader “culture” of informal payments that characterizes the Greek public sector in general and is related with tax evasion in the health system (Yfantopoulos J.,2014; Souliotis K et al, 2016; Yfantopoulos, 2003; Siskou et al, 2008; Liaropoulos et al, 2008, Mossialos et al, 2005)^{52 53}. This issue is explained more in Chapter three and Chapter six of SHARE survey results. Moreover, as far as it concerns the elderly, it is important to keep in mind some key factors that influence the extent to which OOP expenditures on health for elderly are incurred:

- ✓ deficits in financial protection;
- ✓ the lack of a well-designed social safety net and ineffective eligibility criteria for a non-statutory LTC that result in arising the inappropriate use of acute health services increasing costs;
- ✓ values that till recently consider caring for the elderly as a “family affair” with most of the financial burden to fall on the elderly and family;
- ✓ forced private and informal payments due to the absence of a formal workforce;
- ✓ and the fact that, on average, more poor people suffer from health limitations and hence need more health care with the impact of related OOP on income to be significantly higher for the poor than the rich.

Overall, this issue is a matter of serious concern, given that as international experience shows, OOPPs are not the only important determinant of catastrophic payments. They are the biggest issue when all three factors are strong: poverty; restricted access to and use of health services – especially when social mechanisms ‘failure to pool financial risks (Xu et al., 2003). The implications are very serious if we consider the eight years period of

⁵¹ Compared to other OECD countries, Greece has the highest number (3.9) of physicians specialists and dentists (1.27) per 1000 inhabitants and the lowest number of GPs (0.31). (OECD, 2013; OECD, 2009) and in the same time there are pronounced imbalances in the geographical distribution of medical professionals.

⁵² Yfantopoulos J. (2013) on a pooled cross section-time series analysis for the period 1958-2011, revealed that overall, more than one quarter to one third of Greek economic activities have been either unrecorded or hidden from official statistics – valued from 24.66% (sd. \pm 2.8) to 30.13% of the GDP.

⁵³ There is Greek evidence that informal payments (hidden economic activity) in health care represent a high proportion of OOPPs. A recent study for 2012 found about €1.5 billion or 0.8. % of GDP to account for a hidden economy in the health sector, similar to an older study of 0.9 % of GDP in 2005 (Souliotis K et al, 2016; Siskou O. et al, 2008).

economic crisis in Greece since 2008, that are characterized by several cuts in pensions, deterioration of the living standards of retirees, raised poverty and the share of the population at risk of poverty in combination with the decline in household income, and the lack of a well-designed social safety net, as presented at Chapter three⁵⁴. Consequently, according to various waves of Flash Eurobarometer surveys (2009b, 2010b, 2010c, 2011 and 2012), Greece appears among the three countries with the highest proportions (from 47% to 63%) of respondents finding it more difficult to afford health care. It is worth mentioning the significant and alarming result of the aforementioned study of Scheil-Adlung & Bonan (2013) for the elderly health care use, which revealed that ruinous OOP expenditure for health care affects 5% of elderly households in Greece in 2004, as well as other Greek studies for the general population revealing substantial increase of household payments to public hospitals from 4.2 % in 2008 to 7.8 % in 2012 (Souliotis K et al, 2016). Therefore, identifying equitable ways of sharing the burden of care giving is critical. In most countries, regardless of how revenue is collected, broad-based risk-pooling or targeting resources helps spread the financial costs of long-term care across the whole of society. This helps protect poor and marginalized people, and reduces the risk of financial catastrophe for older people and their families. Under this framework, the unification of SHIFunds (IKA, OGA, OAEE, OPAD) in one scheme (EOPYY) that was established by Ministry of Health in 2011 (Law 3918/2011) as a sole purchaser of health services with implementing risk-pooling and introducing a common basic package of health-care services, is in the right direction, although still exist variations. Following, two ministerial decisions in 2014 and a recent Law 4368/2016 that extended coverage of prescription drugs and inpatient care to the uninsured (estimated, between 1.5 and 2.5 million people due to unemployment) – including vulnerable elderly, are important mechanisms, although they do not implement coverage for all the services. It seems that the Government developed specific mechanisms to support equitable access to needed services for vulnerable groups initially limited, slow and ineffective (Economou et al. 2015). In addition, specific mechanisms within and beyond social health protection schemes should be developed to address the potential risk of impoverishment of vulnerable groups. Greek Ministry of Health needs to identify and close more gaps in coverage and develop effective policies targeting the most vulnerable, such as: tailored benefit packages for those most in need; and abolishment of co-payments and user fees for the most vulnerable in order to limit the burden of OOPPs. Overall, in all schemes and systems, an attempt should be

⁵⁴ ELSTAT's data, as we presented at chapter three, reveal that severe deprivation of elderly in Greece has doubled the (average) rates comparing to EU-27 from 2003 (pro crisis) till 2013 (in crisis), and more than double in 2014 and 2015, when the austerity measures are implemented

make to provide at least essential benefits for the elderly to ensure them access to affordable services and financial protection.

4.6 Conclusion

The purpose of the present study was to explore income-related inequalities on utilization of healthcare among the population over 50 years old in an urban-setting in Greece and explore the role of out of pocket payment mechanism (OOPP) in health care use as a dimension of inequalities in the utilization of health care services and a financial barrier to access. Using the Patra Health Interview Survey (PatraHIS) on the urban setting of Patras we have tested the hypotheses:

- (i) The inequalities in use of health care is derived from the different socioeconomic characteristics of the older population that uses the health services;
- (ii) Individuals on higher income are more likely to use health care services than lower income comparators;
- (iii) Individuals with “Non Noble” social health insurance coverage are more likely to pay OOP for using health care than comparators with “Noble” social health insurance coverage.

Applying different methodological approaches, such as the horizontal inequity index via the calculation of concentration indices (as developed by Van Doorslaer and colleagues) and using regression model, we quantify income-related inequity and measure the effect of socioeconomic indicators on the likelihood of contact with health care services. Moreover, using regression model, we measure the effect of socioeconomic indicators on the likelihood of paying OOP for using health care. Our findings support the existence of pro-rich inequity in probability of specialist and dental care. Significant pro-poor inequity was found in probability of inpatient admissions. No significant (slightly pro-rich) income-related inequity was found for probability in outpatient visits and probability of making SHIF physician visits. Income has a large positive effect on inequity – it increases inequity in probability of specialist and dentist visit, as well as it slightly increases inequity in probability of SHIF physician visits, whereas it has a less pronounced effect on inequity in probability of inpatient admissions and probability of outpatient visits, favoring the less advantaged. Our findings indicate that income itself is not the only contributor, provided that higher educational level status and SHIF coverage do not have a consistent effect and explain a high percentage of inequalities in almost all health care types. In addition, by decomposing income – related inequity we identify and measure the extent of SHIF coverage as one of the main contributors to the overall inequity in the likelihood of using health care. Inequalities are apparent among the SHIFs in use of most health care types,

except the probability of inpatient admissions. Non Noble OGA SHIF has a more pronounced pro-poor contribution to overall inequity in the probability of specialist private visit favoring the worse off, than the Noble SHIFs, revealing an unfair relationship with important policy implications. Moreover, OOP expenses as a financial barrier contribute to inequalities mainly in probability of SHIF physician and specialist private visits and not inpatient and outpatient care. The OOP amount is also a significant barrier to specialist private visit in terms of ability to pay by income revealing a regressive relationship, as well as in terms of SHIF coverage among the older population. The economic crisis might have worsened the existing inequity in health care use, especially for the older population. As stressed in an OECD report (2011, p. 101) “the real issue in the field of health in Greece is not merely to improve control over expenditures but also, and above all, to enhance the quality of public medical services”. In line with reduced health care spending (down 30% since the start of the crisis), a series of reforms have been launched in the last two years. The objective is to enforce fiscal discipline and keep public health expenditure at or below 6% of GDP. The challenges in maintaining a balance between efficiency, universal access and service quality mean it is questionable whether this can be achieved under such harsh cuts⁵⁵. Although there is a lack of data regarding health inequalities, especially of the elderly, the existing anecdotal evidence indicates a worsening of health conditions. Further to the measures implemented so far, efficiency gains can increase by systematically tackling fragmentation in the governance and administration of the public health care system, especially in primary health care funding and provision of services, in order to proceed to a truly national health system.

It is also worth noting that future prospects for social and economic progress in the EU appear to be viewed with ‘uncertainty’ by both policymakers and citizens. According to the third EQLife Survey of 2013 “There has been a general decline in optimism across the EU in comparison with the 2007 survey; this decline is associated with reduced trust in government and the economic situation. “Fears that income insecurity would increase were more common among people in the bottom income quartile and especially among older people aged 50+.” (Eurofound, 2013 p.150). This study is intended to be an initial contribution towards improving knowledge and awareness of equity challenges facing use of health care among the elderly Greek population.

⁵⁵ Cost per patient in public hospitals fell from €3,500 in 2009 to €3,000 in 2010 and €2,500 in 2011 (Ministry of Health, 2011). However, in the last six months of 2011, only for the entry ticket to hospitals patients paid out-of-their pocket about €14 million, while for afternoon visits to public hospital medical doctors out-of-pocket payments rose close to €100 million. These indicate a creeping privatisation that is a hotly debated (Petmesidou, 2012).

Chapter Five

5. “Inequalities in health care use in Greece among the older population – Greek National Health Interview Survey (GNHIS)”

5.1 Introduction

According to WHO Commission on Social Determinants of Health (WHO-CSDH 2008; 2013) “significant increases in the numbers of older people in the EU-region mean that investigating and understanding the underlying determinants of health and inequities in health care among them is an important priority for Europe, the region of the world with the largest older population for its overall population size”. Inequities in health and access to health care are important issues for the growing older populations of Europe and Greece. As WHO-CSDH Review recommends, “building an equitable universal health care system should therefore be a priority ambition for all countries in the EU. Neither cost nor social exclusion should be a barrier to treatment”. In addition, access to care, is an essential element in achieving quality of life and growth, a main objective in the *WHO-Europe Health 2020* strategic plan (EC, 2014). Similarly, considering ageing population, health care systems – via regulation, must take action to ensure that older people are not discriminated against within the system, compared with other age groups (WHO -CSDH, 2013). However, without a clear understanding of the cause of the causes of inequities in health, action is likely to be ineffective, project-driven and inappropriately targeted at the bottom of the social gradient. Evidence of variations in the mortality, disability and subjective health of older people in the EU by social factors, is extensive – and generally indicates that the less advantaged have poorer outcomes, especially those aged 75 and over, receive less costly and lower-quality treatment than younger patients with the same illness (Grundy E et al, 2012). However, in terms of access to health care, there is limited evidence of unequal access to various therapies and services by age, gender, education level and other SES indicators (WHO-CSDH, 2013). All the relevant working documents acknowledge that evidence-based interventions for addressing health inequities in older age groups are incomplete. Lack of data presents a significant challenge in addressing inequity (Marmot, 2010). The health system needs to be capable of generating and using evidence, setting equity-oriented targets and monitoring effects to ensure the effectiveness of actions, undertaken. The setting of equity-oriented targets needs to be the result of a political process involving all relevant stakeholders, whereas targets require a monitoring

framework with sufficient data. Moreover, evaluation and assessment evidence about the effects of existing policies is needed to allow policy refinement and knowledge development about other actions and the impacts they might yield. Therefore, it is apparent that improving health and health equity requires an approach that is based on evidence and up-to-date information. As a consequence, measurement of equity of access to health services is a core component of health system performance assessments (Economou, 2015; Allin, Hernández-Quevedo & Masseria, 2009; Hernández-Quevedo & Papanikolas, 2013; OECD, 2004a). This issue is fundamental in Greece given that the establishment of ESY since 1983 aims at comprehensive and universal coverage of the population based on the egalitarian principle of equity. However, despite success in improving the health of the population, the Greek health care system still faces structural problems concerning the organization, financing and delivery of services. The health system still functions within an outmoded organizational culture dominated by clinical medicine and hospital services, without the support of an adequate planning unit or adequate, accessible information on health status, utilization of health services or health costs; with a regressive system of funding including extensive user charges and informal payments; inefficient allocation of resources based on history rather than needs, perverse incentives for providers; a heavy reliance on unnecessarily expensive inputs, and without being proactive in addressing the health needs of the population through actions in public health and primary health care (Economou, 2010). Therefore, from the institutional information of the Greek health care system, a debate is emerging about whether access to health care is indeed equally available to all, arising from supply-side variation, different entitlements and benefits coverage across insurance funds and high informal and direct payments. In addition, despite the fact that Greece has adopted a number of WHO and EU recommendations for universal and equal access to health care services, there is not any clear policy framework relating to inequalities in health care or any serious research on possible reasons that prevent access to health care for the general and older population, apart from a National Action Plan to ensure access to health services for all the citizens in 2013 by the Ministry of Health that has not been implemented (Chrodis JA, 2014). Moreover, little attention has been paid to investigating and measuring equity in the use of health care among the elderly, since they are the consumers who, though they receive high health services, have to deal with unfair use of service among other income groups (Allin S. and Mossialos E., 2005).

5.2 Research Questions

Drawing from the aforementioned challenges – inefficiencies of the Greek NHS, in order to achieve the thesis' objective, the first wave of the nationwide, multidisciplinary GNHIS survey that embedded the European Health Interview Survey (EHIS) modules, with reference time in 2008-2009 will permit us to explore the main hypothesis of this thesis - that the population is expected to face high inequalities in health care use, particularly the elderly - shedding light on the equity issue of the NHS - ESY reforms of 2005-2008 via the acts of 2005, 2006 and 2007, in particular Law 3329/2005. It will permit to explore inequalities in NHS-ESY health care after the adoption of Law 3329/2005 that inactivated most of the 2001 and 2003 Regional Structure of Health Care Services (PeSYPs) that renamed as “Regional Health Administrations - RHAs” (DYPEs or YPE) and reduced RHAs from 17 to 7 in order to “achieve economies of scale”. Consequently, any real decentralization of competences or independence from central government for DYPEs to develop their health services according to the needs of their populations has not been achieved. The management and control of the health care system still remain with the Ministry of Health (ESCG, 2005). Building on the GNHIS – Wave1 and the features of the Greek health care system, we address the following empirical research questions (RQs), guided by the following theoretical hypotheses (THs). THs: (i) The inequalities in use of health care is derived from the different socioeconomic characteristics of the older population who use the health services; (ii) Individuals on higher income are more likely to use health care services than lower income comparators; (iii) Individuals in densely-populated areas are more likely to use more health care services than comparators in intermediate and thinly – populated areas. Guided by the THs we address the following research questions (RQs): (i) What is the extent and contributors of inequity in the use of health care among people over the age of 50 in Greece? (ii) What is the extent in national regional variations and inequalities in accessing health care services among the older population over the age of 50 in Greece?

It is worth mentioning that, as aforementioned in Chapter two, the exploration of GNHIS evidence for the period of NHS-ESY reform of 2005-2008 will supplement evidence of the other two datasets – survey tools of PatraHIS and SHARE for the period 2001-2004 and will result in a robust evidence for inequalities in health care system among the older population to shed light in the whole pre-crisis period in Greece. Therefore, the GNHIS study will attempt to give a clear understanding of inequalities in health care use, by studying the past. Nevertheless, studying the past may contribute to a clearer understanding of the present and this may affect the future (Porter, 1995) and the possible ways to

transform the NHS-ESY system for serving its foundation egalitarian principles of equity in access and universality among the elderly population in Greece.

5.3 Sample and variables

Our study includes all individuals aged 50 years or above. The resulting unbalanced sample includes 3433 individuals aged 50 years or older (from the 6036 respondents or 56.8% of the total sample). This rate is comparable to the response rate of the European survey SHARE for the population aged 50 or over. Moreover, to compensate for non response, we used sampling weights as provided. The GNHIS via 130 questions and around 340 variables covers a wide variety of topics split among four modules on health status; health determinants; health care; and background demographic and socio-economic variables. Overall, in our study, *the dependent variables of health care utilization* were measured by nine separate questions: five questions for the likelihood of a contact and four questions for the number of contacts. The dependent variables for the likelihood of a contact were measured by five separate questions asking the respondent whether he or she has been visiting a hospital as inpatient, as outpatient, a GP/pathologist, a specialist, and a dentist for the last 12 months. The dependent variables of the contacts' number were measured by four separate questions. The numbers of admissions for inpatient / outpatient care have a reference period for the past 12 months, whereas the number of contacts for specialist/GP visits has a reference period for the past 4 weeks. For the models of the conditional number of contacts, only individuals who report ≥ 1 visit are included. For the models of the total number of contacts individuals with 0 visits are also included. Moreover, in our model, we include only the likelihood of dentist visit and not the number of dentist contacts as there was a very small response rate for the specific question. A detailed overview of the utilization dependent variables and the respective questions are showed in detail in Appendix Table A1. *The explanatory variables* used in the models include the following health, demographic and socioeconomic factors, based on the standard approach in the empirical literature: Age (in four dummies: 80+; 70-79; 60-69; versus 50-59 as reference); gender (male; versus female as reference) health status (need) variables associated to physical health dichotomized: The general SAH measure on self-perceived health ("very good and good SAH" as a reference); activity limitations LTI ("no LTI" as reference); GALI ("not limited" as reference variable); and the number of chronic medical conditions using three dummies ("0 chronic conditions" as the reference category). These health status variables constitute the Minimum European Health Module (MEHM)⁵⁶, as a proxy for care need. An assumption that underlies this study is that individuals with bad health conditions

⁵⁶ Eurostat (2013) European Health Interview Survey (EHIS wave 2)- Methodological manual. Methodologies and Working papers. 2013 edition.

and poorer SAH have a greater need for health care, an assumption that is likely to be true in the majority of cases (Allin S. et al, 2011). GNHIS *income measure* is derived from a variable with 10 values –deciles – income bands. It is the household monthly net income derived as the sum from any source per equivalent member added up, after tax and social security contributions Any taxes and social contributions- that have been paid- are deducted from this sum. We adjust household income to reflect differences in a household's size and composition by applying the modified OECD scale⁵⁷. For the regression analysis on the whole data set, the equivalent income variable was calculated using quintiles leading to five (5) income categories, with the 5th richest quintile: "More than 1.225.3€" and the 1st Poorest quintile with range "1€ - 525.5€" as the reference category. Following, in order to quantify the effect of income on health service utilization by calculating and decomposing inequity (HI), we also construct a continuous estimate of monthly net total household income equivalised (as a Logarithm of Income Level). Moreover, variables other than need and income are included in the model, based on the conventional method in the empirical literature, as it is given below: The highest educational qualification is included based on the standard coding of the ISCED-97 into 6 levels, grouped into three (3) categories with "No/Partial/Completed Primary school (ISCED 1)" as the reference category. Marital status was dichotomized with "never married/widowed & not remarried/divorced & not remarried", as the reference category and household composition was grouped into three categories with "Living alone" as the reference category. *Region of residence* is based on the EU Nomenclature of Territorial Units for Statistics (NUTS) used to indicate which territorial unit the household is located in. For Greece there are 4 units in the NUTS1 level concerning 13 urban and regional areas – economic territories that define the variables we include: GR1-North Greece (including Thessaloniki the 2nd more densely populated); GR2 - Central Greece (mountainous and thinly populated); GR3-Athens (the capital, as the reference category); and GR4- Islands (including Crete the largest very mountainous island)⁵⁸. *Degree of urbanization* is derived from 3 dummies: Thinly-populated area; Intermediate area; and Densely-populated area as reference category. There was no information about housing tenure. Moreover, despite the fact that variables about the type of Social Health Insurance Fund coverage ("Privileged" versus "Non-Privileged"), the payment

⁵⁷ Where equivalised household size is a sum of weights attributed to each member of the household according to the modified OECD equivalence scale: 1.0 to the first adult; 0.5 to the second and each subsequent person aged 14 and over; 0.3 to each child aged under 14.

⁵⁸ GR-1North Greece includes: Eastern Macedonia & Thrace (GR11) & Central Macedonia (Thessaloniki - GR12) & Western Macedonia (GR13) & Thessalia (GR14). GR-2 Central Greece includes: Epirus (GR21) & Ionian Islands (GR22) & Western Greece (GR23) & Central Greece (GR24) & Peloponnese (GR25). GR- 3 Islands includes: North Aegean Islands (GR 41) & South Aegean Islands (GR 42) & Island of Crete (GR 43); GR – 4 Athens includes: Athens (GR30).

mechanism (OOPPs) and the existence of Voluntary Health Insurance (VHI) were developed by the Eurostat Group and included in the GNHIS – Wave 1 questionnaire, the Greek National Statistics Authority failed to select the relevant information and not included in the GNHIS Wave1 database. A detailed overview of the need and socio-economic explanatory variables are showed in detail in Appendix Table A2.

5.4 Results

5.4.1 Descriptive Statistics

The description of the sample is displayed in Tables 5.1 - 5.5 below. The Mean age of the sample is 65.43 years, with 66% report suffering from LTI with 1.73 mean number of chronic conditions diagnosed out of 21 listed, and 45.9% of the sample declare “Less than good” (fairly bad or very bad) SAH, a percentage similar to other studies for the older population (Crespo-Cebada E., 2012) and slightly higher than that observed to the Greek studies for the general population. Moreover, the mean monthly net total household income of the sample equalized is 920.41€, representative of a middle-income household of older population in Greece. About the utilization rates, it is worth noting that, although there is significantly higher proportion (72.6%) for GP versus specialist visits (51.7%), once there is a contact, conditional (≥ 1) mean number of specialist visits (1.78) is slightly higher – almost equal to conditional number of GP visits (1.76), revealing imbalances in primary health care services. The distribution of the sample and its utilization rates by degree of urbanization and region of residence indicate regional variances as displayed in Tables 5.2, 5.3 and 5.5. According to estimates of the National Statistical Authority (2011), 61.4% of the population lives in urban areas and 34.3% in the area of greater Athens. Semi-urban and rural populations comprise 30% of the Greek population, provided that 80% of the country is mountainous or hilly and also that 169 out of 3000 islands are inhabited. In our sample, the youngest group (up to 69 years) are residents of densely and intermediate populated areas, and residents of Athens-GR2 and North Greece-GR1 (Thessaloniki), whereas the oldest groups of 70-79 and 80+ are residents of thinly populated areas and rural GR2-Central Greece and GR4-Islands (& Crete). Considering regional variations in utilization rates, mean number of inpatient admissions is similar among areas by degree of urbanization, but it is significantly higher for the residents of North Greece- Thessaloniki. Moreover, it is worth noting that residents of thinly-populated areas (as well as residents of Central Greece and Islands) use more outpatient and GP health care services than residents of the other areas and report significantly lower mean total number of visits to specialists (0.33). All the same, when the conditional (≥ 1) number of visits are included, a big increase in the mean number of specialist visits is reported, similar to the other areas (1.60). Considering forgo health care, purely for descriptive reasons, only 3.2% or

140 of the respondents claim that forwent hospital care (inpatient or outpatient) whereas, 8.1% declare forgo specialist care, a proportion⁵⁹ 3 times higher. The financial barrier is the second main reason to report foregoing specialist care, whereas long waiting list or distance problem were reported as no significant barriers to specialist care. These descriptive findings are explored in detail in our main analysis, as following.

Table 5.1 Need and non need socioeconomic characteristics of the sample

<i>Demographics</i>	Count (N) non weighted	N % weighted
Age 80+	545	10.8%
Age 70 – 79	1,032	24.8%
Age 60 – 69	943	29.4%
Ref/ Age 50-59	913	35%
Mean Age in years	65.43 (SD: 10.37)	
Male	1,231	47.3%
Ref/ Female	2,202	52.7%
<i>Health Status</i>		
<i>SAH</i> “Less than good”(fair, bad and very bad) health	1,787	45.9%
ref/ “very good and good”health	1,645	54.1%
<i>Long Term Illness (LTI)</i> : Suffering (Yes)	2,436	66%
ref/(No) LTI	994	34%
<i>GALI</i> : Been severely limited & limited but not severely (Yes)	1,629	41.4%
ref./ not limited at all (No)	1,799	58.6%
<i>Number of Chronic Conditions</i> “More than 2 conditions”	1,703	43.7%
“1 chronic medical condition”	908	27.9%
Ref/ “0 Chronic medical Conditions”	822	28.4%
Mean Number of chronic medical conditions out of 21 listed	1.73 (SD:1.82)	
<i>Marital status</i>		
Married (& registered partnership)	2,198	76.9%
/ref. single (never married/widowed & not remarried /divorced & not remarried)	1,235	23.1%
<i>Education</i>		
More than secondary School (ISCED 4+5+6)	491	19.3%
Secondary School (partial & completed) (ISCED 2 + 3)	906	28.1%
/ref. No & Primary School (partial &completed) (No + ISCED 1)	2,029	52.6%
<i>Household Size - Total Number of persons in household</i>		
Living in couple (with or without dependent children)	2,230	78.7%
Other (with or without dependent children)	293	8.6%
/ref. Living alone (with or without dependent children)	910	12.7%
Monthly Net Total Household Income Equalized per adult		
Ln Continuous – N	3,171	(97.38%)
Mean Income (€)	920.41€	
SD	540.49	
5th richest quintile with range - Inc5: More than 1.225.3€.	674	23.9%
4th quintile with range- Inc4: 850.4€-1.225.2€	645	21.7%
3d middle quintile with range: - Inc3: 683.8€-850.3€	588	18.4%
2nd poor quintile: 525.5€ - 683.65€;	762	18.8%
/ref. 1st poorest quintile: up to 525.5€	502	17.2%
<i>Forgo hospital care recommended (inpatient or outpatient) (Yes)</i>	140	3.2%
<i>Forgo specialist visit (Yes)</i>	303	8.1%

⁵⁹ The percentage of 8.1% forgoing specialist care is similar with other international studies for Greece (Allin S. & Masseria, 2009; Litwin H. & Sapir E. (2009)

Table 5.2: Health care utilization by degree of urbanization: percentage and sample means of total and conditional contacts

	Densely-populated area			Intermediate area			Thinly-populated area		
	% (last 12 months)	Conditional Mean	Total Mean	% (last 12 months)	Conditional Mean	Total Mean	% (last 12 months)	Conditional Mean	Total Mean
Inpatient nights * ¹	15.5%	11.35 (1.67)	1.76 (0.30)	13.2%	12.72 (5.64)	1.68 (0.85)	13.8%	11.13 (1.51)	1.50 (0.23)
Outpatient days * ¹	14.1%	3.19 (0.59)	0.45 (0.09)	15.5%	3.01 (0.56)	0.47 (0.12)	12.5%	5.93 (1.64)	0.73 (0.21)
GP visits* ²	72.3%	1.74 (0.15)	0.64 (0.06)	71.5%	1.63 (0.15)	0.66 (0.08)	73.7%	1.81 (0.10)	0.71 (0.05)
Specialist visits* ²	57.6%	1.90 (0.13)	0.56 (0.05)	60.3%	1.87 (0.17)	0.67 (0.08)	45.3%	1.60 (0.07)	0.33 (0.02)
Dental visit * ³	47.9%			43.9%			36.5%		

Note *1: For inpatient/outpatient admissions percentage of visit, conditional number of visits and total number of visits concern “the last 12 months”

Note *2: For GP/specialist visits percentage of visit concerns “the last 12 months”, conditional number of visits and total number of visits concern “the past 4 weeks”

Note *3: Conditional number of dentist monthly visits were only (12) cases

Table 5.3 Health care utilization by region of residence: percentage and sample means of total and conditional contacts

	Nuts1 North Greece GR1- Thessaloniki/			Nuts1 Central Greece GR2			Nuts1 Athens GR3			Nuts1 Islands +Crete GR4		
	%	Conditional Mean	Total Mean	%	Conditional Mean	Total Mean	%	Conditional Mean	Total Mean	%	Conditional Mean	Total Mean
Inpatient nights * ¹	15.6%	16.97 (2.99)	2.61 (0.56)	13.0%	9.31 (1.34)	1.19 (0.21)	13.8%	8.66 (1.33)	1.19 (0.21)	16.4%	7.29 (1.05)	1.13 (0.22)
Outpatient days * ¹	15.4%	5.68 (1.71)	0.86 (0.27)	9.0%	4.85 (2.49)	0.43 (0.23)	13.7%	2.89 (0.60)	0.39 (0.09)	17.6%	4.54 (1.28)	0.77 (0.24)
GP visits* ²	75.5%	1.71 (0.09)	0.69 (0.05)	67.2%	1.69 (0.08)	0.56 (0.04)	72.4%	1.61 (0.16)	0.59 (0.06)	78.9%	2.46 (0.37)	1.24 (0.20)
Specialist visits* ²	55.4%	1.95 (0.16)	0.54 (0.05)	38.5%	1.88 (0.15)	0.33 (0.04)	59.1%	1.70 (0.09)	0.52 (0.04)	45.1%	1.45 (0.13)	0.33 (0.05)
Dental visit* ³	33.9%			42.2%			49.0%			40.4%		

Note *1: For inpatient/outpatient admissions percentage of visit, conditional number of visits and total number of visits concern “the last 12 months”

Note *2: For GP/specialist visits percentage of visit concerns “the last 12 months”, conditional number of visits and total number of visits concern “the past 4 weeks”

Note *3: Conditional number of dentist monthly visits were only (12) cases

Table 5.4 Health care utilization: percentage and sample means of contacts

Type of care	Percentage of visit (%)	N	Conditional (≥ 1) number of visits	Total number of visits
	(last 12 months)		Mean (SD)	Mean (SD)
Inpatient night admissions* ¹	14.4%	528	11.42 (1.21)	1.62 (0.20)
Outpatient day admissions* ¹	13.5%	477	4.34 (0.76)	0.58 (0.11)
GP/Family Doctor visits* ²	72.6%	2,545	1.76 (0.08)	0.67 (0.03)
Specialist visits* ²	51.7%	1,795	1.78 (0.07)	0.47 (0.02)
Dental visit- annual* ³	41.3%	1,291		

Note *1: For inpatient/outpatient admissions percentage of visit, conditional number of visits and total number of visits concern “the last 12 months”

Note *2: For GP/specialist visits percentage of visit concerns “the last 12 months”, conditional number of visits and total number of visits concern “the past 4 weeks”

Note *3: Conditional number of dentist monthly visits were only (12) cases

Table 5.5 Regional distribution of the sample

	Count (N) non weighted	N % weighted
<i>Degree of urbanisation</i>		
Thinly-populated area	1,757	46.9%
Intermediate area	371	13.2%
ref./ Densely-populated area	1,305	39.9%
<i>Region of residence – Nuts1 level (national level)</i>		
North Greece (GR1)	1,126	30.9%
Central Greece (GR2)	821	21.8%
Islands (GR4)	352	9.3%
ref ./Athens (GR3)	1,134	38%

5.4.2 Concentration Index Method Results

Tables 5.6 - 5.11 summarize the CI_{unadjusted} (actual use) and the CI_{adjusted Need} for all the patterns of health care use (total, probability and conditional number of visits) and the inequity index. The negative concentration indices for actual use indicate the presence of pro-poor inequality, except the positive CI_{unadjusted} for the conditional number of outpatient admissions, the probability of specialist visits and dentist visits indicating pro-rich inequality, meaning that higher income individuals are more likely to report outpatient admissions, to contact a specialist and visit a dentist, than lower income individuals. The negative concentration indices for CI_{adjusted Need} are mainly due to differences in need factors, which also show a pro-poor distribution except probability of dentist visits.

Table 5.6: Income - related inequality in inpatient admissions

	Probability	Total number of annual admissions	Conditional number of annual admissions
CI unadjusted (actual use)	-0.1042	-0.2220	-0.1295
CI adjusted Need	-0.0767	-0.0914	-0.0578
HI	-0.0275	-0.1306	-0.0716

Bold:p-value <0.01; bold and italics: p-value<0.05; italics:p-value<0.10

Table 5.7: Income - related inequality in outpatient admissions

	Probability	Total number of annual admissions	Conditional number of annual admissions
CI unadjusted (actual use)	-0.0603	-0.0557	0.0198
CI adjusted	-0.0586	-0.1085	-0.0962
HI	-0.0017	0.0528	0.1160

Bold:p-value <0.01; bold and italics: p-value<0.05; italics:p-value<0.10

Table 5.8: Income - related inequality in GP visit

	Probability (annual)	Total number of monthly visits	Conditional number of monthly visits
CI unadjusted (actual use)	-0.0217	-0.0827	-0.0682
CI adjusted	-0.0262	-0.0674	-0.0263
HI	0.0046	-0.0153	-0.0419

Bold:p-value <0.01; bold and italics: p-value<0.05; italics:p-value<0.10

Table 5.9: Income - related inequality in specialist visit

	Probability (annual)	Total number of monthly visits	Conditional number of monthly visits
CI unadjusted (actual use)	0.0236	-0.0216	-0.0388
CI adjusted	-0.0430	-0.0764	-0.0206
HI	0.0666	0.0548	-0.0183

Bold:p-value <0.01; bold and italics: p-value<0.05; italics:p-value<0.10

Table 5.10 Income - related inequality in probability of dentist visit

	Probability (annual)
CI unadjusted (actual use)	0.1175
CI adjusted	0.0138
HI	0.1037

Bold:p-value <0.01; bold and italics: p-value<0.05; italics:p-value<0.10

Table 5.11 Overall Income –related inequity (HI) by health care type (all patterns)

	Probability	Total number of visits	Conditional number of visits
Inpatient nights *¹	-0.0275	-0.1306	-0.0716
Outpatient days *¹	-0.0017	0.0528	0.1160
GP visits*²	0.0046	-0.0153	-0.0419
Specialist visits*²	0.0666	0.0548	-0.0183
Dental visit *³	0.1037		

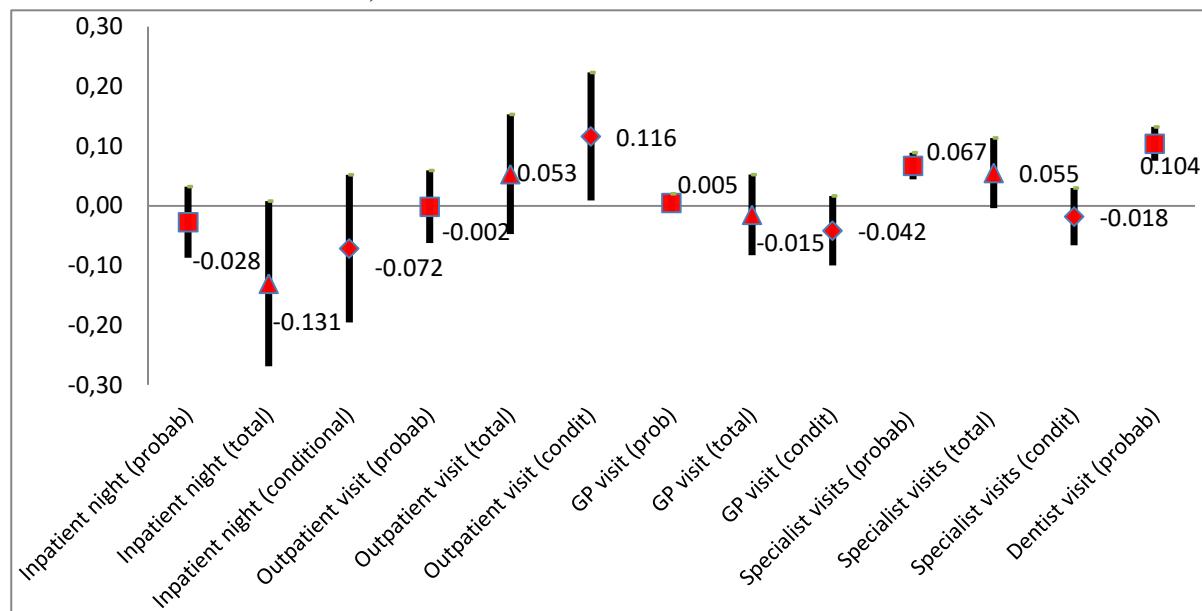
Bold:p-value <0.01; bold and italics: p-value<0.05; italics:p-value<0.10

Note *1: For inpatient/outpatient admissions probability of visit, conditional number of visits and total number of visits concern “the last 12 months”

Note *2: For GP/specialist visits probability of visit concerns “the last 12 months”, conditional number of visits and total number of visits concern “the past 4 weeks”

Note *3: Conditional number of dentist monthly visits were only (12) cases

Figure 5.1 Equity in all health care use types (probability, total number, conditional number of visits)



■ Probability ▲ Total visits ♦Conditional visits

As aforementioned, the range of the horizontal index inequity is from -1 to 1. A positive (negative) value indicates a pro-rich (pro-poor) inequality. The magnitude of the HI inequity index reflects the strength of the relationship between income and the specific health care variable. For example, if we consider the -0.015 HI index of total number of GP visits in Table 5.11, that demonstrates a pro-poor inequality, compared to -0.015 HI index, the -0.041 index of conditional number of GP visits indicates a more pronounced pro-poor inequality. *Overall*, as displayed in Table 5.11 and Figure 5.1, after controlling for the unequal need distributions:

- Inequity in the delivery of health care is distributed among better off -significantly pro-rich - for the conditional number of outpatient admissions, for the probability of specialist and dentist visits, and insignificantly pro-rich for the total number of outpatient admissions and the total number of specialist visits.
- Inequity is distributed among less advantaged – significantly pro-poor for total number of inpatient visits, and slightly pro-poor for the conditional number and total number of GP visits as well as the conditional number of specialist visits.
- Moreover, a weak relationship of income with the probability of GP and outpatient visits exists. The magnitude of HI index is very small for the probability of GP visits (very slightly positive) and the probability of outpatient admissions (very slightly negative), indicating that income is distributed almost equally among individuals for these health care types. Inequity is distributed by need for the probability of GP and outpatient visits.
- For all patterns of inpatient admissions consistent negative “pro-poor” inequity exists, although the magnitude of HI index reveals a more pronounced pro-poor inequality for the conditional number and total number of inpatient admissions, indicating that less advantaged elderly report more inpatient admissions than the more advantaged.
- For outpatient admissions consistent “pro-rich” inequity exists. Almost no inequity exists for the probability of outpatient admission, but when only conditional number of visits is included, there is significantly pro-rich inequity.
- For GP visits, there is a weak in magnitude consistent pro-poor inequity. There is almost no inequity (slightly pro rich) for the probability of making a GP visit indicating that all individuals have the same probability to make a GP visit, regardless of their income. However, when only conditional number (at least once) of GP visits is included, there is pro-poor inequity for total number and conditional number of GP visits, indicating that when need is equalized, and for at least one visit, GP visits are related to need, slightly favoring the poor.
- As far as specialist visit is concerned, a parallel gradient – tendency with GP visits is apparent. There is significant pro-rich inequity in the probability of making a specialist visit, but since one visit at least is included, there is a less pronounced pro-rich inequity for the total number of specialist visits and pro-poor inequity for conditional number of specialist visits favoring the poor. Pro-rich horizontal inequity exists in the access to the first visit, determined by the patients' behavior and incentives, but not in

the subsequent visits indicated by the physician. This result is in compliance with evidence of other country-studies(Leu and Shellhorn, 2004).

- For the probability of dentist visit there is significant pro-rich inequity. Comparison with existing literature for Greece is presented at the discussion section, below.

5.4.3 Decomposition Analysis – Sources of inequality by type of care

The contributing factors, as inequity drivers, are displayed in detail in Tables 5.12 – 5.18 and Figures 5.2–5.6 that report the CI_{unadjusted (actual use)} decomposition for all the health care types and all patterns. Among other contributors we focus on income and regional variables in compliance with the main objectives of our study. Each Table first shows the mean values for the explanatory variables. The second column displays the partial concentration index (CI), the extent to which each contributor is distributed across income. A negative (positive) sign indicates that the variable has a pro-poor (pro-rich) distribution and is prevalent among the lower (higher) income groups. The third column indicates the demand elasticity (Marginal Effect - ME) for each contributor. Finally, the last three columns of the tables report, respectively, the absolute, the sum and % contributions to total income related inequality. The absolute contribution is the product of the elasticity (marginal effect) and the partial concentration index for each factor. A negative (positive) absolute contribution implies that, if only that variant determined utilization, then it would be pro-poor (pro-rich). The Tables can be interpreted in the following way, using the example of the probability of a specialist visit (Table 5.15). The unadjusted concentration index CI_{unadjusted} of the probability of a specialist visit is positive (0.024), implying that across the income distribution, there is a proportional probability of visiting a specialist concentrated among the rich. Since need is standardized for, the level of inequity (HI) is 0.067 implying a pro-rich distribution. The contribution of the need factors to inequality are negative (-0.043), indicating that individuals with poorer self-assessed health and chronic conditions reduce inequity in probability of specialist visit favoring the worse off, pointing out the greatest needs of the poor, similar with most of the empirical literature. Limitation in general activities (GALI) has the most negative contribution being the most important needs-adjustor, followed by self-assessed health and LTI. Gender has almost zero contribution to inequality. Age dummies concentrated among the lower income groups (negative CI) are less likely to visit a specialist and this result in slightly positive contribution (almost zero) – pro - rich inequality. About the non-need contributors, the main factor is income (its contribution is 0.037), meaning that more advantaged (higher

income earners) are more likely to visit a specialist, holding all the rest constant. The second – most important non need contributor is education (0.015) with a positive contribution to inequity. The third important non-need contributor is the degree of urbanization with final contribution (0.008) slightly pro-rich, meaning that the final effect of the dummies of thinly-populated areas (concentrated among the lower income groups-negative CI) and intermediate-populated areas is to increase overall inequity favoring the more advantaged. Similarly, region of residence has final contribution positive (0.005); this means that the final effect of the dummies of North Greece, Central Greece (concentrated among the lower income groups) and Islands is to increase inequity favoring the better off. Marital status and household composition have a quite lower contribution to inequity. Finally, the error term is almost zero (0.0001) implying that there should be only some small effect on the probability of visiting a specialist which are related to income and not accounted for in the specific utilization model. Overall, Tables 5.12 - 5.18 reveal:

- Pro-poor (negative signs) are apparent for the contributions of *need variables* for all types of care similar to the existing evidence, except the case of probability of receiving dental care for which need-adjustment is mainly age standardized (Scheil-Adlung, X. and Bonan, J., 2013; Geitona et al, 2007; Lahana et al, 2011).
- The non-need contributors have a non systemic effect on patterns of health care use by income groups. *Income* itself is not the only contributor, provided that other non-need contributors i.e. education, or region of residence variable do not have a consistent effect.
 - ✓ Income contributes in a positive way (pro-rich) to inequity in distribution of outpatient admissions (all patterns), in probability of making a specialist, as well as a dentist visit favoring the better off.
 - ✓ Income contributes negatively (pro-poor) to distribution of inequity in inpatient admissions (all patterns), in GP visits (all patterns), in total number and conditional number of specialist visits, favoring the less advantaged.
- Another important socio-economic characteristic related to both income and health care is *higher educational level* status that explains a high percentage of inequalities in almost all health care types, except from all patterns of inpatient admissions that reduces inequity, similar to the existing evidence (Tountas et al, 2011; Van Doorslaer et al, 2006; EC, 2005; Koolman X., 2007; Van Doorsaler & Masseria, 2004; Masseria et al, 2004).

- The third important non-need contributor is the *degree of urbanization*. Compared to densely populated areas, inequalities are apparent for all health care types due to the positive effect of thinly- populated areas, favoring the better off, as following.
 - ✓ Residents of thinly-populated areas - less advantaged - face pro-rich inequalities for almost all health care types (inpatient admissions, probability of outpatient admissions, total number and conditional number of GP visits, specialist visits all patterns), apart from the pro-poor inequalities for probability of GP visits, total number and conditional number of outpatient admissions, favoring the less advantaged.
 - ✓ On the other hand, residents of intermediate-populated areas – who tend to be more advantaged - face weak pro-rich inequalities in conditional number of inpatient admissions, in probability of outpatient admissions, in probability and total number of specialist visits, favoring the better off.
- If we examine the *region of residence effect*, compared to region of Attiki-Athens, regional disparities are apparent for most health care types, mainly due to the significant positive effect of Central Greece on overall inequity – except from inpatient admissions, but to a weaker (lower) magnitude than the effect of degree of urbanization.
 - ✓ Inequalities are not apparent for inpatient care (for all regions except for Islands at a slight degree), total number and conditional number of outpatient admissions (for all regions except slightly for Islands), total number and conditional number of specialist visits, favoring the less advantaged. Elderly make inpatient, outpatient admissions and specialist visits, irrespective of their income and their region of residence.
 - ✓ Residents of North Greece-Thessaloniki face inequalities in most health care types in North Greece, favoring the worse off, but they do not face inequalities in probability of specialist and dentist visits. Residents of North Greece are more likely to make specialist and dentist visits, irrespective of their income.
 - ✓ Residents of Central Greece region –concentrated among less advantaged - face pro-rich inequity mainly for PHC (GP care, outpatient visits, and probability of specialist visits) favoring the better off. They do not face inequalities in all patterns of inpatient admissions, as well as, total number and conditional number of specialist visits.
 - ✓ On the other hand, Islands region (including Crete) has the weakest effect on overall income-related inequity, except for inequity in specialist visit, total number and

conditional number of GP visits, favoring the better off. However, for Islands, inequalities- though weak in strength (almost zero)- still exist for most services.

- *Overall*, residents of thinly populated areas and Central Greece have a non systematic effect on inequity in all patterns of GP visits. They are negatively associated with conditional number of outpatient, GP and specialist visits favoring the worse off. On the other hand, they face pro-rich inequalities in the probability of making an outpatient admission and specialist visit favoring the better off, indicating provision of inadequate primary care services (GP, outpatient visits, and the probability of specialist visits).
- Furthermore, all regional variables indicate regional disparities - inequalities in specialist care services. There is a significant gradient of regional inequalities in specialist care among the older population in North Greece, Central Greece and intermediate-populated areas, favoring the better off.
- In particular, it is worth noting that residents of North Greece, Central Greece and intermediate- populated areas, face pro-rich inequity in the probability of making a specialist visit, but once the conditional contacts are included, they face a more pronounced pro-poor inequality in conditional number of specialist visits, favoring the worse off, pointing out that the ineffective primary care services in rural areas “force” them to specialist care, privately provided, irrespective of their income level.
- *Marital status* has a positive contribution in inequity in most health care types and *household type* factor has a systemic negative (pro-poor) contribution on inequity in most health care types, but quite low in magnitude.

Overall, our findings that the utilization of health services is determined mainly by the health needs and by several socioeconomic and structural factors of the healthcare systems are compatible with existing evidence for determinants of health care use for the general population (Phelps and Newhouse, 1974; Newhouse and Marquis, 1978; Wagstaff, 1986; Kasper, 1986; Feldstein, 1988; McGuire et al., 1988; Marmot and Wilkinson, 1999). More specifically, activity limitations (GALI) and the self-assessed health (SAH), older age, female gender, marital status, higher educational level explains a high percentage of inequalities mainly in specialist and dentist visit, except inpatient admissions. Moreover, income, and region of residence are considered as the most important determinants of health services use (Tountas et al, 2011, Pappa and Niakas, 2006; Economou, 2006, Geitona et al., 2007, Alexopoulos and Geitona, 2009, Bíró A. 2014).

