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An in-depth examination of the determinant factors of out of pocket healthcare payments

By

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Abstract

The current study aims at investigating the potentiality of compulsory social health insurance (SHI) with additional private health insurance (PHI) coverage against the financial or even catastrophic effect of out of pocket (OOP) payments on individuals' welfare at a micro-data level approach. Further, we aim to extend previous empirical research by investigating the effect of several macroeconomic and health financing parameters on OOP expenditure. Specifically, we also involve the influence of PHI financing on OOP expenditure at a macro-data level approach, since the available literature has ignored to address the responsiveness of OOP expenditure by PHI financing.

Particularly, we present three studies which are mainly related to the impact of public and health insurance financing on OOP healthcare payments. In the first and second study we investigate the impact of compulsory SHI and additional PHI insurance on Greek insured OOP spending for private hospitalization using micro-level data and employing ordinary least squares (OLS) regression models. We also use the widely accepted computational methodology to examine the catastrophic impact of OOP spending on individuals' welfare and the financing incidence analysis for measuring financial equity of the overall private hospitalization expenditure in Greece. Evidence both for these two studies is drawn from Greece, a developed country with advanced public health system risk pooling mechanisms, which is currently under fiscal monitoring and faces public health budgets constrains. In the third study, using panel data country-level regression analysis and specifically fixed/random effects and dynamic panel data methodology, for several OECD and European settings, we test for the effect of several macroeconomic and health financing parameters on OOP expenditure. The common point between these studies is the impact of public and private health insurance spending on OOP payments, which is driven by governmental decision making on organizing health system financing.

The main findings of the first study exhibit that the new SHI carrier in Greece fails to ensure financial protection against OOP payments for private hospitalization. Although the presence of a theoretically well-developed and full-coveraged SHI system, a significant proportion of Greek insured face catastrophic OOP healthcare payments, while the phenomenon is more intense for the worse-off segments of population. The findings suggest that Greek policy-makers prefer to promote fiscal adjustment in order to limit public debt and deficits rather

than to provide greater levels of financial protection by increasing public health spending. In the second study, prominent amongst our findings is that mandatory SHI supplemented by PHI has a strong negative effect on insured OOP payments for private hospitalization, as well as, it considerably offsets individuals' catastrophic OOP payments impact on their living standards. Finally, in the third study we find that government health expenditure (*i.e.* public or social) and PHI institution financing have a significant countervailing influence on OOP expenditure.

Overall, our findings suggest that catastrophic OOP healthcare payments can be incurred even in a developed European economy, such as Greece, with a well-established and advance health insurance system and not only in low-income and developing settings with inefficient national health insurance risk-pooling arrangements. Nevertheless, the large economic shocks driven by the current financial crisis severe recession, have compelled governmental decision making in several countries on significant cuts of public health spending in order to achieve fiscal consolidation and recovery. Despite the fact that external creditors' financial assistance conditionalities require substantial cuts in government health spending, our results indicate that health state-planners have to provide efficient financial protection against the economic burden or even catastrophic impact of OOP payments on population wellbeing. The results presented both in the micro and macro-data level approaches of this study provide evidence that PHI shows a significant counterbalance impact on OOP payments. In times of economic stringency with limited public health budgets due to the pursued fiscal compliance and sustainability objectives, policy-makers should proceed on a complete review of PHI potential on health systems financing, parallel to compulsory SHI, in order to offset OOP spending in several countries.

Keywords: *OOP healthcare payments; informal payments; health shock; financial catastrophe; SHI; PHI; macroeconomy; public and private health financing; panel data analysis, micro-data and macro-data level analysis; Greece, OECD*

Πρόλογος

Η τρέχουσα έρευνα στοχεύει στη διερεύνηση της δυνατότητας της υποχρεωτικής κοινωνικής ασφάλισης υγείας (SHI) με πρόσθετη κάλυψη ιδιωτικής ασφάλισης υγείας (PHI) έναντι του οικονομικού ή και καταστροφικού αποτελέσματος των ίδιων – απευθείας (άμεσων) πληρωμών για υγειονομική περίθαλψη στην ευημερία των ατόμων, σε επίπεδο μικροανάλυσης δεδομένων (micro-data analysis). Περαιτέρω, επιδίωκει να επεκτείνει την προηγούμενη εμπειρική έρευνα διερευνώντας την επίδραση πολλών μακροοικονομικών παραμέτρων και παραγόντων χρηματοδότησης της υγείας στις απευθείας δαπάνες υγείας των νοικοκυριών. Συγκεκριμένα, η παρούσα έρευνα περιλαμβάνει επίσης την επιρροή της χρηματοδότησης της Ιδιωτικής Ασφάλισης Υγείας στις απευθείας υγειονομικές δαπάνες των νοικοκυριών με μία προσέγγιση μακροοικονομικών δεδομένων (macro-data analysis), καθώς η διαθέσιμη βιβλιογραφία αγνοεί την αντιμετώπιση της ανταπόκρισης των απευθείας ατομικών δαπανών υπό τη χρηματοδότηση της ιδιωτικής ασφάλισης ασθενείας, παράλληλα με την Κοινωνική Ασφάλιση.

Ειδικότερα, παρουσιάζονται τρεις μελέτες – επιστημονικά άρθρα που σχετίζονται κυρίως με τον αντίκτυπο της δημόσιας ασφάλισης και της κοινωνικής ασφάλισης υγείας στις απευθείας πληρωμές για την υγεία των νοικοκυριών. Στην πρώτη και τη δεύτερη μελέτη διερευνώνται οι επιπτώσεις της υποχρεωτικής ασφάλισης (Κοινωνικής Ασφάλισης) και της πρόσθετης ιδιωτικής ασφάλισης ασθεσνείας στις απευθείας δαπάνες για την υγεία των Ελλήνων ασφαλισμένων για ιδιωτική νοσηλεία χρησιμοποιώντας δεδομένα μικρο-επιπέδων και χρησιμοποιώντας μοντέλα παλινδρόμησης ελαχίστων τετραγώνων (OLS). Χρησιμοποιήθε επίσης η ευρέως αποδεκτή υπολογιστική μεθοδολογία για να εξεταστεί ο καταστροφικός αντίκτυπος των ίδιων – απευθείας δαπανών υγείας στην ευημερία των ατόμων και η ανάλυση της επίπτωσης χρηματοδότησης για τη μέτρηση της χρηματοοικονομικής ισότητας των συνολικών ιδιωτικών δαπανών νοσηλείας στην Ελλάδα.

Τα στοιχεία - αποδείξεις και για τις δύο αυτές μελέτες προέρχονται από την Ελλάδα, μια ανεπτυγμένη χώρα με προηγμένους ασφαλιστικούς μηχανισμούς συγκέντρωσης κινδύνων για τον δημόσιο τομέα υγείας, ο οποίος επί του παρόντος βρίσκεται υπό δημοσιονομική παρακολούθηση και αντιμετωπίζει περιορισμούς στους προϋπολογισμούς για τη δημόσια υγειονομική περίθαλψη.

Στην τρίτη μελέτη – επιστημονικό άρθρο, χρησιμοποιώντας ανάλυση παλινδρόμησης σε επίπεδο δεδομένων πίνακα και συγκεκριμένα σταθερά / τυχαία αποτελέσματα και μεθοδολογία δυναμικών ομάδων δεδομένων, για αρκετές χώρες του Ο.Ο.Σ.Α. και της Ευρώπης, εξετάστηκε η επίδραση πολλών μακροοικονομικών παραμέτρων και παραγόντων χρηματοδότησης της υγείας στις ιδιωτικές δαπάνες των νοικοκυριών για υγειονομική περίθαλψη. Το κοινό σημείο μεταξύ αυτών των μελετών είναι ο αντίκτυπος των δημόσιων και ιδιωτικών δαπανών ασφάλισης υγείας στις ατομικές πληρωμές για την υγεία, η οποία καθοδηγείται από τις κυβερνητικές αποφάσεις για την οργάνωση της χρηματοδότησης του Εθνικού Συστήματος Υγείας.

Τα κυριότερα ευρήματα της πρώτης μελέτης δείχνουν ότι ο νέος φορέας κοινωνικής ασφάλισης (Ε.Ο.Π.Υ.Υ.) στην Ελλάδα δεν εξασφαλίζει χρηματοοικονομική προστασία έναντι των απευθείας πληρωμών των ατόμων για ιδιωτική νοσηλεία. Μολονότι την παρουσία ενός θεωρητικά καλώς αναπτυγμένου και πλήρους συστήματος κοινωνικής ασφάλισης, ένα σημαντικό ποσοστό των ασφαλισμένων στην Ελλάδα αντιμετωπίζουν καταστροφικές πληρωμές για την ληφθήσα υγειονομική περίθαλψη, ενώ το φαινόμενο είναι πιο έντονο για τα ευπαθέστερα οικονομικά τμήματα του πληθυσμού. Τα ευρήματα δείχνουν ότι οι υπεύθυνοι χάραξης πολιτικής στην Ελλάδα προτιμούν να προωθήσουν τη δημοσιονομική προσαρμογή, προκειμένου να περιορίσουν το δημόσιο χρέος και τα ελλείμματα και όχι να παράσχουν υψηλότερα επίπεδα οικονομικής προστασίας αυξάνοντας τις δαπάνες για τη δημόσια υγεία.

Στη δεύτερη μελέτη, εξέχων από τα ευρήματά μας είναι ότι η υποχρεωτική κοινωνική ασφάλιση η οποία συμπληρώνεται από την ιδιωτική ασφάλιση υγείας έχει ισχυρό αρνητικό αντίκτυπο στις απευθείας ατομικές δαπάνες για ιδιωτική νοσηλεία, καθώς επίσης, αντισταθμίζει αισθητά τις καταστροφικές απευθείας ιδιωτικές πληρωμές των ατόμων και τις επιπτώσεις τους αναφορικά με το βιοτικό επίπεδο των ασφαλισμένων. Τέλος, στην τρίτη μελέτη διαπιστώνουμε ότι η χρηματοδότηση των δημόσιων δαπανών για την υγεία (δηλ. της Δημόσιας Εθνικής ή Κοινωνικής Ασφάλισης Υγείας) και του θεσμού της Ιδιωτικής Ασφάλισης Υγείας έχει σημαντική αντισταθμιστική επιρροή στις απευθείας δαπάνες των νοικοκυριών για υγειονομική περίθαλψη.

Συνολικά, τα ευρήματα της παρούσας μελέτης υποδεικνύουν ότι καταστροφικές πληρωμές για την υγειονομική περίθαλψη μπορούν να πραγματοποιηθούν ακόμη και σε μια αναπτυγμένη ευρωπαϊκή οικονομία, όπως η Ελλάδα, με ένα καθιερωμένο και εκ των προτέρων καθορισμένο σύστημα ασφάλισης υγείας και όχι μόνο σε χαμηλού επιπέδου εισοδήματος και αναπτυσσόμενα κράτη με αναποτελεσματικούς εθνικούς ασφαλιστικούς μηχανισμούς περιορισμού του οικονομικού κινδύνου της υγείας. Ωστόσο, τα μεγάλα οικονομικά πλήγματα που προκλήθηκαν από τη σημερινή σοβαρή ύφεση λόγω της χρηματοπιστωτικής κρίσης ανάγκασαν τις κυβερνητικές αποφάσεις σε αρκετές χώρες, να κινηθούν σε σημαντικές περικοπές δαπανών για τη δημόσια υγεία, προκειμένου να επιτευχθεί δημοσιονομική εξυγίανση και ανάκαμψη.

Παρά το γεγονός ότι οι όροι χρηματοοικονομικής βοήθειας των εξωτερικών πιστωτών απαιτούν σημαντικές περικοπές στις κρατικές δαπάνες για την υγεία, τα αποτελέσματα της παρούσας διατριβής δείχνουν ότι οι υπεύθυνοι σχεδιασμού των πολιτικών υγείας πρέπει να παρέχουν αποτελεσματική οικονομική προστασία έναντι του οικονομικού βάρους ή ακόμα και των καταστροφικών οικονομικών επιπτώσεων των ίδιων - απευθείας πληρωμών των ατομών για την υγεία στην ευημερία του πληθυσμού.

Τα αποτελέσματα που παρουσιάστηκαν τόσο στις προσεγγίσεις σε επίπεδο μικροδεδομένων όσο και μακροοικονομικών δεδομένων στη παρούσα έρευνα αποδεικνύουν ότι η Ιδιωτική Ασφάλιση Υγείας παρουσιάζει σημαντικό αντίκτυπο στην αντιστάθμιση των άμεσων ιδιωτικών υγειονομικών δαπανών. Σε περιόδους οικονομικής αυστηρότητας με περιορισμένους προϋπολογισμούς για τη δημόσια υγεία λόγω των επιδιωκόμενων στόχων δημοσιονομικής συμμόρφωσης και βιωσιμότητας, οι υπεύθυνοι για τη χάραξη πολιτικής πρέπει να προχωρήσουν σε πλήρη ανασκόπηση της δυναμικής της Ιδιωτικής Ασφάλισης Υγείας στη χρηματοδότηση των εθνικών συστημάτων υγείας, παράλληλα με την υποχρεωτική Κοινωνική Ασφάλιση, προκειμένου να αντισταθμίσουν την άμεση ιδιωτική δαπάνη των νοικοκυριών για υγειονομική περίθαλψη σε αρκετές χώρες.

Λέξεις Κλειδιά: *άμεσες - απευθείας πληρωμές χρηστών υγείας; ανεπίσημες-άτυπες πληρωμές υγείας; σοκ υγείας; οικονομική καταστροφή; Κοινωνική Ασφάλισης Υγείας; Ιδιωτική Ασφάλιση Υγείας; μακροοικονομία; δημόσια και ιδιωτική χρηματοδότηση υγείας; ανάλυση δεδομένων πάνελ; micro-data and macro-data level analysis; Ελλάδα; ΟΟΣΑ*

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Declaration

“Whilst registered as a candidate for the above degree, I have not been registered for any other research award. The results and conclusions embodied in this thesis are the work of the named candidate and have not been submitted for any other academic award”

Abbreviations

ACA = Affordable Care Act

ADF = Augmented Dickey-Fuller

AGI = Annual Gross Income

ASPE = Assistant Secretary for Planning and Evaluation

ATP = Ability to Pay

CHE = Catastrophic Health Expenditures

CMSA = Compulsory Medical Savings Accounts

CTP = Capacity to Pay

DRG's= Diagnosis Related Groups

EAPs = Economic Adjustments Programmes

EC = European Commission

ECB – European Central Bank

EFF = Extended Fund Facilities

EOPYY = National Organization for the Provision of Health Services

EU = European Union

FIA = Financing Incidence Analysis

FPL = Federal Poverty Line

GDP = Gross Domestic Product

GE = Government Expenditure

GGD = General Governmental Debt

GGHE = General Government Health Expenditure

GMM = Generalized Method of Moments

ICHA = International Classification for Health Accounts

IKA = Social Insurance Institution

IMF = International Monetary Fund

MoU = Memorandum of Understanding

NAT = Maritime Retirement Fund

NHS = National Health Services

OAEE = Social Insurance Organization for the Self-Employed

OECD = Organization for Economic Co-operation and Development

OGA = Agricultural Insurance Organization

OLS = Ordinary Least Squares

OOP = Out of Pocket

OPAD-TYDKY=Health Care Organization for Public and Municipal Employees Officers

PHI = Private Health Insurance

PvtHE = Private Health Expenditure

SBA = Stand-By Arrangements

SDGs = Sustainable Development Goals

SES = Socio-economic Status

SHARE = Survey of Health, Ageing and Retirement in Europe

SHI = Social Health Insurance

TAYTEKO = Insurance Fund for Bank and Utility Company Employees

THE = Total Health Expenditure

Total CHE = Total Current Health expenditure

UHC = Universal Health Coverage

UK = United Kingdom

UN = United Nations

USA = United States of America

WHO = World Health Organization

Dissemination

Published papers related to this study:

Grigorakis, N., Floros, C., Tsangari, H., Tsoukatos, E. (2017). Combined Social and Private Health Insurance versus catastrophic out of pocket payments for private hospital care in Greece. *International Journal of Health Economics and Management*. *17*(3), 261-287.

Grigorakis, N., Floros, C., Tsangari, H., Tsoukatos, E. (2016). Out of pocket payments and social health insurance for private hospital care: Evidence from Greece. *Health Policy*, *120*(8), 948-959.

Published papers related to this study (under review):

Grigorakis, N., Floros, C., Tsangari, H., Tsoukatos, E. (2017). Macroeconomic and financing determinants of out of pocket payments in health care: Evidence from 26 E.U. and OECD countries. *Journal of Policy Modeling*. Submission on 30 Dec 2016.

Related work has been presented to the following conferences:

Grigorakis, N., Floros, C., Tsangari, H., Tsoukatos, E. (2016), Macroeconomic and financing determinants of out of pocket payments in health care: Evidence from 26 E.U. and OECD countries. *At the 9th EuroMed Academy of Business Conference*, September 2016, Warsaw, Poland.

Grigorakis, N., Floros, C., Tsangari, H., Tsoukatos, E. (2016), "Macroeconomic and financing determinants of out of pocket payments in health care: Evidence from 26 E.U. and OECD countries". Management of Innovative Business, Education & Support systems (MIBES) 11th Annual International Conference, 22-24 June 2016, TEI of Crete, Business School, Heraklion, Greece.

Grigorakis, N., Floros, C., Tsangari, H., Tsoukatos, E. (2015), Combined Social and Private health insurance versus catastrophic out of pocket payments for hospital care in Greece, *Proceedings of the 8th EuroMed Academy of Business Conference,* September 2015, Verona, Italy.

Grigorakis, N., Floros, C., Tsangari, H., Tsoukatos, E. (2014), The effect of out of pocket payments on the income of hospitalized patients. Evidence from Greece. *ISI Conference Proceedings of the 7th EuroMed Academy of Business Conference,* September 2014, Kristiansand, Norway.
The latter work had been awarded by EMRBI as ***Highly Commended Student Paper.***

Chapter 1

Introduction

In chapter 1 we briefly introduce the reader on what our research study does examine. In turn we provide a background of the study which encompasses the main elements on Greek health system by briefly presenting its main health funding peculiarities. Further, we continue by also providing comprehensively the main focus on the available literature research regarding Out of Pocket Payments (OOP) payments and explain why it is useful to examine the parallel operation on Social Health Insurance (SHI) and Private Health insurance (PHI) schemes against this household health financing contribution. Moreover, we explain the importance of studying OOP healthcare payments. Further, we provide an overview of the Greek health system by overviewing also its fiscal and health financing features. The same brief approach is employed for several other affected by the current crisis countries. In turn, we quote the literature gaps, central aims, research objectives and hypotheses of this thesis, by presenting also its contribution to available empirical literature research. Finally, the structure of this thesis is presented.

1.1 Story of the study

In this study we address three main issues (see section 1.4). First, we want to test the effectiveness of SHI on OOP payments restraint and investigate any catastrophic impact of OOP spending on insured well-being in a high-income economy, Greece, with a well-developed national health system. Thus, we examine SHI effect on financial burden or even potential economic catastrophe that OOP payments bring on insured living standards for private hospital healthcare in Greece. In addition, we access the drivers affecting this OOP spending. Second, we test whether additional PHI to statutory SHI is effective in declining insured financial ruin or catastrophe by OOP payments, as well as, we examine overall health financing equity for private hospital expenditure. Using micro-data cases gathered from two cross sectional surveys in Greece during the year 2013, we employ the widely accepted methodology for measuring OOP payments catastrophic effect on insured well-being and health financing fairness, as well as, we model SHI and PHI financing on influencing OOP spending in order to test our research hypotheses. The survey comprises insured information regarding SHI, PHI, OOP funding for private hospitalization, while several respondents' socio-economic and healthcare characteristics are also collected.

Third, we investigate the effect of macroeconomy, governmental and PHI funding on OOP expenditure in a macro-level approach, by employing econometric panel data methodology to a homogeneous dataset of 26 EU and OECD countries for a period lasting from 1995 to 2013, which was adopted by official organization databases.

Our thesis principally aims at providing knowledge that OOP payments can have a catastrophic impact on insured living standards in an advanced European health system, regardless of having a well-established national health insurance risk-pooling mechanism; and secondly to contributing on existing empirical literature by giving evidence that the statutory public health insurance supplemented by PHI can have a negative impact on financial consequences or catastrophe that OOP payments brings on households well-being, both at a micro and macro-data level approach examination.

OOP payments represent households or individuals' private expenses for healthcare services or products, excluding any public or private health insurance reimbursement (Chen et al., 2012; Mossialos & Thomson, 2002). Given that the majority of population in European and OECD countries is publiced-compulsorily or privately health insurance coveraged, the reasonable situation that everyone should expect is OOP payments to be accounted for low proportion to health systems total financing. Nevertheless, OOP payments range from 25% to almost 50% of total health financing for several European and OECD economies, such as Cyprus, Bulgaria, Chile, Greece, Korea Republic, Latvia, Lithuania, Mexico, Portugal and Spain (Eurostat, 2017; OECD, 2017a). Such OOP spending levels are comparable only to developing settings with insufficient health insurance risk-pooling mechanisms in Asia[1], Africa[2] and Latin America[3] region (WHO, 2017a). National health systems over-reliance on OOP payments can incur financial ruin, financial catastrophe to health consumers or even can push households into poverty (Xu et al., 2003). Furthermore, the presence of OOP payments brings barriers on healthcare access and promotes financial insecurity since it compels households to sacrifice financial resources in order to cope with them (Saksena et al., 2014; Van Doorslaer et al., 2005; Wagstaff et al., 1999).

Although, World Health Organization's (WHO) financing agenda since 2008 and United Nations (UN) Sustainable Development Goals (SDG's)[4] framework suggest that countries have to promote financial protection against OOP payments for healthcare, government decision making in several European countries proceeded on fiscal stability measures rather than ensuring state health funding (WHO, 2017; Mladovsky et al., 2012; WHO, 2008). The originated economic shocks (e.g. GDP falls, high unemployment rates) by the 2008 financial crisis and the over the years problematic fiscal adjustment (*i.e.* high level of public debt and deficits) for several European economies, drove governments in several cuts of social welfare benefits, including state health financing (McKee et al., 2012; Kentikelenis et al., 2011). As a result, governments in Italy, Spain and the UK declined public health expenditure to offset fiscal weaknesses, while the policy cuts were more severe for Greece, Ireland and Portugal (OECD, 2017a; Pereirinha and Murteira, 2016, Nolan et al., 2015; Reeves et al., 2014). The employed tough political actions on attending only fiscal compliance objectives for the aforementioned countries had resulted in an increase of their OOP payments levels (OECD, 2017a; Goranitis et al., 2014).

1.2 Background and motivation of the study

The financial crisis that the Globe is currently experiencing proved to be extremely painful as regards funding existing health care systems. In Greece, in the midst of rapid changes and

[1] E.g. Bangladesh, India, Myanmar, Sri Lanka and Vietnam.
[2] E.g. Cameroon, Cote de Ivoir, Nigeria, Niger and Uganda.
[3] E.g. Argentina, Eguador, Guatemala and Venezuela.
[4] In June 2016, the UN Statistical Commision proposed and implied a final list of 230 SDG's which are attributed as indicators (goals and targets from the 2030 Agenda). The SDG 3 and its dissagregated component indicator 3.8 concerns the "*lack of financial protection coverage*" in health (WHO, 2017). Indicator 3.8 defines the impact of households private payments (OOP) for meeting healthcare needs on their living standards.

reforms[5], which all lead to greater curbing of public health spending, adverse effects are presented concerning population health status and financing (Karanikolos et al., 2013). Further, a study of Vandoros et al. (2013) provided evidence that health trends in Greece deteriorated as a result of the recent financial crisis. The deficits in public finances and the sanitization experiments of the Country's external creditors have led the health system to a standstill and the very promising national health insurance reform (National Organization for the Provision of Health Services (EOPYY)) in doubt. The Greek public health spending is one of the lowest among OECD countries both as a percentage of Gross Domestic Product (GDP) and Total Health Expenditure (THE), while on the other hand the total health financing for medical expenses is mainly relied on household current income and savings, widely known in the literature as OOP payments. As a result, PHI financing in Greece exhibits negligible levels as a proportion of THE (Economou, 2010; Siskou et al., 2009).

To date, much of the literature on health economics and finance advocates that households OOP direct and informal outlays in cash prevent poor people for receiving needed healthcare as well as causes financial burden or even catastrophe for millions of those who have to face health shocks (O' Donnell et al., 2008; Wagstaff and Van Doorslaer, 2003; Xu et al., 2003).

While a substantial number of published studies have examined catastrophic health care OOP payments, the majority of them focuses on developing and low-income countries, with rudimentary public health coverage (e.g. Flores and O'Donnell, 2016; Alam and Mahal, 2014; Ekwochi et al., 2014; Onwujekwe et al., 2014; Van Minh et al., 2013; O'Donnell et al., 2008; Doorslaer et al., 2005; Wagstaff and Van Doorslaer, 2003).

Little evidence exists about high or catastrophic OOP payments in high-income economies in the post 2008 environment and on-going recession period for several of them, since previous published work had provide findings by only using data until 2011 (e.g. Baird, 2016; Quintal and Lopes, 2016; Zawada et al., 2016; Kronenberg and Barros, 2014; Scheil-Adlung and Bonan, 2013; Luczak and García-Gómez, 2012; Dukhan et al. 2010). This study fills the gap in the literature by examining the financial burden of OOP payments for inpatient health care for a high-income country, Greece, with well-developed and organized public health insurance arrangements, which currently faces fiscal hardships due to the 2008 financial crisis.

Further, Paccagnella et al. (2013:290) noted that surprisingly remains an unanswered question whether PHI is effective in reducing OOP spending for individuals despite the previous work

[5] General fiscal restraint measures and reforms promoted in the country under the Medium Term Fiscal Strategy 2012-2013 as a follow up program of the Fiscal Adjustment and Structural Reform 2009-2014.

by other authors (Schultz and Tadesse, 2006; Holly et al., 2005). This study fills the gap by providing empirical evidence on the effect of combining SHI and PHI on individuals' OOP medical expenses for a wide range of ages.

Finally, although, an extensive part of the literature focuses on plenty macroeconomic and health funding determinants impact on THE, empirical evidence concerning the influence of several macroeconomic and health financing factors on OOP expenditures is limited (e.g. Fan and Savedoff, 2012:8). Additionally, the existing empirical knowledge about the potential impact of PHI on OOP expenditures is still scarce (e.g. Palaşcă and Enea, 2014). Motivated by existing literature, we apply both random effects and dynamic models to give evidence that several macroeconomic and health financing factors are associated with OOP expenditures, using panel data for 26 European and OECD countries from 1995 to 2013.

Given the purpose of this study, it is interesting to be examined, whether the population of a developed country faces huge or even catastrophic OOP payments. Since, financial crisis strains public and private financing resources (Thomson et al., 2014; Mladovsky et al., 2012), one of the most essential factor on health systems (Xu et al., 2011), it would be useful for households, governments and policy-makers, to examine whether an alternative prepayment scheme such as the SHI with parallel PHI coverage could have an inversely association with OOP spending. Further, acquiring more knowledge regarding the influence of several macroeconomic and health financing factors on OOP payments drives this research to contribute to the existing empirical literature and governmental plans on this matter. By providing empirical evidence for the effect of macroeconomy, public and PHI financing on OOP spending also at a macro-data level approach, we consider lessons for future health financing decision making by policy-planners, especially on periods of deep recession, such as the post 2008 economic environment. Policymakers and political actions should take carefully into consideration in designing health system financing to remove population financial insecurity due to high OOP payments.

Greece, a developed country, hardest hit by recession severity among others (Ifanti et al., 2013) exhibited a chance to examine how macroeconomy and health financing affect OOP payments. The high proportion of OOP payments to THE for several countries has always been a major issue of their health care systems, since their over-reliance on OOP spending has short and long term threats to the wellbeing of households both in developed and developing countries (WHO, 2015; Van Doorslaer et al., 2005; Xu et al., 2003).

The importance of studying OOP healthcare payments

Enhancing knowledge about the drivers of OOP expenditures is an important tool for national health systems policymakers. According to the WHO every year 250 million people suffer financially because of OOP payments for healthcare services (WHO, 2016). Despite the fact that financial protection against household private health expenditures is a fundamental policy goal for healthcare systems and WHO's financing agenda (WHO, 2008), several European and OECD countries rely significantly on OOP healthcare payments (OECD, 2015). The term financial protection attributes health insurance coverage against population OOP medical costs when seeking for healthcare. Its main objective is to prevent patients to become poor due to the utilization of health services as well to enable people for overtaking a great dilemma; forgoing medical treatment due to unaffordability and maintaining well-being standards or incurring high burden of medical OOP expenses (WHO, 2008).

The high share of OOP payments to family income can impose financial hardship, financial catastrophe or even impoverishment on households not only in low-middle income countries but in high income countries too (Xu et al., 2007; Xu et al., 2005; Murray et al., 2003). A pioneering study in the research field of health economics reveals that there is a positive relationship between the percentage of OOP payments to THE and the proportion of households facing catastrophic medical spending. Amongst low-income countries (e.g. Azerbaijan, Lebanon, Peru, Vietnam and Zambia) also high-income settings, such as Portugal, Spain, Greece, Switzerland and the USA present significant proportions of households incurring financial catastrophe due to medical costs, despite the presence of developed national or social insurance mechanisms (see section 3.1.1 for more information) (Xu et al., 2003). Hence, for all countries irrespective of income level, increases of THE funded by OOP payments are associated with greater proportion of households facing financial catastrophe from healthcare expenses.

High OOP spending for healthcare is not solely responsible for financial catastrophe, albeit reflecting low health insurance financing from official pre-payments risk pooling schemes. Therefore, the absence of health insurance arrangements for several low-income countries and the permanent state healthcare underfinancing for several developed, constitute the causative factors of OOP payments globally.

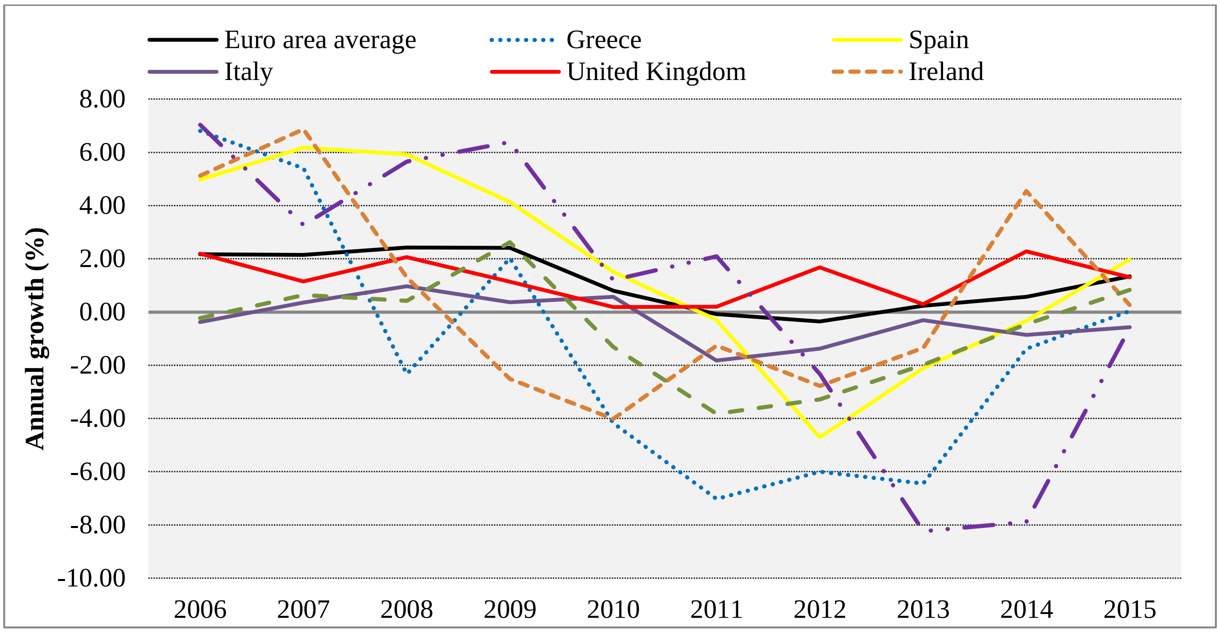
In addition, OOP payments in the healthcare financing sector are considered by the literature to have short and long term threats to the wellbeing of households and individuals both in developed and developing countries (see Van Doorslaer et al., 2005; Xu et al., 2003). Overall, the OOP spending produces health care funding inequity; as the most regressive form of health financing (Frenk and Knaul, 2002) and financial insecurity since it deprives household economy from valuable financial resources (Saksena et al., 2014; Van Doorslaer et al., 2007).

A question that looks for an answer is why it is appropriate to study this topic at this time. Since the outburst of the financial crisis of 2008, several OECD and European countries had reduced their funding on health as part of broader efforts to limit the large fiscal deficits and rising debt ratios to GDP (OECD, 2015b). At the beginning of the financial crisis in 2007/2008, European politicians had two options; bailing out or not banking and financial sector. They preferred to absorb bank debts in state budgets sheets, resulting in high levels of government deficits, which were also assisted by the negative economic climate and expanded recession (Reeves et al., 2014). Greece was not an exception from these political actions in order to ensure financial stability (Gerhardt et al., 2017; Repousis, 2015).

Not surprisingly, a group of European countries (e.g. Cyprus, Greece, Ireland, Portugal and Spain), which have been severely affected by the financial crisis and economic downturns (e.g. national income fall, high unemployment rates) had to follow the rigorous fiscal discipline in order to succeed in ensuring public finances consolidation (Goranitis et al., 2014; Reeves et al., 2013). Economic recovery and public debt declines, following the fiscal consensus of international institutions, require radical cuts on general government spending on all public sector activities (e.g. defense, education, health, wages – pensions etc.). In parallel, austerity measures also comprise painful direct and indirect taxation (Reeves et al. 2013).

Figure 1.1 testifies that governmental actions to offset public escalating debts and deficits burden led to generalized public spending cuts on several European countries the period 2009-2013. Greece, Cyprus, Ireland, Italy, Portugal, Spain and the UK proceeded in significant declines of general government expenditure post to 2010, indicating that public spending is driven by GDP falls in these countries, following up a pro-cyclical direction (McKee et al., 2012).

Figure 1.1: General government final consumption expenditure (annual % growth) for selected European countries, from 2006 to 2015



1. Annual percentage growth of general government final consumption expenditure based on constant local currency. Aggregates are based on constant 2010 U.S. dollars. General government final consumption expenditure (general government consumption) includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditure on national defense and security, but excludes government military expenditures that are part of government capital formation. Indicator code by World Bank: NE.CON.GOVT.KD.ZG

Source: World Bank (2017) World Bank national accounts data, and OECD National Accounts data files: Data from database: World Development Indicators (http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators#). Data extracted on 15 May 2017.

Particularly, in those European countries with significant fiscal problems and high unemployment rates, the financing of public health spending noted declined rates. Governmental leaderships like British, Greek, Irish, Italian, Spanish and Portuguese had adopted strict fiscal austerity paths and therefore their economies continue to decline incurring pressure on healthcare system financing (Karanikolos et al., 2013).

Benefits cuts or cost sharing policies through advanced deductibles, co-insurance, and co-payment rates [6] on state health insurance reimbursements constitute a useful tool for policymakers to discourage unnecessary healthcare and controlling public health spending (Drechsler and Jutting, 2007). Formal patient cost-sharing represents an alternative source of funds for social and private health insurance schemes (Robinson, 2002). It provides as a cost-containment tool, since health insurance mechanisms shift a fraction of healthcare expenses to households budgets (see for more information theory section 2.3) (Saltman and Figueras, 1998).

[6] The most common forms of formal patient cost sharing are represented by deductibles, co-payment and co-insurance both for SHI and PHI arrangements. Publicly or privately insured (*i.e.* health consumers) are required to pay some of the provided medical expenses of their health insurance plans, through deductibles (*i.e.* insurance requires from health consumer to pay a fixed amount before any health insurance plan reimbursement), co-insurance (*i.e.* it represents a fixed percentage of each medical service) and co-payment (*i.e.* a fixed amount paid by insured for each received medical service).

However, these policies increase households OOP payments (Reeves et al., 2014). State should focus on reducing insured OOP payments, which are excessive and often catastrophic, especially for the vulnerable groups of population (e.g. poor, unemployed, disabled etc.).

The findings of the literature and the messages for the tough upcoming fiscal policies on government health funding for countries in deep recession, emerge as a great concern for healthcare policy-makers (see Reeves et al., 2014). Policy-makers have to adopt measures in order to drastically reduce OOP payments to THE in several OECD and European healthcare systems. Alleviation of OOP spending can be achieved through the raise of public spending and the co-operation of social and private health insurance. The first proposal in the current situation is quite difficult to be implemented due to the serious fiscal problems of several countries worldwide. Although WHO recommends that governmental plans should ensure sufficient public resources on achieving financial protection to their citizens and thus eliminating direct and indirect OOP spending (WHO, 2008), the proponents (*i.e*. international financial institutions) of fiscal consolidation are totally opposed with the concept of promoting social welfare objectives (McKee and Stuckler, 2011).

A reliable mechanism to reduce the financial insecurity of households high OOP spending is the more active involvement of PHI in SHI plans. The fiscal inability of countries, such as Greece, (e.g. to arrange black economy and corruption issues, to collect taxes and insurance contributions for increasing public health resources) it may impose on health policy-makers to pay more attention on the potential of PHI to supplement SHI. Ensuring financial protection through mixed insurance schemes will facilitate OOP expenditure to be declined and public health resources to be channeled on health spending for poor and vulnerable groups of population.

Contextualization

Greece over the years exhibits fiscal weaknesses as a result of its high public debt even in the pre-crisis era (Thomson et al., 2014). Due to this fiscal pressure Greece required financial assistance on the form of bailout rescue packages from European Commission (EC), European Central Bank (ECB) and International Monetary Fund (IMF) (so called, Troika) in 2010 (Thomson et al., 2014). Greece in order to receive external financial assistance had committed to unremittingly implement unprecedented rigorous reforms since the middle of 2010. Moreover, until nowadays, two further Economic Adjustment Programmes (EAPs) followed up the first in order Country to meet its creditors' fiscal compliance requirements and address its future economic challenges, the second in 2012 and the third one in 2015

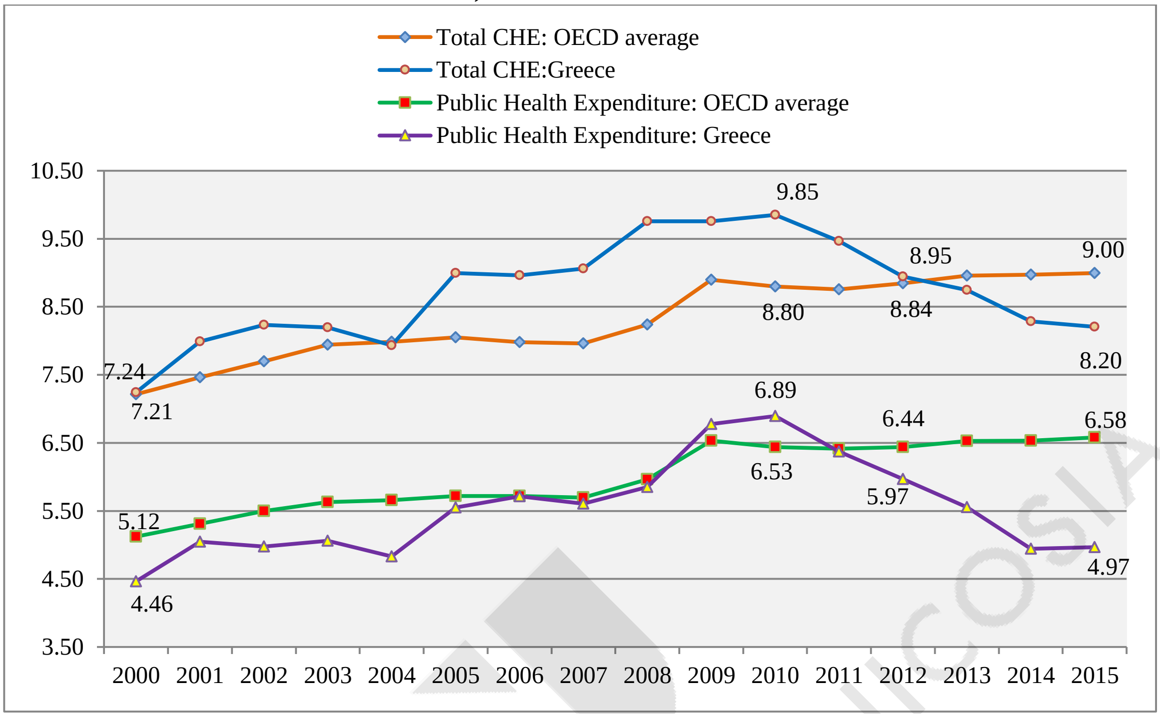
(Eurostat, 2017; Economou et al., 2014). Equivalents of these financial assistance bailouts included the implementation of several tough austerity measures by the Greek government, including deep declines in general public spending and regressive increases in general taxation (Economou et al., 2014). The official statistics indicate that the adopted structural adjustment policies weakened the Greek economy further and have not led to the expected results. Particularly, Gross Domestic Product (GDP) in 2014 recorded a sharp decline 26.03%, compared with this of 2008 (OECD, 2015). For the same year, the consolidated government gross debt reached the 177.1% of GDP, the government deficit was amounted to -3.5% of GDP and the unemployment rate reached the 26.5% of total labour force (Eurostat, 2015).

Therefore, Greece, in order to obviate a potential fiscal default in 2010, agreed to and received a bailout rescue package €110 billion from the EC, ECB and IMF with the precondition to proceed in significant cuts of public sector expenses, including health financing (Economou et al., 2014; Polyzos et al., 2013). Under this fiscal context, the Greek healthcare system like all social welfare arrangements in the Country, came under financing pressure. The rigorous economic policy conditionality of IMF, ECB and EU focused, amongst other, on Greek health sector spending, which was enjoying great volumes before the lending agreements. Particularly, the Greek THE climbed from 7.24% of GDP in 2000 to 9.85% in 2010, indicating an extravagant growth rate (37.5%) compared to other OECD countries (see figure 1.2). The rapid growth was mainly driven by the public healthcare spending increases in the same period (OECD, 2017a). Goranitis et al. (2014:280) provides useful insights regarding the generosity of the Greek governments on health budgets before the EAPs. Especially, because of the public health spending elevation from 2005 to 2009, which accounted for almost the 20% of the cumulative fiscal national deficit, and the total health financing allocation nearly to 10% of GDP, the Greek health sector inevitably was came under Troika's monitoring magnifier.

Since then, the national health statistics scenery had dramatically reversed post to lending agreements in 2010. More specifically, the three external creditors of Greece required a stabilization of THE to GDP at 9% and a decline of public health financing to less under 6% of GDP, in 2012. The Greek government managed to reach 5.97% of GDP for public health spending in 2012 (OECD, 2017a; Economou et al., 2014). The continuous rigorous health financing agenda in the Country had managed to impose cost-containment in all public health spending activities, incurring even larger declines to public health spending. Several cuts on outpatient, inpatient and pharmaceutical expenditure caused considerable reductions in public health expenditure as a percentage of GDP. Particularly, this indicator accounted for 4.97% of

GDP in 2015, one of the lowest in OECD settings and far beyond than the Group's average; *i.e.* 6.58% for the same year (see figure 1.2) (OECD, 2017a).

Figure 1.2: Total current health expenditure and public health expenditure as percentage of GDP in Greece and OECD countries, 2000-2015



1. According to the OECD Health Data, total Current Health Expenditures (CHE) *"is the sum of total personal and total collective services but not including investment (gross capital formation in health)"* (OECD, 2015a:2)
2. Funds for public health financing are allocated from government schemes and compulsory contributory health care financing schemes. (http://stats.oecd.org/Index.aspx?DataSetCode=SHA#).
Source: OECD (2017a) Health Expenditure and Financing Database (http://stats.oecd.org/#). Authors' calculations based on OECD health statistics and expenditure data (OECD, 2017a). Data extracted on 15 May 2017 from OECD.Stat

Further, in the context of dramatic budget reductions for health funding, greater levels of patient cost sharing were inevitably necessary to be applied by Greek authorities. Policy responses in public health funding encompassed huge cuts in health service benefits and shifting costs to health consumers either by applying higher formal cost patient involvement (e.g. co-payments) or by adopting policy instruments that lead patients to seek health care in the private sector (Cylus et al., 2012).

Greek policy-makers concentrated only on achieving fiscal adjustments disregarding the fact that these harsh austerity measures would result in growth of OOP spending especially as a consequence of inequitable climate of health financing (Goranitis et al., 2014; Wagstaff et al., 1999). Similarly, apart from Greece, several other developed European countries, such as Cyprus, Ireland, Italy, Portugal, Spain and the UK had also been affected by the recent financial crisis, and thus have to adopt considerable cuts to public health spending as a part of the broader governmental efforts to limit general state expenditure (OECD, 2017a; Reeves et al., 2014; Thomson et al., 2014). Specifically, Spanish and Italian healthcare systems also met significant falls of governmental health funding because of the implemented austerity policies on their general government budgets as a counterbalance of their chronic fiscal weaknesses (Bosch et al., 2014; De Belvis et al., 2012).

Despite the fact that the main objective of health systems is to encourage risk pooling mechanisms against high OOP payments (Dukhan et al., 2010), the implementation of public budget restraints due to the bailout agreements on health for countries such as Greece, Cyprus, Portugal, Ireland caused negative effects on health care utilization and financing (Goranitis et al., 2014; Fahy, 2012). Nevertheless, before and after the significant cost-cutting strategies on health budgets, Greece traditionally exhibits one of the highest OOP spending ratios (formal and informal) amongst developed economies, almost 35.4% of total current health expenditure (CHE) for 2014 and much greater than the average of the OECD group (OECD, 2017a). Greek public health financing to total current health expenditure is diachronically lower than the OECD average as it is illustrated in Table 1.1. The financing of health system through PHI over the years records minimal proportion to total health funding, and particularly less than 4% in 2014 (OECD, 2014; Biro, 2009). Since health risk is unpredictable the aforementioned statistics suggest that such high OOP payments may incur financial catastrophe to a large population segment even in a developed economy like Greece with an advanced health system (Xu et al., 2003).

Table 1.1: Health expenditure trends as a share (%) of total CHE in Greece, 2007-2014

Year	2007	2008	2009	2010	2011	2012	2013	2014
Public : Greece	61.86	59.94	69.46	69.97	67.29	66.69	63.52	59.65
Public: OECD average	71.09	71.92	73.16	72.97	72.94	72.37	72.41	72.23
PHI: Greece	..	2.19	2.09	2.72	2.82	3.24	3.23	3.74
PHI: OECD average	7.41	7.20	7.00	7.15	7.20	7.38	7.02	6.81
OOP expenditure: Greece	..	37.86	28.44	27.29	29.72	29.92	32.46	35.37
OOP expenditure: OECD average	20.77	20.38	19.67	19.81	19.63	19.99	20.21	20.64

1. Here, each health financing scheme is presented as a share (%) of total current health expenditure. Last updated in October 2016.
2. Current expenditure on health care or total current expenditure on health is the sum of total personal and total collective services, but not including investment (excluding capital expenditure).
4 The fact that Greece has recently adopted the OECD system of health accounts results in an unavailability of qualitative and quantitative health data before the year 2008. For instance, there is not official data regarding the allocation of public and private aggregate health expenditure for several years and for different types of healthcare providers and financing agents (Hellenic Statistical Authority, 2014)
Source: OECD (2017a) Health Expenditure and Financing Database (http://stats.oecd.org/#). Authors' calculations based on OECD health statistics and expenditure data (OECD, 2017a). Data extracted on 14 May 2017 from OECD.Stat

Amongst OECD settings Mexico, Korea, Latvia and Chile also exhibit considerable proportion of OOP payments as share of total current health expenditure. In the European economies, such as Cyprus, Greece, Portugal and Ireland, which were also hit by the financial crisis more than the rest EU members, OOP medical spending noted considerable increases since 2011 (OECD, 2017a; 2015). Similar patterns were also observed, in the Netherlands, Spain and the UK. OOP expenditure met significant rises post to the implemented strict policy responses, which were undertaken on these countries to meet cost-containments on their state health budgets, compared to the beginning of 2008 (OECD, 2017a).

Reeves et al. (2014:2) note that fiscal sustainability and public finances restoration, under fiscal monitoring by external financing institutions, are the catalyst drivers of the major declines in public health spending in several European countries. Contrary, in countries whereupon public and private health insurance financing dominate the healthcare funding landscape, their OOP expenditure share diachronically ranges in low levels and is much smaller than the OECD average (e.g. Canada, France, Germany, Luxemburg, Japan, New Zealand, Norway and Slovenia) (OECD, 2017a).

Although financial protection, equitable distribution and financing transparency are the main objectives of WHO’s health financing agenda (WHO, 2008b), paradoxically there is limited evidence regarding health systems funding of these severely affected countries by the 2008 economic crisis. Also, a paradoxical situation that comes to light is the low share of PHI funding in these countries with fiscal hardships such as Greece, Italy, Spain, Portugal and Cyprus, which over the years indicate remarkable OOP payments proportions. As OECD statistics indicate, policy-makers in these countries do not give serious consideration of PHI institution against OOP spending as a complementary risk pooling mechanism (Quesnel-Vallée et al., 2012:2).

1.3 Theoretical gaps in the related literature

This thesis was mainly inspired and motivated by the fact that secondary data from official databases reveals anecdotal evidence concerning the high or even catastrophic impact of OOP payments on households’ budgets in developed countries post to the 2008 financial crisis tough environment; and especially for them with high OOP spending to total financing (e.g. Cyprus, Chile, Greece, Korea Republic, Portugal etc.). Further, the empirical literature concerning catastrophic OOP spending for the developed European and OECD economies is limited, since the majority of published studies is focused on low and middle-income countries. Particularly for Greece, albeit several published studies have dedicated remarkable effort to examining formal and informal OOP spending for Greek population, however they have not provided insights for the catastrophic impact of health expenditures to households or individuals livings standards (e.g. Souliotis et al., 2016; Kaitelidou et al., 2013; Liaropoulos et al., 2008; Siskou et al., 2008).

Further, there is no empirical evidence concerning the effect of complementary or supplementary PHI parallel to mandatory SHI on OOP spending for hospitalization events in a high-income economy with an advanced health insurance system. Finally, previous empirical research for investigating the effect of several macroeconomic and health financing drivers on OOP expenditure, ignores to address the potential impact of PHI on this type of health expenditure (e.g. Keegan et al., 2013; Xu et al., 2011).

The main blueprint of this thesis (presented in Chapter 5) is based on three studies following a part-publishable paper format. In each of these studies we focus on filling the gap and contributing in the available literature, concerning the responsiveness of OOP spending to national, social, private health insurance financing in a micro and macro-data level approach. Throughout this study we use the term micro-data to describe any data at an individually level and we consider as macro-data the aggregated one which is available from organization on-line databases.

There are several approaches for examining healthcare expenditures in the literature. Some published studies use micro-level household data (e.g. Van Doorslaer et al. 2006; Wagstaff and Van Doorlaer, 2003) while others use aggregated macroeconomic data (e.g. Xu et al., 2011). Given the purpose of our study we use both micro-level and macroeconomic for testing the selected health funding variables and providing findings.

In the first two studies we examine the influence of SHI and PHI on OOP expenditure for Greek hospitalized insured in private providers. Particularly, in the micro-data approach, we present in detail the impact of SHI and SHI and additional PHI on OOP spending for private hospitalization by collecting individually data over the year 2013. On the other hand, in the macro-data approach, we provide evidence regarding the effect of PHI institution on OOP expenditure, using panel data country-level regression analysis, for several OECD and European settings.

The rationale of the thesis rests upon the significant empirical gaps that exist in the available literature and are described in each of our three studies, regarding:

Gap I (GI): The catastrophic OOP payments impact on households / individuals welfare, apart from developing and low-income countries, in a high-income too. There appears to be limited evidence about catastrophic OOP payments in developed economies in the post 2008 environment, especially for countries suffering from fiscal problems as a result of the current financial crisis.

Gap II (GII): The potential of PHI to promote financial protection by supplementing SHI, against OOP payments, using micro-data on the current economic situation and for a wide range of ages.

Gap III (GIII): The responsiveness of OOP expenditure to several macroeconomic, public and especially PHI financing in a macro-data approach, pre and post the 2008 economic climate for European and OECD countries.

More specifically:

Gap in Study I: Out of Pocket Payments and Social Health Insurance for private hospital care: Evidence from Greece

A substantial number of published studies has examined the catastrophic impact of OOP payments for health care in developing and low-middle income countries, with rudimentary public health coverage (e.g. Flores and O'Donnell, 2016; Kwesiga et al., 2015; Narci et al., 2015; Rashad and Sharaf, 2015; Onwujekwe et al., 2014; Van Minh et al., 2013; Arsenijevic et al., 2013; Selvaraj and Karan, 2012; Bredenkamp et al., 2011; Galárraga et al., 2010; Yardim et al., 2010; O'Donnell et al., 2008; Doorslaer et al., 2005; Falkingham, 2004; Wagstaff and Van Doorslaer, 2003). Further, several studies have investigated the high or even catastrophic effect of OOP spending for health care in developed and high-income countries using data before the 2007/2008 financial crisis (e.g. Kronenberg and Barros, 2014; Scheil-Adlung and Bonan, 2013; Luczak and García-Gómez, 2012; Dukhan et al. 2010; Liaropoulos et al., 2008; Siskou et al., 2008; Habicht et al., 2006; Merlis et al., 2006; Waters et al., 2004; Murray et al., 2003; Xu et al., 2003). Overall, the above mentioned studies provide evidence that catastrophic OOP spending has short and long run financial consequences for both developing and developed countries, despite the fact that households are supposed to be protected by health systems against high OOP health care expenses. However, only a handful of studies use recent data (and only until 2010/2011), for examining the catastrophic impact of OOP payments on households wellbeing in high-income and developed countries (e.g. Baird, 2016a; Quintal and Lopes, 2016; Zawada et al., 2016). Thus, little evidence exists concerning the financial catastrophe of individuals and households as a result of OOP spending after the major health public retrenchments in the financial crisis era and its effects on developed economies health system financing.

Gap in Study II: Combined social and private health insurance versus catastrophic out of pocket payments for private hospital care in Greece

Furthermore, although there exists a limited body of literature regarding the effect of PHI on OOP payments in several developed European countries, such studies only focused on the over 50s age group and used data prior to the financial crisis (Paccagnella et al., 2013; Schultz and Tadesse, 2006; Holly et al., 2005). The empirical literature has not, so far, provided any evidence concerning the effects on OOP spending of complementary PHI to SHI for a wide range of ages in developed countries. Despite the fact that one of the desired effects of PHI is to promote financial protection (Sekhri and Savedoff, 2005), paradoxically there is a gap in the empirical analysis on the effect of SHI and additional PHI on OOP spending, especially for countries like Greece, which were plagued by the economic crisis and have been suffered from health spending cuts.

Gap in Study III: Macroeconomic and financing determinants of out of pocket payments in health care: Evidence from 26 E.U. and OECD countries

The majority of the literature demonstrates that national income (GDP) variations constitute the predominant factor affecting aggregate health expenditures (Hartwig and Sturm, 2014; Farag et al., 2012; Jönsson and Eckerlund, 2003). However, evidence on the impact of several macroeconomic and health financing factors to OOP expenditures is still scarce. Fan and Savedoff (2012) and Clemente et al. (2004) note that much work has been done to examine several explanatory factors of THE, whilst very little attention has been paid in the literature regarding the potential drivers of OOP spending. Especially for PHI institution potential impact on OOP expenditures, the existing empirical literature presents a gap, although previous studies have already well documented the impact of a multitude of other parameters (macroeconomic and public health expenditure factors) on OOP spending (Keegan et al., 2013; Fan and Savedoff, 2012; Xu et al., 2011; Clemente et al., 2004; Musgrove et al., 2002).

1.4 Central aims, research objectives and contributions of the thesis

Having established the health financing context post to the current crisis and the examined literature gaps, we now present the central aim, specific research objectives and the contribution of this thesis to the existing literature.

1.4.1 Aims

This study aims to demonstrate that even the population of a high-income OECD setting, Greece, with a theoretically well-developed national and SHI system, can be exposed to high financial burden or catastrophe due to OOP payments. Further, the aim of this thesis is to develop a conceptual framework concerning the potentiality of SHI and PHI parallel coverage operation against the high or even catastrophic impact of OOP healthcare payments on individuals' welfare, through the first two studies. Moreover, we consider, that the developed research on the determinants of OOP health care spending in the third study, contributes to existing theory and provides to policy-makers more knowledge to deal with this matter.

Evidence for this study was drawn from Greece, a developed country with an advanced health system currently facing sharp cuts of health budgets (as explained before).

The overall contribution of this thesis is to provide additional evidence concerning the financial catastrophic impact of OOP healthcare payments on households budget for high-income country, Greece. We implement the widely accepted methodology for quantifying the economic burden of OOP spending and adopt multiple and panel data regression analysis models at a micro and macro-data level approach, respectively. Our aim is to show that policy-makers and individuals can deal with private medical expenses by involving more PHI institution contribution on total health financing.

1.4.2 Research Objectives

1. To assess and measure the impact of OOP spending for hospital-based care in private hospitals contracted with the Greek SHI carrier on individuals' family budgets.
2. To empirically investigate the effect of combining SHI and additional PHI coverage on formal and informal OOP payments for a wide ranges of age brackets at a micro-data basis.
3. To assess the overall health financing equity for private hospitalization in affiliated providers with the new SHI organization.
4. To study how several macroeconomic conditions, governmental and PHI funding over the years affect the OOP expenditure.
5. On the basis of the examining, to revise the existing knowledge concerning the capability of SHI and additional PHI to deal with OOP payments by developing a new conceptual framework where the presence of the mandatory SHI and additional PHI, especially on hospitalization events, could have a countervailing effect on OOP spending · and also to flourish the existing literature on the effects of several macroeconomic factors public and private health financing factors on OOP expenditure.

More specifically, the objectives and the contribution to literature are presented below disaggregated by each study:

Study I**: **Out of Pocket Payments and Social Health Insurance for private hospital care: Evidence from Greece

The current study aims at investigating the extent and distribution of OOP payments of insured in private hospitals affiliated to the new SHI fund, evaluating OOP payments catastrophic impact on insured family budget as well as assessing the factors affecting OOP spending.

Furthermore, this study attempts to fill the literature gap (*i.e.* GI) regarding the presence of catastrophic OOP payments for inpatient health care in private providers in an EU country with a developed public insurance system like Greece. The study aims to quantitatively examine SHI and OOP funding allocation on hospitalization events in private hospitals with a particular focus on the effects on insured welfare, through widely accepted methods of measuring catastrophic health care payments and implementation of a multiple regression analysis.

Prominent among our findings is that we provide evidence, that individuals in a well-organized and developed SHI health system in a high-income European country, Greece, face catastrophic OOP payments. Our analysis shows that OOP payments for private hospitalization in Greece have a catastrophic impact especially amongst the poor people despite the theoretical ¨full¨coverage of SHI institutional agent.

Study II**: **Combined social and private health insurance versus catastrophic out of pocket payments for private hospital care in Greece

The main objective of this study is to investigate the effect of combining SHI and duplicate - complementary PHI coverage on OOP payments. Another aim is to assess the catastrophic impact of OOP payments on Greek individuals for hospital-based care in private hospitals contracted with the unique Greek SHI carrier. Further, in this study we examine how well the Greek national health system perform and distribute health payments to its insured enrollers. Conducting a cross sectional survey in Greece by employing the accepted methodology of measuring financial catastrophe of OOP payments on insured welfare, evaluating financing incidence analysis (FIA) by assessing progressivity of healthcare spending and finally by adopting a multiple regression-based approach, we aim to meet our research objectives.

This study contributes to the existing literature in several ways; a) we enhance the literature by examining the catastrophic impact of OOP spending for Greece, a developed country, after the outbreak of the 2008 financial crisis (*i.e.* GI), b) we fill the gap concerning the responsiveness of individuals' OOP payments to combining SHI and PHI coverage for a wide range of ages (*i.e*. GII) and c) our dataset is unique in that it includes information both for formal and informal OOP healthcare payments. The gathering of such data is a difficult task, due to the unofficial, illegal and "sensitive" character of informal healthcare spending, as it pointed out in the technical-computational contributions sub-section just few paragraphs below.

Our findings indicate that the combination of mandatory SHI and additional PHI has a strong offsetting effect on insured OOP payments for private hospitalization. Furthermore, our results show that SHI coverage funding is insufficient to limit insured OOP expenditure, while the health funding contribution by the worse-off is much greater than its share of financial ability to pay for inpatient healthcare. Additionally, we evaluate that poor people present a greater tendency to face financial catastrophe from OOP payments for hospital healthcare in private providers than the richer.

The high degree of reliance on OOP expenditures in Greece (and other heavily affected by the crisis countries) can turn out to be the starting point for policymakers to revise the currently ineffective of providing financial protection health systems. Our study considers lessons of promoting and developing a system based on the pillars of co-operation between SHI and PHI.

Study III*: *Macroeconomic and financing determinants of out of pocket payments in health care: Evidence from 26 E.U. and OECD countries

In this study, we implement panel data econometric analysis for 26 European and OECD countries for the period 1995-2013 in order to examine how OOP spending might be affected by various factors. This paper contributes to the existing literature in several ways; we extent the empirical literature concerning the impact of a) several macroeconomic parameters and b) governmental expenditures on OOP spending and c) finally by filling the gap (*i.e.* GIII) concerning the responsiveness of OOP expenditures to PHI funding.

Prominent among our findings is that PHI financing has a significant countervailing impact on OOP expenditure. According to our results, government health spending has also a negative effect on households OOP spending, totally aligned with existing empirical literature evidence. Further, we estimate that unemployment rate presents a significant positive influence on OOP expenditure. Several sensitivity tests to our econometric methodology show that our findings are robust.

Technical – Computational contributions in the research field

In addition to filling theoretical gaps in the literature the current thesis also makes technical and computational contributions in related research. The majority of the literature has treated OOP payments as an aggregate figure and it does not differentiate them on various categories (Sanwald and Theurl, 2014). In the current work a detailed presentation regarding information on health care OOP payments, SHI and PHI reimbursement financing associated with each individual hospitalization experience after a health shock in private hospitals has been made, in order to have a more illustrative picture of OOP spending categorization and SHI-PHI funding allocation.

We focus on private hospitals inpatient events because this kind of services, as compared with outpatient, results in high or even catastrophic OOP expenses for individuals (Lostao et al., 2014; Dutta and Husain, 2012). Peters et al. (2002) refer that almost 25% of the hospitalized patients in India impoverish due catastrophic OOP payments for receiving health care. A recent published study indicates that households financial catastrophe due to great levels of OOP expenditure is associated with inpatient health treatment in Argentina, Brazil, Chile, Colombia, Ecuador, Mexico and Uruguay rather than the limited affordability of Latin American patients (Amaya-Lara, 2016).

Furthermore, Shin (2012) finds evidence that PHI in South Korea has a limited negative impact on OOP spending and concludes that there is need for further research on PHI coverage effects on OOP payments at an individual level. Further, Thomson et al. (2014) note that it is necessary to gather better data (disaggregated by income, more systematic analysis of catastrophic OOP spending) in order to fully understand the effects of the economic crisis on health care systems financial protection. In our study, we manage to gather data including the major financing resources of inpatient events; information on such hospital payment practices is not systematically available and extremely difficult to be collected (Paris et al., 2010).

Further, our study enriches the existing literature regarding informal spending on private health sector, where such OOP payments are not recorded by national tax authorities and remain aside from the official health payment systems (Souliotis et al., 2016).

In this thesis we compute catastrophic impact, progressivity measures and analyze SHI and PHI effect on OOP payments for micro – data cases despite the fact that information on such hospitalization events is not recorded and, hence it is difficult enough to be gathered, especially when it includes sensitive issue data, such as informal and illegal health payments from health consumers to health providers (Stepurko et al., 2010).

Table 1.2 presents the implemented conceptualization and correlation framework between our research hypotheses - questions and research objectives. Further, the adopted methodological framework and data analysis tools to test research hypotheses and meet research objectives are also displayed.

1.5 Research hypotheses

The fiscal pressure on Greek health budgets since 2010 as a result of the global economic crisis (Kaitelidou and Kouli, 2012), provides to this study the opportunity to shed more light on the effects of OOP to individuals' well-being in a developed economy and to assess the potentiality of co-operated pre-payment insurance mechanisms (mixed SHI and PHI schemes) to deal with OOP spending. Furthermore, it will be important to contribute to the existing empirical analysis respecting the association between macroeconomy and health expenditures, and especially concerning the effect of several macroeconomic and health financing conditions on OOP expenditure.

Summarily, the research hypotheses in this study are displayed below in a categorizeable way based on each study:

***Study I**: Out of Pocket Payments and Social Health Insurance for private hospital care: Evidence from Greece*

On evidence from the Greek SHI system, by using micro-data cases for private hospitalization collected from a cross-sectional survey in Greece, the study addresses the following research hypotheses:

H1a. Greek SHI efficiently protects its insured members against financial burden or catastrophe due to OOP payments for private hospitalization healthcare.

H1b. Greek hospitalized insured do not incur catastrophic health costs relative to their income.

***Study II**: Combined social and private health insurance versus catastrophic out of pocket payments for private hospital care in Greece*

Using evidence drawn from the financially hard-pressed Greek health care system for private hospitalization, the study tests the following research hypotheses:

H2a. The SHI funding has a countervailing impact on OOP payments.

H2b. Mandatory SHI combined with PHI reduces OOP payments.

H2c. Compulsory SHI and SHI with additional PHI protect individuals from catastrophic health expenditures.

H2d. The Greek health care system financing for private inpatient services is not equitable.

***Study III**: Macroeconomic and financing determinants of out of pocket payments in health care: Evidence from 26 E.U. and OECD countries*

In particular, in addition to the gap (GIII) in the literature, regarding the effect of macroeconomic perspective, governmental and PHI funding on OOP expenditures, this study tests the following research hypotheses:

H3a. The PHI financing has a negative effect on OOP spending.

H3b. The General Government Health Expenditure (GGHE) as a share of THE also has an inversely impact on OOP spending.

H3c. Other macroeconomic factors are associated with OOP spending.

Table 1.2: The analytical conceptualization framework of the study

	Gap in the empirical literature	Research Hypotheses	Relates to Research Objective(s) - Contributions	Proposed Methodological Tool and Data Analysis
Study I.	**GI**: The catastrophic OOP payments impact on households / individuals welfare, apart from developing and low-income countries, in a high-income too.	1. Greek SHI efficiently protects its insured members against financial burden or catastrophe due to OOP payments for private hospitalization healthcare. 2. Greek hospitalized insured do not incur catastrophic health costs relative to their income.	This study attempts to fill the literature gap regarding the presence of catastrophic OOP payments for inpatient health care in private providers in an E.U. country with a developed public insurance system; Greece	Systematic Review of the Literature. Survey Method - Interviews through a structured questionnaire. Documentation papers. Descriptive Statistics, regression analysis, literature computational methods for evaluating catastrophic OOP payments.
Study II.	**GII**: The potential of PHI to promote financial protection by supplementing SHI, against OOP payments, using micro-data on the current economic situation and for a wide range of ages.	1. The SHI funding has a countervailing impact on OOP payments. 2. Mandatory SHI combined with PHI reduces OOP payments. 3. Compulsory SHI and SHI with additional PHI protect individuals from catastrophic health expenditures. 4. The Greek health care system financing for private inpatient services is not equitable.	a) we enhance the literature by examining the catastrophic impact of OOP spending for Greece, a developed country, after the outbreak of the 2008 financial crisis, b) we fill the gap concerning the responsiveness of individuals' OOP payments to combining SHI and PHI coverage for a wide range of ages and c) our dataset is unique in that it includes information both for formal and informal OOP healthcare payments. The gathering of such data is a difficult task, due to the unofficial, illegal and "sensitive" character of informal healthcare spending.	Systematic Review of the Literature. Survey Method - Interviews through a structured questionnaire. Documentation papers. Descriptive Statistics, regression analysis, literature computational methods for evaluating catastrophic OOP payments and financing incidence analysis.
Study III.	**GIII.**: The most heavily affected by the fiscal crisis countries provided an opportunity also to examine how macroeconomy, public and especially PHI health financing affect OOP payments in a macro-data approach, pre and post the 2008 economic climate.	1. The PHI financing has a negative effect on OOP spending. 2. The General Government Health Expenditure (GGHE) as a share of THE also has an inversely impact on OOP spending. 3. Other macroeconomic factors are associated with OOP spending.	We extent the empirical literature concerning the impact of a) several macroeconomic parameters and b) governmental expenditures on OOP spending and c) finally by filling the gap concerning the responsiveness of OOP expenditures to PHI funding.	Systematic Review of the Literature. Access to on line databases. In this study, we implement panel data econometric analysis (random effect and dynamic models) for 26 European and OECD countries for the period 1995-2013 in order to examine how OOP spending might be affected by various factors.

1.6 Structure of the thesis

This study comprises six chapters. We have already pointed out what Chapter 1 comprises. Chapter 2 provides an analytical theory exploration of the health financing framework, while it also presents the health funding structure and its components for several countries around the world. Further, we analyze the basic financing schemes and institutional units classified by the two basic contributor axes; public and private health financing. Health financing concepts are being presented by providing representative paradigms of several national health systems structure and funding mechanisms. Additionally, we merely aim to introduce the reader to the concepts of financial risk protection and equity in health financing, by analytically presenting the available literature for measuring the financial impact of OOP payments on households living standards, by extensively providing the widely accepted literature computational tools for estimating catastrophic OOP spending and financing incidence analysis (FIA).

In chapter 3 we provide international experiences concerning the high or even catastrophic OOP spending, as well as, empirical evidence about fairness in health financing are also exhibited. Finally, in this chapter we provide the available empirical literature concerning the impact of plenty macroeconomic and health financing determinants on OOP expenditure.