Table 5.12:Detailed Decomposition of inequality in probability of inpatient admissions, total number and conditional number of inpatient admissions

	Probability of inpatient admissions					Total number of inpatient admissions					Conditional number of inpatient admissions				
	Mean	CI	ME	Contrib	Sum	Mean	CI	ME	Contrib	Sum	Mean	CI	ME	Contr.	Sum
CI unadjusted		-0.104					-0.222					-0.129			
HI index		-0.028					-0.131					-0.072			
Need				-0.077	-0.077				-0.091	-0.091				-0.058	-0.058
Age (80+ vs 50-59)	0.111	-0.218	0.022	-0.005		0.110	-0.217	-0.026	0.006		0.171	-0.216	-0.038	0.008	
Age (70-79 vs 50-59)	0.254	-0.092	0.043	-0.004		0.253	-0.090	-0.001	0.000		0.325	-0.036	-0.029	0.001	
Age (60-69 vs 50-59)	0.291	0.009	0.021	0.000	-0.009	0.292	0.007	-0.059	0.000	0.005	0.281	0.078	-0.034	-0.003	0.007
Gender (male vs female)	0.470	0.071	0.177	0.013	0.013	0.470	0.070	0.503	0.035	0.035	0.497	0.045	0.271	0.012	0.012
SAH	0.470	-0.143	0.164	-0.023	-0.023	0.469	-0.141	0.371	-0.052	-0.052	0.700	-0.133	0.285	-0.038	-0.038
Long Term Illness (Yes vs No)	0.668	-0.065	-0.034	0.002	0.002	0.667	-0.066	-0.048	0.003	0.003	0.823	-0.056	0.055	-0.003	-0.003
Gali (Yes) vs No	0.422	-0.140	0.379	-0.053	-0.053	0.421	-0.140	0.554	-0.078	-0.078	0.704	-0.118	0.280	-0.033	-0.033
"2 + chronic diseases" vs "0"	0.447	-0.087	0.069	-0.006		0.446	-0.087	0.069	-0.006		0.620	-0.049	0.050	-0.002	
"1 chronic disease" vs "0"	0.276	0.046	-0.007	0.000	-0.006	0.276	0.047	0.020	0.001	-0.005	0.224	0.001	0.048	0.000	-0.002
In income (x)	6.677	0.045	-0.543	-0.024	-0.024	6.678	0.045	-1.192	-0.054	-0.054	6.589	0.042	-0.265	-0.011	-0.011
Non Need variables															
"More than secondary" vs "Primary"	0.184	0.478	-0.010	-0.005		0.184	0.476	-0.102	-0.048		0.133	0.484	-0.040	-0.019	
Education - "Secondary" vs "Primary"	0.276	0.125	-0.025	-0.003	-0.008	0.276	0.123	-0.162	-0.020	-0.068	0.215	0.281	-0.072	-0.020	-0.040
Married vs No Married	0.773	0.032	-0.078	-0.002	-0.002	0.773	0.032	-0.201	-0.006	-0.006	0.727	0.059	0.000	0.000	0.000
"Living in couple" vs "alone"	0.789	0.029	-0.026	-0.001	-0.001	0.788	0.029	0.047	0.001	0.002	0.747	0.054	-0.098	-0.005	-0.004
"Other" vs alone"	0.082	0.049	-0.014	-0.001		0.082	0.047	0.014	0.001		0.081	0.031	0.033	0.001	
North Greece vs Athens	0.327	-0.103	0.057	-0.006		0.327	-0.102	0.341	-0.035		0.349	-0.131	0.213	-0.028	
Central Greece vs Athens	0.214	-0.077	0.030	-0.002		0.214	-0.076	0.100	-0.008		0.202	-0.178	0.007	-0.001	
Islands +Crete vs Athens	0.095	0.026	0.026	0.001	-0.007	0.094	0.026	0.020	0.001	-0.042	0.105	0.141	0.001	0.000	-0.029
Thinly populated areas	0.488	-0.123	-0.169	0.021		0.486	-0.121	-0.398	0.048		0.466	-0.113	-0.101	0.011	
Intermediate populated areas	0.130	0.096	-0.034	-0.003	0.017	0.130	0.091	-0.030	-0.003	0.045	0.116	0.037	0.016	0.001	0.012
Error				-0.001					-0.008					0.000	

Table 5.13 Detailed Decomposition of inequality in the probability. total number of outpatient visits and conditional number of outpatient visits

Probability of outpatient visits						Total number of outpatient visits						Conditional number of outpatient visits					
	Mean	CI	ME	Contri	Sum	Mean	CI	ME	Contri	Sum	Mean	CI	ME	Contri	Sum		
CI unadjusted	-0.060						-0.056				0.020						
HI index	-0.002						0.053				0.116						
Need			-0.059		-0.059				-0.109		-0.109				-0.096		
Age (80+ vs 50-59)	0.111	-0.219	-0.005	0.001		0.110	-0.214	-0.131	0.028		0.113	-0.208	-0.138	0.029			
Age (70-79 vs 50-59)	0.254	-0.091	0.049	-0.004		0.253	-0.092	-0.137	0.013		0.317	-0.039	-0.254	0.010			
Age (60-69 vs 50-59)	0.291	0.011	0.068	0.001	-0.003	0.292	0.010	0.022	0.000	0.041	0.333	0.066	-0.068	-0.005	0.034		
Gender (male vs female)	0.470	0.071	0.012	0.001	0.001	0.470	0.070	-0.167	-0.012	-0.012	0.439	0.133	-0.068	-0.009	-0.009		
SAH	0.470	-0.142	0.117	-0.017	-0.017	0.469	-0.142	0.538	-0.076	-0.076	0.642	-0.086	0.512	-0.044	-0.044		
Long Term Illness (Yes vs No)	0.668	-0.066	0.050	-0.003	-0.003	0.667	-0.065	0.215	-0.014	-0.014	0.817	-0.054	0.315	-0.017	-0.017		
Gali (Yes) vs No	0.422	-0.140	0.217	-0.030	-0.030	0.421	-0.141	0.596	-0.084	-0.084	0.619	-0.145	0.651	-0.094	-0.094		
"2 + chronic diseases" vs "0"	0.447	-0.088	0.108	-0.009		0.447	-0.088	-0.466	0.041		0.584	-0.068	-0.694	0.047			
"1 chronic disease" vs "0 "	0.276	0.045	0.063	0.003	-0.007	0.276	0.047	-0.096	-0.005	0.036	0.271	0.091	-0.139	-0.013	0.034		
In income (x)	6.677	0.045	0.181	0.008	0.008	6.678	0.045	3.042	0.137	0.137	6.611	0.044	3.458	0.151	0.151		
Non Need variables																	
"More than secondary" vs "Primary"	0.184	0.478	-0.069	-0.033		0.184	0.479	-0.172	-0.082		0.103	0.592	-0.051	-0.030			
Education - "Secondary" vs "Primary"	0.276	0.123	-0.016	-0.002	-0.035	0.276	0.122	-0.146	-0.018	-0.100	0.257	0.202	-0.091	-0.018	-0.048		
Married vs No Married	0.773	0.032	0.258	0.008	0.008	0.773	0.032	0.883	0.028	0.028	0.793	0.047	0.121	0.006	0.006		
"Living in couple"vs "alone"	0.789	0.029	-0.176	-0.005	-0.007	0.789	0.028	-0.342	-0.010	-0.011	0.805	0.042	0.146	0.006	0.007		
"Other" vs alone"	0.082	0.049	-0.031	-0.002		0.082	0.052	-0.019	-0.001		0.052	0.088	0.008	0.001			
North Greece vs Athens	0.327	-0.103	0.029	-0.003		0.327	-0.103	0.110	-0.011		0.378	-0.059	0.119	-0.007			
Central Greece vs Athens	0.214	-0.079	-0.058	0.005		0.214	-0.076	-0.057	0.004		0.141	-0.260	0.014	-0.004			
Islands +Crete vs Athens	0.095	0.027	0.026	0.001	0.002	0.094	0.024	0.025	0.001	-0.006	0.118	0.099	0.021	0.002	-0.009		
Thinly populated areas	0.488	-0.123	-0.081	0.010		0.487	-0.123	0.141	-0.017		0.458	-0.072	0.131	-0.009			
Intermediate populated areas	0.130	0.097	0.010	0.001	0.011	0.130	0.092	-0.021	-0.002	-0.019	0.154	0.044	-0.080	-0.004	-0.013		
Error			0.010						0.024						0.022		

Table 5.14 Detailed Decomposition of inequality in the probability of GP visits, total number of GP visits and conditional number of GP visits

Probability of GP visits					Total number of GP visits					Conditional number of GP visits					
	Mean	CI	ME	Contr	Sum	Mean	CI	ME	Contr	Sum	Mean	CI	ME	Contr	Sum
CI unadjusted	-0.022					-0.083					-0.068				
HI index	0.005					-0.015					-0.042				
Need				-0.026	-0.026				-0.067	-0.067				-0.026	-0.026
Age (80+ vs 50-59)	0.109	-0.221	0.005	-0.001		0.110	-0.219	-0.001	0.000		0.133	-0.213	0.005	-0.001	
Age (70-79 vs 50-59)	0.254	-0.089	0.016	-0.001		0.254	-0.089	-0.007	0.001		0.306	-0.068	-0.002	0.000	
Age (60-69 vs 50-59)	0.291	0.007	-0.008	0.000	-0.003	0.292	0.008	-0.035	0.000	0.000	0.259	0.023	0.008	0.000	-0.001
Gender (male vs female)	0.470	0.071	-0.015	-0.001	-0.001	0.470	0.071	-0.055	-0.004	-0.004	0.440	0.099	-0.052	0.005	-0.005
SAH	0.470	-0.143	0.017	-0.002	-0.002	0.469	-0.144	0.203	-0.029	-0.029	0.600	-0.118	0.132	-0.016	-0.016
Long Term Illness (Yes vs No)	0.669	-0.067	0.134	-0.009	-0.009	0.668	-0.067	0.070	-0.005	-0.005	0.798	-0.045	-0.088	0.004	0.004
Gali (Yes) vs No	0.423	-0.141	0.030	-0.004	-0.004	0.422	-0.142	0.181	-0.026	-0.026	0.554	-0.106	0.122	-0.013	-0.013
"2 + chronic diseases" vs "0"	0.448	-0.089	0.106	-0.009		0.448	-0.089	0.063	-0.006		0.574	-0.057	-0.076	-0.004	
"1 chronic disease" vs "0 "	0.275	0.047	0.054	0.002	-0.007	0.275	0.050	0.022	0.001	-0.004	0.261	0.007	0.016	0.000	0.004
In income (x)	6.677	0.045	-0.076	-0.003	-0.003	6.677	0.045	-0.826	-0.037	-0.037	6.658	0.044	-1.507	-0.066	-0.066
Non Need variables															
"More than secondary" vs "Primary"	0.184	0.475	0.008	0.004		0.183	0.476	0.004	0.002		0.155	0.5	0.009	0.004	
Education - "Secondary" vs "Primary"	0.276	0.126	0.012	0.002	0.005	0.277	0.125	-0.027	-0.003	-0.002	0.258	0.167	-0.027	-0.005	0.000
Married vs No Married	0.774	0.031	-0.007	0.000	0.000	0.774	0.031	0.277	0.009	0.009	0.760	0.037	0.118	0.004	0.004
"Living in couple"vs "alone"	0.789	0.028	0.041	0.001	0.001	0.789	0.028	-0.229	-0.006	-0.007	0.774	0.036	-0.067	-0.002	-0.003
"Other" vs alone"	0.082	0.051	-0.003	0.000		0.082	0.049	-0.015	-0.001		0.078	0.094	-0.001	0.000	
North Greece vs Athens	0.328	-0.104	-0.005	0.000		0.328	-0.103	0.021	-0.002		0.346	-0.149	0.001	-0.000	
Central Greece vs Athens	0.213	-0.078	-0.021	0.002		0.213	-0.074	-0.013	0.001		0.187	-0.09	-0.001	-0.000	
Islands +Crete vs Athens	0.095	0.029	0.003	0.000	0.002	0.095	0.027	0.084	0.002	0.001	0.122	0.109	0.067	0.007	0.007
Thinly populated areas	0.488	-0.123	0.016	-0.002		0.488	-0.121	-0.062	0.007		0.501	0.118	-0.072	0.009	
Intermediate populated areas	0.130	0.097	-0.005	0.000	-0.002	0.129	0.093	-0.007	-0.001	0.007	0.131	-0.103	-0.012	-0.001	0.007
Error					0.002					0.014				0.008	

Table 5.15 Detailed Decomposition of inequality in the probability of specialist visits, total number and conditional number of specialist visits

	Probability of specialist visits					Total number of specialist visits					Conditional number of specialist visits				
	Mean	CI	ME	Contri	Sum	Mean	CI	ME	Contri	Sum	Mean	CI	ME	Contri	Sum
CI unadjusted	0.024					-0.022					-0.039				
HI index	0.067					0.055					-0.018				
Need			-0.043	-0.043				-0.076	-0.076				-0.021	-0.021	
Age (80+ vs 50-59)	0.110	-0.216	-0.005	0.001		0.110	-0.217	-0.034	0.007		0.111	-0.169	-0.008	0.001	
Age (70-79 vs 50-59)	0.255	-0.089	-0.024	0.002		0.256	-0.090	-0.039	0.003		0.291	-0.096	-0.037	0.004	
Age (60-69 vs 50-59)	0.292	0.009	0.010	0.000	0.003	0.292	0.013	0.037	0.000	0.011	0.308	0.029	0.019	0.001	0.005
Gender (male vs female)	0.469	0.070	0.009	0.001	0.001	0.470	0.070	0.054	0.004	0.004	0.459	0.066	0.000	0.000	0.000
SAH	0.471	-0.139	0.088	-0.012	-0.012	0.471	-0.141	0.250	-0.035	-0.035	0.648	-0.124	0.103	-0.013	-0.013
Long Term Illness (Yes vs No)	0.670	-0.065	0.143	-0.009	-0.009	0.670	-0.066	0.015	-0.001	-0.001	0.818	-0.045	-0.144	0.007	0.007
Gali (Yes) vs No	0.423	-0.140	0.132	-0.018	-0.018	0.423	-0.140	0.308	-0.043	-0.043	0.601	-0.119	0.155	-0.018	-0.018
"2 + chronic diseases" vs "0"	0.450	-0.087	0.093	-0.008		0.450	-0.086	0.162	-0.014		0.602	-0.077	0.037	-0.003	
"1 chronic disease" vs "0 "	0.276	0.049	0.026	0.001	-0.007	0.276	0.047	0.042	0.002	-0.012	0.246	0.086	0.017	0.001	-0.001
In income (x)	6.677	0.045	0.822	0.037	0.037	6.676	0.045	-0.652	-0.029	-0.029	6.684	0.044	-0.896	-0.040	-0.040
Non Need variables															
"More than secondary" vs "Primary"	0.183	0.475	0.029	0.014		0.183	0.475	0.090	0.043		0.192	0.446	0.040	0.018	
Education - "Secondary" vs "Primary"	0.277	0.125	0.012	0.002	0.015	0.278	0.125	0.030	0.004	0.046	0.281	0.141	-0.014	-0.002	0.016
Married vs No Married	0.773	0.031	0.055	0.002	0.002	0.774	0.031	0.183	0.006	0.006	0.774	0.041	0.024	0.001	0.001
""Living in couple"vs "alone"	0.789	0.028	0.004	0.000	0.000	0.789	0.028	-0.091	-0.003	-0.002	0.784	0.035	0.015	0.001	0.000
"Other" vs alone	0.083	0.052	-0.001	0.000		0.083	0.051	0.001	0.000		0.087	0.028	-0.006	0.000	
North Greece vs Athens	0.327	-0.104	-0.010	0.001		0.328	-0.104	0.097	-0.010		0.343	-0.076	0.085	-0.006	
Central Greece vs Athens	0.211	-0.076	-0.055	0.004		0.212	-0.074	0.017	-0.001		0.137	-0.120	0.038	-0.005	
Islands +Crete vs Athens	0.095	0.026	-0.019	0.000	0.005	0.095	0.025	-0.001	0.000	-0.011	0.083	0.109	0.004	0.000	-0.011
Thinly populated areas	0.486	-0.124	-0.058	0.007		0.486	-0.123	-0.304	0.037		0.379	-0.123	-0.131	0.016	
Intermediate populated areas	0.131	0.097	0.006	0.001	0.008	0.130	0.090	0.014	0.001	0.039	0.173	0.105	-0.008	-0.001	0.015
Sum			0.023	0.023				-0.029	-0.029				-0.038	-0.038	
Error			0.000					0.007					0.000		

Table 5.16 Detailed Decomposition of inequality in probability of dentist visits

	Probability of dentist visits				
	Mean	CI	ME	Contribution	Sum
CI unadjusted	0.118				
HI index	0.104				
Need				0.014	0.014
Age (80+ vs 50-59)	0.108	-0.222	-0.065	0.014	
Age (70-79 vs 50-59)	0.253	-0.093	-0.096	0.009	
Age (60-69 vs 50-59)	0.293	0.009	-0.041	0.000	0.023
Gender (male vs female)	0.471	0.071	-0.084	-0.006	-0.006
SAH	0.468	-0.141	0.028	-0.004	-0.004
Long Term Illness (Yes vs No)	0.667	-0.063	0.044	-0.003	-0.003
Limited in General Activities Gali (Yes) vs No	0.420	-0.140	-0.036	0.005	0.005
“2 + chronic diseases” vs “0”	0.446	-0.087	0.017	-0.002	
“1 chronic disease” vs “0”	0.278	0.048	0.000	0.000	-0.002
In income (x)	6.679	0.045	1.136	0.051	0.051
Non Need variables					
“More than secondary” vs “Primary”	0.185	0.473	0.080	0.038	
Education - “Secondary” vs “Primary”	0.277	0.123	0.050	0.006	0.044
Married vs No Married	0.773	0.032	0.079	0.003	0.003
“Living in couple”vs “alone”	0.789	0.028	-0.009	0.000	0.000
“Other” vs alone”	0.083	0.050	-0.002	0.000	
North Greece vs Athens	0.326	-0.106	-0.077	0.008	
Central Greece vs Athens	0.212	-0.078	0.001	0.000	
Islands +Crete vs Athens	0.095	0.021	-0.007	0.000	0.008
Thinly populated areas	0.485	-0.125	-0.026	0.003	
Intermediate populated areas	0.130	0.095	-0.005	0.000	0.003
sum				0.122	0.122
error				-0.004	

Table 5.17: Overall Decomposition of inequity in inpatient nights and outpatient visits (all patterns)

	Probability of inpatient nights		Total inpatient nights		Conditional inpatient nights		Probability of outpatient visits		Total outpatient visits		Conditional outpatient visits	
	CIndex		CIndex		CIndex		CIndex		CIndex		CIndex	
CI unadjusted	-0.1042		-0.2220		-0.1295		-0.0603		-0.0557		0.0198	
HI index	-0.0275		-0.1306		-0.0716		-0.0017		0.0528		0.1160	
	Contrib. to Inequality	% Contrib.	Contrib. to Inequality	% Contrib.	Contrib. to Inequality	% Contrib.	Contrib. to Inequality	% Contrib.	Contrib. to Inequality	% Contrib.	Contrib. to Inequality	% Contrib.
Need	-0.0767		-0.0914		-0.0578		-0.0586		-0.1085		-0.0962	
Age	-0.0086	8.25%	0.0053	-2.37%	0.0066	-5.07%	-0.0026	4.35%	0.0409	-73.32%	0.0340	171.99%
Gender	0.0125	-12.04%	0.0352	-15.85%	0.0122	-9.46%	0.0008	-1.40%	-0.0116	20.85%	-0.0090	-45.43%
Health Status -SAH	-0.0234	22.43%	-0.0523	23.56%	-0.0381	29.40%	-0.0166	27.49%	-0.0762	136.73%	-0.0441	-223.21%
Health Status - Health Limitations(LTI, Gali, Chronic Disease)	-0.0573	54.96%	-0.0795	35.83%	-0.0386	29.79%	-0.0403	66.79%	-0.0616	110.46%	-0.0771	-390.40%
Ln (income)	-0.0244	23.46%	-0.0536	24.16%	-0.0111	8.56%	0.0082	-13.55%	0.1368	-245.47%	0.1513	765.70%
Other Non-Need	-0.0020		-0.0695		-0.0608		-0.0200		-0.1082		-0.0574	
Education	-0.0080	7.68%	-0.0684	30.81%	-0.0396	30.57%	-0.0350	58.07%	-0.0999	179.28%	-0.0483	-244.66%
Marital Status	-0.0025	2.40%	-0.0065	2.91%	0.0000	-0.01%	0.0083	-13.76%	0.0279	-50.07%	0.0057	28.98%
("Living in couple" vs "Living alone")	-0.0015	1.40%	0.0020	-0.92%	-0.0043	3.29%	-0.0066	10.88%	-0.0106	19.01%	0.0068	34.39%
Region of Residence (vs Urban- Nuts1 Athens)	-0.0075	7.16%	-0.0420	18.91%	-0.0289	22.35%	0.0023	-3.82%	-0.0064	11.48%	-0.0086	-43.34%
Degree of urbanisation (vs Densely populated area)	0.0174	-16.71%	0.0454	-20.43%	0.0119	-9.21%	0.0110	-18.28%	-0.0192	34.51%	-0.0130	-65.69%
Error	-0.0011	1.03%	-0.0075	3.38%	0.0003	-0.21%	0.0101	-16.76%	0.0242	-43.46%	0.0221	111.67%

Table 5.18 Overall Decomposition of inequity in GP and specialist visits (all patterns)

	Probability of any GP visit		Total GP visits		Conditional GP visits		Probability of specialist visit		Total specialist visits		Conditional specialist visits	
	CIndex		CIndex		CIndex		CIndex		CIndex		CIndex	
CI unadjusted HI index	-0.0217 0.0046		-0.0827 -0.0153		-0.0682 -0.0419		0.0236 0.0666		-0.0216 0.0548		-0.0388 -0.0183	
	Contrib.	%	Contrib.	%	Contrib.	%	ContribI	%	Contrib.	%	Contrib.	%
	Inequalit.	Contrib	Inequalit.	Contri	Inequal.	Contrib	Inequal	Contrib	Inequal.	Contrib.	Inequalit.	Contrib
Need	-0.0262		-0.0674		-0.0263		-0.0430		-0.0928		-0.0206	
Age	-0.0026	12.21%	0.0005	-0.55%	-0.0008	1.12%	0.0032	13.47%	0.0112	-51.99%	0.0053	-13.72%
Gender	-0.0011	5.10%	-0.0039	4.67%	-0.0052	7.63%	0.0006	2.59%	0.0038	-17.60%	0.0000	0.02%
Health Status -SAH	-0.0025	11.39%	-0.0292	35.27%	-0.0156	22.88%	-0.0122	-51.87%	-0.0352	162.95%	-0.0127	32.75%
Health Status - Health Limitations(LTI. Gali. Chronic Disease)	-0.0200	92.42%	-0.0348	42.07%	-0.0479	31.63%	-0.0346	-146.71%	-0.0562	260.02%	-0.0132	33.95%
Ln (income)	-0.0034	15.86%	-0.0371	44.90%	-0.0664	97.43%	0.0370	156.88%	-0.0293	135.42%	-0.0397	102.19%
Other Non-Need	0.0057		0.0080		0.0162		0.0295		0.0769		0.0218	
Education	0.0052	-24.02%	-0.0017	2.03%	-0.0002	0.31%	0.0153	64.68%	0.0464	-214.35%	0.0158	-40.61%
Marital Status	-0.0002	0.95%	0.0087	-10.53%	0.0044	-6.44%	0.0017	7.31%	0.0058	-26.60%	0.0010	-2.48%
("Living in a couple" vs "Living alone")	0.0010	-4.56%	-0.0072	8.66%	-0.0025	3.70%	0.0001	0.38%	-0.0025	11.54%	0.0003	-0.86%
Region of Residence (vs Urban- Athens)	0.0022	-9.96%	0.0011	-1.39%	0.0072	-10.55%	0.0047	20.07%	-0.0114	52.54%	-0.0106	27.29%
Degree of urbanisation (vs Densely populated area)	-0.0024	11.30%	0.0069	-8.32%	0.0073	-10.76%	0.0077	32.68%	0.0386	-178.52%	0.0153	-39.42%
Error	0.0023	-10.68%	0.0139	-16.83%	0.0084	-12.27%	0.0001	0.53%	0.0072	-33.41%	-0.0003	0.88%

Figures 5.2 – 5.6: Decomposition of inequality – Contribution to inequity - GNHIS

Figure 5.2 Decomposition of inequality in inpatient nights - GNHIS (excluding need contributions)

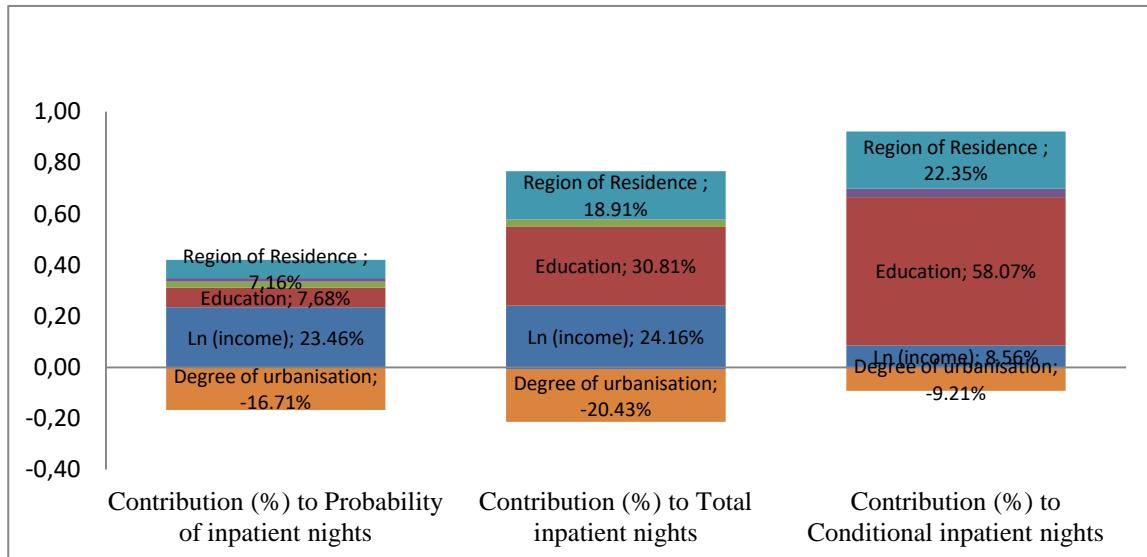


Figure 5.3 Decomposition to inequity in outpatient visits- GNHIS (excluding need variables)

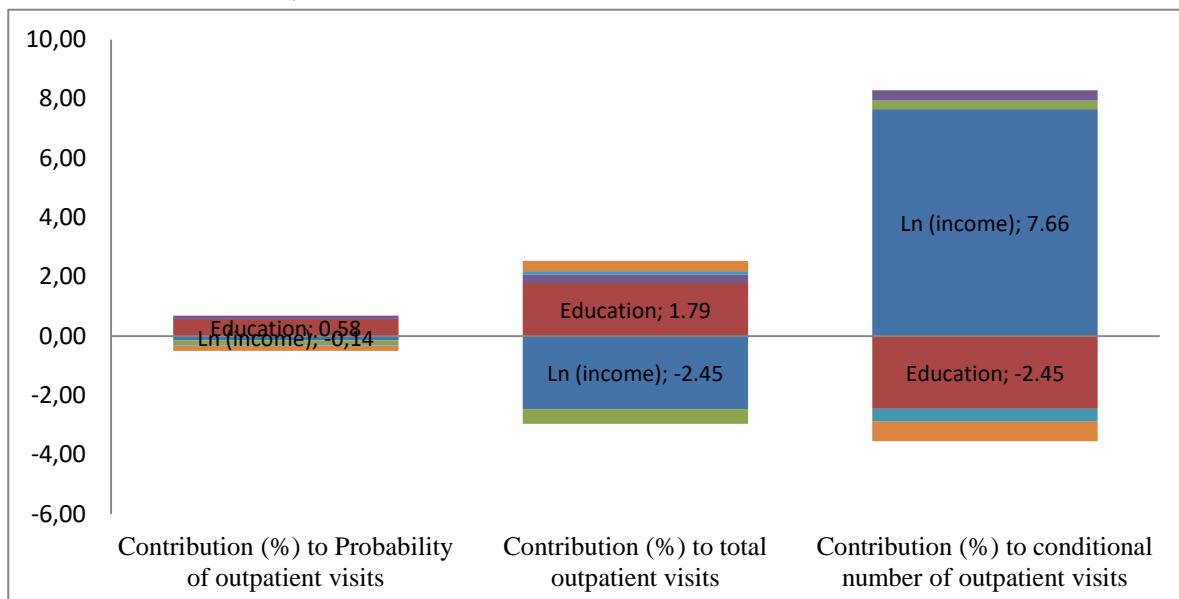


Figure 5.4 Contribution to inequity in the GP/Family physician visits- GNHIS (excluding need variables)

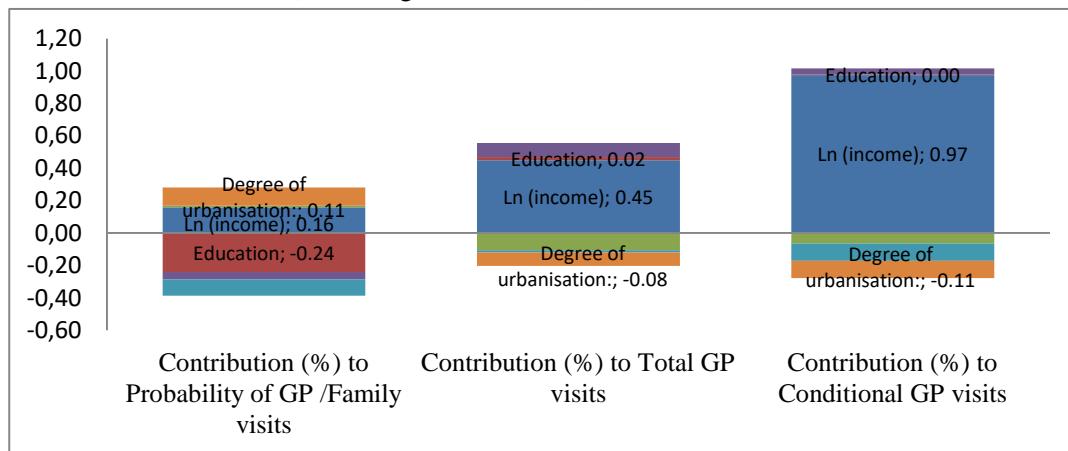


Figure 5.5 Contribution to inequity in the specialist visits – GNHIS (excluding need variables)

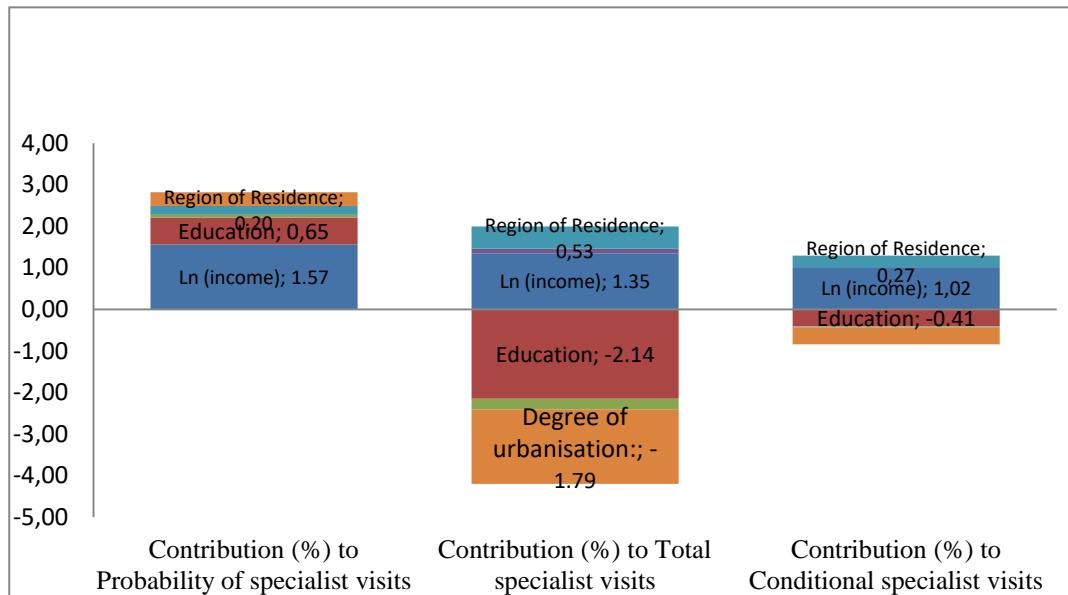
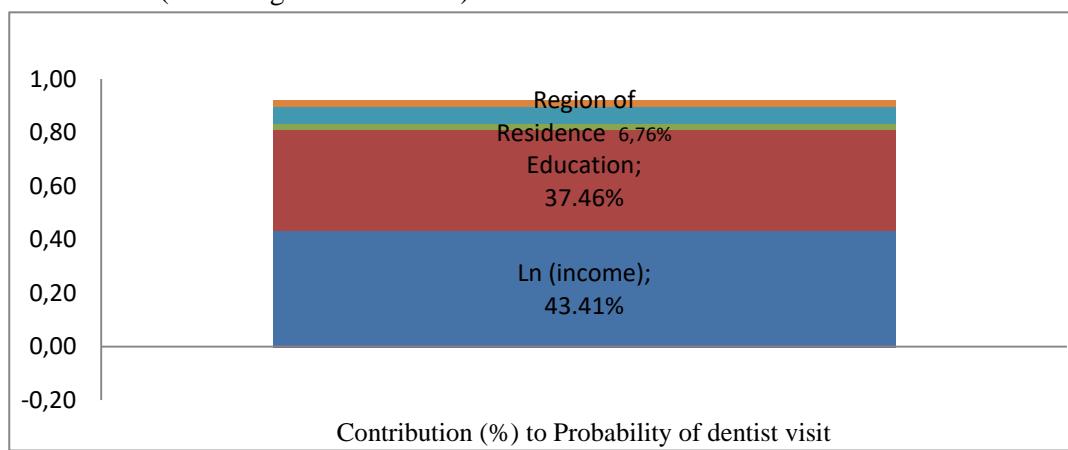


Figure 5.6 Contribution to inequity in the probability of dentist visits – GNHIS (excluding need variables)



5.4.4 Regression Results – Determinants of use

- The most important determinants of health services utilization, as presented in Tables 5.19 and 5.20, are the indicators of *health care need*, mainly activity limitations (GALI) and the self-assessed health (SAH). *Older individuals* are more likely to be admitted to hospital (inpatient and outpatient visit) and visit a GP, and less likely to visit a specialist and a dentist. *Women* are more likely to use all health care services, except having an inpatient admission, and making specialist visits.
- Our findings are consistent with the results of other studies, as presented below, about the effect of income.
 - ✓ Income has a positive association with the probability of specialist and dentist visits and total and conditional number of outpatient admissions. The more advantaged individuals are more likely to visit a specialist and dentists and report more outpatient admissions than those who are less advantaged.
 - ✓ Income level has negative association with inpatient admissions (all patterns) and lower income earners report having total number and conditional number of inpatient admissions more times than the better off, revealing pro-poor inequalities.
 - ✓ However, income level has no association with the probability of inpatient admissions, the probability and total number of GP visits and the total number and conditional number of specialist visits, related with the characteristics and deficiencies of the Greek health care system, as discussed below.
- Compared to lower educational level, *higher level of education* shows a weak negative association with the probability and total number of outpatient visits, but it is strongly positively related with the probability and total number of specialist visits and the probability of dentist visits. It has no association with inpatient and GP care in all patterns as well as with the conditional number of specialist visits.
- Considering the effect of the other factors, *degree of urbanization* reveals significant systematic variations in health care use.
 - ✓ Compared to densely-populated areas, residents of thinly-populated areas use less health care services in most care types (inpatient admissions—all patterns; probability and total number of specialist visits; total and conditional number of GP visits).
 - ✓ Residents of thinly-populated areas are insignificantly more likely to make a GP visit, but once they make a visit, they report conditional number of GP visits fewer times than the densely-populated areas, revealing inadequate GP care services.

- ✓ On the other hand, residents of intermediate – populated areas are more likely to use most health care services, not all services.
- Considering the effect of *region of residence*, compared to region of Attiki-Athens, residents of North Greece – Thessaloniki GR1 are significantly more likely to use and report more health care services than the other regions, especially conditional number of specialist visits. They also have less probability to make a dentist visit.
- On the other hand, *interregional and intra-regional disparities* are evident among the densely populated areas of Athens and Thessaloniki with the thinly-populated areas of Central Greece and Islands for the total number of outpatient admissions, for GP and specialist visits. Although, residents of Central Greece and Islands – who tend to be worse off-are less likely to make a specialist (a GP) visit, they are more likely to report more conditional number of specialist visits than residents of Athens.
- *Marital status* (“Being married”) has a strong positive association with reporting total and conditional outpatient visits, whereas *household composition* “Other - not in a couple” has a negative association with probability and total number of outpatient visit.
- Furthermore, the respective analysis for the determinants of forgone hospital and specialist care -not displayed here - indicates that residents of Central Greece, intermediated and thinly-populated areas are insignificantly less likely to forgo hospital care. In terms of specialist care, thinly-populated areas and region of Islands (including Crete) are insignificantly more likely to report forgo specialist care, similar to the aforementioned results.

Table 5.19 Regression model analysis for probability of inpatient admissions (nights), total and conditional number of inpatient admissions and probability of specialist visits, total number and conditional number of specialist visits based on GHIS dataset

	Probability of inpatient admissions	Total number inpatient admissions	Conditional number of inpatient admissions	Probability of outpatient visits	Total number outpatient visits	Conditional number of outpatient visits
	SE	SE	SE	SE	SE	SE
Need						
Age (80+ vs 50-59)	1.26	0.29	1.59	0.46	1.14	0.27
Age (70-79 vs 50-59)	1.29	0.26	1.19	0.3	1.05	0.23
Age (60-69 vs 50-59)	1.16	0.25	1.5	0.38	1.09	0.26
Gender (male vs female)	1.63	0.23	1.81	0.34	1.58	0.22
SAH	1.6	0.28	2.21	0.52	1.75	0.29
Long Term Illness (Yes vs No)	0.94	0.22	1.06	0.28	1.1	0.27
Gali (Yes) vs No	2.9	0.51	4.72	1.04	1.75	0.34
"2 + chronic diseases" vs "0"	1.24	0.3	1.34	0.34	1.72	0.29
"1 chronic disease" vs "0 "	1	0.26	1.16	0.3	1.3	0.3
Non Need variables						
Income 5	0.76	0.18	0.7	0.22	0.6	0.16
Income 4	0.98	0.21	1.14	0.33	0.8	0.19
Income 3	0.84	0.17	0.8	0.22	0.76	0.17
Income 2	0.86	0.16	0.53	0.12	0.54	0.12
"More than secondary" vs "Primary"	0.97	0.25	0.87	0.29	0.84	0.21
"Secondary" vs "Primary"	0.88	0.15	0.88	0.24	0.85	0.18
Married vs No Married	0.87	0.25	0.84	0.35	0.93	0.29
"Living in couple"vs "alone"	0.93	0.27	0.61	0.26	0.71	0.23
"Other" vs alone"	0.79	0.18	0.83	0.26	1.3	0.34
North Greece vs Athens	1.21	0.21	1.32	0.33	1.72	0.33
Central Greece vs Athens	1.15	0.25	0.8	0.21	0.96	0.21
Islands +Crete vs Athens	1.38	0.36	1.3	0.43	0.94	0.19
Thinly populated areas	0.66	0.12	0.64	0.13	0.85	0.13
Intermediate populated areas	0.71	0.16	0.68	0.2	1.1	0.31

Bold:p-value <0.01; bold and italics: p-value<0.05; italics:p-value<0.10

Table 5.20: Regression model analysis for probability of outpatient visits , total number and conditional number of outpatient visits and probability of GP visits, total number and conditional number of GP visits, probability of dentist visits based on GHIS dataset

	Probability of GP visits	Total number of GPvisits	Conditional number of GP visits	Probability of specialist visits	Total number of specialist visits	Conditional number of specialist visits	Probability of dentist visits	
	SE	SE	SE	SE	SE	SE	SE	
Need								
Age (80+ vs 50-59)	1.25 1.37	0.24 0.21	0.96 0.97	0.16 0.13	1.17 1.02	0.38 0.26	0.91 0.8	0.15 0.11
Age (70-79 vs 50-59)								
Age (60-69 vs 50-59)	0.89	0.13	0.86	0.11	1.23	0.35	1.09	0.15
Gender (male vs female)	0.87	0.1	0.9	0.08	0.7	0.13	1.05	0.11
"Less than Good" (Fair, Bad, Very Bad) SAH vs "Very Good & Good"	1.19	0.16	1.5	0.18	1.76	0.43	1.56	0.2
Long Term Illness (Yes vs No)	2.01	0.29	1.24	0.24	0.81	0.28	1.64	0.22
Limited in General Activities Gali (Yes) vs No	1.42	0.2	1.48	0.2	1.63	0.39	2.09	0.26
"2 + chronic diseases" vs "0"	2.37	0.36	1.42	0.23	1	0.3	1.63	0.25
"1 chronic disease" vs "0 "	1.86	0.28	1.29	0.23	0.9	0.3	1.25	0.19
Non Need variables								
Income 5 1225.25€ + vs <525.50€	1.02	0.2	0.98	0.15	0.57	0.18	1.54	0.27
Income 4 850.33€ - 1225.24€ vs <525.50€	1	0.19	1.01	0.15	0.73	0.21	1.4	0.23
Income 3 683.66 - 850.32 vs <525.50€	0.91	0.17	1.03	0.17	1.37	0.42	1.1	0.18
Income 2 525.50 - 683.65 vs <525.50€	1.08	0.2	1.08	0.18	1.12	0.34	1.18	0.19
"More than secondary" vs "Primary"	1.16	0.22	0.98	0.15	1.22	0.41	1.52	0.28
Education - "Secondary" vs "Primary"	1.21	0.17	0.89	0.11	0.75	0.2	1.14	0.15
Married vs No Married	0.97	0.35	1.37	0.3	1.41	0.82	1.19	0.36
"Living in couple"vs "alone"	1.28	0.45	0.77	0.17	0.73	0.43	1.03	0.31
"Other" vs alone"	0.86	0.17	0.85	0.14	0.88	0.33	0.98	0.17
North Greece vs Athens	0.95	0.14	1.11	0.14	1.45	0.4	0.93	0.13
Central Greece vs Athens	0.67	0.11	0.97	0.13	1.7	0.5	0.53	0.08
Islands +Crete vs Athens	1.16	0.26	2.08	0.35	4.41	1.75	0.62	0.12
Thinly populated areas	1.18		0.82	0.09	0.43	0.12	0.75	0.1
Intermediate populated areas	0.87		0.87	0.12	0.71	0.22	1.14	0.19

Bold:p-value <0.01; bold and italics: p-value<0.05; italics:p-value<0.10

5.5 Discussion

The purpose of the present study was to explore income-related inequalities on utilisation of health care among older population aged over 50 in Greece and investigate national regional inequalities as one of the main contributors to the overall inequity. Our findings and their contribution to inequity in utilization of health care services, as well as the exploration of regional disparities in the utilization of health care services are summarized and discussed underneath, following the comparison with existing literature.

5.5.1 Inequity in utilization of health care services by health care type

- The most *important determinants of health services utilization* by the elderly are the indicators of health care need, mainly the presence of activity limitations (GALI) and the self-assessed health (SAH). Older individuals are more likely to be admitted to hospital (inpatient and outpatient visit) and visit a GP, and less likely to visit a specialist and a dentist. Women are more likely to use all health care services, except have an inpatient admission, and probability of specialist visits. From non need indicators, higher educational level explains a high percentage of inequalities mainly in specialist and dentist visit, except inpatient admissions; income, insurance coverage, marital status and household composition are also considered as important determinants of health services use, but not with the same strength for all the health care types.
- *Inequity in utilization of health care services by health care type*
 - ✓ Significant pro-poor inequity was found for inpatient admissions, and slightly pro-poor inequity for total number and conditional number of GP visits and conditional number of specialist visits.
 - ✓ Pro-rich inequity in conditional outpatient visits, in probability of specialist visit and dentist visit is supported by our findings.
 - ✓ Despite pro-rich inequity in the probability of specialist visit, given that the act of a first visit is a patient's decision, once at least one visit is included, there is pro-poor inequity for conditional number of specialist visits favoring the less advantaged. Therefore, inequity is determined by the patients' behavior and incentives and not by physicians' attitudes.
 - ✓ No significant income-related inequity is apparent for probability of outpatient admissions and probability of making GP visits.
 - ✓ Income has a large positive effect on inequity – it increases inequity in all types of specialist visit, in conditional number of outpatient admissions and probability of

dentist visits. On the other hand, it has a less pronounced effect on inequity in probability of inpatient admissions and GP visits, favoring the less advantaged.

5.5.1.1 Inequity in utilization of health care services by health care type: Comparison with existing literature

By attempting to compare our findings for utilization of care among older population with the existing evidence mainly for general population, we conclude the following.

Inequity in inpatient admissions (hospital utilization)

Overall, our findings of a pronounced pro-poor inequity in inpatient admissions, implying that inpatient care can meet the needs of older population, are *in line with* most of the aforementioned evidence for the general population:

- a) *in line with* two EU comparative studies of Van Doorslaer, Koolman and Jones (2004) and Van Doorslaer & Masseria (2004) that measured income-related inequity in health care using ECHP data and found no income inequity after standardizing for need; and
- b) *in line with* almost all Greek literature that argues no-income related inequity for inpatient care (Kyriopoulos et al, 2002; Tountas et al, 2011; Geitona et al, 2007; Siskou et al 2008; Liaropoulos et al, 2008; and the urban setting study of Pappa E. and Niakas D., 2006). However, we need to treat these findings in caution because of limitations in their study design. For example, the study of Liaropoulos et al, (2008) was a telephone interview survey and its results should be treated in caution.
- c) *in line with* two urban setting cross-sectional studies: (i) the study of Pappa E. and Niakas D., 2006 in the broader Athens area found that hospital admissions were related to need and not related with SES factors; (ii) as well as the study of Sissouras A, Karokis A et al (1996) in Patras' the third largest urban area, within the Phase II framework (1993-1997) programme of W.H.O. European Healthy Cities Network Survey more action-oriented, that indicated no-income related inequalities in hospital admissions.
- d) *in line with* a comparative study of Santos-Eggimann B. et al, 2005 based on SHARE Wave 1 survey for older population including Greece, who explored the determinants of utilization of health care and found no income association with inpatient admissions.
- e) *On the other hand*, our finding is *contradictory to*: (i) the study of Masseria C., Koolman X., Van Doorslaer E., 2004 that is a pooled analysis of ECHP from 1994-1998 in Greece and found significant pro rich inequity for inpatient care relevant to non-elective care (ii) the study of Siskou et al (2008) to analyze private health payments by

provider and type of service, which showed pro-rich inequity for the total number of private inpatient admissions. (iii) A regional cross-sectional study in Thessaly in 2006 of Lahana E. et al (2011) that indicates pro-rich inpatient care, but this study has a small sample and its findings are not easily acceptable. (iv) Considering the elderly evidence: the cross-sectional studies of Majo M. C., van Soest A. (2012); Allin S. & Masseria C. (2006) based on SHARE survey for elderly which examined the relationship between income and health care utilization across countries and Allin S., Masseria C. and Mossialos E. (2009) that explore inequalities in use of health care by wealth versus income, and found slightly pro-rich inpatient care.

Inequity in outpatient visit

Our finding of no significant income-related inequity in the probability of outpatient visits mainly due to a medical symptom, but once at least one visit is included as a medical decision there is pro-rich inequity for conditional number of outpatient visits *is partly compatible* with the following evidence mainly for general population.

- a) Is *in line with*: (i) the results of the urban-setting study in Athens for the general population, that doesn't find any income association for outpatient care (Pappa E. & Niakas D., 2006); (ii) the results of a study exclusively for elderly of Majo M. & Van Soest A. (2012) based on SHARE data that outpatient care does not increase with income.
- b) is *partly compatible* with two studies evaluating cases treated in the ED of a Greek general hospital -that reported increased outpatient visits not associated with income - and revealed that almost one in three patients in specific surgical groups could have been managed by a GP, as could 40% of orthopaedic cases (Marinos et al., 2009; Vasileiou et al., 2009); and two other Greek studies that illustrate no association of patients' SES characteristics with informal payments in public hospitals for inpatient or outpatient admissions (Siskou et al, 2008; Liaropoulos et al, 2008).
- c) On the other hand, our finding is *contradictory to*: (i) the urban setting study of Sissouras A, Karokis A et al (1996) in Patras' the third largest urban area, within the Phase II framework (1993-1997) programme of W.H.O. European Healthy Cities Network Survey, that indicated more conditional outpatient visits from those in lower SES (pro poor) – mainly for having diagnostic tests and medication prescribing. The fact that study was conducted before the NHS-ESY reforms of 2001 is important for considering the dynamics of inequalities in health care use.

Inequity in GP care use

For GP visits our findings indicate that there is a weak in magnitude consistent pro-poor inequity. In particular, there is almost no inequity (slightly pro-rich) for the probability of making a GP visit as a patient's decision for the first GP visit, indicating that all individuals have the same probability to make a GP visit, irrespective of their income, but for the subsequent GP visits (conditional number of visits), there is pro-poor inequity for total number of GP visits and a more pronounced pro-poor inequality for the conditional number of GP visits, as a medical decision. Moreover, we should note that in Greece, given that GPs are few, individuals usually refer to different specialists for a first opinion for their health problems according to their need, but none of them bear responsibility for the patient as a whole. This issue explains the parallel gradient of patient's decision for the first visit to specialist (pro-rich probability of visit) and GP visit (no inequity) which turns to pro-poor subsequent specialist and GP visits as a medical decision (pro-poor conditional number of visits). Moreover, in some cases, people consult a single provider – specialist (or fewer GPs at HCCs) regularly and they consider him as their “personal” or “family” doctor. Therefore, in reality the question of GP or Family (or EOPYY SHIF) physician visit may be answered as a specialist visit. There are difficulties, thus, in comparing inequity results for specialists versus GP visits. Our findings are *in line with* existing evidence for general and elderly population:

- (a) The finding in our study is *in line with two regional cross-sectional studies*: (i) an urban setting study of Sissouras A, Karokis A et al (1996) in the third largest urban area of Patras', within the Phase II framework (1993-1997) programme of W.H.O. European Healthy Cities Network Survey, that indicated more conditional SHIF visits from those in lower SES – almost no inequity. (ii) the regional study of Pappa E. and Niakas D. (2006) in the broader Athens area found that SHIF visits are related to pro poor SES.
- (b) is *comparable with* nationwide studies: (i) a study of Van Doorslaer et al (2004; 2002) using ECHP data of 1996 for Greece that found slightly pro-rich inequity for the probability of GP visit; (ii) with a recent comparative study based on ECHP data concluded that in Greece higher SES users report average total number of GP and specialist visits three times larger than that of the lower SES users (i.e. predicted total number of GP users is 1:3.06) (Bago d'Uva T. & Jones A., 2009); (iii) another study that finds pro-rich family physician visit but once family physicians are not established

- due to inexistence of GPs- individuals may consider a specialist as their “personal” or “family” doctor. Thus, the results should be treated in caution (Tountas et al, 2011).
- (c) Is *in line with* a study exclusively for elderly(Allin S. & Masseria C., 2006) based on SHARE Wave1 data that GP visits are positively associated with income.
- (d) On the other hand, this finding is *contradictory to*: (i) few EU comparative studies including Greece of Bago d'Uvaa T., et al (2009, 2007); Bago d'Uvaa T. & Jones A. (2009) that made a pooled analysis for 1994-2001 using ECHP data for Greece; (ii) the studies of Van Doorslaer et al, 2006; and Van Doorslaer & Masseria (2004) using data of the ECHP 2000 for Greece, and found pro-poor inequity for the probability of GP visit.
- (e) It is *contradictory with* cross-sectional nationwide studies: (i) a recent study of Zavras D et al, (2014) that examined determinants of PHC services in Greece during 2006 using the methodology of the WHO (Üstün et al., 2001) and found that people with lower income report increased PHC services; (ii) another mail study conducted in Greece 2001 - 2002 of Geitona et al, (2007) that examined the determinants of PHC and hospital care utilization and found that the number of PHC visits is affected by income only for poor population, whereas it is a mail study with significant limitations on design method.
- (f) Is *contradictory with* a study exclusively for elderly of Majo M. & Van Soest A. (2012) based on SHARE Wave1 data that GP visits reveal pro-poor income related inequity.

Inequity in specialist care use

For specialist visit, a parallel gradient – tendency with GP visits is apparent. There is significant pro-rich inequity in the probability of the first specialist visit, but once at least one visit is included, there is a less pronounced pro-rich inequality for the total number of specialist visits and pro-poor inequity for conditional number of specialist visits favoring the poor, with important policy implications. Pro-rich horizontal inequity exists in the access to the first visit, but not in the subsequent visits indicated by the physician. Given that the act of a first visit is a patient's decision, while subsequent visits are a medical decision, this result suggests that inequity is determined by the patients' behavior and incentives and not by physicians' attitudes.

- (a) Overall, our findings are *in line with* little evidence for the general and elderly population:

- (i) *in line with* the older cross-sectional nationwide survey study of Zavras D et al, (2014) that examined determinants of PHC services in Greece during 2006 using the methodology of the WHO (Üstün et al., 2001) and found increased PHC services by pro- lower income groups.
 - (ii) *in line with* another cross-sectional nationwide mail survey conducted in Greece 2001 - 2002 of Geitona et al, (2007) that examined the determinants of PHC and hospital care utilization and found that the number of PHC visits is affected by income only for poor population, whereas it is a mail study with significant limitations on design method.
 - (iii) *In line with* few nationwide studies with *evidence of no association* of individuals' socioeconomic characteristics with specialist care as an inpatient or outpatient patient for the general population (Tountas et al, 2011); and those that deal with private health expenditure and informal payments (Siskou et al, 2008; Liaropoulos et al, 2008).
 - (iv) The nationwide Greek study concluded that specialist visit is equally distributed among people in lower socioeconomic status (SES) than those in middle SES (Tountas et al, 2011). Similarly, the cross-sectional regional study of Pappa E. and Niakas D., 2006 in the broader Athens area found that for specialist visits almost no (slightly pro rich) socio-economic factor was related; (iv) a study exclusively for elderly of Majo M. & Van Soest A. (2012) based on SHARE data that no clear association with SES is found.
- (b) *On the other hand, our finding is contradictory to:*
- (i) *is contradictory to* four EU comparative studies including Greece of Van Doorslaer, Koolman and Jones (2004) and Van Doorslaer, Koolman and Puffer (2002) that measured income-related inequity in specialist care in 1996; Bago d'Uvaa T. & Jones A.(2009) and Bago d'Uvaa T. et al (2009) that made a pooled analysis for 1994-2001 using data of the ECHP for Greece and found significant pro-rich inequity for the probability of specialist visit.
 - (ii) *Is contradictory to* Greek literature of Tountas et al, 2011; and Mergoupis et al, 2003; Kyriopoulos et al, 2002 that argue pro-rich inequity for specialist visits. Similarly, according to nationwide telephone survey of Souliotis et al (2016) for informal payments in health care in 2012, it seems that more frequent visits to private health services (mainly PHC) are reported by persons with higher SES profile.

- (iii) *Is contradictory to urban settings* literature of regional cross-sectional study in Thessaly in 2006 of Lahana E. et al (2011) for determinants of utilisation that indicates pro-rich specialist care, similar with the cross-sectional study of Sissouras A, Karokis A et al (1996) in Patras' the third largest urban area, within the Phase II framework (1993-1997) programme of W.H.O. European Healthy Cities Network Survey, that indicated pro-rich inequalities in specialist visits.
- (iv) *Is contradictory to studies for elderly* of Allin S. & Masseria C., 2006 based on SHARE data and found slightly pro-rich inequity, whereas Allin S. et al, 2009 based on SHARE wave 1 found that in Greece wealth-related difference in physician visits was greater than income differences.

Inequity in dentist utilization

Significant pro-rich inequity exists in probability of making a dentist visit, similar with the other datasets of the thesis.

- (a) Our findings that higher income has been positively associated with dental use as expected, *are in compliance with* other studies: (i) for the general population that identify higher dentist and dental care use by individuals in high SES (Koletsi-Kounari H. et al, 2011; Koletsi-Kounari H. et al, 2007; Zavras D. et al, 2004; Souliotis K. et al, 2016; Van Doorslaer E. & Masseria C., 2004; Kyriopoulos et al, 2002) (ii) A study that explored determinants of older Greek adults' oral health patterns found that that cost and no disease awareness were the most frequently mentioned barriers to regular dental visits (Naka O, Anastassiadou V, 2012) (iii) for the elderly (Majo M. & Van Soest A., 2012; Egimann S. et al, 2005; Allin S. & Mossialos, 2004 based on SHARE data that identify the significant effect of income in dentist and dental care use; and the study of Listl S. (2011) based on SHARE Wave 2 data that explored income inequalities in dental care use and preventive treatment by 50+ and found significant pro-rich inequity in dental care in Greece, and higher inequalities for preventive treatment among retired individuals. (iv) Moreover, a recent study of Listl, S (2012) based on life-course data from SHARE (waves 1 to 3) that identified pro-higher education inequalities in regular dental attendance throughout the life-course and relatively inelastic until age yrs 65+ but not thereafter, due to age-related inequality decline in Greece.
- (b) Our finding *is contradictory only to* (i) a Greek study (Siskou et al, 2008) that found no association of income with dental care use. (ii) few studies that indicate lower

levels of oral health associated with those in lower income and lower SES (Yfantopoulos et al., 2014; Kyriopoulos et al, 2002).

5.5.1.2 Inequity in utilization of health care services by health care type:

Contribution to literature - new evidence and discussion

The findings of this first national health survey GNHIS contributes to the assessment of the current situation relevant to inequalities in health care utilization among the older population in the country. We can see what is likely to work in its context before mapping specific next steps that will be most appropriate. Inequalities in use among individuals are partly associated with national health policies that generally have not kept pace (WHO, 2015; WHO –CSDH, 2013). Given the health dynamics of older age, it might be expected that increasing age would be associated with increased health-care utilization for less – advantaged population, given that the burden of disease is greater in low-resource settings. However, evidence by WHO (2015) and WHO– CSDH (2013) indicates that there is a disconnect between health-care need and health-care utilization in disadvantaged subgroups of older people in high-income countries. Our findings -consistent with the aforementioned evidence- show that not only age and chronic conditions determine health care use, but the socioeconomic status is a key determinant. Although the need for health care is likely to be higher among disadvantaged individuals, we found that among older adults with equal levels of need, those in greatest need may be those who use specialist and dentist health services least. However, once at least one visit is included as a medical decision, there is pro-poor inequity for conditional number of specialist visits favoring the less advantaged, and pro-rich inequity for conditional outpatient visits. Inequity is determined by the patients' behavior and incentives and not by physicians' attitudes. Thus, although population ageing is likely to be associated with increasing health needs, the association with the demand for, and utilization of health services is less clear-cut. In all countries, one key component of a health-systems response to population ageing must therefore be to breakdown the barriers that limit health-care utilization by the older people who need it. Under this framework, our study contributes to existing literature by introducing more sophisticated statistical methodology in order to examine inequalities in the patterns of utilization among the elderly, that likely result from barriers to access due to common gaps in the current system and also to explore challenges to reduce these inequalities. In particular, *our findings of pro-poor inequity in probability of inpatient care seem to ensure comprehensive coverage of older population under the framework of the*

egalitarian principle of Greek NHS-ESY that health is a social good and that all citizens, irrespective of their SES or location of residence, should have equal rights to access to healthcare services. They imply that the use of inpatient care in the NHS is distributed according to need. Our finding highlights the absence of barriers for inpatient admissions for older population in compliance with the fundamental policy goal of universal health coverage (UHC) and the objectives of effective coverage and health system performance, as introduced by the WHO Health Report 2010 and WHO-CSDH (2013), that all people obtain the health services they need (i.e. equity in service use relative to need), as a first step towards a more equitable health care system. Our data do not distinguish between public and private inpatient admissions, though there is evidence that, despite the rapid growth of the private sector during the last decade, public hospitals are used more frequently than private hospitals (Economou C., 2010). Moreover, the accessible inpatient admission for older population is in compliance with the Greek evidence that evaluated the relative efficiency of hospital care in the NHS-ESY and found efficiency gains in the performance mainly of medium (250 to 400 beds) in size hospitals in urban areas versus larger general hospitals - in almost all regions except 6th YPE and 7th YPE for medium size hospitals, and 2nd YPE for small hospitals, (Prezerakos P., 1999; Polyzos N., 2002; NSPH, 2012; Polyzos. N, 2013), except the large hospitals of the 2nd YPE (Piraeus & Aegean Islands) and 4th YPE (Central & East Macedonia & Thrace) (Polyzos, 2013; NSPH, 2012). Similarly, Xenos P., NektariosM, ConstantopoulosA, Yfantopoulos J (2016) more recently, examined the efficiency of 112 Greek public hospitals in 2009 by applying two models of DEA, augmented by bootstrapping techniques in the efficiency and bias-corrected efficiency scores. Their results show that the majority of the hospitals (30.4%) score between 0.51 and 0.7, while less than a quarter (23.2%) are fully efficient, indicating that, despite the difficulties in the healthcare sector in Greece, certain public hospitals are leading the way to high productivity and efficiency, whereas their “best practices” should be adapted by the less productive hospitals that were almost 10% of hospitals as totally inefficient.

Furthermore, our findings of *pro-rich inequity in probability of specialist and slightly pro rich in the probability of GP visits and pro rich conditional outpatient visits* reveal the patients’ behavior under the inadequate and inefficient way that PHC (GP care, outpatient visits, and probability of specialist visits) is provided in the NHS-ESY. They are also in accordance with regional variations - as we present below - in PHC for thinly populated areas and Central favoring the better off. They indicate that among older adults with equal

levels of need, those in greatest need (pro-poor) may be those who are likely to use specialist and GP health services least. These findings reveal gaps in coverage and provision in PHC services and undermine the egalitarian principle of NHS-ESY established since 1983 of equity in health care delivery: equity of access to available care and equality of utilization for equal need – that implies equal entitlements (Whitehead, 1991; Mooney 1983 &1986); as well as they undermine the fundamental policy goal of universal health coverage (UHC). The PHC is provided via multiple subsystems in a fragmented - bureaucratic way with no coordination and a physician-driven organizational structure. As several authors point out, despite the fact that HCCs and PEDY- EOPYY units (ex IKA) were established in order to provide a wide range of PHC services, in practice, most of the times they result in inefficient, low quality services and problematic operation, due to a number of weaknesses. Given these weaknesses, older population are “forced” to make a private physician visit, or to travel to visit private providers in urban areas or to visit the outpatient facilities of NHS-ESY hospitals as a first PHC contact, making their demand pressure worse resulting most times in high OOP and informal payments. This causes interregional patients’ flow seeking for care and financial handicaps for the vulnerable populations- who are unable to pay- and increases access inequity.

In addition, our findings of initial pro-rich inequity in the probability of specialist visit as patient's decision for the first visit, which turns to *pro poor conditional number of specialist visits* for the subsequent visits as a medical decision reveal the “enforcement” of older population by the inadequate PHC system, to make a private physician visit, or result in interregional patients’ flow seeking for care to private providers in urban areas or to NHS-ESY hospitals as a first PHC contact, that increases access inequity.

This finding of *pro-poor conditional specialist visits that is in parallel with pro-poor conditional GP visits*, relevant with the fragmented PHC system that is characterized by the lack of GPs in HCCs and other PHC centres (EOPYY-PEDI or ex IKA units) and the oversupply of specialists, result in the specialist visits to correspond to GP visits. Therefore, among the elderly with equal need, the less advantaged are more likely to make a specialist private visit with high OOPPs or have equal probability to visit a GP, irrespective of their income level, with important financial handicaps implications. This result is also related with the high OOP expenses that older people face for the PHC outpatient and private specialists’ visit, as revealed in the other datasets.

Moreover, *the finding of significant pro-rich dental care* is related to the limited coverage of dental care in the public sector and the fragmented way which is provided in NHS-ESY

and SHIFs facilities, similar to the other datasets and the existing literature (Koletsi-Kounari H. et al, 2011; Koletsi-Kounari H. et al, 2007; Zavras D. et al, 2004; Souliotis K. et al, 2016; Yfantopoulos et al., 2014; Van Doorslaer E. & Masseria C., 2004; Kyriopoulos et al, 2002; Majo M. & Van Soest A., 2012; Egimann S. et al, 2005; Allin S. & Mossialos, 2004). The poor social health insurance (SHI) coverage of dental care, in combination with the oversupply of private dentists⁶⁰ leads to extended use of private dental care sector with high expenditure, especially OOP and informal payments (Koletsi-Kounari H. et al, 2011; Siskou et al, 2008). This relates to the fact that, in reality, the Greek population is uninsured for oral health services resulting in regressive interregional variations with financial barrier for accessing dental services favoring the residents of rural areas that have to travel to seek private dental visits at urban areas (Koletsi-Kounari H. et al, 2007; Siskou et al, 2008). As many authors point out dental provision, the private care and OOP payments by patients act as “a substitute for the gaps in insurance coverage of dental treatment” (Economou, 2010 p.133; Mossialos et al, 2005).

Under this framework of strong inequalities and gaps in PHC services that have been worsened during the deep structural and multifaceted crisis that Greece faces since 2010, the Greek government has started implementing reforms in health care system in order to protect accessibility to health care for vulnerable groups and reduce public health expenditure. Initially, the unification of SHIFunds (IKA, OGA, OAEE, OPAD) in one scheme (EOPYY) that was established in 2011 as a sole purchaser of health services with the Law 3918/2011 implementing risk-pooling, as well as providing a common basic package of health-care services in EOPYY, is in the right direction though there are still differences in eligibility conditions. However, in the current austerity-driven context, the common package was accompanied by reductions in benefits and by increases in copayments and user charges for visits to HCCs and hospital outpatient departments, pharmaceuticals and laboratory tests, that undermine equity in utilization. Following, in order to close the gap in coverage created by the crisis, two ministerial decisions in 2014 and a recent Law 4368/2016 were introduced and only extended coverage of prescription drugs and inpatient care to the uninsured (estimated, between 1.5 and 2.5 million people due to unemployment) – including vulnerable elderly. Therefore, it seems that the Government developed specific mechanisms to support equitable access to needed services for vulnerable groups initially limited, slow and ineffective (Economou et al. 2015).

⁶⁰ Compared to other OECD countries, Greece has the highest number (1.27) of dentists per 1000 inhabitants (OECD, 2009) and in the same time there are pronounced imbalances in the geographical distribution of dentists, with approximately 50% of all dentists employed in the greater Athens area.

However, to meet the needs of ageing populations and eliminate inequalities in PHC, significant changes are required complementary, in the way the existing NHS-ESY PHC system is structured and PHC is delivered, as following.

- New PHC services and approaches will need to be developed in these settings. The existing PHC services will have to be redesigned to deliver the comprehensive and coordinated care that has been shown to be more appropriate and more effective.
- The likely transformation of the PHC health system needs to move away from disease-based curative models and towards the provision of older-person- centred and integrated care.
- PHC services have to be better integrated between levels and across specialist groupings. Establishment of LTC – with the integration of health and social care services, based on ensuring equitable access to care services will provide a real safety net for older people— and their families and seems to be crucial.
- In order to address the new policies and programmes, the governments require to make efforts to reach groups that are particularly disadvantaged.
- The starting point will need to assess health policies and programmes in relation to inequalities, from inputs to outcomes, and gauging to what extent these are fair or unfair.
- It is important also to put older people at the centre of health care, including them as active participants in care planning and in managing inequalities in health care.

Although these actions will inevitably require resources, as WHO (2015) highlights “they are likely to be a sound investment in society’s future”.

5.5.2 Regional Variances in health care use: Contribution to inequalities in health care use

Our findings reveal not only inter-regional disparities but also intra-regional disparities in most health care types, summarized, as following:

- (i) Inequalities are apparent for most of health care types except the probability of GP visits, mainly due to the strong pro-rich (positive) effect of thinly - populated areas.
- (ii) Residents of thinly-populated areas face pro-rich inequalities for almost all health care types, except pro-poor inequity in probability of GP visits.
- (iii) Compared to densely-populated areas and Athens region, thinly populated areas and Central Greece face disparities in PHC (GP care, outpatient visits, and probability of specialist visits) favoring the better off, indicating the inadequate provision of primary care in residents of thinly-populated areas.

- (iv) Pro-rich inequity is apparent in the probability of specialist visits as patient's decision for the first visit for all areas and regions favoring the better off, which turns to pro poor conditional number of specialist visits for the subsequent visits as a medical decision for older residents of North Greece, Central Greece and intermediate-populated areas who report more specialist visits than those of the Athens residents and densely-populated areas and reduce inequity in favor of worse off, resulting in pro-poor inequity for conditional number of specialist visits.
- (v) Regional disparities are not apparent in inpatient admissions, except slightly in Islands.
- (vi) Inequalities are not apparent in North Greece in most health care types, favoring the worse off, apart from probability of specialist and dentist visits.

5.5.2.1 Regional Variances in health care use: Comparison with existing literature

Despite the fact that existing literature for regional variations in health care use in Greece concerns only general population we attempt to compare it with our findings for utilization of care among older population, as following. Most of our findings are in line with the existing evidence that reveals significant regional disparities in health care use favouring the residents of rural regions- who are less advantaged.

- (a) *Our finding (i) to (iii) are in line* with the evidence that the residents of rural regions use- in total - fewer health care services (PHC, outpatient and secondary) comparing to urban areas (Zavras D et al, 2014; Tountas Y et al, 2011; Oikonomou N., Tountas Y, 2011; Lahana E et al, 2011; Marinos G et al, 2009); as well as *in line with* evidence of geographical proximity barrier to PHC (including access barrier to SHIFs' physicians and to NHS rural HCCs) (Oikonomidou E. et al, 2010; Alber & Kohler, 2004); *in line with* interregional variations in dental services favoring the residents of rural areas that have to travel to seek private dental visits at urban areas (Koletsi-Kounari H. et al, 2007; Siskou et al, 2008); use less hospital care (Economou C, 2015; Brokalaki et al., 2011; Eurofound, 2012; Tountas et al, 2011; Kentikelenis et al, 2011; Anderson, 2004; Masseria C. et al, 2004;).
- (b) *Our finding (ii)* that the residents of thinly-populated areas face pro-poor inequalities in the probability of GP visits compared to densely-populated areas *is in line* with the study of Geitona et al, (2007) that indicated increased use of GPs by rural population (specifically residents of Central Greece and Epirus); it is *in line* with Van Doorslaer, Koolman and Puffer (2002) that indicate slightly pro-poor probability of GP visits after standardizing for regional utilization; and it is also *contradictory to* Oikonomidou

E. et al, (2010) that reveal geographical proximity as a barrier for old patients to receive care by the ESY rural HCCs and rural settings – (practices) that result in increased number of GP home visits to older patients in thinly populated areas; It is also *contradictory to* evidence of geographical proximity barrier in access to PHC (Economou C, 2015; Brokalaki et al., 2011; Eurofound, 2012; Kentikelenis et al, 2011; Anderson, 2004; Masseria C. et al, 2004;).

- (c) *Our findings (iii) and (iv)* that rural residents of thinly and intermediate-populated areas face pro-rich inequalities in the probability of specialist visits as patient's decision for the first visit, which turns to pro poor conditional number of specialist visits for the subsequent visits as a medical decision, *are in line* with evidence that the residents of rural regions report increased utilization of SHIF physicians and private specialists' consultations, accessed in bigger urban centres (Tountas et al, 2011; Oikonomou N., Tountas Y, 2011; Lahana E et al, 2011; Vadla D. et al, 2011; Siskou et al, 2008; Pappa, E. and Niakas, D., 2006, Geitona 2007; Van Doorslaer, Koolman & Pufffer, 2002; Van Doorslaer and Masseria C., 2004). Moreover, *our finding (iv)* of pro-poor inequity for the total and conditional number of specialist visits favoring the residents of North Greece, Central Greece and intermediate-populated areas *is in line* with Geitona et al, (2007) that found increased use of PHC (GPs and specialists) by rural population of Central Greece and Epirus.
- (d) *Our finding (v)* that regional disparities are not apparent in inpatient admissions among residents of different regions *is in line* with restricted evidence in local and nationwide studies where inpatient care is related to health needs and not to socioeconomic factors (Pappa E. and Niakas D., 2006; Tountas et al, 2011; Kyriopoulos et al, 2002). However, it *is contradictory to* the evidence of pro-rich regional inpatient admissions favoring the residents of the urban regions (Van Doorslaer and Masseria, 2004; Lahana E et al, 2011 with a local study). It is also *contradictory to* the evidence of geographical proximity barrier in access to inpatient care (Economou C, 2015; Brokalaki et al., 2011; Eurofound, 2012; Kentikelenis et al, 2011; Anderson, 2004; Masseria C. et al, 2004;).

5.5.2.2 Regional Variances in health care use: Contribution to literature - new evidence and discussion

Our findings have a major contribution to *new evidence* of regional disparities in inequity in use of health care and the contribution of income among the older population in Greece. This issue has to be interpreted in conjunction with the urban-rural differences.

Understanding what drives geographic variation in utilization has important implications for policy, by reorganizing existing services to meet health care objectives, especially for the older population.

First of all, our finding of slight variation in inpatient care among regions, indicate the comprehensive inpatient (secondary and tertiary) care provided to the entire population through the network of ESY public hospitals that is in compliance with Greek studies that applied the data envelope analyses (DEA) method to evaluate hospital's performance and demonstrated efficient operation of small and medium in size hospitals (250 to 400 beds) in urban areas - versus larger general hospitals in the capital Athens (2nd YPE) (Prezerakos P., 1999; Polyzos N., 2002; NSPH, 2012; Polyzos. N, 2013; NSPH, 2012; Xenos P. et al, 2016). According to a recent study of Xenos P., Nektarios M, ConstantopoulosA, Yfantopoulos J (2016) that examined the efficiency of 112 Greek public hospitals in 2009 by applying two models of DEA found that the majority of the hospitals (30.4%) score between 0.51 and 0.7, while less than a quarter (23.2%) are fully efficient, indicating that, despite the difficulties in the healthcare sector in Greece, certain public hospitals are leading the way to high productivity and efficiency. The finding of non-apparent regional disparities in inpatient admissions is important from policy view. On the other hand, the fact that our findings signal either under-utilisation (Central Greece, Islands and the thinly-populated areas mainly for PHC services), or over-utilisation (mainly North Greece) of care, raises questions about the issues of equity, efficiency and the overall health system performance. Similarly, the findings of strong pro-rich (positive) effect of thinly populated areas- that is less advantaged - for most health care types except the probability of GP visit, as well as the pro-poor inequity in conditional specialist visits mainly accessed in urban areas related with OOP payments, have important implications for policy making in the growth and provision of PHC system in rural and remote areas.

Overall, the evidence in our study suggests that geographic differences in health care use are not consistent with differences in need or patient preferences. Geographic variations in health care are explained by both demand and supply-side factors. On the demand side, several studies have showed the influence of socio-economic factors to under-use of services – ie. strong correlation not only with disease burden but with social deprivation of the residents of these regions (OECD 2014; Majeed et al., 2000). In particular, Central Greece, Islands, and the thinly-populated areas that report the highest inequalities and

disparities in PHC and specialist care account for the poorest regions in Greece⁶¹ with the lowest regional GDP per capita and the highest at-risk-of poverty indicator (AROPE) for older population⁶² at NUTS1 level since 2004 till 2015, as in Chapter three (ELSTAT, 2016). On supply side, it points to the fact that there is unmet need in regions of low activity - explained by unequal regional allocation of health infrastructure (ie the number of hospital beds per capita indicator) or variations in medical practices (number of physicians per capita or number of nurses per capita), as presented at Chapter three. In particular, Central Greece, Islands, and the thinly-populated areas that report the highest inequalities in PHC and specialist care, have the lowest density in doctors and nurses^{63, 64}, and consist the poorest regions in Greece with highly mountainous and isolated areas, whereas the majority of physicians are concentrated in the two most crowded regions of the country (49.3%) in Attika/Athens - the capital and 16.5% in Central Macedonia/ Thessaloniki- North Greece that report the lowest inequity in specialist visits. Despite the fact that health centers (HCCs) have generally increased in rural areas during the last decades, PHC in rural areas is highly deficient because of inadequate staffing (mainly GPs), old-fashioned and useless biomedical technology and facilities as well as lack of financial and managerial autonomy. This maldistribution is explained by the inefficient allocation of resources on the basis of historical precedent and political negotiation and not according to health care need. This result in a failure to cover the needs of the population in remote areas as well as to develop an integrated PHC network (Gibson et al., 2013; Papatheodorou & Moysidou, 2011). Thus, it's very difficult for the people of these areas- especially the elderly with greater concentration in rural areas - to have access to adequate NHS primary care, "forcing" them to seek private care, which may be expensive. As a consequence, we observe high percentages of uncontrollable interregional flows of elderly patients to urban areas such as to Athens or to areas with university hospitals, despite

⁶¹ The poorest regions with the lowest regional GDP per capita are Epirus, Western Greece and Thessaly and those with the lowest Gross Value Added are North Aegean, Epirus and Ionian Islands and East Macedonia & Thrace, according to the National Accounts by the Hellenic Statistical Authority (ELSTAT, 2014).

⁶² According to the trends of regional variations of at-risk-of poverty indicator (AROPE) for older population at NUTS1 level from 2004-2015, the period prior crisis in 2004, the highest poverty is recorded at North Greece and Central Greece, whereas in 2015 the highest poverty is noted at Central Greece and the Aegean Islands (& Crete Island).

⁶³ About regional allocation of physicians, the regions with the lowest density in doctors (Western Macedonia, Ionian Islands and North Aegean Islands) less than half of the national average (614.4 doctors). Western Macedonia has 4.5 lower density of physicians than the national average. About the allocation of nurses, Central Greece with the lowest density in nurses (144) has 0.40 nurses of the national average of 354 nurses.

⁶⁴ According to Greek Statistics Authority for 2007, the concentration of doctors in the area of greater Athens (Attica) is remarkable (7.3 physicians per 1.000 inhabitants), the second in concentration area is Central Macedonia (5.3), Crete has 5.4 physicians, whereas the regions of Central Greece (2.7), Western Macedonia (3.2) and the South Aegean Islands (3.2) that display the largest scarcities (Economou, 2010).

possible transportation problems⁶⁵ (“Health and Welfare Map” – NSPH, 2011). In this case, our findings indicate that the Greek health system is not achieving the level of performance it should, mainly for PHC, whereas it is not achieving its commitment to equity that is at the heart of the universal health coverage (UHC) that has been adopted by the Greek NHS – ESY since 1983.

As WHO-CSDH (2013) points out, in terms of action on the social determinants of inequities in health care, many countries are currently reviewing their national and local development plans and evaluating or reforming health policies and services with the aim of incentivizing actions on social determinants and eliminating geographical and regional disparities in health care use through quality improvement in primary care. Given that the Greek NHS-ESY is in ongoing reform, the evidence derived by our study -targeting groups like the older population -could be included as part of routine intelligence systems to inform analysis, reporting and implementation of action, in a regional and multicounty framework. These findings give the opportunity for reorganization of existing services or for re-direction of resources to meet health care or social objectives related to regional and local characteristics, especially for the older population.

- The health system requires to move away from disease-based curative models and move towards the provision of older-person- centred and integrated care, redesigned in a subnational level that has been shown to be more effective.
- The well establishment of LTC – with the integration of health and social care services in a local level, will provide a real safety net for older people that seems to be crucial to ensure equity in access to health services.
- The starting point will need to assess health policies and programmes in relation to inequalities, from inputs to outcomes, and gauging to what extent these are fair or unfair in a local level, by putting older people at the centre of health care, including them as active participants in care planning and in managing inequalities in health care according to the regional and local needs.
- Moreover, in order the Government to respond to the issue of undersupply of medical staff in thinly-populated areas, given the absence of adequate incentives for staffing, should perform a comprehensive regional development policy that aims to distribute physicians more evenly across regions.

⁶⁵ According to the “Health and Welfare Map” data as estimated by National School of Public Health in 2011, patients prefer to travel from rural and isolated areas (ie mountainous as in poor regions of Epirus, Central Greece and islands) to urban areas such as to Athens (33.2%) or to areas with large university hospitals (in Thessaloniki 42.6% or in Ioannina- Epirus 66.3%) offering expensive and high-technology services or visiting private providers (NSPH, 2012).

- First policy responses need to take into account the reasons physicians choose to locate in certain regions (organization of service delivery, the income potential and working conditions of physicians, the prestige and recognition they derive and finally the origin of doctors), according to Ono T. et al (2014) suggestion.
- Then, strategies that could develop for even human resource distribution, include:
 - ✓ to target future physicians (increasing the number of qualified physicians who are interested in practice in underserved regions);
 - ✓ to target current physicians (via suitable incentive system with not only financial incentives but also suitable regulatory measures);
 - ✓ to do with less (through expansion of involvement by non-physician providers or by service delivery innovations using technology - telemedicine).

5.6 Conclusion

The purpose of the present study was to explore income-related inequalities on utilization of health care among older population aged over 50 in Greece and investigate national regional inequalities as one of the main contributors to the overall inequity. Using the first wave of the Greek National Health Interview Survey (GNHIS) we have tested the hypotheses: (i) The inequalities in use of health care is derived from the different socioeconomic characteristics of the older population that uses health services; (ii) Individuals on higher income are more likely to use health care services than lower income comparators; (iii) Individuals in densely-populated areas are more likely to use more health care services than comparators in intermediate and thinly – populated areas. Applying different methodological approaches, such as the horizontal inequity index approach by calculating concentration indices (as developed by Van Doorslaer and colleagues) and using regression model, we quantify income – related inequity and measure the effect of socioeconomic indicators on the likelihood of contact with health care services. Our findings support the existence of significant pro-rich inequity in outpatient admissions, in probability and total number of specialist visit. Moreover, significant pro-poor inequity was found for inpatient admissions, and slightly pro-poor inequity for total number and conditional number of GP visits and conditional number of specialist visits. No significant income-related inequity could be found for probability of outpatient admissions and probability of making GP visits. Our findings indicate that income itself is not the only contributor, provided that higher educational level status and regional factors do not have a consistent effect and explain the high percentage of inequalities in almost all health care

types. In addition, by decomposing income – related inequity we identify and measure the extent of regional inequalities as one of the main contributors to the overall inequity in the likelihood of using health care. Our findings indicate intra and interregional variations in most of health care services that contribute to a large extent to the overall inequity. Compared to densely-populated areas and Athens region, thinly-populated areas and Central Greece exacerbate the use of most health care services for the older population. Residents of thinly-populated areas face pro-rich inequalities for almost all health care types (inpatient admissions, outpatient and specialist care), except probability of GP visits. Compared to Athens region, regional disparities -inequalities are apparent for most health care types except inpatient care (slightly for Islands). Moreover, we find regional variations in primary health care for thinly populated areas and Central Greece (GP care, outpatient visits, and probability of specialist visits) favoring the better off. Although we find territorial disparities for all areas and regions in the probability of specialist care use favoring the better off, once the positive contacts of specialist visits are included, older residents of North Greece, Central Greece and intermediate-populated areas report total number and conditional number of specialist visits more times than residents of Athens and densely-populated areas reducing inequity in favor of worse off, “forcing” older residents to specialist care, irrespective of the income level of the individuals. Geographical barriers may partly explain our findings of regional disparities. The economic crisis may have risen the existing inequity of the health care use, especially for the older population. The recent Eurofound report in “Access to healthcare in times of crisis”, indicates that inability to obtain health care increased most for older people. Moreover, an analysis before (2006) and after crisis (2011), of EU-SILC data in the EU27 ‘enforced unmet needs’ because of costs, waiting lists or distance, for those aged 65 and over, concluded that inability to obtain care has been increased, and this increase concerns mainly Greece (from 9.4% to 13.2%) and Italy versus EU27 increase (from 3.5% in 2006 to 4.7% in 2011) (Rodrigues et al, 2013; Kentikelenis et al, 2014 comparing 2007 and 2011). There are significant policy actions that stem from our study findings. These help to identify the extent of inequalities in health care use among the older population and transfer the findings to policy makers by relating the identified socio-economic and geographical variations in health care use with the characteristics of the older population in Greece. Our findings prove the solutions for diminishing inequalities in health care use cannot be simple and universal. There’s no doubt that the impact of the various health care efforts for reform on the older population up to now needs evaluation. Policy documents and National Action Plans still target to

broaden population health determinants such as the demographic expansion of the older groups, their living situation and challenges of poverty at old age. Future reforms might concentrate on reducing inequalities in NHS health care services use among the vulnerable group of older population by targeted policy responses and improving the Greek NHS performance. Moreover, they could focus on integrating health and social protection services based on the specific needs of older people who use health care.

Chapter Six

6. “Inequalities in health care use in Greece among the older population – Survey of Health, Aging and Retirement in Europe (SHARE)”

6.1 Introduction

The Commission, in its 2009 communication, underlined the existence of large gaps in health among the EU Member States and invited the Governments of the Member States to develop targeted policies for reducing inequalities in health. In a similar effort, the WHO targeted the reduction of health inequalities both within and between countries by launching the programmes “Health for All by the year 2000” and “Closing the Gap” in 2008, followed by the WHO - Europe 2020 strategic plan (EC, 2014) till the more recent WHO global strategy on people-centred and universal health coverage (WHO, 2015b; 2016), as presented at Chapter one. The relevant WHO report reached to the conclusion that health inequalities should be a major concern of governmental policies in all countries and that it is a matter of social justice to combat poverty and health inequalities, particularly among the most disadvantaged and vulnerable. This approach is derived from the egalitarian view of access to health care that suggests a publicly financed system where “equal opportunity of access for those in equal need would be the determining rule” independently “of who is paying for the care..... The success criterion in the egalitarian system is the level and distribution of health in the community” (Williams, 1993). In this respect, according to *Europe 2020* strategic plan for reducing inequalities in health (EC, 2014), it is recommended that – among others- action is needed on social determinants to improve average health and reduce health inequities within each country. Moreover, adequate monitoring and review is necessary to ensure accountability and transparency and provide evidence that action has been taken. Moreover, the challenges and policy instruments of Ageing and Health Equity framework that have been introduced since 2002 with the UN Political declaration and Madrid international plan of action on ageing (UN, 2002), followed by the WHO-CSDH policy framework on adopting the life-course model in order to “ensure access to health and social care” till the recent WHO’s World Report on Ageing and Health (WHO, 2008; 2013; 2015) identify the importance of health equity in older age. Health equity in older age is important both in its own right and flags several key issues that include among other “promoting health and well-being throughout life; and ensuring universal and equal access to health-care services to reduce health inequities at

older age". However, the existing evidence indicates that although the health dynamics of older age are related to increased needs for health care, the association with the demand for, and utilization of, health services is less clear-cut. There are few key barriers /challenges- related to current ineffective public-health approaches to population ageing- that need to be overcome, if improved access to effective health care intervention is the most important determinant of health, especially for vulnerable groups, such as the elderly (WHO, 2015). These challenges were presented in the Conceptual Framework section. Moreover, evidence about health care use and treatment quality is mixed: not all studies have found poorer treatment for those in older ages, with patterns varying according to health condition and health care outcomes considered (Grundy E et al, 2012). Evidence also suggests that once individual - demand effects have been isolated, cross-cohort and country differences in the prevalence of regular care use are partly associated with national health policies. Results indicate that supply side factors ie physician density has a significant impact on utilization of most health services over the life-course. Nevertheless, the commitment of governments to the adoption of systematic plans for their older populations, including health equity policy and the monitoring of the effectiveness of measures, particularly from the perspective of older people, has remained problematic (Triantafillou & Mestheneos, 2013). At least one significant reason for this is the lack of systematic data making it impossible to record advances in policy implementation or any real measure of its effectiveness. Fewer analyses have been undertaken of health inequities among older people than in younger age groups. As a consequence, measurement of equity of access to health services is not used adequately to assess the health system performance. In Greece, similar to other European countries, as aforementioned, health and protection of older population are consolidated in the Greek Constitution as social rights and the founding law of the egalitarian Greek NHS -ESY in 1983 with the aim to expand coverage and reduce inequities, particularly in finance, access and resource allocation, despite the fact that after four decades still faces structural problems. Moreover, considering the health care needs of the rapidly increasing older population in Greece, there is no universal statutory scheme for LTC in Greece and integrated health and social care still remains a neglected subject. This issue results in the under- development of public services for elderly that consists also a potential source of inequalities in utilization of health care among the elderly in Greece. In the meantime, Greece has adopted all the aforementioned international and EU recommendations for the determinants of health equity in a life-course perspective, as well as for universal and equal access to health care services, but

without any clear policy framework relating to inequalities in health and health care in Greek health system (Chrodis JA, 2014). Moreover, little attention has also been paid to investigating and measuring equity in the use of health care among the elderly, since they are the consumers who, though they receive high health services, with unfair use of service among income groups (Allin S. and Mossialos E., 2005). Therefore, more collection and sharing of learning in a consistently way “as part of routine intelligence systems” is needed, on measuring social determinants of inequities in health care and on how to effectively implement programmes to tackle them, especially for the fundamental egalitarian principles of Greek NHS -ESY that it should be: comprehensive, equal, with universal coverage, of high quality and free of charge at the point of delivery.

6.2 Research Questions

Drawing from the aforementioned challenges – inefficiencies of the Greek NHS-ESY, in conjunction with the effects of demographic ageing and the need for a clear understanding of inequalities in health care use among the elderly, by using the nationwide, multidisciplinary 1st wave of Greek SHARE for people aged 50 years or over, we have the opportunity to provide new empirical comprehensive evidence, to achieve the thesis’ main objective and thus filling the gap in the research for Greece. Given that the reference time of SHARE study is 2003-04, we have also the opportunity to explore inequalities in health care use in elderly by shedding light on the equity issue of the NHS-ESY reform of 2001-2004 (via the major reform acts of 2001 Law 2889/2001 on the Regional Structure of Health Care Services and reform act of 2003 Law 3106/2003 on the Regional Structure of Welfare Services) that divided the country into 17 regional health and welfare authorities (PeSYPs). Building on the features of the Greek health care system and the existing literature and evidence, in order to achieve these objectives, we address the following empirical research questions (RQs), guided by the following theoretical hypotheses (THs). THs: (i) The inequalities in use of health care is derived from the different socioeconomic characteristics of the older population that uses the health services; (ii) Individuals on higher income are more likely to use health care services than lower income comparators; (iii) Individuals in densely-populated areas are more likely to use more health care services than comparators in intermediate and thinly – populated areas; (iv) Individuals with “Non Noble” social health insurance coverage are more likely to pay OOP for using health care than comparators with “Noble” social health insurance coverage. Guided by the THs we address the following research questions (RQs): (i) what is the extent and contributors of inequity in the use of health care among people over the age of 50 in Greece? (ii) What is

the extent in national regional variations and inequalities in accessing health care services among the older population over the age of 50 in Greece? (iii) What are the determinants of OOPPs as a payment mechanism of the utilisation of health care among the older population over the age of 50 in Greece?

It is worth mentioning that by the SHARE survey tool, we address similar research questions with the other survey – tools as in Chapters four and five, given that we have a similar framework for examining the same objectives with the same theoretical hypotheses, but for exclusively the older population aged 50+ in Greece, in the period of NHS-ESY reform of 2001-2004 in a nationwide setting. Our exploration of SHARE evidence – exclusively for the older population in Greece - to supplement evidence of the other two datasets – survey tools of PatraHIS on an urban setting and GNHIS evidence on a nationwide setting for the period of NHS-ESY reform of 2005-2008 and result in a robust evidence for inequalities in health care system among the older population to shed light in the whole pro-crisis period in Greece. This evidence will attempt to give a clear understanding of inequalities in health care use in order to transform the NHS system for serving its foundation principles of equity in access and universality among the elderly population in Greece. In addition, we should keep in mind that research which examines past experience empowers policy analysis that should be focused on the future (Klarman, 1980) in the current long crisis period, since 2009. Nevertheless, studying the past may contribute to a clearer understanding of the present and this may affect the future (Porter, 1995).

6.3 Sample and variables

In our research we will include data from the 1st wave of the survey in 2004 with reference time in 2003 - 2004 (Wave1 – release 2.6.0).⁶⁶ The household response rate for Greece in Wave 1 was 60.2% and the individual response rate (within household) was 91.8%. In our study, the *dependent variables* were measured by eight separate questions: six questions for health care use and two questions for the amount of out of pocket expenses (OOPPs). The *dependent variables for health care utilisation* concern the likelihood and number of contacts and were measured by six separate questions asking the respondent: (i) about the number of any medical contact the past 12 months; (ii) among those who reported at least one medical visit, the number of any GP/HCC physician visit. However, provided that HCC are staffed mainly by specialists and few GPs due to absence of GPs in Greek health

⁶⁶ SHARE (2013) The Survey of Health, Ageing, and Retirement in Europe. Release Guide 2.6.0 of waves 1 & 2. November, 29th 2013.

system, in reality any visit at HCC may be answered as a specialist visit and this is a data limitation of SHARE study; (iii) among those who reported at least one medical visit whether he or she consulted any specialist. There is no information about the number of specialist visits and this is a data limitation; (iv) among all respondents, whether he or she had an inpatient admission (yes/no); (v) the number of inpatient nights; and (vi) whether he or she had a dentist visit (yes/no). There is also limited information about outpatient surgery (whether he or she had an outpatient surgery and the number of times of having outpatient surgery) and we use this variable only for descriptive reasons. In particular, we measure use of health care during the past 12 months derived by the above variables, as following:

- (1) About any medical consultation, excluding dentist visits and inpatient nights, but including emergency and outpatient visits – for the whole sample -we measure:
 - (1a.) The likelihood of any medical consultation (yes/no) (Yes= ≥ 1 versus No=0 as the reference)
 - (1b.) The mean conditional (≥ 1) number of any medical consultations, and separately
- (2) Among individuals who reported at least once consultation (≥ 1) in the previous variable of any medical visit, we measure:
 - (2a.) The likelihood of any GP or health center (HCC) physician visit (yes/no) (Yes= ≥ 1 versus No=0 as the reference) and
 - (2b.) The mean conditional (≥ 1) number of GP/HCC physician visit.
 - (2c.) The likelihood of any specialist visit (yes/no) (Yes= ≥ 1 versus No=0 as the reference).
- (3) About the inpatient admissions in the past 12 months– for the whole sample -we measure:
 - (3a.) The likelihood of inpatient admissions (yes/no) (Yes= ≥ 1 versus No=0 as the reference).
 - (3b) Among individuals who reported inpatient admissions, the mean conditional (≥ 1) number of inpatient nights.
- (4) The likelihood of any dentist visits (yes/no) (Yes= ≥ 1 versus No=0 as the reference).

The *dependent variables for facing OOP expenses*⁶⁷ are measured by two questions for the amount of OOP expenses for inpatient and outpatient care⁶⁸, based on a twelve months recall in the following two categories for the analysis for each question:

- (5a) Among the individuals who reported having inpatient admission, the OOP amount for inpatient care with two categories: (i) OOP amount including 0€: yes/no (yes≥1€ vs no:0€) and (ii) OOP positive conditional amount >0€ dichotomized in (>672.6€) versus (1€-672.6€) where 672.6€ is the median of OOP conditional amount for inpatient care, comparing higher OOP amount (>672.6€) versus lower OOP amount (1€-672.6€).
- (5b) Among all the sample irrespective of receiving or not receiving care, the OOP amount for all outpatient care received (for all health professionals including dentists, for all labs, exams or therapies –except for drugs and alternative medicine) with two categories for the analysis: (i) OOP amount including 0€: yes/no (yes≥1€ vs no:0€) and (ii) OOP positive conditional amount >0€ dichotomized in (>194.4€) versus (1€-194.4€) where 194.4€ is the median of OOP positive amount for outpatient care, comparing higher OOP amount (>194.4€) versus lower OOP amount (1€-194.4€).

A detailed overview of the utilization and OOPP dependent variables, as well as the explanatory variables with the respective questions is displayed in Appendix Table A1.1 and A1.2. The *explanatory variables* used in the models include the following health, demographic and socioeconomic factors, based on the standard approach in the empirical literature: Age (in four dummies: 80+; 70-79; 60-69; versus 50-59 as reference); gender (male; versus female as reference) *health status (need) variables* associated to physical health include: (i) a general SAH measure dichotomised with “Very Good & Good” SAH as reference category; (ii) activity limitations LTI (“no LTI” as reference); (iii) GALI (“not limited” as reference variable); and (iv) the number of chronic medical conditions using three dummies (“0 chronic conditions” as the reference category). These health status variables constitute a proxy for care need. An assumption that underlies this study is that individuals with health conditions and poorer SAH have a greater need for health care, an assumption that is likely to hold in the majority of cases (Allin S. et al, 2011). SHARE

⁶⁷ Out-of-pocket payments represent a high percentage of health expenditure in Greece, accounting for more than half of total health expenditure. The figure depicts formal cost-sharing arrangements, direct payments and informal payments, with the latter two representing the highest proportion of out-of-pocket payments among EU countries.

⁶⁸ The OOP amount means: “Not counting health insurance premiums or reimbursements from employers, by OOP expenses we mean everything that is not paid by the insurance company, if you first pay but later get it reimbursed, this is not OOP expenses, if the insurance company pays first, but later charges you, this is OOP expenses” (SHARE wave1 Questionnaire).

Wave 1 *income* is derived from the sum of different components, some incomes at the individual level and some at the household level at a gross level. It is the household total gross annual income received the previous year (2003) derived as the sum over all household members of the individual – level values from any source added up, from employment, from self - employment or work for a family business; income from (public or private) pensions or invalidity or unemployment benefits; income from alimony or other private regular payments, income from long term care, sum of the gross incomes of other household members and other benefits, capital assets income (income from bank accounts, from bonds, from stocks or shares and from mutual funds), rent payments received, plus imputed rents, all of them calculated, generated, imputed according to the methodology, as suggested by the MEA Institute⁶⁹ and described in SHARE release guide 2.6.0. We equalized the household total gross annual income adjusting for the household's size and the age of its members according to the modified OECD scale⁷⁰. For the logistic regression analysis on the whole data set, the equalized household total gross annual income variable was calculated using quintiles leading to five (5) income categories, with the 5th richest quintile: "More than 16,045.66€. €" and the 1st poorest quintile with range "0€ – 4,928€" as the reference category. Following, in order to quantify the effect of income on health service utilization by calculating and decomposing inequity (HI), we also construct a continuous estimate as a natural logarithm of equalized household total gross annual income. It is also worth mentioning that imputation procedures for missing values were applied in SHARE survey in 69 demographic and economic variables in Wave 1 by the MEA Institute for SHARE with a multiple imputation procedure using an "iterative conditional specification approach" similar to many other household surveys (Christelis D.,2011; Börsch-Supan A. et al, 2005). Imputations for missing values of OOPP amount concerning outpatient care were applied by the MEA Institute⁷¹ using basic socio-economic characteristics, dummy variables for participation, missing values and bracket values as described in Börsch-Supan A. et al (2005) and Christelis D. (2011).

Moreover, variables other than need and income, are included in the model, following the standard approach in the empirical literature: (vi) The *highest educational qualification* is

⁶⁹ Börsch-Supan A. et al (2005) The Survey of Health, Aging, and Retirement in Europe – Methodology. Mannheim Research Institute for the Economics of Aging (MEA), 2005.

⁷⁰ Where equivalised household size is a sum of weights attributed to each member of the household according to the modified OECD equivalence scale: 1.0 to the first adult; 0.5 to the second and each subsequent person aged 14 and over; 0.3 to each child aged under 14.

⁷¹ Börsch-Supan A. et al (2005) The Survey of Health, Aging, and Retirement in Europe – Methodology. Mannheim Research Institute for the Economics of Aging (MEA), 2005.

included based on the standard coding of the ISCED-97 into 6 levels, grouped into three (3) categories with “No/Partial/Completed Primary school (ISCED 1)” as the reference category. (vii) *Marital status* was dichotomized with “never married or divorced or widowed”, as the reference category; (viii) the *household composition* dichotomized with “living alone” as the reference category; (ix) the *housing tenure* information dichotomized into “homeowner” versus “Not owner: tenant/subtenant/ rent free” as the reference category. (x) *Region of residence* is based on the EU Nomenclature of Territorial Units for Statistics (NUTS) used to indicate in which territorial unit the household is located. For Greece there are 4 units in the NUTS1 level concerning 13 NUTS2 urban and regional areas – economic territories that define the variables we include: GR1-North Greece (including Thessaloniki the 2nd more densely populated); GR2 - Central Greece (mountainous and thinly populated); GR3-Attika (Athens the capital, as the reference category); and GR4-Islands (thinly populated, including Crete the largest mountainous island)⁷². *Degree of urbanisation* is derived from 3 dummies: Thinly-populated area; Intermediate area; and Densely-populated area as reference category. The information for *Social Health Insurance Fund (SHIF)* information is derived from a question with 11 categories of insurance funds (9 Social Health Insurance Funds – SHIFs; Other; and No SHIF)⁷³. In order to examine in detail the role of the fragmented Social Health Insurance system, we sorted these 9 SHIFs groups into three (3) broad groups of more generous “noble” versus “non noble” funds, based on more “official” classification⁷⁴, as following: (i)“Non Noble IKA-SHIF” or “Social Security Institution” (IKA blue-collar and white-collar employees), that is the largest fund covering 50% of the population; (ii) ‘Non Noble Farmers OGA-SHIF” (OGA-Organization of Agricultural Insurance Rural Sector) the second largest fund covering 20% of the population involved in agriculture and (iii) “Noble SHIFs” (including all other SHIFs: Civil Servants, Self-Employed, Bank

⁷² GR-1North Greece includes: Eastern Macedonia & Thrace (GR11) & Central Macedonia (Thessaloniki - GR12) & Western Macedonia (GR13) & Thessalia (GR14). GR-2 Central Greece includes: Epirus (GR21) & Ionian Islands (GR22) & Western Greece (GR23) & Central Greece (GR24) & Peloponnese (GR25); GR – 3 Athens includes: Athens (GR30); GR- 4 Islands includes: North Aegean Islands (GR41) & South Aegean Islands (GR42) & Island of Crete (GR43).

⁷³ Originally, in the questionnaire are included 7 categories of social insurance funds [IKA (Social Security Institution); 1.OGA (Organization of Argicultural Insurance); 2.OAEE (Fund for Self - Employed); 3.OPAD (Civic Servants, employees of municipalities); Various bank employees funds 5.Public utilities: telecoms, electricity, trains, metro; 6. Other SHIF (engineers; lawyers; health professions; seamen etc) 7. no insurance.

⁷⁴ They are based on more “official” classification as established by experts, trade unions, authorities such as Labor Institute of Greek Workers’ Confederation - INE G.S.E.E. Observatory (Koutsampelas C., Tsakloglou P., 2010; Economou, C. & Giorno C, 2009; Mossialos, E. et al, 2005; Tountas, Y. et al, 2005).

⁷⁵ The majority 61.4% of the population lives in urban areas and 34.3% in the area of greater Athens. Semi-urban and rural populations comprise 30% of the Greek population, provided that 80% of the country is mountainous or hilly, as well as 169 from 3000 islands are inhabited, according to the estimates of National Statistical Authority (2011).

Employees, Health Professions etc); with the “Non Noble IKA-SHIF” as the reference category. The information for Voluntary (Complementary) Health Insurance (VHI) Coverage is not used as the positive sample is very small (88 individuals with VHI tenure versus 2571 without VHI).