Chapter 4 pertains our study philosophical research approach. Particularly, we present our research philosophical standpoint of positivism and explain our research methodology framework, concerning the employed research approach, strategy, data collection procedure, data analysis and arrangement of ethical issues.

Chapter 5 includes our three empirical studies, which had been developed in this study. The common feature between these three developed studies is the impact of SHI, PHI and macroeconomic conditions on OOP payments, using micro and macro-data level approach for presenting evidence for the examined health financing linkage. In this regard, the remainder of each study is structured as follows. Firstly, we provide a brief abstract, and then we describe the data collection and sampling methodology, and present data definitions. Then, we explain the employed literature and econometric methodology. Finally, we illustrate our results, discuss them and conclude each study with policy implications.

Finally, in Chapter 6 we conclude our research study. We present the main findings of our three studies and provide concluding remarks. Further, we also present the main limitations of this study and potential considerations for further research concerning OOP healthcare spending.

Chapter 2

Theory and Description (background) of health financing systems

- **Financing of healthcare systems**
- **An overview of the Greek health financing system**
- **Financial protection and equity in health financing**

Introduction

This chapter begins by presenting an analytical theory and description overview of the healthcare financing theoretical and accounting framework for almost all the countries around the world. We mainly focus on explaining the health financing structure, flow and its disaggregated components for the EU and OECD countries, aiming to present a more homogenized view in accordance with our examined country in this thesis, Greece. Nevertheless, this chapter also details the structural, organizational and funding characteristics for several other healthcare systems in Africa, Latin America, Central - East Asia and Pacific region.

Further, we provide a detailed picture regarding the core structure of the healthcare financing system by analyzing the basic financing schemes and institutional units classified by the two basic contributor axes; public and private health financing. Under this perspective, public and private health financing are analyzed thoroughly by presenting also the main subcategories and features of them. Particularly, we present in an explanatory way, applications of healthcare financing schemes by providing representative paradigms of several national health systems structure and funding. Government, SHI, PHI and OOP payments funding are provided in this chapter in a readably way, by both utilizing numerical-statistical data and including figures and tables, in order to facilitate readers to make comparisons, gain scope and support any academic argument about these health financing schemes.

In turn, emphasis is also given to the Greek healthcare financing system by providing analytical patterns, trends and the most crucial reforms that have been implemented in the country post the 2008 economic climate.

Finally, in this chapter we introduce the concepts of financial risk protection and equity in health financing. Both of them constitute objectives of vital importance by national health systems globally. This third part of the chapter 2 begins with a brief analysis on the concept of financial risk protection against OOP healthcare payments, which over the years draws the attention of health economists, researchers and policymakers amongst all countries, irrespective of income classification level. In this context, this chapter enables the reader to gain insights about the link between households living standards and health-related OOP expenditures. Therefore, it is considered crucial to provide the available literature on measuring the financial impact of OOP payments on households wellbeing by different available resources denominators, to define financial catastrophe due to OOP payments and to present the widely accepted computational methods of measuring catastrophic OOP healthcare spending. In turn, emphasis is also given on financing incidence analysis (FIA), by providing perspectives on defining and measuring equity in health financing.

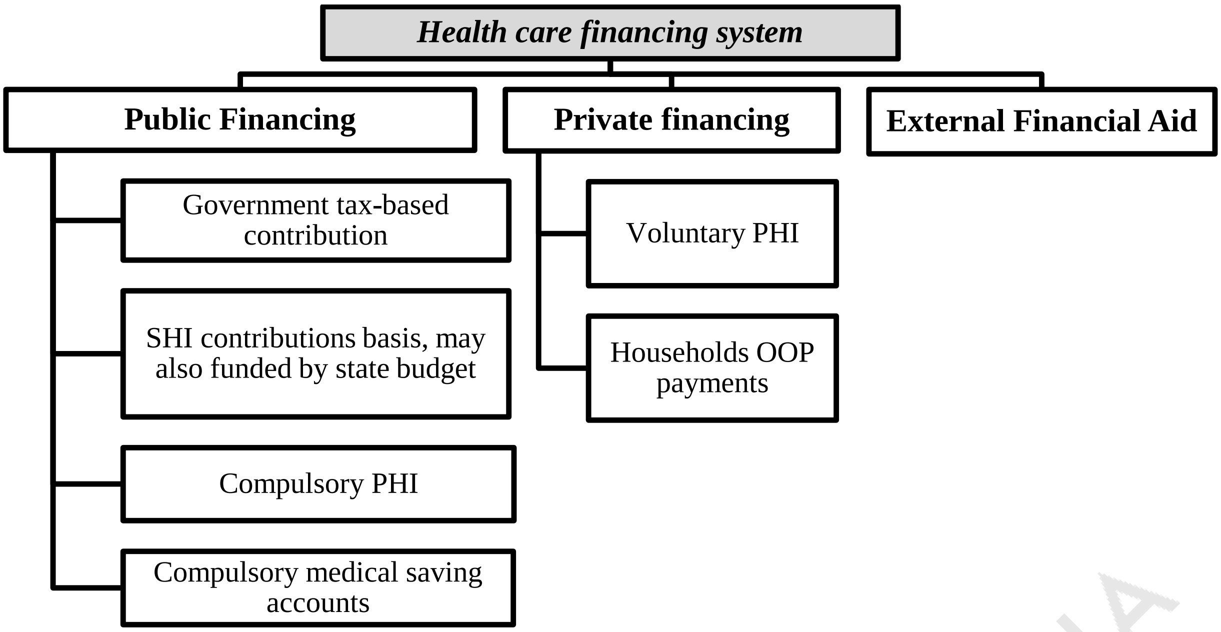
It is worth clarifying, that in this third part of the current chapter we mainly focus on exploring the empirical literature with a view to present the computational methodology adapted on examining, interpreting and discussing our study findings in accordance with our research hypotheses and objectives.

2.1 Financing of healthcare systems

Health financing is the most principal bedrock amongst all healthcare systems determinants since it has to generate, allocate and administrate the sufficient funding sources for the provision of healthcare services. Except of seeking and attaining funding available, health financing objective is also to provide equitable access and utilization on population to needed healthcare services alongside with the ensuring of efficient safe-nets against the risk of financial hardship (WHO, 2008).

The financing of healthcare system varies significantly between countries and within regions. Diachronically, the financing of health systems can be funded through public and/or private expenditure resources (Tanzi and Schuknecht, 2000). Most of the time the predominant type of funding source in a healthcare system characterizes and distinguishes national health systems in national health services (NHS), SHI and PHI schemes or even in a mix of all the latter; without being able to be ignored the importance of households and individuals' direct payments for healthcare (Cichon et al., 2009; Drechsler and Jütting, 2007). Comprehensively, the public financing pillar comprises the NHS systems which are mainly funded by taxation, the SHI systems that fund healthcare services through compulsory employees' and employers' contributions and finally the compulsory PHI and medical saving accounts schemes in a few national health systems (Paris et al., 2010; Cutler and Zeckhauser, 2000). On the other hand, voluntary PHI schemes operation parallel with the public insurance arrangements and household private medical spending, widely known as OOP payments, are counted as the private financing pillar (OECD, 2017; Shwetha and Bhat, 2014). In addition, external financial aid (e.g. from non-governmental organizations) support the healthcare financing system in several low-income and developing countries in a non-insurance funding way through granting donors or development lending. Figure 2.1 reflects a variant visual approach of health financing system structure in a more general and simplified way based on the current revised classification form of OECD (OECD, 2017), Shwetha and Bhat (2014:91-92) and Cichon et al. (2009:38-40). Under this perspective, health financing is based and distinguished on the two basic pillars, public and private funding, which both of them are envisaged the aforementioned health sub-system financial contributors.

Figure 2.1: Health care financing system main categorization



Source: OECD (2017), Shwetha and Bhat (2014:91-92) and Cichon et al. (2009:38-40)

Health insurance plays the most substantial role in national health systems, since it provides on its enrollees coverage against the uncertainty of medical spending (Sekhri and Savedoff, 2005; Cutler and Zeckhauser, 2000). The sense of self-protection leads individuals either to implement the precautionary saving consensus by holding financial reserves or to being insured for a fee against health costs, both of them pursuing risk-averse principle (Carroll & Samwick, 1997). Irrespective of public or private financing resources or even the different institutional contexts for obtaining healthcare coverage, insurance is the most dominant funder in health system financing around the world. In OECD countries and EU (28) member states, governmental, compulsory and voluntarily public and PHI fund almost the 80%, on average, of total current health expenditure[7] (OECD, 2017a; Eurostat, 2017). Taking into account the WHO global database, tax-based, social and private insurance expenditure for healthcare corresponds almost to 70% of total health spending (WHO, 2017).

According to OECD (2017), the core structure of a health care financing system comprises two main categories of organizational entities; financing schemes and institutional units. Financing schemes include third-party funding arrangements, such as NHS, SHI and PHI,

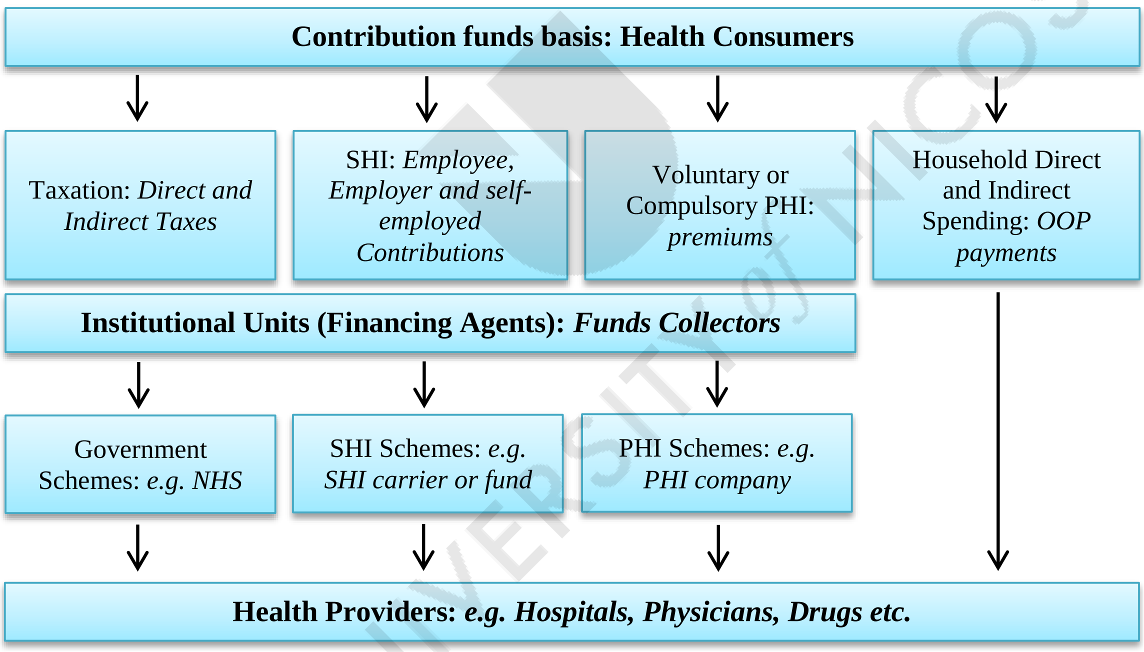
[7] According to international classification for health accounts (ICHA), "*total current healthcare expenditure quantifies the economic resources of both the public and private sectors dedicated to healthcare, with the exception of those related to capital investment. It reflects current expenditure of resident units on the final consumption of goods and services directed at improving the health status of individuals and of the population*" (Eurostat, 2017a; OECD, 2015a:2).

which are regulated by current national legislation in order to administrate population participation and enrolling in coverage programs, to monitor the rules of raising funds and finally to supervise the entitlement basis to healthcare services obtained by its members. Apart of the third-party financing arrangements, OOP medical expenditure also constitutes a healthcare financing scheme, since through households direct payments family members can receive healthcare. In turn, institutional units of health financing or financing agents, as they are widely known, represent public as well private official corporations which are responsible for the management and administration of financing schemes. Moreover, they provide the collected revenues to fund or purchase healthcare services from health providers. General and local governments, SHI funds, agencies or carriers, for profit PHI enterprises and non-profit organizations are glaring examples of financing agents. For instance, a SHI model explicitly specifies population embodiment obligation within the scheme determines employee and employer mandatory contributions, pre-defines the basis for entitlement to health care and finally it demarcates the offered benefit basket of healthcare services. This standing order and adjustment framework can be operated by a state agency, by several or single SHI institutions, by private insurance companies or even of a mix of all them (OECD, 2017:155; Cutler and Zeckhauser, 2000).

One of the most important procedures of financing schemes is to raise funds in order to operate their activities and plans. The main categorization of financing schemes revenues can be classified under the concept of compulsory and voluntary collecting funds basis (OECD, 2017). The main types of compulsory revenues are direct and indirect taxation monitored by general and local governments, mandatory SHI income-related contributions and mandatory non-income related fees by compulsory PHI establishments. The voluntary revenue basis is represented by voluntary PHI risk-related premiums and households OOP payments (OECD, 2017:161).

In most of the countries globally, the primary source of healthcare financing is the state, albeit other financing components such as the private funds also constitute important contributors (Docteur and Oxley, 2004). Particularly, in developed countries the last twenty years, it can be observed a shift from purely public financing systems to mixed ones, enrolling in this way the subsidiary role of PHI financing alongside with the compulsory NHS or SHI coverage (Petretto, 1999). Indeed, international evidence suggests that public or private funding exclusiveness is not an inviolable rule (OECD, 2017). The institutional health financing mixture, by public and private funds, represents a side by side operation, in which public health financing provides on a solidarity basis mandatory coverage and private insurance policies offer a supplementary financial one when healthcare is needed (Drechsler and Jütting, 2007; Sekhri and Savedoff, 2005). Under this mixed financing perspective and health insurance institutional context, households or individuals' private expenditures for healthcare needs are partly covered by government or social insurance, an additional private insurance policy and finally the rest part of these health expenditures by patients' OOP spending (Cutler and Zeckhauser, 2000; Petretto, 1999). Figure 2.2 illustrates the dimension of health financing flow starting from the contribution basis (employees, employers – health consumers) to final recipients (health providers). Health consumers' funding is primarily channeled through the financing schemes spectrum (e.g. taxation, SHI and PHI contributions) and then via the institutional units (financing agents) to health providers. Contrary, households OOP spending is directly channeled to health providers without passing through risk-pooling health financing agents.

Figure 2.2: Health care financing flow



Source: Authors' graphical interpretation based on Sekhri and Savedoff (2005:128)

With this brief background in mind, in the following sub-sections of this first part of chapter 2, we present a more analytical overview of the public and private healthcare financing as well their disaggregated components. Additionally, we exhibit in an informative way, applications of healthcare financing schemes taking into account representative paradigms of several national health systems structure and funding.

2.1.1 Public healthcare financing

The most common approaches of public healthcare financing are governmental and compulsory contributory health funding schemes, which represent the major funders of health financing in most of the countries around the world. The first approach comprises national and public health services, which both of them display the role of financing agent as well the role of healthcare provider. The second approach includes SHI funds or carriers aiming to fund for their enrollers needed healthcare services but not necessarily to provide them (Cichon et al., 2009). The raise of funds in compulsory health insurance encompasses the rigorous pre-paid framework of employee and employer insurance contributions or premiums in order insured participation to be achieved. Additionally, according to the OECD (2017), public healthcare financing categorization module includes, except of government schemes and compulsory SHI, also compulsory PHI and medical saving accounts policies.

2.1.1.1 Government health care financing schemes

The government health care financing schemes in capitalist democracies constitute the hereditary continuity of the widely known Beveridge model, which was named by Sir William Beveridge's submitted report to Churchill's government in 1942 for organizing the postwar British welfare state. The model became operable in 1948, while its fundamental economic principle is the active participation of the national budget in the social security (Kulesher and Forrestal, 2014). The raise of funds flows from government budget (taxation revenues) supporting thus the *ex-ante* redistributive policy on achieving society objective; distribution of benefits from the better-off to the worse-off (Rothgang et al., 2010). In the Beveridge model, health insurance coverage is based on the notion of universality (no uninsured) while healthcare is a human right irrespective of ability to pay for it. The national insurance administration and healthcare provision are under state control and ownership (e.g. NHS in the UK), deducting in this way the profit motivation and remaining in equalizing policies (Zigante et al., 2012).

Therefore, in governmental health care financing schemes a separate budget is scheduled by the general government in order national healthcare coverage program to be funded for all country residents or specific segments of population (e.g. vulnerable groups). Their operation is determined and rested by the national legislation and intercalary each time government policies, while the overall administration is conferred upon a government unit (e.g. Ministry of Health) (OECD, 2017). In several industrialized counties, health care financing is funded by government, which is responsible to raise funds from direct and indirect taxation (Wagstaff et al., 1999; Abel-Smith, 1994). Thus, in tax-financed healthcare systems the majority of health expenditure is derived from tax payments; taxation represents the greater funding component in overall health financing than any other contributor, while this basic method of raising funds is compulsory (Evans, 2002). Tax payments are imposed by general or local government authorities and obtained from households and corporations through direct (e.g. personal income, property, asset and corporation profit tax) and indirect taxation (e.g. compulsory levies, transaction and commodities, excise, sales, value-added, import and export tax) (Mossialos and Dixon, 2002).

Government health care financing schemes represent the predominant source of health funding in several countries (e.g. in Australia, Canada, Denmark, Finland, Italy, Latvia, New Zealand, Portugal, Spain, Sweden and the UK), accounting for more than 60% of total health financing over the years (see Table 2.1) (OECD, 2017a).

Table 2.1: Government schemes health care financing as a share (%) of total current health expenditure, 1995 - 2014

Function	Current expenditure on health (all functions)							
Financing scheme	Government schemes							
Measure	Share of current expenditure on health							
Country/Year	1995	2000	2005	2010	2011	2012	2013	2014
Australia	66.37	68.38	68.40	68.64	69.21	67.54	67.55	..
Canada	69.94	68.54	68.36	68.49	69.16	69.14	68.98	69.17
Denmark	..	83.11	83.74	84.56	84.75	85.23	84.35	84.19
Finland	58.06	56.90	60.83	60.50	61.30	62.10	62.51	62.23
Italy	71.19	72.54	77.39	78.31	76.76	76.75	77.02	75.51
Latvia	66.27	54.39	55.70	60.18	63.50	60.35	60.01	59.86
New Zealand	77.17	78.02	71.55	72.00	72.58	72.52	71.98	..
Norway	..	..	68.36	72.28	73.15	73.63	74.23	74.25
Portugal	..	69.62	70.51	68.78	66.62	64.41	65.75	64.95
Spain	..	..	66.53	70.02	69.06	67.24	66.03	65.00
Sweden	..	..	81.76	81.88	83.97	83.58	83.38	83.37
United Kingdom	..	79.14	81.11	82.91	82.41	81.78	79.43	79.48
Belgium	..	..	11.58	10.77	10.68	11.13	11.35	11.36
Chile	..	..	32.30	41..05	41.06	41.69	2.48	2.33
Greece	..	..	..	29.08	21.44	29.50	29.18	28.39
Mexico	8.72	..	16.12	21.83	22.98	23.09	23.16	23.86
Korea	7.49	10.46	11.76	11.43	10.83	10.45	10.24	10.25
Switzerland	15.97	15.08	16.73	17.92	18.39	19.24	18.84	18.64
Turkey	..	..	27.34	..	27.04	21.34	20.48	21.28

1. Data refers to governmental schemes health financing as a share (%) to total current health expenditure. Last updated in October 2016.
2. Current expenditure on health care or total current expenditure on health is the sum of total personal and total collective services, but not including investment (excluding capital expenditure).
3. Funds allocated from general revenues of government for governmental schemes. (http://stats.oecd.org/Index.aspx?DataSetCode=SHA#)

Source: OECD (2017a) Health Expenditure and Financing Database (http://stats.oecd.org/#). Data extracted on 02 April 2017 from OECD.Stat

For Belgium, Greece, Mexico, South Korea, Switzerland and Turkey public healthcare financing presents a duality, since compulsory health insurance is also financially complemented by pure governmental funding which exhibits notable proportions of their total health financing (Mossialos and Dixon, 2002) (see Table 2.2 in section 2.1.1.2). Moreover, a change of scenery is recorded for Chilean health system financing. Government healthcare financing scheme appears to be replaced by compulsory SHI scheme which constitutes the greater contributor since 2013 (see also Table 2.2). Apart of the OECD countries, a representative example of government health care financing scheme is the universal coverage scheme in Thailand, which embodies almost the three quarters of population and the major source of revenues is general taxation (Hsu et al., 2017; Limwattananon et al., 2011).

2.1.1.2 Social health insurance (SHI) schemes

Social health insurance schemes constitute the descendants of so called, sickness funds, which are based on the Bismarck type of insurance models. Dating back in 1883 in Germany, Chancellor Otto von Bismarck declared the government obligation for the social welfare and solidarity of all, especially for the poor people. The basic notion was the creation of an insurance system based on autonomy and self-management of individual workers and occupational pension funds (Kulesher and Forrestal, 2014). Hence, the earlier established SHI sickness funds promoted the societal-funding basis emerging as an insurance synthesis which includes both the concepts of taxation (obligingness) and individual financing (waged-contributions) (Rothgang et al., 2010). Under the socialized insurance model, healthcare is organized, supervised and provided under multiple social insurance funds which are independent government entities responsible to collect employee and employer mandate insurance contributions (pay-roll deductions) (Saltman, 2004).

Nowadays, the Bismarck model operates via SHI schemes. SHI is an institutional financing mechanism responsible for raising funds in order access and purchase of healthcare services to be obtained for its entitlement insured members (Doetinchem et al., 2010). Its funding organizational procedure is operated through a various pre-payment non-risk related contribution basis by or on behalf of social insurance possible policyholders (OECD, 2017; Figueras et al., 2014). SHI operation, like governmental schemes, is also defined by specific public legislation, which among other specifies insured members' eligibility, health benefits provision and contribution accounting (OECD, 2017; Mossialos and Dixon, 2002). This healthcare financing scheme is compulsory for the majority of the workforce population, including employees, farmers and self-employed (Normand and Busse, 2002). Contributions for enrolling in SHI schemes, are related to income and are collected from employees, employers, free-launchers and finally on behalf of unemployed, handicapped and pensioners from unemployment, sickness and retirement SHI institutional agents (Mossialos and Dixon, 2002). Further, SHI contributions are counted by a fixed percentage rate on SHI members' wages[8] or pensions and they are not associated to enrollees' health status or other risk-related criteria under an underwriting policy (OECD, 2017; Saltman, 2004).

Compulsory SHI funds are the major contributor to total health financing in several OECD countries. Table 2.2 illustrates that SHI financing is predominant in Austria, Belgium, the Czech Republic, Germany, Hungary, Japan, Luxemburg, the Slovak Republic and Slovenia (OECD, 2017a). As it has already been stated before, especially in Greece, Mexico, South Korea and Turkey, public healthcare financing is not clearly funded by one source but is separated between governmental and SHI agents (Paris et al., 2010). Governmental budget subsidies are often required to support SHI schemes financial sustainability (Doetinchem et al., 2010; Busse et al., 2004). In contrast, compulsory SHI schemes in Finland appear to financially supplement its predominantly tax-funded health system (OECD, 2017a; Saltman, 2004). In the United States, for example, SHI schemes[9] contribute for more than 40.00% of total health expenditure, despite the fact that the US health system is mainly considered as one of the most privately health-financed systems (WHO, 2017; Chicon et al., 2009).

Beyond of the OECD settings, SHI funding records significant proportion to total health financing in several other countries over the world. According to WHO (2017), SHI is the major health financing contributor, providing in 2014 almost or more than 50% of total health spending in Costa Rica (62.44%), Serbia (57.89%), Lithuania (55.25%), Argentina (45,91%), Uruguay (42.87%) and Bulgaria (44.08%). SHI schemes also constitute important funders on overall national health systems financing in China (37.70%), Russia Federation (27.73%) and Vietnam (24.07%). Nevertheless considerable segments of population in low-income and developing countries remain uninsured, because of the large informal labour sector, non-existent state institutional interventions for mandatory coverage and citizens' lack of insurance awareness and consent to be insured (Carrin, 2002).

[8] The SHI contributions are wage-related and shared between employers and employees in a different ratio proportionality, which it depends on SHI fund eligibility and enrollment (Gottret and Schieber, 2006; Saltman et al., 2004).

[9] Medicare and Medicaid health expenditure financing, which are regarded as SHI schemes, reach in 2014 the 42.64% of total health expenditure, based on WHO Global Health Expenditure database (WHO, 2017).

Table 2.2: Compulsory contributory health funding schemes health care financing as a share (%) of total current health expenditure, 1995 - 2014

Function	Current expenditure on health (all functions)							
Financing scheme	Compulsory contributory health insurance schemes/CMSA							
Measure	Share of current expenditure on health							
Country/Year	1995	2000	2005	2010	2011	2012	2013	2014
Austria	..	..	45.93	44.49	44.45	44.03	44.31	44.73
Belgium	..	..	64.76	66.50	66.31	66.42	65.99	66.23
Chile	..	..	4.54	4.44	4.47	4.56	58.42	58.22
Czech Republic	..	..	81.28	77.92	79.19	79.21	71.68	71.88
Estonia	..	..	66.64	65.58	65.84	65.93	64.82	65.64
Finland	13.17	14.21	14.85	14.18	13.89	13.65	12.98	13.16
France	..	..	75.23	74.16	74.05	74.14	74.25	74.54
Germany	70.66	72.04	69.23	77.03	76.94	76.85	77.54	77.99
Greece	..	..	..	40.89	45.85	37.19	34.34	31.26
Hungary	..	..	61.92	58.94	58.48	56.89	57.79	57.64
Iceland	..	..	27.21	29.29	29.65	28.67	28.23	28.97
Israel	..	..	..	46.00	46.45	45.91	..	..
Japan	73.77	72.28	72.88	72.52	74.94	75.16	75.80	..
Korea	34.79	43.50	45.32	47.67	47.50	46.60	46.39	46.25
Luxembourg	77.08	72.95	74.32	76.81	76.44	74.99	74.74	73.92
Mexico	33.41	..	26.12	26.82	28.35	28.50	29.60	27.97
Netherlands	..	..	64.69	78.23	78.10	77.03	76.17	75.83
Poland	..	..	61.50	65.83	64.53	63.63	61.14	62.43
Slovak Republic	..	..	67.65	65.15	66.54	65.38	67.55	76.23
Slovenia	..	..	70.05	69.94	69.98	68.62	67.84	67.63
Switzerland	37.59	40.35	42.74	46.19	45.84	45.46	46.98	46.54
Turkey	..	..	40.40	..	52.09	57.84	57.87	56.32

1. Data refers to compulsory contributory health funding schemes. Here, health financing is presented as a share (%) to total current health expenditure. Last updated in October 2016.
2. Current expenditure on health care or total current expenditure on health is the sum of total personal and total collective services, but not including investment (excluding capital expenditure).
3. Funds allocated from social health insurance (SHI) contributions, compulsory private health insurance (PHI) premiums and Medical Saving Accounts (CMSA) payments. (http://stats.oecd.org/Index.aspx?DataSetCode=SHA#)

Source: OECD (2017a) Health Expenditure and Financing Database (http://stats.oecd.org/#). Data extracted on 02 April 2017 from OECD.Stat

2.1.1.3 Compulsory private health insurance (PHI) schemes

As compulsory private health insurance can be attributed this financing arrangement in healthcare systems, under which the whole population or specific groups of people are obligated to subscribe for health coverage on private insurers, meaning thus that the legal link between insurer and insured is based on a bilateral insurance agreement (OECD, 2017:171). Although the financing in most of OECD and EU national health systems is mainly financed by taxation and SHI contributions, in a handful of countries, certain groups of population are excluded from subscribing on statutory public health insurance or are allowed to opt out of it. Therefore, they have to compulsorily take out health insurance coverage with PHI companies and hence to pay premiums, including sometimes governmental subsidies such as possible tax reliefs, in order to enroll in private compulsory schemes (Mossialos and Thomson, 2002; Mossialos and Dixon, 2002).

Glaring example is the German health care system as well as the Austrian and Belgic. In all of them, population eligibility for participating in compulsory PHI schemes is determined by individuals' income level[10] or employment status[11] under PHI risk-related criteria premiums (OECD, 2017:172). This was also taking place in the Dutch health care system several years before. In the Netherlands, prior to the establishment of statutory universal insurance coverage in 2006, PHI for profit companies offered substitutive health coverage in the higher-income groups[12] of population, which were excluded by the mandatory public health insurance (Mossialos and Thomson, 2009; Normand and Busse, 2002). Since then, PHI companies are regulated by the Dutch government and they are obligated to insure anybody, providing at least the basic benefit package with no risk-related premiums (Van de Ven and Schut, 2008). The bilateral insurance agreement between insurer and insured proofs the health insurance entitlement and it is based on the private law. Therefore, it ceases to be valid in the case that individuals fail to purchase or fulfill their payments obligation, resulting in this way to become totally uninsured (OECD, 2017). Under this health structure reform, the Dutch universal health coverage can be characterized as both statutory and private, because health insurance provided by PHI schemes is compulsory for all citizens (Mossialos and Thomson, 2009). As it is illustrated in Table 2.2, compulsory or substitutive PHI insurance schemes financing in the Netherlands reach in 2014, the three quarters of total current health expenditure (OECD, 2017a).

2.1.1.4. Compulsory medical savings accounts

Compulsory medical savings accounts (CMSA) scheme is an alternative health insurance policy which is based on the principles of "*self-reliance and individual accountability*" when

[10] In Germany before the 2009, individuals with high annual earnings could voluntarily opt out of the statutory SHI coverage schemes and remain uninsured (Mossialos and Thomson, 2002). Since 2009 and onwards, high-income citizens obligingly have to purchase PHI programs depending on their annual income level. PHI policyholders are allowed to return in public insurance schemes when there are serious reasons for lowering their income below the legislative permissible benchmark for PHI coverage (OECD, 2017; Paccagnella et al., 2013; Mossialos and Thomson, 2009). Further, also better-off Irish were excluded from public hospitalization healthcare, unless they had PHI coverage, until the establishment of universal hospital coverage in 2008 (OECD, 2017).

[11] In Austria and Belgium, certain groups of self-employed individuals are excluded from statutory state health insurance schemes and alternatively they should choose PHI coverage. Moreover, in Germany, self-employed are also excluded from SHI schemes, unless they were SHI subscribers in the past (Mossialos and Thomson, 2009).

[12] For example, in 2002, Dutch workforce individuals with annual turnover more than €30,700.00 were excluded from statutory state health insurance coverage and thus had to subscribe on PHI companies with individual risk-related criteria (Mossialos and Thomson, 2002).

healthcare is needed, as Maynard and Dixon (2002:121) point out. Under the government law regulation, all citizens are obligated to transfer a pre-defined percentage share of their income, most of the times in a monthly basis, to a specific account in order to deal with medical spending when health risk is occurred (Cichon et al., 2009). Therefore, the accumulated compulsory health insurance contributions by an individual are used to cover medical expenses, without being always achievable this saving deposit to fund the real cost of healthcare treatment (OECD, 2017). On the other hand, the proponents of this health coverage scheme insist that addresses issues inefficiencies, like preventing cost escalation on medical spending and curbing excessive demand for healthcare services driven by individuals' (*i.e.* health consumers') moral hazard as it usually happens in social and private types of health insurance (Maynard and Dixon, 2002). Under the medical savings accounts theoretical approach, insured beneficiaries are responsible to rationally use and reasonably purchase healthcare services respecting their account reserves for health needs (Sheffler and Yu, 1998). This essential difference distinguishes compulsory medical savings accounts from compulsory SHI and PHI schemes, since the latter are based on the principles of risk sharing and pooling across insured enrollers and not on the individual saving and funding approach for healthcare, as the first they do.

The Medisave system, which was established in 1984 in Singapore, exemplifies most the mandatory saving accounts health insurance model between other countries, such as China, South Africa and the USA, where it also plays a moderate role (Wouters et al., 2016; Hsiao, 1995). Particularly, the Medisave system is a strictly administrated and monitored by the Singaporean state national medical insurance program (Hanvoravongchai, 2002). The raise of funds is majorly based on the imposition of a percentage deduction [13] from workforce individuals' wages in accordance with enrollers' age (Maynard and Dixon, 2002). Further, personalized savings accounts are also supplemented by employers' contributions and an *ad hoc* annual subsidy by the government; with the perspective all personal accumulated deposits to be used for public or private provided healthcare facilities (Wouters et al., 2016; Gottret and Schieber, 2006). According to WHO (2017), compulsory medical savings accounts funding corresponds to 41.74% of Singaporean total health spending and as it is subsequent to the high enough 54.83% of individuals' OOP payments.

[13] The monthly percentage Medisave contribution ranges between 6-8% and are equally distributed (shared) between employees and employers (OECD, 2017).

2.2 Private healthcare financing

As it has already been mentioned, the private healthcare financing can be classified into two main categories; the pre-financing arrangement which is represented by the pre-paid voluntary PHI schemes and the post-financing one which is represented by the direct and indirect households OOP spending for healthcare. According to the OECD (2017), PHI schemes encompass the primary/substitutive, duplicated, supplementary and complementary voluntary PHI schemes. All the latter are based on a voluntarily basis, in contrast with the compulsory PHI schemes as they are described previously in section 2.1.1.3, where individuals' eligibility and enrollment are made mandatory by the public legislation. The voluntary PHI financing schemes are based on the purchase of an additional health insurance policy by individuals against the medical expenses of health risks (OECD, 2017:173). The mechanism of raising funds in voluntary PHI schemes is most often based on the collection of premiums by for-profit enterprises under risk-related criteria, while the legal status enrollment is entitled by bilateral personal or collective/group policy holding agreements (contracts)[14] (Cichon et al., 2009; Mossialos and Thomson, 2002). Similarly to SHI schemes, the PHI institution operates also on a risk pooling (sharing) basis, however it presents an essential difference; it does not patronize the income-redistributive (and thus income-related) principle, but it evaluates the membership fees under individual gender, age and health status eligibility requirements (Cichon et al., 2009; Cutler and Zeckhauser, 2000). PHI institution has a secondary or a minor role in total health financing in the majority of the countries around the world, since the public financing dominates the arena. Nevertheless, voluntary PHI plays a predominant role in the USA and a significant one for instance in Chile, France, Ireland, Slovenia and Switzerland (OECD, 2017a; Eurostat, 2017). The second private healthcare financing funder is OOP expenditure which represents the direct purchase of medical services by households or individuals from health providers, either in the form of direct official spending, cost sharing alongside with health insurance schemes funding or even through an unofficial financing channel as it is discussed in the following sections of this chapter (please section 2.3) (Chereches et al., 2013; Chen et al., 2012; Sun et al., 2009; Mossialos and Thomson, 2002). OOP payments can be attributed likewise as a financing scheme, since household medical outlay of money which is net of third party payments (reimbursements or benefits by public or private insurance plans), so it can causes financial burden to health consumers (OECD, 2017:178). OOP payments are widely spread, especially across low-income and developing

[14] PHI existence is rested upon a private legal commitment between the insurer and its subscriber-purchaser, which it contains the premium in exchange for a given benefit coverage (Drechsler and Jütting, 2007:499).

countries, accounting for several of them as the principal source of health financing due to the limited presence of pre-paid insurance schemes (WHO, 2017; Xu et al., 2003).

2.2.1 Voluntary private health insurance (PHI) schemes

PHI can be attributed as the primary or extra coverage at a voluntarily basis which is paid privately for offsetting the unpredictability of medical expenses when healthcare is necessary (Mossialos and Thomson, 2002). Further, as PHI can be defined as any compulsory or voluntarily health insurance option under a privately owned and monitored regime (Basset and Kane, 2007:346). Paccagnella et al. (2013:294) very aptly state that "*the main aim of a voluntary PHI, independently of its particular configuration, should be the reduction of the illness-related financial risks*". Contrary, to tax and societal-based insurance systems, voluntary PHI does not follow the *ex-ante* redistribution principle, since it is based on risk-related pre-paid contributions (Rothgang et al., 2010:86)

PHI institution encompasses through institutional units or so called financial agents, all the private pre-paid schemes which are solely responsible to provide access and purchase or reimburse healthcare services on behalf of their insured members (OECD, 2017). There is a broad spectrum of PHI schemes which represent different dimensions. They are mainly differentiated by (Thomson and Mossialos, 2009; Sekhri and Savedoff, 2005):

- subscriber's eligibility and entitlement (compulsory or voluntary which is not mandatory imposed by the state but it could be required by enterprises)
- contributions estimation (individual or group[15], community[16] risk assessed or income-based premiums)
- contributions payment (by employees and/or on behalf of employees by employers)
- contributions subsidized directly or indirectly by government (e.g. by tax reliefs or credits) or even not
- types of insurance plans (individual or corporate, collective and group contracts)
- and scheme ownership function (provided by commercial for profit or non-profit private entities)

Voluntary PHI institution operates alongside with the tax or social financed compulsory health insurance schemes in the majority of the countries around the world. Apart from

[15] The calculation of premium is based on the average health risk and professional status of employees in companies, especially to the formal labour sector (Drechsler and Jütting, 2007; Maynard and Dixon, 2002).

[16] The community rated contributions (premiums) are estimated in accordance with the average risk in a specific group of population, taking into account for example the place of residence (e.g. rural or urban areas) (Maynard and Dixon, 2002:111).

notable exceptions, in most of the national health systems financing, PHI plays a second-tier role because of the governments consensus for mandatory socialization on healthcare and public-funded health insurance dominance (Thomson and Mossialos, 2009; Maarse, 2006).

Other reasons for the modest role of voluntary PHI in overall health financing are its strict or even prohibitive eligibility criteria for subscribing. In alignment with all private insurance forms, PHI pre-assumes that every risk has a chargeable price, but unlike the social or public one, it has the final decision about insurance eligibility or not (Chollet and Lewis, 1997:78). Particularly, PHI companies are not restricted to reject admissions for insurance, especially to individuals' target groups with high health risk status (e.g. elderly, poor, chronically ill, disabled, people with pre-existing health conditions), a practice which is widely known as cream skimming or risk selection (Van de Ven and Van Vliet, 2002). Moreover, critics point out that PHI presents drawbacks, such as the trend to provide limited benefited health services, cover at high pricing to be obtained, long enough waiting periods for reimbursement and high levels of cost sharing. Further, it retains high premiums (e.g. difficult for the worse-off to afford the premiums), permits adverse selection and allows for excessive use of services (e.g. moral hazard) by insured[17] (Gechert, 2010; Barros et al., 2008; Drechsler and Jütting, 2007; Tapay and Colombo, 2004). PHI financial agents main focus of making profits results on providing health coverage only in healthy individuals at low risk, constituting PHI institution to be impracticability adopted as the unique healthcare funding option (Cichon et al., 2009). Further, it is considered inefficient to meet social objectives as public schemes pursue, without tighter monitoring and regulation by the state (Zweifel, 2005; Maynard and Dixon, 2002).

On the other hand, PHI presents benefits, such as the capability to impose reducing medical costs on healthcare providers, maintain high standards and amenities of treatment, as well as provide extra protection on households income and savings through insurance reimbursements for health expenses when risk occurs (Thomson and Mossialos, 2009). Moreover, PHI facilitates healthcare options, accessibility on healthcare services (e.g. skip long waiting times list for surgery in public hospitals) and finally allows governments to direct public health resources in vulnerable groups of people (e.g. worse-off) without financial ability to purchase PHI plans (Basset and Kane, 2007; Pearson and Martin, 2005; Zweifel, 2005; Tapay and Colombo, 2004).

[17] Adverse selection in insurance sector describes the practice of one party (potential insured) to conceal essential information concerning his/her profession, life style and health status from the other party (insurer) before any contractual deal (Folland et al., 2013). Moral hazard constitutes one of the core agency problems of PHI institution, since subscribers with full-benefited PHI plans tend to excessively use and thus overspend for medical services without always being necessary, often encouraged by physicians' induced demand or health providers supplier-induced demand (Barros et al., 2008; Cutler and Zeckhauser, 2000).

2.2.1.1 Sub-categories of voluntary private health insurance (PHI) schemes

Despite the predominant presence of mandatory public health insurance, in most of the countries around the world, tax-based and SHI schemes provide partial reimbursement on health risk-affected individuals for their total cost of treatment or abstain at all from several healthcare services financing (Wasem et al., 2004). Therefore, apart from state security coverage, there is a need for extra financial protection against the risk of medical expenses, which can be satisfied through individuals' subscribing on PHI schemes (Paccagnella et al., 2013). A close look at PHI in OECD countries reveals two main distinct functions of the institution, in accordance to the type and extent of its coverage, alongside with the statutory public health insurance. As it is pointed out by the OECD (2017a:173-175) and the literature (Thomson and Mossialos, 2009), the first function includes both individual and group PHI enrollment, which constitutes the one-way primary (substitutive) or sole alternative option for health coverage for great segments of population in certain countries. The second one encompasses three sub-categories; the duplicate, supplementary and complementary PHI (the previous two are also labeled as duplicate PHI) to the statutory public health insurance (Wasem et al., 2004:227; Maynard and Dixon, 2002:117; Mossialos and Thomson, 2002:129). Nevertheless, in the majority of OECD countries voluntary PHI exhibits a second-tier supporting role to public health insurance arrangements by providing extra rewarding benefits and privileges to also privately insured (Tapay and Colombo, 2004:273).

In more detail, primary or substitutive PHI is defined as this insurance which substitutes or acts as alternative of government and SHI schemes, by offering all-inclusive health care coverage (Preker et al., 2010). As it had already been explained before (*i.e.* section 2.1.1.3), the primary PHI usually covers groups of people are either legislative excluded from mandatory public health insurance or are free to opt out of the latter; and thus have the legal concession to purchase health coverage from private insurers (OECD, 2017). Almost 11% of German citizens were opted-out and covered by compulsory substitutive PHI schemes in 2014 (see figure 2.3). In Mexico, while the majority of population is insured through state insurance, 7.3% of Mexicans obtain health coverage through *Seguro Popular*, a substitutive publicly-subsidized PHI policy option for the uninsured individuals (OECD, 2016; Paris et al., 2010:8). However, the most representative example of primary or substitutive PHI is operated in the US national health system. Over the years, the US social security is characterized by selective government coverage and is mainly responsible to cover vulnerable groups of the population which are unable to participate equally in the cost of their healthcare coverage. Socio-economically worse-off and specific groups of population are insured by state insurance schemes, such as Medicare[18], Medicaid[19] and the Veterans Health Administration[20] (Rice et al., 2014:895-896). PHI in the USA is an independent health coverage form for citizens who are not required to subscribe on federal or state standards, constituting thus the institution as catalytic health financing contributor on overall US health spending (OECD, 2017a; Tapay and Colombo, 2004:267). The raise of funds for grouped PHI plans is based on employee and employer contribution basis under group-rated criteria, while the choice of a commercial insurer is a solely task of the employer, leaving thus employees to have little or no involvement in this issue (Maynard & Dixon, 2002:117). According to Rice et al. (2014:895), approximately 150 million or 56% of US citizens under 65 years old were insured by primary employer-sponsored PHI and almost 10 million or 6% of the workforce population obtained health coverage via individual PHI programs in 2012. As it is presented in figure 2.3, substitutive PHI is the sole coverage option for more than 50% of US individuals (OECD, 2016). Nonetheless, the individually-purchased PHI plans are quite costly, since they are not employer-sponsored like group ones. However, the pioneering healthcare reform namely Affordable Care Act (ACA), which is in effect since the beginning of 2014, strongly promotes the voluntary PHI institution in US national health system. Under ACA reform, the US government provides insurance subsidies on individuals to purchase PHI plans, imposes on firms with more than fifty employees to offer employer-sponsored PHI and tax-rewards smaller firms to do the same (Bishop, 2014:28).

The first sub-category of the second function of voluntary PHI is widely known in the literature set as supplementary (Wasem et al., 2004: 227; Mossialos and Thomson, 2002:131). PHI supplements SHI by providing, in part or in full, benefits that social statutory insurance does not provide, such as high-tech health acts, dental care – periodontal pathology, cosmetic surgery, alternative medication etc. (Kumar et al., 2014). But beyond these, the most important benefit of supplementary PHI is the increasing of health coinsurer choice and accessibility on a broad spectrum of health providers which is also accompanied by upgraded standards (e.g. free choice of physicians, better outpatient and inpatient accommodation

[18] Medicare finances health care costs for the elderly (over 64), disabled and end-stage kidney patients. It displays as the largest public health funding contributor in the USA, while is mainly funded by insured pay-roll taxation and contributions.

[19] Medicaid finances health care costs for poor (e.g. low income elderly, those who have lost their property, poor mothers and their children), disabled and unemployed people. Medicaid funding is based on federal and state budgets revenues. Under the Affordable Care Act (ACA) which was introduced in the 2014, insurance eligibility for enrolling in Medicaid requires personal annual income lower than 138% of the federal poverty line (FPL). According to the Office of the Assistant Secretary for Planning and Evaluation (ASPE), which is monitored by the US Dept. of Health and Human Services, FPL is $12,060.00 for one person and $4,180.00 for each additional member in 2017, for all states, except Alaska and Hawaii (Available on: https://aspe.hhs.gov/poverty-guidelines).

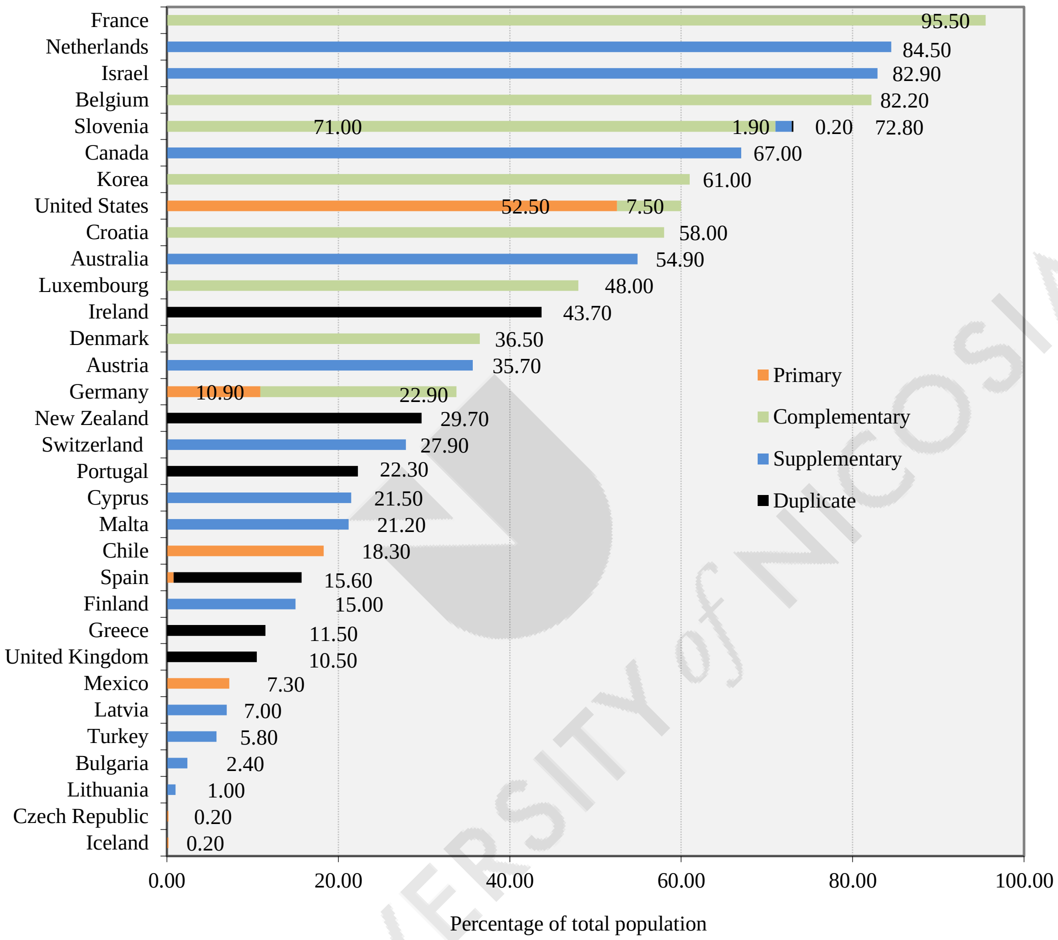
[20] It provides insurance coverage and is responsible for medical assistance provision plans for the active military stuff and former members of the US Armed Forces.

amenities in public or private hospitals, faster access to health services, such as public health queues for surgery) (Kang et al., 2009; Hoel and Saether, 2003). Especially, in national (publicly-financed) health systems which are characterized by long waiting lists for surgery (e.g. Greece and the UK) supplementary PHI may contribute for its policyholders to bypass or "*jump the queue*" (Thomson, 2011:20; Mossialos and Thomson, 2004:67). In the Netherlands, voluntary PHI plays a supplementary role by offering healthcare benefits which are not covered by the compulsory state and PHI schemes (Paccagnella et al., 2013:294). Alongside with statutory health insurance, supplementary PHI is an additional voluntary option for Dutch population and based on the principles of private insurance sector. Despite the fact that both compulsory and voluntary PHI is provided by the same for-profit commercial insurance enterprises, for supplementary PHI plans private insurers apply their own-modified per individual financial and medical (*i.e.* underwriting) conditions for eligibility (Roos and Schut, 2012). In the Swiss health system since 1996, where compulsory insurance is majorly provided either by non-profit sickness funds or by private insurance companies, citizens may voluntarily purchase additional PHI coverage at a supplementary form (Colombo, 2001). According to the OECD (2016), almost 85% of Dutch citizens are extra covered by supplementary PHI plans, while this extra voluntary insurance option covers also significant proportions of population in Canada, Australia and Austria (see figure 2.3).

In the second-tier coverage perspective, PHI duplicates public health insurance schemes, by offering coverage and supplying financing for health services already included under SHI, with the purpose to ensure better access to private health care providers and new technology treatments (Kiil, 2012, Colombo, 2007). Further, it does not prevent individuals to also belong and contribute in public schemes (Kumar, 2014). The supplementary function of PHI simulates the duplicated one (*i.e. double coverage*) and is a common voluntary PHI policy in Australia, Greece, Ireland, New Zealand, Portugal, Spain and the UK (OECD, 2016; Mossialos and Thomson, 2002:131).

Last but not least, offering complementary benefits that are provided to insured, against additional premium payment, along with the compulsory SHI and PHI institutional agents. Complementary PHI provides full or partial financing for not fully reimbursed by the SHI health care costs (Basset and Kane, 2007). Zweifel and Pauly (2007:140) state that the voluntary PHI, such as the US and French complementary type, aims to fill or cover the financial gap; the cost sharing obligations and uncovered expenses by SHI medical services. Indeed, the complementary PHI function is a significant player of French national health system, since it financially covers formally-required patient cost sharing[21] and not provided by SHI medical goods and services[22] (Paccagnella et al., 2013; Buchmueller and Couffinhal, 2004). As it is displayed in Figure 2.3, the 95.5% of French population is covered by complementary PHI in order to fill the gap between the actual-demanded charges of health providers and public schemes reimbursements (OECD, 2016; Odeyemi and Dixon, 2013; Dukhan et al., 2010).

Figure 2.3: PHI coverage, by type, 2014 (or nearest year) in EU and OECD countries



1 Private health insurance can be both complementary and supplementary in Denmark, Finland, Korea and Luxembourg; and duplicate, complementary and supplementary in Slovenia. Data for Italy is not available.
2. Data for PHI coverage as a percentage of population for Australia, Canada, Chile, Korea, Mexico, the Netherlands, Slovenia and the USA based on the last available year 2013 and for Switzerland in 2012 (OECD, 2015c).
3. The figure was partly color modified by the authors in order a more clear illustration for comparisons to be for the readers obtained.
Source: OECD (2016), Private health insurance coverage, by type, 2014 (or nearest year), in *Health at a Glance: Europe 2016*, Paris: OECD Publishing. DOI: http://dx.doi.org/10.1787/health_glance_eur-2016-graph145-en

Further, complementary PHI also covers significant proportions of population in Belgium, Slovenia, Korea, Croatia and Luxembourg, while in the USA it provides extra reimbursement benefits on compulsorily public and primary PHI policyholders. Despite the predominance of

[21] The officially-imposed co-payments (so called, *Ticket Modérateur*) usually include per diem co-payment charge per hospitalization event, charges for upgraded level of hospital rooms, co-payments for general practitioners, physicians visits and prescription drugs (Buchmueller and Couffinhal, 2004).
[22] Dental-oral care, eyeglasses and contact lenses.

SHI on population coverage in Germany for the 2014, nearly 23% of Germans purchased complementary PHI policies in 2014 (OECD, 2016).

Despite the strong or weak presence and even different functions of PHI, it is an important primary or alternative source of health care financing in several countries around the world, as it is described in the next sections (Pearson and Martin, 2005; Docteur and Oxley, 2004).

2.2.1.2 Private health insurance (PHI) financing in OECD and EU countries

The majority of national health systems in OECD and EU countries focuses over the years on solely promoting tax-based and socialized health insurance models restricting in this way the development of PHI funding in total health financing (Siskou et al., 2008). Diachronically, the publicly-financed insurance arrangements influenced by Beveridge and Bismarck models, especially in the EU countries, promote the universal and compulsory participation of population by the state, which as sequel was accompanied by the expansion of public health expenditures (OECD, 2017a; Mossialos and Thomson, 2002:128). Public health financing accounts for most of the years, on average, almost the three quarters of total current health expenditures in OECD countries (OECD, 2017a; OECD, 2015b). As an aftermath, PHI does not play a dominant role in health care system financing in EU countries as does in Australia, Chile, Canada, Israel and the USA. On average PHI funding across OECD countries reaches in 2014 the 6.81% of total health financing, while the share is almost 1% less when the outlier, the USA is excluded (OECD, 2017a). Especially for the USA, PHI constitutes the main pillar of national health system, always accounts approximately for the 40% of total health financing (see Table 2.3). In Chilean health system over the years, PHI institution partly simulates[23] the privatized US one, despite the fact that the PHI financing in 2013 and 2014 presented a rapid decline compared to the previous years (Bossert and Leisewitz, 2016). In Canada, France, Ireland, Israel and Slovenia, the PHI financing to total current health expenditures records double-digit proportions which is between 10%-15%, as it is illustrated in Table 2.3. PHI funding accounted from 5% to 10% in Austria, Luxemburg, Mexico, the Netherlands, Poland, Portugal, Spain, South Korea and Switzerland. Contrary, in Belgium, Czech Republic, Greece, Germany, Italy and Japan, PHI contributes less than 5% of their aggregate health spending. In Cyprus and in transition economies, such as Estonia, Latvia,

[23] Since 1980s, the dictatorial regime of Augusto Pinochet imposed to salaried employees to opt out of the public health insurance scheme and purchase through a compulsory salaried contribution (7%) PHI plans. The last years, the middle-class group of population presents a financial unaffordability to purchase or maintain PHI plans by for-profit commercial entities, and hence, Chileans have to spend for PHI coverage much greater than 7% (almost 10%) of their wages or to alternatively opt in public insurance scheme (so called, Fondo Nacional de Salud (FONASA)) (Bossert and Leisewitz, 2016).

Lithuania, Romania and the Slovak Republic, PHI financing represents only a marginal contribution (OECD, 2017a; Eurostat[24], 2017). Further, in the Nordic countries, such as Denmark, Norway and Sweden, which stand out for their high quality and efficiency benefits of the public health system, PHI is almost absent (OECD, 2017a).

Table 2.3: Voluntary PHI schemes health care financing as a share (%) of Current Health Expenditure, from 2005 to 2014

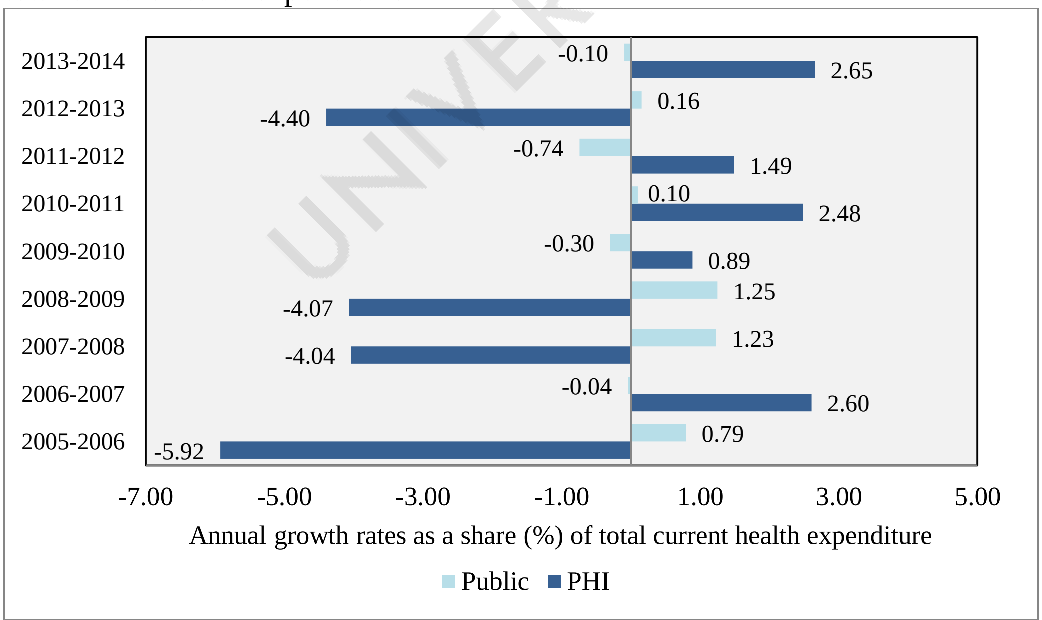
Function	Current expenditure on health (all functions)										
Financing scheme	Voluntary PHI health care financing schemes										
Provider	All providers										
Measure	Share of current expenditure on health										
Country/Year	**F.S.**	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Australia	PHI	11.95	11.94	11.69	11.96	11.65	11.61	11.61	12.53	12.73	..
Austria	PHI	6.35	6.14	6.15	6.01	6.15	6.14	6.15	6.25	6.44	6.39
Belgium	PHI	5.44	5.43	5.46	4.48	4.31	4.27	4.47	4.38	4.50	4.61
Canada	PHI	14.77	14.58	14.73	14.79	14.73	14.65	14.68	14.90	15.07	14.99
Chile	PHI	20.53	19.65	20.36	20.73	19.67	19.51	19.52	19.88	5.77	6.65
Czech Republic	PHI	2.07	2.04	1.68	1.76	1.68	1.42	1.10	0.97	2.84	3.27
Denmark	PHI	1.55	1.60	1.73	1.86	1.86	1.74	1.95	1.87	1.93	2.00
Estonia	PHI	2.61	1.06	1.40	1.03	1.77	1.72	1.67	1.76	1.73	1.63
Finland	PHI	5.10	4.85	4.83	5.10	5.25	5.22	5.34	5.48	5.40	5.54
France	PHI	13.95	13.82	13.88	13.99	13.89	14.13	14.41	14.47	14.48	14.35
Germany	PHI	9.11	9.17	9.29	9.46	2.21	2.20	2.30	2.35	2.45	2.40
Greece	PHI	..	..	..	2.19	2.09	2.72	2.82	3.24	3.23	3.74
Hungary	PHI	3.55	4.20	4.84	4.75	5.43	5.48	5.26	5.09	4.99	4.56
Iceland	PHI	1.39	1.44	1.45	1.44	1.40	1.39	1.46	1.48	1.47	1.48
Ireland	PHI	7.58	8.25	9.20	8.82	10.23	10.03	11.95	12.79	15.22	15.29
Israel	PHI	7.78	10.52	11.44	11.92	12.03	12.14	12.31	12.52	12.88	13.34
Italy	PHI	0.91	0.93	1.00	0.99	1.03	1.00	0.96	0.99	0.96	2.16
Japan	PHI	3.16	3.26	3.24	3.59	3.55	3.50	3.14	3.10	3.04	..
Korea	PHI	2.75	2.84	3.11	3.79	4.60	4.85	5.54	5.98	6.17	6.69
Latvia	PHI	2.30	2.87	2.17	2.27	1.09	2.62	2.21	1.83	1.51	1.22
Luxembourg	PHI	3.88	3.84	5.50	2.61	4.36	4.85	5.96	6.66	7.14	6.91
Mexico	PHI	3.17	3.41	3.68	5.49	5.98	5.68	5.94	5.81	5.93	6.70
Netherlands	PHI	21.33	8.06	8.19	7.67	7.89	7.66	7.88	7.65	7.21	7.07
New Zealand	PHI	6.25	6.09	6.15	5.89	6.55	6.82	6.98	7.20	7.55	..
Norway	PHI	0.23	0.21	0.23	0.15	0.26	0.22	0.37	0.44	0.38	0.38
Poland	PHI	3.57	3.65	3.63	3.90	3.99	4.61	5.17	5.70	5.63	6.04
Portugal	PHI	5.42	5.73	5.62	5.80	5.47	5.68	6.01	6.25	6.11	6.25
Slovak Republic	PHI	1.10	3.43	3.33	3.62	4.10	5.29	2.65	4.60	2.47	1.76
Slovenia	PHI	13.49	14.60	14.85	13.81	14.15	13.99	14.44	15.67	16.38	15.96
Spain	PHI	6.17	6.26	6.25	5.35	5.12	4.49	5.13	5.30	5.05	5.54
Sweden	PHI	1.13	1.16	1.20	1.22	1.13	1.18	0.99	1.01	1.09	1.09
Switzerland	PHI	9.91	10.08	10.19	10.01	9.80	9.51	9.37	8.06	8.13	8.08
Turkey	PHI	8.08	7.50	7.33	8.12	4.99	..	4.98	4.90	4.72	4.67
United Kingdom	PHI	8.65	7.33	7.89	7.85	7.21	7.24	7.62	7.58	5.68	5.67
United States	PHI	40.77	40.43	40.35	39.73	39.41	39.40	39.57	39.72	39.47	39.25

[24] For Cyprus in 2014 PHI funds the 3.8% of total current health expenditures. For the same year, in Lithuania and Romania PHI funding constitutes a minority report, since it records negligible proportions, 0.8% and 0.2% respectively (Eurostat, 2017).

1. Data refers to government, compulsory contributory and voluntary PHI health funding schemes. Here, health financing is presented as a share (%) to current health expenditure. Last updated in October 2016.
2. Current expenditure on health care or total current expenditure on health is the sum of total personal and total collective services, but not including investment (excluding capital expenditure).
3. Funds for public health financing are allocated from taxation, social health insurance (SHI) contributions, compulsory private health insurance (PHI) premiums and Medical Saving Accounts (CMSA) payments. On the other hand, the raise of funds for PHI financing comes from voluntary PHI premiums (http://stats.oecd.org/Index.aspx?DataSetCode=SHA#).
Source: OECD (2017a) Health Expenditure and Financing Database (http://stats.oecd.org/#). Data extracted on 21 April 2017 from OECD.Stat

Although public health care expenditure has recorded sharp and ongoing declines in several EU countries (e.g. Greece, Cyprus, Ireland, Italy, Portugal, Spain and the UK) in response to the current financial crisis for reducing public deficits and maintain fiscal sustainability, PHI funding has not seen considerable increases in total health financing (OECD, 2017a; Eurostat, 2017). As it is displayed in Figure 2.4, growth in public health spending as a share of total current health expenditure, on average, notes downward trends in OECD countries compared with the pre-crisis period slightly increases. Albeit, the rate of growth for PHI to total current health expenditure was greater post to the 2008 crisis compared with this of 2005-2009; however, the health funding growth through PHI was kept in low levels in relation to public health financing stagnation. Similar patterns are also presented for PHI funding in Figure 2.5, taking into consideration the annual growth per capita health spending in real terms (%). The slightly increase in PHI funding in the post-crisis period, except in 2012-2013, was driven by individuals' response to offset the parsimonious state policies on public health spending (OECD, 2015b). Notable examples are countries such as the Czech Republic, Ireland, Italy, Luxemburg and Poland. Especially in Ireland, PHI financing recorded a significant growth from 2008 to 2014, as it is appeared in Table 2.3.

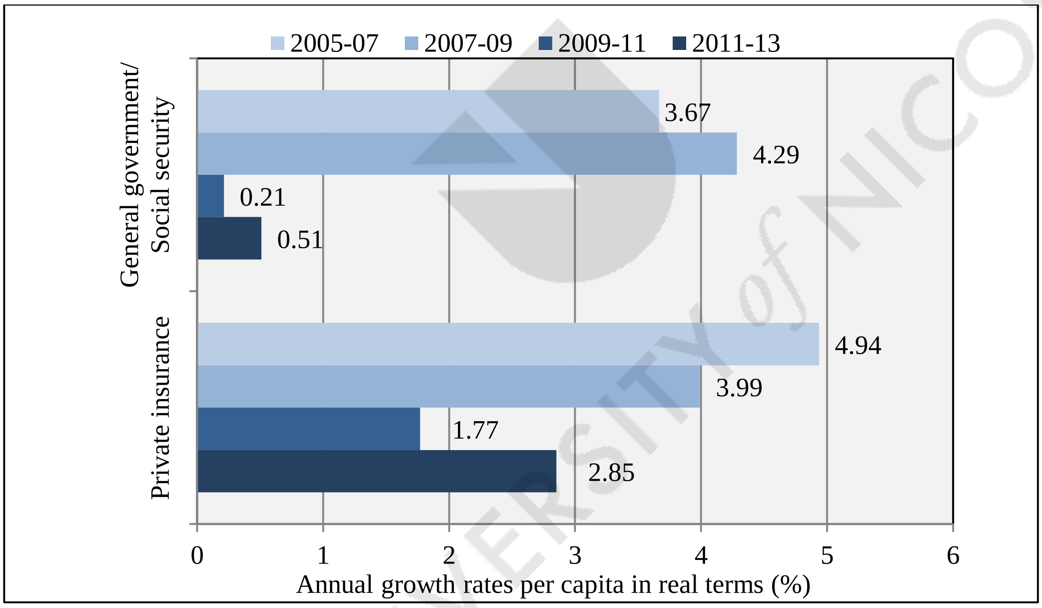
Figure 2.4: Growth of public and PHI financing, OECD average 2005-2014, as a share (%) of total current health expenditure



1. Data for public health financing refers to government and compulsory contributory health care financing schemes. Data for PHI refers to voluntary PHI health financing schemes. Both public and voluntary PHI health financing growth rates are presented as a share (%) to current health expenditure. Last updated in October 2016.
2. Current expenditure on health care or total current expenditure on health is the sum of total personal and total collective services, but not including investment (excluding capital expenditure).
3. Funds for public health financing are allocated from taxation, social health insurance (SHI) contributions, compulsory private health insurance (PHI) premiums and Medical Saving Accounts (CMSA) payments. On the other hand, the raise of funds for PHI financing comes from voluntary PHI premiums (http://stats.oecd.org/Index.aspx?DataSetCode=SHA#).
Source: OECD (2017a) Health Expenditure and Financing Database (http://stats.oecd.org/#). Authors' calculations based on OECD (2017a). Data extracted on 21 April 2017 from OECD.Stat

EU governments prefer to offset fiscal shocks through the sifting of medical expenses in their citizens rather than promoting and encouraging PHI institution (OECD, 2015b; De Belvis et al., 2012; Mladovsky et al., 2012). Controversially, voluntary PHI in Australia, as an example, was considerably strengthened in the decade of 2000 driven by governmental generous tax reliefs on premiums to citizens who took out PHI plans or kept existing ones (Segal, 2004, Butler, 2002).

Figure 2.5: Average annual growth of health spending per capita by public and PHI financing schemes, in real terms, 2005-2013 for OECD countries



1. Data for public health financing refers to government and compulsory contributory health care financing schemes. Data for private insurance refers to voluntary health payment schemes (voluntary PHI, NPISH and enterprise financing schemes).
2. Here the annual growth rate per capita represents the per person annual health expenditure growth by financing schemes, in which the effect of price increases has been removed through "deflating" health expenditure by converting to values in real terms (OECD, 2017:347).
3. Funds for public health financing are allocated from taxation, social health insurance (SHI) contributions, compulsory private health insurance (PHI) premiums and Medical Saving Accounts (CMSA) payments. On the other hand, the raise of funds for PHI financing comes from voluntary health payment schemes premiums (http://stats.oecd.org/Index.aspx?DataSetCode=SHA#)
Source: OECD (2015c) OECD Health Statistics 2015, http://dx.doi.org/10.1787/health-data-en.

2.2.1.3 Private health insurance (PHI) financing in the rest of the world

In several low, lower-middle and upper-middle income countries (e.g. Bangladesh, India, Cambodia, Nigeria, Zimbabwe etc.), where public health financing is insufficient to provide universal coverage on total population either through tax revenues or SHI contributions, OOP healthcare payments share dominates in total health spending, depriving always from households valuable resources (Xu et al., 2003).

PHI funding is an inconsiderable parameter in low-income settings, despite the fact that in many countries of the developing world private pre-paid health insurance arrangements are the only shield against household direct medical expenses (Drechsler and Jütting, 2007:498). PHI financing, on average, is not a sizeable factor in low and lower-middle income countries, based on WHO global health expenditure database[25] (WHO, 2017a). Beyond of OECD and EU settings, however, there are quite a few countries with different income classification level, where PHI market plays a significant role in overall health financing and population coverage (Sekhri and Savedoff, 2005:131-132).

For example in the African region, and particularly in a low-income setting such as Zimbabwe, and in lower-middle one such as Senegal, PHI financing in 2014 corresponds to 9.56% and 10.18% of THE, respectively; albeit the privilege for private insurance coverage is only possible for the high-earners individuals. In Botswana, Namibia and South Africa, which are classified in the upper-middle income group by the World Bank, contributions to total health financing by PHI are remarkable, corresponding to 32.76%, 24.49% and 42.86% of THE in 2014, respectively (WHO, 2017a). Despite the fact that PHI financing in overall health spending is higher than any other OECD country (for example in South Africa), it only covers a small percentage of population. PHI financing in African settings plays both a duplicate and supplementary role, by offering healthcare on private facilities and refunding medical costs for health services which are not provided by public health system (Kumar et al., 2014:9). Similarly to Zimbabwe and Senegal, PHI coverage is affordable only to high-income individuals and formal sector employees in Botswana, Namibia and South Africa (Drechsler and Jütting, 2007).