6.4 Results

6.4.1 Descriptive Statistics

The description of the sample is displayed in Tables 6.1 – 6.7. The mean age of the sample is 64.77 years, with 37.8% report suffering from LTI, 30.99% from GALI, with 1.46 mean number of chronic conditions diagnosed out of 10 listed, and 37.60% of the sample declare “Less than good” (fair, bad or very bad) SAH a percentage similar to other studies for the older population (Crespo-Cebada E., 2012) and slightly higher than that observed in the Greek studies for the general population. Moreover, the mean annual gross total household income of the sample equalised is 11,468.31€ representative of a low to middle-income household of older population in Greece of 2003. Our sample is distributed mainly in densely-populated areas (43.67%) of North Greece GR1 (including Thessaloniki) and Attiki region GR3 (including Athens) (34.41%) and less in thinly- populated areas (17.52%) and Islands, similar to the distribution of the population according to estimates of the Greek National Statistical Authority (2011)⁷⁵. Moreover, about the SHIF coverage, the majority (43.14%) of the sample has Non-Noble IKA (Social Security Institution) SHIF coverage, 37.6% has Noble SHIFs coverage and 19.20% has Non Noble OGA (Organization of Agricultural Insurance) SHIF coverage, as expected, given that OGA SHIF covers mainly population involved in agriculture and possibly it covers residents in thinly populated areas with the smaller sample. Only 88 (3.2%) versus 2,571 individuals have VHI coverage. Due to very small sample, it is not included in the analysis.

Overall, about *health care use measures*, 8.89% (227 individuals) report having inpatient admission with 10.63 conditional inpatient nights, similar to other studies for the general population (Table 6.4). The data do not distinguish between public and private inpatient admissions⁷⁶. Only 2.56% or 71 individuals report having outpatient surgery. Moreover, the majority (79.21%) of the sample report making any medical visit (except for dentist visit and inpatient admissions). Among the individuals reporting a positive medical visit, the majority (64.4%) report a GP/HCC physician visit and 35% report making a specialist

⁷⁶ However, there is current evidence that despite the rapid growth of the private sector during the last decade, public hospitals are used more than private hospitals (Economou C., 2010).

visit, similar to other Greek nationwide studies for the general population (Tountas et al, 2011; Geitona et al, 2011). Once there is a contact, individuals report 7.0 conditional (≥ 1) number of medical visits and 5.52 GP/HCC physician visits. Unfortunately, there is no information for conditional number of specialist visits that could reveal possible imbalances in health care provided. Moreover, 37.7% of the sample report making a dentist visit. The distribution of utilisation rates by *degree of urbanization and region of residence* indicates regional variances as displayed in Tables 6.2 and 6.3. Overall, it seems that regional variations are apparent for all health care types favoring densely-populated areas, except for inpatient admissions. Residents of all areas and regions report equal proportion of inpatient admissions, irrespective of region of residence and urbanization degree. However, when conditional number of inpatient admissions is involved, residents of Central Greece and Islands report less conditional number of admissions. We observe interregional and intra-regional variances for all the other health care types. Residents of densely-populated report higher proportion and more conditional number of visits for most health care types (any medical visit, GP/HCC physician visits, specialist and dentist visits). Residents of the densely-populated areas as well as residents of Attika-Athens and North Greece-Thessaloniki report higher proportion of GP/HCC physician visit and specialist visit. On the other hand, residents of thinly-populated areas report lower proportion and less conditional number of visits for most health care types. The lowest proportion and less conditional number of most health care visits are reported by residents of Central Greece, except for inpatient admissions. Considering distribution of *health care use by SHIF coverage*, we observe that variations among Non Noble SHIFs beneficiaries are apparent except for inpatient admissions and outpatient surgeries (Table 6.5). Non Noble OGA beneficiaries demonstrate higher percentage in GP/HCC physician visit than the other SHIFs. Non Noble IKA beneficiaries report the higher percentage and conditional number of any medical visits (except for dentists), higher conditional number of any GP/HCC physician visits as well as higher percentage of specialist visits. IKA SHIF beneficiaries use more primary health care services than OGA SHIF, whereas Noble SHIF beneficiaries report the higher percentage of dental care. It is worth noting that Noble SHIF beneficiaries report lower conditional number of inpatient admissions, lower conditional number of any medical visits and GP visits, possibly due to better health status. Considering *OOP payments*, it is worth mentioning that half of the older population who receive inpatient or outpatient care report facing OOP expenses in an equal percentage among inpatient and outpatient care, though the mean OOP amount for inpatient care

(1483€) is 4.5 times higher than the mean OOP amount for outpatient care (330€), irrespective of income level, SHIF coverage, degree of urbanization and region of residence, as indicated in Tables 6.7 and 6.15. The *highest proportion of OOP expenses for inpatient care as well as for outpatient care* concern: (i) individuals in 4th advantaged and 2nd less advantaged income level; (ii) Noble SHIFs beneficiaries for both inpatient and outpatient care and an equal proportion with Non Noble IKA beneficiaries for outpatient care; (iii) residents in densely populated areas almost equal with residents in thinly-populated areas - and residents of Attiki-Athens region. The highest proportion of OOP expenses for outpatient care is reported by residents of North Greece-Thessaloniki region in a significantly higher proportion than residents of Islands. It is worth mentioning that residents of Central Greece report paying OOP for outpatient care in an equal percentage with residents of Attika-Athens who are more advantaged. On the other hand, the lowest proportion of individuals who report OOP expenses for inpatient care is reported by older individuals in highest richer income group ⁵ – even lower than the poorest income group 1 revealing a regressive relation; by Non Noble IKA SHIF beneficiaries as well as residents in intermediate - populated areas and residents of Central Greece and Islands regions. The lowest proportion of individuals who report OOP expenses for outpatient care is reported by individuals in poorest 1st level, Non Noble OGA beneficiaries, residents in intermediate-populated areas and residents of Islands region.

Table 6.1 Need and non need socioeconomic characteristics of the sample – SHARE

	Count unweighted	N % weighted
<i>Demographics</i>		
Age 80+	278	8.34
Age 70 – 79	562	25.05
Age 60 – 69	755	30.84
Ref/ Age 50-59	1,064	35.77
Total	2,659	
Mean Age in years	64.77 (0.20)	
Male	1,235	46.38
Ref/ Female	1,424	53.62
<i>Health Status</i>		
SAH “Less than good”(fair, bad and very bad) health	982	37.60
ref/ “very good and good”health	1,674	62.40
<i>Long Term Illness (LTI): Suffering (Yes)</i>	<i>970</i>	<i>37.80</i>
ref/(No) LTI	1,686	62.20
<i>GALI: Been severely limited & limited but not severely (Yes)</i>	<i>802</i>	<i>30.99</i>
ref./ not limited at all (No)	1,853	69.01

<i>Number of Chronic Conditions</i> “More than 2 conditions”	1065	40.48
“1 chronic medical condition”	846	32.06
Ref/ “0 Chronic medical Conditions”	745	27.47
Mean Number of chronic medical conditions out of 10 listed	1.46 (0.02)	
<hr/>		
<i>Marital status</i>		
Married (& registered partnership)	1,823	69.10
/ref. single (never married/widowed & not remarried /divorced & not remarried)	835	30.90
<hr/>		
<i>Education</i>		
More than secondary School (ISCED 4+5+6)	436	15.76
Secondary School (partial & completed) (ISCED 2 + 3)	826	29.74
/ref. No & Primary School (partial & completed) (No + ISCED 1)	1,388	54.49
<hr/>		
<i>Household Size - Total Number of persons in household</i>		
Living in couple (with or without dependent children)	1,957	73.94
Other (with or without dependent children)		
/ref. Living alone (with or without dependent children)	702	26.06
<hr/>		
Annual Gross Household Total Income equivalized		
Mean	11,468.31 (SE:235.96)	
Ln Continuous - N	8.92 (SE: 0.03)	
Income Quintile 5 (richest): 16045.66+	546	19.96
Income Quintile 4: 9866.68 – 16045.65	558	20.02.
Income Quintile 3: 7127.01 – 9866.67	520	19.99
Income Quintile 2: 4928.01 – 7127.00	514	19.84
Income Quintile 1 (poorest): ≤ 4928.00	521	20.19
<hr/>		
<i>Degree of urbanisation</i>		
Thinly-populated area	400	17.52
Intermediate area	947	38.81
ref./ Densely-populated area	1,312	43.67
<hr/>		
<i>Region of residence – Nuts1 level (national level)</i>		
North Greece (GR1)	882	32.55
Central Greece (GR2)	488	23.61
Islands (GR4)	161	9.44
ref ./Attiki - Athens (GR3)	1,127	34.41
<hr/>		
<i>Social Health Insurance Fund (SHIF) coverage</i>		
“Noble SHIFunds”	998	37.67
“Non Noble OGA-SHIF”	448	19.20
ref/“Non Noble IKA”	1,118	43.14
<hr/>		
<i>Voluntary (Complementary) Health Insurance</i>		
VHI Coverage (Yes)	88	3.02
ref/ No VHI Coverage	2,571	96.98

Table 6.2 Health care utilization by degree of urbanisation: percentage and sample means of conditional (≥ 1) number of contacts (the last 12 months)

	Densely- populated areas		Intermediate-populated		Thinly-populated areas	
	%	Conditional Mean	%	Conditional Mean	%	Conditional Mean
Inpatient night admissions ^{*1}	8.7%	9.02 (1.30)	9.0%	11.85 (2.43)	9.1%	11.60 (3.34)
Outpatient surgery ^{*1}	3.1%	1.14 (0.07)	1.9%	1.28(0.16)	2.7%	1.25 (0.24)
Any medical visit ^{*2}	79.9%	7.69 (0.31)	79.3%	6.86(0.28)	77.4%	5.68 (0.36)
GP /Physician visits at Health care centre (HCC) ^{*3}	83.2%	5.94 (0.25)	80.6%	5.65(0.25)	78.5%	4.31 (0.30)
Specialist visits ^{*3}	94.9%		92.6%		86.0%	
Dental visit- annual ^{*4}	41.3%		37.3%			29.7%

Note^{*1}: Inpatient admission and outpatient surgery information concern sample with conditional (≥ 1) number of inpatient admissions and outpatient surgeries

Note^{*2}: Any medical visit concerns sample with total (including 0) number of any visits except from dentist visit and inpatient admissions

Note^{*3}: GP/ physician HCC visits and specialist visits concern sample with conditional number of visits for “individuals who reported at least once consultation – any medical visit (≥ 1)”

Note^{*4}: There was no information for conditional number of dentist visits

Table 6.3 Health care utilization by region of residence: percentage and sample means of conditional number of contacts (the last 12 months)

	Nuts1 North Greece GR Thessaloniki		Nuts1 Central Greece GR2		Nuts1 Attiki GR3- Athens		Nuts1 Islands +Crete GR4	
	%	Conditional Mean	%	Conditional Mean	%	Conditional Mean	%	Conditional Mean
Inpatient night admissions ^{*1}	9.5%	12.59 (2.22)	8.9%	6.94 (1.10)	8.4%	12.28 (2.86)	8.7%	6.53 (1.71)
Outpatient surgery ^{*1}	2.5%	1.0	1.9%	1.27 (0.25)	3.3%	1.20 (0.08)	1.7%	2.06 (0.46)
Any medical visit ^{*2}	83.4%	6.48 (0.30)	75.6%	5.88 (0.33)	77.2%	8.18 (0.35)	81.5%	7.60 (0.65)
GP/Physician visits at Health care centre (HCC) ^{*3}	83.4%	5.49 (0.31)	77.5%	4.87 (0.29)	84.7%	6.07 (0.23)	71.6%	5.48 (0.54)
Specialist visits ^{*3}	91.7%		90.0%		94.5%		92.3%	
Dental visit * ⁴	41.9%		30.8%		39.2%		34.5%	

Note^{*1}: Inpatient admission and outpatient surgery information concern sample with conditional (≥ 1) number of inpatient admissions and outpatient surgeries

Note^{*2}: Any medical visit concerns sample with total (including 0) number of any visits except from dentist visit and inpatient admissions

Note^{*3}: GP/ physician HCC visits and specialist visits concern sample with conditional number of visits for “individuals who reported at least once consultation – any medical visit (≥ 1)”

Note^{*4}: There was no information for conditional number of dentist visits

Table 6.4 Health care utilization: percentage and sample means of contacts

Type of care (the last 12 months)	Percentage of visit (%)	N	Conditional(≥ 1)	Total number of visits (including 0 visits)
			number of visits Mean (SD)	Mean (SD)
Inpatient night admissions ^{*1}	8.89%	227	10.63 (1.29)	
Outpatient surgery ^{*1}	2.56%	71	1.19 (0.07)	
Any medical visit ^{*2}	79.21%	2,088	7.0 (0.18)	5.57 (0.16)
GP /Physician visits at Health centre (HCC) ^{*3}	64.39%	1,705	5.52 (0.15)	4.49 (0.13)
Specialist visits ^{*3}	35.01%	928		
Dental visit- annual ^{*4}	37.70%	1,028		

Note^{*1}: Inpatient admission and outpatient surgery information concern sample with conditional (≥ 1) number of inpatient admissions and surgeriesNote^{*2}: Any medical visit concerns sample with total (including 0) number of any visits except from dentist visit and inpatient admissionsNote^{*3}: GP/ physician HCC visits and specialist visits concern sample with conditional number of visits for “individuals who reported at least once consultation – any medical visit (≥ 1)”; Note^{*4}: There was no information for conditional number of dentist visits**Table 6.5** Distribution of health care utilization by SHIF: percentage and sample means of total and conditional contacts (the last 12 months)

	Noble SHIFs	Non Noble OGA SHIF		Non Noble IKA SHIF		
	%	Conditional Me	%	Conditional M	%	Conditional Mean
Inpatient night admissions ^{*1}	7.1%	7.75 (0.91)	12.5%	11.15 (2.34)	8.9 %	12.29 (2.50)
Outpatient surgery ^{*1}	2.4%	1.10 (0.06)	3.2%	1.20 (0.19)	2.3%	1.26 (0.13)
Any medical visit ^{*2}	77.5%	6.23 (0.27)	79.0 %	6.45 (0.33)	81.6%	7.88 (0.32)
GP /Physician visits at Health centre (HCC) ^{*3}	78.2%	4.82 (0.20)	83.7%	5.10 (0.28)	82.9 %	6.26 (0.27)
Specialist visits ^{*3}	92.9%		88.4%		94.2%	
Dental visit * ⁴	45.7%		28.5%		35.0%	

Note^{*1}: Inpatient admission and outpatient surgery information concern sample with conditional (≥ 1) number of inpatient admissions and outpatient surgeriesNote^{*2}: Any medical visit concerns sample with total (including 0) number of any visits except from dentist visit and inpatient admissionsNote^{*3}: GP/ physician HCC visits and specialist visits concern sample with conditional number of visits for “individuals who reported at least once consultation – any medical visit (≥ 1)”Note^{*4}: There was no information for conditional number of dentist visits**Table 6.6** Percentage and mean conditional OOPP (positive amount >0€) for inpatient and outpatient care during the last 12 months

Type of care (last 12 months)	(%)	Mean conditional payment (€)	SE	N
Inpatient conditional (>1) number of admissions	47.32%	1483.26	217.26	14 from 227
Outpatient total (including 0) visits	47.76%	329.79	17.47	1,307 from 2,659

Table 6.7 Percentage of sample facing OOP expenses (>0€) for inpatient and outpatient care during the last 12 months by Income Quintile, by SHIF, by degree of urbanization, by region of residence

	Inpatient conditional (>1) number of admissions	%	N	Outpatient conditional (>1) number of visits	%	N
By Income Quintile						
Income Quintile 5: 16045.66+	45.3%		19	48.9%		272
Income Quintile 4: 9866.68 – 16045.65	49.6%		24	47.2%		270
Income Quintile 3: 7127.01 – 9866.67	46.9%		25	47.5%		258
Income Quintile 2: 4928.01 – 7127.00	48.6%		24	48.3%		252
Income Quintile 1: ≤ 4928.00	46.2%		22	46.9%		255
By SHIF						
Noble SHIF	52.0%		37	48.4%		486
Non Noble OGA SHIF	45.4%		28	45.9%		213
Non Noble IKA SHIF	43.3%		46	48.3%		564
By degree of urbanisation						
Thinly populated	49.1%		21	50.8%		216
Intermediate populated	41.4%		36	44.5%		425
Densely populated	52.1%		57	49.4%		666
By region of residence						
North Greece (GR1)	44.4%		37	52.1%		470
Central Greece (GR2)	40.6%		19	46.2%		237
Islands (GR4)	40.4%		6	40.4%		66
Attiki - Athens (GR3)	57.2%		52	46.8%		534

6.4.2 Concentration Index Method Results

Tables 6.8 and Figure 6.2 summarize the CI_{unadjusted (actual use)} and the CI_{adjusted Need} for the probability of health care use and the inequity index. The concentration index sign indicates the direction of the relationship between the health care variable and income distribution, and its magnitude reflects the strength of the relationship. The CIs for actual use (CI_{unadjusted}) are negative for the probability of all health care types except for the probability of dentist care. The small negative CIs for actual use CI_{unadjusted (actual use)} reveal a weak relationship of the probability of having inpatient admission, the probability of making any medical visit and the probability of making any specialist visit with income - concentrated among the less advantaged, as it is demonstrated in Figure 6.2. Therefore, older individuals have inpatient admissions, make medical visits and make specialist visits, irrespective of their income level, slightly favoring the poorest. The negative CIs for need (CI_{adjusted need}) - mainly due to differences in need factors, show a pro-poor distribution of need factors in all health care types, with the exception of the probability of dentist visits. The HI defined as the difference between the CI_{unadjusted} and the CI_{adjusted} is displayed

in Table 6.8 and Figures 6.1 and 6.2. *Overall*, after controlling for the unequal need distributions:

- Inequity in the delivery of health care is distributed among the better off (significantly pro-rich) for the probability of inpatient admissions and dentist visits. The strong pro-rich inequity (HI) for inpatient admissions is the product of the difference of (almost zero) pro-poor CI_{unadjusted} and the strong pro-poor CI_{need adjusted}.
- Inequity is also distributed slightly positively (pro-rich) for the probability of making any medical visit, favoring more advantaged individuals.
- Among the individuals who report any medical visit, inequity is distributed slightly - but significantly - negatively for the probability of GP/HCC physician visit, favoring the less advantaged. Among the elderly who report a medical visit, the less advantaged are more likely to make a GP or HCC physician visit.
- For the probability of specialist visits, there is almost no income –related inequity, given that the small negative magnitudes of CI_{unadjusted} and CI_{adjusted} result in a very small (very slightly negative) magnitude of HI index revealing the weak relationship of the probability of specialist visits with income. Income has almost no effect on inequity in probability of specialist visit. It also indicates that among the elderly individuals who report a medical visit, all individuals have the same probability to make a specialist visit, irrespective of their income, slightly favoring less advantaged. When need is equalized, the use of specialist health care services is related to need, slightly favoring the worse off.

Table 6.8: Income - related inequality in *probability* of inpatient stay, any medical visit, GP visit, specialist and dentist visit in the last 12 months

	Inpatient admission ^{*1}	Any medical visit ^{*2}	GP/HCC physician visit ^{*3}	Specialist visit ^{*3}	Dentist
CI unadjusted	-0.001	-0.006	-0.018	-0.002	0.102
CI adjusted	-0.075	-0.022	-0.004	-0.001	0.033
HI	0.075	<i>0.016</i>	<i>-0.014</i>	-0.001	0.070

Bold:p-value <0.01; bold and italics: p-value<0.05; italics:p-value<0.10

Note^{*1}: Inpatient admission information concerns sample with conditional (≥ 1) number of inpatient admissions

Note^{*2}: Any medical visit concerns sample with total (including 0) number of any visits except from dentist visit and inpatient admissions

Note^{*3}: GP/ HCC physician visits and specialist visits concern sample with conditional number of visits for “individuals who reported at least once consultation – any medical visit (≥ 1)”

Figure 6.1: Income – inequity in the probability of health care use types in SHARE

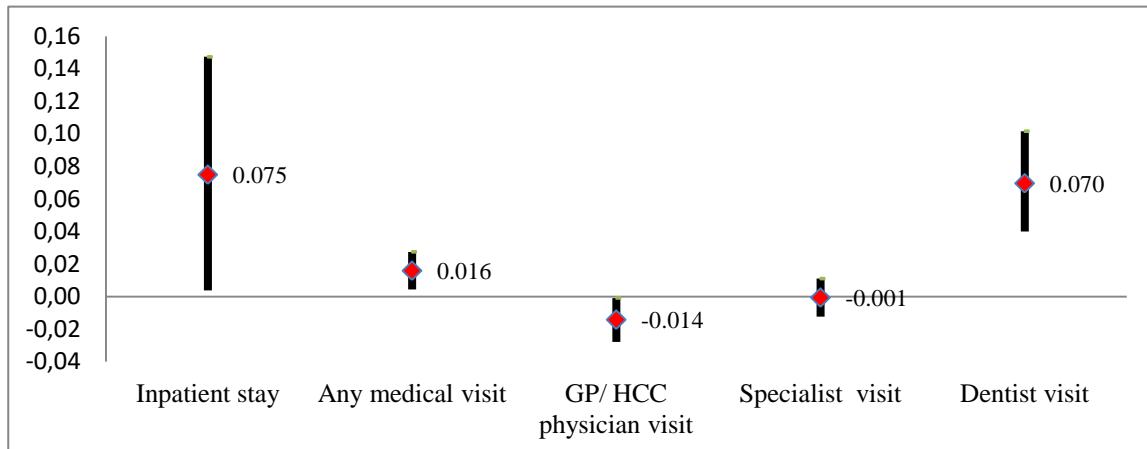
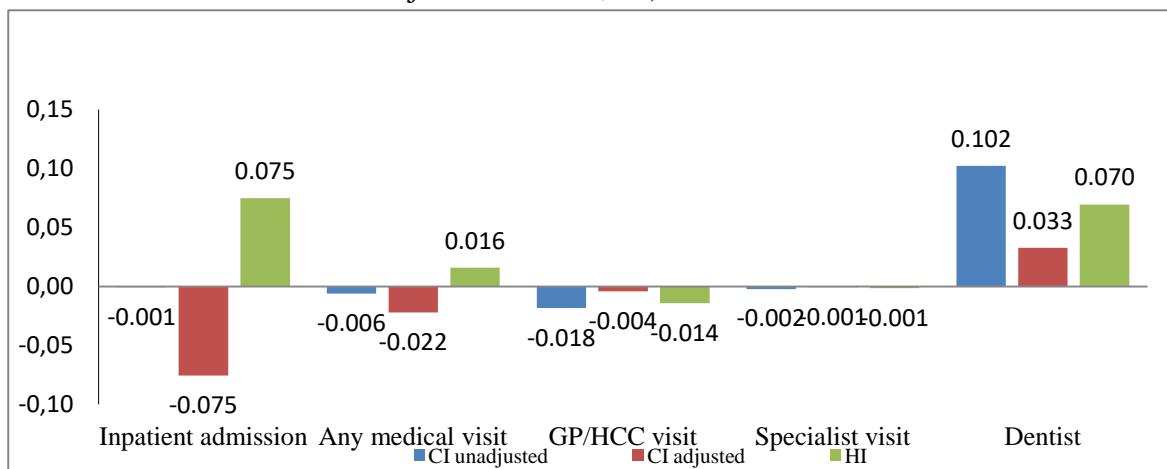


Figure 6.2: Income-inequalities in the probability of health care use types (actual use; adjusted for need; HI) in SHARE



6.4.3 Decomposition Analysis – Sources of inequality by type of care

The results of the decomposition analyses provide indication of the inequity drivers. The contributing factors are displayed in detail in Tables 6.9-6.12 and Figures 6.3–6.7 that report the CI_{unadjusted} (actual use) decomposition for all the health care types. Among other contributors we focus on income, region of residence, and SHIFs coverage in compliance with the main objectives of our study. Each Table in decomposition analysis includes information for: the mean values of the explanatory variables; the extent each contributor is distributed across income that is displayed by the partial concentration index (CI); the impact of each variable on health care use that is displayed by the Marginal Effect - ME (demand elasticity); the complete contribution of each variable to total income inequality; the sum and the % contribution to total income inequality. The positive (negative) sign of CI indicates that each contributor has a pro-rich (a pro – poor) distribution across income and is prevalent among the higher (lower) income groups. The complete contribution (in

the fourth column) depends on the impact (Margin effect - ME) of each variable on health care use and on its unequal distribution by income (CI). A negative (positive) contribution denotes that, if utilization was influenced only by that variable, then it would be pro-poor (pro-rich) favoring less (more) advantaged. The Tables can be interpreted in the same way as presented in the PatraHIS and GHIS respective chapters, using the example of the probability of a specialist visit. *Overall*, Tables 6.9-6.12 indicate:

- Pro-poor (negative signs) are apparent for the contributions of need variables for all types of care, similar to existing evidence, except the case of probability of receiving dental care for which need-adjustment is mainly age standardized. Poorer SAH, chronic conditions, LTI, and limitations in general activities (GALI) factors reduce overall income –related inequality. They also indicate the greatest needs of the poor comparing to the better off.
- Chronic conditions have the most negative contribution to inequity and consists the most important needs-adjustor. LTI has no contribution to income inequity for GP and dentists.
- The non-need factors have a non systemic effect on patterns of health care use by income groups. Income has a large effect on inequity in most health care types, but is not the only contributor, given that education or SHIF coverage factors do not have constant effect.
- *Income* contributes positively (pro-rich) to inequity in the probability of inpatient admissions, as well as in dentist visit favoring the better off. Higher income elderly are more likely to have an inpatient admission and a dentist visit than the worse off elderly.
- On the other hand, income contributes negatively (pro-poor) to distribution of inequity in probability of any medical visit, of GP visit and probability of specialist visits, favoring the less advantaged. Less advantaged are more likely to make any medical visit, to visit a GP and make a specialist visit than more advantaged, holding all the other factors constant.
- *Higher educational level* increases inequity in all health care types, apart from specialists.
- The third important non-need contributor is the *degree of urbanization*. Compared to densely populated areas, inequalities are apparent for all health care types due to the positive effect of thinly- populated areas, favoring the better off, as following.

- ✓ Residents of thinly-populated areas – who tend to be less advantaged - face slightly pro-rich inequalities in all health care types (inpatient admissions, any medical visit, GP/ HCC physician visit, specialist and dentist visits) and significant pro-rich inequalities in the probability of inpatient admissions indicating major interregional inequalities.
- ✓ On the other hand, residents of intermediate-populated areas – who tend to be more advantaged - face weak pro-poor inequalities in all health care types, favoring the worse off, apart from no income inequity in the probability of GP/HCC physician visits.
- If we examine the *region of residence effect*, compared to region of Attiki-Athens, weak inter-regional and intra-regional differences are apparent for most health care types, apart from no income-related inequity in the probability of making a specialist visit.
 - ✓ Region of residence has a similar impact on inequity in the probability of specialist visit and probability of any medical visit. The elderly have equal probability to make a specialist visit irrespective of their income and their region of residence.
 - ✓ Similarly, income-related inequity in any medical visit is not apparent for residents of Central Greece and Islands, whereas it is pro-rich for residents of North Greece.
 - ✓ Residents of North Greece-Thessaloniki face inequalities in the probability of inpatient admissions, any medical visit and dentist visits favoring the better off, but they do not face inequalities in probability of GP/HCC physician visits and specialist visits. They are more likely to make a GP/HCC and a specialist visit, irrespective of their income.
 - ✓ Residents of Central Greece region -less advantaged - slightly face pro-poor inequity in probability of inpatient admissions and pro-rich inequity in GP and dentist visits. They do not face inequalities in any medical visit and specialist visits, as well.
 - ✓ On the other hand, Islands region (including Crete) has the weakest effect on overall income-related inequity, except for inequity in GP/HCC visits, favoring the better off.
- *Social health insurance fund (SHIF) coverage* explains a high percentage of inequalities:
 - ✓ Compared to Non-Noble IKA, SHIF coverage factor reduces inequity in probability of inpatient admissions, in probability of GP and dentist visits favoring the worse off.

- ✓ But, SHIF coverage increases income-related inequity in probability of any medical visit and specialist visits favoring the better off, revealing important inequalities.
- ✓ OGA SHIF coverage increases inequity in the probability of any medical visit and specialist visits favoring the better off, while it strongly reduces inequity in the probability of inpatient admissions, GP/HCC and dentist visits favoring the worse off.
- Noble SHIF coverage increases inequity only in dentist visits, whereas it reduces inequity in the probability of inpatient admissions, GP and specialist visits favoring the worse off. It has no effect on inequity in the probability of any medical visit. *Marital status* has a weak negative contribution in inequity in probability of inpatient admissions, GP and specialist visits favoring the worse off.
- *Household composition* and *housing tenure* have weak positive to no effect on inequity in probability of inpatient admissions and dentist visit whereas it has no effect on inequity other health care types. Figures 6.3-6.7 indicate the effect of the non-need factors to income-related inequity via the decomposition analysis procedure.

Table 6.9: Detailed Decomposition of inequality in the probability of inpatient admissions and probability of any medical visits

	Probability of inpatient admissions					Probability of any medical visit				
	Mean	CI	Margin E	Contrib.	Sum	Mean	CI	Margin E	Contrib.	Sum
CI unadjusted	-0.001					-0.006				
HI index	0.075					0.016				
			-0.075	-0.075					-0.022	-0.022
Age (80+ vs 50-59)	0.083	-0.287	0.004	-0.001		0.083	-0.291	0.002	-0.001	
Age (70-79 vs 50-59)	0.258	-0.161	0.040	-0.006		0.259	-0.161	0.012	-0.002	
Age (60-69 vs 50-59)	0.309	0.028	0.040	0.001	-0.006	0.308	0.028	0.011	0.000	-0.002
male vs female	0.464	0.077	0.269	0.021	0.021	0.465	0.077	-0.041	-0.003	-0.003
SAHEU "Less than Good" (Fair, Bad, Very Bad) vs "Good & Good"	0.376	-0.135	0.173	-0.023	-0.023	0.375	-0.136	0.009	-0.001	-0.001
Long Term Illness (Yes vs No)	0.378	-0.051	0.102	-0.005	-0.005	0.376	-0.053	0.027	-0.001	-0.001
Limited in General Activities Gali (Yes) vs No	0.310	-0.131	0.378	-0.050	-0.050	0.308	-0.135	0.028	-0.004	-0.004
"2 + chronic diseases" vs "0"	0.411	-0.105	0.078	-0.008		0.408	-0.107	0.158	-0.017	
"1 chronic disease" vs "0"	0.325	0.071	-0.048	-0.003	-0.012	0.325	0.072	0.096	0.007	-0.010
Non Need variables										
In income (x)	8.946	0.060	0.529	0.031	0.031	8.944	0.060	-0.030	-0.002	-0.002
"More than secondary" vs "Primary" Education	0.162	0.452	0.039	0.018		0.161	0.452	0.008	0.003	
"Secondary" vs "Primary" Education	0.293	0.101	0.025	0.002	0.020	0.294	0.101	0.013	0.001	0.005
Married vs No	0.686	0.040	-0.112	-0.004	-0.004	0.688	0.040	0.029	0.001	0.001
"Homeowner" vs "Not Homeowners"	0.630	-0.014	-0.009	0.000	0.000	0.629	-0.014	0.019	0.000	0.000
"Couple/Other" vs "Alone"	0.735	0.028	0.221	0.006	0.006	0.736	0.029	0.007	0.000	0.000
North Greece GR1 vs GR3 Attica	0.320	0.070	0.084	0.006		0.321	0.068	0.037	0.003	
Central Greece GR2 vs GR3 Attica	0.243	-0.101	0.006	-0.001		0.244	-0.101	0.003	0.000	
Islands +Crete GR4 vs GR3 Attica	0.091	-0.058	-0.001	0.000	0.005	0.091	-0.057	0.007	0.000	0.002
Thinly-populated vs densely-populated	0.177	-0.198	-0.073	0.014		0.179	-0.197	-0.010	0.002	
Intermediate-populated vs densely -populated	0.389	0.059	-0.012	-0.001	0.014	0.388	0.058	-0.013	-0.001	0.001
"Noble SHIFunds" vs "Non Noble IKA"	0.378	0.216	-0.028	-0.006		0.379	0.217	-0.001	0.000	
"Non Noble OGA-SHIF" vs "Non Noble IKA"	0.189	-0.368	0.074	-0.027	-0.033	0.190	-0.366	-0.016	0.006	0.006
sum				-0.036	-0.036				-0.009	-0.009
error				0.036					0.003	

Table 6.10: Detailed Decomposition of inequality in the probability of GP visits and specialist visits

	Probability of GP visits					Probability of specialist visits				
	Mean	CI	Margin E	Contrib.	Sum	Mean	CI	Margin Eff	Contrib.	Sum
CI unadjusted		-0.018					-0.002			
HI index		-0.014					-0.001			
			-0.004	-0.004				-0.001	-0.001	
Age (80+ vs 50-59)	0.090	-0.284	0.005	-0.001		0.084	-0.22	-0.008	0.002	
Age (70-79 vs 50-59)	0.280	-0.151	0.015	-0.002		0.286	-0.195	-0.008	0.002	
Age (60-69 vs 50-59)	0.312	0.063	0.001	0.000	-0.004	0.309	0.055	0.000	0.000	0.003
male vs female	0.430	0.076	0.003	0.000	0.000	0.419	0.095	-0.005	0.000	0.000
SAHEU "Less than Good" (Fair, Bad, Very Bad) vs "Very C & Good"	0.430	-0.132	0.008	-0.001	-0.001	0.468	-0.135	0.008	-0.001	-0.001
Long Term Illness (Yes vs No)	0.440	-0.044	0.003	0.000	0.000	0.5	-0.047	0.014	-0.001	-0.001
Limited in General Activities Gali (Yes) vs No	0.362	-0.128	-0.017	0.002	0.002	0.419	-0.102	0.012	-0.001	-0.001
"2 + chronic diseases" vs "0"	0.478	-0.103	0.017	-0.002		0.535	-0.087	0.006	-0.001	
"1 chronic disease" vs "0 "	0.338	0.088	0.002	0.000	-0.002	0.304	0.094	-0.009	-0.001	-0.001
Non Need variables										
ln income (x)	8.933	0.060	-0.013	-0.001	-0.001	8.94	0.06	-0.08	-0.005	-0.005
"More than secondary" vs "Primary" Education	0.154	0.439	-0.017	-0.007		0.168	0.449	0.001	0.000	
"Secondary" vs "Primary" Education	0.288	0.108	-0.013	-0.001	-0.009	0.295	0.107	-0.009	-0.001	-0.001
Married vs No	0.674	0.038	-0.036	-0.001	-0.001	0.692	0.034	-0.015	-0.001	-0.001
"Homeowner" vs "Not Homeowners"	0.636	-0.019	-0.016	0.000	0.000	0.624	-0.026	0.009	0.000	0.000
"Couple/Other" vs "Alone"	0.726	0.024	-0.001	0.000	0.000	0.742	0.022	-0.001	0.000	0.000
North Greece GR1 vs GR3 Attica	0.340	0.066	0.001	0.000		0.315	0.103	0.003	0.000	
Central Greece GR2 vs GR3 Attica	0.232	-0.113	-0.019	0.002		0.23	-0.137	0.001	0.000	
Islands +Crete GR4 vs GR3 Attica	0.095	-0.031	-0.017	0.001	0.003	0.104	-0.077	0.000	0.000	0.000
Thinly-populated vs densely-populated	0.175	-0.191	-0.009	0.002		0.194	-0.23	-0.018	0.004	
Intermediate-populated vs densely -populated	0.387	0.059	-0.002	0.000	0.002	0.372	0.082	-0.009	-0.001	0.003
"Noble SHIFunds" vs "Non Noble IKA"	0.368	0.211	-0.003	-0.001		0.384	0.222	-0.002	-0.001	
"Non Noble OGA-SHIF" vs "Non Noble IKA"	0.188	-0.377	0.003	-0.001	-0.002	0.192	-0.436	-0.007	0.003	0.003
sum				-0.012	-0.012				-0.001	-0.001
error					-0.006					-0.001

Table 6.11: Detailed Decomposition of inequality in the probability of dentist visits

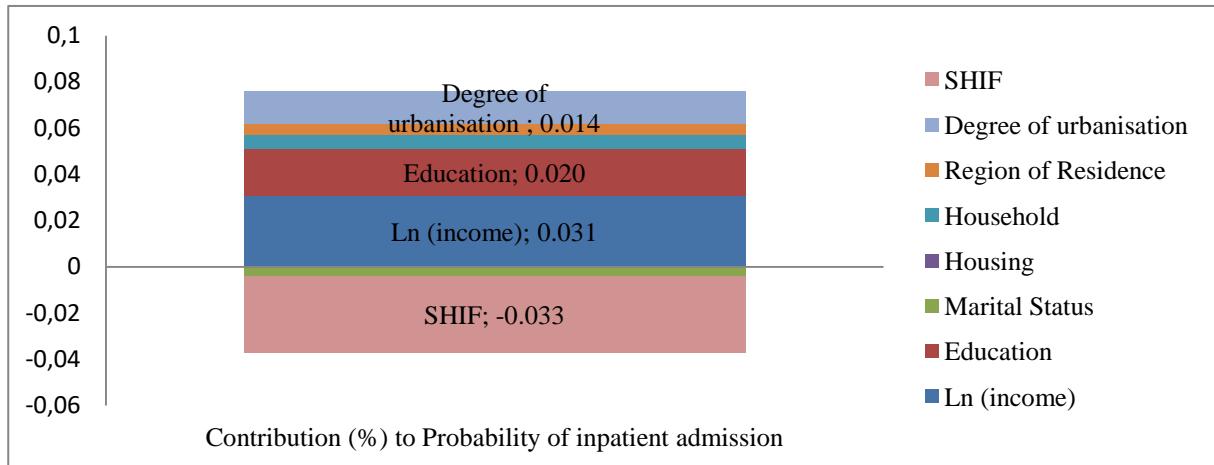
	Probability of dentist visits				
	Mean	CI	Margin E	Contrib.	Sum
CI unadjusted	0.102				
HI index	0.070				
				0.033	0.033
Age (80+ vs 50-59)	0.083	-0.288	-0.058	0.017	
Age (70-79 vs 50-59)	0.259	-0.161	-0.134	0.022	
Age (60-69 vs 50-59)	0.308	0.029	-0.061	-0.002	0.037
male vs female	0.464	0.077	-0.052	-0.004	-0.004
SAHEU "Less than Good" (Fair, Bad, Very Bad) vs "Very Good & Good"	0.376	-0.136	0.002	0.000	0.000
Long Term Illness (Yes vs No)	0.377	-0.051	0.006	0.000	0.000
Limited in General Activities Gali (Yes) vs No	0.310	-0.132	-0.009	0.001	0.001
"2 + chronic diseases" vs "0"	0.410	-0.106	0.006	-0.001	
"1 chronic disease" vs "0 "	0.324	0.072	0.001	0.000	-0.001
Non Need variables					
In income (x)	8.946	0.059	0.305	0.018	0.018
"More than secondary" vs "Primary" Education	0.162	0.452	0.078	0.035	
"Secondary" vs "Primary" Education	0.293	0.100	0.079	0.008	0.043
Married vs No	0.686	0.040	0.011	0.000	0.000
"Homeowner" vs "Not Homeowners"	0.630	-0.014	0.049	-0.001	-0.001
"Couple/Other" vs "Alone"	0.735	0.028	0.033	0.001	0.001
North Greece GR1 vs GR3 Attica	0.321	0.070	0.026	0.002	
Central Greece GR2 vs GR3 Attica	0.243	-0.102	-0.020	0.002	
Islands +Crete GR4 vs GR3 Attica	0.091	-0.058	0.006	0.000	0.004
Thinly-populated vs densely-populated	0.178	-0.198	-0.022	0.004	
Intermediate-populated vs densely -populated	0.389	0.059	-0.050	-0.003	0.001
"Noble SHIFunds" vs "Non Noble IKA"	0.377	0.217	0.024	0.005	
"Non Noble OGA-SHIF" vs "Non Noble IKA"	0.190	-0.367	0.023	-0.008	-0.003
sum				0.097	0.097
error				0.006	

Table 6.12: Overall Decomposition of inequity in inpatient nights, any medical visits, GP/HCC physician visits, specialist visits, dentist visits

	Probability of inpatient admission	Probability of any medical visits	Probability of GP/HCC physician visits	Probability of specialist visits	Probability of dentist visit					
CI unadjusted	-0.001	-0.006	-0.018	-0.002	0.102					
HI index	0.075	0.016	-0.014	-0.001	0.070					
	Contrib. Inequality	% Contrib. Inequality	Contrib. Inequality	% Contrib. Inequality	Contrib. Inequality					
Need	-0.075	-0.0219	-0.004	-0.001	0.033					
Age	-0.006	1203.86%	-0.0023	37.50%	-0.004	19.97%	0.003	-156.09%	0.037	35.74%
Gender	0.021	-3949.10%	-0.0032	52.44%	0.000	-1.08%	0.000	20.54%	-0.004	-3.85%
Health Status -SAH	-0.023	4463.84%	-0.001	20.64%	-0.001	5.85%	-0.001	49.87%	0.000	-0.23%
Health Status - Health Limitations (LTI, Gali. Chronic Disease)	-0.066	12684.16%	-0.015	251.63%	0.000	-2.57%	-0.003	152.92%	0.000	0.39%
Ln (income)	0.031	-6008.78%	-0.002	29.56%	-0.001	4.24%	-0.005	230.36%	0.018	17.73%
Other Non-Need										
Education	0.020	-3840.78%	0.005	-78.48%	-0.009	47.90%	-0.001	32.96%	0.043	42.15%
Marital Status	-0.004	857.99%	0.001	-19.16%	-0.001	7.46%	-0.001	24.30%	0.000	0.42%
Housing Tenure	0.000	-23.20%	0.000	4.27%	0.000	-1.71%	0.000	11.55%	-0.001	-0.68%
Household Composition	0.006	-1174.51%	0.000	-3.14%	0.000	0.18%	0.000	0.83%	0.001	0.89%
Region of Residence (vs Urban- Nuts1 Athens)	0.005	-1009.61%	0.002	-29.62%	0.003	-14.92%	0.000	-9.31%	0.004	3.45%
Degree of urbanisation (vs Densely populated area)	0.014	-2625.66%	0.001	-19.18%	0.002	-8.56%	0.003	-167.67%	0.001	1.39%
Social Health Insurance Fund (SHIF) Coverage	-0.033	6344.57%	0.006	-91.43%	-0.002	10.48%	0.003	-123.15%	-0.003	-3.10%
Error	0.036	-6822.55%	0.003	-55.04%	-0.006	32.79%	-0.001	32.89%	0.006	5.70%

Figures 6.3 - 6.7 Contribution to inequity - SHARE

**Figure 6.3: Contribution to inequity in the probability of inpatient admission – SHARE
(excluding need variables)**



**Figure 6.4: Contribution to inequity in the probability of any medical visit – SHARE
(excluding need variables)**

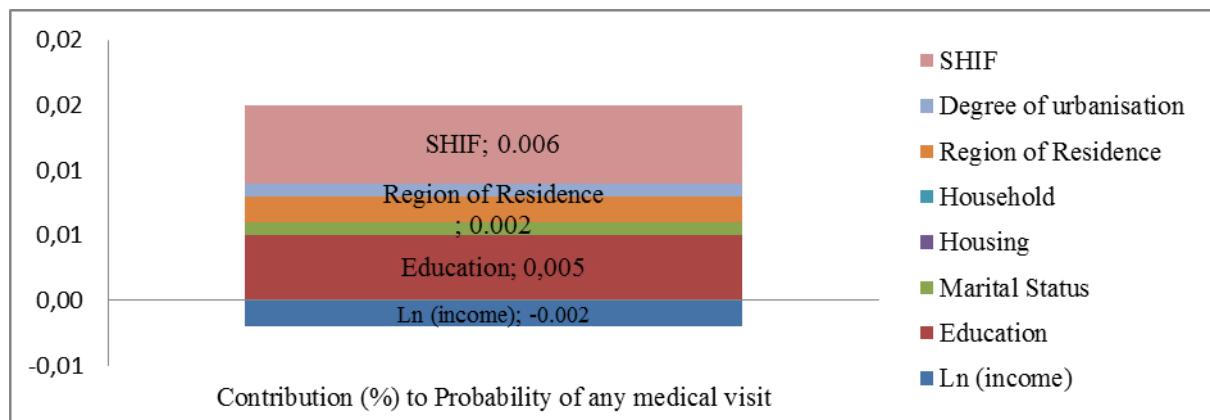
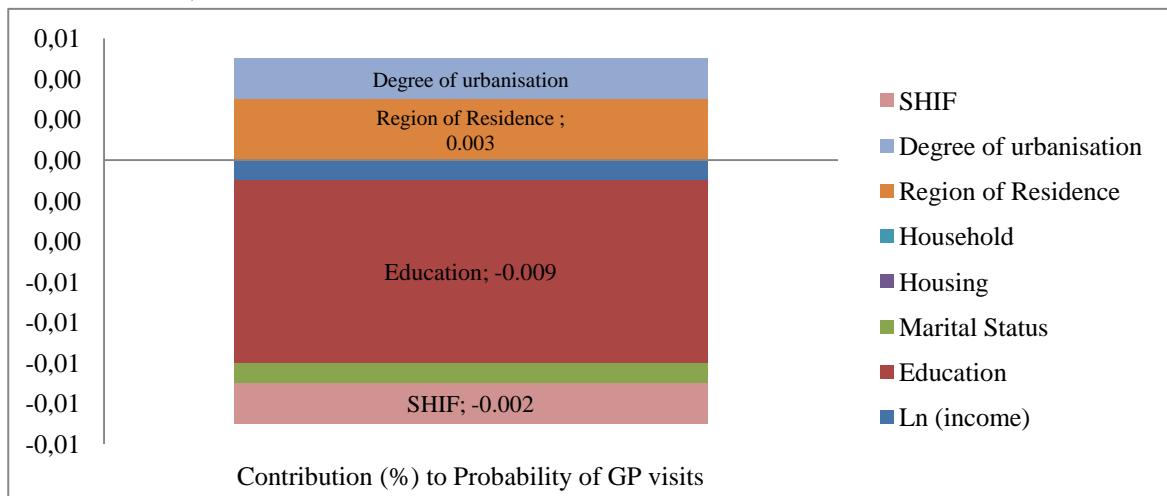
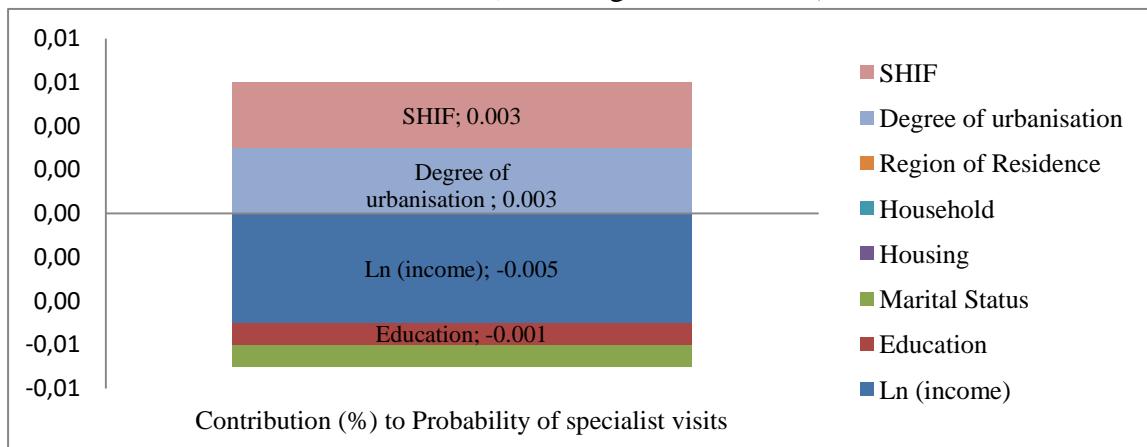


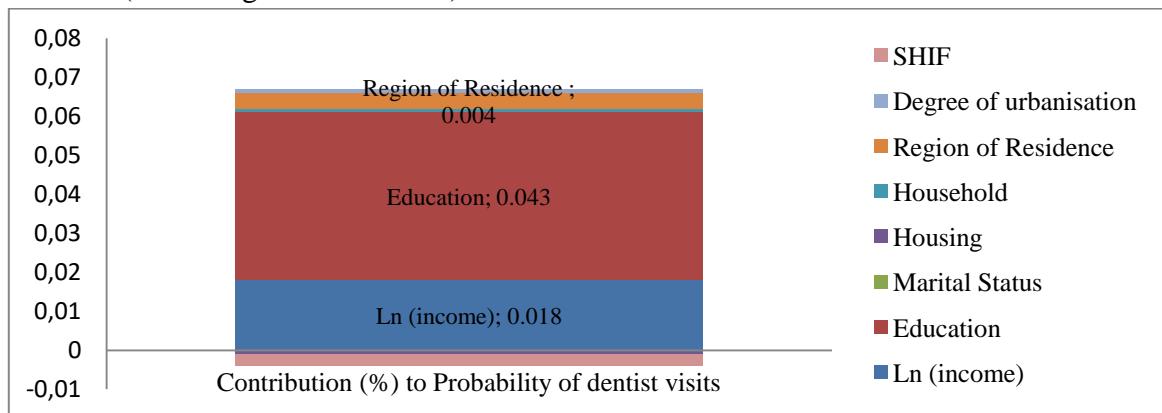
Figure 6.5 Contribution to inequity in the probability of GP visit– SHARE (excluding need variables)



**Figure 6.6: Contribution to inequity in the probability of specialist visit– SHARE
(excluding need variables)**



**Figure 6.7: Contribution to inequity in the probability of dentist visit– SHARE
(excluding need variables)**



6.4.4 Regression Results – Determinants of use in health care

- Indicators of health care need are the most significant determinants of health service use in all areas (except dental care where only age was considered needs -related), mainly the presence of activity limitations (GALI), chronic medical conditions and the SAH. About the effect of age and gender, older individuals are more likely to be admitted to hospital, and less likely to visit a specialist and a dentist. Women are significantly more likely to make any visit, to visit a specialist and a dentist, and less likely for inpatient admission (Table 6.13).
- Non-need factors such as: education, region of residence, degree of urbanization and SHIF coverage are also significantly associated with health care use, but not the income.
- Income* has a weak relation with health care utilisation. Only less advantaged older individuals in income level 2 are much more likely to make a specialist visit than the poorer individuals in income level 1, indicating a regressive relation. However, individuals in all income groups are insignificantly more likely to have inpatient and dentist visits than

individuals in lower groups, whereas all income groups are insignificantly less likely to make a GP/HCC physician visit than those in lowest income group.

- Compared to lower educational level, *higher level of education* has a strong positive association (more likely) only with the probability of a dentist visit and a strong negative association (less likely) with the probability of GP/HCC physician visit.
- *Degree of urbanization* reveals significant systematic variations in health care use. Residents of thinly-populated and intermediate-populated areas use consistently less health care services in all types of care. Residents of thinly-populated areas are significantly less likely to have an inpatient admission, to make any medical or specialist visit. Residents of intermediate-populated areas are significantly less likely to make a dentist visit, too.
- Considering the effect of *region of residence*, significant inter-regional variations for any medical and GP visits are apparent. Compared to Athens, residents of all regions (mainly from North Greece-Thessaloniki and Islands) are significantly more likely to make any medical visit. Residents of Central Greece and Islands (including Crete) are significantly less likely to report any GP/HCC physician visit. However, weak intra-regional variations are apparent for the probability of inpatient admissions, specialist and dentist visits.
- *SHIF coverage* has a non systematic significant association with the probability of having inpatient admissions. Compared to Non Noble IKA SHIF, OGA beneficiaries are significantly more likely to have an inpatient admission maybe due to worse health status, and significantly less likely to make any medical visit, highlighting significant variations. Both Noble SHIFs and Non-Noble OGA SHIFs beneficiaries are less likely to make any medical or specialist visit. In addition, they are weakly more likely to make a dentist visit.
- The other non-need factors of *marital status*, *housing tenure* and *household composition* have a weak non-systematic association with all health care types.

Overall, our findings of the main determinants of health care use are compatible with existing international and greek evidence for the general population (Phelps and Newhouse, 1974; Newhouse and Marquis, 1978; Wagstaff, 1986; Kasper, 1986; Feldstein, 1988; McGuire et al., 1988; Marmot and Wilkinson, 1999). More specifically, chronic health problems, perceived morbidity, self-rated health, older age, female gender, marital status, education, income, degree of urbanization, geographical region and insurance coverage are considered as the most important determinants of health services use in the Greek studies (Zavras et al, 2014; Tountas et al, 2011; Lahana E. et al, 2011; Alexopoulos and Geitona, 2009; Pappa and Niakas, 2006; Economou, 2006; Geitona et al., 2007, Bíró A., 2014).

Table 6.13 Regression model analysis for probability of inpatient admissions, of any medical visits, GP visits, specialist visit and dentist visit based on SHARE dataset (the last 12 months)

	Probability of inpatient admission		Probability of any medical visit		Probability of GP visit		Probability of specialist visit		Probability of dentist visit	
		SE		SE		SE		SE		SE
Need										
Age (80+ vs 50-59)	1.15	0.35	1.06	0.30	1.37	0.40	0.25	0.13	0.26	0.06
Age (70-79 vs 50-59)	1.25	0.31	1.30	0.27	1.39	0.29	0.64	0.31	0.42	0.06
Age (60-69 vs 50-59)	1.15	0.27	1.25	0.18	1.03	0.17	0.98	0.36	0.75	0.09
male vs female	2.00	0.34	0.59	0.07	1.03	0.14	0.83	0.26	0.83	0.08
SAHEU "Less than Good" (Fair, Bad, Very Bad) vs "Very Good"	1.69	0.37	1.21	0.22	1.10	0.19	1.42	0.54	1.01	0.13
Long Term Illness (Yes vs No)	1.35	0.29	1.86	0.34	1.05	0.17	1.37	0.52	1.02	0.13
Limited in General Activities Gali (Yes) vs No	3.26	0.74	2.16	0.46	0.77	0.14	1.55	0.60	0.95	0.13
"2 + chronic diseases" vs "0"	1.31	0.40	6.41	1.27	1.19	0.26	1.36	0.61	1.03	0.15
"1 chronic disease" vs "0 "	0.86	0.25	2.87	0.42	1.02	0.19	0.75	0.29	1.00	0.12
Non Need variables										
Income Q5: 16045.66+€ vs IncQ1:<= 4928.00€	1.57	0.46	1.03	0.20	0.79	0.18	0.76	0.38	1.24	0.19
Income Q4: 9866.68€ - 16045.65€ vs IncQ1:<= 4928.00€	1.34	0.37	1.11	0.22	0.73	0.16	1.05	0.51	1.04	0.16
Income Q3: 7127.01€ - 9866.67€ vs IncQ1:<= 4928.00€	1.44	0.38	1.16	0.23	0.89	0.20	0.71	0.31	1.04	0.16
Income Q2: 4928.01€ - 7127.00€ vs IncQ1:<= 4928.00€	1.27	0.33	0.98	0.20	0.77	0.17	2.61	1.44	1.03	0.16
"More than secondary" vs "Primary" Education	1.39	0.41	1.28	0.25	0.59	0.12	1.06	0.58	2.14	0.33
"Secondary" vs "Primary" Education	1.12	0.24	1.26	0.19	0.78	0.13	0.64	0.26	1.58	0.18
Married vs No	0.78	0.23	1.22	0.33	0.74	0.20	0.64	0.65	1.02	0.19
"Homeowner" vs "Not Homeowners"	1.02	0.17	1.19	0.15	0.86	0.12	1.18	0.34	1.14	0.11
"Couple/Other" vs "Alone"	1.47	0.47	1.09	0.30	0.98	0.27	0.99	1.03	1.09	0.21
North Greece GR1 vs GR3 Attica	1.35	0.27	2.00	0.31	0.99	0.16	1.30	0.46	1.15	0.13
Central Greece GR2 vs GR3 Attica	1.05	0.27	1.13	0.20	0.62	0.12	1.12	0.47	0.85	0.13
Islands +Crete GR4 vs GR3 Attica	0.98	0.35	1.58	0.43	0.42	0.10	0.98	0.51	1.11	0.22
Thinly-populated vs densely-populated	0.63	0.17	0.69	0.15	0.78	0.16	0.28	0.12	0.80	0.13
Intermediate-populated vs densely-populated	0.94	0.18	0.80	0.12	0.99	0.15	0.65	0.23	0.81	0.09
"Noble SHIFunds" vs "Non Noble IKA"	0.91	0.19	0.96	0.13	0.96	0.14	0.89	0.30	1.10	0.12
"Non Noble OGA-SHIF" vs "Non Noble IKA"	1.62	0.38	0.60	0.12	1.04	0.23	0.55	0.26	1.23	0.19

Bold:p-value <0.01; bold and italics: p-value<0.05; italics:p-value<0.10

6.4.5 Regression Results – Determinants of OOPPs in use of health care

OOP payments are reported at an equal percentage among inpatient and outpatient care, though the mean OOP amount for inpatient care (1483€) is 4.5 times higher than the mean OOP amount for outpatient care (330€), as expected. *Overall*, we observe that OOP expenses constitute a significant financial burden to inpatient and outpatient care, irrespective of the income level, the region of residence and SHIF coverage of older population. In SHARE database we have the chance not only to examine the determinants of the probability of paying OOP for inpatient and outpatient health care but also to explore the determinants of OOP amount for inpatient and outpatient care, as following.

- About need variables, chronic conditions and bad SAH are significantly positively associated with paying higher OOP mean amount for both inpatient and outpatient care.
- About non need variables, “couple/family” marital status is significantly positively associated with paying higher OOP mean amount for inpatient care. More than secondary school level is also significantly positively associated with facing OOP for outpatient care.
- About the effect of income, older people are more likely to pay higher OOP mean amount for inpatient and outpatient care, irrespective of their income.
- Compared to Non Noble IKA, Noble SHIFs beneficiaries are insignificantly more likely to pay OOP for inpatient and outpatient care, and OGA SHIF beneficiaries are less likely to pay OOP for inpatient and outpatient care.
- Residents from all regions - except for Islands- and all areas of urbanization are insignificantly more likely to pay higher OOP mean amount for inpatient care, and insignificantly less likely to pay higher OOP amount for outpatient care.
- Compared to densely-populated areas, residents of thinly populated areas – who are less advantaged- are insignificantly more likely to pay OOP for inpatient and outpatient care. They are more likely to pay higher OOP mean amount for receiving inpatient care.

In our analysis, we have also the chance to explore to *what extent OOP payments for inpatient and outpatient care are related to ability to pay* as expressed by income and whether they differ by SHIF coverage, by degree of urbanization and region of residence. Our findings summarized-as displayed in Table 6.15, include the following:

- a) For *inpatient care*, our analysis reveals a regressive trend in OOP amount for inpatient care in terms of ability to pay and region of residence and significant variations among SHIFs.
 - There is a clear trend that OOP mean amount for inpatient admission decreases as the income level accedes from the 2nd poorest to richest level, revealing a regressive relationship in ability to pay. Elderly in the 2nd poor income quintile face the highest OOP

amount (2012.94€) that is almost twice the OOP amount (1118.83 €) paid by the 5th richest

- By SHIF coverage, we find that all SHIFs beneficiaries pay almost the same OOP amount except for Noble SHIFs beneficiaries. Noble SHIFs beneficiaries, who tend to be better off, face slightly higher OOP amount (almost 70€ more). Among the Non Noble SHIFs, OGA beneficiaries pay higher OOP mean amount than those with IKA SHIF coverage.
- The association of OOP mean amount for inpatient care by degree of urbanization and region of residence, indicates that:
 - ✓ Residents of thinly-populated areas and residents of Central Greece region – who tend to be less advantaged - have less inpatient admissions (lower use proportion) and pay higher OOP mean amount almost twice the OOP mean amount paid by the residents of intermediate-populated areas, almost twice the OOP mean amount paid by the residents of Attiki and three times more the OOP mean amount paid by residents of Islands.
 - ✓ If we consider the mean annual gross total household income of the sample equalized that is estimated 11468€, the higher OOP mean amount of thinly populated areas (2107€) for inpatient care represents 18% of the household annual gross income, and the higher OOP mean amount of Central Greece (2324€) represents 20% of the household annual gross income, which is significant and may reveal catastrophic payments for inpatient care.

b) For *outpatient care*, our analysis reveals a progressive trend in OOP amount for outpatient care in terms of ability to pay, SHIF coverage and region of residence, in contrast with inpatient care.

- It reveals a progressive relationship of OOP mean amount for outpatient care by income quintile. The OOP amount increases as the income quintile increases, except the 1st poorest. The OOP amount for outpatient care is similar among the income quintiles but it is significantly lower than the OOP amount for inpatient care.
- By SHIF coverage, Non –Noble IKA beneficiaries face almost equal OOP amount with Noble beneficiaries. They also face higher OOP mean amount than the Non Noble OGA.
- By region of residence, it is obvious that the residents of densely-populated areas and regions of North Greece-Thessaloniki and Attiki -Athens report the highest OOP amount versus residents of Central Greece – who tend to be less advantaged.

Table 6.14: Regression model analysis for probability (yes/no) of paying OOP for inpatient admissions and outpatient visits and probability of paying OOP positive ($\geq 1\text{€}$) amount for inpatient ($>672.6\text{€}$) vs ($1\text{€} - 672.6\text{€}$) and outpatient care ($>194.4\text{€}$) vs ($1\text{€} - 194.4\text{€}$) based on SHARE dataset

	Probability of conditional OOPP for inpatient admissions ($\geq 1\text{€}$ versus 0€ - yes/no)	OOP amount for inpatient admissions ($>672.6\text{€}$) vs ($1\text{€} -$ 672.6€)	Probability of conditional OOPP for outpatient care ($\geq 1\text{€}$ versus 0€ - yes/no)	OOPP amount for outpatient care ($>194.4\text{€}$) vs ($1\text{€} -$ 194.4€)				
	SE	SE	SE	SE				
Need								
Age (80+ vs 50-59)	1.13	0.03	0.03	0.03	0.67	0.13	0.58	0.15
Age (70-79 vs 50-59)	1.13	0.11	0.11	0.10	0.82	0.11	0.66	0.13
Age (60-69 vs 50-59)	0.47	0.38	0.38	0.34	0.74	0.09	0.78	0.13
male vs female	0.93	0.30	0.30	0.20	0.76	0.07	0.86	0.12
SAHEU "Less than Good" vs "Very Good & Good"	2.08	0.99	0.99	0.64	1.05	0.13	1.69	0.28
Long Term Illness (Yes vs No)	0.77	0.78	0.78	0.50	1.11	0.13	0.93	0.15
Limited in General Activities Gali (Yes) vs No	1.76	0.96	0.96	0.65	1.58	0.20	1.29	0.23
"2 + chronic diseases" vs "0"	0.56	6.63	6.63	7.38	1.52	0.22	1.79	0.37
"1 chronic disease" vs "0 "	1.02	2.28	2.28	2.75	1.47	0.18	1.16	0.21
Non Need variables								
Income Q5: 16045.66+€ vs IncQ1:<= 4928.00€	1.04	4.26	4.26	4.03	1.00	0.15	1.28	0.28
IncomeQ4: 9866.68€-16045.65€ vs IncQ1:<= 4928.00€	0.81	2.59	2.59	2.88	0.95	0.14	1.11	0.23
Income Q3:7127.01€ - 9866.67€ vs IncQ1:<= 4928.00€	0.98	2.81	2.81	2.42	1.04	0.15	1.15	0.23
Income Q2:4928.01€ - 7127.00€ vs IncQ1: <= 4928.00€	1.10	3.09	3.09	2.59	1.05	0.15	1.24	0.26
"More than secondary" vs "Primary" Education	<i>3.09</i>	0.16	0.16	0.20	1.50	0.23	1.52	0.34
"Secondary" vs "Primary" Education	1.72	1.11	1.11	0.86	1.76	0.20	1.18	0.19
Married vs No	1.82	0.10	0.10	0.10	1.06	0.20	0.92	0.26
"Homeowner" vs "Not Homeowners"	0.63	0.60	0.60	0.35	0.98	0.09	1.02	0.14
"Couple/Other" vs "Alone"	0.18	23.82	23.82	23.21	0.61	0.12	1.02	0.30
North Greece GR1 vs GR3 Attica	0.92	1.11	1.11	0.68	1.49	0.16	0.81	0.13
Central Greece GR2 vs GR3 Attica	0.67	1.54	1.54	1.22	1.06	0.15	0.56	0.12
Islands +Crete GR4 vs GR3 Attica	0.42	0.44	0.44	0.52	0.82	0.16	0.75	0.23
Thinly-populated vs densely-populated	1.27	2.50	2.50	2.16	1.26	0.20	0.94	0.20
Intermediate-populated vs densely-populated	0.62	1.12	1.12	0.69	0.77	0.08	0.87	0.14
"Noble SHIFunds" vs "Non Noble IKA"	1.43	0.64	0.66	0.48	1.03	0.11	0.97	0.14
"Non Noble OGA-SHIF" vs "Non Noble IKA"	0.79	0.38	0.55	0.44	0.85	0.12	0.66	0.14

Bold:p-value <0.01; bold and italics: p-value<0.05; italics:p-value<0.10

Table 6.15: Percentage and mean OOP positive amount (>0€) for inpatient and outpatient care during the last 12 months by Income, SHIFs, degree of urbanization and region of residence

	Inpatient conditional (>1) number of admissions				Outpatient conditional (>1) number of visits			
	%	Mean (€)	SE	N	%	Mean(€)	SE	N
<i>By Income</i>								
Income Quintile 5: 16045.66+	45.3%	1118.83	230.49	19	48.9%	386.37	62.92	272
Income Quintile 4: 9866.68 – 16045.65	49.6%	1467.90	288.81	24	47.2%	344.71	32.60	270
Income Quintile 3: 7127.01 – 9866.67	46.9%	1941.27	661.26	25	47.5%	321.93	28.66	258
Income Quintile 2: 4928.01 – 7127.00	48.6%	2012.94	616.78	24	48.3%	299.91	21.78	252
Income Quintile 1: ≤ 4928.00	46.2%	692.30	135.30	22	46.9%	294.79	33.61	255
<i>By SHIFs</i>								
Noble SHIF	52.0%	1544.27	372.63	37	48.4%	330.61	24.86	486
Non Noble OGA SHIF	45.4%	1474.08	493.24	28	45.9%	265.88	24.99	213
Non Noble IKA SHIF	43.3%	1473.01	343.85	46	48.3%	334.31	19.99	564
<i>By degree of urbanisation</i>								
Thinly populated	49.1%	2107.75	737.23	21	50.8%	292.17	27.71	216
Intermediate populated	41.4%	1045.20	212.45	36	44.5%	329.78	37.30	425
Densely populated	52.1%	1557.42	303.97	57	49.4%	345.34	21.67	666
<i>By Region of Residence</i>								
North Greece (GR1)	44.4%	1287.95	263.86	37	52.1%	374.19	41.07	470
Central Greece (GR2)	40.6%	2324.18	699.98	19	46.2%	229.99	18.92	237
Islands (GR4)	40.4%	820.60	267.65	6	40.4%	257.22	46.79	66
Attiki – Athens (GR3)	57.2%	1345.48	319.81	52	46.8%	367.79	22.09	534

6.5 Discussion

The purpose of the present study was to explore income-related inequalities in utilisation of health care among older population aged over 50 in Greece, to investigate national regional inequalities as one of the main contributors to the overall inequity and explore the role of out of pocket payment mechanism (OOPP) in health care use as a financial barrier to access. Our findings, summarized, reveal the contribution of our study to inequalities in health care use among the elderly, as following:

6.5.1 Inequity in utilization of health care services by health care type

- The most *important determinants of health services utilization* by the elderly are the indicators of health care need, mainly the presence of activity limitations (GALI), the existence of chronic medical conditions, the bad SAH, older age and gender. Older individuals are more likely to be admitted to hospital, and less likely to visit a specialist and a dentist. Women are significantly more likely to make any visit, to visit a specialist and a dentist, and less likely to be admitted as an inpatient. From non need indicators education, income, degree of urbanization, region, insurance coverage, marital status

and household composition are considered as the most important determinants, but not with the same strength for all the health care types.

- *Inequity in utilization of health care services by health care type*
 - ✓ Significant pro-rich inequity in probability of inpatient admissions and dentist visits.
 - ✓ Slightly pro-rich inequity in probability of any medical visit is apparent.
 - ✓ Among the better off elderly who report a medical visit, weak pro-poor inequity was found in probability of GP/ HCC physician visit.
 - ✓ Almost no significant income-related inequity was found in probability of specialist visits, slightly favoring less advantaged.
 - ✓ Income has a strong positive (pro-rich) effect on inequity in probability of inpatient admissions and probability of dentist visits. It has a weak positive effect on probability of any medical visit.
 - ✓ Among the elderly who report a medical visit, income has a weak negative (pro-poor) effect on probability of GP/HCC physician visit and almost no effect on probability of specialist visits.

6.5.1.1 Inequity in utilization of health care services - Comparison with existing literature

By attempting to compare our findings for utilization of care among older population with the existing evidence mainly for general population, we conclude the following, based on literature review as presented at Chapter One and Appendix Table 1.2-1.5.

Inequity in inpatient admissions (hospital utilization)

Our findings of a pronounced pro-rich inequity in probability of inpatient admissions, are in line with few studies and contradictory to more studies, as following.

- a) *In line with:* (i) an EU comparative pooled analysis of ECHP including Greece from 1994-1998 of Masseria, Koolman & Van Doorslaer, (2004) that found pro-rich inequity for inpatient care relevant to non-elective care; (ii) the Greek study of Siskou et al (2008) that analyzed private health payments by provider and type of service, which showed pro-rich inequity for the total number of private inpatient admissions; (iii) A Greek regional cross-sectional study in Thessaly in 2006 of Lahana E. et al (2011) that indicates pro-rich inpatient care, but this study has a small sample and its findings require caution. (iv) A comparative cross-sectional study for elderly using SHARE data – Wave 1 of Allin S. & Masseria C. (2006) which examined the relationship between

income and health care utilization across countries and found slightly pro-rich inequity in hospital care use.

- b) *On the other hand*, our finding is *contradictory to*: two EU comparative studies of the ECHP data including Greece of Van Doorslaer, Koolman and Jones (2004) and Van Doorslaer & Masseria (2004) that measured income-related inequity in health care and found no income inequity after standardizing for need studies, and
- c) *contradictory to*: almost all Greek literature that argues no-income related inequity (Kyriopoulos et al, 2002; Tountas et al, 2011; Geitona et al, 2007; Siskou et al 2008; a telephone interview survey of Liaropoulos et al, 2008; and the urban setting study of Pappa E. and Niakas D., 2006). However, we need to treat these findings in caution because of limitations in their study design.
- d) *contradictory to*: two urban setting studies: (i) the cross-sectional study of Pappa E. and Niakas D., 2006 in the broader Athens area found that hospital admissions were related to need and no socio-economic factor was related; (ii) the cross-sectional study of Sissouras A, Karokis A et al (1996) in Patras' the third largest urban area, within the Phase II framework (1993-1997) programme of W.H.O. European Healthy Cities Network Survey, that indicated no-income related inequalities in hospital admissions.
- e) *For the elderly - contradictory to*: a comparative cross-sectional study including Greece based on SHARE survey for older population, of Santos-Eggimann B. et al, 2005, and Majo M. C., van Soest A. (2012) who explored the relationship of determinants with utilization of health care and found a negative but very weak association and no income association with inpatient care and inpatient admissions;

Inequity in any medical care (outpatient visit)

According to our analysis, there is weak pro-rich inequity (almost no inequity) in probability of any medical visit. Furthermore, given that the variable “any medical consultation” by definition excludes dentist visits and inpatient nights but includes emergency and outpatient visits, we could compare our results for any medical visit with other evidence for inequity in outpatient visit provided in the wider PHC framework. This result is related to the OOP financial barrier of outpatient visits, as well, displayed below.

- a) This finding is *in line with* few existing evidence for general and elderly population: *in line with*: (i) two studies for general population of no association of socioeconomic characteristics with informal payments in public hospitals for outpatient admissions (Siskou et al, 2008; Liaropoulos et al, 2008); (ii) two studies evaluating cases treated in

the emergency department of a Greek general hospital - reported increased outpatient visits not associated with income - and revealed that almost one in three patients in specific surgical specialty groups, could have been managed by a GP (Marinos et al., 2009), as could 40% of orthopaedic cases (Vasileiou et al., 2009); (iii) the results of the urban-setting study in Athens for the general population, that doesn't find any income association for outpatient care (Pappa E. & Niakas D., 2006); (iv) the results of a study exclusively for elderly of Majo M. & Van Soest A. (2012) based on SHARE data that outpatient care does not increase with income.

- b) *On the other hand*, our finding is *contradictory to*: (i) the results of cross-sectional urban setting study of Sissouras A, Karokis A et al (1996) in Patras' urban area, within the Phase II framework (1993-1997) programme of W.H.O. European Healthy Cities Network Survey, that indicated more conditional outpatient visits from those in lower SES – mainly for having diagnostic tests and medication prescribing. However, this is an older study undertaken before the NHS-ESY reforms of 2001.

Inequity in GP/HCC physician visit

Among the elderly who report a medical visit, there is a weak pro-poor inequity in probability of GP or HCC physician visit. It is worth mentioning that when we interpret findings of income-related equity in GP/HCC physician visits, it is important to keep in mind that the specific findings are not related to the whole sample of the study but they are connected to the individuals who report any medical visit favoring the better off. Moreover, given that there is undersupply of GPs in HCCs and oversupply of specialists, individuals in Greece usually refer to different specialists for their health problems according to their need. Therefore, in reality the question of GP visit or SHIF physician visit may be answered as a specialist visit, indicating caution in the interpretation of the findings. Consequently, our findings for inequity in GP visits are parallel to inequity in specialist visits. Moreover, in some cases, people consult a single provider – specialist regularly (or not often a GP at HCCs) and they consider him as their “personal” or “family” doctor. There are difficulties, thus, in comparing inequity results for specialists versus GP visits.

- a) This finding is *compatible with*: (i) few EU comparative studies of ECHP in Greece pooled analysis of 1994-2001 data of Bago d'Uvaa T., et al (2009, 2007); Bago d'Uvaa T. & Jones A. (2009); (ii) Van Doorslaer et al, 2006; and Van Doorslaer & Masseria

(2004) using data of the ECHP 2000 for Greece, that found pro-poor inequity for the probability of GP visit.

- b) *in line with:* (i) a recent cross-sectional nationwide survey study of Zavras D et al, (2014) based on examined determinants of PHC services in Greece during 2006 using WHO methodology for assessing PHC (Üstün et al., 2001) and found that people with lower income report increased PHC services; (ii) another cross-sectional nationwide mail survey conducted in Greece 2001 - 2002 of Geitona et al, (2007) that examined the determinants of PHC and hospital care utilization and found that the number of PHC visits is affected by income only for poor population.
- c) *in line with:* (i) a cross-sectional regional study of Pappa E. and Niakas D. (2006) in the broader Athens area found that SHIF visits are related to pro poor socio-economic status. (ii) the cross-sectional urban setting study of Sissouras A, Karokis A et al (1996) in the third largest urban area of Patras', within the Phase II framework (1993-1997) programme of W.H.O. European Healthy Cities Network Survey, that indicated more conditional SHIF visits from those in lower SES – almost no inequity.
- d) *On the other hand, our finding is contradictory to:* (i) two studies of Van Doorslaer et al (2004; 2002) using data of the ECHP 1996 for Greece that found slightly pro-rich inequity for the probability of GP visit; (ii) with a recent international study based on ECHP data concluded that in Greece higher SES users report average total number of GP and specialist visits three times larger than that of the lower SES users (i.e. predicted total number of GP users is 1:3.06) (Bago d'Uva T. & Jones A., 2009); (iii) a nationwide study that finds pro-rich family physician visit but once family physicians are not established - due to inexistence of GPs- individuals may consider a specialist as their “personal” or “family” doctor. Thus, the results should be treated in caution (Tountas et al, 2011).
- e) *contradictory to:* two studies exclusively for elderly of Majo M. & Van Soest A. (2012) and (Allin S. & Masseria C., 2006) based on SHARE data indicated that GP visits are positively associated with income.

Inequity in specialist care

Among the better off who report any medical visit, there is no income-related inequity in the probability of specialist visit, slightly favoring less advantaged. Therefore, the elderly have equal probability to make a specialist visit, irrespective of their income level. The use of specialist health care services is related to need.

- a) Overall, our findings are *in line with* little evidence for the general and elderly population: (i) a recent cross-sectional nationwide survey study of Zavras D et al, (2014) based on determinants of PHC services in Greece during 2006 using the methodology of the WHO (Üstün et al., 2001) found that people with lower income report increased PHC services; (ii) another cross-sectional nationwide mail survey conducted in Greece 2001 - 2002 of Geitona et al, (2007) examined the determinants of PHC and hospital care utilization and found that the number of PHC visits is affected by income only for poor population;
- b) *in line with:*(i) few nationwide studies with *evidence of no association* of individuals' socioeconomic characteristics with specialist care as an inpatient or outpatient patient for the general population (Tountas et al, 2011; Siskou et al, 2008; Liaropoulos et al, 2008). (ii) (iii) The cross-sectional regional study of Pappa E. and Niakas D., 2006 in the broader Athens area found that for specialist visits almost no (slightly pro rich) socio-economic factor was related; (iv) a study exclusively for elderly of Majo M. & Van Soest A. (2012) based on SHARE data that no clear association with SES is found.
- c) *On the other hand, our finding is contradictory to:* four EU comparative studies including Greece, of Van Doorslaer, Koolman and Jones (2004) and Van Doorslaer, Koolman and Puffer (2002) that measured income-related inequity in specialist care in 1996; and Bago d'Uvaa T. & Jones A.(2009) and Bago d'Uvaa T. et al (2009) that made a pooled analysis of ECHP for Greece 1994-2001 and found significant pro-rich inequity for the probability of specialist visit.
- d) *Is contradictory to* Greek literature of Tountas et al, 2011; and Mergoupis et al, 2003; Kyriopoulos et al, 2002 that argue pro-rich inequity for specialist visits. Similarly, according to nationwide telephone survey of Souliotis et al (2016) for informal payments in health care in 2012, it indicated that more frequent visits to private health services (mainly PHC) are reported by persons with higher SES profile.
- e) *Is contradictory to* urban settings literature of regional cross-sectional studies: (i) in Thessaly in 2006 of Lahana E. et al (2011) for determinants of utilisation that indicates pro-rich specialist care, similar with (ii) the cross-sectional study of Sissouras A, Karokis A et al (1996) in Patras' the third largest urban area, within the Phase II framework (1993-1997) programme of W.H.O. European Healthy Cities Network Survey, that indicated pro-rich inequalities in specialist visits.
- f) *Is contradictory to* studies for elderly of Allin S. & Masseria C., 2006 based on SHARE data and found slightly pro-rich inequity, whereas Allin S. et al, 2009 based on SHARE

wave 1 found that in Greece wealth-related difference in physician visits was greater than income differences.

Inequity in dentist utilization

Significant pro-rich inequity exists in probability of making a dentist visit; equal in magnitude to pro-rich inequality as far as probability of inpatient admissions is concerned.

(a) Our findings that higher income has been positively associated with dental use as expected, *are in compliance with* other studies: (i) for the general population that identify higher dentist and dental care use by individuals in high SES (Koletsi-Kounari H. et al, 2011; Pavi E, et al, 2010; Koletsi-Kounari H. et al, 2007; Zavras D. et al, 2004; Souliotis K. et al, 2016; Van Doorslaer E. & Masseria C., 2004; Kyriopoulos et al, 2002) (ii) A study that explored determinants of older Greek adults' oral health patterns found that that cost and no disease awareness were the most frequently mentioned barriers to regular dental visits (Naka O, Anastassiadou V, 2012) (iii) for the elderly (Majo M. & Van Soest A., 2012; Egimann S. et al, 2005; Allin S. & Mossialos, 2004 based on SHARE data that identify the significant effect of income in dentist and dental care use; and the study of Listl S. (2011) based on SHARE Wave 2 data that explored income inequalities in dental care use and preventive treatment by 50+ and found significant pro-rich inequity in dental care in Greece, and higher inequalities for preventive treatment among retired individuals. (iv) Moreover, a recent study of Listl S (2012) based on life-course data from SHARE (waves 1 to 3) that identified pro-higher education inequalities in regular dental attendance throughout the life-course and relatively inelastic until age yrs 65+ but not thereafter, due to age-related inequality decline in Greece. (b) Our finding is *contradictory to*: (i) a Greek study (Siskou et al, 2008) that found no association of income with dental care use; (ii) Few studies that indicate lower levels of oral health associated with those in lower income and lower SES (Yfantopoulos et al., 2014; Kyriopoulos et al, 2002).

Overall, we could claim that the evidence for income-related inequity in inpatient and specialist care is mixed, comparing to evidence for inequity in any medical visit or outpatient, GP visits and dental care that is clearer.

6.5.1.2 Inequity in utilization of health care services - Contribution to literature, new evidence and discussion

The aforementioned literature showed that evidence about health care use and treatment is mixed: not all studies have found poorer treatment for those in older ages, with patterns

varying according to health condition and health care outcome considered (WHO, 2013). An important determinant of this diversity in health-care utilization is socioeconomic status. Overall, in terms of access to health care and inequalities in use, some interactions of low income have been found with gender, education level, region of residence, SHIF coverage, marital status and household composition. The highest educational level seems to have a significant effect on utilization, as well. It is also worth mentioning that *income has a weaker effect on utilisation* in SHARE dataset compared to the other two datasets – survey tools of our thesis. This issue is mainly related to the survey design of SHARE and the income measure definition that is completely different than PatraHIS and GNHIS. There are significant differences - mainly in definition (categorical versus continuous; and net versus gross), in components and in reference period (monthly versus annual) of income measure, between the data surveys that could result in response variations and overestimation or underestimation of the level of inequity. Thus, the different findings of pro-rich inequity in inpatient admissions of SHARE survey versus pro-poor inequity of PatraHIS and GNHIS, could be explained by the significant differences in income measure. This issue, as well as other differences in survey design, impedes the attempt to compare the findings of the three surveys, as we discuss at Methodology Chapter.

However, evidence also suggests that once individual effects have been isolated, country inequalities in use are partly associated with national health policies that generally have not kept pace (WHO, 2015; WHO –CSDH, 2013). In Greek health system similar to most health systems, older people typically encounter a system that is not designed to address their needs, as it is designed around acute care model – in some cases poorly aligned with the dominant health issues of older age. This issue is more emphasized in Greece, given that LTC or elderly care has not been statutory established yet, and has been less of a priority. New approaches are needed to foster the egalitarian principle of equity in access NHS-ESY health services as a response to population ageing. Under this framework, our study contribute to existing literature by introducing more sophisticated statistical methodology in order to examine inequalities in use and breakdown the barriers that older people face due to gaps and inefficiencies of the Greek health care system of NHS-ESY in the daily provision and finance of health care, and explore challenges in the patterns of utilization. In particular, *our findings of pro-rich inequity in probability of inpatient care and any medical visit corresponding to outpatient care* are in accordance with and explained by the apparent regional variations favoring residents of thinly-populated areas – who tend to be less advantaged - and face pro-rich inequalities in the probability of having

inpatient admissions, as well as with the OOP expenses reported that constitute a significant financial burden against inpatient and outpatient care by the older people. Therefore, if we try to explain these findings, we need to consider the regional misallocation of hospital beds and health professionals of the Greek health care system that are concentrated in the two most crowded regions of the country. Consequently this misallocation of resources leads to uncontrollable interregional flows from rural to urban areas or to areas with large university hospitals offering expensive and high-technology services, despite possible transportation problems - and “forces” older population to private sector seeking for hospital and physician care. It is also related to the increased OOP and informal payments that patients face in order to bypass long waiting list to the NHS-ESY hospitals due to the demand pressure of the ESY hospitals. We discuss this issue, below. Under this framework, in terms of action on the social determinants of inequities in health care (WHO-CSDH,2013), given that the Greek NHS-ESY is in ongoing reform, the evidence derived by our study -targeting the older population -could be included as part of routine intelligence systems to reporting and implementation of action, in order to review and perform a comprehensive regional development policy with the aim of incentivizing actions on improving allocation of resources to meet health care or social objectives related to regional and local characteristics. It is also important to give adequate incentives for staffing, as we present below.

Moreover, our findings of *pro-poor inequity in probability of GP visit* and the increased likelihood of less advantaged elderly to make a GP visit have a parallel gradient with specialist visits that conclude in *slightly pro-poor or no-income inequity in the probability of specialist visits*, and can be explained in parallel. Therefore, among the more advantaged elderly who make any medical visit, the less advantaged elderly are more likely to make a GP or have equal probability to make a specialist visit, irrespective of their income level, and the use of specialist health care services is related to need. These findings are related with the fragmented –bureaucratic way with a physician-driven (mainly specialist) organizational structure of the PHC system in Greek NHS-ESY. As aforementioned in Chapter Three, the lack of GPs in HCCs and other PHC centres (EOPYY-PEDI or ex IKA SHIF units) and the oversupply of specialists, result in the GP visits to correspond to specialist visits. In particular, despite the successive reforms focused on decentralization and the growing network of 220 HCCs mainly in rural areas and about 350 outpatient facilities owned by (EOPYY ex IKA SHIF) established in urban areas, an integrated PHC network based on GPs as gatekeepers was never established due to the hospital-oriented

NHS-ESY, under a number of weaknesses, including: inadequate staffing in GPs, oversupply of specialists; inadequate medical technology and infrastructure; inefficient allocation of resources between isolated regions versus less rural areas and urban areas, resulting in low quality of provided public PHC services. As a result, elderly, visit a HCC in rural areas or PEDY/SHIF physician in urban areas that is a specialist and not a GP, which for the majority of cases is not the proper first PHC contact. Consequently, given the inability of PHC centres to act as gatekeepers and referees between primary and secondary health care, the elderly patients choose to seek for private providers' services or visit the outpatient facilities of NHS-ESY hospitals as a first PHC contact, making their demand pressure worse. This "enforcement" results in OOP expenses, and for some of the most poor and vulnerable, possibly in financial ruin. Therefore, in reality the question of any visit at HCC may be answered as a specialist visit, indicating caution in the interpretation of the findings for the Greek sample of SHARE dataset. In addition, the finding of *significant pro-rich dental care* is related to the poor social health insurance (SHI) coverage of dental care, the limited coverage of dental care in the public sector and the fragmented way which is provided in NHS-ESY and SHIFs facilities, similar to the other datasets and the existing literature. This inadequacy and weaknesses in dental care coverage, in combination with the oversupply of private dentists⁷⁷ lead to extended use of private dental care sector with high expenditure, especially OOP and informal payments (Koletsi-Kounari H. et al, 2011; Siskou et al, 2008) with important implications.

Overall, our study reveals the deep weaknesses of the Greek NHS-ESY system in terms of addressing inequalities in health care use by elderly population. A comprehensive, public-health response to the Greek population ageing will need to transform the fragmented inefficient Greek health care system that it seems to be misaligned with the population it serves. According to evidence of WHO (2015) and WHO-CSDH (2013), in these settings, concrete steps need to be taken by the Greek NHS-ESY to ensure that all older people have access to needed services – prevention, treatment, rehabilitation and long-term care – without the risk of the associated financial hardship that may affect them or their families. In particular, Greece similar to few OECD countries could adopt schemes or mechanisms to successfully generate universal coverage for ageing population in the following key areas: (i) aligning health systems with the needs of the older populations, by developing

⁷⁷ Compared to other OECD countries, Greece has the highest number (1.27) of dentists per 1000 inhabitants (OECD, 2009) and in the same time there are pronounced imbalances in the geographical distribution of dentists, with approximately 50% of all dentists employed in the greater Athens area.

and ensuring access to services that provide older-person centred and integrated care; (ii) developing systems for providing LTC – an important issue due to inexistence of LTC in Greece with a rapidly ageing population; (iii) creating age-friendly environments by combating age-based stereotypes, protecting the rights of older and enabling autonomy; (iv) improving understanding and monitoring of age-related needs, issues and determinants of healthy ageing. In addition, more mechanisms related social protection systems should be developed to identify and close more gaps in coverage to achieving equitable access, based on key policies such as:

- universality of social protection coverage based on financial solidarity; and
- coordination and coherence of existing social protection schemes in order to built a well-designed social safety net based on effective and efficient administration and fiscal sustainability.
- Involvement of population groups and civil society organizations that advocate for older adults in decision-making

Moreover, in these circumstances, it is crucial to ensure that there is collaboration among the various schemes and that an integrated and holistic approach is used (WHO, 2015).

6.5.2 Regional Variances in health care use - Contribution to inequalities in health care

Our findings reveal territorial inequalities in use of most health care types, as following.

- (i) Residents of thinly-populated areas – who tend to be less advantaged - face slightly pro-rich inequalities in all health care types and stronger pro-rich inequalities in the probability of having inpatient admissions.
- (ii) Residents of thinly-populated areas, of Central Greece and Islands (including Crete) are significantly less likely to report making any GP/HCC physician visit, resulting in pro-rich inequalities in the probability of making a GP/HCC physician visit.
- (iii) On the other hand, among the better off who report any medical visit, residents of all regions are more likely to make a specialist visit and result in no income-related inequity in the probability of specialist visit. The elderly have equal probability to make a specialist visit, irrespective of their income and their region of residence.
- (iv) About dentist visits, residents of densely-populated areas and North Greece report the highest proportion of visits, whereas residents of thinly-populated areas and Central Greece report the lowest proportion of pro-rich dentist visits.

6.5.2.1 Regional Variances in health care use - Comparison with existing literature

We compare existing literature for general population with our findings for utilization of care among older population, as following.

- a) *Our finding (i)* that residents of thinly-populated areas face stronger pro-rich inequalities in the probability of having inpatient admissions is *in line with* the evidence of pro-rich regional inpatient admissions favoring the residents of the urban regions (Van Doorslaer and Masseria, 2004; Lahana E et al, 2011 with a local study); and *in line with* the evidence of geographical proximity barrier in access to inpatient care (Economou C, 2015; Brokalaki et al., 2011; Eurofound, 2012; Kentikelenis et al, 2011; Anderson, 2004; Masseria C. et al, 2004;). On the other hand, it is *contradictory to* evidence in local and nationwide studies where inpatient care is related to health needs and not to socioeconomic factors (Pappa E. and Niakas D., 2006; Tountas et al, 2011; Kyriopoulos et al, 2002).
- b) *Our finding (i) and (ii) are in line* with the evidence that the residents of rural regions use in total - fewer health care services (PHC, outpatient, inpatient) comparing to urban areas (Zavras D et al, 2014; Tountas Y et al, 2011; Oikonomou N., Tountas Y, 2011; Lahana E et al, 2011; Marinos G et al, 2009); as well as *in line with* evidence of geographical proximity barrier to PHC (including access barrier to SHIFs' physicians and to NHS rural HCCs) (Oikonomidou E. et al, 2010; Alber & Kohler, 2004); use less hospital care (Economou C, 2015; Brokalaki et al., 2011; Eurofound, 2012; Tountas et al, 2011; Kentikelenis et al, 2011; Anderson, 2004; Masseria C. et al, 2004;); *in line with* evidence of geographical proximity barrier to dentist visit favoring the residents of rural areas that have to travel to seek private dental visits at urban areas (Koletsi-Kounari H. et al, 2007; Siskou et al, 2008).
- c) *Our finding (ii)* that the residents of thinly-populated areas, of Central Greece and Islands (including Crete) face pro-rich inequalities the probability of making a GP/HCC physician visit is *compatible with* the study of Oikonomidou E. et al, (2010) that reveals geographical proximity as barrier to receive care by the NHS rural HCCs and rural settings – (practices) that result in increased number of GP home visits to older patients in thinly populated areas; It is also *in line with* evidence of geographical proximity barrier in access to PHC (Economou C, 2015; Brokalaki et al., 2011; Eurofound, 2012; Kentikelenis et al, 2011; Anderson, 2004; Masseria C. et al, 2004;).On the other hand, it is *contradictory to:* the study of Geitona et al, (2007) that indicated increased use of

GPs by rural population (specifically of Central Greece and Epirus); and the study of Van Doorslaer, Koolman and Puffer (2002) that indicate slightly pro-poor probability of GP visits.

- d) *Our findings (iii)* that rural residents of thinly and intermediate-populated areas face no income-related inequity in specialist visits *are in line* with evidence that the residents of rural regions report increased utilization of SHIF and private specialists' consultations, in bigger urban centres (Tountas et al, 2011; Oikonomou N., Tountas Y, 2011; Lahana E et al, 2011; Vadla D. et al, 2011; Siskou et al, 2008; Pappa, E. and Niakas, D., 2006, Geitona 2007; Van Doorslaer, Koolman & Puffer, 2002; Van Doorslaer and Masseria C., 2004).

6.5.2.2 Regional Variances in health care use - Contribution to literature, new evidence and discussion

Our findings have a major contribution to *new evidence* of regional disparities. Understanding what drives geographic variation in utilization has important implications for policy by reorganizing existing services to meet health care objectives, especially for the older population.

Overall, the evidence in our study suggests that geographic differences in health care use are not consistent with differences in need or patient preferences. Geographic variations in health care are explained by both demand and supply-side factors. From the supply-side, our findings indicate the regional misallocation of hospital beds and health professionals and reveal significant interregional disparities in resource allocation of the Greek health care system, as presented in detail in chapter three. They are also in line with the findings of DEA analyses that evaluate hospitals' technical efficiency under the management of regional health authorities (RHAs). According to the data and relevant ratios, the less privileged regions lack adequate hospital infrastructure and specific categories of specialized physicians, given that the majority of hospital beds and physicians are concentrated in the two most crowded regions of the country (Attiki/Athens and Central Macedonia/Thessaloniki). On the other hand, on the demand side, several studies have showed the influence of socio-economic factors to under-use of services – ie. strong correlation with social deprivation of the residents of these regions (OECD 2014; Majeed et al., 2000). In particular, Central Greece, Islands, and the thinly-populated areas that report the highest inequalities and disparities in PHC and specialist care account for the

poorest regions in Greece⁷⁸ with the lowest regional GDP per capita and the highest at-risk-of poverty indicator (AROPE) for older population⁷⁹ at NUTS1 level since 2004 till 2015, as in Chapter three (ELSTAT, 2016). Our findings of thinly-populated areas, Central Greece and Islands facing pro-rich inequities in probability of inpatient admissions and GP/HCC physicians are in line with these data, as well. Consequently, the inefficient geographical distribution of infrastructure and human resources in combination with the lack of staff results in underutilization of hospital beds with important implications. This issue is important due to the geographical peculiarity of the numerous islands and the fact that there is a greater concentration of less advantaged older people in rural areas who contribute to an increase in the need for health care. Thus, there is evidence of high percentages of uncontrollable interregional flows of patients from rural to urban areas. These interregional flaws of patients are also relevant to our finding of no inequity in the probability of making a specialist visit and making any medical visit, irrespective of income and region of residence. According to evidence of the Health and Welfare Map as it was estimated by the National School of Public Health in 2011, patients prefer to travel from rural and isolated areas (i.e. mountainous like poor regions of Epirus, Central Greece and islands) to urban areas such as Athens (33.2%) or areas with large university hospitals (in Thessaloniki 42.6% or in Ioannina- Epirus 66.3%) offering expensive and high-technology services or visiting private providers (NSPH, 2012). This issue is important due to the geographical peculiarity of the regions and substantial transportation difficulties in financial and psychological terms, especially for the elderly (Mosialos et al al, 2005; Economou, 2010, Altanis P et al, 2008, Petmesidou M, 2006). However, the uncontrollable interregional flows to the ESY hospitals in urban areas exacerbate their demand pressure and the waiting lists that lead patients either to seek care in the private sector or face informal payments, in order to bypass the waiting list, placing at a disadvantage the vulnerable populations who do not have the ability to pay.

Therefore, our findings of NHS-ESY failure to cover the needs of the population in remote areas, indicate that the Greek health system is not achieving either the level of performance it should, or its commitment to equity in use and universal health coverage (UHC) that are the main principles of the egalitarian Greek NHS-ESY since 1983. In order Greece to

⁷⁸ The poorest regions with the lowest regional GDP per capita are Epirus, Western Greece and Thessaly and those with the lowest Gross Value Added are North Aegean, Epirus and Ionian Islands and East Macedonia & Thrace, according to the National Accounts by the Hellenic Statistical Authority (ELSTAT, 2014).

⁷⁹ According to the trends of regional variations of at-risk-of poverty indicator (AROPE) for older population at NUTS1 level from 2004-2015, the period prior crisis in 2004, the highest poverty is recorded at North Greece and Central Greece, whereas in 2015 the highest poverty is noted at Central Greece and the Aegean Islands (& Crete Island).

successfully generate universal health care coverage for ageing population and eliminate regional disparities in use, at first requires a transformation of the NHS-ESY to move towards the provision of older-person- centred and integrated care. This requires action in the following key areas:

- The health system requires to be redesigned in a subnational level that has been shown to be more effective. This requires the redesign and fully implementation of the decentralization of ESY via the existing Regional Health Authorities (RHAs) that have been established but partially been implemented since 2001 till today.
- The well establishment of LTC or elderly care – with the integration of health and social care services in a local level that will provide a real safety net for elderly. The starting point will need to put older people at the centre of health care, including them as active participants in care planning and in managing inequalities in health care according to the regional and local needs.
- Moreover, in order the Government to respond to the issue of undersupply of medical staff in thinly-populated areas, given the absence of adequate incentives for staffing, should perform a comprehensive regional development policy that aims to distribute physicians more evenly across regions. This policy could include strategies to develop even resource distribution (OECD, 2013): via increasing the number of qualified physicians who are interested in practice in underserved regions; via suitable incentive system with not only financial incentives but also suitable regulatory measures; through expansion of involvement by non-physician providers or by service delivery innovations using technology – telemedicine.

6.5.3 Social health insurance fund (SHIF) coverage variances – Contribution to inequalities in health care use

- Inequalities are not apparent among the SHIFs in the probability of inpatient admissions, the GP/HCC physician visits and the probability of dentist visits favoring the worse off.
- Inequalities are apparent among the SHIFs for the probability of making any medical visits and the probability of specialist visits favoring the better off.
- Non-Noble OGA SHIF coverage has the highest pronounced contribution to overall pro-rich inequity in most health care use services favoring the better off, apart from GP/HCC.

Overall, our findings point out SHIFs coverage variations in the use of most health care types. These variations were expected, given the qualitative and quantitative differences among the multiple SHIFs in the level of coverage, freedom of choice of primary care providers (including private providers), access to specialists and access to private hospitals. As aforementioned, these differences exist not only among Noble and Non Noble SHIFs but also among Non Noble SHIFs (IKA SHIF versus OGA SHIF). They are also related with the fragmented way that PHC is provided, characterized by poor coordination among the PHC providers, and absence of referral system from PHC providers to hospitals.

6.5.3.1 SHIF coverage variances -Comparison with existing literature

Our findings are *in line* with the significant differences among health insurance schemes regarding the level of coverage (content, procedures and quality) and freedom of choice, as they have been confirmed and validated by most Greek and foreign experts in health care policy (Mossialos E. et al, 2005; Economou D., 2010; Economou C. & Giorno C., 2009; Petmesidou M. & Guillen A., 2008; Tountas et al, 2011; Kyriopoulos et al, 2002).

6.5.3.2 SHIF coverage variances -Contribution to literature, new evidence and discussion

The findings contribute to the literature to identify and evaluate the extent to which social health protection system – via SHIF coverage - offers adequate protection to the Greek elderly, as a critical determinant of progress on UHC objectives, and its policy implications.

- Our findings that inequalities are not apparent among the SHIFs for inpatient admissions, GP/HCC physician and dentist visits are related with the free access of the population to NHS-ESY hospitals and 220 HCCs mainly in rural areas, irrespective of SHIF coverage.
- Our finding of IKA SHIF beneficiaries to be more likely to report any medical and specialist visits, is related with wider freedom of choice provided by ex IKA SHIF covering 50.3% of the population, via a nationwide network of about 350 urban PHC medical facilities owned, financed and operated by EOPYY-PEDY (ex IKA SHIF), mainly located in urban areas and less in rural areas, even though most of the IKA units operate in an inadequate way.
- Our finding of the OGASHIF coverage that reports the highest pronounced contribution to overall pro-rich inequity in most health care use services favoring the better off, apart from the probability of GP/HCC physician visit is related with the least benefits and the

minimum freedom of choice that OGA SHIF offers to its beneficiaries –covering 19.3% of the population, mainly people in agriculture - compared to other Non Noble and Noble SHIFs. OGA SHIF offers PHC services in rural ESY health centres (HCCs), regional offices-rural posts, and outpatient NHS-ESY hospital departments and limited dental care in HCCs, whereas any private specialist consultation or private hospitalization is not covered, or any visit the IKA SHIF network is not entitled, either. Thus, these weaknesses in coverage and limited choice of providers - in combination with the low quality services, and problematic operation of HCCs due to significant staff shortage (mainly GPs) and irrational regional allocation of resources - as well as the long waiting lists in most outpatient ESY departments, lead OGA beneficiaries to visit private providers more recently than beneficiaries of other SHI Funds, placing at a disadvantage the vulnerable populations who do not have the ability to pay. This result is also in line with our findings, beneath, for the financial burden of OOP expenses for inpatient and outpatient care of OGA beneficiaries.