In the Middle-East region, PHI contributes 15.52% on total health financing in Lebanon in 2014, a lower-middle income setting (WHO, 2017a). PHI institution in Lebanon is operated through a broad spectrum of institutional agents, while the results of a previous study proves that PHI has a negative impact on households OOP medical payments (Salti et al., 2010).

[25] According to WHO global health expenditure database, there is no data for PHI financing as a share (%) of THE or PHI share is less than 0.5% of THE (*i.e.* it is presented by the inequality symbol ¨<¨ rather than the real negligible volume), for several low, lower-middle and upper-middle income countries (WHO, 2017a). For example, no data is available for Afghanistan, Albania, Angola, Azerbaijan, Belarus, Bosnia-Herzegovina, Cambodia, Cameroon, Comoros, Congo Democratic Republic, Cuba, Eritrea, Haiti, Liberia, Libya, Nepal and South Sudan. Similarly, for countries where PHI as a share (%) to THE is less than 0.5, no data is available (e.g. Armenia, Bangladesh, Benin, Burundi, Bulgaria, Djibouti, Kazakhstan, Lao P.D.R, Mauritania, Mali, Micronesia, Mongolia, Moldova Republic, Myanmar, Samoa, Serbia, Sierra Leone, Tajikistan and Vietnam).

Further, PHI financing ranges between 5-10% in the high-income settings of the Middle-East region (e.g. in Bahrain, Saudi Arabia, Qatar and the United Arab Emirates) (WHO, 2017a).

In terms of contribution to THE, PHI represents negligible proportions in low (e.g. Cambodia and Nepal), lower-middle (e.g. in Bangladesh, India, Indonesia, Sri Lanka and Vietnam) and high-income countries (e.g. Singapore) in Asian region. Notable exceptions are Philippines (lower-middle), China and Thailand (both upper-middle), where PHI funds 8.59%, 4.49% and 7.71% of THE, respectively (WHO, 2017a). Despite the wide diversity of PHI dimension in Asian region, private coverage programs are exclusively directed on specific segments of population. Subscribers can be high-income employees and self-employed, working in the formal labour sector, high-educated and living in urban centers (Liu and Chen, 2002). Bad-risk, rural residents and worse-off individuals are not pursued selling target groups by for-profit PHI companies. Pre-paid public schemes but primarily OOP spending is the most common path to healthcare access for Asian population (Drechsler and Jütting, 2007; Van Doorslaer et al., 2006).

The majority of the Latin America countries, irrespective of income classification level, had emphasized in social protection through public health spending increases[26] the previous two decades, aiming on promoting universal health coverage to their citizens (WHO, 2017a). Governmental tax-based and SHI schemes dominates on total health financing; however, PHI institution covers large segments of population in Argentina, Brazil, Chile and Mexico (Atun et al., 2015:1232). Similarly with Chile, in Uruguay, a high-income country too, PHI institution operates like the US health system. Public health insurance schemes insure poor and elderly, while PHI supplements state health policy objectives by providing coverage on much more than the half Uruguayan population and contributing 13.21% on total health spending (WHO, 2017a; Sekhri and Savedoff, 2005:131). As it is indicated in Figure 2.6, PHI contributes, on average, less than 9% of THE in the upper-middle income settings (e.g. Costa Rica, Dominica, Ecuador, Mexico, Panama and Peru) and less than 3.5% in low and lower middle-income settings (e.g. El Salvador, Guatemala, Haiti, Honduras and Nicaragua) (WHO, 2017a).

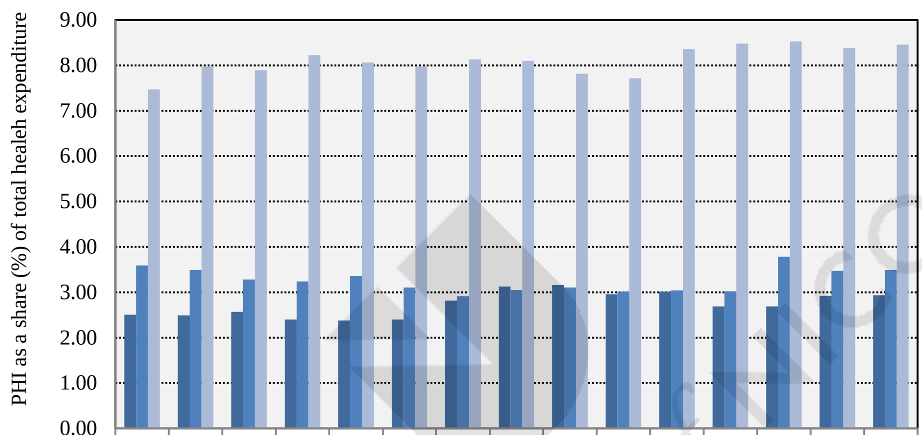
PHI financing accounts for less than 3% in an upper middle-income economy, Venezuela. On the other hand, PHI finances 26.39%, 10.91% and 9.52% of THE in Brazil, Dominica Republic and Colombia, which are also classified by the World Bank as upper-middle income countries. Although PHI funding as a share of THE has been recorded significant decline,

[26] According to WHO, the annual growth rate of public health expenditure as a share (%) of THE, on average, have been increased 5.56% from 1995 to 2014. Considerable raise of public health spending is exhibited in Bolivia, Colombia, Cuba, El Salvador, Mexico, Panama, Paraguay and Uruguay (WHO, 2017a).

almost 32.5%, in Argentina since 2000, it is still a sizeable factor of national health system, accounting for the 9.67% of THE in 2014 (WHO, 2017a).

Nevertheless, like in Asian region, PHI presents cream skimming issues on providing coverage by insuring only the low-risk and wealthy individuals in the majority of Latin America countries (Atun et al., 2015). Conclusively, the main pillar of private health financing in Latin America region is OOP payments rather than the PHI sector, corresponding over the years almost to one third of THE (WHO, 2017a).

Figure 2.6: PHI financing, in low, lower-middle and upper-middle income countries in Latin America and Caribbean region, on average 2000-2014, as a share (%) of total health expenditure



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Low	2.51	2.49	2.57	2.40	2.38	2.40	2.82	3.12	3.16	2.96	3.01	2.69	2.69	2.92	2.94
Lower-Middle	3.59	3.49	3.28	3.24	3.36	3.11	2.91	3.05	3.10	3.01	3.04	3.02	3.78	3.47	3.50
Upper-Middle	7.47	7.97	7.89	8.22	8.06	7.97	8.13	8.10	7.82	7.72	8.36	8.48	8.53	8.38	8.45

1. Here, PHI financing is expressed as a percentage of Total Health Expenditure (THE). THE is the sum of all outlays for health maintenance, restoration or enhancement paid for in cash or supplied in kind. It includes the general government expenditure and private expenditure on health, taking also into consideration investments (capital expenditures).
2. PHI financing includes the expenditure on health by private commercial insurance institutions as well by private social insurance schemes (which are managed and administrated by the state).
3. Countries current classification by income is based on World Bank classification by income. Available: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups.

Source: WHO (2017a). National Health Accounts (NHA) indicators - Global Health Expenditure database. Available: http://apps.who.int/nha/database. Authors' calculations based on WHO (2017a). Data extracted on 23 April 2017.

2.3 Household out of pocket (OOP) healthcare payments

Definition of the out of pocket (OOP) payments

Health systems major objective, irrespective of their structure financing, is to ensure and promote universal health coverage (UHC). UHC is always the basic motivation and principal focus of national health systems to protect population from the adverse financial consequences of medical services utilization when healthcare is necessary (Saksena et al., 2014; Wagstaff, 2008). Although the majority of nations set up various health system forms for achieving this imperative goal, households and individuals in several developed and developing countries face financial consequences and important costs for receiving healthcare, which are known on the literature of health economics as OOP payments, expenditures or spending (Van Damme et al., 2004).

According to WHO (2017b), OOP healthcare payments can be defined as any direct outlay from health consumers (households, individuals) to health providers (e.g. physicians, hospitals etc.) for health services and goods. These specific payments for healthcare exclude any benefit provision in kind, money refund (e.g. monetary reimbursement) and pre-paid fees (e.g. taxes, SHI payroll contributions, premiums) for insurance enrolling either by public or private risk pooling arrangements (WHO, 2017b). Because OOP spending constitute a direct funding mean from households financial resources (income, savings, assets etc.) for purchasing health goods and services, it is regarded and classified as a distinct financing scheme (OECD, 2017). That distinguishes the pre-paid insurance contributions from OOP payments; the latter are timely linked with the provision of healthcare services by creating a *quid pro quo* connection between the health payer and health provider (Sanwald and Theurl, 2015).

Further, OOP healthcare payments constitute an *ex-ante* or *ex-post* payment in cash from health consumers to health providers without a third-party financially involvement. Thus, this cost for meeting healthcare needs is net of any reimbursement by public or private insurance schemes (Chen et al., 2012). For the purposes of this research study, we do not consider issues for indirect OOP medical expenses, such as transportation costs for receiving healthcare or loss of income due to health shocks, even though they are significant and several times greater than the direct OOP costs for treatment, especially in the developing countries (Castillo-Riquelme et al., 2008; Akazili et al., 2007; McIntyre et al., 2006; Gertler and Gruber, 2002). For instance, Akazili et al. (2007) estimate that the indirect cost (e.g. opportunity time cost and travel expenses) for malaria healthcare treatment accounts for more than the two thirds of total expenditure per malaria treated event. Moreover, Castillo-Riquelme et al. (2008) estimate that the transportation costs (e.g. both for patient and caregiver) for malaria treatment account for almost the 61% of total OOP spending, with the remaining 39% being cost for medication. Further, they present that on average, malaria affected people remain out of work 3.4 days, aggravating in this way even more the household financial hardship due to the unexpected health shock. McIntyre et al. (2006) by reviewing the literature, refer that indirect costs for healthcare services in low and middle-income countries are from 2 to 3.6 times higher than the pure direct expenses for treatment per illness episode.

Categorization of the out of pocket (OOP) healthcare payments

Under the health funding perspective, the categorization of OOP payments on disaggregated components rather than an overall magnitude, sheds more light on this health financing scheme, its interaction with the pre-paid risk pooling arrangements and state fiscal-motivated interventions, by providing more insights for the economic burden of households to receive healthcare (OECD 2017; Thomson et al., 2014).

OOP payments include all expenses paid additionally by the users of health services and categorized on direct formal payments, formal cost sharing and informal payments (OECD, 2017; Thomson et al., 2009; Mossialos & Thomson, 2002).

- Direct formal OOP payments or OOP spending excluding cost-sharing represent households health care payments on health providers without any financial compensation or provided benefit by the compulsory or voluntary pre-paid insurance plans. The term formal represents the official recorded OOP payments, not covered by any insurance carrier social or private, with the provision of an official receipt by health providers to health consumers (dental care, maternity care, new-tech medical acts, cosmetic surgery, no-prescriptional medication, advanced hospital accommodation in private sector, practitioners' visits etc.).
- Chalkley and Robinson (1997:14) define as formal cost sharing "*the exposure of consumers of health services to out-of-pocket expenses in relation to the quantity of health care that they receive*". Moreover, formal cost sharing is the users' cost involvement for provided health services by compulsory government, SHI and voluntary PHI schemes (Paccagnella et al., 2013). The formal patient cost sharing implies a partly payment of medical expenses provided by compulsory or voluntary insurance arrangements to be covered by insured (OECD, 2017). The financial participation of insured on health expenses is a useful tool for SHI and PHI to reduce demand for unnecessary utilization of health services (e.g. induced-demand by health providers), encourage cost-consciousness and rationally use of medical care by health consumers, and finally, control health expenditure growth on insurance agents budgets (Drechsler and Jütting, 2007; Chalkley and Robinson, 1997). Robinson (2002) states that the application of formal cost sharing is usually pursued as an instrument in countries, where public resources are insufficient, when public health budgets are under fiscal pressure in times of economic stringency, and when citizens are not disposed to make generous funding on health system through increased insurance contributions or taxation.

The three main categories of formal cost sharing are co-insurance, co-payment and deductibles (Rombaldoni, 2012; Thomson et al., 2009):

- Co- insurance is used as a term to describe a fixed percentage of the total health care costs which is paid by the users, with the health insurance schemes paying for the rest proportion.
- Respectively co – payment can be described as a fixed amount paid by users per health service, regardless of the total health care cost.
- Finally, a fixed-amount paid by insured before any activation of the insurance coverage for a pre-defined period of time can be described as a deductible policy. Any excess over the deductible level is paid by insurers. A high default deductible amount usually involves lower premiums.

It is difficult for compulsory insurance schemes, with no statutory adapted health consumers' charges, to deter insured from using thoughtless the benefits of their health insurance plans (Rombaldoni, 2012). Especially, for voluntary PHI formal cost sharing and users' charges are important instruments of addressing with moral hazard and uncovering health risk of subscribers (Schmid et al., 2010).

- Informal OOP payments for healthcare: by exploring the literature informal payments can be also attributed by synonymous definitions, such as unofficial, ¨envelope¨ or ¨under the table¨ payments (Stepurko et al., 2010). A definition that can be attributed to this illegal kind of health spending is the voluntary or sometimes extortionate compensation (in cash or in a form of gift) from patients to public doctors for ensuring better medical care and faster access to health services (Chereches et al., 2013). Therefore, except of formal direct and statutory cost sharing for healthcare services, health consumers have to deal with a both informal and illegal character of OOP spending no officially regulated by state policies (Lewis, 2002). Further, informal OOP payments are the demanded or voluntary health consumers' payments to health providers in the form of gift, kind or money in order higher quality and faster medical care to be achieved for the interested patients (Lewis, 2007). In addition, medical supplies (e.g. pharmaceuticals, sanitary and operation materials etc.) which are in shortage in state-funded healthcare facilities, and hence have to be purchased by patients, can also be defined as informal OOP spending (Falkingham, 2004; Lewis, 2002). Gaal and McKee (2005:1452-1453) state that informal OOP spending in publicly-financed systems, either represents a socio-cultural custom driven by patients' expression of gratitude to health providers or even exhibits a coercion policy of health providers to health consumers in return to a better provided medical treatment. Specifically, the term informal payments more often is used to define the *ex-ante* or *ex-post* patients' OOP expenses, both monetary and non-monetary, to publicly-employed medical staff for health services that deterministically supposed to be costless provided within national health systems (Siskou et al., 2009; Allin et al., 2006 Adam, 1989).

Despite the fact that provided healthcare is supposed to be free of charge in public health systems; a hidden illegal financial activity outside of the official and recorded payment channels, has been settled by both patients and health providers through the informal OOP payments in several national health systems with minimal or insufficient state-financed health budgets (Siskou et al., 2008; Lewis, 2007; Allin et al., 2006; Vian et al., 2006). Thus, apart of any cultural perception that expresses patients' gratuity for received healthcare (Thompson and Witter, 2000; Adam, 1989), unofficial OOP spending serves as an illegitimate supplementary funding mechanism to inadequate public health resources under government blindfolding in a plenty of countries (Stepurko et al., 2010:1). In a consistent spirit, Cohen (2012:286) introduces an "*alternative politics*" conceptualized perspective for explaining the existence of informal healthcare payments in several countries health systems. The alternative politics perspective regarding informal OOP spending within state health sector is based on the "*do-it-yourself*" personal approach. This approach represents an extra-institutional, and hence illegal most of the times, individual strategy, for offsetting the insufficient public healthcare facilities and financing for a reasonably expected public healthcare services provision (Cohen, 2012:286). Stepurko et al. (2015) note that patients' informal OOP spending presence exhibits national health systems failure to provide the obvious; the desirable, reliable and dignified public-provided healthcare services.

Informal OOP spending assists corruption and promotes underground economy, since public medical personnel use public health facilities for personal business activities and gains (Liaropoulos et al., 2008). This illegal and ¨necessitate¨ type of OOP spending prevents equal accessibility for healthcare irrespective of ability to pay, since the worse-off have disproportionately to deal with higher payments compared to the better off patients (Liaropoulos et al., 2008; Szende and Culyer, 2006; Ensor, 2004). Besides of equal access on healthcare, informal OOP payments reduce the degree of financial protection which supposed to be provided through a theoretically free on any charge public healthcare system (Thomson et al., 2009).

Although, reports for this phenomenon are mostly observed in the former-socialist Eastern and Central European settings and former Soviet Union Republics (e.g. Albania, Armenia, Azerbaijan, Bulgaria, Georgia, Hungary, Kazakhstan; Kyrgyzstan, Lithuania, Moldova

Poland, Romania, Russia, Serbia, Tajikistan, Ukraine), it is also relevant in economies with under-funding national health systems like the Greek and Turkish systems (Vian et al., 2015; Stepurko et al., 2013; Tomini et al., 2013; Kaitelidou et al., 2012; Baji et al., 2012; Bredenkamp et al., 2011; Dimova et al., 2011; Aarva et al., 2009; Tatar et al., 2007; Baschieri and Falkingham, 2006; Vian et al., 2006; Belli et al., 2004; Ensor, 2004; Falkingham, 2004; Balabanova and McKee, 2002; Ensor and Savelyeva, 1998). The prevalence of this phenomenon is not only confined to former-socialist and in transition economies, but it also constitutes a parallel health financing mean in other low-income countries with limited public health budgets. Even in a high-income setting, Taiwan, and despite the introduction of national health insurance since 1995 in the country, informal OOP payments to public health providers are the prerequisite norm for a received better medical care (Chiu et al., 2007). Similar patterns over the years are also presented in other developing countries of Asia region. Informal OOP spending by health consumers for an advanced public-provided medical care is prevalent in Bangladesh, Cambodia, India, Nepal, Pakistan, Papua New Guinea, Philippines, Sri Lanka and Vietnam (Nguyen et al., 2012; Lewis, 2007; Barber et al., 2004; Banerjee et al., 2004; Killingsworth et al., 1999). Further, significant proportions of patients proceed on informal payments within national healthcare systems in order to bypass long waiting lists for surgery, to receive pharmaceuticals and to obtain advanced medical care in several African countries, such as Benin, Ethiopia, Ghana, Madagascar, Morocco, Mozambique, Sierra Leone, Tanzania, Uganda and Zambia (Kwesiga et al., 2015; Lewis and Pettersson, 2009). Finally, informal OOP payments through public health providers' ¨prohibitive¨ in cash extraction from patients, have been pointed out also in Latin America countries, such as Bolivia, Colombia, Costa Rica, Paraguay and Peru (Lewis and Pettersson, 2009; Lewis, 2006).

Irrespective of informal payments motivation, type of healthcare, timing of granting and purpose, this type of OOP expenditure operates parallel to public health services system in an illegal and unreported way like all informal activities of an economy (Stepurko et al., 2015). However, the most important is that informal spending for healthcare undermines national health systems objectives; equal access for equal needs and financial protection against patient medical expenses, and hence have to be eradicated with the contribution of all involved parties (Kaitelidou et al., 2013; Lewis and Pettersson, 2009).

Regarding the private health sector, informal OOP payments occur, when patients pay without the professionals (physicians) issuing legal invoices of their remuneration aiming on tax-evasion (Stepurko et al., 2010). Such unofficial and unrecorded procedure between patients and self-employed health providers (e.g. physicians, surgeons, anesthetists, dentists) is a common feature in the private Greek health sector, always promoting illegal money transactions outside the official tax-registered payment system and flourishing the "black and underground" economy (Pappadà and Zylberberg, 2014; Souliotis and Kyriopoulos, 2002).

Although the collection of informal OOP spending data is a quite difficult research venture because of its illegal character both for health consumers and providers, our research study aims to contribute to current empirical literature in this field through its data collection and sampling methodology approaches for gathering valid and reliable "sensitive" topic data, such as informal OOP payments for healthcare.

2.3.1 Out of pocket payments (OOP) financing in OECD and EU countries

The fiscal adjustment programs and the tough monitoring policies for several European countries, as a result of the current euro-zone debt crisis, create reasonable doubt as to whether health systems are capable of offering adequate financial protection to their citizens (Karanikolos et al., 2013).

As we more analytically explain in section 2.5.1 of this chapter, a main objective of health systems is to ensure risk pooling mechanisms against high OOP payments (Dukhan et al., 2010). However, the implementation of public health care budget restraints in countries such as Greece, Portugal and Ireland causes negative effects on health care utilization and financing (Goranitis et al., 2014; Fahy, 2012). In addition, in countries with pre-existing fiscal problems, like Spain and Italy, the austerity policies on public budgets result in damaging consequences on their respective health care systems (Bosch et al., 2014; De Belvis et al., 2012). Regarding Greece, several studies provided evidence that health trends and funding deteriorated as a result of the recent financial crisis (e.g. Kondilis et al., 2013; Vandoros et al., 2013).

Greece, over the years, exhibits one of the highest OOP expenditures ratios amongst developed economies (Niakas, 2013). Particularly, for the year 2014, Greece recorded OOP expenditures of around 35.4% of total current health expenditure, far beyond the OECD average and comparable only with Mexico, Korea, Latvia and Chile (see Table 2.4). In Greece, Portugal and Spain, OOP expenditures recorded a sharp decline in 2009 and 2010 as compared to 2008, as disposable incomes reduced and personal spending was cut due to the economic recession. However, an upward trend is recorded since 2011 (OECD, 2015). Furthermore, in Ireland, Portugal and Spain, OOP expenditures share on total current health expenditure in 2014, grew significantly compared to 2008 (OECD, 2017a). OOP expenditures in the UK have increased remarkably since 2008, as a result of strict policy responses which have been taken by the government to decrease public health spending (see Table 2.4) (OECD, 2015).

More specifically, the UK among several other European countries (e.g. Iceland, Greece, Ireland, Lithuania, Slovenia, and Spain) implemented severe cuts in general government spending in order to deal with the increasing levels of public deficits and debts (OECD, 2015). OOP expenditures also recorded a remarkable ascent from 2011 to 2015 in the Netherlands, since the Dutch government increased annual mandatory deductible per individual and excluded medical services from the compulsory benefit packages (OECD, 2017a; Kroneman et al., 2016:85).

Table 2.4: Household OOP financing as a share (%) of Current Health Expenditure, from 2007 to 2014, in OECD and non-OECD European countries

Function	Current expenditure on health (all functions)							
Financing scheme	Household Out of Pocket Payments							
Measure	Share of current expenditure on health							
Country (OECD)/Year	2007	2008	2009	2010	2011	2012	2013	2014
Australia	19.00	19.04	19.05	19.75	19.17	19.93	19.72	..
Austria	18.20	17.48	17.40	17.72	17.83	17.83	17.88	17.73
Belgium	19.54	18.72	18.51	18.46	18.54	18.07	18.16	17.81
Canada	15.50	15.36	14.99	15.43	14.77	14.52	14.47	14.33
Chile	39.55	37.70	35.17	35.00	34.95	33.88	33.33	32.81
Czech Republic	13.63	16.13	15.05	15.25	15.02	15.29	13.36	13.22
Denmark	14.56	14.12	13.68	13.70	13.31	12.90	13.72	13.81
Estonia	22.23	20.51	20.38	21.97	21.60	21.54	22.64	22.74
Finland	20.04	19.75	19.58	20.10	19.48	18.77	19.11	19.07
France	7.77	7.99	7.85	7.75	7.53	7.35	7.16	7.00
Germany	14.35	14.09	13.91	14.06	14.07	14.13	13.37	12.97
Greece	..	37.86	28.44	27.29	29.72	29.92	32.46	35.37
Hungary	26.26	26.35	26.23	27.42	28.22	29.37	28.36	28.38
Iceland	16.04	15.96	16.62	18.19	17.99	17.94	17.80	17.48
Ireland	11.57	11.86	12.70	13.80	12.07	11.38	14.95	15.41
Israel	26.78	25.53	25.43	23.67	23.68	23.67	24.52	23.62
Italy	21.52	21.34	20.66	20.55	22.03	21.97	21.66	22.03
Japan	15.52	15.24	15.16	14.57	13.12	12.97	12.70	..
Korea	38.26	37.99	36.38	36.05	36.14	36.97	37.20	36.81
Latvia	39.32	37.31	38.78	37.19	34.30	37.82	38.47	38.92
Luxembourg	10.31	10.06	9.90	10.23	10.88	10.44	10.39	10.70
Mexico	52.50	48.60	47.35	45.67	42.73	42.60	41.31	41.47
Netherlands	6.12	6.21	5.28	5.29	5.44	10.52	11.82	12.30
New Zealand	11.45	13.51	12.78	12.60	12.60	12.69	12.63	..
Norway	16.07	15.66	15.25	15.05	15.21	14.80	14.59	14.50
Poland	26.29	24.43	24.36	23.71	23.95	24.26	23.37	22.47
Portugal	25.67	25.82	24.61	24.56	26.30	28.18	26.97	27.52
Slovak Republic	27.37	21.02	22.42	22.80	23.57	23.23	23.32	18.01
Slovenia	13.63	12.64	12.78	12.68	12.25	12.53	12.62	13.03
Spain	21.03	21.02	19.52	20.75	21.09	22.77	24.06	24.67
Sweden	16.94	16.92	16.91	16.94	15.04	15.40	15.53	15.54
Switzerland	30.73	24.84	24.67	26.38	26.41	27.24	26.06	26.74
Turkey	23.89	19.18	14.51	16.87	15.90	15.93	16.93	17.73
United Kingdom	10.91	9.83	9.49	9.85	9.98	10.64	14.78	14.75
United States	13.47	13.12	12.50	12.21	12.16	12.05	11.93	11.46
OECD average	**20.77**	**20.38**	**19.67**	**19.81**	**19.63**	**19.99**	**20.21**	**20.64**
Country (non-OECD)/Year	2007	2008	2009	2010	2011	2012	2013	2014
Bulgaria	..	..	..	..	..	..	47.17	45.81
Croatia	..	..	..	..	..	..	12.08	16.71
Cyprus	..	..	..	46.53	46.72	47.93	47.29	49.85
Lithuania	..	..	..	..	28.22	31.8	32.82	31.49
Romania	..	..	..	..	..	..	19.89	19.86
Liechtenstein	..	..	..	..	..	..	22.30	23.55

1. Data refers to household OOP expenditure. Here, health financing is presented as a share (%) to total current health expenditure. Last updated in October 2016.
2. Current expenditure on health care or total current expenditure on health is the sum of total personal and total collective services, but not including investment (excluding capital expenditure).
Source: Eurostat (2017) Health care expenditure by financing scheme (http://ec.europa.eu/eurostat/web/health/health-care/data/database); OECD (2017a) Health Expenditure and Financing Database (http://stats.oecd.org/#). Data extracted on 15 May 2017 from OECD.Stat

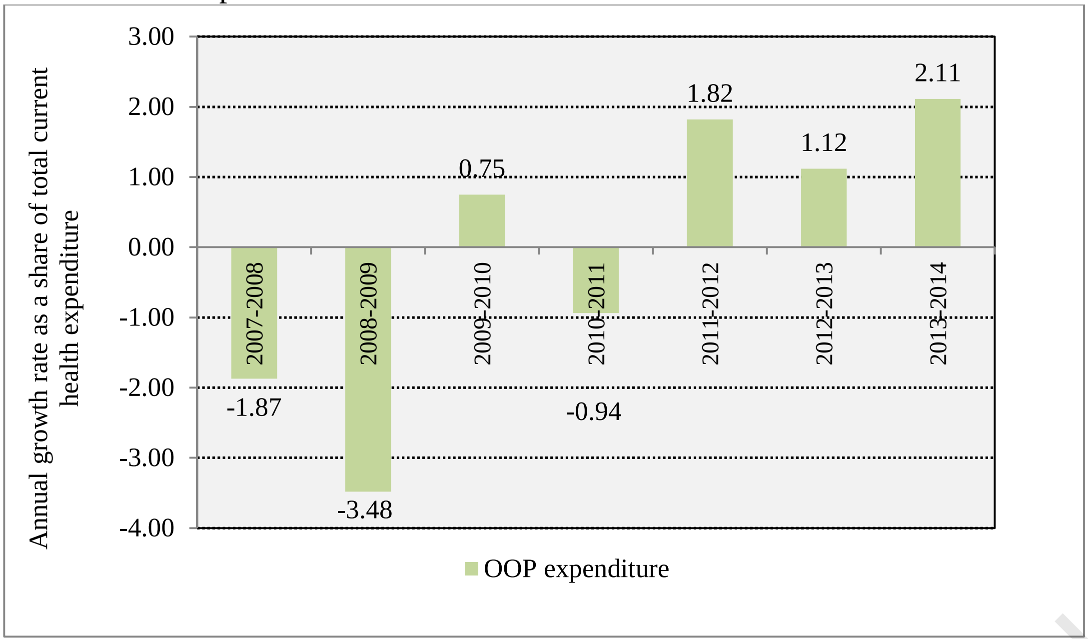
Reeves et al. (2014:2) assert that the "debt" and "role of external factors" hypotheses are the major drivers of reductions in several European healthcare budgets. On the other hand, OOP payments as a share of total current health expenditure are much smaller than the OECD average in Canada, France, Germany, Luxemburg, Japan, New Zealand, Norway and Slovenia, while OOP expenditure records significant downward trends in Mexico, Poland, Slovak Republic, Turkey and the USA because of a slight increase in public health coverage (see Table 2.4) (Eurostat, 2017; OECD, 2017a).

As we have already mentioned, public health resources either in the form of government or SHI financing is the greater contributor of overall health funding in the majority of EU and OECD countries. Nevertheless, OOP payments play a dominant role in national health financing in a few E.U. economies outside OECD area, and especially to those where public health funding is diachronically limited. OOP spending records almost the half share of total current health expenditure[27] in Cyprus (49.85%) and Bulgaria (45.81%) and the one third in Lithuania (31.49%) in 2014, as presented in Table 2.4 (Eurostat, 2017).

Conclusively, OOP expenditure, as it is displayed in Figure 2.7, showed upward trends per year since 2011, mainly as a result of several governments health budget cuts implemented as an offset of the recent financial crisis. More particularly, patient cost sharing measures taken to reduce public health funding, in a number of OECD and European countries, include reduced benefits package, increased co-insurance, co-payment rates and raising reimbursement thresholds for pharmaceuticals (OECD, 2015). The most glaring example is Greece, our examined country in this thesis, hardest hit by the 2008 crisis and its recession severity. Although the OOP spending share on current health expenditure declined from 2008 to 2014 in Greece, this medical expenditure is a serious concern for the Greek health system (see Table 2.4). In view of the public debt crisis that the Greece is experiencing, the overall reduction of public sector spending is a necessity in order for debt payments to be ensured, leading politicians to implement deep cuts in public health benefits as an austerity measure imposed by the "tri-partite coalition" of external creditors; EU, ECB and IMF.

[27] According to the OECD Health Data, total Current Health Expenditures (CHE) *"is the sum of total personal and total collective services but not including investment (gross capital formation in health)"* (OECD, 2015a:2).

Figure 2.7: Growth of OOP expenditure, OECD average 2007-2014, as a share (%) of total current health expenditure



1. Data for OOP expenditure refers to household OOP expenditure on health which comprises cost-sharing, self-medication and other expenditure paid directly by private households, irrespective of whether the contact with the health care system was established on referral or on the patient's own initiative (Available on https://stats.oecd.org/glossary/detail.asp?ID=1967). Last updated in October 2016.
2. Current expenditure on health care or total current expenditure on health is the sum of total personal and total collective services, but not including investment (excluding capital expenditure).
Source: OECD (2017a) Health Expenditure and Financing Database (http://stats.oecd.org/#). Authors' calculations based on OECD (2017a). Data extracted on 15 May 2017 from OECD.Stat

2.3.2 Out of pocket (OOP) payment financing in the rest of the world

The absence of adequate public or private health insurance arrangements in most low and middle-income countries results in OOP spending being over the years a significant parameter in overall health financing (Asante et al., 2016; Schieber and Maeda, 1999). For low and middle-income countries financial protection through social or private health insurance safe nets against people direct medical expenses is just a theoretical concept rather a reality. Large proportions of households in these countries spend extremely high OOP payments as a share of their wealth for healthcare, to go off their living standards plans and to deter or forgo treatment entirely, when they have to face serious unpredictable health shocks (Bathhin et al., 2008; Roy and Howard, 2007).

The WHO having considered seriously the international concerns regarding the predominance of OOP payments within many developing countries, introduced and recommended in 2005, that not well-developed national health systems should promote pre-payment health insurance mechanisms in order to ensure accessibility to health services and provide financial protection against financial hardship when healthcare is necessary (WHO, 2005). Nevertheless, and beyond of few exceptions, OOP payments are the major health financing contributor in several low and middle-income countries around the world, constituting financial protection to seem a faraway achievable objective. According to WHO (2017a), global health expenditure database, OOP payments still account as the major pillar of total health funding in several national health systems in all regions, downgrading in this way the presence of their risk pooling health insurance arrangements and emphasizing that policy-makers have to pay more attention for preventing this phenomenon. Although well-designed and organized health policy reforms for expanding public health insurance schemes have succeeded in declining OOP spending in few middle-income countries, the majority of them have failed to promote timely and effectively social or governmental health funding for offsetting the large levels of OOP expenditure within their health systems (Xu et al., 2003).

Improving financial protection and equity in health financing emerges as an imperative aim and alarming policy priority for developing countries, since OOP spending drives large proportions of households to financial catastrophe or even poverty as a result of seeking for healthcare (Shahrawat and Rao, 2011; Xu et al., 2005). More detailed analysis regarding financial protection and fairness of health financing is provided in the third part of this Chapter. The following sub-sections briefly summarize the reliance of OOP payments for several countries outside the OECD industrialized boundaries, indicating that this health financing scheme varies significantly across global regions and is the catalytic counterbalancing health financing form in accordance to the limited public health resources.

OOP expenditure in the Asia and East Pacific region

The subdued financial presence of national health insurance, either in the form of tax-based or SHI schemes, and the parallel operation of a large informal labour activity across Asian settings over the years, induced to health systems to be majorly dominated by OOP payments (Kwon, 2011; Ghosh, 2010). The 46 countries included in the Table 2.5, irrespective of income level, present that OOP spending is a significant health funding scheme throughout Asian countries. OOP payments, on average, contribute more than the one third of total health financing in 2014 (WHO, 2017a).

Apart from three OECD members, Australia, New Zealand and Japan, and Thailand, the most populous Asian countries record OOP payments at least 30% and some of them approximately or more than the two thirds of total health financing. The launching of national health insurance in Thailand in 2001 and in Vietnam in 1992 has superlatively succeeded in decreasing OOP expenditure, giving evidence that the expansion of mandatory health insurance can provide financial protection against population medical expenses on the rest low and middle-income settings of Asia (Van Minh et al., 2013; Limwattananon et al., 2011). Similarly, the increasing of state health financing, SHI reforms in 2009 for urban citizens and

the introduction of voluntary cooperative and community based insurance programmes for rural population in China in 2003, have managed to significantly decline the OOP expenditure share on national health financing (Liu et al., 2014; Zhang and Liu, 2013; Sun et al., 2009).
Contrary, healthcare needs in most Asian countries, as indicated in Table 2.5, in the absence of risk-pooling arrangements are funded by OOP payments resulting in poor socio-economic strata to deal with financial catastrophe or to forgo treatment (Van Doorslaer et al., 2007). Bangladesh, alongside with India, two lower-middle income countries in South-East Asia, record in 2014 OOP payments more than 60% of total health expenditure due to the minimal government health funding (Molla et al., 2017; Shahrawat and Rao, 2011). Yemen and Cambodia steadily record exorbitant OOP spending; almost the three quarters of total health expenditure and by far the greatest globally (WHO, 2017a). In several others, such as Pakistan, Philippines, Singapore, Myanmar, Indonesia, Nepal and Sri Lanka, OOP expenditure approaches or exceeds the half of overall financing. For all the latter, statistics indicate that the adoption of the UHC transition, through taxation or SHI risk-pooling mechanisms (WHO, 2005), is rather a philosophical ideology than a necessity (Malik, and Azam-Syed, 2012; Schieber et al., 2007; Van Doorslaer et al., 2006). Further, OOP payments approach the two fifths of total health expenditure in two upper middle-income settings of Middle-East, Iran and Iraq, in a lower middle and in an upper middle-income economies of South-East Asia, Lao PDR and Malaysia, respectively (WHO, 2017a).
Similar patterns are presented in Russian Federation (45.85%), Mongolia (41.63%), an inseparably previously linked with Soviet Union country, Afghanistan (63.88%) and in the transition former Soviet economies in Central Asia. OOP expenditure dominates the health financing landscape in Azerbaijan (72.08%), Tajikistan (61.69%), Armenia (59.51%) and Georgia (58.58%). OOP spending in Ukraine (46.22%), Kazakhstan (45.14%), Uzbekistan (43.93%) and Kirgizstan (39.40%) is a significant health funding contributor (WHO, 2017a).
Both increasing governmental health financing and proceeding in radical structural adjustments is the only path for all the former Soviet Semashko[28] health systems to achieve effective financial protection against formal and informal OOP payments and develop health funding models transparency (Zasimova, 2016; Shishkin et al., 2014; Aarva et al., 2009; Baschieri and Falkingham, 2006; Belli et al., 2004).

[28] Semashko health care model, honorably named after Semashko Nikolai the first public health commissar of the Soviet Union in 1918, represents the ex-communist welfare state for population health. This health care system was principally based on the constitutional right for the entire population to obtain free of charge medical treatment. It was completely state-funded and administrated, with healthcare services exclusively provided by state-owned outpatient and inpatient facilities (Borowitz and Atun, 2006).

Table 2.5: Household OOP expenditure as a share (%) of Total Health Expenditure (THE), from 1995 to 2014, in Asia region

Countries / Year	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Afghanistan			89.63	85.23	91.77	83.12	72.31	68.70	73.26	65.43	67.13	63.88
Armenia	66.23	77.35	61.65	52.65	49.45	51.40	53.08	55.87	47.05	54.57	53.69	53.51
Azerbaijan	66.36	63.27	82.36	78.43	72.56	71.75	68.50	69.18	69.83	69.02	71.06	72.08
Bangladesh	60.16	57.78	59.92	58.72	61.18	60.31	61.13	60.97	61.32	63.30	66.84	66.98
Bhutan	33.23	22.96	20.65	18.15	12.53	15.10	18.43	11.49	11.79	25.69	25.23	25.33
Cambodia	78.58	76.65	71.76	71.76	63.95	60.70	60.26	60.27	61.21	70.96	73.10	74.19
China	46.40	58.98	52.21	49.31	44.05	40.42	37.46	35.29	34.77	34.34	33.88	31.99
Georgia	94.78	82.51	76.83	72.22	70.80	64.24	66.55	69.11	64.89	62.41	61.05	58.58
India	67.45	67.86	65.90	65.75	65.25	64.39	63.33	63.37	64.43	64.88	63.81	62.42
Indonesia	46.51	46.04	54.62	52.34	49.11	49.06	49.00	47.21	47.39	45.35	45.63	46.87
Iran	53.59	57.11	54.89	50.30	51.69	53.56	54.79	58.18	56.03	54.24	50.30	40.63
Iraq	..	..	32.65	36.19	30.51	25.16	25.74	26.10	24.93	37.69	37.17	39.73
Japan	14.03	15.61	15.50	16.27	15.38	15.10	15.00	14.45	13.96	13.88	13.89	13.91
Jordan	23.82	38.96	40.03	39.35	35.90	31.86	22.63	21.79	20.76	21.56	22.50	20.87
Kazakhstan	35.53	48.51	37.49	37.54	43.31	37.40	35.36	42.34	43.46	43.69	48.56	45.14
Kuwait	16.24	22.35	18.26	17.13	19.27	19.67	11.69	13.95	12.49	13.55	13.95	12.74
Kyrgyzstan	45.15	49.76	55.99	48.14	45.09	42.26	39.18	38.66	34.49	35.22	37.33	39.40
Laos PDR	37.55	61.39	62.36	54.35	56.48	35.24	30.15	41.82	51.77	52.48	40.78	38.98
Lebanon	53.46	56.85	42.85	44.29	42.81	43.89	42.38	45.60	45.95	37.34	37.50	36.42
Malaysia	32.64	33.75	38.08	35.62	35.76	34.72	31.45	32.80	35.08	34.91	36.11	35.30
Maldives	14.14	18.96	18.07	20.78	22.85	18.32	21.11	26.60	25.22	24.05	21.59	18.26
Mongolia	11.60	16.62	48.09	44.84	42.55	40.36	44.91	40.50	38.59	43.29	44.30	41.63
Myanmar	80.98	85.79	90.64	81.58	84.34	85.12	82.16	76.61	78.79	59.09	57.81	50.69
Nepal	69.56	68.49	52.74	46.66	50.48	48.21	45.45	44.52	41.38	45.91	48.68	47.65
Oman	10.17	11.75	10.55	11.48	11.27	12.45	11.50	10.41	10.84	10.43	7.14	5.78
Pakistan	72.09	63.70	66.01	68.97	67.78	65.57	64.32	60.61	61.49	54.76	54.87	56.28
Papua N. Guinea	7.62	10.24	8.23	8.12	12.64	13.51	14.58	13.28	10.19	11.02	10.21	10.46
Philippines	50.01	40.50	51.93	53.96	55.67	57.17	54.86	54.08	57.74	57.19	56.34	53.69
Qatar	34.63	27.70	15.87	15.92	15.98	16.03	15.82	16.01	13.86	8.68	6.53	6.86
Russia Fed.	16.89	29.97	31.32	29.97	29.74	39.63	41.41	43.30	43.36	42.55	45.43	45.85
Samoa	22.36	19.16	12.61	9.32	8.99	9.59	8.71	7.90	7.52	8.46	6.26	5.88
Saudi Arabia	34.25	18.46	16.49	15.70	17.10	20.05	19.27	19.84	16.30	15.81	14.97	14.31
Singapore	48.83	52.64	69.32	68.90	68.29	65.49	60.50	61.13	61.32	60.10	57.93	54.83
Sri Lanka	45.54	41.30	44.93	42.76	41.70	43.86	43.98	44.83	48.06	48.65	41.03	42.09
Syria	60.32	59.55	49.50	51.46	51.92	53.01	54.00	54.00	53.38	53.69	53.69	53.69
Tajikistan	57.48	78.81	78.35	78.19	73.04	72.30	67.79	66.85	61.42	60.09	60.12	61.69
Thailand	42.59	33.72	27.23	17.38	14.50	14.69	15.37	14.19	12.43	12.57	12.21	11.92
Timor-Leste		30.56	42.63	32.52	51.30	15.85	13.99	11.32	10.61	9.09	8.89	9.57
Turkmenistan	39.50	18.46	42.42	46.76	35.69	50.82	38.19	38.43	35.99	35.09	32.76	34.77
Tuvalu	2.57		0.95	0.62	0.84	1.17	1.00	0.74	0.81	0.96	0.82	0.80
Ukraine	24.46	44.05	37.50	36.28	34.65	39.44	41.96	40.50	43.64	41.98	43.09	46.22
United Arab Em.	14.93	21.94	30.14	29.71	28.88	25.14	16.10	17.95	16.88	16.74	17.15	17.81
Uzbekistan	46.55	52.30	52.13	52.02	56.86	53.87	55.04	45.63	46.36	48.75	47.63	43.93
Vanuatu	11.23	9.39	8.40	7.66	7.85	7.49	7.27	6.36	7.75	8.19	7.65	5.79
Viet Nam	62.86	66.03	67.64	58.77	51.96	54.12	50.23	44.84	45.58	36.77	36.49	36.76

Yemen	64.72	43.49	64.78	63.26	69.16	68.40	73.79	73.84	72.21	71.61	74.58	76.42
Average	**42.27**	**44.22**	**45.05**	**42.99**	**42.67**	**41.11**	**39.60**	**39.38**	**39.06**	**38.83**	**38.43**	**37.66**

1. Here, household OOP financing is expressed as a percentage of Total Health Expenditure (THE). THE is the sum of all outlays for health maintenance, restoration or enhancement paid for in cash or supplied in kind. It includes the general government expenditure and private expenditure on health, taking also into consideration investments (capital expenditures).
2. Countries current classification by income is based on World Bank classification by income. Available: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups.
Source: WHO (2017a). National Health Accounts (NHA) indicators - Global Health Expenditure database. Available: http://apps.who.int/nha/database. Authors' calculations based on WHO (2017a). Data extracted on 23 April 2017.

OOP expenditure in Africa region

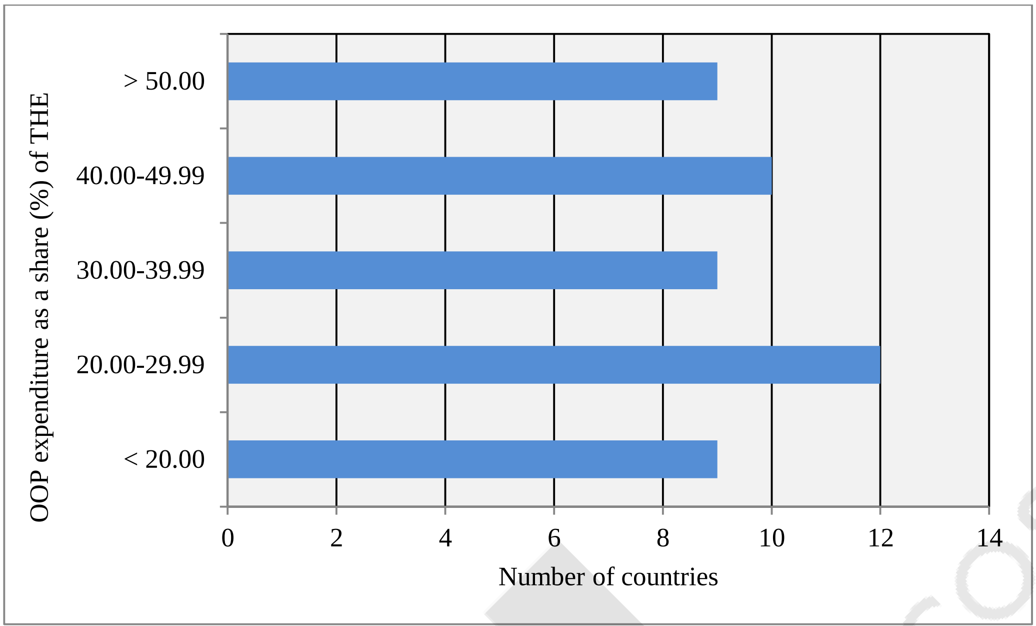
Although the main principle for financially protecting households against OOP medical expenses is efficient risk-pooling insurance mechanisms to be developed and expanded by governments, this is not the case for the most African countries. It is a necessity for African countries, like all low-income settings, to move through universal coverage on improving financial protection and fairness of health financing in order to achieve WHO health care goals (Akazili et al., 2011). According to WHO database, several of them do not move on the right direction, and hence they have to re-adjust their welfare reforms (WHO, 2017a).

As it is illustrated in Figure 2.8, the majority of African nations majorly relies on OOP health payments rather than promoting the development of publicly-funded insurance schemes. As a percentage of total health financing, OOP expenditure in 2014 ranged from 2.34% in a high-income economy Seychelles, to 71.64% in a lower middle-income one Nigeria, with an average of about 35% for 49 countries[29] in the Region (WHO, 2017a). Albeit of a few exceptions, such as two upper middle-income settings, Botswana (5.19%) and South Africa (6.49%), and three low-income economies, Mozambique (9.48%), Swaziland (10.29%), Malawi (10.64%), with well-developed national, social or community health insurance arrangements, the majority of African health systems are characterized over the years by low state-funded health budget, which it results in significant proportions of OOP payments to total health expenditure (THE) (Leive and Xu, 2008). Particularly, for Tanzania, Kenya, Ghana and Zambia, which record OOP expenditure from 20% to 30% and sufficiently had succeeded on declining OOP payments levels since 1995, the rudimentary development of national health insurance mechanisms in most low-income African countries results in nine of them to exhibit household OOP spending more than 50% of THE. The outliers are sub-Saharan countries, such as Nigeria (71.64%), Cameroon (66.31%), Sierra Leone (60.96%), Eritrea (59.27%), Niger (54.70%) and Côte d'Ivoire (50.81%), while considerable proportions of OOP expenditure are also presented for Morocco (58.51%) and Egypt (55.66%), two lower middle-income settings in North Africa. As a share of THE, OOP payments ranged between

[29] Data for OOP expenditure as a share (%) of total health expenditure is not available for Namibia from 2009 to 2014 and for Sao Tome-Principe for the year 2014 (WHO, 2017a).

40% to 50% for the year 2014 in Togo, Central African Republic, Comoros, Guinea, Guinea-Bissau, Mauritania, Mali, Mauritius, Madagascar and Uganda.

Figure 2.8: Household OOP expenditure as a share (%) of Total Health Expenditure (THE) for African countries in 2014



1. Here, household OOP financing is expressed as a percentage of Total Health Expenditure (THE). THE is the sum of all outlays for health maintenance, restoration or enhancement paid for in cash or supplied in kind. It includes the general government expenditure and private expenditure on health, taking also into consideration investments (capital expenditures).
2. Countries current classification by income is based on World Bank classification by income. Available: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups.
Source: WHO (2017a). National Health Accounts (NHA) indicators - Global Health Expenditure database. Available: http://apps.who.int/nha/database. Authors' calculations based on WHO (2017a). Data extracted on 23 April 2017.

Especially, for the worse-off individuals the official enrollment in health insurance schemes is financially prohibitive, even in Namibia[30], a country with high household health insurance coverage rate compared to the rest settings of Africa (Gustafsson et al., 2011). The aftermath is that the poor segments of African population has to deal with high or even catastrophic OOP medical expenses as well as many proportions of them to be excluded from healthcare because of their limited affordability for receiving it (Brinda et al., 2014; Ewelukwa et al., 2013). If it also taken into account, that the official databases for OOP expenditure do not comprise the cases of individuals who prefer to forgo healthcare due their inability to pay, the situation is even worse than is shown in the statistics of WHO (Moreno-Serra et al., 2011; Preker et al., 2002).

Considering that OOP payments accounted for more than 30% of THE for almost the 60% of African nations, improving health insurance arrangements for eliminating OOP spending

[30] The OOP payments share in Namibia reached 8.14% of total health expenditure in 2008 (the last available year) (WHO, 2017a).

emerges as a vital importance priority for the majority of African countries (Kusi et al., 2015; Chuma and Maina, 2012).

OOP expenditure in Latin America and Caribbean region

The international health policy consensus suggests that replacing OOP payments with sufficient public resources for healthcare financing in respect to THE, constitutes the most prerequisite treaty for ensuring efficient safe-nets against households financial shocks incurred by medical expenses (Malik and Syed, 2012; Wagstaff, 2008; Ekman, 2007). Hence, it is not surprising that several Latin America settings with significant levels of OOP payments in overall health financing are those with moderate public or private institutional health funding.

As it has already been discussed in section 2.2.1.2, over the last thirty years, most of Latin American settings, moving definitely away from military dictatorships, have proceeded in raising public health expenditures, as a part of democratic governmental broader efforts to improve social welfare benefits (Almeida and Sarti, 2013; Knaul et al., 2011). According to WHO (2017a), from 1995 to 2014, Bolivia, Colombia, Costa Rica, Panama and Uruguay have significantly strengthen their state health financing, which it exceeds almost the three quarters of THE in 2014. Similarly, public health funding recorded upward trends in Dominican Republic, El Salvador and Peru with proportions more than 60%. Although, the share of health financing comes from public revenues has been increased for the same period for Argentina, Brazil and Mexico, nonetheless it is perpetually much lower than the Region average (i.e. 56.64% in 2014) (WHO, 2017). Cuba[31], a unique case in the Region and amongst the developing economies globally, steadily exhibits public health spending more than 90% and single digits of OOP proportions to THE (see Table 2.6).

[31] Fidel Castro's communist regime has succeeded in achieving universal health coverage for the whole population by establishing Cuban NHS since 1976. Under the state legislation, Cuban healthcare system is strictly publicly-funded, healthcare services are solely provided by public-owned facilities, while costless health care is a constitutional right (Keck and Reed, 2012).

Table 2.6: Household OOP expenditure as a share (%) of Total Health Expenditure (THE), from 1995 to 2014, in Latin America and Caribbean region

Countries / Year	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Antigua and Bar.	29.15	26.35	25.98	24.55	23.09	22.17	24.06	23.10	23.01	24.14	24.38	23.69
Argentina	27.98	29.03	29.88	29.06	25.68	22.61	20.13	22.00	23.03	26.87	30.19	30.73
Bahamas	24.14	20.91	29.47	27.30	29.71	29.18	28.37	28.86	28.70	30.02	30.41	29.23
Barbados	24.29	26.43	28.67	28.63	26.92	26.23	26.82	28.19	30.86	28.52	28.87	29.87
Belize	30.39	39.01	32.17	29.52	27.43	25.89	24.50	23.65	23.40	23.99	24.26	23.01
Bolivia	33.30	34.88	26.69	26.24	25.54	26.46	26.84	27.90	25.27	25.90	24.35	23.11
Brazil	38.74	37.95	36.71	35.98	34.06	31.47	31.79	27.32	26.85	26.90	25.76	25.47
Colombia	38.06	12.22	17.01	18.48	19.86	21.39	18.67	17.76	15.63	14.55	13.79	15.36
Costa Rica	20.60	18.71	24.83	26.88	28.74	27.10	24.66	24.03	24.13	24.36	24.53	24.87
Cuba	9.77	9.17	6.92	7.69	5.15	4.63	4.22	4.81	4.96	5.85	5.48	4.39
Dominica	28.25	28.30	33.11	30.76	32.93	33.38	27.15	26.27	26.51	28.21	28.67	28.34
Dominican R.	54.43	43.09	50.72	45.66	41.05	38.41	34.86	33.24	28.63	26.08	25.02	21.14
Ecuador	32.55	62.67	55.24	51.39	49.40	48.11	49.43	47.47	45.94	50.64	44.32	48.43
El Salvador	60.73	50.66	43.07	33.61	36.23	35.81	34.73	33.61	32.07	32.39	28.44	28.85
Grenada	56.47	47.97	45.42	45.05	49.35	52.05	49.64	49.95	50.40	50.34	52.01	50.93
Guatemala	55.43	56.96	58.61	57.32	57.16	55.55	53.51	54.61	55.62	55.42	52.60	52.22
Guyana	16.28	13.14	22.82	31.52	24.82	22.66	25.47	29.96	30.24	31.31	39.85	37.44
Haiti	45.54	50.38	57.52	41.55	42.61	39.19	36.28	33.52	25.63	27.82	32.37	34.82
Honduras	41.45	43.47	47.09	51.37	51.00	52.65	45.70	47.24	50.24	49.25	45.63	43.46
Jamaica	28.85	28.97	32.58	28.85	34.04	32.96	31.12	30.90	32.91	25.06	24.98	27.81
Mexico	56.15	50.94	53.48	52.68	51.64	50.75	49.12	47.50	45.05	45.00	44.00	44.00
Nicaragua	35.07	42.65	39.89	42.01	42.01	42.01	33.65	31.55	32.67	40.26	41.14	37.54
Panama	26.95	25.95	24.64	26.27	29.72	25.81	21.32	24.91	26.98	24.80	22.22	22.27
Paraguay	57.87	52.07	52.38	51.09	49.91	54.75	55.91	57.72	54.86	50.72	49.94	49.42
Peru	39.72	36.41	33.32	39.61	40.94	41.42	37.46	37.12	37.20	35.62	31.88	28.62
St.Kitts-Nevis	43.24	49.78	58.26	55.49	57.24	63.11	51.98	49.10	54.50	52.20	58.67	50.77
Saint Lucia	49.12	47.03	52.83	50.21	55.30	51.11	45.15	49.48	56.19	48.95	54.26	45.57
St.Vincent-Gren.	43.77	17.73	19.13	18.02	17.86	15.97	15.59	18.05	18.01	48.06	17.28	49.19
Suriname	7.02	18.56	14.76	11.54	13.50	14.73	13.00	13.44	13.77	12.81	10.93	11.40
Trinidad-Tobago	42.08	45.81	41.58	41.53	41.45	41.30	41.11	34.86	37.44	40.61	38.76	37.98
Uruguay	16.16	20.36	11.74	10.94	13.20	11.88	18.25	17.71	17.27	16.86	16.47	15.58
Venezuela	61.48	49.71	47.17	45.89	46.15	61.39	51.31	52.64	49.88	58.54	62.60	64.33
Average	**37.08**	**35.89**	**36.23**	**35.05**	**35.21**	**35.12**	**32.90**	**32.79**	**32.77**	**33.78**	**32.92**	**33.07**

1. Here, household OOP financing is expressed as a percentage of Total Health Expenditure (THE). THE is the sum of all outlays for health maintenance, restoration or enhancement paid for in cash or supplied in kind. It includes the general government expenditure and private expenditure on health, taking also into consideration investments (capital expenditures).
2. OOP payments share (%) to THE is not included for Chile, since this indicator for the Country is presented in the OECD group.
3. Countries current classification by income is based on World Bank classification by income. Available: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups.

Source: WHO (2017a). National Health Accounts (NHA) indicators - Global Health Expenditure database. Available: http://apps.who.int/nha/database. Authors' calculations based on WHO (2017a). Data extracted on 23 April 2017.

Increased state health resources have managed to provide greater levels of health insurance coverage in poor and rural populations across the Region (Atun et al., 2015). Nevertheless, household OOP spending is still significant in the vast majority of Latin America national healthcare systems (WHO, 2017a). As it is presented in Table 2.6, OOP payments indicator exceeds or almost equals the half of THE, in Venezuela, Guatemala, Grenada, Paraguay and Ecuador. OOP spending is also a significant health funding source in Mexico, Honduras, Nicaragua, Trinidad and Tobago, and Haiti, steadily contributing more than the one third of aggregate health financing in the recent years. On the other hand, except of Argentina, which presents upwards trends in OOP spending since 2010, the rest large economies of the Region record OOP payments proportions less than 20% (e.g. in Colombia and Uruguay) and less than 30% of THE (e.g. in Brazil, Costa Rica, Peru and Panama).

In spite of all state reforms for achieving universal health coverage impetus, the vulnerable groups (i.e. poor, unemployed, informal workers) of Latin Americans are excluded from national health insurance schemes, while PHI coverage is solely potential for the better-off (Atun et al., 2015).

In chapter 3, we provide more comprehensively the consequences of the high levels of OOP payments on population for several countries around the world, by presenting issues concerning the link between this healthcare-related private financing scheme and households ability to pay.

2.4 A short overview of the Greek health care system

During the last thirty years, the Greek state health policy is primarily focused on ensuring the accessibility to and utilization by the entire population of health care structures and resources, regardless of income level. The objective always is the universal coverage of the population with high quality healthcare services at low or no-cost to individuals. The overriding principle of equity in delivering and financing health care was the great challenge of any government since 1981 (Liaropoulos and Tragakes, 1998).

The health system in Greece is financed across two main axes, public and private. The public axis includes government subsidies and compulsory SHI financing. The private health funding comprises OOP payments, donations - charities and PHI financing, the latter to negligible levels over time (Siskou et al., 2009). The Greek health care system relies both on Bismark and Beveridge models.

Regarding health care services supply, the system was working for several years as a Beveridge model (Vrachatis and Papadopoulos, 2012), through NHS public hospitals and affiliated private health providers with SHI carriers.

On the demand side of health care services, the system was operating as a Bismarck model through a broad range of SHI funds for the previous years (Economou et al., 2014).

Since the beginning of 2012, almost all insurance carriers are under the umbrella of a unique SHI institution, which now covers over 95% of the insured population (Karakolias and Polyzos, 2014; Groenewegen and Jurgutis, 2013). The creation of the National Organization for the Provision of Health Services (EOPYY), as a unified SHI fund, was among the Country's major reforms (Pappa et al., 2013).

2.4.1 The new social health care financing agent in Greece

The most crucial reform that the Greek state had ever implemented on the health sector, since the introduction of the National Health System in 1983, was the merger of the majority of SHI funds into a unique insurance carrier. The implementation of this structural SHI reform in the Greek health system had been formulated as necessary long before the outbreak of the financial crisis, regardless of whether it was required as a prerequisite condition of the lending agreements of the Country in May 2010 (Economou et al., 2014).

This SHI structural development is not innovative since similar patterns are detected inside and outside Europe (e.g. France, Canada, South Korea and Taiwan)[32] (Karakolias and Polyzos, 2014; Kwon, 2009). Before the establishment of EOPPY in the beginning of 2012, a fragmentation of several SHI funds was operating in the Greek health system. The social security system was operating through the presence, just a few years before, of a broad range of social insurance agencies and funds which was counted 32 different health insurance public institutional schemes (Siskou et al., 2008). Just in 2008, a partial merger of social insurance organizations took place[33] (Economou et al., 2014). Thus, different occupational groups of insured having same labor remunerations were paying different SHI contributions and were enjoying different benefits, health care access and utilization (Van Gool and Pearson, 2014).

EOPYY merged in its early operation stages the most sizeable SHI carriers, such as the Social Insurance Institution (IKA), Social Insurance Organization for the Self-Employed (OAEE), Agricultural Insurance Organization (OGA) and Health Care Organization for Public and Municipal Employees Officers (OPAD-TYDKY), while the national SHI consolidation also was joined by TAYTEKO, House of Sailor (former, Maritime Retirement Fund (NAT)) and several other smaller sickness funds, a few months later. It is crucial to be pointed out, that EOPYY has managed to attribute social justice in provision and delivery of healthcare benefits, since by its establishment the unified insured body enjoys the same privileges (Economou, 2015). Further, the mandatory merger of the former numerous social sickness

[32] For example, Karakolias and Polyzos (2014) refer that EOPYY almost perfectly simulates the French SHI model (*Union Nationale des Caisses d'Assurance Maladie - UNCAM*). According to Kwon (2009), the Korean National Health Insurance Corporation (NHIC) nowadays represents for South Korea the single national health insurer after the general merger of several SHI funds which took place in 2000.

[33] For example in 2008, the former Insurance Fund of Greek Telecoms, Railways, Mail (TAP-OTE), Insurance Fund of Public Power Corporation (TAP-DEH), Insurance Fund of Banks (TAAPTPGAE), Insurance Fund of former Commercial Bank S.A. (TAP-ETE) create the Insurance Fund for Bank and Utility Company Employees (so called TAYTEKO). Further, the Health Care Organization for Public Officers (OPAD) and Health Care Organization for Municipal Employees (TYDKY) proceeded also on an insurance scheme consolidation.

carriers in a national unified SHI organization has managed to simplify the previous fragmented SHI identity (Economou et al., 2014).

Having influences from Western Europe, the Greek health system continues to operate under a backdrop of mixed financing systems (Wagstaff, 2009). The operation of the former SHI funds under the umbrella of EOPYY, which largely relies on mandatory employees' and employers' contributions, basically simulates the German ¨Bismarckian¨ model (Economou and Giorno, 2009). The Greek health care system can be characterized as a SHI financing system such as the French, German, Korean and Japanese systems. It is mainly based on social contributions, despite some supplementary funding from the tax-financed state revenues on SHI funds and NHS (Paris et al., 2010). Although, the new social security organization unified the majority of the former social sickness funds, it should be clarified that it is not a pure SHI institutional fund but a national purchaser of healthcare services on behalf of the consolidated former social health insurers. The merged SHI schemes into EOPYY were continuing to separately operate for non-healthcare-related activities (e.g. collection of SHI contributions, registry administration) until the end of 2016, while in the beginning of the 2017 all of them constitute under the new legislation (i.e. Law 4387/2016) also a single insurance-retirement carrier, namely Single Social Security Institution (EFKA).

The new SHI organization, EOPYY, operates as a monopsonist insurance player in the health insurance market. It purchases outpatient and inpatient health care services for its members from public and private health care suppliers and provides insurance coverage to 95% for all insured, *i.e.* 79% of the total population (OECD, 2014; Groenewegen and Jurgutis, 2013).

Despite EOPYY's public health insurance profile, it additionally purchases health services from private providers[34], in order to ensure efficiency and affect equity of access to the health system (Thomson et al., 2014; Sissouras, 2014).

In addition to its basic objective to provide equal, efficient and cost effective health care options, thus eliminating past inequalities, EOPYY's role is to control and reduce the public health care expenditure (Kaitelidou and Kouli, 2012). However, coverage and benefits limitations often result in extra OOP spending (Kyriopoulos, Zavras et al., 2014; Economou et al., 2014).

The rigorous financing agenda which Greek health policymakers implemented during the last six years following the fiscal hints of external creditors (E.U., E.C.B and I.M.F) allows for

[34] EOPYY, nowadays, purchases for its insured members primary and secondary health care services, from both public and private health providers through contractual mechanisms and payment systems (Thomson et al., 2014).

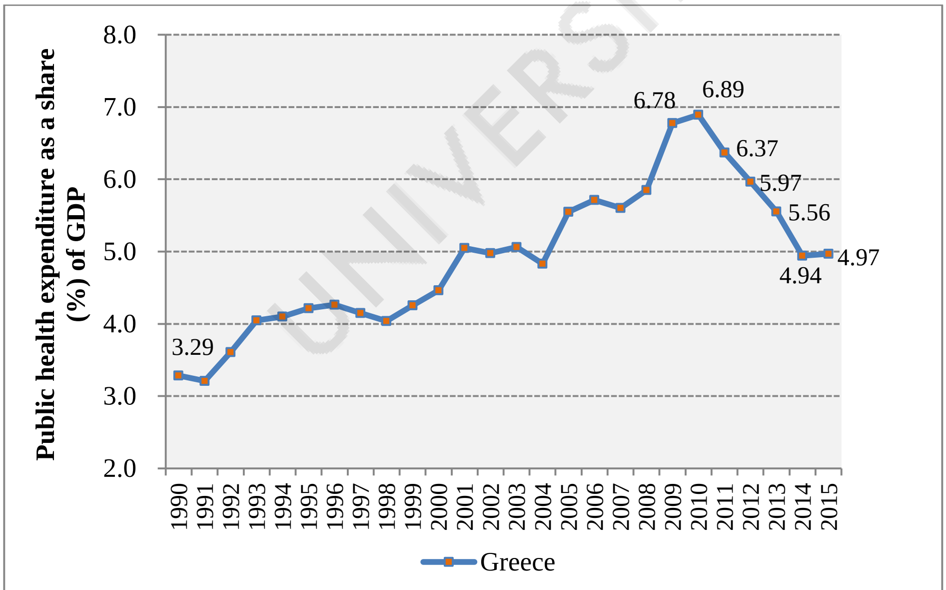
doubts on whether EOPYY has succeeded in its aforementioned tasks (Economou et al., 2014; Sissouras, 2014).

2.4.2 The Greek health care system financing

The Greek health care system financing is based on a mix of public and private schemes resources. Public healthcare financing is based on direct and indirect taxation and SHI contributions by employees, employers and self-employed (e.g. farmers, entrepreneurships) workforce population. Private healthcare financing predominantly comprises OOP medical payments and PHI in minimal levels over the time (Siskou et al., 2009). The Greek healthcare system is among the most "privatized" between OECD countries (Kaitelidou et al., 2013; Kondilis et al., 2011; Siskou et al., 2009), while public policy in health expenditure is a tool to achieve fiscal goals (Niakas, 2013).

Despite the steadily annual growth of public health expenditure in Greece over the past two decades, the scenery drastically had been reversed by the Greek government political actions to achieve fiscal sustainability and condensate public sector high levels of debt (Economou, 2015). All the adopted austerity health sector reforms since 2010 had succeeded in achieving cost-containment in public health spending, as indicated in Figure 2.9. Public health spending as a percentage of GDP experienced significant downward trend from 2010 (6.78%) to 2015 (4.97%), in spite of the obligatory compliance under the bailout rescue packages agreements that Country has to abide with (OECD, 2015b; 2017a).

Figure 2.9: Public health expenditure as a share (%) of Gross Domestic Product (GDP) in Greece, from 1990 to 2015



1. Funds for public health financing are allocated from government schemes and compulsory contributory health care financing schemes. (http://stats.oecd.org/Index.aspx?DataSetCode=SHA#).
Source: OECD (2017a) Health Expenditure and Financing Database (http://stats.oecd.org/#). Authors' calculations based on OECD health statistics and expenditure data (OECD, 2017a). Data extracted on 15 May 2017 from OECD.Stat

As it is presented in Table 2.7 and we have already pointed out in section 2.3.1, the Greek health system is diachronically characterized by considerable OOP payments, which in 2014 approached 35.37% of total current health expenditures[35] considerably higher than the OECD countries' average 20.64%; in this respect, Greece ranks in the 4th position, after Mexico, Latvia, and Korea (OECD, 2017a). According to WHO, OOP payments for the same year reached 34.86% of THE[36] much higher than the WHO's average, 18.2% (WHO, 2017a).

For the same year, Greece's public health funding approached 59.65% of CHE; one of the lowest and always descending since 2009 compared to the rest E.U. (28) and OECD countries (Eurostat, 2017; OECD, 2017a). Amongst OECD countries, Greece ranks 32nd out of 35, with the leading positions to be classified by Korea, Mexico and the U.S.A. (OECD, 2017a).

The descending trend in public healthcare financing was majorly driven by the sharp reductions in SHI budgets on account of the generalized cuts of the Greek government to totally align with creditors austerity policies (Economou et al., 2015). Particularly, the public health expenditure had shown a decline 14.12% between 2009 and 2014 because of the escalating decrease on SHI schemes funding (Table 2.7).

The total private health financing as a proportion of THE noted slightly increases from 2008 to 2014. Cost containments on SHI benefit baskets and the implementation of greater formal patient cost sharing rates (e.g. pharmaceuticals, private hospital care) after the Country's borrowing admitting on the Memorandums of Understanding (MoU), caused significant rise of OOP payments share to THE. The OOP spending increased almost 19 % between 2011 and 2014.