- Our finding of Noble SHIF coverage that reduces inequity in all health care types except dental care, compared to Non Noble IKA SHIF, reveals significant inequalities. This result is expected, given that Noble Funds provide the most comprehensive benefit packages and wider freedom of choice of medical services and providers (public and private) than Non-Noble SHIFs in all types of care (inpatient, primary care, specialist visits).

Our findings that reveal gaps in coverage, finance and provision of services, indicate that social health insurance in Greece does not ensure comprehensive coverage of older population against the risk of illness, and undermine the egalitarian principle of NHS-ESY established since 1983, of equity in health care delivery: equity of access to available care and equality of utilization for equal need – that implies equal entitlements (Whitehead, 1991; Mooney 1983 &1986); They also undermine the UHC objectives of financial protection, effective coverage and health system performance, as introduced by the WHO Health Report 2010 and WHO-CSDH (2013). Under this framework of inequalities in SHIFs coverage and gaps in services provided among SHIFs, in combination with the deep structural and multifaceted crisis that Greece faces since 2010, the Greek government has implemented reforms in health care system in order to protect accessibility to health care for vulnerable groups and reduce public health expenditure. The unification of SHIFunds (IKA, OGA, OAEE, OPAD) in one scheme (EOPYY) that was established in 2011 as a sole purchaser of health services with the Law 3918/2011 implementing risk-pooling, is in

the right direction. The unification under EOPYY has produced major benefits for social solidarity by establishing a common basic package of health-care services in EOPYY, but there are still differences in eligibility conditions. However, in the current austerity-driven context, the common package was accompanied by reductions in benefits and by increases in copayments and user charges for visits to HCCs and hospital outpatient departments, pharmaceuticals and laboratory tests. Following, in spite of the magnitude of the gap in coverage created by the crisis, two ministerial decisions in 2014 and a recent Law 4368/2016 were introduced and only extended coverage of prescription drugs and inpatient care to the uninsured (estimated, between 1.5 and 2.5 million people due to unemployment) – including vulnerable elderly. Therefore, it seems that the Government developed specific mechanisms to support equitable access to needed services for vulnerable groups initially limited, slow and ineffective (Economou et al. 2015). Therefore, it is clear that the Greek NHS-ESY should develop more schemes and mechanisms to provide at least essential benefits for the elderly to ensure them fully access to affordable services and financial protection. Expansion of existing social health insurance (SHI) for LTC or care for the elderly could be a potential instrument for protecting from health risks, because it is effective in reaching a large number of poor people. However, as Yang W (2013) highlights, in reality, it is not certain that health insurance always reduces health expenses, as it may result in ex post moral hazard (Dusansky and Koc, 2010, Feldman and Dowd, 1991, Arrow, 2001), or may raise an incentive for doctors to provide more care because payment is dependent on the quantity of care, rather than quality of care, resulting in increased OOP payments, that is usually common under a fee-for-service system similar with the compensation system of PHC physicians contracted with the Greek SHI system under EOPYY (Eggleston et al., WHO, 2010). Therefore, based on the above weaknesses, we believe that the establishment of statutory LTC (including policies for coordinating health and social needs of the elderly) along with a universal health insurance system, in combination with a supplemented private insurance and incentives to providers, could be introduced in order to ensure equitable access to and utilization of care services, provide faster access, better quality of services and increased consumer choice in the public sector, limit informal payments and provide a safety net for older people— and their families.

6.5.4 Out of pocket payments (OOPPs) as a dimension of inequalities in the utilization of health care services

Our findings, summarized, reveal that OOP expenses constitute a significant financial burden against inpatient and outpatient care for older population, irrespective of ability to pay by their income level, the region of residence and SHIF coverage, as following:

- The mean OOP amount for inpatient care (1483€) is 4.5 times higher than the mean OOP amount for outpatient care (330€), as expected.
- Residents of thinly populated areas are insignificantly more likely to pay OOP for inpatient and outpatient care. They are more likely to pay higher OOP mean amount for receiving inpatient but not for outpatient care. In terms of ability to pay:
 - (a) A regressive trend is apparent in OOP amount for *inpatient care* in terms of ability to pay and region of residence. In particular:
 - ✓ OOP mean amount for inpatient admission decreases as the income level accedes from the 2nd poorest level to the richest one. The elderly in the 2nd poor income quintile face twice the mean OOP amount paid by individuals in the 5th richest.
 - ✓ The household income of the elderly patients seems not to be related with the possibility of OOP payments for inpatient care.
 - ✓ Residents of thinly-populated areas and Central Greece region – who tend to be less advantaged - pay higher OOP mean amounts than residents of densely-populated areas and residents of other urban regions (Attiki- Athens and North Greece-Thessaloniki).
 - ✓ Residents of thinly-populated areas pay OOP amount (2107.75€) almost twice the OOP mean amount paid by the residents of intermediate-populated areas (1045€).
 - ✓ Among the Non Noble SHIFs, OGA beneficiaries pay higher OOP mean amount than those with IKA SHIF coverage.
 - (b) There is a progressive trend in OOP amount for outpatient care in terms of ability to pay, SHIF coverage and region of residence.
 - ✓ The OOP amount increases as the income quintile increases. In addition, the OOP mean amount for outpatient care is significantly lower than the OOP amount for inpatient care.
 - ✓ The residents of densely-populated areas and regions of North Greece-Thessaloniki and Attiki-Athens report the highest OOP amount for outpatient care. Residents of Central Greece – who tend to be the less advantaged - pay the lowest OOP amount.

- ✓ Non-Noble IKA beneficiaries face almost equal OOP amount with Noble beneficiaries, and higher mean OOP amount than the Non Noble OGA SHIF.

6.5.4.1 Out of pocket payments (OOPPs) –Comparison with other studies

By comparing with the existing evidence - mainly for general population, our findings that OOP expenses as a financial barrier contribute to inequalities in health care use, are *in line with* most of the aforementioned evidence.

- (a) Our findings of OOPPs for inpatient admissions and outpatient care, irrespective of income level, region of residence and SHIF coverage are *in line with* studies indicating that individuals face OOP and informal payments for receiving specialist care as an inpatient or outpatient irrespective of their socioeconomic characteristics and SHIF coverage (Siskou et al; Liaropoulos et al, 2008; Tountas et al, 2011; Kaitelidou D. et al, 2013 and Penders Y. et al, 2016; Matsaganis M., Mitakos T., Tsakloglou P, 2008). Similarly, the recent qualitative WHO study of Economou C (2015) revealed that certain users view informal OOPPs as facilitators for timely access to qualitative services, especially inpatient care.
- (b) Our findings of OOP expenses as a financial barrier *for inpatient care are in line with* studies indicating that OOP and informal payments (hidden economic activity) to specialists, primarily surgeons concern the provision of inpatient and outpatient care, so that patients can bypass waiting lists or ensure better quality of service and more attention from doctors (Souliotis et al, 2016; Kaitelidou et al, 2013; Kentikelenis A. et al, 2011; Siskou et al, 2008; Liaropoulos et al, 2008; Mosialos et al, 2005). The nationwide telephone survey in 2012 of Souliotis et al (2016) found that approximately 32.4% of public hospital admissions accounted for informal payments, with main reason (20%) to ensure better care – similar to 24% for private clinics. Another telephone nationwide survey in 2008, reported that 36% of those treated in public hospitals had made at least one informal payment wishing to avoid a waiting list (72%) and 137% greater for patients requiring surgery (Liaropoulos, Siskou, Kaitelidou et al., 2008).
- (c) Our findings of *regressive trend in OOP amount for inpatient care in terms of ability to pay are in line with* a lot of the aforementioned studies for the fairness and economic impact of informal payments.(i) Matsaganis M et al, (2008) found that the top 1% of all households accounts for 37.6% of all OOP hospital expenditure. (ii) Similarly, according to ELSTAT (2015) with recent Household Budget Survey data,

the poor households' expenditure is 9% of the family budget, whereas the corresponding percentage for non-poor households is 7%. (iii) Moreover, in Greece, the poorest respondents state that they make OOP three times more than the richest ones, a reversed pattern compared to Italy and Spain (Rodridues R. et al, 2013). (iv) Considering evidence *for older population*, few studies that investigated the size and determinants of OOPs using SHARE comparative data, found that in Greece the poorest spend a higher share of their income on OOP health expenditures on all health care than the better-off (Holly A. et al ,2008; Børsch-Supan A. et al, 2005; 2008) and Scheil-Adlung & Bonan (2013), found that OOP expenditure on inpatient care takes up a higher share 6.1% of household income from the lowest income quintile than 0.5% from richest quintile. In addition, 2% of elderly households face ruinous OOP expenditure for health care. (v) Similarly, the study of Economou, Karabli et al., (2004) found that 2.44% of households in Greece face the danger of making catastrophic payments for health care, and as in Souliotis et al., (2016) the majority (55.8%) of those with bad financial status reported a large impact on their income and living conditions.

- (d) Moreover, our findings of *regressive trend in OOP amount for inpatient care affiliated to region of residence*, are *in line with* a few studies revealing that residents of rural or other than Attica areas use and pay OOP for private health services more than residents of Attica (including the capital Athens) or urban dwellers (Souliotis et al, 2016; Tountas et al, 2011). However, it is *contradictory to* Kaitelidou D. et al (2013) who revealed that informal payments for maternal services in public hospitals were higher for women living in Athens.
- (e) Our finding of *significant variations in OOP amounts for receiving inpatient care affiliated to the SHIF coverage* are *in line with*: (i) other studies indicating that the distribution of health care expenditures is related to the fragmented SHI system favouring the Noble SHIFs beneficiaries revealing a regressive relation (Liaropoulos, 1995; NSSG, 2002; INE-GSEE, 2010). (ii) This finding is also *compatible with* a recent study that reveals the inefficient way that the SHI system protects individuals against catastrophic OOP payments for inpatient care in private hospitals contracted with EOPYY in three urban centres in Greece in 2013 (Grigorakis et al., 2016;2014). This study indicated that the SHIF- EOPYY covered only 47.3% of the total hospitalization cost; the rest 52.7% was OOP expenses with the average OOP amount €1655.24 paid to surgeons; 10% of the sample made OOP hospital payments that

exceeded one quarter of their annual wage or pension income. However, this study included only private hospitals in main urban areas and excluded rural population – such as farmers. On the other hand, our findings are *contradictory to* Tountas et al (2011); Siskou et al (2008) and Liaropoulos et al (2008) studies which found that OOP for hospital admissions - are not influenced by SHIFs.

- (f) Our findings that OOP constitute a burden *against outpatient visits* of older population *are in line with* nationwide studies that reveal high percentage of OOP and informal expenses for private practitioners contacts (Souliotis et al (2016) that revealed 36% of informal payments; Tountas et al, 2011 in Hellas Health I study with 39% of the sample paid OOP and Siskou et al (2008) that one out of three patients for specialist outpatient care.
- (g) Moreover, our findings *that OOP expenses burden outpatient care to a lower magnitude than inpatient admissions are in line* with Liaropoulos, Siskou, Kaitelidou et al. (2008) mail study that the probability of making such payments was 137% greater for patients requiring surgery, with the median payment amount reached €300 – double the amount of monthly household spending on private health care, or 15% of their aggregate monthly outlays – and €200 in the case of gratuities. Other study of Siskou et al. (2008) has been estimated that, on average, patients pay additional fees of approximately €5300 for heart operations. In addition, a study for obstetric services in four general public hospitals (Kaitelidou, Tsirona et al., 2013) found a high rate of informal payments: 74.4% of the women were involved in informal transactions with mean total OOP amount of €1549, comprising a mean informal payment of €848 and a mean formal payment of €701. The Transparency International survey in Greece conducted in 2013 indicates that the amount of informal payments in public hospitals accedes from €50 to €7000 for surgery; and from €30 to €5000 for a doctor's payment.

6.5.4.2 Out of pocket payments (OOPPs) – Contribution to literature, new evidence and discussion

Overall, our findings of the role of OOP payments have a fundamental contribution to literature in inequity in use, as they fill the gap in literature, and also give the opportunity not only to identify the determinants of OOPPs, but also to explore the regressive relationship in ability to pay OOP and region of residence.

Initially, the financial burden that our findings indicate with regard to inpatient and outpatient care is related to the significant pro-rich inequity in probability of inpatient

admissions and slightly pro-rich inequity in probability of any visit that were extracted from our analysis. As far as it concerns *inpatient care*, our study reveals that the extent of personal funding and OOP expenses is not affected by the household earnings and the gap in financial protection being more severe for poorer households than for the wealthier.

The important results of regressive relationship in ability to pay OOP and region of residence reveal that the egalitarian perspective of the Greek NHS-ESY to ensure that health care is financed according to ability to pay- not influenced by income or wealth exists only in theory. As aforementioned, the Greek NHS-ESY health system was introduced aiming at achieving universal and equitable access and ensuring that people are protected from the financial consequences of illness and death, or at least from the financial consequences associated with the use of medical care (Wagstaff A., 2009). Moreover, equity in health care is often defined in terms of health-care financing based on the concept of vertical equity principle of unequal payment for unequals- in which unequals are defined in terms of their level of income (Wagstaff & van Doorslaer 2000; Wagstaff et al. 1999). Therefore, our results reveal an “unfair” NHS system in terms of finance (Van Doorslaer et al., 1992). In addition our findings are compatible with the fact that OOP and informal payments in health care tend to be the “tradition” for health services reimbursement in Greece, as they are reported consistently for many years (Chereches R,et al, 2011; Souliotis, 2016; Yfantopoulos, 2013; Siskou et al, 2008; Tountas, 2011; Kutzin J, 2013; Mossialos E. et al, 2002). In a nutshell, two types of informal payments prevail in the existing literature: Informal payments to healthcare providers in order to achieve higher quality or improved access to care before treatment; and payments made to providers as an expression of gratitude from their patients after treatment (Chereches R,et al, 2011; Souliotis, 2016; Siskou et al, 2008). The wider theoretical framework that attempts to explain and distinguish between causal factors of OOP and informal payments - a task that remains very complex, is that informal payments can be explained by structural (poor organization, low quality, low/irregular reimbursement of health care providers, lack of regulation etc), or cultural factors (related to local customs with a deeply rooted notion of expressing gratitude and reward to providers for health care) (Cohen et al., 2012). According to most Greek researchers, among these models, the theoretical concept that could explain better the persistence of informal payments in Greece, is the “alternative politics” described by Cohen et al. (2004) – related to the “culture” or “tradition” of informal payments in Greek public sector in general and used as an alternative means of improving public product and service provision. (Yfantopoulos

J., 2014; Souliotis K et al, 2016; Yfantopoulos, 2003; Siskou et al, 2008; Liaropoulos et al, 2008, Mossialos et al, 2005). Informal payments are related with tax evasion and “black economy” and constitute a serious problem of the Greek public sector and health care financing system as they represent one of the main sources of the regressive redistributive effects of the tax system in Greece. A current study by Yfantopoulos J. (2013) on a pooled cross section-time series analysis for the period 1958-2011, revealed that overall, more than one quarter to one third of Greek economic activities have been either unrecorded or hidden from official statistics – valued from 24.66% (sd. \pm 2.8) to 30.13% of the GDP with a significant percentage attributed to health care. Specifically, in 2006, the shadow economy in all sectors accounted for 25.3 % of GDP in Greece, much higher than the OECD average of 15.8 % of GDP (Yfantopoulos, 2013). The high OOP expenses, create a black economy within the public health sector, and, for some of the most poor and vulnerable older patients, possibly financial ruin.

As far as it concerns *outpatient care*, our result that there is a progressive trend in OOP amount in terms of ability to pay, that is, the OOP amount increases as the income quintile increases could be explained as the existence at the country level-of a redistribution from the rich to the poor ('Robin Hood' role) through informal payments as suggested by Ensor and Savelyeva (1998), pointing out that “it is not impossible that some providers (especially in private practice) actually apply price discrimination by setting their fees according to the living standards of the patients for the same medical care” (Szende and Culyer, 2006). However, to test this hypothesis at the level of doctors, at a national level, we would need appropriate microdata. Moreover, the results of *distribution of OOPPs in health care affiliated to the density and region of residence* is coherent with the unequal regional allocation of NHS-ESY infrastructures, human and financial resources, given that the concentration of most of resources is in large urban areas, with significant inequalities in thinly populated areas, such as Central Greece and Islands. The fact that our findings of financial and geographical barriers prevent the poorest to access health care indicates important policy issues. The disproportionate burden of informal payments on the worse-off highlights the need to ensure a better financial risk protection to the poorest elderly patients. The measures of financial protection developed to date are based on OOP spending on medical care and relate these payments to a threshold (Wagstaff & van Doorslaer 2003) by classifying spending as catastrophic if it exceeds a certain fraction of household income. According to Wagstaff A (2009) another approach is to classify it as

impoverishing if it is sufficiently large to make the difference to a household being above or below the poverty line. It seems also reasonable that financial protection measures should capture forgone utilization caused by high OOP costs. However, in Greece, the problematic existence of egalitarian NHS-ESY health system in terms of financing due to the extremely high proportion of health care OOPs, are comparable to those health systems in economies with insufficient social health insurance (Sun et al, 2009, Wagstaff A, 2009; Doorslaer, et al 2007, O'Donnell and Van Doorslaer, 2005). The results of our study confirm the literature for Greek and other health systems which suffer high proportion of OOPPs despite the coverage and safety nets of insurance systems (Xu et al, 2007). According to many studies and especially Scheil-Adlung & Bonan (2013) study, ruinous OOP expenditure for health care affects 5% of elderly households in Greece that is significant and alarming, given that according to aging projection, older vulnerable population in Greece will soon increase dramatically. Moreover, this burden is increased if we consider the fact that as LTC for elderly is not statutory available and the state expenditure is less than 0.3% of GDP, the real costs are likely to have been shifted to inappropriate use of acute health-care services (EC, 2014) that include OOPPs to fund a large portion of LTC resulting in significant adverse impact on the disposable income of older people and their families. A core policy issue is how these costs can be equitably shared. Expansion of existing social health insurance (SHI) for LTC or care for the elderly could also be a potential instrument for protecting from health risks, because it is effective in reaching a large number of poor people. However, as Yang W (2013) highlights, in reality, it is not certain that health insurance always reduces health expenses, as it may result in ex post moral hazard (Dusansky and Koc, 2010, Feldman and Dowd, 1991, Arrow, 2001), or may raise an incentive for doctors to provide more care because payment is dependent on the quantity of care, rather than quality of care. This issue leads to increased OOP payments, that are usually common under a fee-for-service system similar with the compensation system of PHC physicians contracted with the Greek NHS-ESY (Eggleston et al., WHO, 2010). Moreover, this issue is more apparent in the case of SHI coverage for private care, given the existing paradox reimbursement policy of inpatient care in private hospitals on DRG's practice⁸⁰ without a gate-keeping system subjected to clinical audit, that permits the private hospitals to impose high (30% or 50%) proportionate

⁸⁰Care Regulation of EOPYY, published in the 3054/18-11-2012 Gazette of the Government.

personal cost participation to the insured, especially for severe medical DRGs and often results in supplier – induced demand that consequently all these lead to increments for SHI and insured OOP funding (Matsushima and Yamada, 2013). Therefore, it seems that the SHI system partially protects insured members against financial burden due to OOPs. The alarming findings of our study -under the new health insurance system in Greece of the unified SHIF (EOPYY) that was established as a sole purchaser of health services with the Law 3918/2011- impose the adoption of policy measures that will drastically reduce the high individuals' contribution to total health expenditure. The revision of Greek DRG's pricing with higher reimbursement rates is essential primarily in order to categorize the cost components of inpatient health care; The allocation of more financial resources (e.g. higher salaries to medical and nursing staff) to public hospital system is imperative for eliminating great barriers of the past; Moreover, complementary or supplementary private health insurance working in parallel to social insurance and LTC insurance could be a potential mechanism of eliminating the high share of OOP expenses and offer solutions to the enormous funding problems of social insurance systems (Sekhri and Savedoff, 2005; Siskou et al, 2009). More recently, studies show that supply-side interventions (treatment protocols, drug lists, and so on) have more success in improving financial protection than expansion of insurance coverage. This reinforces the point that policy-makers have a variety of instruments available to increase financial protection in health.

6.6 Conclusion

The purpose of the present study was to explore income-related inequalities in utilization of healthcare among the population over 50 years old in Greece, to point out national regional inequalities in access of health care use, to explore the role of out of pocket payment mechanism (OOPP) in health care use as a dimension of inequalities in the utilization of health care services and a financial barrier to access on the basis of fragmented social health insurance coverage. Finally, it aims at discussing their policy implications. Using the nationwide Survey of Health, Ageing and Retirement in Europe (SHARE) for Greece, we have tested the hypotheses:

- (i) The inequalities in use of health care is derived from the different socioeconomic characteristics of the older population that use the health services;
- (ii) Individuals at higher income are more likely to use health care services than lower income comparators;

- (iii) Individuals in densely-populated areas are more likely to use more health care services than comparators in intermediate and thinly – populated areas;
- (iv) Individuals with “Non Noble” social health insurance coverage are more likely to pay OOP for using health care than comparators with “Noble” social health insurance coverage.

Applying different methodological approaches, such as the horizontal inequity index via the calculation of concentration indices (as developed by Van Doorslaer and colleagues) and using regression model, we quantify income-related inequity and measure the effect of socioeconomic indicators on the likelihood of contact with health care services. Moreover, using regression model, we measure the effect of socioeconomic indicators on the likelihood of paying OOP for using health care. Our findings support the existence of significant pro-rich inequity in probability of inpatient admissions and dentist visits and slightly pro-rich inequity in probability of any medical visit. Given the slightly pro-rich inequity in any medical visit among the elderly who report a medical visit, weak pro-poor inequity was found in probability of GP/ HCC physician visit. Taking into account the slightly pro-rich inequity in any medical visit among the elderly who report a medical visit, almost no significant income-related inequity was found in probability of specialist visits, slightly favoring less advantaged. Income has a strong positive (pro-rich) effect on inequity in probability of inpatient admissions and probability of dentist visits. It has a weak positive effect on probability of any medical visit. Given the slightly pro-rich inequity in any medical visit, income has also a weak negative (pro-poor) effect on probability of GP/HCC physician visit and almost no effect on probability of specialist visits. Our findings indicate that income itself is not the only contributor, provided that higher educational level status, degree of urbanization, region of residence and SHIF coverage do not have a consistent effect and explain a high percentage of inequalities in almost all health care types. In addition, by decomposing income – related inequity we identify and measure the extent of regional inequalities as one of the main contributors to the overall inequity in the likelihood of using health care. Our findings signify that regional variations in terms of degree of urbanization are apparent for most health care types. Compared to residents of densely-populated areas, residents of thinly-populated areas – who tend to be less advantaged - face slightly pro-rich inequalities in all health care types and stronger pro-rich inequalities in the probability of having inpatient admissions. Among the better off who report any medical visit, residents of thinly-populated areas, of Central Greece and Islands (including Crete) are significantly less likely to report making any GP/HCC

physician visit, resulting in pro-rich inequalities. On the other hand, among the better off who report any medical visit, residents of all regions are more likely to make a specialist visit and result in no income-related inequity in the probability of specialist visit. Among those who report any medical visit, the elderly have equal probability to make a specialist visit, irrespective of their income and their region of residence. Furthermore, our findings indicate that inequalities are apparent among the SHIFs for the probability of making any medical visits and the probability of specialist visits favoring the better off. Inequalities are not apparent among the SHIFs for the probability in inpatient admissions, the probability in GP/HCC physician visits and the probability in dentist visits favoring the worse off. Non-Noble OGA SHIF coverage has the highest pronounced contribution to overall inequity in most health care use services, favoring the worse off in the probability of having inpatient admissions, GP/HCC physician visits and dentist visit. Moreover, Non-Noble OGA favors pro-rich inequity in the probability of any medical visit and specialist care, revealing an unfair relationship with important policy implications. OOP expenses constitute a significant financial burden to inpatient and outpatient care, irrespective of income level, the region of residence and SHIF coverage. The mean OOP amount for inpatient care is 4.5 times higher than the mean OOP amount for outpatient care. As far as it concerns inpatient care, there is a regressive trend in OOP amount for inpatient admission in terms of ability to pay and region of residence. For outpatient care, there is a progressive trend in OOP amount in terms of ability to pay, SHIF coverage and region of residence. Residents of thinly-populated areas and Central Greece region – who tend to be less advantaged - pay higher OOP mean amounts than residents of densely-populated areas and residents of other regions (Attiki- Athens and North Greece-Thessaloniki) who tend to be better off. Residents of thinly-populated areas pay OOP mean amount (2107.75€), almost twice the OOP mean amount paid by the residents of intermediate-populated areas (1045€). All SHIFs beneficiaries pay almost the same OOP amount except for Noble SHIFs beneficiaries who face higher OOP amount than the other SHIF beneficiaries. Among the Non Noble SHIFs, OGA beneficiaries pay higher OOP mean amount than those with IKA SHIF coverage. There are significant policy actions that stem from our study findings. The existence of the above inequalities at different levels of Greek NHS indicates that although in Greece the NHS - ESY offers universal coverage of the older population similar to the general population, a debate is emerging about whether access to health care is indeed equally available to all, especially during the current economic crisis. The current economic crisis with continuous public expenditure decline leads to increased concerns

about inequalities in health care use and access to health care services, especially for the elderly who contribute to some increase in the need for health care. It is worth noting that two years ago, WHO EURO pointed out that the Greek government as well as the other European governments are required to act right away to guarantee universal access to high quality health services focused on humans in a period of global economic crisis; in short, to be people-centered (WHO EURO 2013a and 2013b). The Greek Ministry of Health endorsed policy document and National Action Plan to ensure universal access to health services to the citizens, beyond the implications of economic crisis for health sector. (Ministry of Health, 2013). However, compared to the evidence carried out on the socio-economic inequalities, there is little research about the corresponding inequalities in use and access to healthcare services offered to the general population, especially the older one. The close relation of barriers to healthcare access and the organization of health care system on the side of both supply and demand is complex and there is currently a gap in the evidence base. There is also a gap between evidence and policy relevance. This study sets barriers on the system characteristics (supply side) as well as barriers at demand side and fills the gap in the evidence. The evidence by this study will permit examining the impact of inequalities and barriers to access, not only on the population in general but on the older population –where the available evidence is even more limited. This study will permit to assess and ensure that the current health care services provided are ready to meet the healthcare needs of the older people in Greece. Furthermore, this research improves our knowledge of health care issues for the older population in Greece by addressing priority issues and questions for further research.

Chapter Seven

7. Conclusion and Policy Implications

The main hypothesis of this thesis is that the population is expected to face high inequalities in health care use, particularly the elderly who are the most constant consumers of health services. Inequalities in health care use are expected with regard to: region variations in health care use caused by inadequate allocation of human and infrastructure resources, variations in health care use among different social health insurance funds due to unequal health insurance coverage resulting in increased out of pocket payments. We start this chapter by summarizing the findings and results of the empirical chapters. Then, we present international literature and policy actions in the context of health care inequalities in an ageing population. Finally, we consider a framework of policy implications for addressing issues of inequities and inefficiencies in the Greek healthcare system related with the empirical findings, as well as future research agenda. Relevant limitations are aforementioned in Chapter Two.

Table 7.1 Overall Income –related inequity (HI) by health care type and data-Survey

		Inpatient nights * ¹	Outpatient days * ¹	SHIF physician visits* ²	Specialist visits* ²	Dental visit * ³
PatraHIS	Probab.of visits	-0.049	0.009	0.007	0.128	0.020
GHIS	Probab.of visits	Inpatient nights *¹ -0.0275	Outpatient days *¹ -0.0017	GP visits*² 0.0046	Specialist visits*² 0.0666	Dental visit *³ 0.1037
	Total No visits	<i>-0.1306</i>	0.0528	-0.0153	0.0548	
	Conditional No visits	-0.0716	<i>0.1160</i>	-0.0419	-0.0183	
SHARE	Probab.of visits	Inpatient admission*¹ 0.075	Any medical visit*² 0.016	GP /HCC physician visit*³ -0.014	Specialist visit*³ -0.001	Dental visit *³ 0.070

Bold:p-value <0.01; bold and italics: p-value<0.05; italics:p-value<0.10

Note *1: PatraHIS: Inpatient probability of admissions concerns “the last 12 months”

GHIS: Inpatient/outpatient admissions probability of visit, conditional number of visits and total number of visits concern “the last 12 months”

SHARE: Inpatient admission information concerns “the last 12 months”

Note *2: PatraHIS: Outpatient, SHIF physician and specialist private probability of visit concerns “the last 3 months”

GHIS: For GP/specialist visits probability of visit concerns “the last 12 months”, conditional number of visits and total number of visits concern “the past 4 weeks”

SHARE: Any medical visit concerns sample with total (including 0) number of any visits except from dentist visit and inpatient admissions concerns “the last 12 months”

Note *3:PatraHIS: Dentist probability of visits concerns “the last 5 years”

GHIS: Dentist probability of visits concerns “the last 12 months”, conditional monthly dentist visits were only (12) cases

SHARE: GP/ HCC physician visits and specialist visits concern sample with conditional number of visits for “individuals who reported at least once consultation – any medical visit (≥ 1) the last 12 months”. Dentist probability of visits concerns “the last 12 months”.

7.1 Summary of the findings

Table 7.1 above summarizes the inequity index (HI) by health care type and data-Survey, as displayed in relevant Chapters for each Survey. The summary of empirical findings of the three survey tools’ analysis, the measures of health care use and the income definition are displayed in Appendix Tables 7.2-7.4. Furthermore, we summarize the findings of the thesis across the three essays, as following:

- (1) About *income-related inequalities*, the findings of the thesis suggest that inequalities in health care exist mainly for the probability of specialist and dentist private visits.
 - *Inpatient admissions*: Income- related inequalities are less apparent in probability of inpatient admissions, favoring the less advantaged. However, pro-rich inequity in probability of inpatient admissions is apparent only in SHARE study.
 - *Outpatient visits*: No significant income-related inequity was found for probability of outpatient admissions for PatraHIS and GNHIS. However for GNHIS study, once at least one visit is included, there is pro-rich inequity for conditional number of outpatient visits similar with SHARE study findings of slightly pro-rich inequity for any medical (not dentist/not inpatient) visit.
 - *GP/HCCs physician visits or SHIFs visits* (for PatraHIS): No significant income-related inequity (or slightly pro-poor) was found for the probability of making GP/HCCs.
 - *Specialist visits*: pro-rich inequity in probability of specialist visits for PatraHIS and GNHIS that results in high OOP expenses and comply with the way that primary care is provided, as we present at the respective chapters and the OOPPs’ section, below. However for GNHIS study, once at least one visit is included, there is pro-poor inequity for conditional number of specialist visits favoring the less advantaged. Given that the act of a first visit is a patient's decision, while subsequent visits are a medical decision, this result suggests that inequity is determined by the patients' behavior and incentives and not by physicians' attitudes. Similarly, for SHARE study, no income-related inequity was found in probability of specialist visits, slightly favoring less advantaged.
 - *Dental visits*: Pro-rich inequity in probability of dentist visits is apparent for all surveys.

- Income itself is not the only contributor.
- (2) In addition, our findings indicate intra and *interregional variations* in most of health care services that contribute to a large extent to the overall inequity. Compared to densely-populated areas and Athens region, thinly-populated areas— who tend to be less advantaged - and Central Greece exacerbate the use of most health care services for the older population.
- Compared to densely-populated areas, residents of thinly-populated areas face pro-rich inequalities for almost all health care types (inpatient admissions, outpatient and specialist care) for both GNHIS and SHARE studies, except for pro-poor inequity in probability of GP visits for GNHIS study.
 - *Overall*, we find regional variations in PHC for thinly populated areas and Central Greece (GP care, outpatient visits, and probability of specialist visits) favoring the better off, revealing inadequate PHC provided in these regions. On the other hand, regional inequalities are not apparent for inpatient care (slightly for Islands), mainly due to the significant positive effect of Central Greece on overall inequity, but on a weaker magnitude than the degree of urbanization.
 - About the probability of specialist visits and outpatient admissions for the residents of intermediate-populated areas, Central Greece and North Greece, pro-rich inequity is apparent for the GNHIS study in the access to the first visit, but not in the subsequent positive (conditional) visits indicated by the physician. Pro-poor inequity is apparent for the conditional number of specialist visits for the GNHIS study similar to the pro-poor inequity in the probability of specialist visit for the SHARE study and equity for residents of all regions in the first specialist visit for the SHARE. This significant gradient of regional inequalities in specialist care reveals that the ineffective primary care services on intermediate-populated and rural areas “force” residents to specialist care, mainly privately provided, irrespective of the income level of the individuals, or the need to travel long distance with incurring large time and costs.
 - Intermediate-populated areas seem to have a parallel effect with Central Greece and North Greece on overall inequity in most health care services, income-related equity in the probability of GP/HCCs visits for both GNHIS and SHARE studies and equity in the probability of dentist visits for GNHIS and SHARE studies.

- Furthermore, compared to Attiki-Athens, region of Islands (& Crete) has the lowest effect on overall inequity, but inequalities- though small and weak in strength- still exist.

These findings of regional disparities in health care signal either under-utilisation (Central Greece, Islands and the thinly-populated areas mainly for PHC services), or over-utilisation (mainly North Greece) of care, raise questions about the issues of equity, efficiency and the overall health system performance. Similarly, the contribution of regional disparities to inequalities in use by income, that reveal strong pro-rich (positive) effect of thinly-populated areas- that is less advantaged, for most health care types except the probability of GP visit, as well as the pro-poor inequity in using specialist care mainly accessed in urban areas, have important implications for policy making especially as far as it concerns the growth and provision of PHC system in rural and remote areas. They are explained by both demand and supply-side factors. On the demand side, several studies have showed the influence of socio -economic factors to under-use of services – ie strong correlation with social deprivation (OECD 2014; Majeed et al., 2000). In particular, Central Greece, Islands, and the thinly-populated areas that report the highest inequalities and disparities in PHC and specialist care account for the poorest regions in Greece⁸¹ with the lowest regional GDP per capita and the highest at-risk-of poverty indicator (AROPE) for older population⁸² at NUTS1 level since 2004 till 2015. On the supply side, it points to the fact that there is unmet need in regions of low activity - explained by unequal regional allocation of health infrastructure (ie the number of hospital beds per capita indicator) or variations in medical practices (number of physicians per capita or number of nurses per capita). In particular, Central Greece, Islands, and the thinly-populated areas that report the highest inequalities in PHC and specialist care, have the lowest density in doctors and nurses^{83, 84} and consist the poorest regions in Greece with highly mountainous and isolated areas, whereas the majority of physicians are concentrated in the two most crowded

⁸¹ The poorest regions with the lowest regional GDP per capita are Epirus, Western Greece and Thessaly and those with the lowest Gross Value Added are North Aegean, Epirus and Ionian Islands and East Macedonia & Thrace, according to the National Accounts by the Hellenic Statistical Authority (ELSTAT, 2014).

⁸² According to the trends of regional variations of at-risk-of poverty indicator (AROPE) for older population at NUTS1 level from 2004-2015, the period prior crisis in 2004, the highest poverty is recorded at North Greece and Central Greece, whereas in 2015 the highest poverty is noted at Central Greece and the Aegean Islands (& Crete Island).

⁸³ About regional allocation of physicians, the regions with the lowest density in doctors (Western Macedonia, Ionian Islands and North Aegean Islands) less than half of the national average (614.4 doctors). Western Macedonia has 4.5 lower density of physicians than the national average. About the allocation of nurses, Central Greece with the lowest density in nurses (144) has 0.40 nurses of the national average of 354 nurses.

⁸⁴ According to Greek Statistics Authority for 2007, the concentration of doctors in the area of greater Athens (Attica) is remarkable (7.3 physicians per 1.000 inhabitants), the second in concentration area is Central Macedonia (5.3), Crete has 5.4 physicians, whereas the regions of Central Greece (2.7), Western Macedonia (3.2) and the South Aegean Islands (3.2) that display the largest scarcities (Economou, 2010).

regions of the country in Attika/Athens - the capital and in Central Macedonia/Thessaloniki- North Greece that report the lowest inequity in specialist visits. Despite the fact that health centers (HCCs) have generally increased in rural areas during the last decades, primary care in rural areas is highly deficient because of inadequate staffing (mainly GPs), old-fashioned and useless biomedical technology and facilities as well as lack of financial and managerial autonomy. This result in a failure to cover the needs of the population in remote areas and in high percentages of uncontrollable interregional flows of elderly patients to urban areas such as to Athens to seek private care or to areas with university hospitals, despite possible transportation problems⁸⁵ (“Health and Welfare Map” – NSPH, 2011). In this case, our findings indicate that the Greek health system is not achieving the level of performance it should, mainly for PHC. Given that the Greek NHS-ESY is in ongoing reform, the evidence derived by our study gives the opportunity for reorganization of existing services or for re-direction of resources to meet health care or social objectives related to regional and local characteristics, especially for the older population, similar to many countries, with the aim of incentivizing actions on eliminating geographical and regional disparities in health care use (WHO-CSDH, 2013). Moreover, in order the Government to respond to the issue of undersupply of medical staff in thinly-populated areas, given the absence of adequate incentives for staffing, should perform a comprehensive regional development policy and strategies to distribute physicians more evenly across regions. These strategies include: to target future physicians (increasing the number of qualified physicians who are interested in practice in underserved regions); to target current physicians (via suitable incentive system with not only financial incentives but also suitable regulatory measures); to learn do with less (through expansion of involvement by non-physician providers or by service delivery innovations using technology - telemedicine).

(3) In addition, we identify that inequalities are apparent *among the SHIFs* in use of most health care types, except the probability of inpatient admissions and the probability of GP/HCC physician visits favoring the less advantaged.

- There is an unfair relationship among the SHIFs coverage and benefits. Compared to Non Noble IKA SHIF, Non-Noble Farmers OGA SHIF coverage has the highest pronounced contribution to overall pro-rich inequity in most health care use services for both PatraHIS and SHARE studies, including inequity to probability of

⁸⁵ According to the “Health and Welfare Map” data as estimated by National School of Public Health in 2011, patients prefer to travel from rural and isolated areas (ie mountainous as in poor regions of Epirus, Central Greece and islands) to urban areas such as to Athens (33.2%) or to areas with large university hospitals (in Thessaloniki 42.6% or in Ioannina- Epirus 66.3%) offering expensive and high-technology services or visiting private providers (NSPH, 2012).

specialist visits favoring the worse off and to inequity in the probability of SHIF physician visits (PatraHIS) or any medical (outpatient) visit (SHARE) favoring the better off than the Noble SHIFs .

Furthermore, these findings are expected given the least benefits and the minimum freedom of choice that OGA SHIF provides to its beneficiaries. As aforementioned, OGA beneficiaries were not entitled to visit the IKA SHIF nationwide network of about 350 urban primary care medical facilities, either. In addition to these weaknesses in coverage, there is also significant staff shortage and under-functioning of many public health units and services mainly in rural and isolated areas that concerns the limits of accessibility of farmers OGA SHIF beneficiaries to specialized health care. Thus, the limited choice of providers- in combination with the low quality services and problematic operation of HCCs- as well as the long waiting lists in most outpatient ESY departments lead OGA beneficiaries to visit private providers more recently than beneficiaries of other SHI Funds with more choices.

(4) This thesis also finds that *OOP expenses constitute a significant financial burden* to most health care types according to the available information of the two surveys. Our thesis finds that OOP expenses especially for specialist and inpatient care irrespective of ability to pay, SHIF coverage and region of residence, could be a serious barrier to access health care and a heavy burden on individual and household incomes.

- According to the available information, PatraHIS indicates that OOP expenses as a financial barrier contribute more to the probability of specialist private visits. On the other hand, given that SHARE survey provides OOPPs information only for inpatient and outpatient care, OOP expenses constitute a significant financial burden to inpatient and outpatient care, irrespective of income level, the region of residence and SHIF coverage.
- For PatraHIS, the OOP amount is a significant barrier to specialist private visit in terms of ability to pay by income revealing a regressive relationship, as well as in terms of SHIF coverage among the older population.
 - ✓ According to the PatraHIS study, when we consider the mean conditional-positive ($>0\text{€}$) OOPP amount for the specialist private visit by income quintile, there is a clear trend that mean OOPP positive amounts decrease as the income level proceeds from poorest to richest level, revealing a regressive relationship.
 - ✓ Considering mean OOP amount ($\geq 0\text{€}$) for specialist visit by SHIF coverage, elderly with Non Noble OGA SHIF coverage – who tend to be less advantaged

- face the highest OOP mean amount for a specialist private visit, slightly higher than the amount paid by Non Noble IKA beneficiaries.
- ✓ Nevertheless, if we consider mean conditional-positive ($> 0\text{€}$) OOPP by SHIF coverage, it is apparent that elderly pay a higher OOP amount than the median of 40€, irrespective of their SHIF coverage, though elderly with Noble SHIF coverage pay somehow a higher in magnitude OOP amount.

Furthermore, the results of pro-rich inequity in probability of specialist visit in combination with high OOP expenses mainly for the specialist and outpatient visit are related to the oversupply of specialists⁸⁶ and the anachronistic retrospective remuneration system, where physicians are paid on low salary, and the contracted physicians are reimbursed on a low fee-for-service basis with a limited number of visits per month, regardless their specialty and their performance. This reimbursement method does not provide efficiency-promoting incentives and indirectly encourages physicians to induce unnecessary demand for health care services as well as to ask for informal additional payment. Specific mechanisms within and beyond social health protection schemes should be developed to address the potential risk of impoverishment of vulnerable groups. In order to address related issues, the Government needs to identify and close more gaps in coverage and develop effective policies targeting the most vulnerable, such as: tailored benefit packages for those most in need; and abolishment of co-payments and user fees for the most vulnerable in order to limit the burden of OOPPs. Overall, in all schemes and systems, an attempt should be made to provide at least essential benefits for the elderly to ensure them access to affordable services and financial protection.

- On the other hand, for the SHARE survey, OOP expenses constitute a significant financial burden to inpatient and outpatient care, irrespective of income level, the region of residence and SHIF coverage. The mean OOP amount for inpatient care is 4.5 times higher than the mean OOP amount for outpatient care.
 - (a) As far as it concerns inpatient care, there is a regressive trend in OOP amount for inpatient admission in terms of ability to pay and region of residence.
 - ✓ The elderly in the 2nd poor income quintile face twice the mean OOP amount paid by individuals in the 5th richest group.
 - ✓ Residents of thinly-populated areas and Central Greece region – who tend to be less advantaged - pay higher OOP mean amounts than residents of densely-

⁸⁶ Compared to other OECD countries, Greece has the highest number (3.9) of physicians specialists and dentists (1.27) per 1000 inhabitants and the lowest number of GPs (0.31). (OECD, 2013; OECD, 2009) and in the same time there are pronounced imbalances in the geographical distribution of medical professionals.

populated areas and residents of other regions (Attiki- Athens and North Greece-Thessaloniki) who tend to be better off.

- ✓ Among the Non Noble SHIFs, OGA beneficiaries pay higher OOP mean amount than those with IKA SHIF coverage.

(b) For outpatient care, there is a progressive trend in OOP amount in terms of ability to pay, SHIF coverage and region of residence.

- ✓ There is a progressive relationship given that the OOP amount increases as the income quintile increases.
- ✓ Non–Noble IKA beneficiaries face almost equal OOP amount with Noble beneficiaries, and higher mean OOP amount than the Non Noble OGA SHIFs beneficiaries.
- ✓ Furthermore, the residents of densely-populated areas, regions of North Greece–Thessaloniki and Attiki-Athens report the highest OOP amount for outpatient care. Residents of Central Greece – who tend to be the less advantaged - pay the lowest OOP mean amount.

Overall, the thesis suggests that inequalities in use of health care exist, especially with regard to primary health care services. Moreover, it is worth noting that if we attempt to compare the findings of the surveys, we need to take into consideration the differences in survey design of the datasets, as in the paragraph below. Thus, the different findings of pro-rich inequity in inpatient admissions of SHARE survey versus pro-poor inequity of PatraHIS and GNHIS, could be explained by the significant differences - mainly in definition (categorical versus continuous; and net versus gross), components and reference period (monthly versus annual) of income measure. These differences in income measure could result in response variations and overestimation or underestimation of the level of inequity.

7.2 Comparing with international literature and policy implications

Since the early 2000s, in the context of ongoing health care reforms in most European countries, international organizations, national governments and researchers have made efforts to identify the impact of different institutional features on access to care.

On the one hand, research has focused on analysing the existence of barriers to access, across population groups (geographical, ethnic, or, most commonly, socio-economic groups), and on the other hand, researchers have attempted to measure the degree to which utilization of health care services is based on need for health care and equity in access to health care is achieved, mainly for the general population. There is substantial body of

international comparative evidence and country-specific studies aimed at analyzing health and healthcare inequities for the general population that can be discriminated between:

- (a) Previous evidence in the early 2000s under the ECuity Project - a multiyear study aimed at analyzing health and healthcare inequities in OECD countries and other affiliated countries. This evidence for countries with universal coverage health systems, showed income-related equity in the probability of a GP visit, and a pro-poor distribution in follow up visits to the GP (less clear cut picture). By contrast, in all countries, there was evidence for substantial pro-rich inequities in the probability of contacting a medical specialist and a dentist that was stronger in countries where either private insurance coverage or private practice options were offered to purchase quicker and/or preferential access (Van Doorslaer et al., 2000; Van Doorslaer, Koolman and Puffer, 2002; Van Doorslaer et al,2004; Van Doorslaer, & Masseria, C, 2004)⁸⁷;
- (b) Current international comparative studies using old data around the year 2000 under the ECuity Project, that confirmed the previous patterns (Or Z et al, 2008; Bago d'Uva, T, 2009);
- (c) A number of country-specific studies for the early 2000s, comparing inequities across types of services, across geographic regions, and before and after the implementation of healthcare reforms. For the countries with universal coverage and establishment of NHS, the evidence shows equity or pro-poor distribution of GP visits and hospitalizations and emergency services (Van Ourti,2002; Morris et al., 2003; Garcia Gómez and López,2004), and differences in physician visits by region of residence (Costa and Gil, 2005). They also found pro-rich horizontal inequity in the access to the first GP or specialist visit, but not in the subsequent visits indicated by the physician (Leu and Shellhorn, 2004); Our findings for older population are consistent with these studies. Nevertheless, the differences in access increase between those with and without private health insurance.
- (d) More current research that re-examines income-related inequalities in health care use with more current data of 2006–2009 mainly from European Health Interview Survey (EHIS) as well as individual country studies evolve before the onset of the global economic crisis, given that governments have prioritized equity of access (Devaux M,

⁸⁷ Similar comparative evidence exists under EquiLAC project by World Bank and the IHEP collaboration aimed at quantifying and comparing inequities for the general population.across a number of less developed countries in Latin America.

2015, 2012; Ono, T et al, 2014; De Looper M & Lafortune G., 2009; Urbanos and Meneu, 2008; Mackenbach, J.P. & EUROTINE, 2007). However, a decade later, this evidence shows that in the majority of countries, still exists little inequity in visits to GPs, pro-rich inequity to consult a specialist and a dentist and regional variations in terms of supply-side factors, with increased inequalities in France and USA, and lower inequities in Switzerland and UK.

- (e) As far as it concerns older population, there is growing concern and research activity on socio-economic inequalities in health and health care among the elderly in the last 15 years (Allin et al, 2011, 2006, 2009; Blay et al, 2008; Kim D. et al, 2011; Chen & Escarce, 2004; Jun, Raven, & Tang, 2007; Luo et al., 2009; Perelman et al., 2009; Schellhorn et al, 2000; Santos-Eggimann et al, 2005; Huisman et al, 2005; Mackenbach et al, 2003). This evidence is more clear-cut and shows inequalities favoring the better off, in the majority of countries. There is evidence from UK 1997-2993 for pro-rich inequity for all services areas, but not significantly in hospital care (Allin et al., 2011); similar evidence from the international comparative study for elderly SHARE for 2004 (Allin, 2009); similar evidence for income-related inequality to be highest among American seniors despite publicly financed programs including Medicaid, Medicare (Chen and Escarce, 2004); pro-rich inequity to physician visits and pro-rich hospitalization after adjusting for health conditions in China (Jun et al., 2007 and Luo et al., 2009); pro-private health insurance facilitated outpatient access in Swiss elderly (Blay et al., 2008); and pro-rich inequity for both outpatient and inpatient care utilization for elderly in Korea (Kim D et al, 2012). Both studies for general and older population show that for the countries with universal coverage and establishment of NHS, there is equity or pro-poor distribution of GP visits and emergency services, but a concentration of specialty visits favoring high-income groups, similar with dentist visits. For inpatient care, the evidence is not clear-cut. It seems that for the elderly population dominates inpatient care favoring the better off. However, these studies do not separate public from private hospital services, which is a strong limitation. The significant role of private health insurance and regional variations on inequity is visible, as well. Following the international literature for older population, it is apparent that the findings of our study are consistent with the aforementioned studies and literature for the older population.

Overall, the larger inequities are found in countries where: universal health coverage is not achieved, health care financing relies on a large share of private insurance and out-of-

pocket payments, GPs do not act as gatekeepers, health care provision is mostly private and national cost sharing arrangements do not include free care at the point of delivery. Moreover, the fact that a decade later and after rapid reforms, the evidence shows that in the majority of countries, inequity favoring the higher socioeconomic groups still exists, calls for a need to combine universal policies that affect the whole population with more targeted policies aimed at vulnerable and older populations. This issue is important given that in the same period, all over Europe - including Greece, the health care systems are reformed under the pressure of economic globalization -trying to balance increasing demand with declining budget, whilst still remain firmly within the parameters of a universalistic and egalitarian health care system. Under this framework, it is therefore particularly important to ascertain which of the main elements of health care systems need to be safe-guarded during the development of reforms if equity is to be ensured. In order to improve access to care and reduce inequalities, most of the OECD countries have introduced reforms to their health care system including: the extension of primary health coverage in the USA; the introduction of exemptions of co-payments and up-front payments for vulnerable populations visiting GPs in Belgium since 2011; the suppression of co-payments for GP and specialist visits in Germany since 2013.

However, the increased investigation in the last 15 years to reveal socioeconomic inequalities in health care utilization among the elderly has not been sufficient to support policy decisions. Only recently, there is growing concern about the policy implications of these inequalities among the elderly, by international projects such as WHO Healthy Ageing Report (2015) and the OECD Ageing Equally Action Plan for 2017 that enable countries to design sustainable policy approaches to better adapt to population healthy ageing by understanding of compounded health inequalities over the life-cycle linked with poor labour market experience during active years and poor social outcomes among the elderly, efficiently rather than waiting for when people retire. According to these projects, the impact of ageing populations on health systems will give rise to a number of challenges and policy options. Each country or region needs to assess its current situation and what is likely to work in its context before mapping the specific next steps that will be most appropriate. A number of priority areas for action to reduce health care inequalities among the elderly, can be identified:

- One key component of a health-systems' response must be to breakdown the barriers (affordability barriers, transportation, limitation capacity, health workforce behavior, long waiting times) that limit health-care utilization by the older people who need it.

- Given the chronic and complex health-care needs of the older population, and the fact that many existing services were designed to cure acute conditions often managed with a fragmented manner, with coordination frequently lacking across care providers, settings and time, significant changes are required in the way health systems are structured and health care is delivered.
- The health services will have to be redesigned to deliver the comprehensive and coordinated care that has been shown to be more appropriate and more effective. Changes are needed to the health systems that will require a shift that extends beyond disease-based curative models and towards the provision of older-person-centred and integrated care.
- Health services have to be better integrated between levels and across specialist groupings. The development - sometimes from nothing- of comprehensive systems of LTC (for countries like Greece where LTC is non-statutory), as a coordinated response from multiple levels of government, is needed, as well.
- These changes appear to be both affordable and sustainable. However, how action might be financed will vary among settings. Some may be financed by adapting current services to the changing demographic and epidemiological contexts. Concrete steps need to be taken to ensure access to universal coverage for health care and LTC – that is still a distant ambition - to needed services – prevention, health promotion, treatment, rehabilitation and LTC – without the risk of the associated financial hardship that may affect them or their families. Where this cannot be achieved immediately for the whole population due to resource constraints, the initial target should be those with the greatest needs and with the least resources to meet their needs.
- Making progress on reducing inequalities will require improving understanding and monitoring on a routine basis of age-related needs, issues and determinants of healthy ageing and evaluating existing policies. Quantitative target setting is a useful instrument to guide policy making.
- Policies and interventions to reduce health care inequalities should be tailored to the specific pattern of health inequalities prevailing in a country. Countries differ strongly in the health determinants which make the largest contribution to the explanation of health inequalities.
- Addressing policies to “upstream” determinants of inequalities, including income and education, via introducing measures to ensure that older people are protected from poverty, for example through social protection schemes - are necessary ingredients, but

the persistence of inequalities in countries with universal welfare systems show that they are not sufficient to eliminate health care use inequalities.

Overall, we cannot expect to reduce health care inequalities substantially without a powerful, sustained and systematic effort to develop systematic strategies that Eurothine Health Inequalities Project suggests to include: political commitment; attainable objectives; package of effective policies and interventions (to build a comprehensive evidence-based); effective implementation (via quantitative target setting as a useful instrument); evaluation and monitoring (not only to understand the dynamics, but also to see what degree of inequality might be avoidable) (Mackenback, Eurothine, 2007).

It may not be realistic to eliminate health care inequalities in the foreseeable future, but reducing them to more acceptable levels is well within the realm of possibility.

However, the empirical findings of our essays –that are consistent with the aforementioned studies and literature for the older population - provide useful tools for understanding and exploring inequalities in the use of health care among the older population in Greece. Given that most of the reform processes in Greek health care system are still ongoing, our findings can shed light on the types of services and sources of inequities that need more serious attention. Future studies using a similar methodology with post-reform data would shed light on the impact of the current reforms in terms of inequity, quality of access, and use of healthcare services. Moreover, this thesis goes further than the existing studies of equity by discussing the policy context in which inequalities in use arise, and thus it can be addressed. Our results have implications for other countries with aging populations, as well.

7.3 Policy implications/challenges of our study

Our findings similar to the health care system characteristics highlight the fragmented physician-driven organizational structure of the primary health care (PHC) system and the weaknesses that obstruct its efficiency, as presented in chapter two. The thesis suggests that inequalities of access exist, especially with regard to primary health care services. Most of the health care system weaknesses are caused -to a great extent- by the incomplete carrying out of changes and attempts of reform. According to several authors “The most significant problem facing health policy in Greece is the gap between declared objectives and the enactment and implementation of the legislation” (Economou, 2010 p. 159; Mossialos et al, 2005; Petmesidou M., 2006; Tinios et al, 2011). Drawing from the empirical results of the essays presented, we make a number of policy recommendations. However, policy recommendations need to be raised thoroughly under the current

circumstances of the financial crisis, when a large part of the population is deprived of health insurance.

Restructuring of primary health care by enhancing the quality of public primary health care services

Greater continuity and coordination in the supply of health care are required for the improvement of the quality of public primary services, given the fragmented physician-driven organizational structure of the primary health care (PHC) system that leads to regional variations in accessibility of health care and interregional patient flows, to increased use of hospital outpatient services as well as to private health sector with the prevalence of OOP expenses and informal payments.

- A number of relevant measures related to the redesigning of PHC into an integrated model that have been recently enacted but not implemented, are suggested, such as:
 - ✓ The upgrade of the gate-keeping role of GPs and the development of an electronic system / database of referring physicians to hospitals in order to control public spending, avoid unnecessary technical exams and make PHC more cost-effective.
 - ✓ the introduction of an electronic medical file for each patient with systematic records and disease registries to coordinate PHC with hospital care and produce incidence rate data, in combination with
 - ✓ the systematic introduction of medical protocol- not only to control and monitor the PHC physician prescribing behavior (via e-prescribing and e-referrals) – as slowly adapted since 2013 – but also to improve PHC operation.

These measures would focus on more patient-oriented services that enhance the quality of public PHC.

- It is important that we examine the consolidation of HCCs and EOPYY units and upgrade the HCCSs' role by the increase of number of HCCs operating in the urban areas, given the existing evidence that HCCs provide care mainly to less advantaged population. Thus, it would be easier for HCCs and EOPYY units to act - as they were planned - as gatekeepers and referees to more specialized treatments for ESY secondary health care in urban areas and eliminate hospitals' demand pressure and waiting lists.
- In addition, given that HCCs operate understaffed and they are administered by ESY hospitals that do not favour their expansion, it is important that HCCs should be managed independently with their own budget. Given the significant staff shortage of

HCCs due to undersupply of GPs and oversupply of specialists, incentives are required to increase the proportion of GPs and to shift specialists to general practice as well as staff restructuring best suited in PHC.

- In addition a new remuneration system -connected with the performance and specialty- is required for the PHC physicians – employed in the public sector on a salary basis or in the private sector on a fee-for-service contract basis. It could be payment by capitation or a combination of capitation and salary instead of fee-for-service in order to restrict the incentives for physicians to induce demand and health expenditure and reduce informal payments by patients (Mossialos et al, 2005).
- It is also important that a system for the evaluation of PHC services provided be developed.

Review the governance of the health care system by setting necessary conditions for improving efficiency

- A *wider consolidation* of all bodies within a single ministry is required. This is obvious given the existence of different bureaucratic subsystems and organizational models involved in administering the supply of health care services and managing day-to-day operations between the NHS-ESY, EOPYY and other SHIFs. The separation of health from the pension- social branch of the social insurance funds since 2013 is an important first step.
- There is a *necessity for decentralization in practice, flexibility and higher level of autonomy in healthcare management of health care units*, ESY hospitals, ESY and EOPYY PHC units, which currently are mainly administered and not managed, *in combination with strict control on costs and outputs*. The necessity for more flexibility and autonomy in management derives from the current limited decentralization of competences of regional health authorities – DYPEs as well as EOPYY units, since the capital investment, recruitment policy and all the financial transactions of DYPE and EOPYY have to be approved by the Ministry of Health (MoH) and Ministry of Labour (MoL) for other SHIFs.
- As far as it concerns the *establishment and efficient operation of the recently unified fund (EOPYY)* in terms of financing the system, we set a number of future developments:
 - ✓ Provided that a multipayer system still exists due to the failure of multiple attempts to establish an organization which will act as a third party payer, it is important

that the recently unified fund (EOPYY) will act as the main public and social financier and not as a provider. EOPYY could pool public health resources from social insurance contributions and taxation (direct, property and indirect taxes). As authors have pointed out, EOPYY could collect contributions either directly or indirectly by pension funds, **on** an online monthly basis (Karakolias & Polyzos, 2014; Polyzos et al, 2014).

- ✓ Subsequently, EOPYY could separate its purchasing and provider functions and become a sole purchaser with monopsony power with the broader goal to have bargaining power by setting contracts for providers, assess their performance and finally drive the prices down. The relevant Law adopted one year ago about the transfer of PHC responsibility and EOPYY units to RHAs and ESY needs to be implemented.
- ✓ Furthermore, given that EOPYY needs to operate as a unified social health insurance fund in practice, it could also undertake individual managerial roles such as contributing to evasion management or controlling the budget state subsidies. This way it would compensate ESY hospitals and HCCs for the services provided to its beneficiaries.
- Changing the payment system of providers by the introduction of a prospective payment system for public hospitals in combination with reviewing arrangements for eliminating transfers from the state budget to hospitals, PHC and EOPYY will contribute to better resource allocation and offer incentives to providers for improving productivity and effectiveness. The current pilot introduction of DRGs method under a revised pricing method of ESY hospitals is in the right direction.
- The introduction of revised pricing system in combination with global budgets and the faster introduction of health information systems and accounting system- which will permit establishing high-quality statistical techniques and systematic reporting methods on health services performance- will lead to significant changes in the managerial structure of health care system – especially hospitals and provide incentives for more productivity and effectiveness.
- The development of an integrated and better monitored public procurement system under systematic health technology assessment (HTAs) and economic evaluation will improve the efficiency of the current procurement system. The centralized public procurement legislation that was introduced since the 2007 reform needs to be adopted faster.

Eliminating inequalities in access to health care due to differences in SHIFs coverage

As far as it concerns *the issue of inequalities in health care use among SHIFs*, it is derived – as mentioned above - by the qualitative and quantitative differences of multiple SHIFs in the range of entitlements, the level of coverage, freedom of choice of primary care providers (including private providers), access to specialists and to private hospitals, and uneven contribution rates. This issue of inequalities among the merged SHIFs is not just an issue of fairness. Given the establishment and operation of recently unified fund (EOPYY), it is important that we eliminate the above differences among the SHIFs almost three years after the operation of EOPYY. The standardization of benefit package among the unified SHIFs based on the EOPYY Integrated Health Care Regulation (EKPY) - established two years ago - is moving towards the right direction.

Eliminating inequalities in access to health care due to regional disparities - Implications

With regard to *the geographical inequalities in access to health care* as described above, they will be reduced under the implementation of a rational allocation formula in combination with the systematic development of “Health and Welfare Map” of the country that highlights the health needs of the population and the ESY’s and EOPYY’s staffing problems in every region. In order to solve the staffing problem of specific regions (i.e. more isolated regions of Central Greece, Western Greece and Islands) a different employment and reimbursement policy must be adopted by MoH and MoF. Incentives for attracting and retaining health personnel to rural areas in combination with reimbursement connected with the performance and specialty, would be probably the alternative option of investing in productive human capital and improving equity in access as well as reducing the interregional flows to private providers with increased expenses or to the ESY hospitals in urban areas. This would exacerbate their demand pressure and the waiting lists. In addition, a routine use of telemedicine could link the remote areas with specialized medical centres, as suggested by a lot of authors (Healy & McKee, 2004; Simoens & Hurst, 2006).

Moreover, with respect to access, for the future it is important:

- To directly inquire how rural beneficiaries’ use rates can be related to rates for urban beneficiaries and whether rural areas have fewer local physicians per capita than urban areas.

- To attain a thorough understanding of recipients' perspectives and individuals who provide health care in different areas of the country, particularly, in diverse rural areas.
- To focus on diversity within rural areas with regard to rural patients' satisfaction concerning access and quality.
- To inquire into the reasons why patients travel to urban areas for receiving care: In some cases, they do so because of the lack of local providers; in other cases, they select to bypass local providers for urban providers, as well as the specific health care services they demand for travelling.
- To direct additional predictors of regional disparities in health care use such as:
 - ✓ Different rates of poverty after adapting the cost of living among rural and urban areas.
 - ✓ Different share of population over 65 and for those over 85 among urban and rural areas.
 - ✓ Characteristics of rural areas population: whether rural recipients are of older age or sicker, or constantly live in communities with higher percentage of poverty as opposed to the urban areas.

Controlling the role of OOP expenses and informal payments as a significant financial barrier to access health care services

As far as it concerns *the role of OOP expenses as a financial barrier* to access health care services, our findings - similar to limited evidence - indicate that OOP expenses and informal payments constitute a serious problem of the Greek health care financing system. Furthermore, our findings of OOP expenses and mainly informal payments, especially for specialist and inpatient care irrespective of ability to pay, SHIF coverage and region of residence, indicate that OOP payments could be a serious barrier to access health care and a heavy burden on individual and household incomes. The problems get worse due to the economic crisis the country is currently facing. As a lot of authors have pointed out, given the incomprehensive and uneven development of health coverage and the lack of a rational pricing and remuneration policy, informal payments were developed as complement to public funding (Brian-Abel Smith et al (1994); Mosialos et al, 2005; Liaropoulos et al, 2008). Provided the Greek evidence that informal payments concern patients' attempt to bypass waiting lists or ensure better quality of service and more attention from doctors, it is obvious that there is no simple solution, especially during the era of the economic crisis.

To address drivers of OOPPs and informal payments, wide policies are needed, as following.

- Supplemented private insurance along with a universal health insurance system could be introduced in order to provide cover for faster access, better quality of services and increased consumer choice in the public sector, based on income and ability to pay and limit informal payments (Kaitelidou et al, 2013) Complimentary or duplicate coverage is also possible (Looper M, 2009).
- Certain mechanisms that will increase the accountability and transparency of the whole health system should be developed in order to maximize the success of any efforts to control and eliminate informal payments. According to the last study of European Commission on corruption in the healthcare sector (EU, 2013), the Greek government – similar to other Member States, is indicated to:
 - ✓ To apply self-regulation, for instance through a Code of Conduct or Code of Ethics of the industry.
 - ✓ To ameliorate transparency in healthcare system, for example by publication of waiting lists (and queuing times).
 - ✓ To ameliorate transparency in the relation between the industry and healthcare providers which can be initiated by either the sector itself or government policies.
 - ✓ Furthermore, to induce physicians to prescribe generic instead of brand medicines as a good transparency enhancing policy.
 - ✓ To motivate – independent – media involvement, ‘civil society’ watchdogs and patient groups to find out and report on informal payments and corruption. Moreover, to make them organise awareness campaigns and fraud reporting as good examples of mobilisation of countervailing powers.

Given that little research has been carried out, systematic research is recommended to explore the scope, scale, the impact of informal payments in the healthcare sector and possible policies to limit it.

- It is also important to systematically evaluate the policies and their impact in order to facilitate successful implementation under the current circumstances of economic crisis.

Priority areas – next steps in reducing health care inequalities among the elderly

In a nutshell, following the aforementioned international priority areas for action to reduce health care inequalities among the elderly, Greece - similar to other EU and OECD

countries- need to adopt schemes or mechanisms to successfully generate universal health care coverage for ageing population that include action in the following key areas: (i) aligning health systems with the needs of the older populations, by developing and ensuring access to services that provide older-person centred and integrated care; (ii) developing systems for providing long-term care – an important issue due to inexistence of LTC in Greece with a rapidly ageing population; (iii) creating age-friendly environments by combating age-based stereotypes, protecting the rights of older and enabling autonomy; (iv) improving understanding and monitoring of age-related needs, issues and determinants of healthy ageing. Overall, in all schemes and systems, an attempt should be made to provide at least essential benefits for the elderly to ensure them access to affordable services and financial protection. In addition, more mechanisms related social protection systems should be developed to identify and close more gaps in coverage to achieving equitable access, based on key policies such as:

- ✓ Universality of social protection coverage based on financial solidarity via development of tailored benefit packages; abolition of co-payments and user fees for the most vulnerable in order to limit the burden of OOPPs; and
- ✓ Coordination and coherence of existing social protection schemes in order to built a well-designed social safety net based on effective and efficient administration and fiscal sustainability.
- ✓ Placing more emphasis on local solutions via the involvement of local people and communities as a key factor in shaping priorities for action on social determinants in eliminating inequalities in health care

Moreover, we believe that the orientation of the Greek fragmented health system designed to provide acute care, to an integrated care system among levels and services focus on the needs of older population is crucial. In addition, the establishment of statutory LTC (including policies for coordinating health and social needs of the elderly) based on ensuring equitable access to and utilization of care services will provide a real safety net for older people– and their families. It will also help to share the risk of catastrophic health-care costs, reduces burdens on families and promotes social cohesion. Moreover, supplemented private insurance along with a universal health insurance system could be introduced in order to provide cover for faster access, better quality of services and increased consumer choice in the public sector, based on income and ability to pay and limit informal payments.

In addition, without a clear understanding of the cause of the causes of inequities in health, action is likely to be ineffective, project-driven and inappropriately targeted at the bottom of the social gradient. Proportionate universal policies and action focused on the social determinants of health across the life-course require clarity of understanding, a defined strategy and concerted leadership across key agencies to be effective.

Overall, the investigation and measurement of inequalities in health care use the period preceding the current economic downturn (with reference from 2003 till 2008), could help health policy-makers to examine the impact of the crisis on equitable access to health care services, and the reforms implemented in the Greek health sector during the last eight years, under the imposition of public health spending restrictions and specific operational policy measures, that seems to ignore the citizen/patient side. This perspective is important, since 2009 the public health sector is called upon to meet the increasing needs of the population with decreasing financial resources, leading to negative effects, particularly for those most at risk of vulnerability, as the older population, especially in terms of increased restrictions on access to quality health and social care.

7.4 Future research agenda

The Greek healthcare system in the last twenty years is at least a continuous process of "transition" and ongoing structural and organizational changes. Given the current weaknesses of the Greek NHS with regard to organization, coverage, funding and delivering health services, it will undoubtedly continue to experience changes and reforms. Therefore, future research agenda is useful to enrich more the existing literature for inequalities in health care use among older population in Greece.

- It would be ideal to re-estimate and re-analyse the SHARE survey results using data collection after the 2004 baseline wave. Since 2004, Greece conducted the second wave of SHARE data collection in 2006, and the third wave of SHARElife data in 2008-09 that is focused on the collection of detailed life-histories of respondents who participated in previous waves. Thus, we could conduct another study based on either cross-sectional or longitudinal data of SHARE survey that will permit to address our research issue of inequalities in health care among the elderly on “an ongoing large-scale cross-national study with a longitudinal perspective” (SHARElife, 2010). We could examine the SHARELIFE survey conducted in 2009 as a unique cross-national survey that complements the SHARE data of Wave1 in 2004 and Wave2 in 2006 by providing life history information to enhance our understanding of how early life experiences and events throughout life influence the circumstances of older people.

- Furthermore, we could investigate inequalities in health care use based on the dataset of Household Budget Survey conducted annually since 2008 till 2014 by the National Statistical Authority of Greece under the coordination of Eurostat. The Household Budget Survey provides high-quality statistical information on expenditure on health care recorded on a household rather than on an individual basis. Therefore, future analysis of household budget survey dataset since 2008 either on cross-sectional or on longitudinal basis, will provide a unique opportunity to address our research topic to the economic crisis period. Given the major health care initiatives undertaken during the economic crisis since 2010, in particular the reduction in economic resources via income significant reduction and reduction in health insurance coverage, using the household budget surveys data, we could learn a lot about the effects of these reforms on the health care utilisation behaviour and the well-being of Greek elderly citizens.
- Another significant issue of future research agenda that it would also be worth thinking is how the results generated from the application of CI and the methods of measurement of health inequity can be related to policy implication. Further research is required to correlate the method of measuring inequity and inequalities via CI with the particular features of the elderly population in Greece and convey the conclusions to policy makers.
- Finally, the indicator of care quality could also be included in future research agenda. Comprising some measures of quality of care (i.e. waiting times) would be crucial so that we can realise in depth to fully realise the nature and extent of existing inequalities. It is worth mentioning that the indicator of care quality has never been examined in the existing evidence for inequalities in health care use in Greece.

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APPENDICES

Chapter One: Tables 1.2 - 1.5: Evidence for inequalities in utilisation of health care in Greece

**Table 1.2 Evidence for inequalities in utilisation of health care in Greece - EU Comparative studies with the participation of Greece
(Income-related inequalities)**

Study	Data and year the data refer to	Method	Subject	Measures	Results for General Population	Other Results	Notes
Bago d' Uva T., Jones A. and Van Doorslaer E. (2009)	Comparative Study - European Community Household Panel (ECPH) for Greece 1994 - 2001 (pooled analysis)	Econometric estimation (measure: number of contacts, variations in time)	Short -term and long-term inequalities in the use of physician visits	GP visits: Medical specialist visit:	1. pro-poor inequalities 2. pro-poor short run 3. pro-poor long- run 1. pro-rich inequalities in all waves 2. Long-run pro-rich inequality for specialists visits	The average short-run HIs underestimate long run inequity by a proportion ranging from 6% (Greece) This suggests that not only richer individuals tend to use more specialist care in the short-run (controlling for need), but also that individuals moving up in the income distribution over time tend to visit a specialist more often than those moving to the opposite	Since there are few GPs that do not act as gatekeepers in Greece, the results for GP visits should be treated with caution.
Bago d'Uva T. & Jones A. (2009)	Comparative Study - European Community Household Panel (ECPH) for Greece 1994 - 2001 (pooled analysis)	Econometric estimation- latent class (LC) hurdle for modeling individual effects. (measure: total contacts, variations in time)	The effects of income on probability and total use of GPs, on probability and total use of specialist visits - inequalities in the use of physician visits	probability and total number of GP visits: probability and total number of specialist visit:	1. Slightly pro-rich (almost zero) inequity 2. insignificant but positive elasticity of income effects on total number of GPs visits 1. pro-rich inequity 2. Large income elasticities of the expected (total) number of specialist visits	Insignificant but positive elasticity of income effects on total number of GPs visits. Large income elasticities of the expected (total) number of specialist visits	since there are few GPs that do not act as gatekeepers in Greece, the results for GP visits should be treated with caution

Study	Data and year the data refer to	Method	Subject	Measures	Results for General Population	Other Results	Notes
Bago d' Uva T., Jones A. and Van Doorslaer E. (2007)	Comparative Study - European Community Household Panel (ECPH) for Greece 1994 - 2001 (pooled analysis)	econometric estimation (measure: total contacts, variations in time)	Short -term and long-term inequalities in the use of physician visits	GP visits: Medical specialist visit:	1. pro-poor inequalities 2. large variations across time (in waves 3,5,6,8: less pro-poor), (in waves 2, 4: larger pro-poor) 3. pro-poor long-run income inequalities 1. pro-poor inequalities in all waves 2. Long-run pro-rich inequality	1. pro-poor long-run income inequalities for GP visits 2. Long-run pro-rich inequality for specialists visits	Since there are few GPs that do not act as gatekeepers in Greece, the results for GP visits should be treated with caution
Van Doorslaer E., Masseria C. and Koolman X. (2006)	Comparative cross sectional Study - ECPH for Greece 2000	Econometric estimation (two measures: annual mean; probability of contact)	Income-related inequality in the use of physician visits in 21 OECD countries	total physician visits: GP visits: Medical specialist visit:	No inequity in the annual probability 1. low proportion visiting GP 2. Pro-poor pro-rich		Since there are few GPs that do not act as gatekeepers in Greece, the results for GP visits should be treated with caution.
MasseriaC., Koolman X., Van Doorslaer E., (2004)	Comparative Study -European Community Household Panel (ECPH) for Greece 1994 - 1998 (pooled analysis)	econometric estimation (three measures: total contacts, probability for one contact, and (conditional) number of subsequent visits)	1. Long-run inequity in the use of inpatient care 2. Impact of inter-regional differences and bed availability (supply side factor) on inequity	Hospital (inpatient) care utilization: Medical specialist visit:	1. pro rich inequity relevant to regional disparities 2. pro need inequity for inpatient care relevant to the total number of specialist visits 3. significant pro rich inequity for inpatient care relevant to non-elective care (after standardising for specialist visits) pro rich and higher educated income-related inequity for specialist visits. 3. No supply-based inequity	1. pro rich inequity for inpatient care relevant to regional disparities 2. pro rich and higher educated income-related inequity for specialist visits. 3. No supply-based inequity	
	Comparative	econometric	income-related	GP visits:	pro poor inequity		Since there are

Study	Data and year the data refer to	Method	Subject	Measures	Results for General Population	Other Results	Notes
Van Doorslaer & Masseria (2004)	cross sectional Study - European Community Household Panel (ECPH) for Greece, 2000	estimation (two measures: total contacts and probability for one contact)	inequality in the use of medical care in 21 OECD countries	Medical specialist visit:	1. pro rich, 2. higher educated, 3. pro-rich regional disparities income-related inequity	For specialists visits: 1. higher educated income-related inequity 2. pro-rich regional disparities	few GPs in Greece - the results for GP visits should be treated with caution.
				Hospital (inpatient) care utilization:	no income related inequity / slightly pro poor	For inpatient care: some pro rich regional contribution to income inequity (the richer versus poorer regions & the urban versus rural regions –Athens)	
				Dental care:	strong pro rich inequity		
van Doorslaer, Koolman, & Jones (2004)	Comparative cross sectional Study - European Community Household Panel (ECPH) for Greece 1996	econometric estimation (three measures: total contacts, probability for one contact, and (conditional) number of subsequent visits)	income-related inequality in utilization of GPs and specialists	GP visits:	probability of contacting a GP: slightly pro rich	Since there are few GPs that do not act as gatekeepers in Greece, the results for GP visits should be treated with caution.	
				Medical specialist visit:	For the probability of contacting a specialist: significant pro rich income-related inequity		
				Hospital (inpatient) care utilization:	(after need standardization): no inequity – Related to how hospital care is distributed		
				For the probability of any inpatient care use (at least one night)	(before standardizing for need): pro poor		
van Doorslaer, Koolman, & Puffer (2002)	Comparative Study - European (ECPH) for Greece 1996 (cross sectional)	Econometric estimation (total contacts, probability for one contact; and number of subsequent visits)	1. income-related inequality in use of GPs and specialist 2. Impact of private health insurance and regional disparities on inequity	total physician visits:	1. Significant pro rich income-related inequity 2. Slightly pro poor inequity in total doctor visits, after adjusting for Private Medical Insurance coverage 3. Slightly pro inequity in total doctor visits, after adjusting for regional disparities	Significant horizontal inequities related to regional disparities in doctor visits and not related to need	
				Medical specialist visit	pro-rich		

Chapter One: Table 1.3 Evidence for inequalities in utilisation of health care in Greece - EU studies with the participation of Greece

(*Barriers to access*)

Study	Data and year the data refer to	Method	Subject	Measures	Results for General Population	Other Results	Notes
Rodrigues, R., et al (2013)	Comparative Study - EU-SILK for Greece 2006 , 2011	Descriptive	Descriptives of unmet and enforced unmet need between 2006 and 2011	Enforced unmet need for medical examination	The most important reason in 2011 was the cost (more than 60%)	The percentage of people reporting cost as a barrier is highest in Greece (31%), even though financial barrier is not the first reason	Greece is the top one country versus EU-27 confronting accessibility problems when visiting a specialist
				Enforced unmet need for medical examination by income	people on low income tend to report more enforced unmet needs than higher earners		
Anderson et al - Eurofound (2012)	Comparative Study - cross-sectional The Third European Quality of Life Survey (2011)	Descriptive - and nationwide	Reasons for difficulties of access to doctors	Financial barrier -Cost of seeing the doctor ("Reporting very difficult")	1. 64% Reporting difficulty 2. Pro poor Reporting "very difficult"	1. Greece features in the top three countries with problems caused by all five types of problems. 2. If we rank the barriers to access, the most frequent barriers are waiting time and delay in getting appointment, financial barrier (cost) is the third reason, and distance to doctor is the forth barrier	Some of the dimensions of quality of life are measured with narrower set of indicators than could be used in highly specialized surveys.
				Geographical access - Distance to doctor's office/hospital (Rural - Urban Differences)	45% reporting difficulty		
				Waiting time to see doctor on day of appointment	66% reporting difficulty		
				Delay in getting appointment	67% reporting difficulty		
				Finding time because of work or care	39% reporting difficulty		
Eurofound (2013)	Comparative Study - Analysis of EU-SILK macro data from 2007 to 2011 (pooled analysis)	Descriptive - and nationwide	Determinants of unmet needs	Financial barrier -Cost	1. Greece has the highest reporting cost (43%) 2. Larger problem in urban areas 3. Per unemployed people 4. Per migrants		Some of the dimensions of quality of life are measured with narrower set of indicators than it could be used in highly specialized surveys.
	Comparative Study - Analysis of the third European			Geographical access- Distance to doctor's office/hospital (Rural - Urban Differences)	1. More difficulties (27%) because of distance in 2011 than 2007 (22%) 2. The proportion of people		

Study	Data and year the data refer to	Method	Subject	Measures	Results for General Population	Other Results	Notes
	Quality of Life Survey 2012				reporting unmet need almost tripled between 2007 and 2011.		
				Waiting time to see doctor on day of appointment	Reporting difficulty (11% for general population; 14% for disability persons)		
				Delay in getting appointment	1. Reporting increased difficulty in 2011 than in 2007. 2. High trade off between getting an appointment and affordable access		
Koolman, X. (2007),	EU Statistics on Income and Living Conditions (EU-SILK) for Greece 2004 (cross- sectional)	econometric estimation (measures: unmet need for medical examination / treatment)	1.Unmet need by cause 2.Inequalities in unmet in relation to: income; education; degree of urbanisation;	Unmet need by cause	1. Cost is the most important cause (58%) on average 2. Distance difficulty (10%) 3. Watchful waiting (9%) 4. Waiting lists (7%), 5. Lack of time (7%)	5.2% of the sample claims unmet need during the last 12 months.	
				Unmet need by income	Pro-poor unmet need; Unmet need is (strongly) concentrated among the lower income househ.	Income inequalities are larger than other inequalities.	
				Unmet need by education	No inequity. Educational level does not affect unmet need		
				Unmet need by degree of urbanisation	1. Slightly favoring urban areas 2. People in more urban areas are insignificantly slightly more likely to report unmet need		
				Unmet need by country of birth	1. Slightly favouring immigrants	Citizens born out of the EU had a significant and comparatively large greater probability of reporting unmet need compared to natives.	
Anderson - Eurofound, (2004)	Comparative Study - European Quality of Life Survey 2003 (cross sectional)	Descriptive and nationwide	Cost sharing - Financial barrier	Cost of seeing the doctor ("Reporting very difficult")	Pro poor Reporting "very difficult" (30% of lowest income quantile v. 13% of highest		
			Geographical access	Distance from doctor's office/hospital (Rural -	Reporting difficulty	No association of household size and assessment of	

Study	Data and year the data refer to	Method	Subject	Measures	Results for General Population	Other Results	Notes
				Urban Differences)		quality	
			Waiting times	Waiting time to see doctor on day of appointment	Reporting difficulty	No association of number of children and assessment of quality	
			Delay	Delay in getting appointment	Reporting difficulty		
Alber & Kohler (2004)	Comparative Study - Eurobarometer (1999, 2002)	Descriptive, nationwide	Geographical access	Geographical proximity to hospitals	1. Greece at the bottom of the distribution of EU-15. 2. 96% of the Greek population need less time than one hour to get to a hospital at the distribution of EU-15	1. Only 40% of the long-term ill find quick access to a doctor. 2. There is more variation with respect to proximity to GPs than with respect to proximity to hospitals. 3. Higher proportions of the populations have faster access to hospitals than to GPs. 4. Almost no difference in access to hospitals by income. 5. Only 40% of the long-term ill find quick access to a doctor	1. Since there are few GPs that do not act as gatekeepers in Greece, the results for GP visits should be treated with caution. 2. The income measure has a lot of limitations in Eurobarometer and needs to be treated in caution
				Geographical Proximity to hospitals by income - Difference between lowest and highest quartile	Almost no difference in access to hospitals by income (8,5% difference in Greece versus 15% in EU-15)		
				geographical proximity to GPs (% having access in less than 20 minutes)	Greek people report the highest proportion in EU-15 with very difficult access		
				geographical proximity to GPs by income	Small difference in access to GPs by income (14,9% difference in Greece versus 2,7% in EU-15)		

Chapter One: Table 1.4 Evidence for inequalities in utilisation of health care in Greece - Greek studies
(determinants of health care utilisation)

Study	Data and year the data refer to	Method	Subject	Measures	Results for General Population	Other Results	Notes
Souliotis K. et al, (2016)	Cross-sectional, nationwide, telephone study (2011) For the impact of informal and OOPPs: the nationwide sample is extrapolated to the results of the 2012 Household Budget Survey	Descriptive nationwide - binary logistic model Overall OOP and informal payments for Hospital care (private vs public) Overall OOP and informal payments for PHC (private specialists vs public HCCs and SHIF visits)	Utilisation and informal and OOP payments (OOPPs) for private and public health services (PHC and hospital)	Both public and private health care services (a) Private clinics: Higher OOPPs but lower informal payments versus (b) Public hospital care: less OOP but more informal (32.4% of OOPPs are informal in public hospitals)	<ul style="list-style-type: none"> 1. Pro-poor, women, older age: 66+, lower education, residents of Attica 2. More inpatient care in public hospitals than private clinics <ul style="list-style-type: none"> 1. Men, younger groups, residents of rural areas, pro-rich, higher educational level 2. More private PHC than private hospital care <ul style="list-style-type: none"> (a) Private clinics: Higher OOPPs but lower informal payments versus (b) Public hospital care: less OOP but more informal (32.4% of OOPPs are informal in public hospitals) <ul style="list-style-type: none"> 1. Higher informal (under-the-table) payments to private PHC (specialists and dentists) versus public PHC (HCCs and SHIF visits) 	The majority 58% of health care recipients paid OOP.	<p>It is a telephone survey and has a complicated study design, as the nationwide sample is extrapolated on the results of the 2012 HBS. The results should be treated with caution.</p> <p>Reasons for informal payments to hospital care:</p> <ol style="list-style-type: none"> 1. To ensure better care: 24% for private versus 20% for public hospitals 2. Patient gratitude: 4% for private vs 13.6% for public hospital care <p>Reasons for informal payments in PHC:</p> <ol style="list-style-type: none"> 1. Ease of access and reduction in waiting times (70.6% for SHIF visits and 86.6% for private PHC-diagnostics) 2. Higher quality care: 13.4% for private PHC-diagnostics and 29.4% for SHIF visits

Study	Data and year the data refer to	Method	Subject	Measures	Results for General Population	Other Results	Notes
				Informal and OOPPs for public sector: (a) hospital care and (b) PHC: HCC physician and SHIF physician.	1. 26.04% OOPPs for public hospital care (32.4% are informal payments) 2. Informal payment for public PHC: 12.2% for HCC physician visit and 10.6% for SHIF physician visit.	Economic impact of OOP and informal payments: 1. Significant impact (46.6%) 2. Medium impact (22.8%) 3. Small impact (23.3%) 4. Neutral (7.4%)	
				Informal and OOPPs for private sector: (a) private clinics and (b) specialists and dentists	1. Higher OOPPs to specialists and dentists (36%) than private clinics (13.5%) 2. (28% of OOPPs are informal (under-the-table) to specialists and dentists.	1. The majority (55.8%) of those with bad financial status made informal payments. 2. Informal – hidden payments were estimated 28% of households' health expenditure or €1.5 billion for 2012	
Grigorakis et al (2016; 2014)	Cross-sectional, nationwide (2013)	Descriptive qualitative nationwide - based on documentation and interviews	The relationship between OOPs and SHI funding for private hospitalization. Moreover, the catastrophic impact of OOPs on individuals' living standards.	1. Costs (SHI and OOP and informal) in private clinics/ hospitalisation; 2. funding arrangements, (SHI, and categorization of OOPs.	1. SHIF- EOPYY covered only 47.3% of the total hospitalization cost; 2. the rest 52.7% was OOP expenses with the average OOP amount €1655.24 paid to surgeons; 3. Informal total payments to physicians is greater than 13% of overall inpatient OOPs.	1. The effect of OOP on the household income: 10% made OOP hospital payments that exceeded one quarter of their annual wage or pension income	Included only private hospitals in main urban areas and excluded rural population – such as farmers.
Economou C (2015)	Cross-sectional WHO qualitative nationwide study on barriers in access to health services (2014)	Descriptive qualitative nationwide - based on interviews and focus groups discussions with Tanahashi framework	Barriers in access to health services, with a focus on barriers experienced by socially excluded populations and other vulnerable/high risk groups.	Geographical access and regional disparities	1. Significant regional disparities favouring the residents of rural regions- who are less advantaged. 2. Interregional variations in hospital services favoring the residents of rural areas that have to travel to seek hospital care at urban areas. 3. geographical proximity barrier to inpatient care		

Study	Data and year the data refer to	Method	Subject	Measures	Results for General Population	Other Results	Notes
		methodology		Financial Barrier to access (OOP and Informal Payments) and affordability	1. Large increases in OOP expenditures for: medical prescriptions; unlisted drugs; and laboratory tests. 2. Informal OOPPs for timely and qualitative access to inpatient care.		
Zavras D et al (2014)	Cross-sectional, nationwide – based on WHO Multi-country Survey Study for assessing PHC 2006	Descriptive nationwide – logistic regression model	Socioeconomic determinants of utilisation of the Greek PHC services	Number of PHC physician visits	1. Younger age; women; 2. Less than good SAH; chronic conditions; 3. Lower income groups (pro-poor) 4. Residents of Attika		Not discrimination between public and private PHC visits
Kaitelidou et al (2013)	Cross-sectional, nationwide (2013)	Descriptive nationwide (3 provincial and 1 general hospital in Athens) - binary logistic model	Socioeconomic determinants of OOP and informal payments for obstetric services in 4 public hospitals	Total informal payments (probability and amount)	1. 74% of women paid informally 2. Living in Athens 3. Higher educational level 4. Higher income 5. Mean total private payments were €1549: mean informal payment of €848; and a mean formal OOPP of €701	The most common reason for under-the-table payment was the obstetrician's request (56.3% of respondents).	Small sample size
Pappa E. et al, (2013)	Cross-sectional, nationwide (2010)	Descriptive nationwide - binary logistic model	Socioeconomic determinants of unmet need in the Greek primary health care services (PHC)	Unmet needs for health services (family doctor, specialist, medication)	Pro-poor, cost -financial barrier, young age: 25-34 group	Distribution of reasons for unmet needs: 1. Accessibility (33.6%) 2. Cost (25.4%) 3. SHIF coverage (5.2%) 4. Distance (3.0%)	
Kentikelenis et al (2011)	Comparative- EU Statistics on Income and Living Conditions (EU-SILK) for Greece 2007 - 2009 (pooled analysis)	Descriptive - nationwide (Logistic Regression Model- they created a financial crisis dummy variable)	Socioeconomic determinants of unmet need in health and health care in Greece-effect of the economic crisis	Unmet need for medical physician examination or treatment	1. Significant increase in people reporting that they did not go to a doctor or dentist despite feeling that it was necessary 2. Not related to inability to afford ; 3. Related to: long waiting times; travel distance to care;		The analysis is based on the creation of a financial crisis model and its results should be treated with caution.

Study	Data and year the data refer to	Method	Subject	Measures	Results for General Population	Other Results	Notes
					waiting to feel better; and other		
				1. Supply-side problems 2. Bribes	1. About 40% cuts in hospital budgets; understaffing, reported occasional shortages of medical supplies, and bribes given to medical staff to jump queues in overstretched hospitals; 2. Rise in admissions to public hospitals of 24% in 2010 compared to 2009; and 8% in the first half of 2011 compared with the same period of 2010. 3. Decline 25–30% in admissions to private hospitals		
Tountas et al, 2011	Cross-sectional nationwide household survey Hellas Health I (2006)	Descriptive - Nationwide - Logistic regression model	Socioeconomic determinants of utilisation of the Greek primary and hospital health care services	Family physician visits for primary health care	1. Higher SES more likely – pro rich 2. Higher educational level 3. Pro – voluntary private health insurance (PHI)	Pro rural areas -	The institution of the family doctor is not well established –due to inexistence of GPs, and people who consult a single provider regularly –ie a specialist may consider him as their ‘personal’ or ‘family’ doctor.
				Specialist visits	1. Higher SES more likely – pro rich, Men, chronic illness 2. Pro -Higher educational level 3. Pro – voluntary private health insurance (PHI)	Pro rural areas favor specialist visits	
				Total physician (PHC) visit	1. Higher educational level 2. Pro – voluntary private health insurance (PHI)	Pro urban areas - Residents of urban areas favour any PHC physician visit	
				Inpatient admission	1. No income related 2. Higher educational level		
				OOPPs during visits to health care professionals	1. Residents of rural areas favour OOPPs 2. VHI owners favour OOPPs		

Study	Data and year the data refer to	Method	Subject	Measures	Results for General Population	Other Results	Notes
Lahana E., Pappa E. & Niakas D. (2011)	Cross-sectional, regional (2006)	Descriptive - regional (Thessaly region – Central Greece) -Logistic regression model	Socioeconomic & ethnicity determinants of utilisation of the Greek primary and hospital health care services	Social Health Insurance Fund (SHIF) physician visits for primary health care	1. Pro-higher educated; Greeks 2. More residents of urban areas. 3. In urban areas, the middle-aged visit a private doctor and the elderly (65+) to visit a SHIF physician.	Higher educated residents and higher income residents of rural areas favor SHIF physician visits	The study has small size and its findings need to be treated in caution.
				Specialist private practitioner visits	Pro -rich	Pro-rich in rural areas favour specialist visit	
				Outpatient department visit	1. More immigrants 2. Lower-educated		
				Inpatient admission	Pro rich	Pro rich favour inpatient admission two times more than pro poor	
Tountas Y, Oikonomou N. (2011)	Cross-sectional nationwide household survey Hellas Health I (2006)	Descriptive - Nationwide	Primary health care use of rural population	PHC services visit of rural residents versus urban residents	1. Rural/semi rural residents: • The majority (31.8%) make a private PHC visit; • 15.7% visit a private doctor contracted to SHIF at urban regions; • 13.7% visit Insurance Fund' (SHIF) polyclinic; • 15.3 % make hospital outpatient visit at urban areas	Urban residents: • The majority (28.9%) visit a private doctor contracted to SHIF; • the (28.1%) visit a SHIF's polyclinic physician • 24% visit a private doctor; • 11.9 % make a hospital outpatient visit	
Brokalaki et al., 2011	A cross-sectional study conducted during a 2-year period (2006 to 2008) in two large tertiary hospitals in Greece	Descriptive – Medical exam & interview (Athens urban setting versus Crete Island – rural)	Factors that delay hospital arrival among patients with acute myocardial infarction (AMI)	patients' proximity to health units associated with delays in treatment	The risk of delayed hospital arrival when the AMI occurred was almost 20 times greater among patients who reported a main residence located more than 10 km from the nearest hospital.		
Koetsi-Kounari H et al (2011)	Cross-sectional, nationwide (2010)	Descriptive - Nationwide - Logistic regression model	Socio-demographic and health-related lifestyle	Dentist visits the past 12 months	1. Younger age (<56 years) 2. High SES (higher educational level)	Healthier diet and physically active and low obesity	

Study	Data and year the data refer to	Method	Subject	Measures	Results for General Population	Other Results	Notes
			determinants of the use of dental services				
Pavi E et al (2010)	Cross-sectional, nationwide (2010)	Descriptive - Nationwide - Logistic regression	Social determinants of dental health services use	Dentist visits the past 12 months	1. Pro-need 2. Lower income correlates to lower number of dental visits	Having visited for treatment (rather than for prevention) correlated to higher number of dental visits	
Oikonomidou E. et al, 2010	Cross-sectional, nationwide, mail study (2007)	Descriptive - Nationwide – mail study- via the opinion of RS's physicians.	Evaluate the number of GPs serving in the NHS regional RS (practices) and their working conditions in terms of personnel and equipment	Proximity as a barrier to access the RS of the NHS- HCCs	1. The average distance of the RS from the HCC is 24 km and from the local hospital 35 km. 2. The majority (87.9%) of the rural doctors perform home visits, as the older – mainly – patients have difficulty in arriving at the RS	26 consultations were reported on average per day, with GPs – who overall are very few, reporting more consultations as compared with the non-specialized doctors.	Mail study with low response rate 40.3%.
Marinos G et al, 2009	Cross-sectional, urban setting in ED of a big University Hospital in Athens (2006)	Descriptive – qualitative evaluation of medical records for patients attending Hospital ED in 2006.	Evaluation of medical records for patients attending the ED – outpatient Department of a big University Hospital in Athens with respect to the necessity for hospital rather than GP attendance. They were classified into 6 groups.	The total number of patients who visited the ED was classified into 6 groups Medical records for patients Athens' ED – outpatient visits.	1. Of these, mean age was 65.6 years and (17%) residents of rural areas and visited the hospital with or without a referral from a private physician. 2. Almost one in three patients in specific surgical specialty groups, could have been managed by a GP.		
Vasileiou I. et al, (2009)	Longitudinal, urban setting study in ED of a	Descriptive – qualitative	Evaluation of medical records for	The total number of patients who	1. Of these, (52.6%) were men 2. Increased outpatient visits not		

Study	Data and year the data refer to	Method	Subject	Measures	Results for General Population	Other Results	Notes
	big University Hospital in Athens retrospective evaluation 2001-2006, (2006)	retrospective evaluation of medical records for patients attending Hospital ENT ED (Jan. 2001 –Jan. 2006).	patients attending ear, nose or throat (ENT)- ED of a big University Hospital in Athens with respect to the necessity for hospital rather than PHC-GP attendance.	visited the Athen's Hospital ENT-ED Jan. 2001- Jan. 2006 were included retrospectively and classified into 8 groups.	associated with income 3. Of these, 40% in ENT specialty groups could have been managed by a PHC-GP attendance.		
Siskou et al, (2008)	Cross-sectional, nationwide study (2005)	Descriptive - nationwide; For the OOPPs: the nationwide sample is applied to the results of the 2005 Household Budget Survey	Socioeconomic determinants of utilisation of the private health care services in Greece and distribution of the OOPPs	Outpatient services (frequency of use)	1. Not related to income level. 2. Lower educational level tend to visit doctors in surgical specialties privately more often 3. Rural dwellers seek private outpatient care more often.	1. 66% of total household health expenditure is for outpatient care (31.1% for dental services) 2. Private facility is higher among families of higher income and those with private insurance coverage	It has a complicated study design, as the nationwide sample is applied on the results of the 2005 HBS. The results should be treated with caution.
Liaropoulos L. et al (2008)	Cross-sectional, nationwide, telephone study (2004)	Descriptive - nationwide; telephone survey	Socioeconomic determinants of informal payments (OOPPs) for public hospital services	OOPPs for admission to	1. 4:10 respondents reporting pay OOP to doctors for at least one admission to public hospitals. 2. The size of OOPPs is not related to SES 3. Paying OOP is 2.73 times higher for patients undergoing a	1. 36% of those treated in public hospitals had at least one informal payment to a hospital doctor; 2. Admissions through normal procedures is 3.38 times higher for patients waiting	It is a telephone survey and the results should be treated with caution.