Permanent state healthcare underfinancing in Greece, over the years, contrary to the other industrialized European and OECD countries, constitutes OOP spending to be a significant parameter in health financing landscape.

Although, the first two years after the crisis, the PHI financing to total current health expenditures in OECD countries recorded downward trends, the period 2011-2013 increased by 3.2%, as an offset to formal cost sharing and moderate state health coverage (OECD, 2015b). PHI in Greece was not an exception. Nevertheless, the PHI funding as a share of total current health financing in Greece is minimal share, despite the increased trends since 2009 (OECD, 2017a). The financing of health system through PHI always represents a minor share to total current health expenditures (3.23% in 2013, and 3.74% in 2014) and covers 11.5% of the population at a duplicate basis (OECD, 2016; Biro, 2009).

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[35] According to the OECD Health Data, total Current Health Expenditures *"is the sum of total personal and total collective services but not including investment (gross capital formation in health)"* (OECD, 2015a:2).

[36] The difference between current and total health expenditure is that the latter also includes capital formation (investments).

Table 2.7: Health expenditure as a share (%) of total Current Health Expenditure by financing source, from 2008 to 2014, in Greece

Financing Source / Year	2008	2009	2010	2011	2012	2013	2014	**OECD average (2014)**
Public Financing (Aggregate)	**59.94**	**69.46**	**69.97**	**67.29**	**66.69**	**63.52**	**59.65**	**71.85**
Government schemes	28.91	26.39	29.08	21.44	29.50	29.18	28.39	**34.97**
Compulsory contributory health insurance schemes/CMSA	31.04	43.07	40.89	45.85	37.19	34.34	31.26	**36.88**
Private Financing (Aggregate)	**40.06**	**30.53**	**30.01**	**32.53**	**33.17**	**35.69**	**39.11**	**27.45**
Household out-of-pocket payment	37.86	28.44	27.29	29.72	29.92	32.46	35.37	**20.64**
Voluntary health care payment schemes	2.19	2.09	2.72	2.82	3.24	3.23	3.74	**6.81**
Rest of the world health financing schemes (e.g. donations)	0.00	0.01	0.02	0.18	0.14	0.79	1.24	**0.70**
Total current health expenditure	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

1. Here, health financing is presented as a share (%) of total current health expenditure. Last updated in October 2016.
2. Current expenditure on health care or total current expenditure on health is the sum of total personal and total collective services, but not including investment (excluding capital expenditure).
3. Funds for public health financing are allocated from taxation, social health insurance (SHI) contributions, compulsory private health insurance (PHI) premiums and Medical Saving Accounts (CMSA) payments. On the other hand, private health financing includes voluntary PHI financing schemes and household OOP payments (http://stats.oecd.org/Index.aspx?DataSetCode=SHA#).
4 The fact that Greece has recently adopted the OECD system of health accounts results in an unavailability of qualitative and quantitative health data before the year 2008. For instance, there is not official data regarding the allocation of public and private aggregate health expenditure for several years and for different types of healthcare providers and financing agents (Hellenic Statistical Authority, 2014)
Source: OECD (2017a) Health Expenditure and Financing Database (http://stats.oecd.org/#). Authors' calculations based on OECD health statistics and expenditure data (OECD, 2017a). Data extracted on 15 May 2017 from OECD.Stat

The Greek state had never considered the substantial OOP payments and the NHS weaknesses as major concerns, preferring to pass direct private spending on households' budget rather than promoting the PHI sector (Kyriopoulos et al., 2014). Therefore, the high proportion of OOP payments to total health financing and the generous benefit basket of publicly-financed coverage over the years significantly obstructed the development of the PHI institution in Greece (Thomson and Mossialos, 2009; Davaki and Mossialos, 2005). PHI funding in Greece ranges in low levels due to: (a) lack of confidence of population to the private insurance market, (b) lack of insurance awareness, (c) the beliefs of individuals that are fully covered from the SHI, (d) the limited income of individuals, (e) absence of suitable products to fill the gaps of social insurance and (f) several other social and cultural factors (Economou, 2010; Siskou et al., 2009). Mossialos and Thomson (2004) mention that the informal direct spending to health providers is a cultural custom which acts as a brake against the development of PHI in countries like Greece. Greek population prefers to directly pay a doctor, "under the table", in order to ensure faster access and better quality to public health facilities, rather than paying a third party such as a PHI provider.

This, over the years, results in a blooming health care "black" economy mainly in the form of informal or "under the table" payments from health users mainly to public providers (e.g. surgeons) in order for the users to skip the queues to overcrowded public hospitals (Kentikelenis et al., 2011; Siskou et al., 2008). Particularly, this phenomenon, according to published studies (e.g. Dimova et al., 2011; Balabanova and McKee, 2002) is well known in South Eastern European countries and occurs widely in Greek public hospitals where medical staff mainly receive payments from patients in order to ensure for them better treatment and bypass long term waiting lists for surgeries (Kaitelidou et al, 2013; Notara et al, 2010; Liaropoulos et al, 2008; Mossialos et al, 2005). Thus, "under the table" OOP payments account for more than 20% of total health care private expenses and have always been an important problem for Greek health system financing (Simou and Koutsogeorgou, 2014). For example, a pioneering study aiming to examine this phenomenon in Greek health sector, indicated that 36% of hospitalized patients proceeded on informal OOP spending to NHS doctors (Liaropoulos et al., 2008). Further, Kaitelidou et al. (2013) estimate that 74.4% of women, who had given a birth in Greek NHS hospitals in Athens for the year 2010 had to OOP informally pay the public obstetricians. A more recent published study by Souliotis et al. (2016), gathering data from 2011 to 2012, presents that 32.4% of the survey respondents carried out informal OOP payments in public hospitals. With regards to the private health sector in Greece, they report that 36% of the patients pay for healthcare services without receiving a legal receipt from physicians and dentists, aiming both the transactional parties on tax evasion (Souliotis et al., 2016).

2.4.3 The private hospital expenditure in Greece

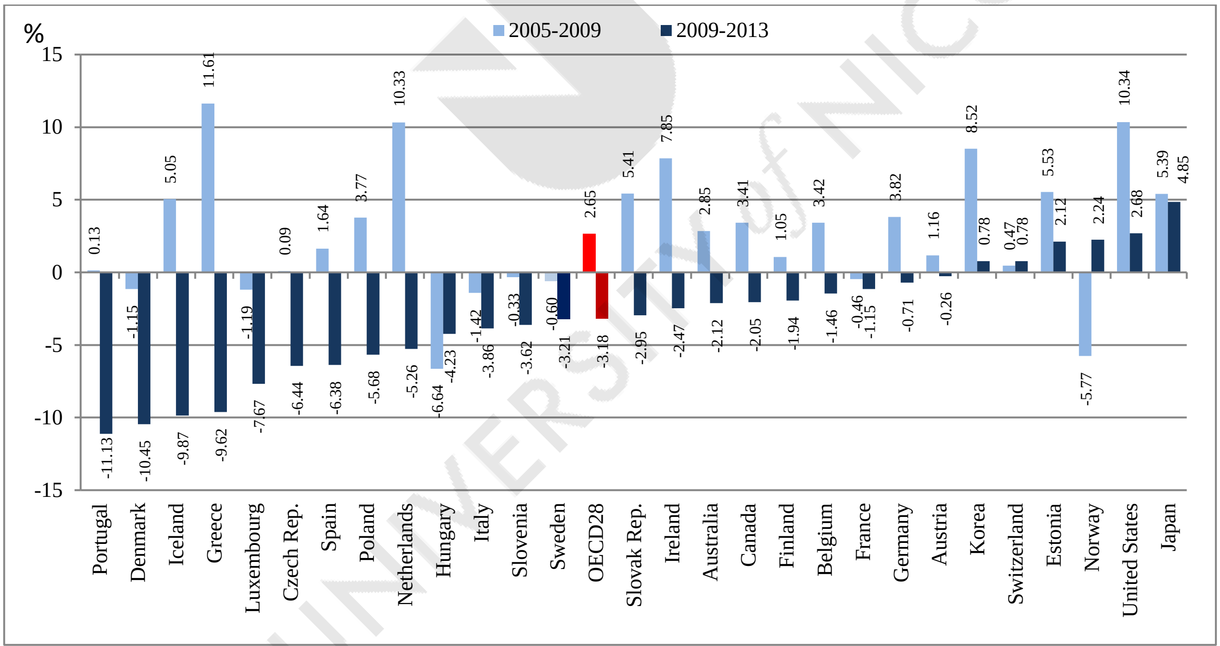
The implementation of the MoU since 2010, undoubtedly had negatively affected the majority of public healthcare activities spending in Greece. Massive reductions recorded in the NHS hospitalization funding as well as in the private hospital reimbursing expenditure by SHI schemes. Public pharmaceutical expenditure followed even greater reductions.

Hospital[37] expenditure funding by government schemes and compulsory contributory health care financing schemes declined as a share of GDP from 3.16% in 2009 to 2.48% in 2014 (OECD, 2017a). Under MoU conditionality reforms, public hospital budgets had been remarkably shrunk by declining NHS hospital supplies and personnel pay-roll (Economou et al., 2014). From 2009 and onwards, public spending on pharmaceuticals as a percentage of

[37] The ICHA-HP classification of System of Health Accounts (SHA) by OECD does not distinguish between public and private ownership of hospitals. Thus the classification of healthcare providers into the category HP.1:Hospitals comprises public and private General hospitals HP.1.1, HP.1.2 Mental health hospitals HP.1.2 and HP.1.3 Specialized hospitals (other than mental health hospitals) (OECD, 2011a:129).

GDP exhibited significant negative growth due to the rigorous measures undertaken by the Ministry of Health to approach the OECD levels. Hence, the public pharmaceutical expenditure decreased from 2.3% in 2009 to 1.48% in 2012 (Economou et al., 2014). In real terms, public pharmaceutical expenditure reduced from 5,108 billion in 2009 to 2,019 billion in 2014, indicating a sharp fall, almost 60.5% (Siskou et al., 2014). Cost-containment measures on public pharmaceutical expenditure comprised higher rates of patient cost sharing (e.g. higher co-payment and ceiling rates), re-pricing (e.g. price cuts) of the majority of drug list, re-introduction of a positive list, prescription of generics medication and implementation of return mechanisms on SHI organization (e.g. claw back and rebate) (Goranitis et al., 2014; Vandoros and Stargardt, 2013). As it is reflected in Figure 2.10, the public pharmaceutical expenditure per capita had been considerably declined between the periods 2005-2009 and 2009-2013, as a part of the broader efforts of several countries, including Greece, to decrease the general public health expenditure (OECD, 2016).

Figure 2.10: Average annual growth in public pharmaceutical expenditure per capita, in real terms, 2005-2009 and 2009-2013 (or nearest year)



Source: OECD (2015d), Expenditure on pharmaceuticals as a share of GDP, 2013 (or nearest year), in *Health at a Glance 2015*, OECD Publishing, Paris. DOI: http://dx.doi.org/10.1787/health_glance-2015-graph167-en

Nevertheless, we concentrate on private hospitalization events because this type of services, as compared with outpatient healthcare, results in high OOP medical expenses or even financial catastrophe for treated patients (Lostao et al., 2014; Dutta and Husain, 2012).

Nowadays, in the midst of rapid changes and reforms which all lead to greater curbing of public health spending, the situation of the system is particularly worrying (Vandoros et al., 2013). The Greek health system has to meet population healthcare needs with insufficient budgets. Further, pursuing fiscal austerity measures through severe cuts in general government spending in combination with the significant unemployment rates and revised labor relations (e.g. abolition of collective agreements, part-time working) had caused an irreparable blow to the finances of Greek population and SHI funds (Economou et al., 2015).

Keegan et al. (2013) show that the consequences of the economic crisis, such as the rise of unemployment and the decline in households income, lead to an increase in demand for public health care services with limited financial resources to satisfy it. Kaitelidou and Kouli (2012) indicate that the increase in demand for public health services in Greece may have a negative impact on the capability of the health system to maintain standards of care. Thus, the consequences of the financial crisis together with the enduring problems of the Greek public hospitals (e.g. long queuing for operations, low amenities standards, considerable volume of informal OOP payments) can drive the population to the private hospital sector, despite the high formal cost sharing and extra billing payments in times of income strain (Keegan et al., 2013; Kentikelenis et al., 2011). Hence, EOPYY, being aware of the existing problems in the public health sector, recognizes that the private hospitals affiliated with the Organization perform an important task and provide quality health services, some of which are not offered at all or sufficiently by the public sector (EOPYY's Press Release 09.22.2014).

Particularly, the chronic underfinancing of public healthcare facilities in accordance with low qualified and amenities standards in NHS hospitals results in the Greek population to also seek for healthcare in private hospitals, which provide upgraded inpatient standards and new-tech medical healthcare services. Public health unpopularity, despite the great state efforts for the expansion of an effective NHS hospital network led to an excessive growth of private healthcare in Greece (Tountas et al., 2005).

Thus, Greek individuals, and especially the worse-off, have to deal with high primary and secondary medical OOP payments in order to obtain healthcare services for private providers. Similarly to the other healthcare activities in Greece, private hospital reimbursement by the new SHI insurance carrier has been compressed since the end of 2012 through the imposition of benefits cuts and higher patient cost involvement. For instance, EOPYY funding for inpatient cases in affiliated private hospitals amounts 70% of Greek DRG's pricing practice for all insured members and 50% for OGA enrollments (i.e. farmers and pensioners farmers)[38].

[38] Single Health Benefits Regulation (EKPY) published in the 3054/18-11-2012 Gazette of the Government.

Therefore, the remaining 30% or 50% respectively, constitutes a statutory co-insurance in the framework of the current cost-containment health expenditure policy by the Greek state.

Despite that the use of inpatient health care in private hospitals is currently for high-income individuals and/or PHI coverage due to the higher prices compared to the public sector (Kondilis et al., 2011), the persistent weaknesses and deficiencies of public hospitals may inevitably lead insured regardless of income to private hospital care (Economou and Giorno, 2009; Siskou et al., 2008).

According to a similar study published by Siskou et al. (2008), 26.10% of Greek households aggregate OOP hospital expenditure concerned physicians' fees in private hospitals and 28.6% of this spending was represented by extra OOP expenses in private hospitals. Moreover, the private hospital expenditure for the year 2013 reached 1.8 billion Euros, while the main financial contributor with an outstanding 57.49% of total, was OOP spending of insured (OECD, 2015). OOP spending (Table 2.8) for private hospital care has risen significantly since 2009, indicating a shift of inpatient health care expenses from SHI funds to treated individuals, as a result of the implemented sparing policies on Greek state health funding the years post to the public debt crisis.

Table 2.8: The financing schemes of private hospital sector in Greece as a share (%) of Current Health Expenditure (CHE), from 2009 to 2014

	Year	2009	2010	2011	2012	2013
	Provider	Hospitals: private sector (millions € / % of APHE)				
Aggregate Private Hospital Expenditure (APHE)		1975.32/100.00	1967.18/100.00	2067.89/100.00	2153.72/100.00	1757.52/100.00
Public sector		824.60 / 41.75	748.00 / 38.02	785.74 / 38.00	803.24 / 37.30	394.71 / 22.46
General government (OECD code)	General government (excluding social security) = Territorial government	2.10 / 0.11	0.98 / 0.05	1.28 / 0.06	0.54 / 0.02	0.55 / 0.03
	Social security funds	822.50 / 41.64	747.02 / 37.97	784.46 / 37.93	802.70 / 37.27	394.17 / 22.43
Private sector		1150.72 / 58.25	1219.18 / 61.98	1282.16 / 62.00	1350.48 / 62.70	1362.81 / 77.54
Private sector (OECD code)	Private health insurance	298.33 / 15.10	361.31 / 18.37	360.58 / 17.44	371.05 / 17.23	352.32 / 20.05
	Private household out-of-pocket (OOP) expenditure	852.39 / 43.15	857.87 / 43.61	921.57 / 44.57	979.43 / 45.48	1010.49 / 57.49

1. OECD definitions of financing schemes are available from http://stats.oecd.org/Index.aspx?DataSetCode=SHA).
Source: OECD (2015). Internal OECD database by the System of Health Accounts, OECD Health Division.

2.5 Financial protection against OOP healthcare payments and equity in health financing: methodology on the estimation of catastrophic OOP payments and financing incidence analysis

All the forms of OOP health payments, including direct payments, formal patient cost sharing, and informal payments constitute barriers to accessibility to healthcare aids and cause financial hardship to population when medical treatment is necessary. The main aim of all national health systems is to ensure financial protection against OOP healthcare spending; one of the intrinsic and fundamental policy goals of WHO (WHO, 2008b). However OOP payments are a great concern for policymakers both for developed and developing countries around the world, as they lead to inefficiencies and equity problems for households (Ekman, 2007).

Health systems objective, beside of ensuring advanced health status and accessibility to quality healthcare (*i.e.* good health and responsiveness), is also to provide protecting shield on households against high medical expenses from health shocks or illness (Peters et al., 2002). Another basic key objective for health systems is fairness in financial contribution (WHO, 2008b). According to Xu et al. (2005a) fairness or equity in health financing implies that every household should not fund for health more than its ability to pay (ATP) or even better it has to fund healthcare by a fair share according to its financial resources. Therefore the equitable health financing principle requires that healthcare payments should be proportionate to households ATP (Yu et al., 2008). The widely accepted measurement methodology to examine the proportionality between healthcare payments and households ATP is the financing incidence analysis (FIA) or progressivity analysis, as presented in section 2.5.2 of this chapter (Asante et al., 2016).

2.5.1 Financial protection against OOP healthcare payments

Financial risk protection in health requires from health systems to provide protection to their members against the financial hardship and economical adverse consequences associated with households OOP payments when they seek for medical care (Wagstaff, 2008). The concept of financial protection implies to health financing policies to reduce the reliance of OOP health spending and thus to diminish as much as possible households exposure to financial hardship due to health care use (Waters et al., 2004). Further, Saksena et al. (2014a:1) state that "*financial risk protection is a key component of universal health coverage (UHC), which is defined as access to all needed quality health services without financial hardship".*

Despite the rationale and developments of public and private pre-payment insurance mechanisms to achieve financial protection against households healthcare spending, the total health financing for several high and low-income countries significantly relies on OOP spending (Van Doorslaer et al., 2007; McIntyre et al., 2006; Waters et al., 2004; Wagstaff and Van Doorslaer, 2003). Van Doorslaer et al. (2007), investigating OOP spending in ten Asian countries, provide evidence that financial protection is insufficiently achieved in Vietnam and Bangladesh, two lower middle-income economies in Asian continent. Nevertheless, significant household catastrophic OOP spending prevalence also emerges in a high-income country with efficiency risk pooling mechanisms, the USA (Waters et al., 2004). Himmelstein et al. (2005) give evidence that almost the half of American debtors in 2001 forced to personal bankruptcy due to the substantial OOP payments for seeking healthcare. In 2007 the percent presents an increase, since 62.1% of all personal bankruptcies were caused by OOP medical spending for treatment (Himmelstein et al., 2009). In 2001-2002, the 62.5% of Cambodian population entered in debt in order to receive cure for dengue (Van Damme et al., 2004).

There is a growing concern regarding the high levels of OOP payments globally, whereas it has received high attention by policymakers and scholars the successful ability to measure how well a health system protects its people (Saksena et al., 2014a). Every year around the world, 100 million people impoverish and 150 million suffer financially because of healthcare services associate OOP healthcare payments (WHO, 2016).

According to WHO (WHO, 2017), there are two basic indicators which are widely used to evaluate how well a health system provides financial protection to its population. Both these indicators are specified by OOP health expenses extent to consume household financial resources (WHO, 2017). The first indicator or applied concept is the catastrophic health expenditure measurement, which classifies OOP spending as financially catastrophic if it is greater than a certain threshold of household income (Saksena et al., 2014a; Wagstaff and Van Doorslaer, 2003; Xu et al., 2003). The other perspective is the impoverishment due to a great exposure to OOP expenditures or the OOP healthcare spending to be defined as "*impoverishing*" (Wagstaff et al., 2008:2). The second concept it happens when households are pushed by the high OOP healthcare payments below the poverty line in such a magnitude that they cannot afford to satisfy basic living standards (Saksena et al., 2014a; McIntyre et al., 2006). The incidence of poverty can be estimated before and after the deduction of OOP spending by a household for the receiving cure (Wagstaff and Van Doorslaer, 2003).

For the purposes of this research study, we implement the first indicator suggested by the literature. In the fifth chapter (section 5.1 and 5.2) of our thesis the financially catastrophic effect from inpatient healthcare services in private hospitals for Greek insured is presented and analyzed thoroughly.

In addition to WHO, the OECD and World Bank (OECD, 2014; Wagstaff, 2008) suggest one more alternative to measure the degree of financial protection; OOP expenditures as a share (%) of THE or total current health expenditures. Drawing also from Xu et al. (2003), we use the proportion of OOP payments to THE as a measure of how well a health system protects its people. Xu et al. (2005, 2003) support the view that for a SHI system to be sufficient the proportion of OOP expenditures to THE should be kept less than 15%, in order the key target of financial risk protection or the lack of financial hardness due to OOP health expenditures to be complied with health systems principles.

2.5.1.1 Measuring the financial impact of OOP payments on household or individual's living standards

There has been a considerable debate in the literature concerning the appropriate choice of the denominator for measuring the financial impact and the FIA of OOP payments on household or individual's living standards. The most common and widely used by the empirical literature approaches to measure household available resources, living standards, socio-economic status (SES) or ability to pay, are household income and consumption expenditure (Saksena et al., 2014a). Nevertheless, both of these household welfare indicators present advantages and disadvantages, while the most solid option largely depends on the availability of the data and the examined geographic or economic study framework (Akazili et al., 2012).

Kwesiga et al. (2015), O'Donnell et al. (2008a), Wagstaff et al. (2007), Xu et al. (2003) and Younger (1996) support the view that households total consumption (on food and non-food goods), non-subsistence expenditure (net of basic food expenses), or even total household expenditure as is attributed in many empirical studies; this is a better indicator for measuring OOP payments financial hardship in developing and low-income countries than the utilization of income. This is due to the presence of a large informal and unorganized labour sector in these countries, which leads income variability to totally be associated with unofficial and unregistered work activities, constituting thus consumption expenditure as a more reliable indicator of household living standards (O'Donnell et al., 2008a). In addition, in low-income settings, income could be underestimated due to household intention to conceal or under report earnings aiming on tax evasion, therefore consumption provides less exposure to bias issues on obtaining wealth-being data (Akazili et al., 2011). Total consumption and expenditure apart from advantages also present drawbacks. For instance, household ATP should reflect financial capability prior to healthcare expenses; hence household total consumption ignores health spending system potentiality to affect saving decisions (Wagstaff et al., 2007). Further, total consumption in low-income countries, does not always include individuals' expenditures on addictive or illegal trade goods and services (e.g. alcohol, gamble, drugs, prostitution etc.) (Akazili et al., 2011:3).

Despite the drawbacks of household total consumption or expenditure, several published studies use these as a proxy indicator for measuring the financial impact or redistributive effect of OOP payments on households living standards (e.g. Piroozi et al., 2016; Kwesiga et al., 2015; Wang et al., 2015; Saksena et al., 2014b; Akazili et al., 2012; Pal, 2012; Selvaraj and Karan, 2012; Knaul et al., 2011; Prakonsai et al., 2009; Sun et al., 2009; Roy and Howard, 2007; Wagstaff and Van Doorslaer, 2003).

According to O'Donnell et al. (2008a:71), gross income as a measure of household living standards is preferable than collecting complex consumption data, especially in developed economies where a large share of the population works formally in organized labour markets. For example, income is used as indicator for assessing equity in health financing in high-income European and OECD countries (Wagstaff et al., 1999; Wagstaff and Van Doorslaer, 1992).

In addition, as Akazili et al. (2011:2) state, the reported income as a proxy of household ATP provides on researchers the option to estimate income elasticity in healthcare payments. However, income like consumption has its disadvantages. As it has already been stated, it is not a suitable living standards indicator in low-income countries. Nevertheless, several studies for developing and low-income countries use income as a measure of SES, an indication that the choice depends on data availability. Buigut et al. (2015) use the approach of income with pre-defined thresholds, to classify catastrophic OOP spending for Kenyan residents in slum areas. For instance, Almeida and Sarti (2013) use as living standards variable the aggregate household income for five Latin American and Caribbean countries. In addition, Bredenkamp et al. (2011), in order to assess the catastrophic and impoverishing effects of OOP spending on five Western Balkan countries, they use income as an indicator of household ATP. Lwin et al. (2011), in order to estimate the extent of household catastrophic OOP spending in urban and rural counties of Lower Myanmar, they use total annual income as a proxy of household living standards. Moreover, Adhikari et al. (2009) use household income for quantifying catastrophic OOP payments for hospital care in Nepal. Castillo-Riquelme et al. (2008) in order to investigate the financial burden of malaria in South Africa and Mozambique also use income as a proxy of household SES.

Following O'Donnell et al. (2008a) and Wagstaff et al. (1999), who report that income is an appropriate measure of SES for developed economies, we carry on our research study based on the annual gross income (AGI) of our insured respondents, which is used as a proxy of household livings standards in similar empirical studies for high-income countries (e.g. Baird, 2016a; Baird, 2016b; Abramowitz and O'Hara, 2015; Sanwald and Theurl, 2015; Sanmartin et al., 2014; Law et al., 2013; Luczak and García-Gómez, 2012; Sulku & Bernard, 2012; Mitra et al., 2009; Banthin et al., 2008; Banthin and Bernard, 2006; Waters et al., 2004).

Based on O'Donnell et al. (2008a:72), the four main categories of reported household income are; wages from labour services, rental income from property tenancy, business or professional services income and finally transfers from state or nongovernmental organizations to households.

In this study, we use as measurement indicator of the living standards of our respondents the level of their AGI. The AGI per insured comprised salaries for labor services (e.g. wages, salaries) and pensions earnings during the last 12 months and includes gross of taxation, SHI contributions and PHI premiums (Wagstaff et al., 2007) (for example see section 5.2.1).

2.5.1.2 Defining catastrophic OOP healthcare payments

OOP health care payments can incur financial burden, debts or even catastrophe when they cause serious disruption to households expenditures plans, living standards and available resources (Kim et al., 2010; Van Doorslaer et al., 2007; Habicht et al., 2006).

When household OOP direct and indirect cost of receiving healthcare emerges as too high to be easily absorbed by household available resources, then this health care payment can be defined as financial catastrophic, since it severely prevents household to maintain its necessary routine obligations over a certain period of time or precludes household from future planning (Pal, 2012; Gertler and Gruber, 2002; Russell, 1996; Berki, 1986).

Further, as catastrophic payment can be attributed the health care spending which constitutes a remarkable proportion of households available resources, and hence forces households to either reduce expenditures from basic needs or drives households to use other finance mechanisms (e.g. use savings, sell assets, external formal or informal borrowing) in order to cope with these costs (e.g. Adhikari et al., 2009; Leive and Xu, 2008; Van Doorslaer et al, 2005, Russell, 2004). It is not always necessary a substantial payment for healthcare needs to be catastrophic for households or individuals, unless it will disorder households well-being, living standards and future plans with regards to the obtainment of non-medical goods and services (Xu et al., 2003; Deaton, 1997). Even low medical expenses can lead a poor household to financial ruin while a significant OOP spending may expose a rich one to poverty (Xu et al., 2007).

But beyond any doubt, lower income households globally have greater exposure to catastrophic health spending rather than the better-off (Kawabata et al., 2002). Additionally, Roberts et al. (2003) refer that the effect of catastrophic OOP spending is more severe among the poor households especially in countries where the OOP payments display as the dominant source of health financing. On the other hand, even small OOP spending levels can have a negative economic impact for poor households, since their limited financial capacity is directed to meet basic needs rather seeking for healthcare (Alam and Mahal, 2014b; Goudge et al., 2009; Wagstaff and Van Doorslaer, 2003). According to Russell (1996), rich households can deal with OOP payments by reducing consumption for unnecessary needs in the short term, compared to the poor households which have to defer or retrench the purchase of basic goods.

According to Van Doorslaer et al. (2005), the catastrophic effect of OOP payments for healthcare services presents short and long term consequences to household finances and in extension to the economy. Coping with OOP payments affects individuals' wellbeing through reducing consumption or compromising obligatory expenditures (purchases of commodities-services, lending agreements, taxation etc.) or undermining future productivity (e.g. abridging children's education) that in the long term will be catastrophic for a household economy (Ewelukwa et al, 2013; Adhikari et al., 2009; Whitehead et al., 2001). Savings, credit and liquidation of investments, stocks or physical and productive assets can deal with OOP spending and temporarily restrict the short term financial burden; however, these coping mechanisms could be catastrophic for a household welfare (Flores et al., 2008). In this case, households or individuals have to meet healthcare needs through the financing of OOP spending entirely out of their total wealth (Wagstaff, 2008). Leive and Xu (2008), in a 15 cross-country analysis for the impact of OOP payments in African households wealth, give evidence that population is often forced to borrow money and sell assets in order to cope with medical costs. African households finance the cost of outpatient healthcare services mainly through current income and savings. In contrast, when inpatient care is recommended as necessary, then households proceed on credit, mortgage or even selling of their assets. The path of ensuring money for healthcare takes place through official or unofficial borrowing (e.g. kin or friends). The lack of insurance coverage in most African countries leads to extremely high OOP spending levels, with an average proportion almost 40% to THE, for countries such as Chad, Congo, Ethiopia, Ghana, Kenya, Namibia, Senegal and Zambia (WHO, 2017a). Raccanello et al. (2007) report that especially the poor Mexican households have to pawn their belongings in order to ensure money for health needs despite the presence of national health insurance. In Indonesia, 36% and 27.2% of households take loans and sell assets respectively, in order to cope with OOP spending due to a health shock (Modena and Gilbert, 2011).

Further, households in Cambodia, one of the poorest countries in Asia, use a variety of methods to cope with OOP health spending, such as disposing of savings, selling consumables or assets and finally by borrowing formally (e.g. commercial loans) or informally (e.g. relatives, neighbours and moneylenders) (Van Damme et al., 2004:276). In similar patterns, Kruk et al. (2009) give evidence that on average, 25.9% of households from 2002 to 2004 proceeded in borrowing or selling property to cope with OOP spending in 40 low, lower and upper middle-income countries (e.g. Pakistan, Burkina Faso, Mali, Laos, Ecuador, Congo, Sri Lanka etc.). For India, Joe (2015) evaluates that, in 2004, almost the 60% of the hospitalized Indian rural households and 40% of the urban, have to borrow, or sale assets or to receive contributions from informal third parties (e.g. relatives, friends, moneylenders) for succeed in receiving inpatient healthcare. The aforementioned coping strategies with OOP payments represent the 58% and 42% in total OOP health spending for hospitalized care in Indian rural and urban living areas, respectively.

2.5.1.3 Measuring catastrophic OOP healthcare payments

While the idea of ensuring financial protection is clear and constitutes the main core objective of national health systems agenda, there is a growing debate on the literature for the appropriate critical point that defines health-related expenses as economical disastrous or catastrophic in accordance with household financial ability to spend for healthcare.

Based on Saksena et al. (2014a) and Wagstaff (2008), catastrophic healthcare expenses can be defined the health payments exceeding a pre-defined share or threshold of households available resources, such as the households annual income, total consumption expenditure, non-food expenditure or expenditure net of basic food needs. In addition, catastrophic OOP payments for health care can be considered as those payments which require a remarkable proportion, in excess of a given pre-defined critical limit in a given period, of households resources (O'Donnell et al., 2008; Van Doorslaer et al., 2006, 2005; Xu et al., 2003; Pradhan and Prescott, 2002; Feder et al., 1987; Berki, 1986). According to Wagstaff and Van Doorslaer (2003), the inviolable treaty and ethical conception of fairness in health care expenses necessitates that no household ought to spend more than a given proportion of its income on health treatment (so called z). Any expense in excess of this cut-off point (z) can be labeled as catastrophic.

According to the literature, there is a diversity of views from several authors about the critical cut-off point in order to be quantified an appropriate measurement of catastrophic OOP healthcare payments. As Naga and Lamiraud (2011:2) refer "*there is no exact consensus about the critical threshold level*".

In early empirical studies, annual family income is chosen as the denominator of financial catastrophe for health care needs with regards to OOP payments. Particularly, Russell (1996:221) mentions that previous studies for developing countries until then, used as financially prohibited benchmark a ratio of health expenditures to annual income greater than 5% in order to indicate the degree of household inability to pay for healthcare. However, there is no consensus in the empirical literature regarding the appropriate benchmark of household ATP, in order OOP healthcare payments to be classified as catastrophic (O'Donnell et al., 2008). Several thresholds ranging from 5% to 20% of annual total household income have been reported in the literature. For example, Feldstein (1971) designates as catastrophic OOP spending household healthcare payments which are greater than 10% of household annual income. Moreover, Kasper et al. (1975) attribute as financial catastrophic all that healthcare expenses which exceed the 15% of household annual income. Berki (1986) determines OOP payments as catastrophic when they primarily exceed a threshold 5% of household income. Wyszewianski (1986:619) demarcates three financial catastrophic overlapping groups of households; those which face annual OOP payments exceeding, respectively, 5%, 10% and 20% of annual household income. Feder et al. (1987) and Merlis et al. (2006) suggest as catastrophic OOP healthcare payments a ratio greater than 10%, 15% and 20% of household income. Further, Ranson (2002) defines as catastrophic spending household OOP health payments in excess of 10% of household annual income. A more recent empirical study set up thresholds ranging from 5% to 25% of household income for investigating the economic impact of OOP payments for hospitalized care of Kala-azar disease in Nepal (see Adhikari et al., 2009). Abramowitz and O'Hara (2015) and Waters et al. (2004) examine the impact of OOP payments on the US population wellbeing, defining as high financial medical burden households OOP healthcare spending which is greater than 10% of their annual income. Baird (2016a), in order to measure the magnitude of OOP medical spending for American and

Canadian population, she expresses as high financial burden the excess of 5% and 10% of household OOP payments on its disposable income; the after-tax and net of social transfers available income to meet household total expenditures and obligations. She sets the same household living standards indicator in a cross-national empirical study for seven developed economies (Baird, 2016b). Sanmartin et al. (2014) and Law et al. (2013) set the same denominator as Baird (2016a,b) does, to evaluate the trends of OOP spending relatively to Canadian and the US population annual income, respectively from 1997 to 2009.

Pradhan and Prescott (2002) suggest that an excess of 10% of OOP payments relative to households total expenditure can be catastrophic. Additionally, Hjortsberg (2003) and Rous and Hotchkiss (2003) measure catastrophic OOP payments for healthcare considering as appropriate denominator the total household expenditure. Wagstaff and Van Doorslaer (2003:927) assess household medical payments accordingly to household total expenditure and suggest as catastrophic those OOP healthcare payments which equal or exceed several fraction benchmarks; 2.5%, 5%, 10%; 15%. Further, Van Doorslaer et al. (2007) and Russell (2004) specify a healthcare payment as catastrophic in excess of 10% of household total expenditures (gross of food consumption). For example, Knaul et al. (2011) adapt as denominator to OOP payments, total household expenditure net of food expenses and define as catastrophic threshold the surpass of 30% of the ratio. Prakongsai et al. (2009) and Limwattananon et al. (2007), using national household surveys lasting from 2000 to 2006, define as financial catastrophe a share of OOP healthcare spending greater than 10% of household total expenditures on both food and non-food expenses (other necessities), in order to identify the catastrophic prevalence of Thai population. Ghosh (2010) defines as catastrophic health expenditures household OOP payments greater than 10% of household total consumption expenditure, in order to estimate the catastrophic health expenditures for Indian population. Similarly, Basar et al. (2012) in a study for Turkish health system, evaluate as catastrophic healthcare expenditure the share of OOP spending to total household expenditure using several threshold levels from 2.5% to 20%. Moreover, the results of two studies for Uganda indicate that the 22.8% of households have to pay OOP for healthcare activities more than the 10% of their total consumption expenditure (Kwesiga et al., 2015; Kwesiga et al., 2012).

Xu et al. (2006, 2003) support the view that OOP healthcare payments equal or greater than the 40% of non-subsistence household consumption are catastrophic, an approach which has received wide application in empirical literature (e.g. Piroozi et al., 2016; Yardim et al., 2014;

Van Minh et al., 2013; Correa-Burrows, 2012; Shahrawat and Rao, 2011; Yardim et al., 2010; Sun et al., 2009; Van Doorslaer et al., 2007; Murray et al., 2003). The non-subsistence household consumption or expenditure equals total household income minus household food or subsistence expenditure (satisfaction of basic household needs) and it is defined as household capacity to pay (CTP)[39], disposable household income or non-subsistence effective income (Xu, 2005:3). A variant approach is presented by Habicht et al. (2006) and Võrk et al. (2014) regarding the appropriate catastrophic percentage benchmark in relation to household CTP, a fact that indicates scholars' subjective judgment of what excess is financially disastrous for household budgets. Although they use the widely accepted method of Xu et al. (2006) which defines as catastrophic a health payment greater than the 40% of the household CTP, Habicth et al. (2006) concentrate their analysis on a 20% cut-off point for estimating catastrophic OOP health spending, whilst Võrk et al. (2014) implement various range thresholds for Estonian population. In a similar vein, Su et al. (2006) use as a proxy measure household non-food expenses as the denominator to calculate the prevalence of catastrophic OOP health spending for households in Burkina Faso. They define as catastrophic OOP payments the share of household healthcare expenses to non-food expenses which equals or surpasses four thresholds starting from 20% to 60%. Further, Sun et al. (2009) note that there is no peremptory threshold norm in the literature that classifies what healthcare payment is catastrophic or not. They find as catastrophic OOP payment the widely accepted threshold at 40% of household disposable income, while they also implement thresholds at 20%, 30%, 50% and 60%, in order to measure the effect of a rural community-based health insurance scheme on households catastrophic OOP payments for a Chinese province. Galárraga et al. (2010) define as catastrophic health expenditures these household OOP payments which overcome the 30% of household available income after subsistence needs are met. Moreover, Salti et al. (2010) in order to investigate the impact of catastrophic OOP payments on Lebanese household living standards, compute 5 different thresholds (5%, 10%, 15%, 20% and 25%) using as denominator household total expenditure. In addition, they alternatively employ 3 thresholds (15%, 25% and 40%) setting as household wealth indicator its non-food expenditure. A different approach is proposed by Onoka et al. (2011), considering financial catastrophe at different threshold levels for different socioeconomic groups of households, in a study for southeast Nigeria. They firstly assess OOP payments as catastrophic based on the share of household OOP healthcare spending to non-food consumption expenditure using three fixed threshold levels; 10%, 20% and 40%. Secondly, they evaluate a variable threshold

[39] "*Roughly non-food expenditure*" as it is noted by O'Donnell et al. (2008a:205).

level starting from 5% depending on the ratio of household OOP payments to food expenditure. The excess of OOP spending on the critical threshold, 20% of non-food household expenditure, is also defined as catastrophic for Colombian households in a more recent study (Amaya-Lara, 2016). Pal (2012) proposes as catastrophic the OOP payments which significantly reduce household financial capacity (e.g. non-health expenditure) to maintain consumption of goods and services or even deprive household consumption on essential necessities.

The WHO suggests that households health expenditures should be attributed as catastrophic whenever it is equal or greater to 40% of the CTP or the total non-food household consumption, the proposed denominator by Xu et al. (2006) for assessing financially disastrous OOP healthcare payments, as it is referred above (WHO, 2000). Nevertheless, the WHO also proposes a more general indicator which captures and measures the impact of households OOP healthcare payments on their wealth being or living standards (WHO, 2017). According to WHO, this indicator concerns the lack of financial protection for people healthcare needs, which it reflects the proportion of households with high levels of OOP payments as a share of the pre-defined denominator of household CTP; total household expenditure or income and the pre-determined catastrophic threshold (e.g. greater than 10%, 25% etc.) and it is estimated by the below formula (WHO, 2017).

$$\sum_i w_i \, 1 \left(\frac{household\ health\ expenditure}{total\ household\ expenditure\ or\ income} > \tau \right)$$ **Equation 2.5.1.3-1**

where i denotes a household, 1 is the indicator function, w_i indicates the survey sampling weights, τ corresponds to the pre-determined catastrophic expenditure for healthcare use.

Van Doorslaer et al. (2006), O'Donnell et al. (2005), Wagstaff and Van Doorslaer (2003) and Ranson (2002) suggest that a 10% threshold of OOP payments to income or consumption (household budget) illustrates the benchmark at which a household economy is compelled to decrease other important expenditures, liquidate assets or enter to a spiral of debt in order to cope with this spending. For instance, Selvaraj and Karan (2012) define as catastrophic OOP payments, for Indian population, this medical spending which exceeds the 10% of total household expenditure (see also Prinza et al., 2012; Zhang et al., 2010a).

For the purposes of this research study, we classify health expenditures ($OOP=T$) as catastrophic if they equal or exceed 10% of the insured AGI (x=*Annual Gross Income*) (following Zawada et al., 2016; Wingfield et al., 2014; Huang, 2012; Sulku & Bernard, 2012; Banthin et al., 2008; Castillo-Riquelme et al., 2008; Devadasan et al., 2007; Banthin and

Bernard, 2006; Waters et al., 2004; Ranson, 2002). Zawada et al. (2016), define as catastrophic health expenditures, those household OOP payments which equal or exceed the 10% of household total annual income. Wingfield et al. (2014), in a study for Peru, define as catastrophic the medical costs which are greater than 10% and 15% of household annual income. For Turkey, Sulku & Bernard (2012) define as remarkable financial healthcare burdens those which exceed 10% of household income. Banthin et al. (2008) and Banthin and Bernard (2006) classify American individuals with high financial medical burdens, those who spend more than 10% of their annual income on healthcare services. Waters et al. (2004) in order to examine the proportion of households in the USA that suffers for high or even catastrophic OOP payments, they implement a 10% threshold to household income. Furthermore, Devadasan et al., (2007), in a study for the examination of Indian community health insurance schemes against catastrophic OOP from hospitalization events, set as a critical catastrophic threshold the hospitalization expenses which are greater than 10% of individual's annual income.

In order to investigate whether the percentage of our sample exceeds this pre-defined threshold (z), we calculate an indicator (E_i) which takes values 1 or 0 if $(\frac{Ti}{xi}) \geq z$ or $(\frac{Ti}{xi}) < z$ respectively (O'Donnell et al., 2008) (equation 2.5.1.3-2).

$$E_i = \begin{cases} 1\ if\ \dfrac{T_i}{x_i} \geq (z) \\ 0\ if\ \dfrac{T_i}{x_i} < (z) \end{cases}$$

Equation 2.5.1.3-2

Where T_i represents OOP healthcare payments by an individual i; x_i is the AGI of individual i and (z) corresponds to the pre-defined catastrophic benchmark.

In the first study of this study (see section 5.1.1), the main focus of our analysis is on OOP expenditures for hospitalization events (using only one numerator; medical costs), net of any social or private insurance reimbursement, made by insured individuals after the medical and administrative discharged from private hospitals affiliated with the unique SHI carrier in Greece (Habicht et al., 2006). Following similar studies, the catastrophic inpatient expenditures are reflected in the share of AGI spent on hospitalization care in excess of the pre-defined critical threshold (Adhikari et al., 2009:132; Waters et al., 2004:341).

OOP healthcare payments have theoretically included formal patient cost sharing (e.g. co-payments, co-insurance rates, deductibles), formal and informal spending to health providers and typically exclude insurance premiums (Ranson, 2002). In order to meet the objectives of this study, inspired by similar studies, we also define a threshold in terms of the proportion of household AGI spent both on OOP health payments and PHI premiums (Abramowitz and O'Hara, 2015; Salti et al., 2010; Merlis et al., 2006; Waters et al., 2004). Therefore, in similar vein to the above illustrated equation (equation 2.5.1.3-2), we imply measures of the prevalence of hospitalized health expenditures, including in the numerator apart from medical OOP costs T_i also voluntary PHI premiums (P_i) for enrolling complementary insurance coverage (equation 3.4-3), a methodological approach which is displayed in the second study of this thesis (see section 5.2.1).

$$E_i = \begin{cases} 1 \; if \; \dfrac{T_i + P_i}{x_i} \geq (z) \\ 0 \; if \; \dfrac{T_i + P_i}{x_i} < (z) \end{cases}$$

Equation 2.5.1.3-3

2.5.1.4 Incidence and Intensity of catastrophic OOP health care payments

We use the most common and widely accepted method for measuring incidence, intensity and income relate-related distribution of catastrophic health expenditures (CHE), which is based on the construction of various critical thresholds ranging from 5% to 25% of OOP payments as a share of individuals' living standards (see O'Donnell and Van Doorslaer, 2005; Wagstaff and Van Doorslaer, 2003). We compute the Headcount (H_C), Overshoot (O), concentration indices (C_E and C_O) as well as the rank weighted (RW) H_C and O indices to meet the objectives of our study (Ghosh, 2010; Adhikari et al., 2009; Flores et al., 2008; O'Donnell et al., 2008a; Wagstaff, 2008; Limwattananon et al. 2007; Wagstaff and Van Doorslaer, 2003; Wagstaff, Van Doorslaer, O'Donnell & Lindelow, 2007; Wagstaff et al., 1991; Lerman and Yitzhaki, 1989; Wagstaff et al., 1989 for more details).

Following the previous studies, the Headcount Index (H_C - *incidence*) illustrates the percentage of individuals who spend at least the given percentage thresholds of their AGI on inpatient health care and is given by:

$Hc = \frac{1}{N}\sum_{i=1}^{N} Ei$, where N is the sample size. **Equation 2.5.1.4-1**

Because this measure fails to provide the severity of OOP payments (Adhikari et al., 2009), we move on the Overshoot Index which indicates the average percentage by which OOP payments as a share of annual income exceed the given thresholds which is called catastrophic payment overshoot (*O - intensity*) and is estimated as follows $O=E_i[(T_i/x_i)-z]$ wherein the fraction of OOP payments to income T_i/x_i overcomes the pre-determined *z*. Depending upon on the H_C index formulation, the catastrophic excess of Overshoot is given by:

$O = \frac{1}{N}\sum_{i=1}^{N} Oi$, where N is the sample size. **Equation 2.5.1.4-2**

The mean positive overshoot (MPO) represents the average OOP payments in excess of the given each time catastrophic threshold over all individuals overcoming this threshold and it constitutes the connecting link between H_C and *O* (Wagstaff, 2008; Wagstaff & Van Doorslaer, 2003).

$MPO = \left(\frac{O}{H_c}\right)$ **Equation 2.5.1.4-3**

The computational method that we rely on export values for the concentration indices (C_E and C_O) of incidence and intensity of OOP payments is the convenient covariance approach for micro-data cases proposed by Wagstaff et al. (2007) quantitative techniques analysis notes, as it is given below. "*In the micro-data case, one has individual-level data on both the health variable and socioeconomic ranking variable*" (Wagstaff et al., 2007:4).

$C = 2cov\left(\frac{y_i}{R_i}\right)\mu$ **Equation 2.5.1.4-4**

where cov is the covariance and continuing, y_i is whenever the examined health variable of interest, μ its mean, R_i is *i*th individual's fractional rank in the socioeconomic distribution where observations are classified in ascending order to sum up to *1*, based on the approach of Lerman & Yitzhaki (1989).

Especially, for the concentration indices (C_E and C_O), we also apply the convenient regression approach proposed by Kakwani et al. (1997) as is cited in quantitative techniques analysis notes for health equity by Wagstaff et al. (2007:5) (Equation 2.5.1.4-5).

$2\sigma_R^2\left[\frac{y_i}{\mu}\right] = \alpha + \beta R_i + u_i$ **Equation 2.5.1.4-5**

The regression coefficient β reflects the values for concentration indices. Continuing, y_i is whenever the examined health variable of interest, μ its mean, σ_R^2 is the variance of the fractional variable of *N* insured individuals in socioeconomic distribution ranking by their income. R_i reflects the insured individual cumulative proportion in the annual gross income distribution where observations are classified in ascending order to sum up to 1, based on the formulation of Lerman and Yitzhaki (1989):

$$R_i = \frac{1}{n}\sum_{j=1}^{i=1} w_j + \frac{1}{2} w_i$$ **Equation 2.5.1.4-6**

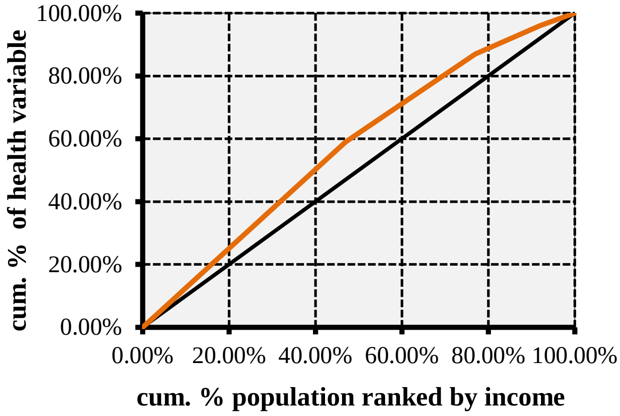
where n is the sample size and w equals the relative sampling weight (scaled to sum up to 1).

Although the simplicity of the most common computational method of convenient covariance (Equation 2.5.1.4-4) (Wagstaff et al., 2007) of calculating concentration indices, we also imply the convenience regression method in order to estimate the standard errors of C_E or C_O (see section 5.2.3).

According to O'Donnell et al. (2008a) and Wagstaff and Van Doorslaer (2003), the concentration indices and concentration curves are computed to present the quantification of income inequality in OOP payments (health funding variable). For the concentration curves to be generated two key variables are definitely necessary; the examined health variable (OOP payments) and this one which represents the living standards of individuals (annual gross income, total expenditure etc.).

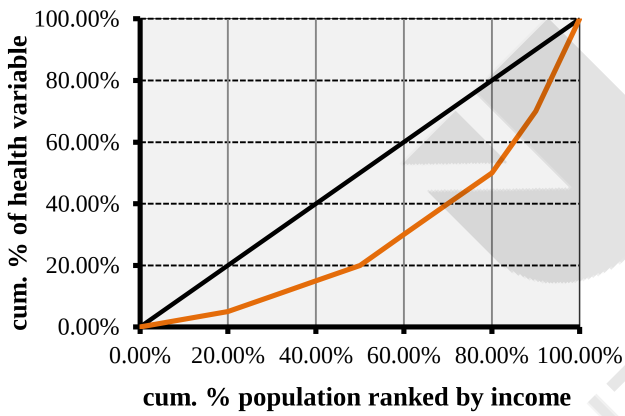
The concentration curve displays the cumulative percentage of the health variable on y-axis (vertical) corresponding to each cumulative percentage of the sample population, ranked by its socioeconomic position, beginning with the poorest and ending up with the richest on x-axis (horizontal). If everyone individual, irrespective of his/her pre-defined CTP (e.g. income) faces the same value of the examined health variable (e.g. OOP spending), which defines no-income related inequality (concentration index equals zero), then the concentration curve will be a 45 ° line (diagonal, known as line of equality), starting from the intersection point of the two axes to the top right corner (O'Donnell, 2008a:84). Respectively, if the examined health variable is concentrated amongst the poor then the concentration curve lies above the line of equality and the concentration index notes negative value (Figure 2.11). Contrary, a positive value of the concentration index is illustrated with a concentration curve placement below the line of equality (Figure 2.12) (Wagstaff, Paci & Van Doorslaer, 1991). However, there is also the case the concentration curve to intersect the line of equality and pass through the areas below and above this line, resulting the presence of inequality, despite the fact that the concentration index could be zero (Almeida and Sarti, 2013:87).

Figure 2.11: Example of concentration curve of health variable which takes greater values amongst worse-off (poorer) people



Source: Adapted from O'Donnell O., Van Doorslaer E., Wagstaff, A., and Lindelow, M. (2008a).

Figure 2.12: Example of concentration curve of health variable which takes greater values amongst the better-off (richer people)



Source: Adapted from O'Donnell O., Van Doorslaer E., Wagstaff, A., and Lindelow, M. (2008a).

Basic aim is to attribute who spend the larger share of their income, the wealthier (better or well-off) or the poor (worse-off) insured for hospitalized care, depending on the sign of the variable C_E and C_O. The concentration indices range from *-1* to *+1*. A positive sign on the value of concentration index implies that the better-off present a higher tendency to overcome the threshold of catastrophic OOP payments relatively to their annual income. In contrast, a higher tendency for the poor to exceed the catastrophic health spending threshold is given with a negative value (Wagstaff and Van Doorslaer, 2003; Kakwani et al., 1997; Wagstaff, Van Doorslaer & Paci, 1989). Although the concentration indices suggest an explanatory treaty for the prevalence and intensity of catastrophic payments among the better off and poor individuals, they do not provide valuable information for both the level and the distribution of this health spending. According to Wagstaff & Van Doorslaer (2003), the latter can be achieved by multiplying the Headcount (H_C) or Overshoot (O) index by the complement of their concentration indices C_E or C_O respectively (Equations 2.5.1.4-7 and 2.5.1.4-8):

$Rank\ Weighted\ Headcount\ (RWH) = H_c \times (1 - C_E)$ **Equation 2.5.1.4-7**

and

$Rank\ Weighted\ Overshoot\ (RWO) = O \times (1 - C_O)$ **Equation 2.5.1.4-8**

The main goal is to construct rank weighted (RW), H_C or O indices in order to provide issues whether this catastrophic health spending is concentrated amongst the better or the worse off. As we have already explained, if the concentration indices C_E and C_O are negative, then the worse-off (poor) individuals present a greater tendency and intensity to exceed the catastrophic health spending threshold and therefore the RWH and RWO will be higher than the H_C and O, indicating thus the fact that a greater proportion of the Headcounts or Overshoots takes place amongst the poorer individuals ($RWH > H_C$ and $RWO > O$). Contrary, if C_E and C_O are positive, the better-off individuals present a greater incidence and intensity to exceed the given each time threshold of the Headcounts or Overshoots and as everyone might expect the H_C and O will prevail RWH or RWO ($RWH < H_C$ and $RWO < O$) (Limwattananon et al. 2007; Wagstaff et al., 2007).

2.5.2 Defining equity or fairness in health financing

Besides promoting financial protection against the financial risk of OOP payments, health systems as well must ensure and promote a more equitable distribution of health financing amongst population (WHO, 2008). Since 2000, WHO uses the term fairness in health financing in a broader conceptualization for evaluating how well national health systems perform and distribute health payments to their members (WHO, 2000).

Health systems fundamental objective, fairness in financing or so called equity in financing, implies that households health payments and contributions are in relation with their ATP (Asante et al., 2016; Sanwald and Theurl, 2015; WHO, 2000; Schieber and Maeda, 1999). Therefore, equity in financing holds, when poor households should not pay more than the rich households (Roy and Howard, 2007) whereas it is also abided by two other dimensions for health financing; "*horizontal equity*" and "*vertical equity*" (Wagstaff and Van Doorslaer, 1992:371). When those with equal ATP make equal payments to healthcare system is described as horizontal funding equity and respectively, vertical funding equity requires that those with higher financial ATP contribute more on healthcare system (Wagstaff & Doorslaer, 2000).

Examining equity or FIA in health systems financing presupposes to assess progressivity of healthcare spending in accordance to households income or consumption expenses

(O’Donnell et al., 2008a). Progressivity estimates the extent to which different socioeconomic groups of people pay different amounts for health care (Cissé et al., 2007; Wagstaff, 2001). The theoretical conception is that in a progressive health care system the proportion of health expenses contributed by the worse-off (poor) groups will be less than their proportion of ATP compared to the richer, and conversely in a regressive health care system the health funding contribution by the worse-off groups will be greater than their share of ATP (O'Donnell et al. 2008a; Daniels et al., 2000; Wagstaff and Van Doorslaer, 1992). Proportionality in health systems holds when any population group, irrespectively of its financial resources, should spend the same proportion of its ATP in financing healthcare needs (Yu et al., 2008; Wagstaff et al., 2003).

Assessing progressivity in health care financing, data of three key variables is preliminary to be gathered: the measurement indicator of households welfare, the overall health system funding sources and secondary macro allocation data of the health funding mix (O’Donnell et al., 2008a). According to Wagstaff et al. (2007), the measurement indicator of households welfare should not encompasses healthcare, tax and insurance payments in order the distributional impact of health financing to be evaluated. The health system funding sources include, besides of net payments for healthcare as the OOP spending, also the personal income and property taxation, indirect taxation (e.g. VAT, duties) compulsory and voluntary households contributions on public and private pre-payment insurance mechanisms (e.g. financing schemes’ collected revenues through direct and indirect taxation, SHI, PHI). The health funding mix captures the proportional contributions of the main financing schemes (also called agents) on total health expenditures of a country health sector. Examples of institutional and non-institutional financing schemes, through which healthcare are financially arranged and obtained by population, are the OOP expenditures, voluntary PHI, compulsory SHI or PHI, general taxation and other sources of state revenues (OECD, 2011).

2.5.2.1 Measuring progressivity of healthcare financing mechanisms

Although, concentration index is a useful tool to evaluate the magnitude of households health care payments in accordance to the level of their living standards, however it does not provide means on assessing equity in healthcare financing (Chen et al., 2012).

The most popular method to estimate the equity in financing and the redistributive impact of health care expenditures from several financing mechanisms is the Kakwani progressivity index (Kakwani, 1997). Investigating progressivity using the Kakwani index has been applied to several empirical studies (e.g. Sanwald and Theurl; 2015; Munge and Briggs, 2013; Mills et al., 2012; Yu et al., 2008; Wagstaff et al., 1999)

Following the literature, Kakwani index (Kakwani, 1977) is defined as twice the area between the health payment variable concentration curve and the Lorenz curve and its calculation is given by:

$$Kakwani\ index = \pi_\kappa = C - G \qquad \textbf{Equation 2.5.2.1-1}$$

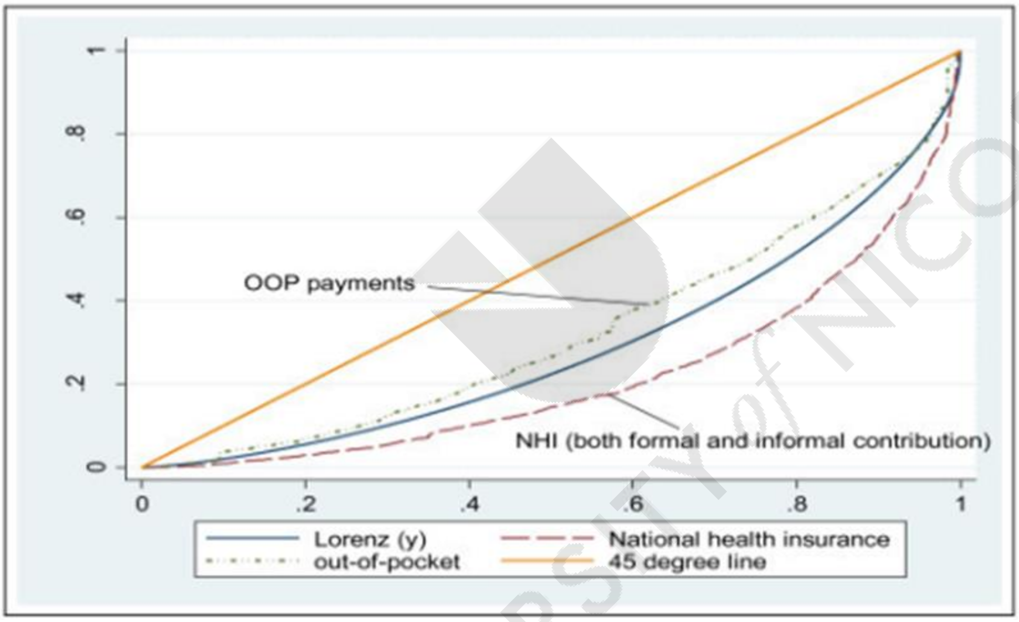
where C interprets the health payment concentration index and G is the Gini coefficient of the ATP variable (e.g. households annual income or total consumption). The concentration index is defined as twice the area between the concentration curve and line of equality (the diagonal 45 ° line) (O'Donnell et al., 2008a). The concentration index C ranges from *-1* to *+1* as is already presented in the section 2.5.4.1 of this chapter. G equals zero when perfect income equality exists and 1 in the presence of perfect income inequality (Yu et al., 2008). Therefore, the Kakwani index (π_κ) ranges from -2 to 1.

The second alternative to measure progressivity can be achieved through the graphical illustration of health payments concentration curves and the Lorenz curve of ATP selected variable. Concentration curves as well the Lorenz curve are displayed against the cumulative percentage of the sample population, ranked by its ATP (from the poorest (0) to richest (1)) on the x-axis. On the y-axis, the concentration curve plots the cumulative percentage of the examined health payment (e.g. OOP expenditures), while Lorenz curve plots the cumulative percentage of the living standards variable (e.g. annual income) (Wagstaff et al., 2007; Wagstaff, Van Doorslaer & Paci, 1989). Lorenz curve cannot be plotted above the line of equality as concentration curves can do (Munge & Briggs, 2013).

In the case of a positive Kakwani index (π_κ) the health system is defined as progressive and concentration curve lies outside or everywhere below Lorenz curve and vice versa if (π_κ) takes a negative value (concentration curve dominates – lies everywhere above Lorenz curve indicating health system regressivity). The Kakwani index receives the outlier value $\pi_\kappa = -2$ in the most regressive health system and respectively $\pi_\kappa = 1$ in the most progressive. In the rare case of proportionality (π_κ) equals zero, resulting in a graphical representation attribute where Lorenz curve and concentration curve coincide (Wagstaff et al., 2011; Wagstaff and Van Doorslaer, 2000; Kakwani, 1977).

We present, as a visual sense in figure 2.13, the findings of a previous study which amongst other investigates the relative progressivity of non-tax health care payments for Ghanaian health system; OOP payments and national health insurance contributions (Akazili et al., 2011:7,9). Lorenz curve appears to be dominated by OOP payments curve and this is also reflected by a negative value for the Kakwani index ($\pi_{\kappa} = -0.070$). On the other hand, national health insurance concentration curve lies below and completely outside the Lorenz curve, indicating and confirming ($\pi_{\kappa} = 0.144$) the progressivity of Ghanaian social health insurance financing.

Figure 2.13.: Example of Concentration curves of OOP healthcare payments and NHI contributions and Lorenz curve of households ability to pay variable (total consumption expenditure), Ghana: 2005/2006



Source: Adapted from Akazili, J., Gyapong, J., and McIntyre, D. (2011).

Similarly to computation of prevalence and intensity of OOP payments, we use the convenient regression formula aiming to calculate values for the Kakwani index for each health payment variable in accordance to ability to pay suggested parameter (O'Donnell et al., 2008a:174, Wagstaff et al., 2003).

$$2\sigma_R^2 \left[\frac{h_i}{\eta} - \frac{y_i}{\mu}\right] = \alpha + \beta R_i + u_i$$ **Equation 2.5.2.1-2**

Where *hi* is the health payment variable for individual *i*, *yi* is it's his/her ATP variable, η and μ are their averages respectively and σ_R^2 is the sample variance of the fractional rank in the ability to pay distribution. The Kakwani index is represented by the estimation of β from the OLS equation results as well as its standard error (Yu et al., 2008).

Aiming to meet the objectives of this research study, except of assessing the relative progressivity of each health financing source, we also assess the progressivity of overall health financing system in Greece for private hospital care (see section 5.2.3). To assess health financing progressivity in total, we use the following formula (O'Donnell et al., 2008a):

$$\pi_{\kappa}^{overall} = \sum i \ w_i \ \pi_{\kappa,i} \qquad \textbf{Equation 2.5.2.1-3}$$

where w_i denotes the proportion weights of each health financing mechanism in total health expenditure funding and $\pi_{\kappa,i}$ indicates the Kakwani index of health financing mechanism i. Therefore, the overall progressivity is based on the Kakwani values of each of the health financing sources (e.g. $\pi_{\kappa,i}$ for OOP expenditures) as well as the relative share of this source to total health expenditures (e.g. OOP expenditures as a proportion (%) of THE) which is derived from official organizations databases (e.g. WHO's National Health Accounts Indicators) (O'Donnell et al., 2008a:193).

This thesis builds on the empirical literature for measuring the redistributive impact of the major components of overall health financing (SHI contributions, PHI premiums and OOP payments) for the private hospital expenditures in Greece (e.g. Akazili et al., 2012; O'Donnell et al., 2008a; Yu et al., 2006; Wagstaff et al., 1999; Wagstaff and Van Doorslaer, 1992).
In accordance with the availability of our data and, although health funding is also allocated through direct and indirect taxes, we exclusively focus on the three key financing sources of inpatient health care in private hospitals for Greece (OECD, 2015). In this study, the Kakwani index enables us to measure the progressivity (regressivity) of OOP payments, SHI and PHI health care payments (contributions and premiums respectively) as a percentage of insured ability to pay. As we have already mentioned before, we use our respondents' annual gross income as proxy of ability to pay which is gross of taxation, social health insurance contributions and private health insurance premiums (Wagstaff et al., 2007).
In addition, we estimate the progressivity of overall financing for the provided inpatient health care, taking into account the evaluated Kakwani indices for each funding allocation source of our survey and the reported proportional contribution of the key funding sources to total private hospital expenditure in Greece from OECD for the nearest year 2013 (OECD, 2015).

Chapter 3

Literature Review on: Financial burden and catastrophe from OOP health expenditures, equity (fairness) in healthcare financing and OOP expenditure and macroeconomy

Introduction

The first part of the literature review begins with a brief presentation regarding the financial burden and/or catastrophic impact of OOP payments on households wellbeing around the world.

In turn, emphasis is given by separately reviewing the available literature concerning the catastrophic OOP healthcare payments presence in several countries, classified by income level; the high-income settings and the low and lower middle-income ones.

Moreover, we consider crucial to provide the main factors which have an impact on modifying OOP payments and finally to exhibit international experiences on this serious issue based on several empirical studies. Greater importance is given for the effect of public and private pre-paid insurance risk pooling mechanisms on OOP payments for several national health systems. Further, we present empirical evidence about fairness in overall health financing system and its disaggregated components in a worldwide level.

Finally, in this chapter we provide the available empirical literature concerning the impact of plenty macroeconomic and health financing determinants on OOP expenditure, while a literature part is also dedicated to explain the impact of several factors on total health expenditure. Moreover, in a briefly way we assess health policy measures undertaken as an offset to the financial crisis consequences to the mostly affected European and OECD countries, as well as, we explore the current health financing trends among these settings.

It is worth mentioning, that in this chapter we mainly focus on reviewing the available literature with a view to be consistent with our research hypotheses in order to test them, and hence, to meet our objectives and contribute to existing literature set by filling the gaps, as presented in chapter 1.

3.1 Empirical literature review on catastrophic OOP healthcare payments worldwide

Exploring the empirical literature, it can be noticed that the phenomenon of household financial hardship or catastrophe due to OOP healthcare spending is borderless, irrespective of region or national income level classification. Financial catastrophe from OOP healthcare spending is not always inherent with low-income, developing and in transition countries. Nevertheless, households catastrophic health expenditures are more severe in low and lower-middle income economies where OOP spending displays as the major source of health financing and the extent of pre-paid insurance schemes is minimal (Roberts et al., 2003). The empirical literature provides evidence that households catastrophic OOP payments can be incurred also in high-income economies with well-developed public and private risk pooling insurance arrangements.

It is worth mentioning, that the findings of several studies in the empirical literature are quite difficult to be compared at a cross-national or a cross-regional level due to the wide variation and diversity of health systems financing profile and insurance policies, the heterogeneity of the national household surveys of obtaining health expenditure and living standards data, the unbalanced period of conducting national household surveys, the measurement of household socio-economic status and finally on account of the different implemented threshold approaches to estimate catastrophic OOP payments. Undoubtedly, however, low or extremely high OOP payments can incur negative financial consequences in the wellbeing of global population because of the absence or the partial involvement of health systems risk pooling mechanisms to provide financial protection to their members.

3.1.1 Literature review on catastrophic OOP healthcare expenditures in high-income countries

Several empirical studies have investigated the high or even catastrophic effect of OOP healthcare spending on households wellbeing in developed and high-income countries using data before the 2007-2008 financial crisis. However, only a handful of studies use recent data (and only until 2010/2011), for examining the catastrophic incidence of OOP medical payments on households budgets in high-income and developed countries (e.g. Baird, 2016a,b; Lee et al., 2016; Quintal and Lopes, 2016; Zawada et al., 2016; Abramowitz and O'Hara, 2015; Caldbick, et al., 2015; Law et al., 2013).

Murray et al. (2003), using national representative survey data from 1991 to 2000 for 59 countries, exhibit that the percentage of households facing impoverishment due to health system contributions is 1.79 for Portugal, 0.56 for Greece and 0.44 for Spain, classifying them amongst the worse positions in OECD countries group. They conclude that the most important driver of households financial ruin is OOP spending.

Xu et al. (2003), using a cross-country analysis design and data from 59 countries (from 1996 to 1999), evince that households even from high-income countries with advanced governmental pre-payment insurance mechanisms, facing catastrophic OOP health expenditures. They explore further, using multivariate OLS regression, that there is a positive effect of OOP payments share to THE on the proportion of households incurring financial catastrophe from healthcare services. A 2.2% variation in the proportion of households suffering from catastrophic medical expenses is associated with an increase 1% of OOP expenditures share to THE. Their results indicate that in Greece, Portugal, Spain, Switzerland and the USA the proportion of households, which incur catastrophic OOP health spending despite the presence of pre – paid insurance mechanisms, is closely or more than 0.5% of their total population. Especially for Portugal, Greece and Korea Republic the proportion accounted for the high enough 2.71%, 2,17% and 1,73%, respectively, compared to the other high-income OECD settings (Xu et al., 2003). In contrast, in other high-income countries such as, Belgium, Canada, Denmark, France, Germany and the UK, the proportion is negligible (less than 0.1%). However, a more recent study for France (Dukhan et al., 2010), presents that the share of households facing financial catastrophe due to OOP payments ascended to 1% in 2006 from 0.01% in 1995; as it is reported by Xu et al. (2003:113). OOP healthcare spending is a significant issue of financial insecurity for the US Medicare policyholders and uninsured population (Merlis, 2002). Particularly, in 2001-02, 11% of all US households (around 13 million households) pay out more than 10% of their income on OOP healthcare payments compared with almost 8% in 1996-97 (Merlis et al., 2006). Similarly, Waters et al. (2004:344) present that 7.5% of households in the USA in 1996 incur catastrophic health expenditures since they pay OOP for medical services more than 10% of their income. Abramowitz and O'Hara (2015), using gross household income and health expenditure data from a national survey which was conducted in 2010, evaluate that 7.1% of US individuals deal with OOP medical payments more than 10% of their annual income. In another developed economy, Canada, the proportion of households pay OOP for healthcare services more than 10% of their after-tax income had been significantly increased; from 3.3% in 1998 to 5.2% in 2008 (Law et al., 2013). Further, in Canada, 1.1% of population overcomes the catastrophic threshold 9% of household income due to OOP pharmaceutical spending in 2009, while 2.6% and 8.2% of Canadian households exceed lower pre-defined catastrophic limits, 6% and 3% respectively (Caldbick, et al., 2015). Moreover, Baird (2016a) estimate for the 2010 that 9.4% of US individuals spend OOP for health care more than 10% of their annual net of taxation income. The proportion of Canadian individuals facing high health expenditures was much lower; 3.1% of the examined sample in 2010 (Baird, 2016a:4). Findings from a cross-national study, for investigating the high financial burden due to OOP payments for the population of seven high-income countries in 2010, reveal that more than 10% of individuals in Israel, Russia, Poland and the USA[40] pay OOP for healthcare more than 10% of annual household disposable[41] income (Baird, 2016b:30). Japan and Slovenia record proportion of individuals less than 10%. In France, only 3% of individuals experience high OOP healthcare payments, since the majority of French population holds complementary PHI to cover SHI formal patient cost sharing. Nevertheless, neither Abramowitz and O'Hara (2015), Law et al. (2013) nor Baird (2016a,b) use the attribution catastrophic healthcare expenditures.

Kronenberg and Barros (2014) ascertain that catastrophic OOP healthcare spending is a major concern for Portuguese health policy agenda. Despite the fact that the proportion of Portuguese households facing financial catastrophe due to OOP payments decreased from 7.85% in 2000 to 5.03% in 2005, their results indicate a sharply rising compare to the pioneering study of Xu et al. (2003:113). Quintal and Lopes (2016), using national representatively survey data, estimate that the incidence of catastrophic health expenditures in Portugal accounts for the high enough 2.1% in 2010, generating a paradoxical and, at the same time, a dismal impression for a high-income country with a well-developed national health service system. Identical conditions are also presented in the Republic of Korea, a high-income country also with an advanced national SHI system, in which nonetheless the OOP spending accounts more than one third of Korean total health financing; 36.1% in 2014, much greater compared to the other high-income settings across OECD and Asian region (WHO, 2017). More specifically, in 2010, the occurrence of financial catastrophe because of high OOP healthcare payments in the Korean households is 30%, 14.9%, 9.1% and 6.0% with the pre-defined as catastrophic threshold at 10%, 20%, 30% and 40% respectively (Lee et al., 2016). Luczak and García-Gómez (2012) evaluate that for OOP drug expenditure in Poland, 18.50% of population makes payments greater than 10% of its annual income in 2010,

[40] Particularly, the proportion for Russia is 17%, for Israel 15%, while both for Poland and the USA is 13%.
[41] In both of the empirical studies of Baird (Baird 2016a, Baird, 2016b), disposable income is defined as the net income after government taxation payments and social transfers received. Baird (2016b) refers that the latter is important issue for the vulnerable groups of population, since it comprises any benefits and allowances received from social insurance, welfare or any public assistance.

showing an increase compared to the previous examined years; 2000, 2003, 2005 and 2007. Further, Zawada et al. (2016) indicate that 20.3% of Polish population spends on healthcare OOP more than 10% of its annual income in 2010, while for Germany and Denmark households catastrophic OOP spending was much lower, 1% and 3.2% respectively.

For Turkey, Sulku and Bernard (2009) show that in 2003, the proportion of families which exceed the OOP spending thresholds 10% and 20% of household annual income is 18.9% and 14.4% respectively. Basar et al. (2012), using household total expenditures as the denominator of OOP payments, estimate that the proportion of Turkish households which overcome the catastrophic threshold of 10% decreased from 5% in 2002 to 3.8% in 2008, as a result of the national health insurance system official establishment this year. In the same spirit, Yardim et al. (2014) present that in Turkey the catastrophic OOP payments showed a decreasing trend from 0.75% in 2003 to 0.48% in 2009, although the public insured households were more likely to face catastrophic payments for medical care between the period 2006-2009. Nevertheless, counterintuitive findings for Turkey are presented by a recent study. Narci et al. (2015), using the same computation methods of measuring catastrophic impact of OOP spending on household wealth being, indicate that the proportion of households facing catastrophic OOP expenses raised from 2004 to 2010. For Estonia, Habicht et al. (2006), using household budget surveys from 1995 to 2001, evaluate that the proportion of households facing catastrophic OOP payments increased from 3.4% in 1995 to 7.4% in 2002, indicating the necessity to Estonian health system policymakers to re-adjust the degree of the provided financial protection to their citizens. Võrk et al. (2014) using more recent data estimate than in 2012, 2.1% of Estonian households incurred catastrophic health expenditures since they proceeded on medical payments more than 40% of their CTP.

3.1.2 Literature review on catastrophic OOP healthcare expenditures in low and lower middle-income countries

According to Scheil-Adlung and Bonan (2013), the majority of existing empirical literature mainly focuses on the financial burdens or even catastrophe that OOP health care expenditures incur to households in developing, low and middle-income countries, with insufficient or almost nonexistent pre-paid insurance schemes. Exploring the literature, it can be noticed, that the main inducers for catastrophic health expenditures are the low financial capacity of poor households to deal with high OOP expenses and the lack of insurance arrangements to moderate the high share of OOP expenditures to THE.

Considerable proportions of catastrophic OOP healthcare spending are observed for households in low-income and transition settings (e.g. Argentina, Azerbaijan, Egypt, Lebanon, Nicaragua, Paraguay, Peru, and Ukraine), while alarming rates (more than 10%) are recorded in Vietnam and Brazil (Xu et al., 2003). Van Doorslaer et al. (2007) set thresholds ranging from 15% to 40% of OOP payments as a share to household non-food expenditure to examine the incidence and distribution of households catastrophic medical expenditures in 14 Asian countries. They find that Bangladesh, China, India, Nepal and Vietnam note significant percentages of households incurring catastrophic OOP spending since their overall health financing is majorly relied on OOP payments. Further, they provide the paradoxical evidence that in low and middle-low income countries the better-off households present a higher tendency to spend a great share of their wealth in OOP payments compared to those in high-income settings (e.g. Taiwan, Korea Republic and Hong Kong). This fact may indicate that in low-income countries the poor households due to their limited financial capacity prefer to postpone, deter or forgo medical care and treatment in order to cover basic subsistence needs (Preker et al., 2002). The available techniques for measuring catastrophic OOP spending and thus examining the degree of health system financial protection efficiency do not provide issues on those individuals who are financially unable to seek for healthcare (Moreno-Serra et al., 2011). Nevertheless, the results of Van Doorslaer et al. (2007), are clearly for China, Nepal, Sri Lanka and Vietnam, which record negative concentration indices (C_E) showing that the poor households are more prone to overcome the catastrophic threshold relatively to their financial resources. Low proportions of households facing catastrophic health care payments are presented in Taiwan, Hong Kong and Malaysia since OOP payments account on a little share to their total health financing. Findings from a recent study for India exhibit that 10.8% of households belonging to the poorest (20%) quintile spend in excess of 10% of their total expenditure; far away from the high enough proportion 27.0% of the richest (20%) quintile, a fact which reflects that poor households are more prone of foregoing healthcare, than of receiving financial protection by the Indian community insurance schemes (Karan et al., 2014).

However, the phenomenon of ″abolishing″ health care due to high medical OOP expenses is not solely restricted to particular regions or income level classifications. Schoen et al. (2010:4) provide aspects that almost the one-third of US individuals consciously defer or face inaccessibility on healthcare services due to high OOP payments which are derived both from insurance limited benefit provisions and the high rates of uninsured population. High proportions of respondents facing financial barriers to seek for recommended healthcare are also presented in countries with developed statutory health insurance coverage; Germany (25%), Australia (22%) and Canada (15%). Moreover, the percent of adults with less than the average income, who have financial difficulties to spend or are unable at all to pay medical expenses, is 24% for the USA, 13% for France, 11% for the Netherlands and 10% both for Australia and Norway (Schoen et al., 2010:7). In confirmation with the previous studies, a more recent for 28 countries, exhibits that lower household income level is significantly associated with deferring care in 21 examined countries; even in developed economies, such as Belgium, Denmark, France, Israel, South Korea, Russia, Turkey and the USA (Kim et al., 2017).

Despite the fact that catastrophic OOP healthcare expenditures concern policymakers both to rich and poor income countries, the empirical literature suggests that over 90% of the population in low-income countries have to deal and cope with them (Xu et al., 2003). Households risk of incurring financial catastrophe is greater in low-income and developing countries where OOP payments for healthcare constitute the predominant financing source of total health funding and insurance schemes display inefficient to provide on households protective shield (Limwattananon et al., 2007; Van Doorslaer et al., 2006, Xu et al., 2006).

In a similar study to our study, Limwattananon et al. (2007) ascertain that Thai households which use hospitalized care are more exposed to catastrophic OOP payments, almost reaching the 15% in 2004, although the national health insurance coverage has succeeded in declining households catastrophic headcount proportion in the country. Similarly, Devadasan et al. (2007) prove that Indian population is also experienced catastrophic OOP inpatient expenses in 2003-2004 since the presence of community health insurance schemes does not provide full reimbursement coverage and healthcare benefits. Ghosh (2010) estimates that the proportion of households incurring catastrophic health expenses increased from 12.97% in 1993-94 to 15.37% in 2004-08 in India, while the rich population presents a greater tendency to suffer from catastrophic OOP payments, since it can spend more for healthcare than the poor groups. Karan et al. (2014) estimate that 18.86% of rural and 15.86% of urban households in 2012 pay OOP for receiving healthcare services more than the catastrophic fraction 10% of their annual total expenditure, summarizing previous studies outcome that public insurance coverage in India is inefficient to provide full compensatory benefits. A more recent published study for India, shows that the incidence of catastrophic health expenditures for Indian households presents over the years ascending trends; from 4.9% in 1993-94 to 6% in 2004-05 and finally to 7.2% in 2011-2012, indicating how associated is the share of OOP expenditures to THE[42] with households catastrophic prevalence for a country (see Gupta and Chowdhury, 2015; Xu et al., 2003).

Catastrophic health expenditures prevalence had been significantly increased since 2000 in Philippines, from 2.5% to 7.7% in 2012, at the 10% total household consumption threshold. When the alternative measurement at 40% of non-food total household consumption threshold is considered as catastrophic, then proportion of households incurring financial catastrophe increasing from 0.5% in 2000 to 2.3% in 2012 (Bredenkamp and Buisman, 2015). Concentration indices for both catastrophic thresholds from 2000 to 2012 record positive values, indicating that the better-off households in Philippines present a greater tendency to incur financial catastrophe from high OOP medical spending,

Adhikari et al. (2009) estimate that 85.25% of Nepalese hospitalized patients, affected from Kala-azar disease, have to pay more than 10% or their annual income to receive treatment, while the evaluated concentration indices are negative for all thresholds, indicating that the poor present a greater tendency to incur financial catastrophe. Moreover, Saito et al. (2014) obtaining more recent data through interviewing, evaluate that almost 14% of Nepalese households incurring catastrophic health expenditures from 2011 to 2012, since their OOP spending exceeded the catastrophic threshold 10% of their total expenditure. For India, a later empirical study also indicates that 5.06% of households incur catastrophic OOP expenditures, because the diverse spectrum of national health insurance does not administer OOP expenditures for all types of healthcare, but it is strictly confined in hospitalized events (Shahrawat and Rao, 2011). In comparison with previous studies for Vietnam (Xu et al., 2006; Wagstaff and Van Doorslaer, 2003; Xu et al., 2003), the proportion of households incurring catastrophic OOP spending has been significantly decreased to 3.9% in 2010 driven by the sharply decline of OOP expenditures share to THE as a result of national health insurance expansion in the country since the 2008 (Van Minh, 2013). In a recent empirical study for investigating catastrophic OOP spending for hospitalized patients in Vietnam, 59.02% of interviewed respondents face financial catastrophe in 2010 due to the high medical bills for inpatient treatment, while national health insurance does not have any significant effect on declining OOP expenditures for hospitalization events (Nguyen et al., 2017). Lwin et al. (2011), present that 9.4% of households in Lower Myanmar exceed the 10% catastrophic threshold of OOP payments to household annual total income, while their findings indicate that there is a greater tendency for the poor to exceed the catastrophic critical point because of the absence of pre-paid health insurance system. Similarly, in another developing country

[42] The OOP health expenditure as a percentage (%) of THE on health for India steadily ranges over 62% from 1995 to the last available year (2014) based on WHO Global Health Expenditure database (WHO, 2017).

where OOP spending is also the major component of health financing, Mongolia, almost 5.5% of households incur catastrophic OOP expenditures in 2012, when household medical expenses are greater than 10 % of household total expenditure, whereas the proportion declines to 1.1% at the common threshold 40% of household CTP (Dorjdagva et al., 2016). In Bangladesh, almost 9% of households suffer from financial catastrophe in 2011, since they spend OOP for healthcare more than 40% of their total non-food expenditure (Rahman et al., 2013). Consistently with the other low-income countries in Asian region, OOP payments are the principle source of THE in Bangladesh[43], while the national health insurance seems as a minor concept on overall health financing, exposing thus the poor to present a higher inclination to incur CHE. A more recent study for Bangladesh, indicates that 14.2% of households incurred catastrophic OOP expenditure in 2010, while the phenomenon is more intense for both urban and rural households (Khan et al., 2017). Sun et al. (2009), using a stratified cluster sample of 3,101 rural households in Shandong province of China in 2005, estimate that the proportion of households incurring catastrophic health spending is 8.25% due to high OOP medical payments, since the cooperative medical insurance scheme provides limited funding reimbursement on its insured members. Li et al. (2012), using primary data which was obtained from a national representative survey conducted in 2008, indicate that 13% of Chinese population exceeds the catastrophic health spending threshold. Catastrophic OOP health spending is inversely associated with the household income quintile indicating that the worse-off households are burdened disproportionally greater than the richer in order to receive healthcare services. Wang et al. (2015) estimate that 44.53% of the entire elderly Chinese households overcome the 20% catastrophic fraction of OOP payments to non-food household expenditure, whereas if the 40% threshold is defined as catastrophic the proportion of households decreases to 25.64%. The intensity of catastrophic OOP payments is higher among elderly households with chronic disease members while national health insurance is an insignificant factor of affecting households catastrophic medical expenditures.

An empirical study for Nigeria, gathering household budget data from the 2008, shows that 40.2% of households deal with OOP payments more than 10% of their total consumption expenditure while the poorest households are more likely to suffer from financial catastrophe in order to meet healthcare treatment (Onoka et al., 2011). In contrast, Amakom and Ezenekwe (2012) using national household survey data from 2003 to 2004, estimate that approximately 24% of Nigerian households face catastrophic OOP spending, which is more prevalent among the better-off population. Their findings reflect poor households exclusion

[43] The OOP expenditures steadily represent the two thirds of total health financing (WHO, 2017).

from health system due to their financial inability to spend for healthcare and to subscribe in pre-payment insurance schemes, resulting thus, over the years the two thirds of Nigerian total health spending to come through OOP expenditures. For Burkina Faso, Su et al. (2006) estimate that almost 15% of households deal with OOP spending more than the 40% catastrophic benchmark of their CTP. In Kenya for the year 2007, 8.7% of households exceed the catastrophic 40% fraction of OOP payments to household total expenditure and when the denominator of household ATP is converted on non-food expenditure the proportion increases in 11.4% for Kenyan families (Chuma and Maina, 2012). The inadequate insurance coverage on all types of health care and the significant OOP spending share to THE expose the poor population to be more likely affected on catastrophic OOP spending and consequently to impoverishment. The financial burden of private medical expenditures is higher also among the poor socioeconomic levels since the latter spend 5 times more for medical treatment that the better-off population. Kimani et al. (2016) confirm the same situation for Kenyan population. Their results do not present any change, since 11.7% of Kenyan individuals who seek for healthcare experienced financial catastrophe in 2007 (Kimani et al., 2016). However, the findings of a more recent study, using household national survey expenditure data from the 2013, exhibit that 4.52% of Kenyan households face catastrophic OOP payments because they proceeded on direct medical payment more than 40% of their non-food expenditure (Basara et al., 2017). In addition, Buigut et al. (2015) estimate that 22.8% of households, which live in slum areas in Kenya, facing catastrophic health payments since they paid OOP for healthcare needs more than 10% of their total income. All the previous authors advocate that if the Kenyan state will not proceed on the mandatory expansion of national health insurance for everyone and especially for the poor, the catastrophic impact and impoverishment due to OOP spending will ever remain major concerns for policymakers and households. Akinkugbe and Chama-Chiliba (2012), using national survey data from 2002 to 2003, estimate that the proportion of households incurring catastrophic health spending is 7% and 1.25% in Botswana and Lesotho respectively, since households health expenditures exceed the threshold of 40% of their CTP. For Uganda, Xu et al. (2006), using national survey data from 1997 to 2003, estimate that 2.9% of households incur catastrophic OOP payments while their incidence is more prevalent among poor households. The catastrophic headcount ratio for Uganda in 2010 with a given threshold 10% of OOP payments to household total consumption expenditure is 22.8% since OOP expenditures are the principal source (almost the half) of national total health spending (Kwesiga et al., 2015).

In a cross-national study for Western Balkan countries, Bredenkamp et al. (2011:354) drawing data from 2000 to 2005, estimate that 26.32% of Kosovar individuals record catastrophic OOP payments in the 2000 (more than 10% of their income). For Albania and Serbia, 20.79% in the 2005 and 12.22% in the 2003 of their citizens respectively, face catastrophic OOP medical payments. In Bosnia and Herzegovina and Montenegro the proportion of households incurring catastrophic OOP payments it is by far lower, 3.10% and 1.14% in the 2004 respectively; however the results do not reflect health system financial protection of each of these two Balkan territories since one major component of OOP payments, informal medical spending, is not included in the household surveys and therefore their catastrophic OOP headcounts are underestimated. In Albania, where informal OOP spending is a significant mean of health financing, 13.3% of Albanian individuals spend OOP for healthcare more than 10% of their total per capita expenditure in 2008, whilst the poorest present a greater tendency to overcome the catastrophic ratio (Tomini et al., 2013). In a former Soviet Republic, Georgia, the catastrophic prevalence have raised from 2.8% in 1999 to 11.7% in 2007, as a result of the low share of public health financing to THE for several years; almost 18% in 2007 (Gotsadze et al., 2009).

For Lebanon, Salti et al. (2010) using national survey data from 2004 to 2005 indicate that the 13.3% of households overcome the catastrophic fraction 10% of OOP payments to household total expenditure. The proportion of households facing catastrophic health expenditures decreases to 2.3% when the excess of 40% of OOP spending to household non-food expenditure is defined as catastrophic by the authors. Regardless of the catastrophic metric and household wealth measurement, their study findings show that the worse-off Lebanese population is more likely to face catastrophic OOP spending. Elgazzar et al. (2010) examine the magnitude and catastrophic incidence of OOP payments on households living standards for six countries in Middle East and North Africa region, using national representative household survey data from 2004-2007. They estimate that the proportion of households, which spend privately for healthcare more than 10% of their total expenditure (defined as catastrophic threshold[44]), ranging from 7% to 13% in Yemen, West Bank – Gaza, Tunisia, Lebanon, Iran and Egypt. Catastrophic OOP spending prevalence is lowest in Yemen, West Bank-Gaza, Egypt and Iran and greatest for Tunisia and Lebanon. It is also worth noting, that the proportion of individuals who defer healthcare due to high OOP expenses is around 37% of Yemen, 20% in Lebanon and 12% in Egypt. For all the aforementioned countries, OOP

[44] The catastrophic threshold for Iran is defined by the authors at 25% of household total expenditure.

payments [45] as proportion of THE, always record extremely high proportions, since governmental financial protection against catastrophic medical spending is just theory (WHO, 2017). In alignment with the previous study, a more recent one for Egypt presents that OOP healthcare payments lead almost the 6% of households in 2010 to suffer from catastrophic health spending, which is higher and more intense among the worse-off population (Rashad and Sharaf, 2015). In addition, for Iran, Piroozi et al. (2016) using face-to-face interviewing on 663 households in July 2015, present that the proportion of Iranian households which exceed the catastrophic OOP spending (40% of household non-food expenditure) is 4.8%.

In Brazil for the period 2002 to 2003, the proportion of households paying OOP 20% or more for medical treatment is 3.8%, whereas if the catastrophic benchmark is defined to be equal or more of 40% of household CTP, then the proportion of Brazilian households facing financial ruin from healthcare needs is 2% (Barros et al., 2011). A cross-country study for twelve Latin American and Caribbean economies, exhibits that the proportions of households incurring catastrophic[46] OOP healthcare expenditures range from the lowest prevalence in Costa Rica 0.4% to the highest in Chile 14.4% (Knaul et al., 2011:90). Guatemala, Nicaragua, Dominican Republic, Argentina, Ecuador and Peru also exhibit significant prevalence, 11.6%, 10.3%, 10.2%, 8.4%, 7.4% and 5.1% respectively. For Brazil, Bolivia, Colombia and Mexico the catastrophic incidence is much lower than 5%. Knaul et al. (2013) indicate that the poorest socioeconomic strata and most vulnerable groups of the population in Latin America and Caribbean region are more likely to face financial catastrophe from high OOP payments for healthcare services. In a similar vein, a more recent empirical study for Latin America and Caribbean region, using national representative household surveys from 2004 to 2010 and setting as catastrophic health spending the excess of OOP payments on 25% of household non-food expenditure, presents that the majority of the examined countries recording high catastrophic incidence ratios (Dmytraczenko et al., 2015:125). Particularly, the catastrophic incidence for Chile is more than 21%, for Guatemala more than 10%, for Argentina almost 10%, for Colombia, Jamaica and Peru between 5-10%, for Brazil and Mexico less than 5% while for Costa Rica is only 1%. In line with Xu et al. (2003), Dmytraczenko et al. (2015:126) advocate that household catastrophic health spending is influenced positively by the share of

[45] According to WHO's Global Health Expenditure database, Yemen records the highest share of OOP expenditure (76.42%) globally. The OOP expenditure share (%) to THE for Egypt is 56.56%, for Iran 47.80%, for Tunisia 37.73% and for Lebanon 36.42% while for West Bank – Gaza data is not available.

[46] Knaul et al. (2011:88) define as catastrophic health expenditures these OOP payments which exceed 30% of household expenditures (net income) after meeting basic food needs. They use for their computations data from national representative surveys from 2002 to 2008, which present, as they refer, great heterogeneity.

OOP payments to THE. Policymakers in Costa Rica[47] have succeeded in achieving minimal catastrophic incidence rates over the years, since their policies target on the principles of health financing equity and financial protection (Unger et al., 2008). In Colombia, where OOP payments are also the main principal source of health financing, the 9.6% of households experiencing financial disastrous expenditure in 2011; they spend privately for medical care over 20% of their ATP (Amaya-Lara, 2016). The enduring heavily reliance of Chilean health system on OOP payments alongside with the low government funding on national THE (e.g. 31.5% and 49.5%, respectively in 2014) resulting in around 4%[48] of households in 2012 to suffer from catastrophic expenditures for healthcare while, 1% of households impoverished due to OOP medical spending (Koch et al., 2017).

3.2 Literature review on the determinants of high or catastrophic OOP healthcare payments

Decidedly, the pre-paid insurance mechanisms have the most predominant and great impact on high or even catastrophic prevalence of household OOP payments for the utilization of health services. Exploring the empirical literature, it can be noticed that there is also plenty of other parameters which majorly influence high or catastrophic OOP health expenditures. Assessing the main factors influencing the financial burden or catastrophic effect of OOP expenditures on household wellbeing is a paramount objective for health systems policy makers. Policy makers gaining knowledge on this serious issue have to promote policy interventions for ensuring better financial protection against high OOP medical spending especially to vulnerable segments of population.

The majority of the empirical studies has investigated the potential drivers of catastrophic OOP healthcare expenditures, using logistic (probit binary response or dichotomous logit) regression models, where the explanatory variable[49] is household occurrence or not on CHE and explanatory factors several covariates (e.g. Barasa et al., 2017; Rashad and Sharaf, 2015; Amaya-Lara, 2016; Van Minh et al., 2013; Su et al., 2006; Murray et al., 2003). On the other hand, other empirical studies implement linear regression models[50] to examine the impact of a set of possible factors on the dependent variable; OOP spending expressed as a monetary

[47] The OOP expenditure share (%) to THE for Costa Rica is always lower than 30% from 1995 to 2004 compared with the average share of Latin America and Caribbean region for the same time period (WHO, 2017).
[48] In this study, as catastrophic health expenditure is defined those OOP expenditure which exceeds 30% of household CTP.
[49] In these regression models the independent variable is a dummy variable which equals (1) if the household incur CHE in accordance with the pre-defined catastrophic percentage threshold; and zero otherwise.
[50] In assessing the impact of various potential drivers (e.g. household income level, insurance reimbursements or insurance status) on OOP expenditures, ordinary least squares (OLS) with log-transformation or generalized linear models (GLM) with log-link functions are implemented by several published empirical studies.

value, as our study presents in sections 5.1.2 and 5.2.2 (e.g. Molla et al., 2017; Nguyen et al., 2017; Brinda et al., 2014; Galárraga et al., 2010).

The following sections describe the factors that have been shown in empirical literature to exhibit a significant impact on household likelihood to incur financial burden from OOP payments or they are linked with catastrophic OOP spending for healthcare needs.

3.2.1 The effect of public pre-paid insurance mechanisms on high or catastrophic OOP healthcare payments

The theoretical hypothesis implies that the presence of prepayment insurance mechanisms on health systems offsets households hazard from financial burdens or even catastrophe by excessive OOP healthcare payments (Xu et al., 2007; Nyman, 1999). Particularly, Waters et al. (2004:339) state that "*One rationale for health insurance coverage is to provide financial protection against catastrophic health expenditures.*" Indeed, in economies with advanced health insurance institutions, the majority of population is well protected from financial ruin due to OOP payments (Xu et al., 2007). Contrary, in low and lower middle-income countries where risk pooling insurance mechanisms are not well established and hence ineffective to provide full coverage and financial protection against OOP payments, large segments of population experiencing financial hardship, financial catastrophe or even loss of property from direct medical spending (Xu et al., 2007; Preker et al., 2002).

Plethora of empirical studies advocate that households with no insurance arrangements are at a greater risk of financial hardship or even catastrophe due to OOP spending for healthcare (e.g. Molla et al., 2017; Van Minh et al 2013; Kavosi et al., 2012; Li et al., 2012; Amaya-Lara and Gómez, 2011; Galárraga et al., 2010). Even in high-income country, the USA (Waters et al., 2004), the lack of health insurance plans leads population on catastrophic health spending likewise in low-income settings (Onwujekwe et al., 2014; Scheil-Adlung et al., 2006). For example, Nguyen et al. (2017), in a published recent study for Vietnam, indicate that the national health insurance enrollers pay for all types of health care lower OOP expenditures compared to the survey participants without an insurance coverage. A recent study for Indonesia, indicates that the national healthcare financing system succeeded in providing better financial protection to its members against the risk of poverty due to OOP healthcare payments (Aji et al., 2017). For Iran, a published study presents that uninsured households or households with partial benefit public health insurance coverage pay for healthcare great proportions of their living standards level (Kavosi et al., 2012).

Hsiao and Shaw (2007:158) support the view that the expansion of SHI inseparably of national health insurance policies, especially in low and middle-income countries, can provide financial protection against households CHE and therefore to the coping strategies to deal with them (e.g. indebtedness, selling of property etc.). Whereas in some developing countries (e.g. Thailand, Philippines) social or national health insurance schemes have succeeded in raising the number of insured among poor segments of population, in other low-income settings (e.g. Cameroon, Guinea, Senegal), SHI enrolling is quite difficult to be achieved because the worse-off and vulnerable groups of population cannot afford to pay insurance fees (Spaan et al., 2012:687). In the same line, Acharya et al. (2012), summarizing the literature for the impact of national insurance schemes on OOP payments, report that few of them manage to provide significant financial protection against OOP payments and some other do not. Conclusively however, they state that the majority of pre-paid insurance mechanisms expansion tries ineffectually to protect poor population from excessive OOP spending in several developing countries.

However, findings from several other empirical studies for middle-income countries, have well documented that public health insurance expansion affects negatively OOP share to THE, providing thus a better shield on population against the financial consequences of CHE (Meng et al., 2012; Kumar et al., 2011; Tangcharoensathien et al., 2011). Especially, evidence from a pioneering cross-country analysis suggests that public health insurance schemes, irrespective of taxation financing or SHI contributing, affect negatively catastrophic OOP spending; although it does not make a reference for PHI potential on this issue (Xu et al., 2007).
For instance, Ranson (2002), using data lasting from 1994 to 2001, gives evidence that a community-based health insurance scheme in Gujarat, India, provides some financial protection to hospitalized insured against catastrophic OOP payments; 35.6% of the sample respondents managed to keep OOP hospitalization payments below the catastrophic threshold (10% of household AGI) after insurance reimbursement. Scheil-Adlung et al. (2006), using data from national household surveys in Kenya, Senegal and South Africa for the year 2003 and applying multiple logistic regression, find that households affiliation on health insurance schemes can decrease the likelihood of catastrophic health expenditures for Senegalese households. Health insurance impact on catastrophic OOP payments is not statistically significant for Kenyan population, whereas only the rich segments of South Africa population are less likely to deal with financial catastrophe from OOP healthcare expenditures. Further, Joglekar (2008), using data from six Indian states in 2003, estimates that households which hold national health insurance have lower probability of incurring catastrophic OOP payments at a 5% catastrophic threshold of household ATP. Increasing the threshold to 10%, health insurance presents a significant negative effect on the monetary value of OOP spending, but a

statistically insignificant impact on the probability of incurring financial catastrophe from OOP expenditures. Furthermore, Somkotra and Lagrada (2008), Prakongsai et al. (2009) and Hsu et al. (2017) prove that Thai universal coverage implementation in 2001 achieved to reduce the incidence and intensity of catastrophic OOP payments, since households OOP healthcare spending as a share of their ATP had been significantly declined from the pre to the post national health insurance era. Moreover, in Mexico, a country which diachronically faces extremely high OOP payments to total health financing and the majority of the population was uninsured 20 years before, the establishment of the public social insurance organization (so called, *Seguro Popular)* in 2001, managed to decrease the national headcount of catastrophic OOP medical spending (Galárraga et al., 2010; King et al., 2009; Gakidou et al., 2006; Knaul et al., 2006). A more recent empirical study for Mexico also confirms national health insurance successful impact on declining household catastrophic OOP spending both to rural and urban areas of the country from 2000 to 2005 (Grogger et al., 2015).

For Ghana, the national health insurance scheme exhibits a significant impact on declining OOP healthcare payments for Ghanaian population in 2011, since the results of a recent empirical study indicate that the headcount of catastrophic medical expenses is lower among fully insured households (2.94%) compared to the partially insured (3.71%) and the non-insured at all (4.03%) at the 40% catastrophic threshold of household CTP (Kusi et al., 2015:8). Aryeetey et al. (2016:6) show that 7.1% of Ghanaian insured households in 2011 incurring catastrophic OOP expenditures compared to the high enough 28.7% of uninsured, since the national health insurance system succeeded in providing financial protection against OOP payments.

On the other hand, Wagstaff et al. (2009) indicate that the rural insurance schemes in China do not yield in a proportional decline of households catastrophic OOP spending because of their limited benefit basket, high patient cost sharing and low reimbursement rates. Lei and Lin (2009) present that the Chinese public health insurance carrier does not manage to decrease OOP payments nor does improve healthcare utilization and health status for Chinese residents in rural areas. Additional empirical evidence, using data for 2005 and 2008, also suggests that the new public health insurance program fails to decline the incidence of catastrophic OOP spending for Chinese population (Zhang et al., 2010b). Further, Liu et al. (2014), using data obtained from a national representative survey for 1645 hospitalized Chinese patients, show that SHI after the implemented health reform in 2009 does not manage to diminish insured OOP payments. Their findings present that SHI reimbursement mechanism impact on OOP payments is poor or even statistically no significant, contrary to what pre-paid risk pooling funds deterministically imply. More clear results are presented by Li et al. (2014), who state that the new cooperative insurance medical scheme fails to prevent Chinese rural households from catastrophic OOP expenditures in 2008. Rural households catastrophic incidence in 2008 is 14.4%, while the insurance scheme beneficiaries experience the same level of CHE as uninsured do. Ambiguous results are provided by Guo et al. (2016:6) for the cooperative medical insurance scheme which was established in China in 2009 compared to the latter scholars. Although, they determine as catastrophic those household health payments which equal or exceed the 40% of household CTP, they refer that public insurance achieve to decrease catastrophic incidence of OOP payments from 2009 to 2012 based on catastrophic thresholds much greater, 50% and 60% of household CTP. Beneficiaries of community based health insurance in Laos from Asia enjoy higher utilization of healthcare services, lower OOP medical payments and hence lower prevalence of CHE compared to the uninsured. Nevertheless, it is financial prohibited for the poor segments of population to obtain health insurance, while among the poor who succeeded in enrolling, there is no one positive result in increasing healthcare utilization or reducing OOP payments financial hardship (Alkenbrack and Lindelow, 2015).

However, the empirical literature sheds light also for the opposite in several other national health systems; health insurance may have a positive role in increasing catastrophic OOP spending.

A country level study of Murray et al. (2003) gives evidence that the public and social pre-payments insurance mechanisms affect positively households catastrophic OOP spending in several countries worldwide, such as in Latin America and Caribbean region; Argentina, Brazil, Costa Rica, Jamaica and Panama, in pre-socialist transition countries; Azerbaijan, Croatia and Estonia and even among OECD countries; the USA and Switzerland.

Ekman (2007), using household available survey data collected in 1998 and implementing multivariate regression analysis, gives evidence that health insurance in Zambia can increase the risk of catastrophic OOP spending. They report that this takes place because of Zambian households OOP medical payments for high-tech and luxurious health services in expensive private providers which are not provided in public establishments. Further, Wagstaff and Lindelow (2008) advocates that the Chinese voluntary urban health insurance schemes raise the incidence of catastrophic OOP payments, since they support a demand inducement from healthcare providers on patients, which it results in remarkable OOP spending for the use of more executive, upgraded and latest technology care. Shahrawat and Rao (2011) mention that poor state gatekeeping and monitoring for healthcare in private providers can result in supplier induced demand which increases patients' medical utilization and thus OOP spending. In the same line, Li et al. (2014) report that the phenomenon of induced demand for healthcare services is a common feature in Chinese health insurance system, which it results in higher level of OOP payments and hence in elevation of catastrophic health expenditures for households. Paradoxical evidence is also presented for households in Colombia, since the insured enrolling households with the contributive and subsidized health insurance policies present greater odds to incur catastrophic OOP spending compared to the totally uninsured households (Amaya-Lara, 2016). Further, the findings of a recent study for India exhibit that the health insurance coverage, named Rashtriya Swasthya Bima Yojana (RSBY) from 1999 to 2012, has a statistically significant positive effect of increasing the likelihood of Indian households to incur financial catastrophe due to OOP spending, both for inpatient and outpatient healthcare treatment (Karan et al., 2017).

3.2.2 The effect of public and/or voluntary PHI pre-paid insurance mechanisms on high or catastrophic OOP healthcare payments

Xu et al. (2007) and O'Donnell and Van Doorslaer (2005) ascertain that public health insurance displays as a protective factor against CHE for households in several countries. As we have already pointed out in Chapter 2, the majority of the developed countries population is covered by public, private or either mixed health insurance schemes. Nevertheless, according to the available literature, the impact of publicly-financed health insurance and especially of any voluntary supplementary or complementary PHI to mandatory coverage on OOP payments varies significantly across European settings. Specifically, Holly et al. (2005) employ an exploratory analysis, by using data from the Survey of Health, Ageing and Retirement in Europe (SHARE) for the year 2004, to test the relationship between additional PHI and OOP payments for the European population aged 50 years old and over. They give evidence that in most European countries the proportion of population proceeding on OOP payments is almost the same between additional PHI subscribers' to compulsory public insurance and those who do not hold a parallel voluntary PHI coverage (Holly et al. 2005:130). Moreover, they find that the additional PHI coverage lowers the probability of OOP payments in France, Greece and in the Netherlands. Contrary, they find that subscribers with supplementary or complementary PHI to compulsory public health insurance have a greater likelihood to incur extensive OOP payments for healthcare in Austria, Denmark, Germany, Italy and Spain. They justify their results by explaining that the additional PHI may lead population to consume more and hence to deal with greater OOP spending for healthcare

services. Further, Paccagnella et al. (2013) motivated by the previous scholars' study, assess the effectiveness of additional voluntary PHI in declining OOP payments by using the same data across SHARE settings for Europe (*i.e.* individuals aged 50 or over). By adopting a simultaneous equations approach they find that the additional PHI policy has a statistically significant negative effect on OOP spending only for the Dutch population. The effect of additional PHI policy on insured OOP payments is not significant for Belgium, France Greece, Germany, Sweden and Switzerland. On the other hand, the estimated PHI parameter exhibits a significant positive impact on OOP payments for Austrian, Danish, Italian and Spanish individuals aged 50 and over. They suggest that PHI influence on raising OOP spending in these countries is driven by individuals' induced-demand incentive to utilize more healthcare services, as well as, by the employed formal patient cost sharing by PHI agents to offset issues like insured moral hazard and adverse selection effects (Paccagnella et al. 2013:309).
In France, the presence of complementary PHI parallel to mandatory SHI significantly declines the likelihood of French households to face extreme financial burdens from OOP health payments (Dukhan et al., 2010). Further, Shin (2012), by using OECD Health Data for a period lasting from 1980 to 2007 and employing a multivariate regression panel analysis through fixed effects model estimation gives evidence that PHI financing has a limited negative degree impact on OOP spending in Korean healthcare system. Specifically, he shows that a 1% increase in PHI financing offsets 0.073% OOP expenditure for Korean population.

Public health insurance schemes are linked with lower likelihoods of catastrophic OOP expenditures for Lebanese households, alongside with voluntary or mutual PHI (Salti et al., 2010). Rashad and Sharaf (2015) evaluate that the pre-paid insurance mechanisms in Egypt provide a shield against financial catastrophe from OOP health payments. More specifically, they present that public health insurance acts as a break against CHE, albeit the lack of additional PHI exposed the Egyptian households 2.74 times more on catastrophic OOP health spending; households comprising at least one PHI policyholder member present lower odds to suffer from catastrophic health payments. In Turkey, households comprising pre-school aged children are more likely to face catastrophic OOP spending irrespective of socio-economic criteria, unless they possess PHI (Yardim et al., 2014). Iranian households without supplementary insurance alongside with the basic national present a greater probability of experiencing catastrophic OOP spending for healthcare (Piroozi et al., 2016).

3.2.3 Households socioeconomic status and living standards

Alam and Mahal (2014b), summarizing the empirical literature regarding the effect of health risk economic impact on households living standards in low and middle-income countries, refer that the poor segments of population are financially burdened more than the rich for obtaining healthcare services. Therefore, catastrophic OOP spending is disproportionately concentrated among the poorer groups. For the most populous country in the world, China, household income is inversely associated with financial catastrophe due to OOP payments, presenting in this way that the richer households are better protected against catastrophic OOP spending (Wang et al., 2015; Li et al., 2012). For Iran, the probability of incurring catastrophic OOP spending is 19.04 times greater for the households in the lower-income class compared to them belonging in the middle and rich classification group (Piroozi et al. 2016). For example, the regression results indicate that poorest households in Kenya are more likely 5.61 times to incur catastrophic OOP expenditures than the richest households (Barasa et al., 2017). The majority of published studies confirms that household higher income level is an important driver of offsetting OOP health expenditures and hence shielding household economy from health risk. Indeed, households or individuals from lower income quintiles are more likely to incur financial catastrophe because of OOP healthcare payments than the richer groups of population in several other countries; Argentina (Cavagnero et al., 2016), in Bangladesh (Molla et al., 2017; Rahman et al., 2013), in Burkina Faso (Su et al., 2006) in Canada (Caldbick et al., 2015), in Colombia (Amaya-Lara, 2016), in Egypt (Rashad and Sharaf, 2015), in Georgia (Gotsadze et al., 2009), in Latin America region (Knaul et al., 2011), in Nepal (Nguyen et al., 2017), in South Korea (Lee et al., 2016; Choi et al., 2015), in Sri Lanka (Kumara and Samaratunge, 2016), in the USA (Abramowitz and O'Hara, 2015; Waters et al., 2004) and in the Western Balkan countries (Bredenkamp et al., 2011). Nevertheless, there are exceptions that prove the rule. The results of a study for France reveal that the richer households present a greater risk for financial burden due to OOP healthcare payments (Dukhan et al., 2010). Similarly, the probability of incurring catastrophic OOP healthcare expenditures rises from the poorest to the richest group of population in Lebanon (Salti et al., 2010), in Turkey (Yardim et al., 2014) and in Vietnam (Van Minh et al, 2013).

3.2.4 Several characteristics and configuration of the household

The empirical literature provides evidence that a rich diversity of family characteristics influence the likelihood of households to face catastrophic OOP expenditures. For instance, households with a female head, unemployed household head, older household head, households comprising unemployed, elderly, pre-school and young children, chronically ill or uneducated members are more likely to incur CHE both in developed and developing countries (see Barasa et al., 2017; Kumara and Samaratunge, 2016; Piroozi et al., 2016;

Quintal and Lopes, 2016; Abramowitz and O'Hara, 2015; Caldbick et al., 2015; Choi et al., 2015; Rashad and Sharaf, 2015; Yardim et al., 2014; Van Minh et al., 2013; Li et al., 2012; Kim and Yang, 2011; Bredenkamp et al., 2011; Knaul et al., 2011; Cavagnero et al., 2006; Su et al., 2006). Furthermore, catastrophic OOP healthcare expenditures are more likely to be incurred to households which encompass vulnerable members, such as, handicapped, disabled and chronically ill because all these are exposed to financial hazard for a longer period of time (Lee et al., 2016; Sinha et al., 2016; Wang et al., 2015; Brinda et al., 2014; Arsenijevic et al., 2013; Salti et al., 2010; Gotsadze et al., 2009; Abegunde and Stanciole, 2008; Somkotra and Lagrada, 2008; Su et al., 2006; Waters et al., 2004; Kawabata et al., 2002). More precisely, the findings of a recent study for Bangladesh show that the presence of chronic illness at least to one household member results in 101% raise in annual household OOP healthcare payments compared to households without chronic ill members (Molla et al., 2017). Moreover, Molla et al. (2017) and Kavosi et al. (2012) indicate that having a household member aged more than 60-65 or less than 5 years old constitute significant risk factors of catastrophic OOP expenditures for Iranian households. In the same line, Amaya-Lara (2016), notes that households in Colombia, with children 5 years old or younger and elderly 65 years old or oldest, present a higher risk of incurring CHE since these family members have a higher likelihood of experiencing health problems.

On the other hand, having the household head employed, more household members and at least one young member appeared to be inversely associated factors with catastrophic OOP expenditures (Lee et al., 2016; Rashad and Sharaf, 2015; Van Minh et al., 2013; Li et al., 2012; Amaya-Lara and Gómez, 2011). The higher education level of household head or more educated members in a household have a countervailing effect on the risk of financial catastrophe due to OOP spending for healthcare in most of the empirical studies (Molla et al., 2017; Rahman et al., 2013; Kim and Yang, 2011; Dukhan et al., 2010; O'Donnell and Van Doorslaer, 2005).

3.2.5 Place of residence: rural or urban areas

Li et al. (2012) estimate that Chinese households which are located in rural areas have a greater likelihood of experiencing financial catastrophe than urban households. Households living in the poorer provinces of the country present greater risk of incurring catastrophic health spending than the residents of wealthier regions. Moreover, an empirical study for 12 Latin-American countries proves that households which live in rural areas conduce considerably to household financial catastrophe due to OOP health payments (Knaul et al., 2011). Barasa et al. (2017), Rashad and Sharaf (2015), Arsenijevic et al. (2013), Van Minh et al. (2013) and Kim and Yang (2011) also present that rural households in Kenya, Egypt, Serbia, Vietnam and South Korea, respectively, are more likely to experience catastrophic OOP spending compared to urban residents. Notwithstanding, empirical evidence also suggests that households in urban areas and capital cities face a greater risk to incur catastrophic OOP payments in comparison to dwellers in rural areas, since the first benefit the privilege of closest approach and accessibility to more advanced healthcare facilities (Molla et al., 2017; Gotsadze et al., 2009; Rous and Hotchkiss, 2003).

3.2.6 The type of healthcare services (e.g. outpatient, inpatient, drug spending), the type of treatment (e.g. surgery or not), the type of diseases

Findings from a study for India reveal that household catastrophic OOP spending for inpatient treatment is greater associated with heart diseases or injuries than inpatient stays caused by communicable conditions (Mahal et al., 2010). For Nepal, Saito et al. (2014) indicate that the poorer households which also encompass members suffer from the most common non-communicable illnesses, such as diabetes, asthma and heart diseases, present greater odds of catastrophic OOP spending. They also exhibit that health shocks which are caused by injury constitute a significant positive associated factor with catastrophic OOP payments for both poor and rich Nepalese population. Similar patterns are also identified for non-communicable diseases influence on catastrophic OOP spending in Egypt (Rashad and Sharaf, 2015). Similarly, in a recent empirical study for Vietnam, 26% of the survey respondents which receive hospitalized treatment for injury face catastrophic OOP expenditures while the prevalence is greater for those with major surgery proceedings and longer inpatient stay than those with no-surgery hospitalization treatment (Nguyen et al., 2017). Unexpected health shocks of household members also constitute a positive associated factor to high OOP expenditures (Molla et al., 2017). Li et al. (2012) ascertain than Chinese households with hospitalized members present a greater risk of incurring catastrophic health expenditures. Kim and Yang (2011) estimate that almost the 85% of South Korean households of those incurring catastrophic OOP spending, have members who received at once inpatient treatment and over 25% of them have a member hospitalized. In the same line, hospitalization care is also the most dominant risk driver for catastrophic OOP spending in Bangladesh (Rahman et al., 2013), in Colombia (Amaya-Lara, 2016; Amaya-Lara and Gómez, 2011), in Georgia (Gotsadze et al., 2009) and in Iran (Piroozi et al., 2016; Kavosi et al., 2012).

3.2.7 The type of healthcare providers (public or private facilities)

Empirical literature suggests that the level of OOP spending for medical care could also be linked with the type of health care providers. For instance, the prevalence of financial catastrophe is greater for those Thai households which seek care in private hospital establishments (27.8% in 2004) compared to the corresponding catastrophic proportion (7.3% in 2004) for inpatient care in public district hospitals (Limwattananon et al., 2007). Mahal et al. (2010) estimate that for non-communicable diseases Indian households have to pay less OOP payments in public healthcare establishments than in private health providers. Additionally, Sinha et al. (2016) reveal that Indian households have to pay OOP more when receiving healthcare in private sector than in public providers, however hospitalization treatment imposes financial catastrophe both to public and private health facilities in India. Similarly, receiving private outpatient healthcare is a greater risk factor of incurring catastrophic health expenditures than the utilization of public outpatient facilities in Bangladesh (Rahman et al., 2013).

3.3 Literature review on the equity in health care financing: experiences by region

The four main bedrocks of health financing, with substantial different contributions to the overall health spending across national health systems, are general taxation, SHI, voluntary or compulsory PHI and households OOP payments (Wagstaff and Van Doorslaer, 1992).

WHO suggests that compulsory state financing sources (general taxation and compulsory SHI) tend to be progressive, voluntary PHI is regressive and less equitable, and OOP spending is displayed as the most regressive form of health financing (WHO, 2008). In high-income countries with SHI as the main pillar of health financing, the better-off households spend a lower proportion of their financial resources on OOP spending for health care compared to the poor. PHI appears to be more regressive because policyholders have to pay premiums abided with risk-rated criteria compared to SHI arrangement, where employees' contributions are linked to the level of salaries (O'Donnell et al., 2008).

3.3.1 European and North American Region

The majority of the literature regarding European countries gives evidence that the tax-financed health systems like British, Portuguese and Irish is more equitable than the SHI systems like French, Spanish and Dutch (Holly et al., 2005; Wagstaff et al., 1999; Wagstaff and Van Doorslaer, 1992). In countries where healthcare financing is considerably relied on private expenditures, either through households OOP payments or PHI, national health systems are most regressive (Murray et al., 2000; Van Doorslaer et al., 1999).

Particularly, an early empirical study for measuring health system equity for ten countries, estimate positive total Kakwani indices for UK, Ireland and Portugal indicating progressivity in tax-financed national health systems (Wagstaff and Van Doorslaer, 1992:380). In the same study, SHI systems (French, Dutch and Spanish) exhibit negative Kakwani indices advocating overall regressivity. PHI is regressive in countries with high shares of PHI to total health spending (France, the Netherlands, Switzerland and the USA), while OOP payments record negative Kakwani indices, except Denmark, Ireland and Portugal, in most countries. Wagstaff et al. (1999) in order to confirm previous study findings indicate again that OOP payments remain a regressive form of health financing to several OECD countries, such as the USA, Switzerland, France, Germany and the Netherlands. Dukhan et al. (2010), using more recent data, estimate that OOP payments in France are regressive in 1995 and 2001 and almost progressive in 2006, while PHI premiums are for all the examined periods totally regressive confirming thus previous studies.

In addition, Figueras et al. (2004) note that in the SHI systems the overall health financing appears to be more regressive than the northern tax-financed European countries. In countries where private expenditures constitute major source of health financing, as the USA and Switzerland, PHI institution and OOP payments tend to be highly regressive (Bilger, 2008). Especially, for Switzerland, a recent study by Crivelli and Salari (2014) gives evidence that even the mandatory health insurance is inequitable ($\pi_{\kappa} = -0{,}23$), contributing thus remarkably to the national health financing regressivity ($\pi_{\kappa} = -0{,}09$).

Smith (2010), using household survey data from 1987 to 2005, demonstrates that Irish OOP health spending is always regressive for the examined period. For Hungary, Baji et al. (2012) measure the progressivity of households private health spending for a four year period (2005-2008) and indicate that all the components of OOP spending (formal and informal) are regressive with a negative Kakwani index ($\pi_{\kappa} = -0{,}22$). Sanwald and Theurl (2015) focus on the effect of OOP health spending on households income distribution and provide insights that total OOP payments as well their disaggregate components are regressive, indicating that the better-off Austrian population spends relatively less on OOP expenditures for healthcare than the worse-off. Quintal and Lopes (2016) using national household survey data from 2010-2011 estimate that OOP payments are regressive and voluntary PHI is a progressive source for health financing in Portugal.

3.3.2 African and Middle Eastern Region

Investigating the equity of health system financing in Ghana, South Africa and Tanzania, Mills et al. (2012) find that OOP payments in all three countries are regressive. The overall health care financing for each country is equitable due to the high degree of progressivity of direct taxation for healthcare. Additionally, Akazili et al. (2012) estimate the Ghanaian total health financing as progressive confirming that equity holds because of the progressivity of direct taxation ($\pi_{\kappa} = 0{,}18$), indirect taxation ($\pi_{\kappa} = 0{,}03$) and national health insurance ($\pi_{\kappa} = 0{,}12$), although OOP spending which corresponds to 45% of total healthcare funding is regressive ($\pi_{\kappa} = -0{,}09$). Confirmation of OOP payments regressivity ($\pi_{\kappa} = -0{,}08$) in Tanzania is also provided by Mtei et al. (2012). Total taxation and public health insurance are progressive means of financing with ($\pi_{\kappa} = 0{,}18$) and ($\pi_{\kappa} = 0{,}28$) respectively. Additionally, Onwujekwe et al. (2014) estimate a negative Kakwani index for OOP payments in Nigeria ($\pi_{\kappa} = -0{,}18$) demonstrating that the worse-off population pay disproportionally more for health care services than its share of ATP. Similarly, in Kenya, Munge and Briggs (2013) find that OOP payments are regressive with a negative Kakwani value ($\pi_{\kappa} = -0{,}31$) and indicate that the Kenyan health care financing system is regressive because of the remarkable (almost 50%) reliance of total health expenditures on OOP spending. Ataguba and McIntyre (2012) and Ataguba (2016) indicate that the total health care financing for South Africa is progressive since the main components of health financing are progressive (personal and corporate income taxation, private health insurance) whilst indirect taxation and OOP payments are regressive.

3.3.3 Asia and Pacific Region

In Australia, the distribution of OOP payments over 40 years is regressive, while the rest health financing sources, general taxation and health payments to Medicare (SHI) are always progressive (Hajizadeh et al., 2014; Lairson et al., 1995). The regressivity of OOP payments is also presented in Palestine, since OOP spending is the greatest financing source of total national health spending and state health insurance covers only the one third of population (Abu-Zaineh et al., 2008). Although, OOP payments and PHI appear regressive in Thailand the overall health financing is progressive due to the taxation high degree of progressivity (Limwattananon et al., 2011).

The findings of a study in Malaysia reveal that its tax-financed health system is progressive because direct taxation, OOP payments and SHI contributions are also progressive (Yu et al., 2008). For a Chinese province in 2002 and 2007, Chen et al. (2012) estimate negative

Kakwani indices for general taxation, different distributions for public health insurance (positive in urban and negative for rural areas), whilst OOP payments both for the two time points are progressive. They conclude that OOP payments are progressive but not equitable since poor socioeconomic groups cannot afford to spend for treatment and consequently to record private health expenses.

In India, where OOP spending corresponds almost to 70% of total health expenditures, OOP payments are paradoxically progressive (Garg and Karan, 2009). Nevertheless, the Indian health system is characterized by high financing inequity since the excessive level of OOP payments expose the whole population, irrespectively of its ATP, to cope privately with healthcare cost (Selvaraj and Karan 2009). Complementarily, Roy and Howard (2007) ascertain that Indian hospitalized patients, with greater ATP contribute more on OOP spending. Nonetheless, they conclude that the vertical equity in financing for inpatient treatment in India is rather counterintuitive, since the almost inexistent SHI in India leads better-off to finance hospitalization expenses throughout OOP payments and deprives healthcare for the poorer. In developed Asian economies, like Japanese, South Korean and Taiwanese, which somehow simulate European SHI systems, the overall health financing is regressive in contrast to OOP spending (O'Donnell et al., 2008). The latter scholars estimate positive Kakwani indices for OOP payments in Bangladesh, Indonesia, Kyrgyz Republic, Nepal, Philippines, Sri Lanka and Thailand, substantiating that in low and lower-middle income Asian countries the poor income strata forgo health care due to OOP spending. Identically, in Bangladesh, Sri Lanka and Thailand the overall health financing is progressive despite the fact that OOP spending is the major source of total health funding, indicating in this way poor income groups abstention from healthcare services (Van Doorslaer et al., 2006).

3.3.4 Latin America Region

Makinen et al. (2000) find that in Guatemala the better-off contribute proportionally more for health care relatively to their financial resources than the poorer population and in contrast in Paraguay vertical financing inequity holds, since the wealthier households tend to spend less than their ATP. In Ecuador the overall health financing is regressive due the regressivity of SHI, indirect taxation and OOP payments. (Suárez-Berenguela, 2000).

For Colombia, Castano et al. (2002) use as proxy to households ATP cash income, and estimate negative OOP payments Kakwani indices from 1984 ($\pi_{\kappa} = -0{,}13$) to 1997 ($\pi_{\kappa} = -0{,}35$) indicating that OOP spending tends to be even more regressive over the years. They estimate the same indices using households total expenses and show rather different results; 1984 ($\pi_{\kappa} = -0{,}0092$) to 1997 ($\pi_{\kappa} = 0{,}0026$) not precisely concluding for the equity in the

Colombian healthcare financing. Also, in another Latin America country, Brazil, Ugá and Santos (2007) demonstrate a marginally regressivity for the overall health system financing which is mainly driven by the great regressivity degrees of OOP payments and indirect taxation. The Brazilian worse-off contribute proportionally more than the better-off segments of the population for health care because of the high share of OOP spending to total health expenditures. Although, the progressivity of mandatory SHI and voluntary PHI the Brazilian health system stimulates the inequity in health financing due to its remarkable reliance on OOP payments.

3.4 Literature review on health financing and macroeconomy

Indisputably, most of the European economies were affected by the 2007-2008 financial crisis. Nonetheless, the current crisis had resulted in deep recession and economic resources stringency for several countries in the Euroland area. Some of them proceeded on remarkable declines of public expenditure to offset their fiscal weaknesses (*i.e.* GDP fall, high deficits and debt), indicating in this way that the economic shocks on general government spending has a pro-cyclical impact; public expenditure for social welfare deterministically follows the national income (GDP) route (Thomson et al., 2014). The economic theory suggests that economic shocks have a great negative impact on health system performance, since they confine state resources for healthcare activities (Mladovsky et al., 2012). Thomson et al. (2014:2-4) very aptly state that government health funding constraints under fiscal pressure bring out benefits cuts and higher official cost sharing for health consumers, resulting in increases of OOP spending and, hence, undermining health systems objective; population financial protection against medical expenses.

In several European and OECD countries the share of OOP spending to THE noted significant downturns from 1960 to 2010 as a result of the expanding public and private pre-payment insurance mechanisms (Fan and Savedoff, 2012). However, for other European and OECD countries the high level of OOP expenditures to THE has always been a major issue in their health care systems (WHO, 2015). A published empirical study advocates that government health expenditure and OOP spending for healthcare follow different paths and proposes that countries should be encouraged to increase governmental health spending in order to reduce the reliance on OOP payments in health care financing (Xu et al., 2011:15). According to Fan and Savedoff (2012:19), OOP payments share to THE is influenced strongly by a country fiscal capacity to increase general government spending as a share to national income, indicating that the variation of OOP spending is mainly determined by political and governmental actions. Furthermore, Jowett et al. (2015:57) note that OOP expenditure share to THE tends to be declined if public health spending to GDP accounts for an adequate level.

The recent financial crisis has posed large economic shocks both to national economies (GDP falls, rising debts, high deficits, high unemployment rates, low tax revenues) and households (falling incomes, greater indebtedness, job losses, financial insecurity) across European and OECD countries (Cylus and Pearson, 2015; Lane, 2012). Governments usual response in times of economic stringency is to implement significant cuts in public healthcare spending (e.g. in the form of rising formal patient cost sharing; and thus rising OOP spending) in order to offset the large economic shocks (De Belvis et al., 2012; Mladovsky et al., 2012). Cylus et al. (2012), using the 2011 OECD Health Data for 24 European countries from 1972 to 2010, indicate that patient cost sharing, which represents OOP healthcare spending, is associated with −1.5% to −3.4% decline in per capita public health expenditure for every 1% point increase in the OOP payments share of THE. In addition, the findings of a cross-national analysis of healthcare expenditures changes in 27 European countries from 1995 to 2011, give evidence that countries high levels of public debt as a fraction of GDP over the years and the greater exposure to lending from international financial institutions are significantly associated with governmental health funding cuts (Reeves et al., 2014).

Overall, it seems to appear a potential strong synergy between OOP spending, macroeconomic and health financing conditions. Austerity policies to ensure fiscal sustainability and sustain public spending in response to the financial crisis for countries such as Cyprus, Greece, Ireland, Italy, Portugal, Spain and UK should be consistent with health system fundamental goal; financial protection against OOP payments (McKee et al., 2012; Mladovsky et al., 2012). Xu et al. (2005) support the view that when the fraction of OOP expenditures to THE is less than 15%, then households indicate fewer tendency to be affected by catastrophic payments for health care. Although there is a conflict between health sector and fiscal decision policy making, concerning their different objectives respectively (raising state health funding versus country macroeconomic and fiscal stability), the great reliance on OOP payments for many EU and OECD health systems raises concerns and should be received governments attention (Goldsborough, 2007).

3.4.1 Literature review on the determinants of total health expenditure (THE)

The literature provides a rich exploration regarding the effect of macroeconomy and health financing on THE. Most studies use aggregate macroeconomic and health financing data (e.g. Xu et al., 2011) while a few use survey health expenditure data at an individual and household level (e.g. Du and Yagihashi, 2015). Previous macro-level studies suggest that several technological, institutional, socio-demographical and health financial factors (either than economic) significantly affecting health care expenditures (e.g. Cylus et al., 2012; Baltagi and Moscone, 2010; Van Elk et al., 2009; Christiansen et al., 2006; Jönsson and Eckerlund, 2003; O'Connell, 1996; Gerdtham et al., 1992a, 1992b; Hitiris and Posnett, 1992; Newhouse, 1992; Leu, 1986). Most studies, based on different econometric approaches (cross-section regressions and panel data models), conclude that national income, measured by GDP, has the most significant influence on health care expenses (e.g. Farag et al., 2012; Fan and Savedoff, 2012; Potrafke, 2010; Musgrove et al., 2002; Gerdtham and Jönsson, 2000; Roberts, 1999; Barros, 1998; Gerdtham et al., 1998; Jeong and Gunji, 1994; Newhouse, 1977; Kleiman, 1974).

Further, empirical literature provides a rich exploration regarding the impact of national income on THE, under the measuring instrument of income elasticity (Farag et al., 2012). Income elasticity determines and classifies whether health care is a luxurious (income elasticity greater than unity) or a necessary-normal good (income elasticity less than unity) depends on the percentage effect in health care spending given a percentage change in income (Di Matteo, 2003). Early empirical studies, based on cross-section regressions, show income elasticity above unity, representing that health care is a luxury good. A 1% increase in GDP is associated with an increase of around 1.15% to 1.5% of THE (e.g. Gerdtham et al., 1992a;1992b; Musgrove et al., 2002; Leu, 1986; Newhouse, 1977; Kleiman, 1974). Contrary, the results of more recent studies based on panel data methodology, advocate that health care is income inelastic (estimates much less than unity; 0.5 to 0.8) and thus a necessity good (e.g. Samadi and Rad, 2013; Fan and Savedoff, 2012; Martin et al., 2011; Xu et al., 2011; Baltagi and Moscone, 2010; Freeman, 2003; Gerdtham et al., 1998).

3.4.2 Literature review on the determinants of out of pocket (OOP) expenditure

Although the majority of the empirical literature has investigated the potential impact of several determinants on THE, little evidence exists concerning the responsiveness of OOP payments by various factors (Fan and Savedoff, 2012; Xu et al., 2011; Clemente et al., 2004; Musgrove et al., 2002). Linear regressions, co-integration approach, static and dynamic model methodology have been used by the previous authors in order to analyze OOP payments responsiveness.

Musgrove et al. (2002) using national health accounts estimates for 191 WHO’s countries for the year 1997, examine through simple comparisons and linear regression analyses, among other, the impact of GDP per capita separately on OOP spending and public health expenditure as a percentage of THE. They find that GDP per capita has a significant negative impact on OOP expenditures to THE and a significant positive to public health spending as percentage to THE. Additionally, Clemente et al. (2004) examine private health expenditures responsiveness to GDP per capita for 22 OECD countries during the period 1960-1997. They present elasticity higher than unity, indicating for private medical consumption a luxurious good behavior. Xu et al. (2011) use GDP per capita, government expenditure, General Government Health Expenditure (GGHE) in absolute values, age structures, disease patterns, health system funding-characteristics, external financing and time as explanatory variables, to examine their effects on OOP expenditures for 143 countries from 1995 to 2008. They present that GDP raise leads to increases in OOP spending. Fan and Savedoff (2012), using a dataset for 126 countries from 1995 to 2009, analyze the possible impact of 4 explanatory variables; per capita GDP, time, government expenditure and the proportion of population over 60 years old, on OOP spending. National income was not identified as a significant influential factor on OOP expenditures as a share to THE by Fan and Savedoff (2012). Keegan et al. (2013) test the responsiveness of OOP payments to macroeconomy. They proceed to the construction of a pioneering recession severity index for the EU (27) countries plus Norway and Turkey, during the period 2007-2009, using as macroeconomic conditions the real growth rate of GDP, unemployment rate and governmental debt. They concluded that OOP expenditures growth rate did not importantly appear to be influenced by the GDP, general governmental debt (GGD/GDP) and unemployment rate. From another perspective, Du and Yagihashi (2015) combine micro-level socio-economic data and a set of 4 macroeconomic conditions (unemployment rate, tax revenue per capita, wage per health worker and state housing price index) to study how all these parameters affect US households and individuals' OOP payments. They provide evidence that unemployment rate has a clearly negative influence on OOP payments. Gerdtham and Jönsson (2000) find that the unemployment rate has an insignificant effect on health expenditures by reviewing the literature until 1998.

Existing studies disregarded the PHI financing as explanatory factor of OOP spending. Palaşcă and Enea (2014) use the PHI financing to THE as a potential regressor and conclude that it has an inverse effect on OOP payments to THE for 23 European countries for the period 2007-2011. However, the main limitation of their study was the determination and calculation of the PHI financing to THE as an explanatory variable. They further define as PHI financing to THE, the difference between the total percentage of private health expenditure (PvtHE) and the percentage of OOP spending to total PvtHE[51], rather than the classical indicator of WHO; PHI expenditure as a proportion (%) of THE. Moreover, Palaşcă and Enea (2014) do not take into consideration that the residual of PvtHE also contains either of OOP or PHI funding, financial resources from non-profit institutions, medical savings accounts, mutual health insurance and external funds (any donor funding) mechanisms (Fan and Savedoff, 2012).

Despite the fact that macroeconomic factors' selection "*requires a certain amount of subjectivity*" (Keegan et al., 2013:149), the empirical literature lacks evidence, about the potential impact of PHI funding on OOP payments as a fraction of THE combined with the effect of other possible macroeconomic and health financing conditions. To sum up, this study contributes to the existing literature by accessing also the effect of PHI funding on OOP spending and filling; hence, the previously described literature gap as it is pointed out in Chapter 1 (see section 1.3).

3.5 A short current overview of the health system financing across European and OECD countries

The aftermath of the recent economic crisis had a severe effect on the public finances of several European countries and inevitably on their health systems efficiency (Karanikolos et al., 2013; Kentikelenis et al., 2011). The responses to the crisis across European and OECD economies varied in magnitude. The implemented reforms were more intense for Greek, Irish and Portuguese health system (McKee et al., 2012). These countries proceeded on a part of severe measurements to restructure their high levels of debt and deficits, under the fiscal monitoring of external financial institutions because of their granted financial assistance (Stand-By Arrangements (SBA) and Extended Fund Facilities (EFF)) (Pereirinha and Murteira, 2016, Nolan et al., 2015; Reeves et al., 2014).

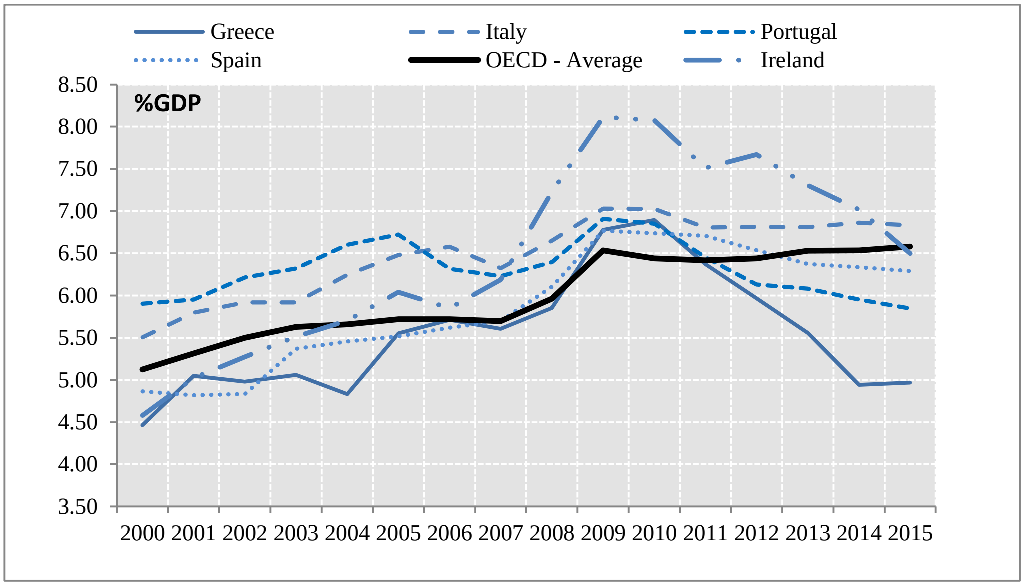
Greece was bailed out by the international community in 2010, and therefore, had to adopt strict fiscal austerity in general government expenditures including healthcare budgetary reductions (Kentikelenis et al., 2014). Similarly, Portugal entered into the Memorandum of Understanding (MoU) in 2011 with the European Commission (EC), ECB and IMF and inevitably adopted strict governmental measures, including state health funding, to offset its fiscal weaknesses (Pereirinha and Murteira, 2016). In the same direction, Ireland implemented remarkable cuts to its public healthcare budgets (Nolan et al., 2015).