Study	Data and year the data refer to	Method	Subject	Measures	Results for General Population	Other Results	Notes
				public hospitals	surgery procedure compared to non surgical cases.	for 10 days compared to those waiting a day or less; 3. 72% greater probability of people wishing to avoid a waiting list compared to the standard admission procedures and 13.7% higher for patients requiring surgery 4. 48.5% of admissions were labeled as emergencies.	
Matsaganis M., Mitrakos T., Tsakloglou P. (2008)	Cross-sectional, nationwide, Household Buget Survey (02/2004 - 01/2005)	Econometric estimation- Comparing two-part models and generalised linear models	Determinants of OOPPs - Modelling household expenditure on health care in Greece	Household expenditure (OOPPs) on all health care	<ol style="list-style-type: none"> Households with PHI spend almost twice as ones without PHI. For elderly households, high spending on health is not related to income. Non Noble OGA SHIF elderly beneficiaries' households spend more than other SHIFs. Residents of urban regions pay higher OOP for all health care 	<ol style="list-style-type: none"> Elderly households spent on health (12% to 13% of budget shares); Only 10.7% of all individuals in the survey have 0€ expenditure on any health care at all. The top 1% of cases account for 14.0% of all health expenditure 	
Geitona M., Zavras D.,	WHO Multi-country Survey Study (mail	Descriptive - Nationwide	Socioeconomic determinants of utilisation of the	Number of PHC visits	<ol style="list-style-type: none"> Less than good SAH; women; Income affects only pro-poor (lower income groups) 	Residents of Epirus favour PHC physician visit	Mail survey: Less than 40% response

Study	Data and year the data refer to	Method	Subject	Measures	Results for General Population	Other Results	Notes
Kyriopoulos J. (2007)	survey) (2002) (cross sectional)		Greek primary and hospital health care services	Number of inpatient admissions	<p>3. Residents of Central Greece & Epirus</p> <p>1. Poor SAH, 2. Pro Non Noble SHIFs (mainly OGA); 3. Favoring residents of Peloponnese region</p>	1. Pro Non Noble SHIFs (mainly OGA) are more likely to make inpatient admissions; 2. Residents of Peloponnese region more likely to have inpatient	rate - caution in interpretation
Koletsi-Kounari H et al (2007)	Household Budget Survey of the National Statistical Service of Greece between 1987-1998- nationwide (pooled analysis)	Econometric estimation- Private dental expenditure was estimated using the Consumer Price Index (CPI).	Evolution of private dental health expenditure in Greece by region and income, between 1987 and 1998	Private dental expenditure	<p>1. The greatest annual dental health expenditure per capita was observed in urban areas and in 1998 it had increased by 9.4% while in semi-urban and rural areas it decreased (by 33.33% and 11.25% respectively). 2. In 1998 the more pronounced and higher income groups showed an increase of 67.2% in annual expenditure per capita</p>	Similar percentages in the distribution of dental expenditure between the geographic areas suggest that during the decade no changes have been made towards increasing the amount of dental care for members of populations in semi-urban and rural areas.	Private dental health expenditure in Greece is differentiated by income level and geographic region and these variations became more pronounced over the decade.
Pappa E. & Niakas D. (2006)	Cross-sectional, urban setting	Descriptive – urban setting (Athens area) - Logistic regression model	Socioeconomic determinants of utilisation of the Greek primary and hospital health care service	<p>Social Health Insurance Fund (SHIF) physician visits for primary health care</p> <p>Specialist private visits</p> <p>Outpatient department visit</p> <p>Inpatient visits</p>	<p>Pro-poor, Women, Elderly, Lower health status</p> <p>1. No- income related (slightly better- off favour specialist visits) 2. Pro-higher educated 5. Women, Lower health status</p> <p>1. No- income related 2. Need-related</p> <p>1. No- income related 2. Need-related</p>		

Study	Data and year the data refer to	Method	Subject	Measures	Results for General Population	Other Results	Notes
Zavras D et al (2004)	WHO Multi-country Survey Study (mail survey) (2001)	Descriptive - Nationwide	Determinants of dental utilisation	1.Any dental visit 2. Number of dental visits	1. Higher SES (higher educational level) 2. Pro-rich 3. Increased age reports lower visits 4. Better SADentalH reports lower visits	No statistically significant geographical imbalances with regard to dental services use	Mail survey: 36.4% low response rate - caution in interpretation
Economou, Karabli et al., (2004)	1998 – 1999 Household budget surveys; 1998 Social Budget of the Ministry of Labor & Social Insurance	Econometric estimation: WHO adopted utilization of Index of Fairness in Financial Contribution	Fairness of health financing in the Greek household expenses	Out of pocket payments (OOPPs) that include all categories of health related household expen.	2.44% of households in Greece face the danger of making catastrophic payments for health care		
Mergoupis (2003)	Eurobarometer (1996) (cross sectional)	Country Specific – Nationwide - Descriptive	Income, health and socio-demographic inequalities in the use of health care	Doctor contacts (no distinguish between GPs and specialists):	pro rich inequity		Income data in Eurobarometer are not carefully collected - caution in interpretation
				Hospital (inpatient) care utilization:	pro poor income inequity		
				For diagnostic care use	pro rich inequity		
Kyriopoulos et al, 2002	WHO Multi-country Survey Study (mail survey) (cross sectional)	Descriptive - Nationwide	1.General Health Status Assessment 2. Assessment of the Greek health care system responsiveness	total doctors visits	pro poor, worse health status	1.For total doctor visits: low educational level 2.no regional differences in use For specialists visits: higher educational level Pro Non Noble SHIFs (mainly OGA);	Mail survey: Less than 40% response rate - caution in interpretation
				Medical specialist visit:	pro rich, better health, higher education		
				Inpatient care:	1. Worse self reported health status 2. Not income - related 3. Lower educational level 4. Uninsured		

Study	Data and year the data refer to	Method	Subject	Measures	Results for General Population	Other Results	Notes
				Dental care:	pro rich inequity pro increased age	1.Dental visit increased with increased income 2. pro high SADH	
Sissouras A, Karokis A et al, 1996	W.H.O. – Patras European Healthy Cities programme - Phase II framework (1993-1997) - Patras Health Profile; and Patras Health Plan (1994) (cross sectional)	Descriptive – urban setting (Patras Municipality) – (measure: number of contacts and SES groups)	Socioeconomic inequalities – determinants (SES) of health and utilisation of the Patras' PHC and hospital health care services	Social Health Insurance Fund (SHIF) PHC visit Specialist private visits Outpatient department visit Inpatient care	1. No- income related 2. Slightly more visits by lower SES 1. Pro-rich; More visits by higher SES 2. Pro-poor; More visits by lower SES 3. Need-related: 4. For diagnostic tests; and medication prescribing 1. No- income related 2. Need-related		An older study conducted before the NHS-ESY reforms of 2001

Table 1.5: Evidence for inequalities in utilisation of health care among the older population in Greece - EU Comparative studies with the participation of Greece (*older population*)

Study	Data and year the data refer to	Method	Subject	Measures	Results for Elderly Population (50+ or 65+)	Other Results	Notes
Penders Y et al (2016)	Comparative, longitudinal post-death SHARE data study: Ten EU countries, SHARE Wave2- Wave 5 (2005- 2012) for Greece: Wave2 to W3 (2009).	Econometric estimation- Descriptive, nationwide, end-of-life interviews – Multilevel modelling	Determinants of OOPPs associated with healthcare in the last year of life of older adults	Total OOP costs as a percentage of median household income	<ul style="list-style-type: none"> 1. 80% of the sample paid OOP 2. Higher OOPPs (44%) for PHC (GPs and specialists) 3. 54% of the sample paid OOP for specialist care 4. Median total OOPPs is 6% of median household income (based on 2009 median household income – OECD extracted). 5. More than two ADLs had significantly higher OOPPs relative to median household income. 6. More than 3–6 months inpatient care during the last year of life had significantly higher OOP costs. 	<ul style="list-style-type: none"> 1. No Hospice use 2. Median total OOPPs (0.37) are below but close to the average total health spending. 	Recall bias as data are based on end-of-life interviews and not on real cost data; No connection of OOP costs with SHIF costs.- Caution on interpretation
Bíró A. (2014)	Comparative Study -SHARE for Greece 2004 - Wave1 (cross sectional)	Descriptive, nationwide, regression models and Two-part models	Supplementary private health insurance and health care utilization	<ul style="list-style-type: none"> 1. Likelihood of inpatient nights; GP visit; specialist; dentist 2. No of: inpatient, GP, specialist visit 	<ul style="list-style-type: none"> 1. PHI coverage increases dental visits; 2. PHI decreases (30%) GP visits; 3. PHI has little and insignificant influence on inpatient and specialist visits 		
Scheil-Adlung, X. and Bonan, J., (2013)	Comparative Study -SHARE for Greece 2004 - Wave1 (cross sectional)	Descriptive, nationwide	Incidence of OOP expenditure on private health care and LTC and impact on household gross income	Incidence of OOP expenditure on private health care as a financial barrier to access health care. Impact of OOP expenditure on the household total gross income of the elderly	<ul style="list-style-type: none"> 1. 87% of elderly households incur OOPPs 2. Prescribed medication accounts for 46% and private outpatient care accounts for 44% of this OOPP. <ul style="list-style-type: none"> 1. The poorest pay OOP 11% of their household income versus 1% of the rich. 2. Health related OOP expenditure for private health care exceeds 5% of the elderly households' income. 3. Ruinous OOP expenditure for health care affects 2% of elderly households (or 220,000 households) in Greece in 2004. 	1. Older people (80+) is less likely to visit a specialist.	Not analysis of OOPPs for public health care services and no connection of OOP costs with SHIF costs

Study	Data and year the data refer to	Method	Subject	Measures	Results for Elderly Population (50+ or 65+)	Other Results	Notes
Rodrigues, R., et al (2013)	Comparative Study - EU-SILK for Greece 2006 , 2011	Descriptive, nationwide	Descriptive of unmet and enforced unmet need between 2006 and 2011	Enforced unmet needs by age	people aged 65+ years were more than twice as likely to have an enforced unmet need as those of working age (1.89% increase among 2006 - 2011)		
Majo M. & Van Soest A. (2012)	Comparative Study -SHARE for Greece 2004 - Wave1 (cross sectional) and HRS for USA	Descriptive, nationwide – probit model (2004)	Income and health care use	Any physician visit GP visit Outpatient visit Specialist visits Inpatient stay Dental visit	Pro-poor income-related inequity Pro-poor income related inequity No clear association of income with specialist visits No clear association (slightly pro-rich) of income with specialist visits Slightly pro-rich income-related inequity Pro-rich		
Listl S (2012)	Comparative, longitudinal retrospective life-history SHARELIFE study for Greece Wave1-Wave3 (2004-2008)	Econometric estimation using: Concentration Index (CI)	Inequalities in dental attendance throughout the life-course	Retrospective variables constructed on life-course: Whether respondents had regularly visited a dentist throughout life history: 0-15; 16-25; 26-40; 41-55; 56-65; 66-75; 76+ years	1. Pro-rich throughout the life-course. 2. Inequality levels remained relatively inelastic until age 65+ but not thereafter. 3. Pro-higher educational attainment throughout life years.		
Naka O & Anastassiadou V (2012)	Cross-sectional urban-setting study - University Prosthetic Public Dentistry Clinic (2011) for older population.	Descriptive Qualitative: clinical examination and interview.	Determinants - Barriers to regular dental visits in public outpatient Clinic.	Factors that serve as barriers to or enablers of older adults' behaviour and attitudes towards oral health.	1. cost and no disease awareness the most frequently mentioned barriers; 2. low level of income and education for public dental care; 3. reduced presence of adverse dental health symptoms compared with the actual oral health status		
Rodrigues, R., et al (2012)	Comparative, cross-sectional - SHARE study for Greece	Descriptive, nationwide	Out-of-pocket expenditure (OOPP) as a financial barrier to	OOP expenditure on all healthcare	1. In the case of quintile 1 (poorest), the share of out-of-pocket expenditure on all healthcare was over 18% in Greece 2. In Greece there were three times as many respondents reporting non-zero out-of-pocket expenditure on health in quintile 1	OOPP is very regressive: low-income persons aged 50+ spent more on health as a proportion of their income in 2006 than their	

Study	Data and year the data refer to	Method	Subject	Measures	Results for Elderly Population (50+ or 65+)	Other Results	Notes
	2006 - Wave2		access health care		(poorest) as in quintile 5 (richest). OOP expenditure on inpatient care OOP expenditure on outpatient care OOP expenditure on medicine	high-income counterparts	
Vadla R. et al (2011)	Comparative Study - Five European Regions 2005 (cross sectional)	Descriptive, regional (Crete Region), 2005 - Second decennial survey of older people, EC project “Tipping the Balance towards Primary Healthcare (TTB) Network”	Descriptive of health care use in elderly	Self-reported frequencies of visits to physicians (specialists) Self-reported hospitalisation rates	1. The highest proportion of specialist visit (70%) was encountered in Greece 2. Poor self-rated health 3. Poor health; male gender; synergy of male gender and single life were significantly associated with specialist visits 1. The highest proportion of hospitalisations (32%) was encountered in Greece 2. Younger age is associated with more frequent hospitalisations	1. Self-rated poor health appears to be the only common denominator associated with increased healthcare utilisation. 2. The use of a specialist care was more frequent in southern than in northern districts.	Since there are few GPs that do not act as gatekeepers in Greece, the Greek elderly can approach a specialist directly. Therefore, comparison results need to be treated in caution.
Listl S. (2011)	Comparative, cross sectional, SHARE study including Greece – 14 EU members -Wave 2, 2006-07	Econometric estimation using: Concentration Index (CI); and the Slope Index of Inequality (SII), 2006-07	Income Inequalities in dental care use and preventive treatment by 50+	1. “any treatment” the last 12 months 2. Preventive and/or operative treatment	1. Significant pro-rich inequity in dental care 2. For preventive treatment, CIs differ significantly in Greece (higher inequalities among retired individuals).	1. Inequalities in preventive dental visits 2. Lower absolute inequality among denture-wearers. 3. Greece is characterized by strong inequalities	

Study	Data and year the data refer to	Method	Subject	Measures	Results for Elderly Population (50+ or 65+)	Other Results	Notes
						in dental care and preventive dental care and lower inequalities among denture-wearers.	
Mielck A et al. (2009)	Comparative, cross sectional, SHARE study including Greece - Five EU members W1, 2004	Descriptive, nationwide, 2004	Association between forgone care and household income	<p>Forgone care due to costs/unavailability</p> <p>Forgone care per income group</p> <p>Forgone care due to costs</p>	<p>1. Greece has the prevalence (9.85%) of the respondents' experienced forgone care.</p> <p>2. The prevalence of forgone care increases with decreasing self assessed health.</p> <p>3. Forgone care is more prevalent among women than among men.</p> <p>1. Greece has the prevalence of highest forgone care in the lowest income group as compared with the highest income group, adjusted for age and sex.</p> <p>2. Low income groups report forgone care usually more often than high income groups.</p> <p>"Forgone care due to costs" is not associated with income levels.</p>	<p>Greece is characterized by low average income and high income inequalities.</p> <p>Paradoxically to a less extent, the highest income groups in Greece showed a higher prevalence in forgoing care than the middle-income groups</p>	
Allin S., Masseria C. & Mossialos E. (2009)	Comparative Study -SHARE for Greece 2004 - Wave1 (cross sectional)	econometric estimation (two measures: probability for one contact, and (conditional) number of subsequent visits)	Income-related inequalities in use of health care by wealth versus by income	<p>Income-related inequalities in prob./ conditional number of any physician visits by wealth.</p> <p>Income-related inequalities in probability / conditional number of any physician visits</p> <p>Income-related inequalities in probability of dentist visit by wealth</p>	<p>In Greece, wealth-related difference in physician visits was greater than differences related to income.</p> <p>Income-related inequalities in probability of dentist visit by wealth</p> <p>the odds of visiting a dentist were higher for richer individuals, in terms of income</p>	<p>Higher educational attainment significantly increased the odds of visiting a physician in Greece.</p> <p>1. The odds of visiting a dentist were higher for richer individuals in terms of wealth</p> <p>2. The odds of a dentist visit increased in Greece with the other level of education.</p>	<p>Measuring socioeconomic disparity by wealth as opposed to measuring it by income, the level of disparity in use of physician services was twice as high for wealth as for income in Greece</p>

Study	Data and year the data refer to	Method	Subject	Measures	Results for Elderly Population (50+ or 65+)	Other Results	Notes			
Litwin H. & Sapir E.V. (2009)	Comparative, cross-sectional study: Eleven EU countries, SHARE Wave1 for Greece (2003-04)	Descriptive, nationwide, 2004 Logistic Regression - Andersen & Newman (1973) framework for health care use	Forgo health care due to cost	Forgo any types of (health) care because of the costs you would have to pay (financial barrier)	<ul style="list-style-type: none"> 1. pro younger old age; pro-greater health needs; and perceived economic inadequacy. 2. 6% forgone health care due to cost 3. Forgone visits to GPs were relatively rare, except in Greece 4. The health service most frequently forgone was dental care, followed by medications and visits to specialists. 	<p>1. the Greek respondents reported spending almost 8% of their disposable income on OOP funded health services;</p> <p>2. Most of the older populations in Greece, considered their household incomes as inadequate to make ends meet</p>				
Mielck A et al. (2007)	Comparative, cross-sectional study: Ten EU countries, SHARE Wave1 for Greece (2003-04)	Descriptive, nationwide, 2004	Association between forgone care and household income	Forgone care due to costs/unavailability	<ul style="list-style-type: none"> 1. Greece has the prevalence (9.3%) experienced forgone care. 2. Controlling for age, sex, SAH, forgone care is always higher in the lowest income group (3.24 times) vs the highest income. 3. The risk of forgone care increases with decreasing income. 	The results support the inverse care law – health care is provided less to those who mostly need it (the low income group).				
Allin S, & Masseria C. (2006)	Comparative Study -SHARE for Greece 2004 - Wave1 (cross sectional)	Econometric estimation (measures: probability of any physician; GP; specialist visit; inpatient care)	Income inequity in the use of physician and hospital care	Any physician visit	Pro-rich income-related inequity	Pro - higher educated level; No wealth-related inequity				
				GP visit	Slightly pro-rich (almost zero) income-related inequity					
				Specialist visits	Slightly pro-rich inequity	Slightly pro-rich (almost zero) wealth-related inequity				
				Inpatient stay	Slightly pro-rich inequity					
		Measures for barriers to access: forgo care; waiting time.	Inequalities in forgo care and waiting times by income and educ.	Forgo health care by income level	<ul style="list-style-type: none"> 1. 10% in Greece declare forgo health care 2. In Greece 26% of those who reported very poor health declared that they had to forgo care. 					

Study	Data and year the data refer to	Method	Subject	Measures	Results for Elderly Population (50+ or 65+)	Other Results	Notes
				Waiting Times	For the majority of the population there is no waiting time for emergency visits in Greece. 2. For non - emergency visits (new problem), the median waiting time is one week in Greece. More than 90% of the demand for non-emergency visits is covered in three or maximum four weeks in Greece. Regarding inpatient admission, the only country where the median waiting time is less than a month is Greece.	In favour of highest educational level	
Santos Eggimann et al, 2005	Comparative Study -SHARE for Greece 2004 - Wave1 (cross sectional)	Descriptive Comparison (measure: reported medical consultations)	Inequalities in the use of health care in 9 EU countries	Ambulatory Care Inpatient Care Inpatient Surgery Care Dental visits	1. Pro age and associated with Gender inequalities 2. No education associated inequality 1.No gender inequalities 2. Lowest level of education associated with a lower level of hospital admission 1. Associated with Age and negatively perceived health 2. Highest level of education associated with frequent hospital admissions The lowest rates of dental visits		
Anderson, (2004)	Comparative Study - European Quality of Life Survey 2003 - For Greece	Descriptive Comparison	Cost sharing Geographical access Waiting times	Cost of seeing the doctor ("Reporting very difficult") Distance to doctor's office/hospital (Rural - Urban Differences) Waiting time to see doctor on day of appointment	No evidence for difficulty 20% of population 65+ reporting "Very difficult" for accessing doctor No evidence for difficulty	Association of retirement with positive assessment of quality No association of household size and assessment of quality No association of number of children and assessment of quality	

Chapter Four: Tables A1.1 – A.1.2:Dependent and explanatory variables- Patra HIS

Appendix- Chapter Four: Table A1.1 Dependent variables- Patra HIS

Health Care Use					Facing OOP expenses					
Inpatient overnight admissions (the last 12 months): (Yes/No)	Outpatient care (the last 3 months) (Yes/No)	SHIF physician visit (the last 3 months) (Yes/No)	Specialist Private (the last 3 months) (Yes/No)	Dental visit (the last 5 years) (Yes/No)	Out of Pocket (OOP) Payment during the last inpatient admission (the last 12 months)	Out of Pocket (OOP) Payment during the last outpatient visit / treatment (the past 3 months)	Out of Pocket (OOP) Payment during the last SHIF physician visit (the past 3 months)	OOP amount paid for the last private specialist visit (the past 3 months)	SHIF Coverage of expenses (OOP) for inpatient admission (the last 12 months)	SHIF Coverage of expenses (OOP) for outpatient visit /treatment (the past 3 months)
“During the last twelve months, have you been in a hospital (public or private) overnight? (Yes /No) with No as the reference	“During the last three months, have you received outpatient treatment in a hospital? (Yes /No) with No as the reference	“During the last three months, have you consulted any SHIF”? (Yes /No) with No as the reference	“During the last three months, have you consulted any specialist privately? (Yes /No) with No as the reference	“During the last five years, have you consulted any dentist?” (Yes/No) with No as the reference category,	“During your last inpatient admission, did you pay any OOP expenses?” (Yes/No) with No as the reference category (the last 12 months)	“During your last outpatient visit / SHIF physician treatment, did you pay any OOP expenses?” (Yes/No) with No as the reference category (the past 3 months)	“During your last SHIF physician visit, did you pay any OOP expenses?” (Yes/No) with No as the reference category (the past 3 months)	“During your last private specialist visit, what is the OOP amount that you paid? ”	“Did your SHIF cover all the OOP expenses for this last inpatient admission?” (In Total & partial/No) with No as the reference category	“Did your SHIF cover all the OOP expenses for this last outpatient visit/treatment?” (In Total & partial/No) with No as the reference category

Appendix- Chapter Four: Table A1.2 Explanatory variables: Need and socio-economic characteristics - PatraHIS

Age	Gender	Health Status	Net Household Monthly Income	Highest Educational Level	Marital Status	Housing Tenure	Household Type	Social Health Insurance Fund (SHIF)	VHI Insurance
age (60-69 vs 50-59)	male vs female as /reference	EQ-5D, SAH -Mobility Problems: "Extreme & Moderate" vs "No Problems" as reference	10 deciles of net household monthly income, recorded into 5 quintiles & ln income (x)	"More than secondary School (ISCED 4+5+6)" vs "Primary (ISCED 1)" with Primary as reference	"Married or registered & living or not with children" vs " Never Married & Divorced / Widowed" as reference	"Owners" vs "Not Owner (tenant / subtenant/rent free)" with & without "Not Owner" as children vs "Living reference alone" as reference	"Living in a couple & Other (family)	"Noble SHIFunds": Public Sector –OPAD + Self Employed – OAEE+ Banks + Health Professions+ Lawyers	VHI coverage (Yes)
age (70-79 vs 50-59)		EQ-5D, SAH Self – Care Problems: "Extreme & Moderate" vs "No problems" as reference	It is derived as the sum from any source per equivalent member added up, after tax and social security contributions	"Secondary education ISCED 2+3 " vs "Primary (ISCED 1)" with Primary as reference				“Non Noble – OGA SHIF”: Rural Sector OGA SHIF	No VHI Coverage/ as the reference
(80+ vs 50-59)		EQ-5D, SAH Usual Activities Problems: "Extreme & Moderate" vs "No problems" as reference						“Non Noble – IKA SHIF”: Private Sector Employees IKA SHIF , as reference	
		EQ-5D, SAH Pain/ Discomfort: "Extreme & Moderate" vs "No problems" as reference						Other SHIF	
		EQ-5D, SAH Anxiety/ Depression:"Extreme & Moderate" vs "No problems" as reference category						No SHIF	
		SAH “Less than Good” (Fair, Bad,Very Bad) vs “Very Good & Good” SAH as reference category						“Noble SHIFunds”: Public Sector –OPAD + Self Employed – OAEE+ Banks + Health Professions+ Lawyers & Other	
		SAH current vs last 12months						“Non Noble SHIFs: IKA SHIF + OGA SHIF” , as reference	
		1.“Worst” vs "Better" SAH last 12m						No SHIF: None	
		2. “the Same” vs "Better" SAH last 12months, as reference category							
		1.“2+ chronic medical conditions” vs "0"							
		2.“1 chronic condition” vs "0 conditions" as reference							
		SADH “Less than Good” (Fair, Bad,Very Bad) vs “Very Good & Good” SADH							

Appendix – Chapter Four: Tables B1-B2 More health care use disciptives- PatraHIS

Appendix – Chapter Four Table B1. Health Care Variables - Contact with Physicians during the last 12 months - PatraHIS

Inpatient stay (at least one night) in the last 12 months	Inpatient stay (yes)	101	14.9%
	No Inpatient stay (No)	579	85.1%
	Public hospitals refers to: General Hospital “St.Andrews”; Military Hospital 409; Hospital of Thorac Diseases; General University Hospital of Patras (Rio)	91 from 101	90.1%
	Private hospitals refers to: “Solomou” Private Thorac Diseases Clinic; “Olympion” Private Hospital; Private Maternity Clinic & others inside Patras	3 from 101	3.0%
	Other Hospital outside the city of Patras for inpatient treatment received.	7 from 101	6.9%
	Missing	579	85.1%
	Reason for inpatient treatment		
	Surgery	38 from 101	37.6%
	Non surgical reasons	53 from 101	52.5%
	Having medical tests	6 from 101	5.9%
	Missing	583	85.7%
Outpatient visit in a public hospital during the last 3 months	Having outpatient diagnostic medical tests during inpatient treatment	33 from 101	32.4%
	No Diagnostic Medical Tests for inpatient treatment	69 from 101	67.6%
	Missing	578	85%
	Public Specialist outpatient visit (yes)	123	32.4%
	No Public Specialist outpatient visit (No)	557	67.6%
Type of public hospital for outpatient treatment	Public Hospital refers to: General Hospital “St.Andrews”; Military Hospital 409; Hospital of Thorac Diseases; General University Hospital of Patras (Rio)	110 from 123	89.4%
	Other public Hospital inside the city of Patras for outpatient treatment	3 from 123	2.4%
	Missing	10	7.6%

	Other public Hospital outside the city of Patras for outpatient treatment	10 from 123	8.1%
	Disease or symptom	50 from 121	41.3%
	Regular, scheduled visit	25 from 121	20.7%
Reason for outpatient visit	Check up & results	24 from 121	19.8%
	Drugs prescribing	9 from 121	7.4%
	Doctor referral	4 from 121	3.3%
	Missing	559	82.2%
	SHIF physician visit (yes)	414	60.9%
	No SHIF physician visit (No)	266	39.1%
SHIF physician visit in the last 3 months	SHIF Physician Specialty	Pathologist Cardiologist Orthopedic Specialist	238 74 29
	Reason for SHIF Physician visit	Disease or symptom Regular, scheduled visit Check up & results Drugs prescribing Doctor referral	48 from 414 73 from 414 54 from 414 231 from 414 6 from 414
			11,6% 17,6% 13.0% 55,8% 1,4%
	Specialist Private visit (yes)	148	21.8%
	No Specialist Private visit (No)	532	78.2%
Specialist Private visit in the 3 last months	Physician Speciality type of visit	Pathologist Cardiologist Orthopedic Specialist	50 from 148 25 from 148 14 from 148
	Reason for Private Specialist visit	Disease or medical symptom Regular, scheduled visit Check up & results Drugs prescribing Doctor referral	45 from 148 50 from 148 36 from 148 12 from 148 4 from 148
			30.4% 33.8% 24.3% 8.1% 2,7%
	Type1: Homeopathic; Physiotherapist; Chiropractor; Dietician; Speech therapist; Other Alternative Therapist visit (yes)	71	10.4%
Complementary and alternative medicine use during the last 12 months	Type of complementary and alternative medicine services	Type2: Home Care Services) (yes) Type3: Outpatient Mental Health Care & Mental Health Care Therapists visitors (Yes)	4 7
		None Special health care services use	598
			87.9%
	Any Dental visit (Yes)	388	57.1%
	No dental visit	291	42.9%
Dental visit in the last 5 years	Type of Dentist visit:	Private dentist Contracted SHIF dentist SHIF Dental Centre physician	530 90 45
			79.7% 13.5% 6.8%

Chapter Four – Table B2. Other Health Care Use Variables - PatraHIS

Private care received	Inpatient treatment received in Private Hospitals in the last 12 months refers to private hospitals: “Solomou” Private Thorac Diseases Clinic; “Olympion” Private Hospital; Private Maternity Clinic	Inpatient Treatment in Private Hospitals (yes)	3 from 101	3%
	Ref/No Private inpatient treatment received	Ref/No Private inpatient treatment received	98 from 101	97%
	Private Specialist Care received in the last 3 months -Dummy (yes/no)	private specialist visit (Yes)	148	21.8%
		No private specialist visit	532	78.2%
	OOPP for inpatient care: (yes)	OOPP for inpatient care: (yes)	19 from 101	18,6%
	Ref / No OOPP for inpatient care	Ref / No OOPP for inpatient care	83 from 101	81.4%
	Missing	Missing	578	85%
	SHIF Coverage of inpatient care cost (OOP) (In total / partial)	SHIF Coverage of inpatient care cost (OOP) (In total / partial)	90 from 101	93.8%
	No Coverage of cost – Paid by patient as OOP	No Coverage of cost – Paid by patient as OOP	6	6.3%
	Missing	Missing	584	85.8%
Inpatient care during the last 12 months	SHIF Coverage of Medical Tests cost (OOP) for inpatients (In total / partial)	SHIF Coverage of Medical Tests cost (OOP) for inpatients (In total / partial)	27 from 101	77,1%
	No Coverage of Medical Tests cost (OOP) for inpatients – Paid by patient as OOP	No Coverage of Medical Tests cost (OOP) for inpatients – Paid by patient as OOP	8	22.9%
	Missing	Missing	66	64.7%
	OOPP for outpatient care (yes)	OOPP for outpatient care (yes)	30	24.6%
	No OOPP for outpatient care	No OOPP for outpatient care	92	75.4%
	Missing	Missing	558	82%
Out of Pocket (OOP) expenses	SHIF Coverage of cost (OOP) for outpatient care (In total / partial)	SHIF Coverage of cost (OOP) for outpatient care (In total / partial)	96	82.8%
	No Coverage of cost – Paid by patient as OOP	No Coverage of cost – Paid by patient as OOP	20	17.2%
	Missing	Missing	564	82.9%
	SHIF Physician visit in the last 3 months	Payment out of pocket (OOP) for SHIF Physician visit	19	4.6%
		No OOPP for SHIF Physician visit	395	95.4 %
		Missing	266	39.12%
Private specialist visit during the last 3 months	OOP amount (€) <=25€	OOP amount (€) <=25€	38	26,6%
	OOP amount (€) 26 - 50 €	OOP amount (€) 26 - 50 €	79	55,2%
	OOP amount (€):51-99 €	OOP amount (€):51-99 €	17	11,9%
	OOP amount (€):>100 €	OOP amount (€):>100 €	9	6,3%
	Mean OPP amount >0 (€)	Mean OPP amount >0 (€)	49,82 (SE:3,44)	
	Stand.Dev.(SD)	Stand.Dev.(SD)	37,51	

Chapter Five: Table A1.1-A.1.2 Dependent and explanatory variables - GNHIS

Appendix – Chapter Five: Table A1.1 Dependent variables - GNHIS

Annual (the past 12 months)	Annual (the last 12 months)	Annual (the past 12 months)	Annual (one year ago)	Annual GP contacts/consultations: “Less than 12 months ago” versus “12 months or longer & never”	Monthly (4 weeks) number of GP contacts: frequency	Annual specialist contacts: “Less than 12 months ago” versus “12 months or longer & never”	Monthly (4 weeks) number of specialist contacts: frequency	Annual dentist visits: “Less than 12 months ago” versus “12 months or longer & never”	Forgone Hospital (inpatient/out patient) Care: (during the past 12 months) (Yes/No)	Forgone specialist visit: (during the past 12 months) (Yes/No)	Financial Barrier as the main reason for forgone hospital and specialist care:
“During the past 12 months, that is since (date one year ago), have you been in hospital as an inpatient that is overnight or longer? (Yes /No) with No as reference	“Thinking of inpatient stay(s), how many nights in total did you spend in hospital?” Referring to the last 12 months.	“During the past 12 months, that is since (date one year ago), have you been admitted to hospital as a day patient, that is admitted to a hospital bed, but not required to remain overnight?” (Yes /No) with No as reference	“How many days have you been admitted as a day patient since (date one year ago)?”	“When was the last time you consulted a GP (general practitioner) or family doctor on your own behalf?” We use two dummies: “Less than 12 months ago” versus “12 months or longer & never” as the reference.	“During the past four weeks ending yesterday, that is since (date) how many times did you consult a GP (general practitioner) or family doctor on your own behalf?” We use two dummies: “Less than 12 months ago” versus “12 months or longer & never” as the reference	“When was the last time you consulted a medical or surgical specialist on your own behalf?” We use two dummies: “Less than 12 months ago” versus “12 months or longer & never” as the reference	“During the past four weeks ending yesterday that is since (date) how many times did you consult a specialist on your own behalf?” We use two dummies: “Less than 12 months ago” versus “12 months or longer & never” as the reference	“When was the last time you visited a dentist or orthodontist on your own behalf (that is, not while only accompanying a child, spouse, etc.)? We use two dummies: “Less than 12 months ago” versus “12 months or longer & never” as the reference	“During the past 12 months, was there any time during the past 12 months when you really needed to be hospitalised following a recommendation from a doctor, either as an inpatient or a day patient, but did not?” (Yes, there was at least one occasion/No) with No as reference.	“Was there any time during the past 12 months when you really needed to consult a specialist but did not?” (Yes, there was at least one occasion/No) with No as reference.	“What was the main reason for not being hospitalized/ or for not consulting a specialist?? (a) Financial barrier: “Could not afford to (too expensive or not covered by the insurance fund); (b) Waiting list; (c) Could not take time; (d) Distance barrier: Too far to travel / no means of transportation; (e) Fear of treatment”; (f) Other.

Appendix- Chapter Five: Table A1.2 Explanatory variables: Need and socio-economic indicators - GNHIS

Need variables			Socio-economic variables					
Age	Gender	Health Status	Net Household Monthly Income equalised	Highest Educational Level	Marital Status	Household Type	Regional information	Degree of urbanisation:
age (60-69 vs 50-59)	male vs female	SAH (Self-assessed health) "Less than Good" (Fair, Bad, Very Bad) vs "Very Good & Good"	10 deciles of household income, recorded into 5 quintiles & ln income (x)	"More than secondary School (ISCED 4+5+6)" vs "Primary (ISCED 1)"	Married or registered living or not with children vs Never Married & Divorced/Widowed	"Living in a couple" (with & without children) vs "Living alone"	Nuts1 North Greece GR1- Thessaloniki vs Nuts1 Athens	Intermediate area vs Densely populated area
age (70-79 vs 50-59)		LTI Suffering from any long term health problems (illness, disability or infirmity) vs No LTI	It is derived as the sum from any source per equivalent member added up, after tax and social security contributions: income from work (as employee or self-employed); from Unemployment benefits; from Old-age and survivor's benefits; Sickness and disability benefits; Family/children related allowances; Housing allowances; Education-related allowance; Other regular benefits	"Secondary education ISCED 2+3" vs "Primary (ISCED 1)"		"Other with & without children" vs "Living alone"	Nuts1 Central Greece GR2 vs Nuts1 Athens	Thinly populated area vs Densely populated area
age (80+ vs 50-59)		Limited in General Activities Gali The person has been limited in general activities (Yes) vs No GALI "2 + chronic diseases" vs "0 chronic medical conditions" "1 chronic disease" vs "0 chronic medical conditions"						Nuts1 Islands +Crete GR4 vs Nuts1 Athens

Chapter Six: Tables A1.1-A.1.2 Dependent and explanatory variables - SHARE

Appendix - Chapter Six: Table A1.1 Dependent variables - SHARE

Health Care Use						OOP amount	
Annual – No of any medical visit (not dentist visit/ not inpatient admissions)	Annual – No of GP contacts/ consultations	Annual specialist contacts (Yes/No)	Annual overnight inpatient admissions: (Yes/No)	Annual - No of overnight inpatient admissions: (Yes/No)	Annual dentist visits (Yes/No)	Out of Pocket (OOP) Payment Amount for all inpatient admissions (the last 12 months)	Out of Pocket (OOP) Payment Amount for all outpatient visit / treatment the last 12 months (for all physicians, dentists, exams, outpatient surgery – Not medicines)
<p>“During the 12 months, about how many times in total have you seen or talked to a medical doctor about your health? Please exclude dentist visits and hospital stays, but include emergency room or outpatient clinic visits”. We measure:</p> <ul style="list-style-type: none"> (i) the likelihood of any visit (Yes= ≥ 1 and No=0) with No as the reference. (ii) The mean conditional (>0) number of medical visits 	<p>“How many of these contacts were with a GP or with a doctor at your health care center?”</p> <p>We measure:</p> <ul style="list-style-type: none"> (i) the likelihood of any GP visit (Yes= ≥ 1 and No=0) with No as the reference. (ii) The mean conditional (>0) number of GP visits 	<p>“During the last 12 months, have you consulted any of the specialists mentioned?”</p> <p>We measure: the likelihood of any specialist visit (Yes /No) with No as reference</p>	<p>“During the last 12 months, have you been in a hospital overnight?”</p> <p>We measure: the likelihood of any inpatient admission (Yes /No) with No as reference</p>	<p>How many nights altogether have you spent in hospitals during the last 12 months?</p> <p>We measure: The mean conditional (>0) number of inpatient nights</p>	<p>During the last 12 months, have you seen a dentist or a dental</p> <p>We measure: the likelihood of any dentist visit (Yes /No) with No as reference</p>	<p>“Not counting health insurance premiums or reimbursements from employers, about how much did you pay out-of-pocket for all your hospital inpatient care in the last 12 months?”</p> <p>We measure:</p> <ul style="list-style-type: none"> (a) the likelihood of paying OOP ($\geq 1\text{€}$ versus 0€) and (b) OOP positive amount $>0\text{€}$ ($>672.6\text{€}$) versus ($1\text{€}-672.6\text{€}$) where 672.6€ is the median (c) the mean positive ($>0\text{€}$) OOP amount 	<p>“Not counting health insurance premiums or reimbursements from employers, about how much did you pay out-of-pocket for all your outpatient care, in the last 12 months?”</p> <p>We measure:</p> <ul style="list-style-type: none"> (a) the likelihood of paying OOP ($\geq 1\text{€}$ versus 0€) and (b) OOP positive amount $>0\text{€}$ ($>194.4\text{€}$) versus ($1\text{€}-194.4\text{€}$) where 194.4€ is the median (c) the mean positive ($>0\text{€}$) OOP amount

Appendix Chapter Six: Table A1.2 Explanatory variables: Need and socio-economic characteristics - SHARE

Need variables			Socioeconomic variables								
Age	Gender	Health Status	Household Total Gross Annual Income equivalized	Highest Educational Level	Marital Status	Housing Tenure	Household Type	Regional information urbanisation: (Nuts1)	Degree of	Social Health Insurance Fund (SHIF)	
age 80+	Male	SAH (Self-assessed health) "Less than Good" (Fair, Bad, Very Bad) vs "Very Good & Good" as reference	Recorded into 5 quintiles & ln income (x)	"More than secondary School (ISCED 4+5+6)" vs "Primary (ISCED 1)"	Married or registered living or not with children	"Owners"	"Living in a couple & OtherGR1- (family) with & Thessaloniki without children"	North Greece	Densely populated areas as reference	"Noble SHIF": Public Sector –OPAD + Self Employed – OAEE+ Banks + Health Professions+ Lawyers	
age 70 - 79	Female as reference	LTI Suffering from any long term health problems (illness, disability or infirmity) Yes) vs No LTI as reference		"Secondary education ISCED 2+3 " vs "Primary (ISCED 1)"	Never Married & "Not Owner Divorced/ Widowed(tenant / as reference	"Living alone"	Central Greece GR2	Intermediate populated areas	Non Noble – OGA SHIF": Rural Sector OGA SHIF		
age 60-69		GAL I Limited in General Activities (Yes) vs No GALI as refer.		Primary (ISCED 1) (No+partial+ complete ISCED 1) as reference			Attika GR2 - (Athens) as reference	Thinly populated area	Non Noble – IKA SHIF: Private Sector Employees IKA SHIF , as reference		
Age 50-59 as reference		"2 + chronic diseases"					Islands +Crete GR4		Other SHIF		
		"1 chronic disease"							No SHIF		
		"0 chronic diseases"									

Chapter Seven: Tables 7.1 - 7.3.2 Summary of empirical findings by survey tool

Appendix - Chapter Seven: Table 7.1 The summary of empirical findings of PatraHIS survey analysis

Study	Data and year the data refer to	Subject	Income Variable	Income non response rate	Measures	Results	Other Results – OOP expenses as a barrier to access	Other Results – Inequalities among SHIFs (Compared to Non Noble IKA SHIF)
Patra Health Interview Survey (PatraHIS)	Urban-setting (Patra, 2005)	Inequalities in the use of health care among the population 50+ in Patra's urban area	<p><i>Net Household Monthly Income (2005):</i> It is derived as the sum from any source per equivalent member added up, after tax and social security contributions</p>	5.2%	Inpatient overnight admissions (the last 12 months): (Yes/No) Likelihood	Pro poor inequity	Lower in magnitude financial barrier of OOP expenses for inpatient admissions	Pro-poor inequalities among the SHIFs
					Outpatient care (the last 3 months) (Yes/No) Likelihood	No inequity (slightly pro poor)	Higher in magnitude financial barrier of OOP expenses for outpatient visit	Pro-rich inequalities among the SHIFs (Noble SHIFs increase inequity – pro rich contribution)
					SHIF physician visit (the last 3 months) (Yes/No) Likelihood	No inequity (slightly pro poor)		Pro-rich inequalities among the SHIFs
					Specialist Private (the last 3 months) (Yes/No) Likelihood	Pro rich inequity	Higher in magnitude financial barrier of OOP expenses for specialist private visit	Pro-poor inequalities among the SHIFs (OGA SHIF has a pro poor contribution)
					Dental visit (the last 5 years) (Yes/No) Likelihood	Pro rich inequity		Pro-rich inequalities among the SHIFs (Noble SHIFs increase inequity – pro rich contribution)

					Out of Pocket (OOP) Payment during the last inpatient admission (the last 12 months) Likelihood		Lower in magnitude financial barrier of OOP expenses for inpatient admissions	
					Out of Pocket (OOP) Payment during the last outpatient visit / treatment (the past 3 months) Likelihood		Higher in magnitude financial barrier of OOP expenses for outpatient visit	
					Out of Pocket (OOP) Payment during the last SHIF physician visit (the past 3 months) Likel.			
					OOP amount paid for the last private specialist visit (the past 3 months)	For mean (≥ 0): Regressive relation by income quintile; For mean (>0): Progressive relation by income quintile	For mean (≥ 0): Non Noble OGA SHIF pays higher OOP than Noble SHIFs (Regressive relation); For mean (>0): Noble SHIFs pay higher OOP than Non Noble IKA	

Appendix - Chapter Seven: Table 7.2 The summary of empirical findings of GNHIS survey analysis

Study	Data and year the data refer to	Subject	Income Variable	Income non response rate	Measures	Results	Other Results – Degree of urbanization compared to densely – populated areas (Urban versus rural areas)	Other Results – Regional Variations compared to Attika – Athens region
Greek National Health Interview Survey – Wave 1 (GNHIS)	Nationwide (Greece, 2009)	Inequalities in the use of health care among the population 50+ in Greece	<p><i>Net Household Monthly Income equalized (2009):</i> It is derived as the sum from any source per equivalent member added up, after tax and social security contributions: income from work (as employee or self-employed); from Unemployment benefits; from Old-age and survivor's benefits; Sickness and disability benefits; Family/children related allowances; Housing allowances; Education-related allowance; Other regular benefits</p>	16.5%	Annual (the past 12 months) overnight inpatient admissions: (Yes/No) Likelihood	Pro poor inequity	Pro –rich inequity favoring thinly populated areas. Pro-poor inequity favouring intermediate-populated areas	Pro poor inequity favouring Central Greece & North Greece
					Annual (the last 12 months) number of overnight inpatient admissions: conditional number	Pro poor inequity	Pro –rich inequity favoring thinly populated areas. Pro-rich inequity favouring intermediate-populated areas	Pro poor inequity favouring Central Greece & North Greece
					Annual (the past 12 months) outpatient admissions: (Yes/No) Likelihood	No inequity	Pro –rich inequity favoring thinly populated areas. Pro-rich inequity favouring intermediate-populated areas	Pro-rich inequity favouring Central Greece & Islands
					Annual (one year ago) number of outpatient days: conditional number	Pro rich inequity	Pro –poor inequity favoring thinly populated areas. Pro-poor inequity favouring intermediate-populated areas.	Pro-poor inequity favouring Central & North Greece
					Annual GP contacts/	No inequity	Pro-poor inequity favouring thinly populated	Pro-rich inequity

				consultations: “Less than 12 months ago” versus “12 months or longer & never” Likelihood		areas. Equity favouring intermediate - populated areas	favouring Central Greece & no inequity in North Gr. & Pro –rich inequity favoring
				Monthly (4 weeks) number of GP contacts: conditional number	Slightly pro-poor inequity	Pro –rich inequity favoring thinly populated areas. Pro-poor inequity favouring intermediate	Pro –rich inequity favouring Islands
				Annual specialist contacts: “Less than 12 months ago” versus “12 months or longer & never” Likelihood	Pro rich inequity	Pro –rich inequity favoring thinly and intermediate - populated areas	Pro –rich inequity favouring Central & North Greece – Equity for Islands
				Monthly (4 weeks) number of specialist contacts: conditional number	Pro-poor inequity	Pro –rich inequity favoring thinly populated areas. Pro-poor inequity favouring intermediate populated areas.	Pro – poor inequity favouring Central & North Greece – Equity for Islands
				Annual dentist visits: “Less than 12 months ago” versus “12 months or longer & never” Likelihood	Pro rich inequity	Pro –rich inequity favoring thinly populated areas. Equity favouring intermediate - populated areas	Pro –rich inequity favouring North Greece; Equity for Central Greece & Islands

Appendix - Chapter Seven: Table 7.3.1 The summary of empirical findings of SHARE survey analysis (1)

Study	Data and year the data refer to	Subject	Income Variable	Income non response rate	Measures	Results
Survey of Health, Ageing and Retirement in Europe (SHARE)	Nationwide (Greece, 2004)	Inequalities in the use of health care among the population 50+ in Greece	<i>Household Total Gross Annual Income equivalized (2003):</i> It is derived as the sum over all household members of the individual – level values from any source added up: from employment; from self - employment or work for a family business; income from (public or private) pensions or invalidity or unemployment benefits; income from alimony or other private regular payments; income from long term care; sum of the gross incomes of other household members and other benefits, capital assets income (income from bank accounts, from bonds, from stocks or shares and from mutual funds), rent payments received, plus imputed rents, all of them calculated, generated, imputed.	17.4%	Annual overnight inpatient admissions: (Yes/No) Likelihood Annual Number of any medical visit (not dentist visit/ not inpatient admissions) (Yes= ≥ 1 and No=0) Likelihood Annual Number of GP/HCC physician contacts/ consultations (Yes= ≥ 1 and No=0) Likelihood Annual specialist contacts (Yes/No) Likelihood Annual dentist visits (Yes/No) Likelihood Probability of OOPP for inpatient admissions (the last 12 months) (Yes= $\geq 1\text{€}$ versus No=0€) OOP amount for inpatient admissions ($>672.6\text{€}$) vs ($1\text{€} - 672.6\text{€}$) Probability of OOPP for outpatient care (the last 12 months) (Yes= $\geq 1\text{€}$ versus No=0€) OOPP amount for outpatient care ($>194.4\text{€}$) vs ($1\text{€} - 194.4\text{€}$)	Pro rich inequity Slightly pro rich inequity Slightly pro poor (weak) inequity No inequity Pro rich inequity Higher in magnitude financial barrier of OOP expenses for inpatient admissions A regressive trend in OOP amount for inpatient care in terms of ability to pay (ATP) Lower in magnitude financial barrier of OOP expenses for outpatient visit A progressive trend in OOP amount for inpatient care in terms of ability to pay (ATP)

Appendix - Chapter Seven: Table 7.3.2 The summary of empirical findings of SHARE survey analysis (2)

Study	Data and year the data refer to	Subject	Measures	Other Results – OOP expenses as a barrier to access	Other Results – Inequalities among SHIFs (Compared to Non Noble IKA SHIF)	Other Results – Degree of urbanization compared to densely – populated areas (Urban versus rural areas)	Other Results – Regional Variations compared to Attika – Athens region
Survey of Health, Ageing and Retirement in Europe (SHARE)	Nationalwide (Greece, 2004)	Inequalities in the use of health care among the population 50+ in Greece	Annual overnight inpatient admissions: (Yes/No) Likelihood	Higher in magnitude financial barrier of OOP expenses for inpatient admissions	Non Noble OGA SHIF and Noble SHIFs reduce inequity in inpatient admissions favoring the worse off.	Pro-rich inequity favoring thinly-populated areas. Pro-poor inequity favoring the intermediate-populated areas.	Pro poor inequity favouring Central Greece. No inequity favouring Islands.
			Annual Number of any medical visit (not dentist visit/ not inpatient admissions) (Yes= ≥1 and No=0) Likelihood	Lower in magnitude financial barrier of OOP expenses for outpatient visit	Non Noble OGA SHIF increases inequity in any medical visit favoring the better off. Noble SHIFs have no effect on inequity in any medical visit.	Pro-rich inequity favoring thinly-populated areas. Pro-poor inequity favoring the intermediate-populated areas.	Pro rich inequity favouring North Greece. Equity favouring Central Greece & Islands
			Among those who report any medical visit, annual number of GP/HCC physician contacts/ consultations (Yes= ≥1 and No=0) Likelihood		Non Noble OGA SHIF and Noble SHIFs reduce inequity in GP/HCC physician favoring the worse off.	Pro-rich inequity favoring thinly-populated areas. Equity for intermediate areas.	Pro-rich inequity favouring Central Greece & Islands. Equity for North Greece.
			Among those who report any medical visit, annual specialist contacts (Yes/No) Likelihood		Non Noble OGA SHIF increases inequity in specialist visit favoring the better off. Noble SHIFs reduces inequity favoring the worse off.	Pro-rich inequity favoring thinly-populated areas. Pro-poor inequity favoring the intermediate-populated areas.	Equity favouring all regions
			Annual dentist visits (Yes/No) Likelihood		Non Noble OGA SHIF strongly reduces inequity in dentist visit favoring the worse off. Noble SHIFs	Pro-rich inequity favoring thinly-populated areas. Pro-poor inequity favoring the intermediate-	Pro-rich inequity favouring Central Greece & North Greece.

			increase inequity favoring the better off.	populated areas.	
		Probability of OOPP for inpatient admissions (the last 12 months) (Yes= ≥1€ versus No=0€)	Higher in magnitude financial barrier of OOP expenses for inpatient admissions	Noble SHIFs beneficiaries are insignificantly more likely to pay OOP for inpatient care than Non Noble SHIFs. Farmers OGA is less likely to pay OOP for inpatient care than IKA	Residents of all areas are more likely to pay higher OOP mean amount than lower OOP amount for inpatient care.
		OOP amount for inpatient admissions (>672.6€) vs (1€ - 672.6€)	The mean OOP amount for inpatient care (1483€) is 4.5 times higher than the mean OOP amount for outpatient care (330€).	All SHIFs beneficiaries pay almost the same OOP amount (slightly higher pay the Noble SHIFs. Among the Non Noble SHIFs, OGA beneficiaries pay higher OOP mean amount than IKA.	Residents of thinly-populated areas pay higher OOP mean amount almost twice the OOP mean amount paid by the residents of intermediate-populated areas.
		Probability of OOPP for outpatient care (the last 12 months) (Yes= ≥1€ versus No=0€)		Noble SHIFs beneficiaries are insignificantly more likely to pay OOP for inpatient care than Non Noble SHIFs. OGA is less likely to pay OOP for inpatient care than IKA	Residents of all areas are less likely to pay higher OOP amount for outpatient care. Residents of thinly populated areas are more likely to pay OOP for inpatient and outpatient care.
		OOPP amount for outpatient care (>194.4€) vs (1€ - 194.4€)	Lower in magnitude financial barrier of OOP expenses for outpatient visit	Non –Noble IKA beneficiaries face almost equal OOP amount with Noble beneficiaries. OGA SHIF pay less.	North Greece & Attiki report the highest OOP amount for outpatient care. Central Greece pay the lowest OOP mean amount.