[51] More specifically they use the formula $PRIV_t^i = 100 - OOPpriv_t^i$ (Palaşcă and Enea, 2014:81)

Especially for Greece, the lending agreement was tough enough since it included an explicit commitment to decline public health spending (Jowett et al., 2015). The severe political responses in public health budgets negatively affected the Greek national health system, burdening even more its productive performance (e.g. long waiting times, low amenities standards, limited medical supplies and drug shortage in public health providers, limited accessibility to health care due to high formal and informal OOP spending) (Ifanti et al., 2013; Kaitelidou et al., 2013; Siskou et al., 2008). In particular, the health system of Greece was significantly affected by its creditors' (EC, ECB and IMF) rigorous conditionality reforms with adverse effects on, public and private health care financing and, consequently, on population health (Karanikolos et al., 2013; Kentikelenis and Papanicolas, 2011). Particularly, the external creditors of Greece for the year 2012 required a stabilization of THE at 9% and a decline of public health spending to less than 6% of GDP respectively (see Figure 3.1) (OECD, 2015; Economou et al., 2014). This indicator reached the 5.97% and 4.97% of GDP in 2012 and 2015, respectively; that is, much lower than the OECD average, *i.e.* 6.44% and 6.58% for the same years (OECD, 2017a).

Similar patterns are also identified in Ireland, Portugal but also in countries without external institutions monitoring like Italy and Spain (see Figure 3.1). For these countries as well as for Cyprus, Slovenia and the UK, public spending followed a pro-cyclical pattern, decreasing as the economy slowed down. Overall, all of them met significant contraction on their government health expenditure in response to the current financial crisis and the necessity to reduce public deficits (OECD, 2016; Augusto, 2012; Barros, 2012; De Belvis et al., 2012; McKee et al., 2012).

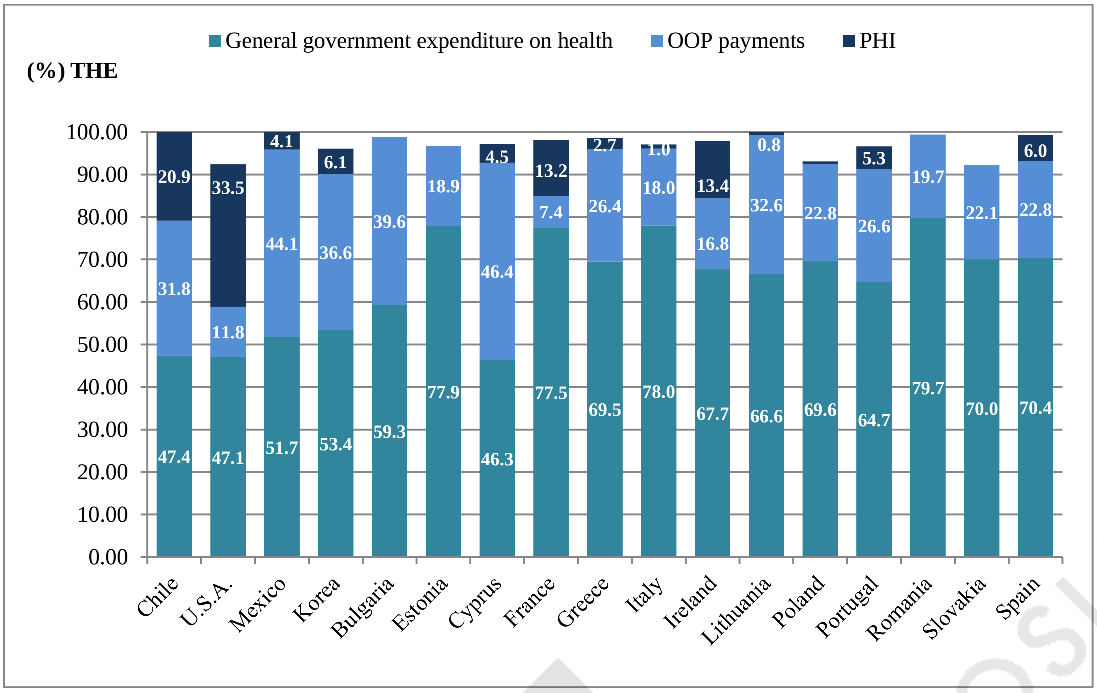
Figure 3.1: Public health expenditure as a share (%) of GDP for selected OECD countries, from 2000 to 2015



1. Funds for public health financing are allocated from government schemes and compulsory contributory health care financing schemes. (http://stats.oecd.org/Index.aspx?DataSetCode=SHA#).
Source: OECD (2017a) Health Expenditure and Financing Database (http://stats.oecd.org/#). Authors' calculations based on OECD health statistics and expenditure data (OECD, 2017a). Data extracted on 15 May 2017 from OECD.Stat

The OOP expenditures in Greece reached in 2013 26.39% of THE, considerably higher than the 18.60% average of WHO's countries (WHO, 2015). According to the WHO's database, high OOP expenditures also occurred, for the same year, in Cyprus, Italy, Portugal, Spain, Bulgaria, Estonia, Hungary, Lithuania Romania, Poland and the Slovak Republic (WHO, 2015). On the other hand, in Mexico, while the public health funding as a share to GDP has experienced significant increases since the beginning of the recent financial crisis, the OOP expenditures always approach half of THE (see Figure 3.2) (WHO, 2015; Bonilla-Chacin and Aguilera, 2013). Similarly, in South Korea and in contrast to the other OECD countries the public health financing to GDP is increased since 2008, however the OOP element, over the years, remains at high levels as a percentage of THE (WHO, 2015). In contrast, for several other European and OECD countries (e.g. USA, Japan, Austria, Belgium, Germany and the Netherlands), the government health expenditure to GDP represents upward trends since 2008, indicating that health system financing could be used as a counter-cycle policy to strengthen economy (Stuckler et al., 2009). For these countries, OOP expenditures, over the years, record low levels to THE (WHO, 2015).

Figure 3.2: Expenditure on health by type of financing for selected countries, as a share (%) of THE, 2013



1 Data by health financing agent refers as percentage to total health expenditure (THE). THE is the sum of all outlays for health maintenance, restoration or enhancement paid for in cash or supplied in kind. It includes the general government expenditure and private expenditure on health, taking also into consideration investments (capital expenditures).
2 PHI financing proportion (%) to THE is less than 0.5% for Bulgaria, Estonia, Romania and Slovakia.
3. The sum of government, OOP and PHI funding does not equal to THE, since the residual to 100% also contains non-government prepaid financing resources (e.g. non-profit institutions-NGOs) and external funding assistance.
Source: WHO (2015). National Health Accounts (NHA) indicators - Global Health Expenditure database. Available: http://apps.who.int/nha/database/ViewData/Indicators/en

On the other side, PHI financing varies considerably among EU and OECD countries[52]. For several countries, PHI represents an inconsiderable proportion to total health spending, whereas in others exhibits a significant share to THE (WHO, 2015). For example, PHI financing supplements SHI in France or provides a primary health care coverage for large segments of the population in the USA (OECD, 2015). Although the rate of growth for PHI to THE was lower post to the 2008 crisis compared with this of 2002-2007, for Ireland however, it recorded a remarkable increase (from 8.12% in 2008 to 13.35% in 2013) indicating the fall of public health spending (Thomson, 2015). In contrast, in Chile PHI demonstrates a sizeable share to THE, while the corresponding OOP payments share is diachronically extremely high (see Figure 3.2).

[52] In 2013 there were just seven EU countries (Croatia, France, Germany, Ireland, the Netherlands, Portugal and Slovenia) in which PHI percentage share exceeded the 5% of THE. The PHI fraction to THE was also greater than 5% in the non E.U. region countries (rest OECD countries); Australia, Canada, Chile, USA, Israel and Republic of Korea (WHO, 2015).

3.6 Conclusions

We notice, by reviewing the literature, that while a substantial number of published studies has examined financial catastrophe due to OOP healthcare payments, most of them focus on developing countries (e.g. in Asia, Africa and Latin America region). Little evidence exists about the financial burden or even the catastrophic effect of OOP spending in high-income and developed economies and particularly post to the 2008 financial crisis period. However, the recession severity and the over the years fiscal weaknesses for the most heavily affected by the financial crisis OECD countries create financial stringency to public health budgets, complicating even more the state health financing and as a result the efficient national or SHI coverage against OOP spending (Goranititis et al., 2014; Karanikolos et al., 2013).

Nevertheless, OOP payments and their financial consequences raise concerns for households wellbeing and living standards, irrespective of country income classification. OOP payments can make households to face financial catastrophe both in high-income countries with well-developed health insurance arrangements and developing economies with elementary national health systems. Obviously, the problem is more severe in low and lower middle-income countries, since their health financing systems are over-reliant on OOP payments. Evidence advocates that substantial proportions of households in most low and lower middle-income countries around the world incur high or even catastrophic OOP spending. The main driver of CHE in these countries are households financial inability to cope with private medical expenses and to arrange insurance coverage, since everything else beyond population subsistence needs seems unnecessary. Further, the insufficient public health spending to promote UHC and thus financial protection against high OOP spending magnifies even more the problem for the developing economies. But beyond any doubt the expansion of national or public health insurance in a handful of developing countries (e.g. Thailand and Vietnam) suggests that the increasing of government health financing resources can have a countervailing effect on OOP payments (e.g. Hsu et al., 2017). The paradoxical finding of the majority of the published studies for low-income countries, that the richer segments of population present a higher inclination to proceed on CHE compared to the poorer, indicates that the latter prefer to abstain from treatment rather than to face medical expenses from healthcare utilization (Preker et al., 2002).

Furthermore, it can be noticed that there is limited empirical evidence concerning the effect of voluntary PHI on OOP payments for the developed economies of European and OECD group. This empirical evidence provides a rich variation for the impact of PHI on OOP spending among European settings, while it only addresses a limited aged group of individuals (e.g.

Paccagnella et al., 2013; Holly et al., 2005). On the other hand, two other published studies examine the effect of PHI on OOP payments at a regional level by using data prior to the outburst of the current financial crisis (Shin, 2012; Dukhan et al., 2010). There is a gap in the empirical literature regarding the impact of combining SHI and additional PHI against households medical OOP expenses for a wide range of ages by gathering data post to the financial crisis period for developed economies. According to the literature, additional PHI coverage to compulsory national health insurance displays as an offset against catastrophic OOP spending for developing countries (Piroozi et al., 2016; Rashad and Sharaf, 2015).

In high-income settings, such as the EU and OECD area, OOP spending is a regressive form of health financing, revealing that the health funding contribution by the poor is greater than their share of ATP (Crivelli and Salari, 2014). When health systems are designed and structured on a SHI basis, they appear more regressive than the tax-funded health systems (Figueras et al., 2004). On the other hand PHI is also a regressive form of health financing, since the subscribing premiums for PHI coverage is not associated with enrollers' income criteria (Bilger, 2008). The empirical literature suggests that in low and lower-middle income countries OOP spending is progressive to households living standards, concluding that vertical funding equity holds for this type of healthcare expenditures. In African countries the poor households contribute on OOP payments disproportionally more than their share of ATP. In contrast, in low income Asian and Pacific countries the better-off appear to financial be burdened from OOP payments, a misleading and more theoretical situation since poor population pursues to procure basic needs rather than healthcare services (Balarajan et al., 2011; O'Donnell et al., 2008).

Conclusively, although a rich body of the literature focuses on the responsiveness of THE on a number of macroeconomic and health financing drivers, the available empirical literature suggests that the effects of several macroeconomic and health financing factors on OOP expenditures is limited (e.g. Keegan et al., 2013; Fan and Savedoff, 2012; Xu et al., 2011; Clemente et al., 2004; Musgrove et al., 2002). Additionally, existing empirical evidence disregarded the PHI financing impact on OOP spending, while to the best of our knowledge only two previous studies (e.g. Palaşcă and Enea, 2014; Shin, 2012) examine PHI factor associated with OOP expenditure based on pane data analysis; the first one with one main limitation on defining the PHI regressor, while the second one provides findings only for one setting.

Chapter 4

Research Methodology

Introduction

We aim on this chapter to introduce the reader to our selected research philosophy approach, as well as to present the employed research methodology of this study.

At the beginning, we explain our selection on positivism philosophy for examining external reality, while we also consider crucial to present its philosophical foundations in relation with our research direction to conclusive remarks. In turn, we discuss our research approach position, as well as, we present and analyze its main categories in accordance with our study; our implemented non-empirical and empirical approach. Afterwards, we describe our research design framework and we thoroughly make reference concerning our research standpoint on cross-sectional survey, the desired gathered research data and our employed sampling strategy. Further, we justify why we implemented to carry out this thesis under a non-probability sampling strategy and why we considered suitable to collect primary data throughout a research instrument, like the interviewed administrated structured questionnaire. Finally, we present the employed data analysis methodology for generating findings and our overall administration of ethical issues for searching sensitive and illegal data for OOP spending.

4.1 Research philosophy

Saunders et al. (2007) indicate that some researchers argue that data for research, which is collected by the external reality of the researcher, is less vulnerable to bias and therefore more objective. Also, they argue that if someone studies social phenomena then it is more preferable to illustrate them in a statistical way rather than a narrative form, a view that many researchers dispute.

Furthermore, Eriksson and Kovalainen (2008) report as objective epistemology the essential presumption that the world is external and neutral from theories, while on the other side the subjective epistemology deprives from researcher the right to entrance on the external world apart from his/her own beliefs and observations. Based on our study central research aim, it was primarily considered crucial for us to select the appropriate blueprint from the initial design to our final conclusions, in order to conduct the current study in an effectively research approach (Johnson and Christensen, 2005). This process is described as research philosophy (Saunders et al., 2007) or research paradigm (Cohen et al., 2007).

Research philosophy can be defined as the development of the research background, research knowledge and its nature (Saunders et al., 2007). Cohen et al. (2007) state that research paradigm is the broad framework of a research, while Denzin & Lincoln (2003) attributed it as the interpretive one, which includes the perception, beliefs and understanding of several theories and practices that are used in order a research to be conducted. The truth is that the selection of a research philosophy or paradigm plays a catalytic role on research process, since it is researcher's integration guide for examining on the correlation of his/her research aim, objectives and hypotheses.

For this study we strongly believe that the suitable research key paradigm to conduct our research is the classical approach of positivism, excluding alternatives, such as the interpretivism, pragmatism and realism. Positivism research philosophy is based on the principle that knowledge is gained by quantifiable observable social reality phenomena that researchers have to collect and interpret through statistical objective procedures in order to present generalized findings (Collins, 2010). Further, Saunders et al. (2009) note that only observable phenomena can generate credible data and are able to drive researchers to develop hypotheses in order to accept or reject them.

According to Grix (2002:68), the starting post of any research action is researchers to primarily meet the Ontology, Epistemology and Methodology trinity before implementing any research design or methodology for meeting their objectives.

Particularly, we focused on collecting quantitative data (survey) from a large insured population sample and secondary sources (previous published work, online statistical databases) in order to obtain results and conclusions with the help of econometrical methods and hence to test our research formulated hypotheses, which were derived by the literature review (Gill and Johnson 2010). In this way the basic principles of the positivism like justification, reliability and validity were satisfied through the direct empirically examination (quantitative methods) on real events for hospital health care in private sector and secondary data from organizations online databases.

This research was based on the philosophical foundations of positivism which are given below and presented in Figure 4.1:

- The ontological position, in which researchers argue that data for research which is collected by the external reality of the researcher is less vulnerable to bias and therefore more objective (Saunders et al., 2007). We abided with the essential presumption (Eriksson and Kovalainen, 2008) that the world is external, neutral from theories and independent of "social actors" (Saunders et al., 2009:119).
- The epistemological position, where the positivism imposes to the researcher in order to discover exactly what happens in social external reality to concentrate on observable facts for examining credible figures, to look for causality and fundamental laws of generalization and to reduce phenomena to simplest elements (Hatch & Cunliffe, 2006; Easterby-Smith et al., 1991). Several research methodology authors have described the main elements of the epistemological position of positivism which is totally well fitted with this study (Easterby-Smith et al, 1991; Blaikie, 2000; Denzin & Lincoln, 2000; Saunders et al., 2009). The research through the compliance with the rule of objectivism, which is imposed by the value-free way of undertaking this project, is totally associated with the concept of positivism (Saunders et al., 2007). Crowther and Lancaster (2012) state that researchers who choose to follow the principles of positivism have to adopt the deductive research approach, because they inevitably should focus on real facts.
- The axiological position, in which researchers should not influence at all the procedure of collection and evaluation of data, based on the axiology principle of positivists that the researcher remains an independent and objective analyst of the external social phenomena, mainly focuses on the achievement of his/her research aim and objectives through reliable results (Saunders et al., 2009).

Figure 4.1: The philosophical foundations of positivism

Source: Authors' interpretation inspired by Saunders et al. (2009) and Grix (2002).

4.2 Research Approach

The important question that needs to be answered by someone conducting a research in social sciences is which research approach is considered as the most appropriate for examining his/her research objectives with an efficient way. By following the appropriate research philosophy the selection of a research approach also represents an important part for the researcher. This imposes to him/her to be aligned with the most suitable process for the research. Research can be approached through two main axes, a non – empirical and an empirical approach, without excluding the conciliation both of them when required by the needs of the research. The methodological approach that we used to meet our research hypotheses is the combination of the elements both of the non – empirical and the empirical research guidelines.

4.2.1 Non-Empirical Research

Undoubtedly, the first issue that had to be resolved in the conduct of our research was the management of existing knowledge, which has been provided in the particular area of health economics and finance science by other researchers. The non-empirical research is not based on obtained data or evidence (primary data) by the external world of researcher, is more abstract and theoretical and represents a procedure of generating knowledge through conceptual or mathematical (analytical modeling) reasoning, without any interference from observed phenomena (Mouton, 2001). A research via the non – empirical approach consists of the location, review, comparison and exploration of the existing literature (previous published research and academic theories from referred journals, conference papers, books, theses etc.) and is based more on secondary data which have been obtained by other researchers. The significance of any research is inevitably related to the research of other people. All the researchers thus, need to demonstrate that they understand the context of their research and specific theories, concepts and ideas, as well as, the major issues and debates on the topic of research (Saunders & Rojon, 2011). The previous authors also state that a detailed understanding of previous research associated with an examined research is an important factor for the quality of the study and this it is usually achieved by a critical review of the existing literature, which it comprises the following main attributes:

1. The presentation of the most relevant, significant previous and up to date research in order to show the relevance to the examined subject.
2. The discussion and evaluation of the existing research in order to give the strengths and weaknesses and to provide arguments if necessary with previous studies.
3. The identification of recognized experts in specific science.
4. The consideration and discussion of research that supports and opposes your thoughts.
5. The referencing of all sources analytically in order to facilitate the readers of the project to find easily the bibliographic references.

4.2.2 Empirical Research

The empirical research method is a class of research methods in which the researcher searches from the outside world empirical observations or data from real experiences, in order to answer specific research questions of his/her survey. Usually, its basic principle is the attempt of the researcher to provide answers about what really happens in the external world which he/she examines. The main purpose of the empirical research approach is to be tested or possibly to be improved by the researcher the existing theory in his/her research field (Easterby-Smith et al., 1991; Hussey and Hussey, 1997). In this study via the empirical research approach our main purpose was the collection of data of real events in order to test our research hypotheses. Regarding health financing research area, this approach facilitated us to separate existing knowledge from actual cost experience in hospitalization events in private hospitals.

The employed empirical research approach was based on three pillars as given and explained below:

- Deductive approach.
- Objective approach.
- Quantitative approach.

Deductive approach

The deductive research approach implies the testing of conceptual and theoretical basis by the empirical observation and is directly associated with the positivism paradigm (Hussey and Hussey, 1997). The general concept of deductive research is the researcher's passage from the general to the particular. As Snieder & Larner (2009) state, in this kind of research approach the researcher tests his/her initial hypotheses (acceptance or rejection) through the results of his/her analytical methods (statistical, econometrical methods), since he/she firstly has been attempted to gather a large number of data (quantitative) through observation (Gill and Johnson 2010). According, to Trochim (2011) the route that must be followed by the researcher, who uses this approach, is the development of theory, establishment of hypotheses, collection of data and figures through observation and the confirmation or not of the theory. The objective of our study was to examine the impact of crucial health funding variables, such as SHI and PHI on OOP payments through the examination of insured real inpatient events in order to test the our research hypotheses via a micro-data approach. Further, we also aimed to investigate the responsiveness of OOP expenditure to several macroeconomic and health funding parameters at a macro-level approach. In turn, we had to propose a general implementation of a new mixed health insurance model (compulsory SHI supplemented by voluntary PHI) in hospitalization healthcare against insured OOP health payments, based on our findings.

Objective Approach

An important benchmark that researchers should seriously consider in conducting their survey is their position of influence on it. Should it remain therefore independent and objective or purely subjective on their results outcome? Based on Easterby-Smith et al. (1991) and Hussey and Hussey (1997) the observation of a phenomenon cannot be seen separately from researcher's idiosyncrasy, but the coupling between them should be maintained in order to achieve the problem understanding by presenting explanations and answers on it. Subjectivists believe that the research of social science phenomena requires the active involvement of the researchers, in such a degree as to be able to provide answers about the meaning of the examined facts, rather than remain strictly adhering to their mathematical approach (measurement, classification, interaction, customization and modeling). However, we retained independent and with no influence of our research outcomes, totally aligned with the concept of positivism. Proponents of objectivism believe that the scientific severity imposes on researchers clear abstinence of beliefs for their studies or the methods they use to reach their goals, mainly aiming on the validity of the produced outputs (Easterby-Smith et al., 1991). Their basic principle is the maintenance of researchers' independence when conducting a survey, which should be strictly focused on testing the observed effects (e.g. variables) and their operative causality in order to be able to accept or reject the assumptions that have been initially set (Saunders et al., 2003; Remenyi et al., 1998). Taking the former into consideration and using as a field of study the hospitalized events in private hospitals in this thesis, we converged on the view that a large sample size of information will lead to generalization of our results in order to test our hypotheses, which were defined by observing the phenomenon of high OOP payments for this kind of health care provision. We also believe that the allocation of these costs into sub-concept categories and their interrelationship with other variables will benefit the understanding of this health systems issue.

Quantitative approach

With the given principal aim of this thesis, a quantitative approach for the data collecting was considered as the principal design. Following several authors (Collis & Hussey, 2009; Thomas, 2003; Blaxter et al., 1996; Guba & Lincoln, 1994; Best & Khan, 1989) quantitative approach involves two basic stages: the first is the collection of data from a usually large-scale population sample and the second one is the analysis and interpretation of them. Specifically, with this approach in mind, we both adopted empirical literature computation tools and econometric analysis methods, due to the fact that the primary and secondary collected data was reflected mainly in mathematical and statistical form. Quantitative research gives particular emphasis on the quantification of gathered data. This justifies why it uses numbers and figures to examine the relationship between variables and involved survey participants characteristics. We believed that this empirical research approach was the most appropriate to test our research hypotheses, as it leads to validity and objectivity of results, throughout the use of accurate numeric data. Particularly, we primarily had to identify and present in numeric form the funding arrangements (e.g. SHI, PHI, OOP payments and their categorization) of inpatient events and other socio - economic variables of hospitalized respondents (e.g. income, age, gender etc.) through a comprehensive cross-sectional survey. Secondly, we had to classify the collected data into explanatory and dependent variables in order to examine and interpret their possible relationship and test in this way our research hypotheses at the micro-data level approach (Fowler, 2008). Furthermore, the adoption of secondary data from on-line statistics databases facilitated us to test our hypothesis concerning the impact of several macroeconomic and health financing conditions on OOP payments at a macro-data level approach.

4.3 Research Design

Without a doubt, the basic design of a research shall be determined by its topic and purpose. This has to include the selection of the most appropriate method for the structure of quantitative research, in order the researcher to be able to test his/her hypotheses, which determine the type of data and therefore their collection and analysis (Saunders et al., 2009; Berry and Otley 2004; De Vaus, 2001). De Vaus (2001:9) characterizes the research design as the work plan similar with the blueprints of civil engineering and also refers that "*the function of a research design is to ensure that the evidence obtained enables us to answer the initial question as unambiguously as possible*". Similarly, Greener (2008) defines research design as the grand plan approach to a research topic. He also considers that the designing of a research constitutes a vital procedure, since all these affect what the business researcher has to do in order to meet his/her research questions. Furthermore, Zohrabi (2011:1) refers to research design as "*a skeleton which supports the different parts of the research*" and splits its concept into two stages. The first stage is its determination, based on the research problem that should be examined and the second one is its selection, which is based on research questions and objectives. He continues that researcher's choice of an appropriate research design is a crucial mechanism of a research process. According to many research methodologists, research design encompasses various alternative options for a researcher in order to test his/her hypotheses and meet the objectives of a study (Yin, 2012; Saunders et al, 2009; Bryman & Bell, 2007; Hussey & Hussey, 1997). Experiment, survey, grounded theory, ethnography, action research, cases studies and operational research are basic research strategies, whereas all of them depend on the research problem and questions that the researcher has to answer.

4.3.1 Survey Design

We believe that the research design that most closely matches our research is that, which its dominant features are the collection of large volume of data (e.g. via questionnaires-interviews, and secondary data as well) and the quantitative analysis of it. The main feature of this strategy is that research is a descriptive approach rather than an experimental method, such as that natural sciences use. The advantages of the survey design are flexibility, efficiency, and generalizability. All these lead several health economists to use survey design rather than other alternative strategies (e.g. Van Minh et al., 2013; Siskou et al., 2008; Xu et al., 2003). Regarding the specific topic of OOP payments and health insurance funding, the majority of the published studies is based on surveys, since they provide flexibility and efficiency for the collection of executive data (e.g. Paccagnella et al., 2013; Saksena et al., 2010). Further, when a health financing research aims to generalize its findings, survey design offers the possibility of a representative and comparable sample to a larger population. When the researchers desire to collect data on phenomena of their external environment, which are difficult to be observed directly, this research strategy is presented as the most useful and necessary tool for achieving this goal. Rea & Parker (2012) mention that when researchers require personal information not recorded elsewhere, and if generalization of the findings to a larger population based on the investigation of a smaller sample, survey strategy is the most appropriate method. Furthermore, Fowler (2008:3-4) state that "*there are, in addition numerous facts about the behaviors and situations of people that can be obtained only by asking a sample of people about themselves*". Additionally, Yin (2009:8) refers that if the form of research question based on "*the survey of who, what, where, how many, how much*", if the "*control of behavioral event is not required*" and if the research "*focuses on contemporary events*", survey emerges as the most appropriate research strategy. Since, we aimed to investigate primary quantifiable data (formal and informal-illegal OOP payments, SHI, PHI funding, income, age, gender etc. for each one inpatient event of our target group), which was not officially recorded elsewhere, the implementation of survey research supported our position on the selection of a basic design as a grand plan in this thesis.

4.3.2 Survey design alternatives

Based on Babbie (1990) the survey design can be separated into two main categories. The first category is the cross-sectional survey or commonly known as snapshot, which is based on the principle of collecting data from a specified population at a single point in time survey (see also, Jensen and Rodgers, 2001). On the other hand, the second category represents a procedure in which the researchers use to gather data from longitudinal surveys over a period of time (multiple time points).

For this study, we undertook two cross-sectional quantitative surveys, which were focused on a specified target population group; hospitalized SHI or/and PHI insured members in affiliated private hospitals with the Greek SHI carrier. Both of them, were sampled and tested at specific time intervals (see sections 5.1.1 and 5.1.2). The advantage of a cross-sectional study design is that enables the researcher to test the relationships of different variables at the same time. In this study, variables, such as age, gender, income of insured were examined parallel to the hospitalization funding variables (SHI, PHI, OOP payments). Following, Visser et al. (2000) we believe that this type of survey fitted well with our research problem. Particularly, Visser et al. (2000:225-226) state that "*Cross-sectional surveys do offer the opportunity to assess relations between variables and differences between subgroups in a population. But although many scholars believe their value ends there, this is not the case. Cross-sectional data can be used to test causal hypotheses in a number of ways. For example, using statistical techniques such as two-stage least squares regression, it is possible to estimate the causal impact of variable A on variable B, as well as the effect of variable B on variable A.*"

4.4 Research Data Collection

According, to Saunders et al. (2009), Bryman and Bell (2007), Saunders et al. (2000) and Powell (1997) data collection methods can be categorized into two main research groups; primary and secondary data collection. Primary data collection can be achieved by various techniques, such as the use of questionnaires and interviews, either directly (face-to-face) to the participants or indirectly (by using the telephone, mail, e-mail etc.). Moreover, they support that primary data can be collected through observation (collecting data from documentation papers, record analysis or historical artifacts). Data can also come from secondary research as published organizations statistics databases or primary and secondary data from previous published work (literature review).

4.4.1 Research Data

Several health economists researchers use social, economic, demographic, health and healthcare expenditure explanatory variables in their analysis (e.g. Rezapour et al., 2016; Saito et al., 2014; Malik and Syed, 2012; Lwin et al., 2011; Sun et al., 2009; Roy and Howard, 2007; Xu et al., 2003).

In order to test our research hypotheses (as presented in section 1.5) we had to gather executive primary data in large volumes. The objective of the survey design was to collect a wide range of data for each hospitalization event, which was associated with an overview of total health expenditure for provided inpatient health services (see sections 5.1.1 and 5.2.1). Data comprised cases of individually hospitalization costs in private hospitals. Private hospital care establishments were mainly located in Athens, Thessaloniki and the region of Crete. Private health funding hospitalization data included funding arrangements, such as SHI, PHI, and OOP payments (*i.e.* direct-formal OOP spending relying on legal tax receipts and invoices and informal OOP payments relying on respondents' interviewing). Further, we succeeded in collecting data for SHI contributions and PHI premiums relying on documentation papers (pay-roll sheets) and our interviewed structured questionnaire. Moreover, data, such as insured age, gender, type of hospitalization care and annual gross income, was also gathered through our interviewed structured questionnaire.

In order to test our research hypotheses, as presented in section 1.5 (Study III) of this thesis, we adopted secondary data (as displayed in Table 5.17: section 5.3.1) from official organization online databases (e.g. WHO, World Bank).

4.4.2 Sampling

Rea and Parker (2012:3) refer that "*There is no better method of research than the sample survey process for determining, with a known level of accuracy, detailed and personal information about large populations. By combining surveys with scientific sampling, the researcher is using the only method of gaining this information to a known level of accuracy.*" According, to Bryman (2001) and Saunders et al. (2000), a basic dilemma that the researchers have to work out before starting any survey procedure, is the choice between probability and non – probability sampling of their focus population group. More specifically, Powell (1997:66-67) classifies the sampling into two main categories. The first is the probability sampling, which it comprises the "*simple or stratified random, systematic and cluster sampling processing*". The second category is the non – probability sampling, which it includes the subcategories of the "*accidental or convenience, the quota, the purposive or judgmental, the self-selected and the incomplete sampling*".

Due to the lack of a sampling frame (*i.e.* completed list of our hospitalized target population), a probability sampling method could not be used. Given the aforementioned requirements for primary data, convenience sampling (non – probability) with specific criteria for the selection of the respondents, was the most suitable option for this research. Convenience sampling is a non-probability sampling method, in which survey respondents are not randomly selected, but their active involvement in survey process is mostly determined by the researcher, accordingly to his/her research problem requirements. A convenience sample is either a collection of subjects that are easily accessible or a self-selection of individuals for participation (volunteers). Several researchers prefer this sampling technique, because it is fast, inexpensive, easy and the subjects are willingly available.

The convenience sampling facilitates us to adhere our essential criteria for the selection of the appropriate survey participants. First of all, this sampling method permitted us to consciously select respondents, who had experienced the phenomenon of hospitalization to be investigated. It is vigorously believed that this sampling option ensured the selection of participants, who had inpatient health care funding experiences to share with us. Further, the second special criterion that we had to take into serious consideration, and justified the alternative of convenience sampling, it was the selection of a sub-group of participants between them who had experienced the hospitalization event. Our survey strictly included public, private employees and pensioners in order to collect accurate and real data concerning their ability to pay (*i.e.* annual gross income). Entrepreneurs and freelancers were excluded from the desired target group of the participants, since this taxpayer group in great shares aim on tax evasion in Greece (Matsaganis et al., 2009).

Our preference on convenience sampling and the parallel rejection of a probability one, despite the fact, that is more scientifically recognized in quantitative surveys and less susceptible to bias, comes to confirm Fowler (2008:3-4). The former mentions that "*To meet the analysis needs, a special-purpose survey may be the only way to ensure that all data needed for a given analysis are available and can be related. For example, hospital discharge records invariably lack information about income. Hence a survey that collects both income and hospitalization data about people is needed in order to study the relationship between a person's income and hospitalization experience*". Thus, we conducted a special – purpose survey, which was based on convenience sampling with the aforementioned specific criteria, by also implementing the following improvements in order to control uncertainty and bias of convenience sampling technique (Skowronck & Duerr, 2009). Firstly, we had to achieve an ideal representativeness of the sample, which could accurately represent the examined population. Secondly we had to use larger samples from our target group participants. According, to Skowronck & Duerr (2009) diversity is another tool of strengthening the foible of convenience sampling. Thus, we included in our sample of participants, both genders, various socio-economic statuses, coming from various parts of the country, their hospitalization experience had been gained from private hospitals in the major urban centers in the country and their social insurance privileges were unified (*i.e.* a unique SHI carrier).

Although, the option of a non-probability sampling method was implemented, we used the equations of Cochran (1963) and Kraska-Miller (2013) respectively, to yield the minimum number of hospitalization events required, aiming to provide evidence that our sample was representative of the population we were focused on. The sample size of this research exceeded the 800 hospitalization cases, a number which strengthened the power efficiency of the survey regarding the estimated prevalence rate of hospitalization events in private hospitals (see sections 5.1.1 and 5.2.1).

4.4.3 Methods and procedures

It should be mentioned that a multi-method approach was used for the analysis. The multi-method approach for data collection has two important advantages. Firstly, it allows for using different complementary methods of evidence collection (Saunders et al., 2000). For example, the structured questionnaires were useful to give an idea about the main key issues and the quality of the research questions. Secondly, the multi-method approach provides a basis for identifying the truth. By using multiple data collection methods, the researcher is better able to distinguish true information from information with errors. Moreover, Cooper and Schindler (2006) suggest that using multiple method research approach, the researcher can understand the problem better and therefore to be leaded in a most compatible solution. Thus, it provides the grounds on which scientific triangulation can be operationalized (Saunders et al., 2000).

Adopting the triangulation approach is a valuable tool because it provides advanced quality in research, while propelling the researcher to collect information using different perspectives. Also, Saunders et al. (2007) supports the view, that dealing with a research through the triangulation approach, it provides the opportunity to the researcher to examine the validity of the collected information and data by investigating different sources. The same view is shared by Yin (1994), who states that triangulation approach intends to increase the validity, credibility, reliability and quality of the combined data (quantitative & partly qualitative in quantifiable forms). Relying on triangulation categorization by Flick (2009), we used data and methodological triangulation types. In data triangulation approach various sources of gathering data used by the researchers (primary and secondary). In methodological triangulation approach the researchers utilize a variety mix of data collecting techniques as the questionnaires, interviews, documentation papers, archival data, record analysis and observation.

In this study, we comprised primary data through an interview structured questionnaire and documentation papers observation where possible. Secondary data were collected, as we have already pointed out, from official organizational databases. Further, secondary date was analysed in association with data from literature sources (books, papers etc.). All this data was appropriately formatted for statistical processing and analysis by us, in order to present findings for testing our research hypotheses and meeting our objectives.

Our selected methodological framework was a combination both of non-empirical and empirical approach. This thesis was based on:

1. Extensive literature review of international theoretical and empirical literature. Studies, papers in journals, reports, conference proceedings, special publications, press releases, and decisions of international committees were the catalysts for the optimal theoretical overview and study of this thesis (Saunders et al., 2009). Rea & Parker (2012) refer that various data already exist in a particular area of research and these should be investigated firstly by the researchers in the research procedure, in order to shed more light in their study. Along the same lines, move Blaxter et al. (2010), who support the view that the researchers have firstly to examine existing secondary information, before any conducting attempt to gather primary data. This enables researchers to gain knowledge of what have already been developed by other scholars.

2. Primary and secondary research.

a. Secondary data included: on-line published statistics from organizations, such as the OECD, Eurostat, IMF, World Health Organization and World Bank. Secondary research is a mechanism of collecting pooled and analyzed data which exist in usable form (Rea & Parker, 2012).

b. Primary research comprised the collection of primary data from the structured questionnaire, as it has already been described previously.

4.4.3.1 Questionnaires

The questionnaire is one of the most employed data collection techniques (Saunders et al., 2000). The main goal of a researcher through the use of a questionnaire in his/her survey design is to collect information through a set of questions posed to several participants, who are suitable to answer for a particular research problem (Saunders et al., 2000; Hussey & Hussey, 1997; Nachmias and Nachmias-Frankfort, 1993). The use of the questionnaire allows the researcher to collect quantitative and qualitative data and to group it in such a way that its analysis can be easily achieved. The use of questionnaires should always has a specific purpose. This should be directly related to the objectives of the research. The questionnaires, regarding the type of their questions, can be categorized into two main groups; structured and unstructured (Oppenheim, 1992; Malhotra and Peterson, 2006). The unstructured questionnaires include mostly free answer questions that the participants have to express their thoughts and beliefs without any binding of fixed answers. On the other hand, structured questionnaires are utilized mostly in quantitative surveys, such our research project, where the desired primary data pursues numeric figures (Oppenheim, 1992). As we have already mentioned before, the collection of primary data through a questionnaire can be achieved either directly (*i.e.* face-to-face) or indirectly (*i.e.* telephone, mail, e-mail etc.). We focused on face-to-face structured questionnaires. Further, the selection of face-to-face questionnaires enables us to select the appropriate participants, who had experienced hospitalization healthcare in private hospital and declare real income data.

Questionnaire Design

To structure the questionnaire, reference was made to other questionnaires forms and some points from them were adopted (Bryman, 2001; Saunders et al., 2000; Oppenheim, 1992). A research that is mostly associated with preferably intended numeric data has to utilize the structured type of questionnaire. Our structured questionnaire focused on fixed numeric data, including thus, open questions where the respondents were required to give specific short answers on them (Fowler, 2008; Saunders et al., 2000). Several relevant questions had been utilized in order to collect data concerning OOP payments and respondents socio-economic characteristics. For example, ˙How much did you informally pay for surgeon or anesthetist fee for your inpatient care? ¨or ˙How much money did physicians request for your hospital treatment or operation? ¨(e.g. Hajizadeh and Nghiem, 2011).

Thus the questionnaire aimed to satisfy the following characteristics:

- It was consisted of a set of open questions.
- Its structure was interpreted in such a way that facilitated its completion.
- The questionnaire was as clear as possible so that the respondents had not encountered any technical difficulties and had not spent lot of time to orally answer our questions.
- Its structure enables the data processing.

In addition, in order to meet the previous describe pursued requirements and to ensure the principles of validity and reliability of the structured questionnaire design, a pilot study of 20 questionnaires was primarily conducted. Questionnaire structure and design play an important role in collecting valid and reliable primary data, because they aim to eliminate any notion of interventionism of the researcher's side in the form of questions. In this way the researcher can gain unbiased answers from the participants (Saunders et al., 2003). At the beginning of any survey, the researchers are primarily obligated to present its purpose and secondly to provide knowledge to the participants regarding the usage of their findings (Saunders et al., 2000). On the cover letter of our pilot questionnaire design (Appendix A1), the purpose of our study was briefly described. Further, we promised that all respondents' information could be anonymous and confidential. Moreover, we made the terms of the consent clear in order to encourage the participants to make comments about the structure and the clarity of questions and to give information about the researchers' identity. Contact details of one corresponding researcher (*i.e.* e-mail, telephone number) were also considered important despite the fact that the questionnaires were orally completed by researchers in accordance with respondents' answers.

As we mentioned before quantitative data (such as SHI, PHI funding, OOP, income etc.) expressed in monetary terms was collected using a structured questionnaire. The structured questionnaire was created for the current survey based on questions regarding health care financing (e.g. Souliotis et al., 2016; Balasubramanian et al., 2015; Nguyen et al., 2015; Van Minh et al., 2013; Hajizadeh and Nghiem, 2011). The research instrument was interviewer administered (Malhotra and Birks, 2007) to a "mall – intercept" convenience sample. Potential respondents were intercepted outside private hospitals and the regional departments of the social insurance fund (Lavado et al., 2013), they were screened for appropriateness and the survey instrument was administered either on the spot or in a nearby facility (Stepurko et al., 2010; Malhotra and Birks, 2007). Due to the quantitative nature of each interview, it did not take more than 15-20 minutes, as it was primarily expected.

Documentation papers

Primary data that comes from documents is a reliable collecting tool for researchers, especially when they have to also combine other research techniques (Yin, 1994).

Whenever applicable, during the interviewed completion of structure questionnaire, participants were also asked to present their related financial documents (*i.e.* documentation papers - receipts, pay-roll sheets) (Yin, 1994). The majority of the respondents were willingly to present their pay-roll sheets and medical invoices and receipts, in order to expose to us in a climate of resentment, the high incurred OOP spending despite their SHI coverage.

Documentation papers helped us to collect trustworthy primary data for official OOP payments and acquire unbiased evidence for informal payments to physicians. In the case of same surgery inpatient events, we contrast physicians fees with the issue of a legal receipt and them with not for the unrecorded informal OOP payments.

Validity and Reliability

Concerning validity, the convenience sampling regarding the desired extracted data ensures what exactly the researcher has actually to measure (Leedy et al., 1996). Also, our major aim was to present a study which was externally valid, which means to provide generalizable findings to the greater population, about the phenomenon under examination (Saunders et al., 2007). Regarding reliability, the selected data analysis tools facilitated us to present accurate and truthful outcomes avoiding thus threats like subjectivism and personal speculations (Bryman and Bell, 2003; Leedy et al., 1996).

4.5 Data Analysis

We believe that the quantitative research approach was the most appropriate to test and meet our research hypotheses and objectives respectively. As it has already been reported, the quantitative approach imposes the analysis and interpretation of data through quantitative tools, since its gathering has primarily been completed. The quantitative mechanisms of data analysis that we had to utilize in our research were:

- Descriptive Statistics: Kleinbaum et al. (2007) refer that descriptive statistics is a single numerical tool of measurement, which aims to describe a particular set of data. Descriptive statistics are useful in social sciences because, through a substantial way, help in the analysis and interpretation of collected data, especially when data reaches great volumes.
- Regression Analysis: The primary objective of many researchers is the identification and investigation of possible relationships among a group of variables (Black, 2011; Kleinbaum et al., 2007). They continue that relationship investigation of at least three variables imposes the use of multivariate or multiple regression analysis. With this in mind, we examined the relationship between total OOP payments and explanatory variables under the estimation of an ordinary least squares (OLS) regression model with a logarithmic transformation of our dependent and explanatory variables where it was necessary (e.g. Malik and Azam, 2012; Salti et al., 2010) (see sections 5.1.1 and 5.2.1).
- We use the widely accepted methods of estimating the catastrophic impact and financial equity of health funding sources (e.g. Wagstaff, 2008; Wagstaff and Van Doorslaer, 2003;

Kakwani et al., 1997) (see sections 5.1.1 and 5.2.1 associated to theory sections 2.5.1.4 and 2.5.2.1).

- Panel Data Analysis: We proceeded on panel data analysis through a random-effects and a dynamic model econometric methodology. Panel data analysis, because of the availability of new data sources by official on-line databases, enable the researchers to examine in a more complicated way the relationship of several variables throughout their econometric models rather than the employment of only single cross-sectional or time series data analysis (Hsiao, 2003) (see section 5.3.1).

Econometric analysis was conducted using the software packages EViews (Econometric Views).

Further, in order to facilitate potential readers to make comparisons or pay attention on the highest essential interest from the collected data, the use of a set of figures and indices are considered crucial issues (Saunders et al., 2000). King et al. (2000) refer that several social researchers, despite the extracted valuable information on their statistical results, failed to present quantifiable knowledge that could be enlightened more their research questions. King et al. (2000:347) believe that the results from the statistical elaborating should be presented in a "*reader-friendly manner*", which it requires no so much specialized effort for understanding.

4.6 Ethical Issues

Accordingly to ethical issues, the research had to be complied by the following ethical principles (Bryman, 2001):

- Misutilization or abuse use of the findings (Cousins and Shulha, 2006): We did not make an inappropriate use of our research findings but we persuasively used them in order to contribute to existing knowledge.
- Anonymity and Confidentiality: Due to the sensitive nature of survey, which included informal OOP payments and thus un-taxed and illegal transactions incurring state revenue losses, the interviews took place only with the consent of the participants and were treated as anonymous and confidential in order to protect the anonymity and identity of the respondents. Informants were also reminded that the interview would be treated as confidential. Especially, for the sensitive nature of informal payments on hospitalization events, the presence of the interviewer was considered necessary in order to explain to respondents "*why their being asked such a question and that their response will be handled in a confidential and proper manner*" (Malhotra and Birks,

2007:281). This was an important issue of the investigation-process, because the confidentiality and anonymity of the participants provided the researchers with more reliable views about the illegal OOP payments. The interviews facilitated us, to gain the confidence of participants to speak honestly and freely, firstly by assuring the confidentiality and anonymity of our survey and secondly by persuading them that had actively participated on a crucial topic, such the official and unofficial OOP spending.

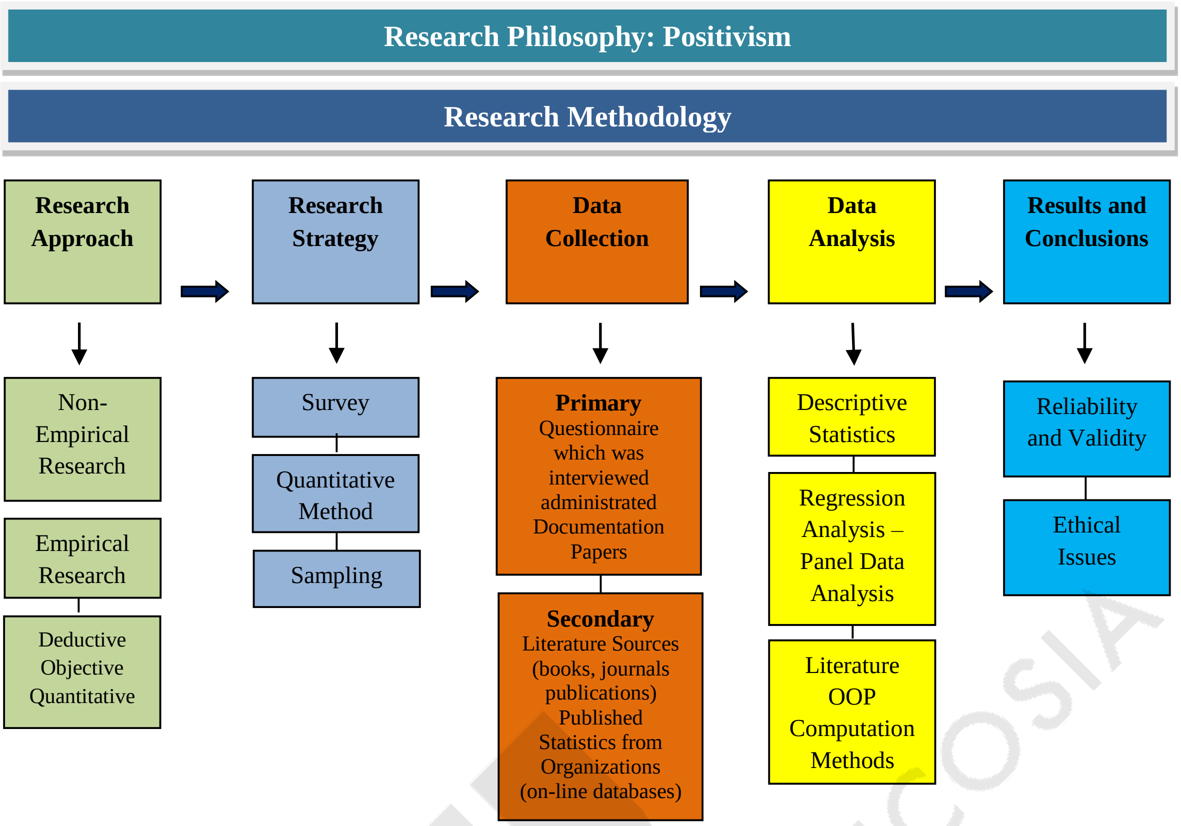
- Privacy: During the collection of primary data we were recognizing the participants' option of refusing to participate in our survey. For this reason we were not importunate, embarrassed or compulsive to elicit participants' involvement in his survey.

Sensitive topics

Informal OOP payments to health providers, respondents' income and reasons for hospitalization can be considered as sensitive personal and medical data. Due care is taken so that all data was anonymized; data was not linked to individuals (insured or health care professional) or health care organizations. Full confidentiality was promised to participants and all due care is taken for it to be achieved. Findings were used solely for academic purposes and for disseminating only generalized (SHI-PHI level) conclusions and recommendations.

Inspired by Biggam (2015:81), we illustrate on Figure 4.2 the main elements of our research, the adopted research philosophy and research methodology steps.

Figure 4.2: Research philosophy and methodology plan



Source: Biggam (2015:81).

Chapter 5

Studies

Introduction

The inadequate public, societal and PHI health financing over the years and tightening governmental health budgets associated with the prolonged recession period because of the 2008 economic crisis, result in households in several European and OECD countries to finance healthcare services through OOP expenditure.

This chapter presents three studies concerning the responsiveness of OOP expenditure to SHI and voluntary PHI financing as well as to several macroeconomic parameters. In this regard, we present three distinct studies, each one corresponding to our empirical results which are associated with our research hypotheses, as they are exhibited in section 1.5. The common feature between these studies is the impact of SHI, PHI and macroeconomic conditions on OOP payments, using both micro and macro-data level approaches for presenting evidence for the examined health financing linkage.

In the first two studies we use the same micro-data level approach methodology, to investigate the impact of SHI and PHI on OOP payments for hospitalized insured (individuals) in affiliated private providers with the unique SHI carrier in Greece. We provide empirical results on the catastrophic impact of OOP on Greek insured population, the effect of Greek SHI policy and additional PHI on OOP spending for private hospitalization and the health financing equity for hospitalization in private providers. In the third study, under the macro-data level approach, we explain the role of macroeconomic and health financing factors of influencing households OOP payments and provide empirical results on the impact of several parameters on OOP expenditure. Our focus on investigating this impact by also using panel data for several cross-sectional units and time series observations, apart from only generating findings of individual experiences at a micro-data basis, it was emerged as crucial benchmark for examining the difference between homogeneous data (panel) availability and any individual heterogeneity issue.

Very clearly, in the first study we provide evidence, by implementing the widely accepted measuring OOP catastrophic methodology and an OLS regression model that the Greek SHI does not provide efficient financial protection to its members against private sector hospital care OOP payments and that the share of health payments contributed by the poor is greater than their ability to pay. Having already ascertain the inefficiency of SHI scheme to offset the high or even catastrophic burden of OOP payments for private hospitalization care in the first study, in the second one we involve the potential impact of voluntary personal or collective PHI to compulsory SHI. Following the same computation and econometric methodology paths, like the first study, we find that SHI with additional voluntary PHI have a significant negative impact on OOP payments. In the third study, using panel data econometric analysis for 26 European and OECD countries for the period 1995-2013, we examine how OOP payments might be affected by various factors. We find that GDP growth and governmental debt have no influence on OOP spending, contrary to the unemployment rate which exhibits a significant positive one. Further, government health expenditure notes a significant negative effect on OOP spending. The crucial finding in accordance with the empirical literature gap, is that PHI financing has a negative impact on OOP expenditure, which is robust to several changes and specifications of our examined explanatory variables, country (sample) and time period variations in our static and dynamic regression modeling.

The three studies presented in this chapter fill the important gap in the literature by developing and subsequently testing a conceptual framework reflecting the effects of combining SHI and additional voluntary PHI on OOP payments both in a micro and macro-data conceptualization approach. Further, concerning the practice contribution, the findings of these research studies have an ultimate aim; to be the starting point for more effective health policy responses by policy-makers in order to ensure efficient financial protection of the population, promote financial equity and address the issue of formal and informal OOP payments on the health systems.

Study I

5.1 Out of Pocket (OOP) payments and Social Health Insurance (SHI) for private hospital care: Evidence from Greece

The Greek state has reduced their funding on health as part of broader efforts to limit the large fiscal deficits and rising debt ratios to GDP. Benefits cuts and limitations of SHI reimbursements result in substantial OOP payments in the Greek population. In this study, we examine social health insurance risk pooling mechanisms and the catastrophic impact that OOP payments may have on insured income and well-being. Using data collected from a cross sectional survey in Greece, we find that the OOP payments for inpatient care in private hospitals have a positive relationship with SHI funding. Moreover, we show that the SHI funding is inadequate to total inpatient financing. We argue that the Greek health policy makers have to give serious consideration to the perspective of a SHI system which should be supplemented by the Private Health Insurance (PHI) sector.

5.1.1 Study I Methods

Data Collection and Sampling Methodology

A cross-sectional quantitative study was conducted from December 2012 until May 2013, where 567 insured respondents hospitalized at least once in affiliated with EOPYY private hospitals during this period were contacted. The final sample included 413 hospitalization cases. The others did not agree to participate in the survey.

We implement a non-probabilistic sampling strategy in order to target a specific population which is quite difficult to be located otherwise (Bryman and Bell, 2003). Due to the lack of a sampling frame (i.e. "under the table payments" are not recorded), convenience sampling was the most suitable option in this research, which also is the usual approach in similar studies (Laokri et al., 2014; Kankeu et al., 2013; Saksena et al., 2010; Vian et al., 2006; Belli et al., 2004).

The study inclusion criteria required participants over 18 years old, public, private employees and pensioners who had experienced hospitalization in private hospitals. Entrepreneurs, farmers and freelancers were excluded from the sample due to the fact that in Greece high proportion of this taxpayer group is prone to tax evasion, typically refusing to declare real income (Koutsogeorgopoulou et al., 2014).

Quantitative data was collected using a structured questionnaire based on questions regarding health care financing and socio-economic profile of respondents (e.g. Balasubramanian et al., 2015; Souliotis et al., 2016). The research instrument was interviewer administered (Sun et al., 2009; Malhotra and Birks, 2007). Stepurko et al. (2010:10) referred that "*using mixing modes* *of data collection, specifically the introduction of a self-administrated part during a face-to-face interview, could be suitable for collecting valid data on informal patient payments*." In the spirit of Lavado et al. (2013), who support the view that the rigorous tracking of OOP payments outflows at selected validation sites (hospitals, etc.) is a good practice for measuring OOP payments, potential respondents were intercepted outside private hospitals (on the day of discharge). The later also enabled us to ask the participants as directly as we could, avoiding in such a way any human memory losses/recall bias (Lu et al., 2009) regarding OOP spending. Whenever applicable, respondents were also asked to present their related financial documents (receipts, pay-roll sheets) (Yin, 1994).

Collecting information from participants of both genders, various socio-economic statuses, coming from various parts of the country in order to obtain a countrywide sample, with hospitalization experience from private hospitals in the major urban centers in the country (Athens, Thessaloniki, Crete) additionally controlled for uncertainty and bias of convenience sampling (Skowronck and Duerr, 2009). We employ the formula of Kraska-Miller (2013:17-18) to yield the minimum number of hospitalization events required, aiming to obtain a satisfactory subset of the target population. Kraska-Miller's formula for selecting an appropriate sample size for a known population is given by:

$$SS = \frac{X^2_{(1)} * (N) * (pq)}{d^2(N-1) + X^2 * p(1-p)}$$ **Equation 5.1.1-1**

Where SS corresponds to the required sample size, $X^2_{(1)}$ is the chi-square value (3.84), N is the known number of hospitalization cases in private hospitals under EOPYY's coverage, p and q are the population proportions and d^2 is the desired degree of accuracy (0.0025). Following a public speech by the Vice President of EOPYY on Minister of Health press conference in November 2014 in Athens (Greece), 'the new SHI carrier covered 6.171 million people with insurance ability in 2013, while for the same year 440.000 cases were faced as inpatient under EOPYY coverage in a broad spectrum of affiliated private hospitals'. Therefore, the estimated prevalence of EOPYY insured hospitalization in private hospitals in 2013 was equal to 0.440/6.171=7.13%. The Kraska-Miller formula shows that, in our case, the minimum number of hospitalization observations we had to collect to gain a generalization scope of our findings was 102.

$$SS = \frac{3.84 * (440{,}000) * (0.0713 * 0.9287)}{0.0025\,(440{,}000-1) + 3.84 * 0.0713(1-0.0713)} \Leftrightarrow SS = \frac{111{,}851.52}{1{,}100.25} \Leftrightarrow SS = 101.65$$ **Equation 5.1.1-2**

Data consisted of individuals' hospitalization costs in private hospitals and respective funding arrangements, such as SHI and categorization of OOP payments. Moreover, information on age, gender, cause of hospitalization, annual gross income (AGI), employment status, place of residence and location of received inpatient care of participants was obtained. All variables employed in the study are presented in Table 5.1.

Definition of the study variable OOP payments

OOP payments include all expenses paid additionally by the users of health services and categorized on direct formal payments, formal cost sharing and informal payments (Mossialos & Thomson, 2002).

In our study, the direct formal OOP payments represent the individuals' health care payments on private hospitals and physicians with the provision of an official receipt.

Formal cost sharing is the users' cost involvement for health services both for SHI and PHI (Paccagnella et al., 2013). The Greek government, in an effort to reduce public health financing, adopted high rates of patient cost sharing and benefits cuts for inpatient health care in private hospitals. For private hospitalization, EOPYY imposes to treated patients a statutory co-insurance rate 30% or 50% on Greek Diagnosis Related Groups (DRG's) total cost depending on their former social security integration (3054/18-11-2012 Gazette of the Government). Statutory co-insurance represents OOP payments with the issue of a legal invoice by private hospitals.

Informal OOP payments are health consumers' payments to health providers in the form of gift, kind or money transactions in order for the former to ensure higher quality and faster medical care etc. in public health facilities (Lewis, 2002). As we have already pointed it out, it is common phenomenon in Greece, Eastern, Southern European and Former Soviet Union countries (e.g. Kaitelidou et al., 2013; Dimova et al., 2011; Balabanova and McKee, 2002; Ensor, 2004). Regarding the private health sector, informal OOP payments occur, when patients pay without the professionals (physicians) issuing legal invoices of their remuneration (Pappadà and Zylberberg, 2014; Stepurko et al., 2010).

Measurement of financial impact of OOP payments

In our study we use as measurement indicator of the living standards of respondents the level of their AGI, which is exclusively derived from salaries, wages or pensions. According to O'Donnell et al. (2008a), gross income as a measure of living standards of households is preferable than collecting complex consumption data, especially in developed economies where a large share of the population works formally.

A health OOP payment can be defined as catastrophic when it requires in excess of 10% of a household's income or consumption expenditure (Russell, 2004; Ranson, 2002).

Van Doorslaer et al. (2006) suggest that a 10% threshold of OOP payments to income or consumption illustrates the benchmark at which a household economy is compelled to decrease other important expenditures, liquidate assets or enter to a spiral of debt in order to cope with this spending. For the purposes of this study, we classify health care spending as catastrophic with the precondition of individuals' OOP spending (T) to be more than 10% (z) of their AGI (x) (Selvaraj and Karan, 2012) (see section 2.5.1.3 for more details).

Accordingly, the catastrophic benchmark E was calculated as:

$E = 1[(\frac{Ti}{xi}) > z]$ **Equation 5.1.1-3**

where the indicator (E) takes values 1 or 0 if $(\frac{Ti}{xi}) > z$ or $(\frac{Ti}{xi}) < z$ respectively (O'Donnell et al., 2008).

We adopt the widely accepted method for measuring the incidence, intensity and income-related distribution of catastrophic spending for private hospital care, using thresholds ranging from 5% to 25%, in order to give an answer to our second research hypothesis (see section 1.5; Greek hospitalized insured do not incur catastrophic health costs relative to their income) (Adhikari et al., 2009; O'Donnell et al., 2008; Wagstaff, 2008; Limwattananon et al. 2007; O'Donnell and Van Doorslaer, 2005; Van Doorslaer et al., 2005; Wagstaff & Van Doorslaer, 2003; Wagstaff, Van Doorslaer, O'Donnell and Lindelow, 2003; Kakwani et al., 1997) (see theory section 2.5.1.4 for more computation details) .

Drawing from Xu et al. (2003), we used the proportion of OOP payments to THE as a measure of how well a health system protects its people. Xu et al. (2005, 2003) support the view that for a SHI system to be sufficient the proportion of OOP expenditures to THE should be kept less than 15%.

Statistical Analysis - Variable Construction of inpatient health funding

The main components of THE for these inpatient cases are SHI funding and OOP payments. The main dependent variable is insured OOP payments, including co-insurance expenses, direct extra payments to private hospitals, and direct formal and informal payments to physicians. We adopt a similar computation approach to that of Zhang and Liu (2013) properly customized to our micro level data. The equation form of the above inpatient health care funding categorization is, thus, given as follows:

$THE = SHI + \ OOP\ payments$, **Equation 5.1.1-4**

where $OOP\ payments = SCI + FPH + FPP + IPP$ (see Table 5.1) **Equation 5.1.1-5**

Table 5.1 illustrates the overall funding allocation of hospitalization in contracted with the EOPYY private hospitals and the definitions of our dependent (DVs) and explanatory variables.

Table 5.1: The overall health financing model and the explanatory variables of the hospitalization cases

Funding	Abb/tions	Definition of Variables	Short Explanation
Total Health Expenditure	THE		OOP payments+SHI
Aggregate OOP payments	OOP	dependent	SCI+FPH+FPP+IPP
1.Statutory co-insurance	SCI		30% or 50% respectively of Greek DRG's pricing practice
2.Formal payments to Hospitals	FPH		OOP payments-extra charges with the issue of legal invoices
3.Formal payments to Physicians	FPP		Spending with the provision of legal tax services receipt to insured
4.Informal payments to Physicians	IPP		Spending without the issue of legal tax document
Social Health Insurance (Log)	SHI	explanatory	70% or 50% respectively of Greek DRG's pricing practice
Potential Relevant Factors			
Annual Gross Income (Log)	AGI	explanatory	wages or pensions in €
Age (Log)	A	explanatory	Range: 21-85 years old
Gender	G	explanatory	male or female (dummy)
Type of Hospitalization Care	THC	explanatory	Surgery or not (dummy)

Our main objective is to give evidence for the effect of SHI on individuals' OOP payments for inpatient health care in private hospitals. In order to estimate our IV-DV relationships we use multiple regression analysis under OLS methods (Matsaganis et al., 2009). The gathering of micro – data cases for OOP payments and its categorization into subgroups eliminate the possibility to have zero values of OOP spending for inpatient health care by the insured. The former was firstly facilitated by the sampling method of collecting, from hospitalized after a health shock respondents, accurate data of OOP payments outside of private hospitals (Lavado et al., 2013); and secondly by the minimal recall period of absorbing OOP spending (Lu et al., 2009).

To control for non-normality, all continuous variables were transformed to log scale. We adapted a double-logarithmic regression model approach. Following similar studies we build a multiple regression model where the individual log of OOP payments for each hospitalization case was our dependent variable (Malik and Azam, 2012; Salti et al., 2010) with explanatory variables the SHI funding (Touhy et al., 2004), annual gross income (Joglekar, 2012; Lindelow and Wagstaff, 2005), age (Paccagnela et al., 2013), dummies for gender (1=male, 0=female) and surgery in hospitalization events (1=yes, 0=no) (Almeida and

Sarti, 2013; Ewelukwa et al., 2013; Roy and Howard, 2007). Thus, the transformed multiple regression model will be:

$$\ln(OOP_i) = b_0 + \mathrm{b}_1 \times \ln(\mathrm{SHI}_{1i}) + b_2 \times \ln(A_{2i}) + b_3 \times G_{3i} + b_4 \times \ln(AGI_{4i}) + b_5 \times THC_{5i} + u_i$$

Equation 5.1.1-6

where

$$OOP_i = SCI_i + FPH_i + FPP_i + IPP_i$$

Equation 5.1.1-5

All explanatory variables were entered in the model, and statistical significance was assessed at $p<0.05$. The econometric software package EViews was used for the analysis. In the next section, we discuss the results from the view of i) descriptive statistical analysis, ii) incidence, intensity and income-related distribution measurement of catastrophic OOP payments and iii) econometric analysis.

5.1.2 Results

Descriptive Results

Table 5.2 represents the main descriptive statistics of respondents' socio-economic status and hospitalization funding in private hospitals. The inpatient cases involved 254 men (61.50%) and 159 women (38.50%). The average age of hospitalized individuals was 51.54 years. The average AGI of participants was €15,242.66. The average OOP spending was €1,655.24, corresponding to 10.86% of average AGI of individuals. The THE of these inpatient cases was €1,297,743.32 while the allocation of funding is presented in Table 5.3. SHI funding covered only 47.32% of THE, with the remaining 52.68% being OOP spending.

Table 5.4 presents the allocation of OOP payments into sub-categories, while noteworthy is the finding that the informal total payments to physicians are greater than 13% of overall inpatient OOP payments. OOP payments to private hospital correspond to 63.72% of overall inpatient financing (see Table 5.4). Out of the 217 hospitalization cases that included surgery, 94 (43.32%) reported incidents of informal payments exclusively to surgeons and anesthetists who didn't issue legal invoices.

Table 5.2: Respondents' socio-economic status and hospitalization funding in private hospitals

A.	**Socio-economic status of insured**	**(No of Obs.) or (€)**	**(%)**	**Cum.Total (%)**
1.	Gender (Number of Obs.)	*N*=413		
	Male	254	61.50	61.50
	Female	159	38.50	100.00
2.	Average Age	51.54		
3.	Age Range	21-85		
4.	Employment Status	*N*=413		
	Employees	275	66.59	66.59
	Pensioners	138	33.41	100.00
5.	Degree of Urbanization	*N*=413		
	Urban area (population >10,000 residents)	288	69.74	69.74
	Rurban area (population 2,000-10,000 residents)	82	19.85	89.59
	Rural (population < 2,000 residents)	43	10.41	100.00
6.	Annual Gross Income Average (€)	15,242.66	Male / Female	Male / Female
	Q1. Annual Gross Income (5,985.60 - 12,001.56)	103	13.32 / 11.63	13.32 / 11.63
	Q2. Annual Gross Income (12,001.57-14,700.00)	103	16.46 / 8.47	29.78 / 20.10
	Q3. Annual Gross Income (14,700.01-17,106.72)	102	14.77 / 9.93	44.55 / 30.03
	Q4. Annual Gross Income (17,106.73-45,917.16)	105	16.95 / 8.47	61.50 / 38.50
7.	Private Hospital Location (Prefecture/City)	*N*=413		
	Attiki / Athens	257	62.22	62.22
	Thessaloniki / Thessaloniki	87	21.07	83.29
	Crete / Heraklion and Chania	69	16.71	100.00
8.	Cause of Hospitalization	*N*=413		
	Surgery	217	52.54	52.54
	No Surgery	196	47.46	100.00
9.	OOP payments to Physicians	217		
	Formal	113	52.07	52.07
	Informal	94	43.32	95.39
	Combination of Formal & Informal	10	4.61	100.00
B.	**Hospitalization Funding in Private Hospitals**	**Monetary Value (€)**	**SD / CI (95%)**	**Min - Max (€)**
	Average Total Health Expenditure (€)	3,142.24	3,853.10 / 372.70	153.57-23,211.08
	Average SHI Funding (€)	1,487.00	2,398.45 / 231.99	106.79-15,723.07
	Average OOP payments (€)	1,655.24	1,665.12 / 161.07	46.07-10,000.00
	Allocation of OOP payments			
	Average Co - Insurance to Private Hospitals (*N=413*)	366.87	353.25 / 34.17	0.00-2,342.15
	Average Private Hospitals Payments w/o Co-Insurance (*N=413*)	687.85	723.00 / 69.93	0.00-6,021.23
	Average Formal Payments to Physicians (*N=123*)	1,279.72	1,309.26 / 233.70	100.00-5,375.00
	Average Informal Payments to Physicians (*N=104*)	871.25	809.39 / 157.41	100.00-4,700.00

Table 5.3: The funding sources of hospitalization cases (*N*=413)

Funding Sources	€	%
SHI	614,130.20	47.32
OOP payments total (A+B)	683,613.12	52.68
A. Statutory Co-Insurance	151,518.20	11.68
B. OOP payments w/o Co-Insurance	532,094.92	41.00
Total Health Expenditure	1,297,743.32	100.00

Table 5.4: The allocation of OOP payments

Allocation of OOP payments	€	%
Private Hospitals Total Payments (SCI)	151,518.20	22.16
Private Hospitals Total Payments (FPH)	284,078.92	41.56
Formal Total Payments to Physicians (FPP)	157,406.00	23.03
Informal Total Payments to Physicians (IPP)	90,610.00	13.25
Total OOP payments	683,613.12	100.00

Catastrophic incidence and intensity results

Table 5.5 presents the percentage of individuals suffering catastrophic health inpatient payments to private providers. The Headcount Index illustrates a descending trend by the raising of the given thresholds. Almost, 37.80% of insured pay more than 10% of their AGI on inpatient health care in private hospitals and around ten percent of them make OOP payments exceeding 25% of their annual wage or pension earnings. The catastrophic payment overshoot (O) attributes the average amount by which OOP expenses, as a proportion of AGI, exceed the pre-defined threshold for all the sampled respodents (so called, *z* – see section 2.5.1.4). For instance (O) equals 4.59% for the 10% pre-defined threshold, indicating that, on average, OOP payments are 4.59% greater than the 10% threshold for the total of sampled Shi hospitalized insured (see Table 5.6).

For all thresholds the concentration index (C_E) takes negative values, demonstrating a higher tendency of the worse-off to incur catastrophic OOP expenses for any given cut-off point. This is in line with the incidence of catastrophic OOP payments, presented for intensity in Table 5.6. The negative values of the concentration index (C_O) in each threshold indicate that poor individuals spend proportionately more than the better off for inpatient health treatment in private hospitals.

The Mean Positive Overshoot (MPO), in Table 5.6, indicates that of those insured whose OOP payments were greater than the 10% threshold, on average they spent 22.14% (threshold: 10% + MPO: 12.14%) of their AGI for private hospitalization. For those who exceeded the 25% threshold, they proceeded on average OOP medical spending 42.48% of their annual income turnover. The catastrophic prevalence and intensity according to the distribution of individuals' living standards (RWH and RWO) are higher in all thresholds from the un-weighted H_C and O, indicating that the individuals who go beyond the given ratio threshold show a trend to be poorer.

Table 5.5: Incidence of catastrophic OOP payments for inpatient health care in private providers – Headcount Index

		OOP payments as a percentage of Annual Gross Income			
	Threshold	5%	10%	15%	25%
	Computation Formula				
Headcount Index (H_C)	$Hc = \frac{1}{N}\sum_{i=1}^{N} Ei$	69.01%	37.80%	22.06%	9.75%
Concentration Index (C_E)	$C = 2\,cov\,(y_i\,, R_i)/\mu$	-0.1093	-0.0733	-0.0754	-0.0807
Rank Weighted Headcount Index (RWH)	$RWH = H_C(1-C_E)$	76.55%	40.57%	23.72%	10.54%

Table 5.6: Intensity of catastrophic OOP payments for inpatient health care in private providers – Overshoot Index

		OOP payments as a percentage of Annual Gross Income			
	Threshold	5%	10%	15%	25%
	Computation Formula				
Catastrophic Payment Overshoot (O)	$O = \frac{1}{N}\sum_{i=1}^{N} Oi$	7.11%	4.59%	3.14%	1.70%
Mean Positive Overshoot (MPO)	$MPO = \frac{O}{Hc}$	10.30%	12.14%	14.26%	17.48%
Concentration Index (C_O)	$C = 2\,cov\,(y_i\,, R_i)/\mu$	-0.1624	-0.1337	-0.1547	-0.1962
Rank Weighted Overshoot (RWO)	$RWO = O(1-C_O)$	8.26%	5.20%	3.63%	2.03%

Regression Results

Table 5.7 presents the multiple regression results regarding the impact of control determinants on OOP payments. The estimated regression beta for patients' age indicates that old age is associated with higher OOP spending (see also, Sanwald and Theurl, 2014; Forget et al., 2008; Alemayehu and Warner, 2004). The logarithmic SHI reimbursement and the surgery processing in inpatient treatment were the most important determinants. A positive change in OOP payments is observed when a surgical case takes place. Accordingly, an increase of 1% in the SHI funding is associated with an increase in OOP payments of almost by 0.64%. The effects of gender and annual income are not statistically significant for the size of OOP spending (p>0.05). More information concerning the econometric model estimation can be found in Appendix B1.

Table 5.7: Relation between OOP payments and explanatory variables

Variable name	Coefficient	Std. Error	t – Statistic	p - value
Constant	1.824337	0.680882	2.679373	**0.0077**
(Log)SHI	0.638304	0.022540	28.318950	**0.0000**
(Log)Age	0.224288	0.068006	3.298047	**0.0011**
Gender	0.011153	0.041205	0.270672	0.7868
(Log)Income	-0.027724	0.075829	-0.365613	0.7148
Surgery	0.587079	0.043022	13.64608	**0.0000**
R-squared: 0.8107				

Robustness Checks

Robustness checks had been carried out to compare our reported results from previous sub-section with several OLS regressions (with/without insignificant parameters: i.e. gender, income). All of the important qualitative conclusions are robust to the estimation model. We run the reported OLS regression using the White's heteroskedasticity consistent covariance matrix estimator which provides correct estimates of the coefficient covariances in the presence of heteroskedasticity of unknown form. Also, a similar OLS regression with variables in 1st differences is considered. All specifications show qualitatively similar results, and report that both gender and income variables do not significantly affect OOP payments (these results are not reported here to save space, so readers have to see Appendix B2-B6). So, we confirm that there are no differences when considering a different model specification in our case, i.e. we can safely assume that the reported results produced from a robust method.

5.1.3 Discussion: Study I

The main objectives of the current study were to investigate inpatient OOP payments catastrophic impact on insured income as well as evaluate the SHI risk protection mechanism against individuals' medical costs in private hospitals. The empirical results are anticipated with the main objectives of our study.

The extremely high proportion of OOP payments in Greece is comparable to those in economies with insufficient social health insurance (Kwon, 2011; Sun et al., 2009; Doorslaer, et al., 2007). The high reliance (52.68%) of OOP payments in funding overall hospitalization cost indicates that Greek SHI does not protect sufficiently its people against catastrophic OOP payments when hospitalized in private establishments (Saksena et al., 2014; Xu et al, 2003). Also, our study indicates that informal payments in Greece occur not only in public but also in private hospitals with high amounts of revenue losses for the Greek state.

Despite the safety nets of Greek SHI against health risk, the share of OOP payments to family income is enormous creating, thus, funding inequalities, financial insecurity and depriving the economy from valuable financial sources (Economou, 2010). According to Van Doorslaer et al. (2005), the catastrophic effect of OOP payments presents short and long term consequences to household finances and in extension to the economy. Coping with OOP payments affects individuals' wellbeing through reducing consumption or compromising essential expenditures (purchases of commodities-services, education, taxation etc.) that in the long term will be catastrophic for a household's economy (Adhikari et al., 2009; Leive and Xu, 2008).

The incidence and intensity results of catastrophic OOP spending indicate that the worse off insured present a greater tendency to exceed the pre-defined catastrophic health payments' benchmarks. Moreover, our results give evidence that catastrophic OOP payments in private hospitals are disproportionately greater for the worse-off rather than the better-off individuals. Similar conclusion presented by Adhikari et al. (2009) for hospital care of Kala-azar disease in Nepal. Further, Hajizadeh and Nghiem (2011) estimate negative concentration index for hospitalized individuals in Iran, indicating in this way that the less better-off households facing greater levels of financial burden because of the received inpatient healthcare services. The disproportionate concentration of catastrophic OOP payments among the poor households also was demonstrated in Nigeria (Onwujekwe et al., 2014), in Ghana (Akazili, 2010), in Botswana and Lesotho (Akinkugbe and Chama-Chiliba, 2012) and Albania (Tomini et al., 2013), where extensive reference of informal payments is also noted.

Our econometric findings bring forward new knowledge for the effect of SHI funding on private hospitalization OOP payments in Greece. The level of SHI inpatient cost reimbursement affects positively the level of OOP spending. This paradoxical situation has primarily to do with the imposition of a significant rate of statutory co – insurance to DRG's pricing by the insured. Also, for expensive and severe medical DRG's, the average hospitalization stay and treatment is greater and thus, the extra expenses which private hospitals impose to the insured (advanced level rooms, hygiene materials, high tech operations and diagnostic tests etc.) are higher (Lieberman and Wagstaff, 2009). This paradoxical situation is described by Wagstaff and Lindelow (2008) in a study for the Chinese health insurance, as a demand inducement from the public health coverage which results in remarkable OOP payments for health care to users. Further, Ekman (2007) advocated that health insurance in Zambia can increase the risk of catastrophic OOP spending due to expenses of high-tech and luxurious health services in expensive private providers because of public health sector inefficiency to provide the obvious.

In contrast, to other health care systems, in Greece, pre-admission notification to hospitals for insured by a family doctor is not necessary (Exadaktylos, 2005). Thus, when it comes to private hospitals there is no gate-keeping subjected to a clinical audit. Also, in the case of health services the patient loses the "consumer sovereignty" and the health care supplier decides for the choice of treatment. The asymmetric information between patient and health provider can lead to artificial or supplier – induced demand and consequently all these to increments for SHI and insured OOP funding (Matsushima and Yamada, 2013).

5.1.3.1 Policy Implications: Study I

The alarming findings of our study under the new SHI reform in Greece impose the adoption of policy measures that will drastically reduce the great share of OOP payments.

The Greek DRG's pricing and reimbursement policy for hospital care in public and private health providers does not include the productive factor labor (wages for medical, nursing, administrative and other staff) as other health systems do (e.g. Australian AR-DRG, German G-DRG, U.S. Health Care Financing Administration-DRG), see Polyzos et al. (2013) and Schreyögg et al. (2006). For public hospitals, the labor cost is subsidized from the state budget. For private hospitals this is not the case, hence resulting in high direct OOP spending especially to cover for surgeons' and anesthetists' fees (formal and informal) that are paid separately by fee-for-service from health consumers (Mathauer and Wittenbecher, 2013). DRG-based payment systems, especially for countries with high proportion of formal and informal OOP payments to THE, should be faced as a common financing mechanism both to public and private hospitals in order policy-makers to ensure the transparency of medical expenses (Annear and Xu, 2015). The revision of Greek DRG's pricing with higher rational reimbursement rates for private hospitals by the new SHI fund (EOPYY) is essential primarily in order to reach the price levels of international experience and secondly to categorize the cost components of inpatient health care, protecting thus the insured from excessive formal and informal OOP charges (Kentikelenis and Papanicolas, 2011). However, this might result in increased social security contributions from all insured in order to improve and develop the SHI risk pre-payment mechanism against such OOP spending.

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 as low rate of satisfaction, long waiting lists for surgical services, informal payments, lack of medical interesting for patient, bounded accessibility etc. (Liaropoulos et al., 2008). The improvement of the services proved by public hospitals can offer especially to the vulnerable and worse off groups of population better accessibility avoiding thus their extra-billing option to private hospitals (Kyriopoulos et al., 2014).

SHI policy makers in Greece should readjust formal cost sharing for private inpatient services to socioeconomic characteristics of insured (Schokkaert et al., 2008) since the public hospital sector appears inefficient to provide access for care to all insured population (Economou and Giorno, 2009; EOPYY's Press Release 09.22.2014).

Also, our findings suggest that the Greek tax authorities should pay close attention on the "sensitive" issue of non-issuance of legal tax invoices from numerous surgeons and anesthetists, which results in huge loss of revenue for the Greek state and allows the shadow economy to flourish (Souliotis et al., 2015).

In addition, main problems afflicting the new Greek SHI carrier reduce its reliability and lower its monopsony power are: the significant delay (more than 3 months) of payments to private health providers; and the implementation of re-bate and claw-back mechanisms, which lead to extra recursive "haircuts" to private hospitals which try to offset the losses through the insured private OOP spending (Karakolias and Polyzos, 2014; Petmesidou, 2013).

Conclusively, because Greece is not an exception regarding the high levels of OOP payments (Thomson et al., 2014) more consideration should be given by European policy-makers on this main component of total health spending. Glaring examples are countries such Cyprus, Portugal and Spain, also fiscal monitored by external financial institutions with major declines on their public health funding, in response to the current financial crisis, and high OOP spending as a share of CHE (Eurostat, 2015; Augusto, 2012; Barros, 2012; McKee et al., 2012). High levels of OOP payments are presented also in Bulgaria, Estonia, Hungary, Italy, Latvia, Lithuania, Romania, Poland and Slovak Republic (Eurostat, 2015). Greece a country which was struck by recession severity harder among others (Ifanti et al., 2013) exhibits a chance to highlight that OOP spending is a major concern since it undermines the welfare of European population.

Health systems' objective is to provide financial protection to their members and pool any financial burden, catastrophe or even impoverishment when using health services (Mladovsky et al., 2012; Xu et al., 2007). Nevertheless, the adopted stringent fiscal measures (e.g. benefits cuts, higher formal cost sharing) on state health funding by several European countries support the reliance on OOP spending (OECD, 2015) and deteriorate population's health (Karanikolos et al., 2013; Kentikelenis and Papanicolas, 2011). In addition, previous experience demonstrated that the intervention of the IMF through fiscal austerity programs to financially ailing countries, incurs sharp reductions in public health spending and as a result in higher levels of households' OOP spending (Stuckler and Basu, 2009).

Study II

5.2 Combined social and private health insurance versus catastrophic out of pocket payments for private hospital care in Greece

The high level of OOP payments constitutes a major concern for Greece and several other European and OECD countries as a result of the significant down turning of their public health finances due to the 2008 financial crisis. The basic objective of this study is to provide empirical evidence on the effect of combining social health insurance and private health insurance on OOP payments. Further, this study examines the catastrophic impact of OOP payments on individuals' welfare using the incidence and intensity methodological approach of measuring catastrophic health care expenditures. Conducting a cross-sectional survey in Greece in 2013, we find that the combination of SHI-PHI has a strong negative influence on insured OOP payments for inpatient health care in private hospitals. Furthermore, our results indicate that SHI coverage is not sufficient by itself to manage with this issue. Moreover, we find that poor people present a greater tendency to incur catastrophic OOP expenditures for hospital health care in private providers.
Drawing evidence from Greece, a country with huge fiscal problems that has suffered the consequences of the economic crisis more than any other, could be a starting point for policymakers to consider the perspective of SHI-PHI co-operation against OOP payments more seriously.

5.2.1 Study II Methods

Data collection and sampling methodology

A cross-sectional quantitative study was conducted, from June 2013 until December 2013. A total of 551 insured respondents were contacted. The final sample included 426 insured respondents, hospitalized at least once in private providers affiliated with EOPYY during this time interval. The majority of them (362) were covered for health care only by SHI, and 64 of them combined the mandatory SHI with additional PHI.
Our main objective is to examine a well-developed sample of Greek insured individuals who have experienced inpatient health treatment in private hospitals in Greece. Further, with a view to present a more comprehensive understanding of OOP, SHI and PHI funding for inpatient health care in private hospitals, we implement a non-probabilistic sampling strategy in order to target this specific population which is quite difficult to be detected otherwise (Bryman and Bell, 2003). Additionally, due to the lack of a sampling frame (i.e. complete list

of the target population and official recording of informal OOP payments), the use of convenience sampling with specific criteria for the selection of the respondents is considered suitable, while is the usual approach in similar studies (e.g. Gupta and Trivedi, 2014; Laokri et al., 2014; Kankeu et al., 2013; Dekker and Wilms, 2010; Saksena et al., 2010; Burak and Vian, 2007; Vian et al., 2006; Belli et al., 2004). Our study inclusion criteria required insured over 18 years old who have received inpatient health care after a health shock in private hospitals affiliated with EOPYY. Furthermore, freelancers and entrepreneurs were excluded from our study due to possible false declaration of income for tax evasion reasons (Matsaganis et al., 2012).

Data collected (either numerical or categorical) is based on a structured questionnaire, with questions regarding health care financing (e.g. Nguyen et al., 2015; Van Minh et al., 2014). In order to minimize the non-response rate and maximize the quality of collected data, the research instrument was interviewer-administered to a "mall – intercept" sample (Malhotra and Birks, 2007). Lavado et al. (2013) support the view that household expenditure surveys are not suitable to measure OOP payments and a good practice for this could be the rigorously tracking of OOP health spending outflows at specific validation sites (hospitals, clinics etc.). Therefore, our survey respondents were intercepted and interviewed outside several private hospitals (on the day of discharge) and the regional departments of SHI organization. Also, aiming to eliminate any recall period biases of the examined health expenditures, the particular selection of the aforementioned locations for conducting the survey enabled us to ask the participants as directly as we could, avoiding in such a way any human memory losses (Lu et al., 2009).

The combination of convenience sampling and personal interviewing additionally enabled us to gather sensitive data, such as informal (thus illegal) payments to surgeons and anesthetists, in a relatively high response rate (e.g. Stepurko et al., 2010; Sun et al., 2009).

In order to achieve a suitable sample of hospitalized patients and control for any uncertainty and bias of convenience sampling, we collected information on both genders, a wide range of age, various salaried employees and pensioners, various socioeconomic statuses and education levels in the main urban centers (Athens, Thessaloniki, Crete) of the country (Skowronck and Duerr, 2009). To the best of our knowledge, none official household/individual survey of collecting data for SHI, PHI and formal - informal OOP spending in affiliated private hospitals with the new social insurance carrier has been so far conducted in Greece. Thus, we employed the equations of Cochran (1963:75), cited in Israel

(1992:3), and Kraska-Miller (2013:17) (Equations (5.2.1-1) and (5.2.1-2) respectively), to obtain a statistically representative sample of our target population.

$$SS = \frac{Z^2 * (p) * (q)}{e^2}$$ **Equation 5.2.1-1**

SS corresponds to the required sample size. "Z^2 *is the abscissa of the normal curve that cuts off an area α at the tails (1 - α equals the desired confidence level, e.g., 95%), e is the desired level of precision, p is the estimated proportion of an attribute that is present in the population, and q is 1-p*" (Israel, 1992:3).We used as inputs the Z-value of 1.96, a margin of error (e) of 5% and an estimate of the (p) prevalence of insured hospitalization in private hospitals.

$$SS = \frac{X^2_{(1)} * (N) * (pq)}{d^2(N-1) + X^2 * p(1-p)}$$ **Equation 5.2.1-2**

Similarly, in equation (5.2.1-2) the SS is the sample size, $X^2_{(1)}$is the chi-square value (3.84), N is the known number of hospitalization cases in private hospitals under EOPYY's coverage, p and q are the population proportions and d^2 is the desired degree of accuracy (0.0025) (Kraska – Miller, 2013:17).

The new SHI organization covered 6.171 million people with insurance capability in 2013, while for the same year almost 440.000 cases were reimbursed as inpatient under EOPYY contract mechanisms in a broad spectrum of private hospitals (Health Minister press conference in November 2014, Athens). Therefore, the estimated proportion (prevalence) of EOPYY insured hospitalization in private hospitals was amounted to 7.13% (0.440/6.171). Both the above equations, indicating that the minimum number of hospitalization events we had to gather in order to obtain a representative sample of EOPYY's hospitalized insured population on private providers is 102 responses. Therefore our sample which includes 362 SHI respondents is representative. Particularly, by replacing the appropriate variables on Equation 5.2.1-1 we have the minimum required sample.

$$SS = \frac{Z^2 * (p) * (1-p)}{C^2} \Leftrightarrow SS = \frac{(1.96)^2 * (0.0713) * (0.9287)}{0.05^2} = 101.68$$ **Equation 5.2.1-3**

According to OECD (2015c) the people covered by PHI in Greece reached the 12.5% of total population in 2013. Therefore, the estimated prevalence of PHI holders with mandatory SHI coverage (EOPYY), who had received hospitalization health services in affiliated with EOPYY private hospitals for the same year, it could be p = 0.125*0.0713 = 0.0089. Thus, the minimum number or observations for this subgroup was amounted to 14 observations based on the utilized 'sample for proportions' Equation 5.2.1-1. We succeeded in gathering data from 64 SHI and additional PHI policyholders.

$$SS = \frac{Z^2 * (p) * (1-p)}{C^2} \Leftrightarrow SS = \frac{(1.96)^2 * (0.0089) * (0.9911)}{0.05^2} = 14 \qquad \textbf{Equation 5.2.1-4}$$

We succeeded in yielding the minimum number of hospitalization events required aiming to provide evidence that our findings are generalizable to the Greek SHI insured population.
Table 5.8 illustrates the data obtained through the personal interviewing with each respondent. The abbreviations represent the names of the dependent (DV) and explanatory variables used in our econometric approach.

Table 5.8: Dependent, Explanatory and Additional Variable(s)

Variables	**Abb/tions**	**Definition of variables**	**Short explanation**
Aggregate OOP payments (Log)	OOP	dependent	SCI+FPH+FPP+IPP (see Table 5.9) (Monetary Values)
Potential Relevant Factors			
Social Health Insurance (Log)	SHI	explanatory	70% or 50% respectively of Greek DRG's pricing practice (Monetary Value)
Annual Gross Income (Log)	AGI	explanatory	wages or pensions in € (Monetary Value)
Age (Log)	A	explanatory	Range: 22-75 years old
Gender	G	explanatory	male or female (dummy)
Type of Hospitalization Care	THC	explanatory	Surgery or not (dummy)
Educational Level	E	explanatory	Tertiary or not (dummy)
Additional PHI scheme parallel to the mandatory SHI	PHI	explanatory	Yes or not (dummy)
Additional Variables			
SHI contributions			Employees and employers monthly rate (%) contributions for SHI coverage (Monetary Value)
Premiums for PHI policyholders			Premiums for holding an additional PHI to SHI (Monetary Value)

Definition of the study variable "out of pocket (OOP) payments"

According to Mossialos and Thomson (2002), all health care expenses that are paid directly by the health consumers, not covered by any insurance carrier, can be attributed as OOP payments. Their main categorization is: on direct payments, formal cost sharing and informal payments.

We use the term "direct formal payments" in our study to describe the OOP payments with the provision of an official receipt issued by health providers (private hospitals and physicians).

The formal cost sharing represents the financial participation of insured on health expenses (Paccagnella et al., 2013). It is a useful tool for SHI and PHI to reduce demand for unnecessary utilization of health services and control health expenditure (Drechsler and Jutting, 2007). In our study the patient cost sharing represents the 30% co-insurance rate of Greek DRG's pricing modeling as presented in Table 5.9. On the hand, formal cost sharing for PHI individual or group policies represents deductibles depending on the type of contract.

Informal or ¨under the table¨payments: A definition that can be attributed to this illegal kind of health spending is the voluntary or sometimes extortionate compensation (in cash or in a form of gift) from patients to public doctors for ensuring better medical care and faster access to health services (Chereches et al., 2013). Regarding the scope of our study, the informal payments represent the tax evading financial payments from health users to health providers (no issue of legal receipts mainly by surgeons and anesthetists) (Stepurko et al., 2010).

Based on the above, we define OOP payments to be the aggregate amount of these hospital care expenses which were non-refunded to the insured by SHI or PHI coverage. Specifically, we divide OOP payments for inpatient health treatment into four main categories, as given in Table 5.9.

Table 5.9: The categorization of OOP payments for inpatient health care to private hospitals

	Abbrev.	Categorization	Short Explanation
Aggregate OOP payments	**OOP**		**SCI+FPH+FPP+IPP**
1.Statutory SHI & PHI co-insurance to Private Hospitals	SCI	Formal Cost Sharing	SHI-30% or 50% respectively of Greek DRG's pricing practice PHI- deductibles depending on the contract
2.Extra Formal payments to Private Hospitals	FPH	Direct Formal Payments and Formal Cost Sharing	OOP-extra charges with the issue of legal invoices PHI co-insurance rates depending on the contract
3.Formal payments to Physicians	FPP	Direct Formal Payments and Formal Cost Sharing	Spending with the provision of legal tax services receipt to insured. PHI co-insurance rates depending on the contract
4.Informal payments to Physicians	IPP	Informal Payments	Spending without the issue of legal tax document. No reimbursement from SHI or PHI

SHI contributions

Despite EOPYY's main objective "equal access for all in a single health service system" the SHI contribution basis varies even today depending on insured former social security fund embodiment (Wingfield, 2012). For salaried employees, who were included in our study, the SHI payroll levies and employer-based contributions were determined depending on their occupational profile and their SHI fund position (see Table 5.10). With the launch of EOPYY in 2012, the SHI contribution rate for health care became the same for all pensioners whose healthcare provider is EOPYY and was determined at the rate of 4% of gross pensionable earnings (Law 3918/2011 published in the 31'A/02-03-2011 Gazette of the Government).

Table 5.10: The SHI contribution rates of our study employee participants

Former SHI Funds	Employee (%)	Employer (%)	Source
Social Insurance Institution (IKA) for insured after 01-01-1993	2.15	4.30	http://www.ika.gr/gr/infopages/asf/insurance/charge.cfm
Social Insurance Institution (IKA) for insured before 01-01-1993	1.85	3.70	http://www.ika.gr/gr/infopages/asf/insurance/charge.cfm
Insurance Fund of Greek Telecoms, Railways, Mail (TAP-OTE)	2.55	5.10	www.tayteko.gr
Insurance Fund of Public Power Corporation (TAP-DEH)	2.55	5.10	www.tayteko.gr
Insurance Fund of Banks (TAAPTPGAE)	3.00	6.00	www.tayteko.gr
Insurance Fund of former Commercial Bank S.A. (TAP-ETE)	3.00	6.00	www.tayteko.gr
Health Care Organization for Public Officers (OPAD)	2.55	5.15	2456/31-10-2011, 96/B31-12-2012 Gazettes of the Government and oik/2/46694/A0024 Paper of the General Accounting Office (Kaitelidou and Kouli, 2012)
Health Care Organization for Municipal Employees (TYDKY)	2.55	12.15	2456/31-10-2011, 96/B31-12-2012 Gazettes of the Government and oik/2/46694/A0024 Paper of the General Accounting Office

PHI premiums

Regarding PHI inpatient health care coverage, the Greek population has the option to pay a risk-rated premium for individual contracts or a collective pre-payment health financing arrangement, especially for big firms, aiming to a complementary extra risk pooling mechanism, despite the compulsory SHI practice (Economou, 2010). The individuals in our study hold either individual or collective duplicate complementary PHI contracts by profit-making insurance companies. They pay non-income-related premiums in order to supplement the social security (e.g. faster access, new technology services) or to complement their reimbursements by bridging the gap between SHI hospitalization indemnities and the market prices (Paccagnella et al., 2013; Dukhan et al., 2010).

Statistical analysis - variable construction of inpatient health funding

The funding sources of our hospitalization events are SHI, PHI and OOP payments. Following Zhang and Liu (2013), we use a properly customized to our micro level data computation approach to illustrate an equation form comprising the overall health care funding as follows:

$THE_i = SHI_i + PHI_i + OOP_i \quad i = 1, \ldots, n$ **Equation 5.2.1-5**

The monetary value of OOP payments was estimated by deducting the monetary value of SHI and PHI reimbursement from the aggregate hospital expenditures for each inpatient episode.

$OOP_i = THE_i - (SHI_i + PHI_i)$ **Equation 5.2.1-6**

where $OOP_i = SCI_i + FPH_i + FPP_i + IPP_i$, as presented in Table 5.9. **Equation 5.2.1-7**

We adopt a multiple regression-based approach in order to present the influence of potential relevant factors on OOP payments for inpatient health care. With a view to examine the relationship between total OOP payments and exploratory variables, we consider that the estimation of an OLS regression model with a logarithmic transformation of our dependent variable (total monetary OOP payments – continuous) would be the most appropriate approach (see Malik and Azam, 2012; Salti et al., 2010).

Inspired by the model of Paccagnella et al. (2013), for each hospitalized insured *i* the potential association between OOP spending and SHI, PHI and a vector of characteristics (Y) that are hypothesized to affect individuals' OOP payments, is expressed as follows:

$OOP_i = f(SHI_i, Y_i, PHI_i, u) \quad i = 1, \ldots, n$ **Equation 5.2.1-8**

The explanatory variables include both numerical parameters such the SHI funding, AGI and age of hospitalized insured and categorical variables expressed as dummies like gender (1=male, 0=female), educational level (1=tertiary, 0=no), surgery in hospitalization events (1=yes, 0=no) and possessing of an additional PHI scheme parallel to the mandatory SHI (1=yes, 0=no) (e.g. Yamada et al., 2014; Almeida and Sarti, 2013; Ewelukwa et al., 2013). It should be mentioned that the last dummy, in contrast with Paccagnella et al. (2013), is treated as an exogenous variable and not as a binary endogenous. We do not move on specific formulations of endogenizing the dummy variable of PHI since the aim of this study is to examine the effect of the latter on OOP payments, and not the crucial determinants of holding PHI. Therefore, the key parameter (variable) of this second study is the voluntary PHI status, which is indicated by a dummy variable equal to 1 if the hospitalized insured has a voluntary PHI insurance program parallel to mandatory SHI scheme and 0 (zero) otherwise (Ekman, 2007).

Further, the sampling technique and the minimal recall option to gather categorized financing data from individuals limited the phenomenon to have observations on our dependent variable (OOP_i) truncated to zero value (Cederberg and Mahal, 2010).

To control for non-normality, in addition to OOP payments, the explanatory variables of SHI funding, AGI and age of insured are also transformed to log scale. Therefore, our transformed multiple regression model is given by:

$$\ln(OOP_i) = b_0 + \mathrm{b}_1 \times \ln(\mathrm{SHI}_{1\mathrm{i}}) + b_2 \times \ln(AGI_{2i}) + b_3 \times \ln(A_{3i}) + b_4 \times G_{4i} + b_5 \times THC_{5i} + b_6 \times E_{6i} + b_7 \times PHI_{7i} + u_i$$

Equation 5.2.1-9

$$OOP_i = SCI_i + FPH_i + FPP_i + IPP_i$$

Equation 5.2.1-7

All explanatory variables were entered in the model and statistical significance is assessed at p<0.05. Statistical analysis was conducted using the econometric software package EViews.

Measurement of the financial impact of OOP payments

O'Donnell et al. (2008a), Wagstaff et al. (2003) and Younger (1996) support the view that consumption expenditure is a better indicator for measuring catastrophic health expenditures in developing and low income countries than the utilization of income. This is due to the presence of a large informal and unorganized labor sector in these countries. Nevertheless, several studies for developing countries use income as a measure of socio-economic status (SES), an indication that the choice depends on data availability (e.g. Almeida and Sarti, 2013). Following O'Donnell et al. (2008a) and Wagstaff et al. (1999), we perform our study based on the annual gross income (AGI) of insured (e.g. Kwesiga et al., 2015; Wingfield et al., 2014). According to data availability, the AGI per insured comprised salaries for labor services and pensions earnings during the last 12 months and includes gross of taxation, SHI contributions and PHI premiums (Wagstaff et al., 2007) (for more details see theory section 2.5.1.1).

Catastrophic OOP health care payments

Catastrophic OOP spending for health care can be considered as this spending which require a remarkable proportion, in excess of a given pre-defined critical limit, of households resources or budgets (O'Donnell et al., 2008; Van Doorslaer et al., 2006, 2005; Xu et al., 2003; Pradhan and Prescott, 2002; Feder et al., 1987; Berki, 1986).

There are several methods available in the literature for catastrophic OOP payments to be quantified (see for more details theory sections 2.5.1.3 and 2.5.1.4). For the purposes of this study, we classify health expenditures ($OOP=T$) as catastrophic if they exceed 10% of the insured AGI (see also Selvaraj and Karan, 2012; Prinja et al., 2012; Castillo-Riquelme et al., 2008). In order to investigate whether the percentage of our sample exceeds this pre-defined threshold of 10% (z), we calculate an indicator (E) which takes values 1 or 0 if $(\frac{Ti}{xi}) > z$ or $(\frac{Ti}{xi}) < z$ respectively (O'Donnell et al., 2008a) (Equation 5.2.1-10).

$$E = 1\left[\left(\frac{Ti}{xi}\right) > z\right]$$ **Equation 5.2.1-10**

Aiming to compare the impact of inpatient OOP payments on individuals' income, we separate our examined insured population into two sub-groups (Saksena et al., 2011; Schneider and Hanson, 2006). The first sub-group includes individuals having only the compulsory SHI, while the second sub-group includes individuals holding a combination of mandatory SHI and additional PHI coverage; considering these two sub-groups, we are able to quantify the impact of OOP payments on their welfare regarding the difference of their insurance coverage. For the first sub-group, we generate our fractional variable using the ratio of OOP payments to AGI of insured (Adhikari et al., 2009). The critical threshold for the catastrophic impact of OOP payments is given in the below equations:

$$Catastrophic\ Health\ Expenditures = 1\ \ if\ \frac{OOP}{AGI} > 0.10$$ **Equation 5.2.1-11**

and

$$Non\ Catastrophic\ Health\ Expenditures = 0\ \ if\ \frac{OOP}{AGI} < 0.10$$ **Equation 5.2.1-12**

We consider crucial for the second sub-group of individuals to add to the continuous variable of OOP payments the annual PHI premiums in order to identify the impact of health expenditures relatively to the first sub-group (Supakankunti, 2010; O'Donnell et al., 2008a; Merlis, 2002) (equations (5.2.1-13) and (5.2.1-14)). We do not include to OOP payments factors such as employer and employee SHI contributions as a common feature between the two sub-groups.

$$Catastrophic\ Health\ Expenditures = 1\ \ if\ \frac{OOP + PHI\ premiums}{AGI} > 0.10$$ **Equation 5.2.1-13**

and

$$Non\ Catastrophic\ Health\ Expenditures = 0\ \ if\ \frac{OOP + PHI\ premiums}{AGI} < 0.10$$ **Equation 5.2.1-14**

Incidence and Intensity of catastrophic OOP health care payments

We use the most common and widely accepted method for measuring incidence and intensity of catastrophic health expenses, which is based on the construction of various critical thresholds ranging from 5% to 25% of OOP payments as a share of individuals' living standards (see O'Donnell and Van Doorslaer, 2005; Wagstaff and Van Doorslaer, 2003). We compute the Headcount (H_C), Overshoot (O), concentration indices (C_E and C_O) as well as the rank weighted (RW) H_C and O indices (Flores et al., 2008; O'Donnell et al., 2008a; Wagstaff, 2008; Limwattananon et al. 2007; Wagstaff and Van Doorslaer, 2003; Wagstaff et al., 2003; Wagstaff et al., 1991; Lerman and Yitzhaki, 1989; Wagstaff et al., 1989 for more details). Especially, for the concentration indices (C_E and C_O), we apply the convenient regression approach proposed by Kakwani et al. (1997) as presented in equation (5.2.1-15) and analyzed in theory section 2.5.1.3.

$$2\sigma_R^2\left[\frac{y_i}{\mu}\right] = \alpha + \beta R_i + u_i$$ **Equation 5.2.1-15**

Measuring progressivity of health care payments financing

The most popular method to estimate the equity and the redistributive impact of health care expenditures from several funding mechanisms is the Kakwani (1997) progressivity index.
We made use of convenient regression formula aiming to calculate values for the Kakwani index for each health payment variable as presented in equation (5.2.1-16) and analyzed in theory section 2.5.2.1 (Wagstaff et al., 2003).

$$2\sigma_R^2\left[\frac{h_i}{\eta} - \frac{y_i}{\mu}\right] = \alpha + \beta R_i + u_i$$ **Equation 5.2.1-16**

In accordance with the availability of our data and, although health funding are also allocated through direct and indirect taxes, we did not include issues as such, but we focused on the three main core financing sources of inpatient health care in private hospitals for Greece (OECD, 2015).
Especially, we analytically calculated the Kakwani progressivity value for the provided inpatient health care taking into account the reported financing contribution basis from OECD for the nearest year 2013 (OECD, 2014). We based on the following formula (O'Donnell et al., 2008a) (for more details, see theory section 2.5.2.1):

$$\pi_\kappa^{overall} = \sum i \ w_i \, \pi_{\kappa,i}$$ **Equation 5.2.1-17**

5.2.2 Results: Study II

Descriptive Results

Our final sample includes 229 men (53.76%) and 197 women (46.24%). The average age of hospitalized individuals is 50.39 years. The average AGI of participants is €15,228.34. The average OOP spending is €2,035.72, corresponding to 13.37% of average AGI of individuals. The total health spending of these inpatient cases is €1,592,616.75 while their financing allocation is presented in Table 5.11. Considerable attention should be given to the share of the informal total payments to physicians which is greater than 14% of overall inpatient OOP spending and almost 8% of THE.

Table 5.11: The funding sources of hospitalization cases (*N*=426)

Funding Sources	€	%	
SHI	618,809.00	38.85	
PHI	106,590.60	6.69	
OOP payments (total)	867,217.15	54.46	
Total Health Expenditure	1,592,616.75	100.00	
Allocation of OOP payments	€	% of total OOP payments	% of THE
Private Hospitals Total Payments (SCI)	160,825.14	18.54	10.10
Private Hospitals Total Payments (FPH)	305,228.33	35.20	19.18
Formal Total Payments to Physicians (FPP)	275,598.68	31.78	17.30
Informal Total Payments to Physicians (IPP)	125,565.00	14.48	7.88
Total OOP payments	867,217.15	100.00	54.46

The segregation between the two subgroups illustrates interesting issues to be discussed (Table 5.12). For the SHI-PHI subscribers' group, the share of OOP payments to THE is at 12.50% as compared to the remarkable 60.07% of the SHI insured. Additionally, no PHI policyholder informally paid a physician due to the potential PHI indemnity by providing an official receipt of medical services in contrast with the first sub-group where both parties make synergies to evade taxation. Also, our results represent that decreasing age constitutes an important factor of PHI holding (Banks et al., 2009). Our findings are in line with other studies regarding the positive effect of higher income and better educational attainment on PHI holding (Paccagnella et al., 2013; Mossialos and Thomson, 2004; Besley et al., 1999).

Table 5.12: Descriptive statistics between the sub-groups

1st Sub-group (SHI) N=362		2nd Sub-group (SHI-PHI) N=64	
Men:	191 (52.76%)	Men:	38 (59.38%)
Women:	171 (47.24%)	Women:	26 (40.63%)
Average Age:	52.51	Average Age:	38.38
Range:	22-75	Range:	26-55
Tertiary Education	105 (29.01%)	Tertiary Education	44 (68.75%)
Average AGI:	14,578.14	Average AGI:	18,906.04
Average OOP payments:	2,330.91	Average OOP payments:	366.07
		Average OOP payments*:	884.71
Funding Sources	€ (%)	Funding Sources	€ (%)
SHI	560,859.09 (39.93)	SHI	57,949.91 (30.83)
PHI	0.00 (0.00)	PHI	106,590.60 (56.71)
OOP payments	843,788.96 (60.07)	OOP payments	23,428.19 (12.46)
Total Health Expenditure	1,404,648.05 (100.00)	Total Health Expenditure	187,968.70 (100.00)
Allocation of OOP payments	€ (%)	Allocation of OOP payments	€ (%)
Private Clinics Total Payments (SCI)	153,429.53 (18.18)	Private Clinics Total Payments (SCI)	7,395.61 (31.56)
Private Clinics Total Payments (FPH)	299,749.43 (35.53)	Private Clinics Total Payments (FPH)	5,478.90 (23.39)
Formal Total Payments to Physicians (FPP)	265,045.00 (31.41)	Formal Total Payments to Physicians (FPP)	10,553.68 (45.05)
Informal Total Payments to Physicians (IPP)	125,565.00 (14.88)	Informal Total Payments to Physicians (IPP)	0.00 (0.00)
Total OOP payments	843,788.96 (100.00)	Total OOP payments	23,428,19 (100.00)

* OOP payments also include the annual premiums for holding a PHI contract.

Regression Results

Table 5.13 shows the multiple regression results regarding the impact of exploratory variables on OOP payments; we test our first hypothesis. The control factors that positively influence OOP payments are SHI funding, surgery process during inpatient stay and gender (with $p<5\%$). An increase of 1% in the logarithmic SHI hospitalization funding has a positive effect of 0.64% on OOP payments. Surgery processing which results in extra payments to surgeons and anesthetists also has a positive influence on OOP payments. Gender has an effect on OOP spending, with males having higher OOP inpatient payments compared to females.

Diametrically opposed, the regression results revealed that individuals' option to hold a PHI contract along with the compulsory SHI coverage succeed in reducing the size of the logarithmic OOP spending. The effects of individuals' income, age and education level do not show a major impact on OOP spending level; these are not statistically significant (with $p>0.05$). More information concerning the econometric model estimation is presented in Appendix C1.

Moreover, we proceed on robustness checks to OLS regression model in order to testify the accuracy of our reported results. Specifically, we perform our reported OLS regression by also using the White's heteroskedasticity consistent covariance matrix estimator without taking into consideration the insignificant parameters (i.e. income, age, tertiary education or not) (see Appendix C2). Further, we considered as well a similar OLS model with variables in 1st differences by excluding also the aforementioned insignificant variables (see Appendix C3). So, we can safely confirm that the reported results produced from a robust econometric methodology.

Table 5.13: Relation between OOP payments (Log) and explanatory variables

Variable name	Coefficient	Std. Error	t - Statistic	p - value
Constant	1.4864	0.3577	4.1559	**0.0000**
(Log)SHI	0.6423	0.0415	15.4880	**0.0000**
(Log)Income	-0.0435	0.0775	-0.5612	0.5750
(Log)Age	-0.0815	0.1286	-0.6335	0.5268
Gender	0.0863	0.0285	3.0340	**0.0026**
Surgery	0.2179	0.0350	6.2261	**0.0000**
Tertiary Educ.	-0.0006	0.0339	-0.0175	0.9861
SHI-PHI	-0.8961	0.0429	-20.8874	**0.0000**
R-squared: 0.7012				

Catastrophic incidence and intensity results

Aiming to test our third research hypothesis (as presented in section 1.5 Study II), Table 5.14 provides information regarding the incidence and intensity of catastrophic payments between the two sub-groups. The Headcount and Overshoot indices present a descending trend with the increase of the pre-defined thresholds. The results reveal that the percentage of individuals suffering from catastrophic OOP payments amounts the remarkable (H_C) of 69.64% for the compulsory SHI policyholders. Summarizing, incidence and intensity results demonstrate that the worse-off SHI individuals spend more proportionally than the better-off, and are more likely to experience catastrophic inpatient OOP payments in private hospitals (*i.e.* negative C_E

and C_O values). Apart for concentration indices, the concentration curves also indicate the quantification of income inequality for the selected health funding variable (see literature section 2.5.1.4). Figure 5.2 displays that OOP expenditure for all survey respondents is concentrated amongst the poor (worse-off), since the OOP concentration curve lies above the line of equality.

Table 5.14: Catastrophic Incidence and Intensity for inpatient health care in private hospitals

SHI coverage policy-holders *(N=362)*

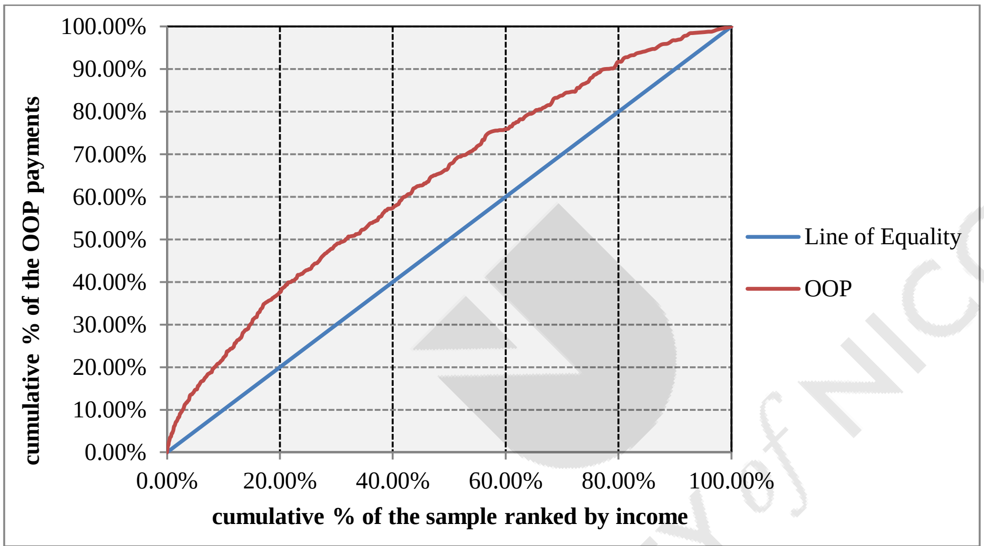
Incidence of catastrophic OOP payments – Headcount Index				
	OOP payments as a percentage of Annual Gross Income			
Threshold	5%	10%	15%	25%
Headcount Index (H_C)	88.12%	69.64%	47.83%	23.00%
Concentration Index (C_E)	-0.2298	-0.2098	-0.1808	-0.1508
Robust SE:	0.0263	0.0261	0.0275	0.0317
Prob:	0.0000	0.0000	0.0000	0.0000
Rank Weighted Headcount Index (RWH)	108.37%	84.25%	56.48%	26.47%
Intensity of catastrophic OOP payments – Overshoot Index				
	OOP payments as a percentage of Annual Gross Income			
Threshold	5%	10%	15%	25%
Catastrophic Payment Overshoot (O)	15.26%	11.30%	8.39%	5.01%
Mean Positive Overshoot (MPO)	17.31%	16.23%	17.55%	21.77%
Concentration Index (C_O)	-0.2961	-0.3390	-0.3352	-0.3235
Robust SE:	0.0339	0.0422	0.0511	0.0679
Prob:	0.0000	0.0000	0.0000	0.0000
Rank Weighted Overshoot (RWO)	19.78%	15.13%	11.20%	6.63%

SHI-PHI coverage policy-holders *(N=64)*

Incidence of catastrophic OOP payments – Headcount Index				
	OOP payments and PHI premiums as a percentage of Annual Gross Income			
Threshold	5%	10%	15%	25%
Headcount Index (H_C)	48.44%	1.56%	0.00%	0.00%
Concentration Index (C_E)	-0.059	-	-	-
Robust SE:	0.0192	-	-	-
Prob:	0.0050	-	-	-
Rank Weighted Headcount Index (RWH)	51.30%	-	-	-
Intensity of catastrophic OOP payments – Overshoot Index				
	OOP payment s and PHI premiums as a percentage of Annual Gross Income			
Threshold	5%	10%	15%	25%
Catastrophic Payment Overshoot (O)	1.15%	0.03%	0.00%	0.00%
Mean Positive Overshoot (MPO)	2.38%	1.72%	-	-
Concentration Index (C_O)	-0.1829	-	-	-
Robust SE:	0.0590	-	-	-
Prob:	0.0050	-	-	-
Rank Weighted Overshoot (RWO)	1.36%	-	-	-

Regarding the second sub-group, which comprises SHI with additional PHI policyholders, the scenery changes radically. 51.56% (Hc) of hospitalized individuals' spend for OOP payments and PHI premiums less than 5% of their AGI. Moreover, 46.88% make health payments in the area of 5%-10% of their AGI. A minor 1.56%, which represents one insured proceeded on health expenditures greater than the catastrophic living standards' benchmark of 10%. The negative values of concentration indices (CE and Co) and the un-weighted Hc and O related with RWH-RWO demonstrate similar patterns with the first sub-group. The convenient regression results for evaluating concentration indices CE and Co given by the Equation 5.2.1-15 are presented in Appendix C4-C8.

Figure 5.2: OOP payments concentration curve for all survey respondents (N=426)



Assessment of Progressivity Results

The overall inpatient health care funding in contracted private hospitals with EOPYY is regressive with a Kakwani progressivity value $\pi_{\kappa}^{overall}$ = -0.20421 indicating that the health funding contribution by the worse-off group of insured was greater than its share of ATP. In this regard, Kakwani estimation meet our forth research hypothesis as presented in section 1.5 (Study II) (see Table 5.15). The overall Kakwani calculation was based on the relative allocation of each health financing scheme to total private hospital expenditure for Greece. The data was gathered by the internal database of OECD for the nearest reported year, 2013 (OECD, 2015e). The main reason that led to the overall financing regressivity is the remarkable proportion of OOP payments to THE, especially on account of their categorized relative weights to total funding. The Kakwani index (π_{κ}) for all OOP spending categorization presents negative values, indicating in this way that OOP expenditure is a regressive form of health financing. Moreover, the regressivity of OOP payments can also be verified by observing the Figure 5.2. The concentration curves for all the types of OOP payments intersect the 45 ° line of equality, lie inside and dominate Lorenz curve, indicating in this way that insured private health spending is strong regressive. The Kakwani index (π_{κ}) for PHI premiums equals -0.25911, while PHI concentration curve placement is completely inside Lorenz curve; this confirms the regressivity of PHI institution. In contrast, total SHI contributions of the merged former insurance societies to EOPYY are marginally progressive, since the Kakwani index exhibits a positive value (π_{κ} = 0.02995). The Kakwani value for SHI is statistically near to zero since the contribution rate is the same for every insured earnings regarding the SHI society which belongs. In Figure 5.3, SHI (employee-employer) contributions concentration curve slightly lies outside Lorenz curve; this confirms their progressivity.

Table 5.15: Health financing by source and estimated Kakwani indices for hospitalization care in private hospitals for (N=426)

Funding Sources	Share of THE	Method of Allocation	Kakwani by source*	p -value	Robust SE
SHI	0.3885	estimated	0.02995	0.000	0.0130
PHI	0.0669	estimated	-0.25911	0.000	0.0290
OOP SCI	0.1010	estimated	-0.31158	0.000	0.0358
OOP FPC	0.1918	estimated	-0.22297	0.000	0.0227
OOP FPP	0.1730	estimated	-0.20225	0.000	0.0405
OOP IPP	0.0788	estimated	-0.26664	0.000	0.0659
Aggregate Financing	1.0000				

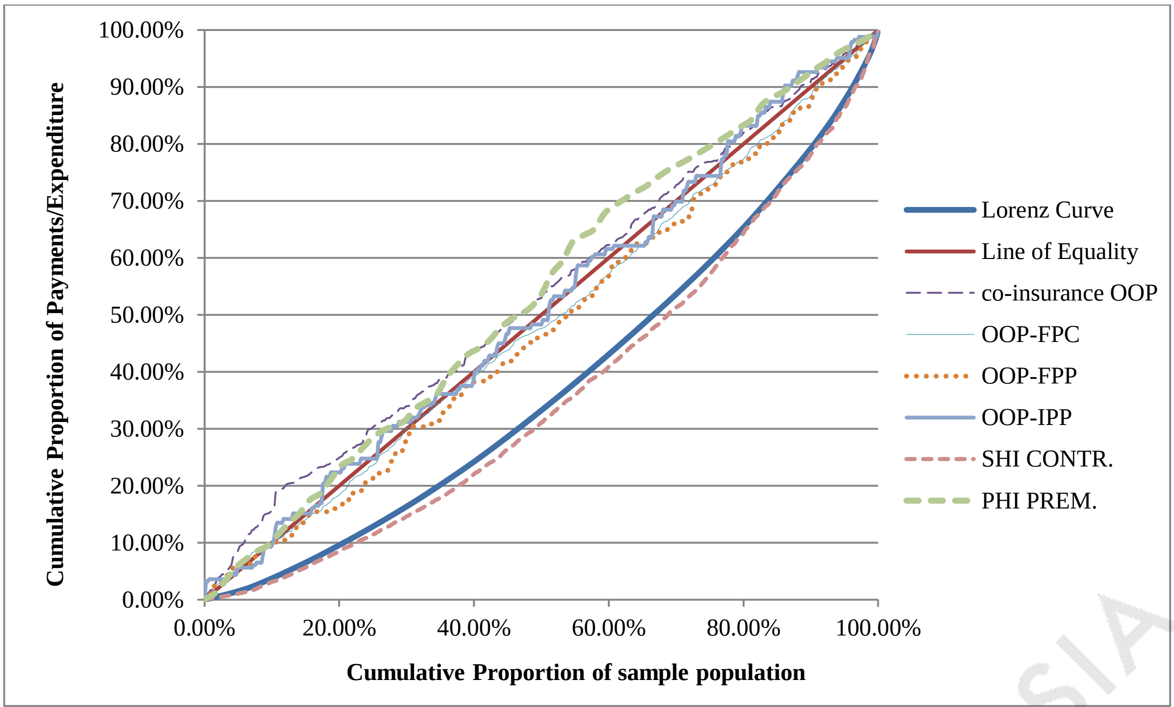
* significantly different from zero at 5%

Funding Sources	Share of THE	Method of Allocation	Kakwani by source*	p -value	Robust SE
SHI	0.2243	reported	0.02995	0.002	0.0130
PHI	0.2005	reported	-0.25911	0.000	0.0290
OOP payments aggregate	0.5749	reported	-0.27653	0.000	0.0237
Aggregate Financing	0,9997		Kakwani for Total Health Financing ($\pi_{\kappa}^{overall}$)	-0.20421	

* significantly different from zero at 5%

The econometric results of the convenient regression formula for calculating Kakwani indices (Equation 5.2.1-16), are presented in Appendix C9-C15 for each selected health payment variable.

Figure 5.3: Lorenz curve and concentration curves of the inpatient health-care financing



5.2.3 Discussion: Study II

The econometric findings imply that the combination of the compulsory SHI and additional PHI has a significant tackling effect on inpatient health care OOP spending, thus verifying the second research hypothesis. In contrast, SHI coverage alone affects OOP payments positively (rejection of first hypothesis). Furthermore, OOP payments catastrophic impact suggests that the combination of SHI-PHI coverage can protect individuals against catastrophic OOP spending for private hospitalization. Conversely, the compulsory SHI alone does not. Hence, the catastrophic impact results validate the third hypothesis regarding SHI-PHI efficiency against OOP payments financial catastrophe, and rejects SHI effectiveness on this issue (as presented in section 1.5 Study II).

Our econometric results show that SHI has a positive impact on OOP payments. The benefit level of Greek SHI DRG's reimbursement policy, along with the implementation of high co-insurance rates for inpatient events and the high pricing policy of private hospitals because of their upgraded amenities and new technology treatments, compared with them of NHS public hospitals, justifies this paradoxical situation. This phenomenon is also described by previous studies and is associated with the aforementioned reasons (Wagstaff and Lindelow, 2008; Ekman, 2007). Based on our findings, the case of surgery conducted during the hospitalization in private hospitals also assists in increasing OOP spending of both sub-groups (Siskou et al., 2008). The SHI with additional PHI subscribers may also be burdened with co-insurance rates for surgeons' and anesthetists' remunerations depending on the affiliation or not among private insurers and private hospitals. The male gender is shown to affect OOP spending positively probably because, as evidenced in medical literature, it has greater prevalence on cardiovascular diseases, and thus to costly operations (CABG, coronary angioplasty and stenting) (e.g. Henderson, 2011; Dueñas et al., 2011).

Previous studies give diversified findings regarding PHI importance on reducing OOP payments (Shin, 2012; Ekman et al., 2008; Holly et al., 2005). A different econometric approach by Paccagnella et al. (2013) among the over fifties age group in Europe gives evidence that the voluntary PHI in Austria, Denmark, Italy and Spain positively affects the OOP payments. The same authors identified that supplementary PHI has a significant effect in reducing the burden of OOP payments for the Netherlands, while for Belgium, France, Germany, Greece, Sweden and Switzerland they report an insignificant effect on OOP payments. However, it is clearly demonstrated from our regression and incidence-intensity results that the existence of mandatory SHI and complementary PHI coverage constitutes an efficient pre-payment risk pooling mechanism against catastrophic OOP spending.

Murray et al. (2003) exhibit that the share of Greek households facing catastrophic health expenditures between the years 1993-2000 reached a 3.29% whereas the percentage of households impoverished due to OOP spending was 0.56%, classifying Greece amongst the worse positions together with Spain and Portugal. Households' protection from catastrophic direct health costs imposes a ratio of OOP payments to THE less than 15-20% (Mc Intyre et al., 2008). Our findings indicate that the Greek SHI coverage does not efficiently protect its members against catastrophic OOP payments for private hospital health care. The significant percentage (69.64%) of the mandatory SHI policyholders to exceed the catastrophic benchmark of OOP payments to AGI indicates that hospitalization in private hospitals in Greece is financially prohibitive. Regarding the first sub-group of insured, our catastrophic incidence and intensity results demonstrate a higher tendency for the poor to exceed the catastrophic health spending threshold. The coverage of inpatient health spending in private hospitals by the poor is proportionately greater than the wealthier. Similar findings were shown in studies for India (Selvaraj and Karan, 2012), China (Zhang et al., 2010a), Nepal (Saito et al., 2014), Ghana (Amporfu, 2013), Iran (Rezapour et al., 2012), Lower Myanmar (Lwin et al., 2011) and Western Balkan countries (Bredenkamp et al., 2011). The absolute majority of SHI with additionally PHI policyholders managed to keep the Headcount Index below the critical catastrophic limit of 10% of their AGI.

The substantial proportion of OOP payments in the southern countries of EU (Greece, Italy, Portugal, Spain and Cyprus) is further deteriorated taking into account the fact that the distributional government policies of tax and social insurance systems becoming more regressive (Rombaldoni, 2012). Especially, for health systems such as the Greek with limited financial protection, in which OOP payments are extremely significant and the hidden health economy thrives over time, the treaty of equity in health funding is rebutted, resulting thus the worse off groups to pay the price of high health expenses (Economou, 2010). Our overall regressivity results confirm the literature. SHI appears progressive in countries with mandatory universal coverage, PHI is regressive due to the non-binding of premiums with insured income and when health funding predominantly relies on OOP payments the health system is characterized most regressive (Crivelli and Salari, 2014; Gottret and Schieber, 2006; De Graeve and Van Ourti, 2003; Mossialos and Thomson, 2004; Murray et al., 2000). Based on our results from Kakwani indices, the poorer socio-economic groups spend more than their ATP for inpatient health services in private hospitals than the better off population, making the system regressive and dispelling the principle of vertical equity in health care funding, validating thus the forth hypothesis (see section 1.5 Study II) (O'Donnell et al., 2008a). Similar current findings for OOP payments regressivity are presented in low income countries in Africa (Onwujekwe et al., 2014; Mtei et al., 2014, 2012; Munge and Briggs, 2013; Ataguba and Mc Intyre, 2012; Mills et al., 2012; El Gazzar et al., 2010), in Middle East (Abu-Zaineh et al., 2008) and in Latin America (Seinfeld and Besich, 2014). For European countries, OOP spending regressivity was ascertained in France (Debrand and Sorasith, 2010), in Estonia (Võrk et al., 2009) and in Hungary (Baji et al., 2012). The progressivity of OOP payments in the low-middle income Asian countries (e.g. Bangladesh, Sri Lanka, Thailand) occurs because of the utilization and access of health services more from the rich population than the income confined poor strata. This fact indicates that equity in health financing is more a theoretical rather than a real situation (Joe et al., 2008; Van Doorslaer et al., 2006, 2005). In Australia, the distribution of OOP payments over the time is regressive, while all health systems reforms since 1984 did not manage to affect efficiently the health care financing, except of the Lifetime Cover Scheme in the beginning of 2000, which encouraged population to purchase and hold PHI coverage with positive progressive outcomes on health funding (Hajizadeh et al., 2014).

In addition, our findings confirm previous studies regarding informal OOP payments in the Greek health sector (Nikolentzos and Mays, 2008; Papanikolaou and Ntani, 2008). Our descriptive results indicate that informal OOP payments are a major driver of health care financing in Greece and occur not only in the publicly-financed NHS hospitals but also in private health market **(**Souliotis et al., 2016). Regarding informal OOP payments, Greece, a country belonging to the European Union since 1981, can only be compared with the former Eastern Bloc countries **(**Gordeev et al., 2014; Tambor et al., 2014), but also with Turkey (Brown et al., 2014) and generally with low and middle income countries (Kankeu et al., 2014; Lindkvist, 2013). The paradox is that, while in Greece the combat against tax evasion is a vital governmental objective in order to achieve debt sustainability and restore public finances (Apergis and Cooray, 2015; Exadaktylos and Zahariadis, 2014), our findings suggest different conclusions.

5.2.3.1 Policy Implications: Study II

Policymakers have to implement radical measures in order to reduce the extremely high formal and informal OOP payments and to encourage the institution of PHI to complement the mandatory SHI.

No one can doubt the considerable role performed by the private hospital sector as an alternative health provider (Duckett, 2005) to the underfinanced and overcrowded Greek public hospitals (Sissouras, 2014), despite its high pricing policy for inpatient services. However, the Greek state must allocate more financial sources to public hospitals. The improvement of the services provided by public hospitals can offer (especially to the vulnerable and worse off groups) better accessibility, thus avoiding their extra-billing option to private hospitals (Kyriopoulos et al., 2014).

Also, policymakers should revise the pricing policy of Greek DRG's for inpatient cases in affiliated with EOPYY private hospitals. While the international experience suggests that a DRG includes any kind of medical and non-medical health care (Polyzos et al., 2013), the SHI reimbursement policy exempting surgeons' and anesthetists' cost components of DRG accounting. Practitioners' ward exemption from Greek DRG indemnity results to hospitalized insured to deal with these financial consequences in private hospitals (Niakas, 2013).

Policymakers should emend co-insurance rates with consideration to insured income level by substantially reducing or eliminating them for people with chronic health conditions (Lee and Shaw, 2014). Due to the Greek fiscal restraints, the revision of Greek DRG's pricing and the readjustment of co–insurance shares are recommended to be replaced by higher SHI contributions and a more efficient tackling to tax evasion in health system.

Furthermore, although gate-keeping for secondary health care is compulsory and encouraged by financial incentives to other countries, in Greece it is not a prerequisite norm, thus incurring financial costs for SHI and insured from unnecessary use and a supplier-induced demand practice of health services (Economou et al., 2014; Paris et al., 2010).
Another important issue that policymakers should settle directly is the significant delay of EOPYY's payments to private hospitals (Karakolias and Polyzos, 2014). In addition, the extra "haircuts" to private hospitals through re-bate, claw-back and retroactive upper ceiling mechanisms bring financial hardship to their budgets, and thereby, result to higher OOP payments to the insured (167A/23-07-2013, 2243/18-08-2014 Gazettes of the Government).

Finally, the state should reinstate tax incentive policies for individual PHI policyholders. The economic downturn on payroll scale, and the evidence of strong positive link between individuals' high income and purchasing of PHI, impose the state to revise the dissuasive legislation (4110/2013 and 4172/2013 Gazettes of the Government). On the other side, PHI firms should promote more flexible and premium affordable coverage programs in order to meet the tough economic situation of the potential subscribers (Economou, 2010).

Study III

5.3 Macroeconomic and financing determinants of out of pocket payments in health care: Evidence from 26 E.U. and OECD countries

In this section, we examine the impact of macroeconomy, public and private health insurance financing on OOP healthcare expenditures. Using fixed/random effects and dynamic panel data methodology to a dataset of 26 E.U. and OECD countries for a period lasting from 1995 to 2013, we find that public and PHI financing have a significant countervailing effect on OOP spending. Moreover, we show that unemployment rate has a significant positive impact on OOP expenditures. Sensitivity tests with variation of specifications and samples show that our findings are robust. We argue that policy-makers should give serious consideration to PHI institution; our results indicate that there is an inverse effect on OOP spending. We suggest that our examined countries have to provide financial risk protection to their citizens against OOP payments, rather than only attending health budgetary retrenchments in order to adjust public finances.

5.3.1 Study III Methods

Data and Methodology

Our sample includes a dataset of 26 E.U. and OECD countries for the period 1995-2013. We examine, using a macro panel data methodology, the impact of several macroeconomic and health financing variables on OOP payments. We test for validation of the reported results by using Hausman test, test for the stationarity of all series (panel unit root tests), Wald test and panel co-integration tests. Further, we conduct robustness check to examine our models in several additional ways.

Data

The balanced panel has a sufficient number of observations. For our empirical analysis we applied three alternative international databases. We gather annual health expenditure data from Global Health Expenditure Database (NHA) available from WHO. Also our data was complemented with annual macroeconomic data from the World Bank (WB) and governmental finance statistics from the IMF. Specifically, we include the countries for which a complete database of all variables of interest was available in order to obtain a sufficient number of observations (494). Inspired by the literature, we focus on complete data with high reliability in order to prevent the presence of structural breaks (missing variables) which could affect the coefficients of variables in our econometric approaches (Clemente et al., 2004;

Musgrove et al., 2002). Thus, because of non-availability of our data of interest for a longer period and for all EU and OECD countries, we limit the examined period from 1995 to 2013[53], while we unavoidably exclude 15 countries[54] (Barros, 1998). The final list of selected countries is given in Table 5.16.

Table 5.16: Selected countries

1.	Austria	8.	Germany	15.	Slovenia	22.	Republic of Korea
2.	Belgium	9.	Greece	16.	Spain	23.	Mexico
3.	Croatia	10.	Ireland	17.	U.K.	24.	New Zealand
4.	Cyprus	11.	Italy	18.	Australia	25.	Switzerland
5.	Denmark	12.	Netherlands	19.	Canada	26.	U.S.A.
6.	Finland	13.	Poland	20.	Chile		
7.	France	14.	Portugal	21.	Japan		

Variables

We consider OOP expenditures as the percentage of THE in line with other studies (Fan and Savedoff, 2012; Musgrove et al., 2002). OOP expenditure includes all health care expenses by households or individuals in the form of direct payments to health care providers, which are not reimbursed by any social, public or private health insurance scheme (Paris et al., 2010; Mossialos and Thomson, 2002).

Further, we consider macroeconomic explanatory variables such as: the GDP annual growth rate (Reeves et al., 2014; Smith et al., 2009; Barros, 1998), GGD as a percentage of GDP (Reeves et al., 2014; Keegan et al., 2013), unemployment rate (Keegan et al., 2013; Gerdtham and Jönsson, 2000) and inflation rate (Gerdtham et al., 1992a, 1992b). Governmental financing was defined as the Government Expenditure as a share GDP (Xu et al., 2011). Concerning the last explanatory variable, which measures «*the capacity of governments to mobilize revenues*» (Fan and Savedoff, 2012:9), our study investigates its impact on OOP expenditures under the assumption that public health benefits are expanded since more governmental revenues are available.

The designated health financing includes GGHE as a proportion of THE (Baltagi and Moscone, 2010; Van Elk et al., 2009; Jönsson and Eckerlund, 2003; Barros, 1998; Roberts, 1999; Hitiris and Posnett, 1992; Leu, 1986). We expect PHI financing to be negatively associated with OOP spending (Sekhri and Savedoff, 2005). We also include the variables such as PHI as a proportion of THE and PHI as a proportion of PvtHE (Thomson et al., 2014). An overview of all variables employed in our study is presented in Table 5.17.

[53] The Global Health Expenditure Database (National Health Accounts Indicators) by WHO provides internationally comparable numbers on national health expenditures from 1995 to 2014.

[54] We excluded 15 countries due to the missing data for several years, which particularly concern among others, the health financing variables of PHI financing to THE (Bulgaria, Czech Republic, Estonia, Hungary, Iceland, Israel, Latvia, Lithuania, Luxembourg, Malta, Romania, Slovak Republic, Sweden, Norway and Turkey).

Table 5.17: Variables, data source and definitions

Variables	Abbreviation	Source(s)/Code (if any)	Short Definition by Databases
OOP payments as a proportion (%) of THE	OOP/THE	WHO and World Bank (SH.XPD.OOPC.TO.ZS)	Out of pocket expenditure is any direct outlay by households to health providers and suppliers, when they utilize health care services. It is a part of private health expenditure. Here is expressed as a percentage of Total Health Expenditure (THE). THE is the sum of all outlays for health maintenance, restoration or enhancement paid for in cash or supplied in kind. It includes the General Government Expenditure and Private Expenditure on Health.
GDP annual (%) growth rate	GDP	World Bank (NY.GDP.MKTP.KD.ZG)	Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2005 U.S. dollars.
General Government gross Debt as a % of GDP	GGD/GDP	IMF, World Economic Outlook Database	Gross debt consists of all liabilities that require payment or payments of interest and/or principal by the debtor to the creditor at a date or dates in the future.
Unemployment, total (% of total labor force) (modeled ILO estimate)	UNEMPL	World Bank (SL.UEM.TOTL.ZS)	Unemployment refers to the share of the labor force that is without work but available for and seeking employment.
Inflation, average consumer prices (% change)	INFLAT	IMF, World Economic Outlook Database	A Consumer Price Index (CPI) measures changes in the prices of goods and services that households consume. Such changes affect the real purchasing power of consumers' incomes and their welfare. Annual percentages of average consumer prices are year-on-year changes.
Government Expenditure as a proportion of Gross Domestic Product	GE/GDP	World Bank (NE.CON.GOVT.ZS)	General government final consumption expenditure (formerly general government consumption) includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defense and security, but excludes government military expenditures that are part of government capital formation.
General Government Health Expenditure (GGHE) as proportion (%) of THE or Health expenditure, public (% of THE)	GGHE/THE	WHO and World Bank (SH.XPD.PUBL)	Public health expenditure consists of recurrent and capital spending from government (central and local) budgets, external borrowings and grants (including donations from international agencies and nongovernmental organizations), and social (or compulsory) health insurance funds.
Private Health Insurance (PHI) as proportion (%) of THE	PHI/THE	WHO	The expenditure on health by private insurance institutions. Private insurance enrolment may be contractual or voluntary. Here, PHI represents the level of private prepaid plans' expenditures for health care expressed as a percentage of THE.

Private Health Insurance as % of Private Health Expenditure (PvtHE)	PHI/PvtHE	WHO	Here, PHI represents the level of private prepaid plans' expenditures for health care expressed as a percentage of PvtHE. PvtHE is the sum of outlays for health by private entities, such as households, commercial or mutual health insurance, non-profit institutions serving households, resident corporations and quasi-corporations.

Econometric Methods

We employ panel data analysis through two different models. Fixed/random-effects panel models as well as a dynamic model (Xu et al., 2011). Mc Coskey and Selden (1998) referred that panel data analysis of studying national health expenses is not so miss-specified while Baltagi (2008) argued that panel data analysis provides more reliable estimates.

The main regression model of our study that can be estimated implying a panel object and represents country and period effects is:

$$y_{\mathrm{i,t}} = a + \beta_{i,t}\, X_{\mathrm{i,t}} + \delta_i + \gamma_t + \varepsilon_{i,t} \qquad \textbf{Equation 5.3.1-1}$$

Where *i* represents a country and *t* represents a year. In equation (5.3.1-1), a represents the constant of the model, y_{it} is our dependent variable and $\mathrm{X_{it}}$ is an exogenous vector of variables. In this setting $\beta_{i,t}$ is a vector of coefficients for the vector of explanatory variables (X_{it}) which was implied across cross-section and periods regressor parameters. In the above expressed formula δ_i and $\gamma_t$represent the cross section and period specific effects (random or fixed) respectively and ε_{it} are the error terms for i = 1,2,3…, M cross-sectional units observed for years t =1,2,3…T (Fan and Savedoff, 2012; Baltagi, 2008). The random effects model assumes exogeneity of all the regressors with the random individual effects (Baltagi, 2008:22). In our study, OOP expenditures as a percentage of THE refers to our dependent variable, while the explanatory variables of interest $X_1 \ldots X_8$ is presented in Table 5.17.

Inspired by Xu et al. (2011), we also employ a dynamic panel model in the case that country fixed/random-effects are correlated with the other explanatory variables of our regression model. Further, in empirical analysis exists the possibility several explanatory policy variables to simultaneously be determined with the outcome of the dependent variable (Bun and Sarafidis, 2015). Our dynamic panel model includes a lagged dependent variable among the regressors. The linear dynamic specification given by the formulas – Equation 5.3.1-2 and Equation 5.3.1-3:

$$y_{\mathrm{i,t}} = \sum_{j=1}^{p} p_j\, \mathrm{y}_{\mathrm{i},t-\mathrm{j}} + \mathrm{X}_{\mathrm{i},t}{}'\, \beta_{i,t} + \delta_i + \varepsilon_{i,t} \qquad \textbf{Equation 5.3.1-2}$$

$y_{\mathrm{i,t}} = \gamma \mathrm{y}_{\mathrm{i},t-1} + \beta_{i,t}\mathrm{X}_{\mathrm{i},t}{}' + \delta_i + \varepsilon_{i,t}$ **Equation 5.3.1-3**

The vector $\mathrm{X}_{\mathrm{i},t}$ represents the explanatory variables, where i = {1,..., N} and t = {1,…,T}. The first-difference of model (Equation 5.3.1-3) eliminates the individual effect and produces the below formulas (Anderson and Hsiao, 1981):

$\Delta y_{i,t} = \sum_{j=1}^{p} p_j\, \Delta \mathrm{y}_{\mathrm{i},t-\mathrm{j}} + \Delta \mathrm{X}'_{\mathrm{i},t}\beta + \Delta\varepsilon_{i,t}$ **Equation 5.3.1-4**

$y_{\mathrm{i,t}} - y_{i,t-1} = \gamma\left(\mathrm{y}_{i,t-1} - y_{i,t-2}\right) + \beta(\mathrm{X}_{i,t} - \mathrm{X}_{\mathrm{i},t-1}) + (\varepsilon_{i,t} - \varepsilon_{i,t-1})$ **Equation 5.3.1-5**

A more efficient estimation can be done by using additional lags of the dependent variable as instruments (Cameron and Trivedi, 2005). This can be estimated using the Generalized Method of Moments (GMM) approach which is based on a pre-defined set of instrumental variables and eliminates various endogeneity problems of fixed or random effects estimators (Bun and Sarafidis, 2015). The GMM estimation involves a system of different equations/instruments, for each time of period, in which the period-specific instruments corresponding to the different numbers of lagged dependent and predetermined variables available at a given period (Blundell and Bond, 1998; Arellano and Bover, 1995). The GMM estimator utilizes moment conditions in which lagged differences of y_{it} are instrumented for equations in levels (Equation 5.3.1-4) additionally with the appropriate lagged levels of y_{it} as instruments of their own first differences equation (Equation 5.3.1-5) (Baltagi, 2013).

In line with the work of Xu et al. (2011:10), our GMM panel dynamic model can be presented as:

$OOP/THE_{i,t} = \gamma * OOP_{i,t-1} + \beta_{i,t}{}'(GDP, GGD/GDP, Unempl, Inflat, GE/GDP, GGHE/THE, PHI/THE, PHI/PvtHE) + \delta_i + \varepsilon_{i,t}$
Equation 5.3.1-6

5.3.2 Results: Study III

Descriptive Results

An overview of the descriptive statistics is presented in Table 5.18. OOP expenditures average accounts for 21.73% of THE. The maximum value of OOP expenditures as a percentage of THE is that for Cyprus for the year 1996 while the minimum is that for the Netherlands for the year 2010. Table 5.18 also illustrates that on average a country PHI financing accounts for 7.26% of THE and 22.80% as a share of PvtHE. The average GGHE was 68.28% of THE. Government expenditure average accounts for 18.28% as a proportion of GDP. The maximum value of general government gross debt as a percentage of GDP corresponds to Japan for the year 2013, while for the same year the highest unemployment rate is that of Greece.

Table 5.18: Descriptive Statistics of selected variables (period 1995-2013)

*Variable:	OOP/THE	GDP	GGD/GDP	UNEMPL	INFLAT	GE/GDP	GGHE/THE	PHI/THE	PHI/PvtHE
Mean	21.73475	2.372351	62.11189	7.594737	2.873453	18.27627	68.28338	7.261246	22.80268
Median	17.58584	2.666721	56.12400	6.900000	2.293500	18.64018	72.34410	4.861767	18.56664
Maximum	64.86436	10.77811	242.5930	27.30000	35.06200	28.06423	87.57811	35.34569	64.21071
Minimum	5.298199	-8.86368	3.890000	2.000000	-1.706	9.951300	30.96866	0.000000	0.000000
Std. Dev.	12.33967	2.822418	37.66741	4.027075	3.358613	3.759645	13.40694	7.356271	17.46863
Skewness	1.249864	-0.71758	1.510636	1.735220	5.440983	-0.30564	-0.94228	2.054149	0.734373
Kurtosis	3.883090	5.132771	6.669893	7.173970	44.19583	2.857000	2.852850	7.527724	2.516872
Jarque-Bera	144.6697	136.0233	465.1052	606.5080	37369.32	8.112227	73.54871	769.3720	49.20709
Prob.	0.000000	0.000000	0.000000	0.000000	0.000000	0.017316	0.000000	0.000000	0.000000
Sum	10736.97	1171.941	30683.27	3751.800	1419.486	9028.475	33731.99	3587.055	11264.53
Sum Sq. Dev.	75067.84	3927.260	699484.9	7995.146	5561.179	6968.520	88614.75	26678.56	150440.5
Obs.	494	494	494	494	494	494	494	494	494

*The abbreviations of the selected variables are explicated in Table 5.17.

Further, we employ the augmented Dickey-Fuller (ADF) regression, as presented below, to test whether our findings from level regressions were biased when the dependent variable exhibits a unit root process (Levin et al., 2002:5).

$$\Delta y_{\mathrm{i,t}} = \alpha y_{it-1} + \sum_{j=1}^{p_i} \beta_{ij}\, \Delta \mathrm{y}_{\mathrm{it-j}} + \mathrm{X'}_{\mathrm{i},t}\delta + \varepsilon_{i,t} \qquad \textbf{Equation 5.3.1-7}$$

We conduct panel unit root tests with common unit root process (Levin et al., 2002) under the null hypothesis (H_0) that y_{it} has a unit root and the alternative (H_a) that there is not unit root, based on Equation 5.3.1-7. The null hypothesis and the alternative one can be presented as:

H_0: $\alpha = 0$
H_a: $\alpha < 0$

Further, we employ panel unit root tests assuming individual unit root process under the null hypothesis using three ADF statistic values *(i.e.* Im, Pesaran and Shin (IPS), ADF – Fisher Chi-square and PP – Fisher Chi-square (Im, Pesaran, and Shin 2003; Maddala and Wu 1999; Choi, 2001).

For example, Im et al. (2003) specify a separate ADF regression for each cross section as the given formula (Equation 5.3.1-7). The null and alternative hypotheses are given by:

$H_0: a_i = 0$ for all i

H_a: $a_i = 0$ for i = 1, 2,…, N_i ; $a_i < 0$ for i = N+1, N+2,…, N_i

Panel unit root tests results demonstrate that for all variables, except GGD/GDP, the null unit root hypothesis is rejected, thus the series are stationary (all P-values<0.05) (see Appendix D4-D10). For GGD/GDP variable, both common (P-value=0.4039, see Appendix D2) and individual (P-value > 0.05 both for IPS and ADF tests (Fisher & PP)) unit root process results demonstrate that the null unit root hypothesis is accepted in levels and rejected in first differences (P-value=0.0085, see Appendix D3). Therefore, GGD/GDP is non-stationary. Because of the presence of non-stationarity in level we employ panel co-integration tests (Kao, 1999). The results demonstrate that the null hypothesis of no co-integration is accepted, which it explains that there is not a relationship within the examined variables (t-Statistic=-0.696555 and P-value=0.2430, see Appendix D11).

Further, in order to investigate GMM method consistency, we imply the Wald test. The Wald statistic help us to test the joint significance of the explanatory variables asymptotically distributed as X^2 under the null hypothesis that the coefficients of our GMM model are equal to zero against the alternative that they are not (Agung, 2011). Our results confirm the consistency of GMM method (Wald Chi-square=4480.948 and P-value=0.00, see Appendix D12).

Regression Results

We choose between our fixed or random-effects approaches, to primarily test whether individual effects are correlated with the explanatory variables (Wooldridge, 2002). Thus, we employ the Hausman specification test to test the null hypothesis H_0 (no correlation between regressors and effects) of random effects against the alternative H_a (correlation) of fixed effects (Hausman, 1978). Particularly, the Hausman (1978) test provides the comparability of fixed effects versus random ones, under the assumption of null hypothesis that the individuals effects of the selected model are not correlated with its other parameters.

The results show that the null hypothesis (H_0) is not rejected (P-value=0.1974 and Chi-Sq.Statistic=11.076724, see Appendix D1). Thus, using the Hausman test, random effects model is considered the most appropriate to test our research hypotheses; it leads to less standard errors of coefficients and greater efficiency compared to the fixed effects model (Hsiao, 2003). The validity of our random effects model specification using a Hausman test does not call for the analysis of covariance model, as the fixed-effects model imposes (Xu et al., 2011).

Our random effects model equation is presented below:

$$OOP_{i,t} = a + \beta_1\, GDP_{i,t} + \beta_2\, GGD/GDP_{i,t} + \beta_3\, Unempl_{i,t} + \beta_4\, Inflat_{i,t} + \beta_5\, GE/GDP_{i,t} + \beta_6\, GGHE/THE_{i,t} + \beta_7\, PHI/THE_{i,t} + \beta_8\, PHI/PvtHE_{i,t} + \theta_i + \varepsilon_{i,t}$$

Equation 5.3.1-8

Where θ represents the random effect and it measures the pooled effect between and within country variation (Hsiao, 2003).

Further, we run both static and dynamic panel models on OOP payments. Both models (Table 5.19) indicate that national income measured by GDP annual growth rate and GGD/GDP do not have a statistically significant effect on OOP payments to THE. Government capacity (GE/GDP) demonstrates a significant negative influence on OOP payments in the static model, while in the dynamic it appears a significantly positive impact. Inflation rate demonstrates a significant marginally positive effect on OOP spending in the static model, while in the dynamic model is not statistically significant.

Table 5.19: Regressions for OOP expenditures as a share (%) of THE

Variable	Static Panel EGLS (Two-way random effects)	Dynamic Panel Generalized Method of Moments
C (Static) or OOP_THE(-1) (Dynamic)	93.00866** (58.41853)	0.175169** (6.392801)
GGD/GDP	0.003086 (0.808313)	0.001465 (0.244294)
GDP	-0.015218 (-0.660988)	0.005449 (0.217609)
GE/GDP	-0.118530* (-2.194655)	0.266187** (3.763395)
INFLAT	0.069374** (3.718600)	0.022696 (0.748643)
UNEMPL	0.098287** (4.120184)	0.118089** (5.523496)
GGHE/THE	-0.929176** (-41.45935)	-0.851283** (-28.13191)
PHI/THE	-1.036900** (-17.31742)	-1.170153** (-16.15011)
PHI/PvtHE	0.033657 (1.521408)	0.061801** (3.218879)
Adjusted R-squared	0.858684	
F-statistic	375.4533	
Prob(F-Statistic)	0.000000	

*Significant at 5%; ** Significant at 1%
The values in parenthesis correspond to t-Statistic

Unemployment rate appears to have a significant positive influence on OOP payments both in the static and dynamic model. The latter findings indicate that, apart from GE/GDP and unemployment rate, the other examined macroeconomic factors do not significantly influence OOP expenditure. Therefore, we can partially reject our third hypothesis (see section 1.5 Study III). Regarding the health financing variables, a negative change of 0.93% and 0.85% in OOP payments is associated with GGHE/THE increases 1% in static and dynamic model respectively, confirming thus our second hypothesis. Further, PHI spending as a share of THE has a significant negative impact on OOP payments. It is associated with almost 1.04 % decline in the OOP spending in the static model and 1.17% decline in the dynamic model, validating in this way our first hypothesis (see section 1.5 Study III). PHI financing as a share of PvtHE does not present a statistically significant influence on OOP spending in the static model whereas in the dynamic demonstrates a negligible positive effect on OOP payments (see Appendix D12).

Robustness Checks

We carry out robustness checks to examine the accuracy of reported results from our selected models in additional ways. We firstly examine whether our regression findings hold when removing explanatory variables. Thus, we test the same regression models excluding insignificant parameters (e.g. GGD/GDP, GDP and PHI/PvtHE). Our reported results do not subversively change with those from the initial static and dynamic regressions transformations. All specifications show qualitatively similar results, and report that GE/GDP, PHI/THE, GGHE/THE and unemployment rate significantly affect OOP payments (see Appendix D13). Further, in order to check the influence of potential outliers (with high PHI financing proportion (%) to THE), we exclude from our model three countries; Chile, France and U.S.A. Our findings do not importantly change[55] in this case, as given in Appendix D14. In a further step, we run the static and dynamic model excluding Chile, France and the U.S.A. as well as the reported insignificant parameters. Results do not qualitatively indicate any change; see Appendix D15. We also re-estimate our regression model by examining the influence of selected explanatory variables on OOP spending using data from the last decade which includes the beginning of 2008 financial crisis and its recession severity (*i.e.* we consider the period from 2005 to 2013). The results do not qualitatively or significantly present any change, except GE/GDP and inflation rate which represent a statistically insignificant impact on OOP expenditures (see, Appendix D16). Furthermore, we replace

[55] The GE/GDP is presented as a statistically insignificant parameter on OOP/THE in the dynamic model.

GGHE/THE with GGHE as a fraction of GDP, we exclude GE/GDP and PHI/PvtHE and finally test PHI financing measured in constant (2005) US$ per capita (in a natural logarithmic form), rather as a share (%) of THE, in order to ascertain any change. It is clearly demonstrated both in our static and dynamic model, that GGHE even as a share of GDP and PHI financing measured per capita have a statistically significant negative impact on OOP/THE (Appendix D17). Finally, we re-estimate our latter models designation in order to examine whether GGHE expressed per capita (constant 2005 US$), rather than a fraction of GDP, it could altered our results. In this case, GGHE expressed per capita has a significant countervailing effect on OOP/THE both in static and dynamic model while PHI financing measured per capita significantly affect OOP/THE only in our dynamic model (Appendix D18). As it can be observed both in Appendices D17 and D18, GDP growth rate has a significant positive effect on OOP/THE (Xu et al., 2011).

5.3.3 Discussion: Study III

This empirical study examines the influence of a considerable set of macroeconomic and health financing parameters on OOP payments. We extend previous studies by taking into consideration the role of the net PHI funding proportion to THE. Using panel data from 26 E.U. and OECD countries and applying random effects and dynamic models we investigated the impact of several macroeconomic and health financing factors on OOP payments as a share of THE.

It is clearly demonstrated in the current study, both from static and dynamic models, that unemployment rate has a statistically significant impact on OOP expenditures, while GDP and GGD/GDP do not (Keegan et al., 2013; Fan and Savedoff, 2012). Although, the universal coverage perspective for several healthcare activities in many E.U. and OECD countries, however, unemployment has as a consequence unemployed people to lose their insurance coverage and thus to deal with OOP expenses in order to meet necessary healthcare needs (Thomson, 2015:95; Thomson et al., 2015:164). Contrary to results of previous studies (e.g., Gerdtham, 1992a;1992b), we find that inflation rate has a marginally positive impact on OOP spending in the static model.

Government fiscal space measured by government expenditure as a share of GDP has a negative impact on OOP spending in our static model and a significant positive effect in the dynamic model. Previous studies find a significant negative effect of GE/GDP on OOP expenditures in their dynamic models (Fan and Savedoff, 2012; Xu et al., 2011)

According to our analysis, GGHE/THE has a significant countervailing effect on OOP spending to THE both to static and dynamic regression models. Similar results of public health funding impact on OOP spending are presented in the static model of Xu et al. (2011). Moreover, the results show that PHI/THE can be provided as an efficient pre-payment risk pooling mechanism against OOP expenditures (Basset and Kane, 2007).

The above findings have several policy implications. In times of recession severity, as the post 2008 era, countries policy-makers influenced by external financial institutions are used to implement significant cuts to public health care funding aiming to consolidate public finances (Jowett et al., 2015). Despite the fact that IMF financial assistance programs seems to have a positive influence on governmental healthcare expenditures (e.g. Clements et al., 2013), there is an intense criticism about IMF conditionalities on public health budgets (Stuckler et al., 2010). Borrowing countries by IMF present the half speed of increasing health system spending compared with them that they are not exposed to IMF lending (Stuckler et al., 2011). In addition, Reeves et al. (2014:5) find that IMF borrowing countries have an 80% probability to proceed on declining of healthcare spending.

Literature demonstrates that fiscal weak countries deterministically have to adapt the rigorous economic adjustments programmes (EAPs) of IMF in order to ensure external borrowing and meet bailout “rescue” packages for their economies (Kentikelenis et al., 2015). IMF requires from financially aligned countries rigorous set of structural reforms on their national expenditure budgets, which subsequently result in sharp reductions also in public health spending (Stuckler and Basu, 2009). Retrenchments on governmental health care financing mean benefits cuts and higher formal cost sharing; and thus higher levels of households OOP payments (Cylus et al., 2012). The sharpest declines in state health spending were concentrated most in Cyprus, Greece, Ireland, Portugal and Latvia (receivers of IMF EAPs) with various implemented strict measures to reduce public health budgets (Nolan et al., 2015; Jowett et al., 2015:60). For example, Greece and Portugal, mostly affected by the financial crisis exhibited a considerable increase in OOP spending since 2009, almost reaching the one third of THE (WHO, 2015).

The objective of health systems is to provide financial protection against OOP spending when using health care services (Mladovsky et al., 2012; Xu et al., 2007). Nevertheless, policy-makers attending on only fiscal objectives and pursuing financial institutions lending agreements ignore the fact that OOP spending deteriorates the well-being of population (Van Doorslaer et al., 2005) and creates an inequitable climate of health financing (Wagstaff et al., 1999). OOP spending is the most common form of health financing not only in developing countries (e.g., Kwesiga et al., 2015) but also in several developed (e.g., Kronenberg and Barros, 2014) and represents a considerable financial burden or even catastrophic for households (O'Donnell et al., 2008). Our results indicate that countries should increase governmental health funding in order to provide better financial protection on their population against OOP expenditures. Especially, when unemployment rate notes increasing trends and households' income declines (due to the recession severity for several countries) fiscal and health sector policy-makers have to revise their rigorous policies on public health financing (Thomson et al., 2010) and desist from decisions on short-term economic fluctuations when attending fiscal sustainability (Jowett et al., 2015). Fan and Savedoff (2012:8) state that *"…the trend of declining out-of-pocket health spending and rise in pooled health financing mechanisms is more a political than an economic process*", indicating in this way the crucial role of governmental policies on organizing health care financing.

Sekhri and Savedoff (2005) recommend that PHI institution can display as an efficient risk pooling mechanism against OOP spending for health care, especially in countries with limited budgetary health financing resources. It is clear from our results that PHI institution cannot be ignored by policy-makers as a supplementary financial safe net against OOP spending. In particular, when tax revenue and social health insurance systems face tight health budgets since financial crisis strains public financing resources (Thomson et al., 2014; Mladovsky et al., 2012), PHI inversely association with OOP expenditures proves that it is an alternative financing option in improving financial protection parallel to the governmental insurance schemes.

Chapter 6
Summary and Conclusion

This study is based on the development of three studies, which aim to provide empirical evidence regarding the relationship between OOP payments and the rest health financing schemes, such as the public health spending and PHI funding. Apart of the health financing parameters, in the third study we also involve the effect of the macroeconomy on OOP expenditures.

We carry out each of these three studies, by working upon specific research hypotheses in order to test them and meet our research aims. In the first study, we examined Greek SHI efficiency in accordance with its insured OOP payments levels, by using data gathered from a cross-sectional survey in Greece. We employ the catastrophic health expenditure methodology and an OLS regression model to find that OOP expenses for private hospitalization have a positive relationship with SHI funding and that the new SHI carrier fails to financially protect its members for catastrophic OOP spending. In a similar methodology vein, in the second study, we provide evidence that additional PHI to compulsory SHI coverage has a significant negative effect on OOP payments for private hospitalization, as well as, that overall health financing for private hospitalization is regressive. Further, by using random effects and dynamic panel data methodology to a dataset of 26 E.U. and OECD countries in the third study, we exhibit that government health expenditure and PHI funding present a negative impact on OOP spending. Moreover, we present that unemployment rate has a significant positive impact on OOP expenditures.

Finally, chapter 6 concludes our study. In this chapter, we comprehensively present a summary of each one study, while we considered crucial to provide a synthesis of our main findings, in terms of the general relationship between our examined variables. Further, this chapter also highlights potential limitations of the study, as well as, recommendations for future research.

6.1 Conclusive remarks and main findings of the study

6.1.1 Empirical findings of each individual study

Study I

The first study investigates the incidence, intensity and distribution catastrophic impact of OOP payments incurred by Greek SHI policyholders for inpatient treatment in private hospitals; as well as the effect of SHI risk protection mechanism and other explanatory factors on these individuals' health expenses. In particular, by proceeding on a cross-sectional quantitative study for collecting individually micro-data cases during the first semester of 2013, we examine the effect of Greek SHI funding on its insured members' OOP spending for private hospitalization.

Research hypotheses testing

Particularly, using the widely accepted methodology for estimating the catastrophic impact of medical payments on health consumers' living standards, our findings give evidence that the unique SHI carrier in Greece fails to protect its members against the catastrophic impact of inpatient OOP payments in private hospitals. The incidence and intensity results reject both our hypotheses as presented in section 1.5 (Study I). A significant proportion of the hospitalized insured (*i.e.* 37.80%) proceeded on medical payments greater than the crucial benchmark (10%) that classifies OOP spending as catastrophic in accordance to their AGI. Our analysis leads to a conclusion that OOP payments in private hospitals in Greece have a catastrophic impact especially amongst the poor people despite the ̈full ̈ coverage of SHI. Both the incidence and intensity concentration indices record negative values, indicating in this way the greater inclination of the poor to incur catastrophic OOP spending for healthcare treatment in private hospitals. Further, the employed multiple regression analysis under OLS methodology exhibits important findings to be discussed. The empirical results demonstrate that the SHI scheme instead of having a tackling effect on formal and informal OOP payments, paradoxically affecting positively them. As it could be expected, the SHI coverage in a well-developed national health system should have a negative impact on OOP payments, rather than promoting them. This paradoxical situation is mainly driven by the remarkable statutory co-insurance rate (*i.e.* patient cost-sharing) on DRG pricing by SHI policy and the expensive length of hospitalization stay in private hospitals for severe medical DRG events.

Our findings strongly suggest that the Greek rigorous fiscal agenda which was inescapably implied also in public health financing landscape generates SHI financial protection inefficiency against the financially catastrophic effects of population health shocks. Our findings, based on the adopted catastrophic measurement methodology and our econometric approach, suggest the rejection of the first hypothesis.

Xu et al. (2003) support the view that OOP payments are not the only driver of catastrophic health care payments, since also SHI mechanisms failure to provide financial risk pooling constitutes an important determinant. Countries affected by the financial crisis should increase financial risk protection against OOP payments through the growth of public health financing, rather than only attending the tough austerity monitoring by external financial institutions. Previous empirical evidence advocated that the growth of state health financing contributes to declining OOP payments and highlights how policy-makers affect this spending (Fan and Savedoff, 2012). Greek policy makers focus only on achieving fiscal adjustments succeeded in generating growth of OOP payments. Results indicated that policy makers have to pay more attention on the catastrophic impact of formal and “hidden” informal OOP payments; and the funding inefficiency of SHI, which undermines the present and future wellbeing of the population. Our results further suggest that insured private medical outlays comprise a remarkable proportion of informal payments to health providers. Informal-untaxed OOP payments to private physicians for private healthcare hospitalization constitute a significant parameter of the large underground health economy in Greece. The over the times obstructiveness of Greek authorities to arrange informal OOP spending calls for urgently tax reforms and interventions to impugn this phenomenon in health sector financing.

Apart from public and social health insurance schemes that protect citizens from the financial hardship of health shocks, PHI institution is also an important player in health care financing even in health systems where public coverage plays a dominant role (Pearson and Martin, 2005). Complementary or supplementary PHI working in parallel to SHI could be a potential mechanism of eliminating the financial burden or even catastrophe of OOP expenses (Siskou et al, 2009; Sekhri and Savedoff, 2005).

Undoubtedly, the theoretical evidence drove us to a further research in order to examine the potentiality of PHI to reduce insured formal and informal OOP payments in private hospitals in Greece. Additionally, the findings of our first study (Study I) called for a re – consideration of our model in addressing also the PHI factor in total financing. In countries with low state health care funding due to fiscal weaknesses, it had to be tested if PHI can be established as a parallel prepayment mechanism to SHI, efficient to provide financial risk pooling to the whole population rather than the better-off individuals, especially against catastrophic OOP payments.

Study II

With this in mind, we proceeded on a second round cross-sectional quantitative study during the second semester of 2013. We contacted this time a total of 426 insured respondents, hospitalized at least once in private hospitals affiliated with SHI organization. Further, we succeeded in contacting both purely SHI insured respondents and several of them who combined the compulsory SHI coverage with additional PHI programs.

Given this desired research backdrop, the second study assesses the effect of combining compulsory SHI and individual or collective PHI coverage on private hospitalization OOP payments by adopting a multiple OLS regression-based model. It also examines the effect of compulsory SHI and mixed SHI-PHI schemes against catastrophic OOP spending in affiliated private hospitals with the unique social health insurance organization of Greece, by also employing, similar to the first study, the literature computation methodology for measuring financial catastrophe due to OOP spending.

Research hypotheses testing

In accordance with the first study findings, our results in the second one exhibit again that EOPYY failed to protect the Greek population from high or even catastrophic OOP payments in private hospitals. Private hospital expenditure in Greece, under the contractual backdrop of affiliated providers with EOPYY, exhibits an excessive over-reliance on OOP payments. Almost 55% of the total private hospitalization financing relies on OOP payments, substantially downgrading in this way the role of the new SHI carrier in the Country to ensure financial protection. According to Xu et al. (2003), EOPYY's insured members have greater likelihoods to experience financial catastrophe due to OOP payments for private hospitalization, since OOP payments account for more than 15% to total private hospital expenditure. In addition, our regression results strongly suggest that SHI financing instead of having an offsetting influence on OOP payments, it positively affects them, rejecting in this way our first hypothesis (see section 1.5 Study II). On the other hand, our findings may help policymakers and insured to revise their views about the potential of PHI against financial catastrophe when a health risk occurs. In particular our econometric results show that the compulsory SHI with parallel PHI have a countervailing effect on OOP payments. This mixed health insurance plan negatively affects (-0.9%) OOP spending for received healthcare services in private hospitals, validating thus our second hypothesis. Further, incidence and intensity results demonstrate that the SHI-PHI group of insured is efficiently protected against financial catastrophe for private hospitalized healthcare. Only 1.56% of SHI-PHI subscribers incurred hospitalization costs more than the catastrophic critical limit 10% of their living standards, contrary to the high enough 69.64% of the purely SHI respondents (*i.e.* insured). Therefore, we can safely testify that SHI does not protect insured from CHE due to private hospitalization treatment, as the combination of SHI and additional PHI does (see our research hypothesis in section 1.5 Study II). Further, the treaty of equity in health funding is rebutted, resulting thus the worse-off group of insured to incur higher health expenses than their share of ATP for them. Our findings exhibit that the overall inpatient health care funding is regressive ($\pi_{\kappa}^{overall}$ = -0.20421). Therefore we have to accept our forth hypothesis. As catalytic driver for the overall regressivity displays OOP spending, since all its disaggregated components are regressive and dominate on the total private hospital expenditure.

The deep recession of the Greek economy in the current period cannot reverse this situation with the given SHI contributions. The predominant trend of reliance on OOP payments in the Greek health system imposes higher levels of catastrophic health expenditures (Saksena et al., 2014). Nevertheless, the extremely high share of OOP payments in Greece and other countries in recession requires from policymakers to face PHI as an alternative source of health financing in order to reduce the financial ruin of households OOP spending. According to our findings, PHI can serve as an additional risk pooling mechanism against high or even catastrophic OOP payments for health care, especially in countries with limited health financing resources (Sekhri and Savedoff, 2005). Policymakers, while pursuing solely deep cuts in public healthcare budgets, they shift health expenses to households, thus increasing OOP payments and creating health access barriers among the vulnerable and the post-2008 financially shocked population.

Following this micro-data level data approach, we had next to further examine the effect of several macroeconomic and health financing conditions on OOP expenditure by also using a macro-data approach based on panel data analysis. The availability of aggregated health financing variable data by official on-line databases offers us the opportunity to validate our micro-data cases results under also a macro-data level approach.

Study III

Turning to the third study, we use fixed/random effects and dynamic panel data methodology to a dataset of 26 E.U. and OECD countries for the period 1995-2013 to examine the impact of several macroeconomic and health financing conditions on OOP expenditure. Inspired by other published studies (e.g. Fan and Savedoff, 2012; Xu et al., 2011), we focus on governmental health financing effect on OOP payments, while serious consideration is given to the potential of PHI funding to THE at a national aggregated-level to deal with this issue.

Research hypotheses testing

This study shows that GDP growth and governmental debt as a share of GDP in OECD and European countries do not have a statistically significant impact on OOP spending. Both static and dynamic panel data methodology clearly present that macroeconomic factors, such as national income growth rate and government debt do not influence at all OOP spending in European and OECD countries. Unemployment rate has a positive influence on OOP expenditures, exhibiting that the loss of insurance coverage as a result of job position loss leads to OOP payments raise. Inflation rate displays as a significant marginally positive driver in the static model and as an insignificant parameter in the dynamic. Government expenditure as a share of GDP presents different influences in static and dynamic models; nevertheless it presents a significant impact on OOP expenditures. Summarily, our results indicate that few of the examined potential macroeconomic factors, such as government expenditure share to GDP and unemployment rate are significantly associated with OOP spending, confirming thus our third hypothesis (section 1.5 Study III).

Results indicate that governmental (public) and PHI financing have a significant negative effect on OOP expenditures. A negative variation of 0.93% and 0.85% on OOP payments share to THE is associated with governmental health spending 1% in static and dynamic model respectively. Further, PHI as a share of THE records a significant negative impact on OOP payments, since every 1% variation on PHI variable is associated with almost 1.04 % decline in the OOP expenditure to THE in the static model and 1.17% decline in the dynamic model. Hence, our first and second hypothesis are validated since our econometric results evince that both GGHE and PHI to THE have an inversely impact on OOP expenditure (section 1.5 Study III).

Our findings reveal that the sparing public health funding by several countries result in higher OOP spending levels to THE. Health care benefits cuts, higher patient cost sharing and various other policy responses to current crisis lead to cost shifting from public health funding to OOP spending. Decreasing health care budgets to deal with government deficits and meet bailout conditions increasing health systems reliance on OOP expenditures. Policy-makers should proceed on increases of governmental health financing and provide financial protection against OOP spending, especially to the vulnerable groups of people and those who have been affected by the economic downturn. Fiscal decision making requiring only strict compliance to EAPs and pro-cyclical patterns of public health spending, it disregards completely the fundamental health policy goals; financial protection and access to healthcare facilities.

Based on the above results, we recommend that the reduction of OOP expenditures can be achieved through PHI pre-payment schemes. Since increases in public health budgets is not a goal for fiscal management authorities in the current economic climate, EU and OECD countries leaders should promote the voluntary PHI institution as an additional shield against households OOP spending financial hardship. Policy-makers affected by the financial crisis should face PHI institution as a supplementary financing transition mechanism in order to complement the limited public financing resources and ensure better financial protection against OOP expenditures.

6.1.2 Synthesis of empirical findings

Given the results obtained from each one study three important conclusive distillates are emerged from this study. According to the results presented in sections 5.1.2 and 5.2.2., it is clearly portrayed that catastrophic OOP healthcare spending can be incurred even in a developed European economy, such as Greece, and not only in low-income and developing countries with insufficient national health insurance risk-pooling mechanisms. The second conclusion is related to the importance of government health funding (*i.e.* political fiscal actions) on OOP expenditure variation. The third one is related to the specific countervailing effect of the parallel PHI funding that supplements SHI on OOP expenditure.

By exhibiting counter-cyclical trends, a group of countries, such as Austria, Belgium, France, Germany, Netherlands and the USA had increased social welfare spending since 2010, including government health funding, despite the temporary GDP declines post to the 2007-2008 financial crisis outburst. Counter-cyclical economic policy on public budgets implies governmental social expenditure to be increased or even to remain stable as GDP notes negative growth rates. Therefore these countries, instead of moving on public health spending limitations, preferred to stimulate social health funding in order to satisfy their population health needs, as it is reasonable in times of economic squeezing (OECD, 2017a). The employed counter-cyclical economic policy and the over the years generous public health spending result in moderate levels of OOP payments for these countries (OECD, 2017a).

According, to Reeves et al. (2014:2), the large economic shocks, such as the sustained GDP declines, upward trends of unemployment rate and severe fiscal weaknesses due to the high levels of public debts and deficits, may compel governments to deep and rapid cuts on public health spending. Under this theoretical backdrop, a group of European economies, such as

Cyprus, Czech Republic, Greece, Iceland, Ireland, Portugal, Romania, Slovenia, Spain and the UK proceeded on significant cuts of public health expenditure in order to address their fiscal pressure, presenting a pro-cyclical economic policy on public health budgets; public health spending is deterministically driven by GDP annual growth rates (Thomson et al., 2014). Government health budgets reduction means health benefits cuts and higher formal cost sharing rates and thus, greater levels of direct OOP payments to insured. The pro-cyclical economic policies on public health financing associated with the prolonged recession period for countries, such as Greece, Ireland, Spain and Portugal, reflect governments unconcern for health systems main objective; financial protection against high OOP payments for healthcare (Moreno-Serra et al. 2011).

With public health expenditure reaching almost 80% of THE, countries such as, Austria, Belgium, Canada, Denmark, France, Germany, the Netherlands, Norway and Sweden have succeeded in keeping OOP spending proportion under 15% of THE, indicating an effective health system financial protection framework against households high or catastrophic OOP payments (see Tables 2.4 and 2.5 in chapter 2). Especially, in France and the USA, where PHI financing plays an important supplementary and primary role besides their compulsory health insurance arrangements, OOP payments to THE correspond to low levels; 7% and 11.46% respectively.
On the other side, Greece's government health expenditure accounts for barely 59.65% of total CHE in 2014; one of the lowest in the EU (28) and quite lower than the OECD average, 71.85% (Eurostat, 2017; OECD, 2017a). Amongst OECD economies, Greece exhibits the 3rd worse position out of 35, with the worst leading positions to be classified by Mexico (51.83%) and Korean Republic (56.50%) for the same year. Limited government health expenditure is also presented in Bulgaria, Chile, Cyprus, Hungary, Latvia, Lithuania and Portugal (Eurostat, 2017; OECD, 2017a), hence causing OOP payments to diachronically constitute a significant contributor of their total health financing. In Greece, OOP payments approached 35.4% of total CHE much higher than the OECD average; 20.6%, classifying the Country in the 4th worst position, after the outliers Mexico (41.5%), Latvia (38.9%) and Korea Republic (36.8%). Chile, Hungary, Portugal, Switzerland and Spain follow the OOP spending race in the Group, indicating figures almost to the one third of their total health financing (OECD, 2017a). Similarly, Cyprus, Bulgaria and Lithuania exhibit substantial OOP payments proportions to total CHE, 49.8%, 45.8% and 31.5% respectively, indicating their health

systems over-reliance on population private medical outlays rather than on public and PHI risk pooling mechanisms (Eurostat, 2017).

Apart from the OECD outliers, Greece, a high-income country with advanced NHS and SHI establishments since 1983, can only be compared with some of low and lower middle-income countries national healthcare systems with insufficient resources to ensure and provide financial protection on their citizens against OOP medical payments (e.g. Ethiopia, Congo, Haiti, Laos PDR, Vietnam etc.). Based on WHO's national health accounts indicators for the last available year 2014, Greece simulates an OOP spending proportion to THE (34.86%) similar with this of several developing countries in the rest of the world (see Table 6.1) (WHO, 2017a). Such a figure indicates the high enough probability of Greek population to incur financial hardship or catastrophe due to OOP spending (Xu et al., 2003).

Table 6.1: Comparison of OOP payments proportion (%) to THE between Greece and several developing countries globally, which exhibit similar OOP expenditure figures for the year 2014

WHO's average	Greece	Africa Region	OOP (%) to THE	Asia Region	OOP (%) to THE	Latin America Region	OOP (%) to THE
18.20%	**34.86%**	Benin	39.10	China	31.99	Argentina	30.73
		Burkina Faso	39.09	Iran	39.73	Guyana	37.44
		Chad	39.15	Kyrgystan	39.40	Haiti	34.82
		Congo DR	38.77	Turkmenistan	34.77	Nicaragua	37.54
		Ethiopia	32.26	Laos PDR	38.98	Trinidad-Tob.	37.98
		Liberia	30.73	Lebanon	36.42		
		Senegal	37.28	Malaysia	35.30		
		Tunisia	37.73	Mongolia	41.63		
		Zimbabwe	33.73	Sri Lanka	42.09		
		Zambia	29.99	Vietnam	36.76		

1. Here, household OOP financing is expressed as a percentage of Total Health Expenditure (THE). THE is the sum of all outlays for health maintenance, restoration or enhancement paid for in cash or supplied in kind. It includes the general government expenditure and private expenditure on health, taking also into consideration investments (capital expenditures).

Source: WHO (2017a). National Health Accounts (NHA) indicators - Global Health Expenditure database. Available: http://apps.who.int/nha/database. Authors' calculations based on WHO (2017a). Data extracted on 23 April 2017.

According to our micro-data empirical results provided in sections 5.1.2 and 5.2.2 the cost containment measures that Greek government had to rigorously adopt following the fiscal hints of external creditors, result in significant financial burdens or even catastrophic consequences to individuals' well-being from the substantial OOP payments for private hospitalization. The remarkable employed formal cost sharing through a co-insurance rate at 30% or 50% on SHI DRG pricing policy and the exclusion of surgeons and anesthetists fees from SHI DRG reimbursement methodology, as a broader part of the austerity responses for reducing SHI expenditure, show a tendency of Greek state-planners on exclusively pursuing fiscal compliance and sustainability rather than social welfare objectives. Our results indicate that SHI budget reductions imposed by the international financial institutions due to the Country's fiscal pressure generate remarkable OOP spending disproportionally greater for the worse-off Greek insured in accordance with their ability to pay for inpatient healthcare.

Recent published studies advocate that significant population proportions in Portugal incur CHE due to the high level of OOP to total health financing, presenting like the case of Greece, an oxymoron situation for a high-income European country with well-organized health insurance arrangements (Quintal and Lopes, 2016; Kronenberg and Barros, 2014). Similar patterns are also presented in Korea, where also OOP payments account for a large share of total CHE (Lee et al., 2016).

Nevertheless, our results presented in sections 5.1.2 and 5.2.2 strongly suggest that the situation for private hospitalization in affiliated providers with EOPYY, is similar with this of several developing countries health systems. Greek poor insured are more likely to exceed the catastrophic threshold in accordance with their living standards, similarly with the treated people in China, Nepal, Sri Lanka and Vietnam (Van Doorslaer et al., 2007). Limwattananon et al. (2007) estimate that Thai population is more exposed to financial catastrophe for hospitalization care, while Karan et al. (2014), Shahrawat and Rao (2011) and Devadasan et al. (2007) ascertain that Indian population is also experienced CHE due to inpatient medical costs, since national or community health insurance arrangements in both countries provide partial coverage and benefits. A similar published study for Nepal, presents that an excessive proportion (85.25%) of Nepalese patients who had received inpatient healthcare for Kala-azar illness, proceeded on medical OOP payments greater than the catastrophic threshold 10% of their annual income, while the estimated concentration indices, like our study, indicate that the worse-off are more prone to incur CHE. Similarly, for Vietnamese population, Nguyen et al. (2017) estimate that 59.02% of their survey respondents incurred CHE in 2010 due to the extremely high OOP costs for hospitalization treatment, since national health insurance did not exhibit any significant impact on decreasing OOP spending. Further, the inefficiency of national health insurance in Bangladesh to deal with OOP spending, exposes worse-off population to be more vulnerable to CHE (Rahman et al., 2013), in a similar vein with the Greek SHI coverage against OOP private hospital expenditure. The findings of a study for Lower Myanmar also indicate a greater tendency for the worse-off to overcome the catastrophic threshold due to the inexistence of any national health insurance plan (Lwin et al., 2011). Kimani et al. (2016) and Chuma and Maina (2012) note that the high share of OOP spending to THE is the main driver for the exposure of Kenyan population to CHE and impoverishment, while the worse-off spend greater than the better-off respectively to their ATP. Similarly for Uganda, Xu et al. (2006) estimate that the incidence of OOP spending is more intense among worse-off population. In a neighboring country to Greece, Albania, where also informal and illegal OOP spending is a major health funding feature, poorest population presents a greater tendency to overcome the catastrophic ratio (Tomini et al., 2013). Furthermore, Salti et al. (2010), estimate that a significant proportion (13.3%) of Lebanese population incurs CHE, while the poorer are more prone to suffer financial catastrophe due to OOP spending. Knaul et al. (2013) estimate that the poorer and most vulnerable groups (e.g. chronic illnesses, disabled etc.) of the population in Latin America and Caribbean region present a greater tendency to incur financial catastrophe from OOP spending for receiving healthcare.

Further, our results in sections 5.1.2 and 5.2.2 testify that the Greek SHI financing, instead of having a negative effect on OOP payments for private hospitalization, paradoxically affects positively insured OOP payments in affiliated providers with EOPYY. Similar patterns are identified in several Latin American countries (e.g. Argentina, Brazil and Panama), in former socialist democracies (e.g. Croatia and Estonia) and even in developed settings, such as the USA and Switzerland (Murray et al., 2003). This paradoxical situation has been also reported in Colombia (Amaya-Lara, 2016), in China (Li et al., 2014; Wagstaff and Lindelow, 2008), in India (Shahrawat and Rao, 2011) and in Zambia (Ekman, 2007). All the previous aforementioned scholars advocate that the positive impact of national health insurance on high or even catastrophic OOP spending is mainly driven by the induced-demand of health providers to health consumers for upgraded hospital amenities, more executive and new-tech treatment that SHI is inefficient to cover. Further, our findings simulate that ones of a recent empirical study for Vietnam, where almost the one third of hospitalized survey respondents for injury treatment incur CHE, while the phenomenon is more intense for those hospitalized patients with major injury operations and longer inpatient stay (Nguyen et al., 2017). Finally our results indicate that the choice of provided inpatient treatment in private hospitals result in high or even catastrophic OOP payments for Greek insured due to the inefficiency of Greek public facilities to satisfy insured population hospitalization healthcare needs. Similar results are presented for private hospitalization in Thailand (Limwattananon et al., 2007) and India (Sinha et al., 2016), where the incidence of CHE is greater for those hospitalized patients who seek healthcare in private hospitals.

According to the evidence provided in section 5.3.2, it is clearly demonstrated both from the employed static and dynamic models that government health spending has a statistical negative effect on OOP spending even in our macro-data level approach. Despite the fact that the EAPs by the external creditors' financial assistance conditionalities require substantial declines in government health expenditure, policy-makers should revise their parsimonious policies on health budgets whereas they want to promote financial protection against OOP spending. However, the current financial crisis had induced devastating consequences for the national economies of several European countries, and especially for those with remarkable public debt and deficit.

For instance, Greek governments had succeeded in reducing primary deficit[56] by adopting rigorous fiscal and structural policies throughout the public sector expenditure field[57] in order to achieve fiscal adjustment and comply with MoUs (World Bank, 2017). As a result, the Greek primary deficit had been declined from 10% of GDP in 2010 to nearly zero (0.1%) in 2016 reflecting a tough austerity environment for the Country, since government expenditure to GDP presented a significant decrease, almost 16%, for the same period (from 23.3% in 2009 to 19.6% in 2016) (World Bank, 2017).

As we have already pointed out, massive reductions had been met in public health budgets, reflecting Greek general government health expenditure to GDP to be one of the lowest (4.97%) among European economies in 2015 and far beyond the OECD average (6.58%). Government health spending as a share (%) to GDP had been strongly compressed in Greece, exhibiting a collapse nearly 27% from 2009 to 2015 (OECD, 2017a). Nowadays, the Country's external creditors require revised public finances targets, calling for a higher degree of austerity for the Greek population. IMF suggests to Greek government a primary fiscal surplus 1.5% of national income (GDP) for the 2017, while the EC and ECB argue for an even higher, 3.5% of GDP for the 2018 (Nelson et al., 2017). Under a fiscal unstable and uncertain environment public spending retrenchments emerge as one-way direction for the severely affected by the crisis countries, such as Greece. Although, public health financing raise lead to negative fluctuations of OOP expenditure based on our panel data econometric results, political preferences on understanding external creditors' conditionality reforms totally ignore social policy objectives.

[56] i.e. state revenue minus expenditure; excluding loans payments.

[57] e.g. declining of health financing, social subsidies and benefits, public officers' salaries, pensions, military expenditure etc.

According to our results (see section 5.3.2), government health spending to THE presents a significant inverse impact on OOP expenditure to THE both to static and dynamic regression models, similarly with the provided results on the static methodology of Xu et al. (2011). Further, both from our static and dynamic methodology is estimated that unemployment rate presents a statistically significant positive impact on OOP expenditure, while other macroeconomic parameters, such as GDP and governmental debt to GDP do not, in a similar vein with the results of Keegan et al. (2013) and Fan and Savedoff (2012).

Sekhri and Savedoff (2005:127) very aptly refer that scholars and policy-makers had given little consideration regarding PHI institution importance, on both low and high-income countries health system financing landscape. PHI institution supplements national or societal health funding schemes in several European and OECD countries (e.g. France and the USA), resulting in low levels of OOP healthcare payments (OECD, 2017a). PHI complements or supplements national or social health insurance schemes either by providing coverage for healthcare services excluded by the publicly security funds, by ensuring faster access to new-tech healthcare treatments and private providers or by reimbursing formal patient cost sharing. Nevertheless, PHI financing in Greece represents a minority report for the Greek health system despite the significant level of OOP payments (*i.e.* 35.37% in 2014) over the years in the Country. PHI accounts for 3.74% in the overall Greek healthcare financing in 2014 (OECD, 2017a). In contrast, PHI allocation to total CHE in other OECD countries represents significant proportions (e.g. in Canada, 14.99%; France, 14.35%; Ireland, 15.29%; the Netherlands, 7.07%; Austria, 6.39% and Belgium, 4.61%). Statistics indicate, that these countries have managed to maintain OOP spending less than 15% of total CHE by combining additional PHI to statutory state health insurance in order to decline households and individuals' OOP expenses for healthcare utilization (OECD, 2017a) (see Table 2.4 in section 2.3.1). The excessive percentage of OOP payments to total CHE for Greece raises doubts about the efficiency of social insurance policies to deal with formal and informal OOP spending. The findings of our study provide evidence that OOP payments for private hospitalization constitute a significant financial burden or even a financial catastrophe for several Greek insured. Moreover, the poorer hospitalized insured are more likely to incur catastrophic OOP spending. Further, progressivity results indicate a vertical inequity in overall health financing, since the worse-off spend for private inpatient services disproportionately more than their ATP. Policy-makers in Greece and in other OECD countries with substantial levels of OOP payments (e.g. Cyprus, Korea, Latvia, Mexico, Portugal and Spain) have to revise their views on strictly focusing only on mandatory public health insurance schemes. Fiscal and health policy decision-makers should consider either increasing public health expenditure or promoting the development of sustainable mixed health insurance schemes in order to improve efficient safe-nets mechanisms against the risk of financial hardship due to OOP payments. According to our results, additional PHI coverage to statutory social insurance mechanism emerges as an efficient financial protection option to health-risk affected insured against the SHI partial reimbursements or excessive OOP spending. Therefore, state decision-makers have to encourage PHI institution by implementing reforms and providing tax incentives for additional insurance coverage to statutory public, while on the other hand, PHI companies have to introduce more affordable plans which may attract potential enrollers (Economou et al., 2014)

Especially, in periods of economic stringency with tight government health budgets under international institutions scrutiny, PHI emerges as an alternative health funding contributor. The limited fiscal space for countries, such as Greece, Italy, Portugal and Spain, to proceed in sufficient national or social health spending in order to provide financial healthcare protection to their citizens, calls for a complete review of PHI potential on health systems financing. When government health expenditure records descending trends due to the adopted bailout consensus agreements, PHI can play an alternative role on health financing contribution and hence, on health systems primary goal; financial protection. This is verified by the evidence provided on both our micro and macro-data analysis approach. The results presented in 5.2.2 section, using the widely accepted methodology of measuring catastrophic healthcare payments, indicate that complementary or supplementary PHI parallel to compulsory SHI, succeeded in providing financial protection on Greek insured against catastrophic OOP spending for private hospitalization. Further, our econometric results in section 5.2.2 strongly indicate that complementary or supplementary PHI to mandatory SHI has a significant negative impact on OOP spending.

A previous published study indicates that additional PHI to mandatory national or SHI lowers the likelihood of OOP payments for the population aged 50 or over in France, Greece and the Netherlands (Holly et al., 2005). In a similar vein, Paccagnella et al. (2013) estimate that additional PHI to compulsory state health insurance has a significant negative effect on OOP spending for individuals aged 50 and over only in the Netherlands, while the effect is positive for Austria, Denmark, Italy and Spain. PHI effect on OOP spending is insignificant for Belgium, France, Greece, Germay, Sweden and Switzerland. Nevertheless, our results present similar trends like the study of Dukhan et al. (2010), who state that the additional PHI to compulsory national in France has succeeded in declining OOP payments for French population. Further, for Lebanon (Salti et al., 2010), for Egypt (Rashad and Sharaf, 2015), for Turkey (Yardim et al., 2014) and for Iran (Piroozi et al., 2016) PHI alongside with the compulsory national or societal health insurance can reduce the likelihood of catastrophic OOP spending for healthcare.

Our OLS regression approach also indicates that the combination of SHI-PHI shows a strong counterbalance effect on OOP spending for private hospitalization. Further, turning into our macro-level approach, the econometric results of both our static and dynamic modeling, testify that PHI has a significant negative impact on OOP expenditure (see section 5.3.2).
Palaşcă and Enea (2014) estimate that PHI financing has a significant inverse impact on OOP to THE for 23 European countries, using data from 2007 to 2011, notwithstanding their limitation for determining and evaluating PHI financing to THE.

6.1.3 Policy implications

The alarming findings of this study, both under our micro and macro-data approach, call for the adoption of more generosity in government health budgets and revulsion of state persistence on public compulsory health insurance schemes, in order OOP payments to be reduced.
Specifically:
We propose that the Greek Ministry of Health and EOPYY should include the labor factor (fees for medical and nursing staff) as other health systems[58] do in the Greek DRG's pricing and reimbursement policy for inpatient care in public and private hospitals (Polyzos et al., 2013; Schreyögg et al., 2006). Since for public hospitals, the labor cost in DRG's pricing is subsidized by the state budget, for private hospitalization EOPYY has to include surgeons' and anesthetists' reward in its DRG's remuneration methodology. Our findings indicate that for private hospitalization in affiliated private providers with EOPYY medical reward exclusion for DRG's pricing results in extremely high direct and informal OOP payments for insured in order to cover surgeons' and anesthetists' fees. For example, the results of our first study indicate that medical rewarding corresponds to almost 36% of total OOP hospital expenditure, which is paid separately by fee-for-service from health consumers (Mathauer and Wittenbecher, 2013). It emerges as a necessity in countries, such as Greece, with high formal

[58] e.g. Australian AR-DRG, German G-DRG, U.S. Health Care Financing Administration-DRG.

and informal OOP spending both in public and private establishments (Souliotis et al., 2016; Liaropoulos et al., 2008) to encompass in DRG's pricing and reimbursement methodology medical fees, in order tax and health authorities to ensure transparency in medical transactions (Annear and Xu, 2015). EOPYY's policy-makers should proceed on the revision of Greek DRG's pricing in affiliated private hospitals, in order to adjust with the international experience methodology for reimbursing inpatient healthcare services (Kentikelenis and Papanicolas, 2012). Although, our proposals require public health spending raise unlike the fiscal sustainability imposes, this may be arranged by increased SHI contributions in order EOPYY's resources to be sufficient to ensure and provide financial protection against OOP spending for private hospitalization.

The private hospitalization in affiliated private providers with EOPYY under contractual mechanisms emerges as a necessity due to the underfinanced and overcrowded Greek NHS hospitals (Sissouras, 2014). However, the Greek government must provide more financial resources in NHS hospitals in order to improve their performance and eliminate great barriers of the previous years (e.g. long waiting lists for surgical services, informal payments to medical personnel, low quality of hospital stay amenities etc.) (Liaropoulos et al., 2008). The allocation of more financial resources to public hospitals establishments can ensure to the poorer socio-economic and vulnerable group of population better accessibility, thus avoiding the high enough SHI statutory cost sharing and pricing policy of private hospitals (Kyriopoulos et al., 2014).

Further, the results of our micro-data cases (*i.e*. Study I and II) call for re-consideration of formal cost sharing for private hospitalization under the Greek SHI coverage. The formal cost sharing (*i.e.* co-insurance OOP spending) accounts for almost the one fifth of total OOP payments, while the worse-off present a higher tendency to incur CHE, as well as, to spend more for inpatient healthcare services than their share of ATP. The Greek SHI policy should proceed on a readjustment of the statutory co-insurance rate for private hospitalization in accordance to the income, health conditions and socioeconomic characteristics of insured population (Schokkaert et al, 2008). Since, NHS hospitals present an inefficiency to provide access for inpatient treatment to the majority of Greek insured population, as well as, to ensure high-tech, advanced and upgraded healthcare services as the private hospitals do (EOPYY's Press Release 09.22.2014, Economou and Giorno, 2009), EOPYY has to decrease the great rates of patient formal cost sharing especially for the vulnerable and poor group of insured. Due to the public health financing stringency, state health-planners can offset the readjustment of co-insurance rates with higher SHI contributions rates, as we have already proposed for DRG's pricing revision.

In addition, our results (see sections 5.1.2 and 5.2.2) suggest for a more closed co-operation between tax and SHI authorities in order informal OOP spending in private healthcare facilities to be at last addressed. The non-issuance of legal tax receipts from a great share of freelancers surgeons and anesthetists, accounts for nearly 14% of aggregate OOP hospital spending, resulting in rampant tax evasion with substantial losses for public revenues. The fight against tax evasion requires decisive political measures for a more efficient tackling to underground economy, especially to the public and private Greek health sector, which over the years exhibits corruption issues and significant illegal and informal OOP spending (Souliotis et al., 2016; Economou, 2015; Liaropoulos et al., 2008; Siskou et al., 2008).

Furthermore, although EOPYY provides on its insured members free-choice for affiliated private hospitals, medical gate-keeping or any pre-admission notification is not a prerequisite treaty before any private hospitalization entry. Although, medical gate-keeping is compulsory and encouraged by financial incentives in other national health systems, for the Greek SHI coverage it is not a necessary procedure, incurring thus financial costs for SHI and insured from unnecessary use and a supplier-induced demand practice of private hospital health services (Economou et al., 2014; Paris et al., 2010). Gate-keeping aims at reducing health consumer's costs by shifting demand for specialized health services in such a way in order the appropriate use of different levels of care to be ensured (Dranove and Satterthwaite, 2000). Empirical evidence based on regression panel data analysis suggests that medical gate-keeping has a negative effect on total health expenditure financing (Jönsson and Eckerlund, 2003; Gerdtham and Jönsson, 2000; Gerdtham et al., 1998).

Moreover, the significant delay of EOPYY's payments to private hospitals (e.g. more than 3 months) (Karakolias and Polyzos, 2014) combined with the intense retrenchments to private hospitals claims through re-bate and claw-back mechanisms bring such a financial hardship to their budgets balance sheets that "necessarily" have to proceed on excessive requirements for offering inpatient healthcare to EOPYY subscribers (167A/23-07-2013, 2243/18-08-2014 Gazettes of the Government).

Finally, especially for a heavily affected by the 2008 financial crisis country with limited public finances capacity, such as Greece, state should reinstate tax incentive policies for individually PHI policyholders in order the expansion of an effective alternative risk-pooling mechanism against OOP spending to be encouraged. The economic decline on Greeks' living standards and the evidence of strong positive association between insured income level and holding an additional PHI plan suggest to the public finances state-planners to revise the dissuasive legislation (4110/2013 and 4172/2013 Gazettes of the Government). On the other hand, PHI enterprises should promote more flexible and premium affordable PHI complementary and supplementary coverage plans in order to meet the tough economic situation of the potential subscribers (Economou, 2010).

Conclusively, it is suggested, that apart of strictly achieving fiscal consolidation and sustainability, which it propounds as a rationalistic policy in the context of the current financial crisis, policy-makers have also to attain health systems fundamental principle; financial protection. Government health spending cuts in response to economic shocks can be replaced by PHI financing. Promoting PHI institution can be emerged as a transitional policy of curbing government health spending, particularly if tax revenues or SHI contribution collection has been seriously affected by economic shocks. Health state-planners should encourage PHI institution to be expanded by supplementing statutory SHI schemes, if they would to be consistent with social health policy goals and secure population against the financial hardship of OOP payments when healthcare is necessary. The provided results on both sections 5.2.2 (micro-data cases) and 5.2.3 (macro-data figures) strongly advocate that PHI institution financing can display as an supplementary or complementary health funding contributor against the economic consequences of OOP payments on households and individuals wellbeing.

6.2 Study limitations and future work

The current study has provided new and important findings, using the widely accepted methodology for measuring financial catastrophe from OOP payments and health financial equity. In the same lines, the employed econometric models provided interesting information regarding healthcare financing both for the micro and macro-data approaches. The discussion of our results in accordance with existing empirical literature for OOP spending, as well as, any information and policy implication provided in each study, we strongly believe that would be a useful guide for scholars and policy-makers.

Although our findings appear to provide specific contributions to empirical literature and decision-making suggestions regarding OOP healthcare payments, further research is required to gain more insights for this unfair household health spending both for our micro and macro-data approaches. Further, while this study presents useful highlights on SHI and PHI effects for providing financial protection against OOP healthcare payments, it has some limitations.

One main limitation of this study relates to the primary data employed in the analysis of measuring catastrophic health expenditures and financing equity. Particularly, our cross-sectional survey included only hospitalized patients in general private hospitals and did not take into consideration inpatient treated respondents in mental clinics, rehabilitation, hemodialysis centers and maternity private facilities affiliated with EOPYY, where there is informal evidence for high OOP spending levels too. Nevertheless, this limitation calls for a re-consideration of our survey in addressing also and other private health providers affiliated with EOPYY. Further, as it has already been discussed (see section 4.2.2), our survey excludes hospitalized freelancers respondents in order to collect unbiased data concerning insured real income criteria. Thus, we did not include in our survey all professional categories. Another limitation was the inability to gather and classify data regarding the coping mechanisms of our conducted respondents to finance OOP spending (e.g. savings, selling assets, assets depletion, credit from financial institutions, borrowing from relatives or friends), as well as, to collect any other additional income criteria from them (e.g. rentals turnovers, financial assets etc.). Finally, it could be also useful to take into consideration in the overall OOP hospitalization expenditure any transportation expenses and income losses which were also privately-funded by the insured. Indeed, health shocks cause destructive financial consequences for individuals and households apart from medical expenditure by losses of earnings too (Gertler and Gruber, 2002) and our study did not address issues such as.

Moreover, although our balanced panel had a sufficient number of observations for our empirical analysis in macro-data level approach; unfortunately we excluded several countries for which a complete database of all variables of interest was not available. Hence, because of non-availability of our data of interest for a longer period and for all EU and OECD countries, we limit the examined period from 1995 to 2013, while we unavoidably exclude 15 countries. Further, due to non-availability of health variables data (e.g. OOP spending, PHI etc.) for the same examined period and due to our central focus on homogenized grouped-data, we did not carry out an empirical analysis including also settings from other regions not belonging in organizational coalitions, such as the EU and OECD.

Although the findings from this research study as provided in each of our three studies present interesting issues to be discussed, all the aforementioned limitations have to be addressed closely in order to improve any future work. Additionally, our macro-data level (panel) approach based on the employed econometric analysis requires further consideration and research. Specifically, it would be interesting to flourish the existing literature on the effects of several macroeconomic and health financing parameters and their short and long run dynamics on OOP payments, by exposing them to unexpected shocks. Particularly, the results obtained of our third study called for a re – consideration of our econometric analysis by using also the vector auto-regression (VAR) and structural/global VAR methodology in order to analyze the dynamic behavior of the variables of our interest.

APPENDICES

APPENDIX A

APPENDIX B

APPENDIX C

APPENDIX D

APPENDIX A

A1. The cover letter of the interviewed processing structured questionnaire pilot study

Nikolaos Grigorakis
PhD Candidate in
Business Administration
in the University of Nicosia

Dear Sir or Madam,

I am writing to you to ask for your help for a study to access valuable information about households' out of pocket payments for private hospitalization in Greece. I request your support as you have been experienced the phenomenon of hospitalization in a contracted with your social insurance carrier (EOPYY) private hospital. Agreeing to join in the study means that you will be part of an effort to give knowledge for the presence and the size of out of pocket payments in inpatient health care. Your support will be useful in order to eliminate this unfair spending which imposes financial insecurity and undermines health system efficiency.

In this initial form, the questionnaire will be used only to identify poor questions, ambiguities, which will be amended to produce a final version.
Moreover, I ask for your co – operation because your completion of this questionnaire will benefit me personally. This questionnaire is part of my Ph.D thesis in the University of Nicosia.

What is involved?
To take part in the study, please give us answers to complete the questionnaire. It should take you no more than 15-20 minutes for answering our questions. There is no identifying personal information on the questionnaire so that all the information you give me will be anonymous and confidential. Also, your comments or criticism about the construction of the questionnaire will be very welcome.

What will happen if I say no?
You are not obligated to take part in this study. However, we would be extremely grateful if you finally decide to give us answers for this questionnaire.
Completion of the questionnaire through the answering of our questions is taken to mean that you have consented to participate.

Thank you for your help.

Nikolaos Grigorakis
E.O.P.Y.Y. – Heraklion Regional Division
4 Kazani Str. P.C.:71201
Heraklion, Greece
LandLine: 00302810246795
Fax: 00302810246785
E – mail: nigrigor@yahoo.com

A2. The cover letter and interviewed processing structured questionnaire

Nikolaos Grigorakis
PhD Candidate in
Business Administration
in the University of Nicosia

Dear Sir or Madam,

I am writing to you to ask for your help for a study to access valuable information about households' out of pocket payments for private hospitalization in Greece. I request your support as you have been experienced the phenomenon of hospitalization in a contracted with your social insurance carrier (EOPYY) private hospital. Agreeing to join in the study means that you will be part of an effort to give knowledge for the presence and the size of out of pocket payments in inpatient health care. Your support will be useful in order to eliminate this unfair spending which imposes financial insecurity and undermines health system efficiency.

Moreover, I ask for your co – operation because your completion of this questionnaire will benefit me personally. This questionnaire is part of my PhD thesis in the University of Nicosia.

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To take part in the study, please give us answers to complete the questionnaire. It should take you no more than 15-20 minutes for answering our questions. There is no identifying personal information on the questionnaire so that all the information you give me will be anonymous and confidential. Also, your comments or criticism about the construction of the questionnaire will be very welcome.

What will happen if I say no?
You are not obligated to take part in this study. However, we would be extremely grateful if you finally decide to give us answers for this questionnaire.
Completion of the questionnaire through the answering of our questions is taken to mean that you have consented to participate.

Thank you for taking time to complete the survey.

Nikolaos Grigorakis
E.O.P.Y.Y. – Heraklion Regional Division
4 Kazani Str. P.C.:71201
Heraklion, Greece
LandLine: 00302810246795
Fax: 00302810246785
E – mail: nigrigor@yahoo.com

QUESTIONS

What is your professional position? Education: Tertiary ☐ or not ☐

☐ Public Sector Servant

☐ Private Sector Employee

☐ Pensioner

☐ Unemployed at the current time

What is your age? ☐

Gender: Male ☐ Female ☐

Former SHI fund: ……………………

Annual or Monthly Gross Income: €…………………..

Reason(s) for Hospitalization: …………………DRG code:……….. Per Diem Charge:……..

Type of Treatment: Surgery ☐ or Not ☐

1. How much money did the private hospital request for your hospital treatment or operation, except of your statutory co-insurance rate?

€............................

2. How much did you formally pay (payment with issuing of receipt) for surgeon or anesthetist fee for your inpatient care?

Surgeon: €............................ Anesthetist: €............................

3. How much did you informally pay (payment without the issue of receipt) for surgeon or anesthetist fee for your inpatient care?

Surgeon: €............................ Anesthetist: €............................

Other comments regarding this informal procedure……………………………………………

4**.** Do you participate in some kind of Private Health Insurance (PHI)?

- Yes, in an alternative individual PHI scheme ☐
- Yes, in a complementary individual PHI scheme ☐
- Yes, in a supplementary individual PHI scheme ☐
- Yes, in a grouped-collective PHI scheme ☐
- No, I do not participate to a PHI scheme. ☐

5**.** How much money of your out of pocket payments will be reimbursed by your private health insurance scheme?

Surgeon: €................. Anaesthetist: €................. Private Hospital: €.................

6**.** Can you provide us the annual or monthly premium expense for subscribing in Private Health Insurance (PHI) plan?

€…………………….

APPENDIX B

B1. Relation between OOP payments for private hospitalization and explanatory variables

Dependent Variable: LOOP
Method: Least Squares
Sample: 1 413
Included observations: 413

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.824337	0.680882	2.679373	0.0077
LSHI	0.638304	0.022540	28.31895	0.0000
LAGE	0.224288	0.068006	3.298047	0.0011
GENDER	0.011153	0.041205	0.270672	0.7868
LINCOME	-0.027724	0.075829	-0.365613	0.7148
SUR	0.587079	0.043022	13.64608	0.0000

R-squared	0.810696	Mean dependent var	7.003049
Adjusted R-squared	0.808370	S.D. dependent var	0.922254
S.E. of regression	0.403722	Akaike info criterion	1.038240
Sum squared resid	66.33748	Schwarz criterion	1.096692
Log likelihood	-208.4338	F-statistic	348.5951
Darbin-Watson stat	1.658956	Prob (F-statistic)	0.00000

B2. OLS with income/ without gender

Dependent Variable: LNOOP
Method: Least Squares
Sample: 1 413
Included observations: 413

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.813800	0.678996	2.671298	0.0079
LNAGE	0.223291	0.067829	3.291952	0.0011
LNSHI	0.637973	0.022481	28.37813	0.0000
LNINC	-0.025298	0.075212	-0.336356	0.7368
SUR	0.587483	0.042947	13.67922	0.0000

R-squared	0.810661	Mean dependent var	7.003049
Adjusted R-squared	0.808805	S.D. dependent var	0.922254
S.E. of regression	0.403263	Akaike info criterion	1.033578
Sum squared resid	66.34942	Schwarz criterion	1.082288
Log likelihood	-208.4338	Hannan-Quinn criter.	1.052843
F-statistic	436.7175	Durbin-Watson stat	1.658451
Prob(F-statistic)	0.000000		

B3. OLS with gender/ without income

Dependent Variable: LNOOP
Method: Least Squares
Sample: 1 413
Included observations: 413

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.592053	0.244608	6.508599	0.0000
LNAGE	0.216098	0.064143	3.369011	0.0008
LNSHI	0.638240	0.022515	28.34708	0.0000
GEN	0.009372	0.040873	0.229305	0.8187
SUR	0.586671	0.042962	13.65569	0.0000

R-squared	0.810633	Mean dependent var	7.003049
Adjusted R-squared	0.808777	S.D. dependent var	0.922254
S.E. of regression	0.403293	Akaike info criterion	1.033726
Sum squared resid	66.35927	Schwarz criterion	1.082436
Log likelihood	-208.4644	Hannan-Quinn criter.	1.052991
F-statistic	436.6376	Durbin-Watson stat	1.659102
Prob(F-statistic)	0.000000		

B4. OLS without income & gender

Dependent Variable: LNOOP
Method: Least Squares
Sample: 1 413
Included observations: 413

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.600396	0.241606	6.623997	0.0000
LNAGE	0.215859	0.064060	3.369633	0.0008
LNSHI	0.637963	0.022457	28.40850	0.0000
SUR	0.587046	0.042881	13.69016	0.0000

R-squared	0.810609	Mean dependent var	7.003049
Adjusted R-squared	0.809220	S.D. dependent var	0.922254
S.E. of regression	0.402826	Akaike info criterion	1.029012
Sum squared resid	66.36782	Schwarz criterion	1.067980
Log likelihood	-208.4910	Hannan-Quinn criter.	1.044425
F-statistic	583.5176	Durbin-Watson stat	1.658629
Prob(F-statistic)	0.000000		

B5. OLS with 1st differences

Dependent Variable: DLOG(OOP)
Method: Least Squares
Sample (adjusted): 2 413
Included observations: 412 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.149962	0.041053	-3.652904	0.0003
DLOG(AGE)	0.192971	0.075255	2.564226	0.0107
DLOG(SHI)	0.745734	0.025449	29.30300	0.0000
SUR	0.286526	0.057049	5.022476	0.0000

R-squared	0.733976	Mean dependent var	0.000521
Adjusted R-squared	0.732020	S.D. dependent var	1.096984
S.E. of regression	0.567873	Akaike info criterion	1.715825
Sum squared resid	131.5720	Schwarz criterion	1.754864
Log likelihood	-349.4600	Hannan-Quinn criter.	1.731267
F-statistic	375.2315	Durbin-Watson stat	2.759992
Prob(F-statistic)	0.000000		

B6. OLS with White Heteroskedasticity (without gender & income)

Dependent Variable: LNOOP
Method: Least Squares
Sample: 1 413
Included observations: 413
White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.600396	0.243642	6.568641	0.0000
LNAGE	0.215859	0.060188	3.586435	0.0004
LNSHI	0.637963	0.023694	26.92508	0.0000
SUR	0.587046	0.041447	14.16373	0.0000

R-squared	0.810609	Mean dependent var	7.003049
Adjusted R-squared	0.809220	S.D. dependent var	0.922254
S.E. of regression	0.402826	Akaike info criterion	1.029012
Sum squared resid	66.36782	Schwarz criterion	1.067980
Log likelihood	-208.4910	Hannan-Quinn criter.	1.044425
F-statistic	583.5176	Durbin-Watson stat	1.658629
Prob(F-statistic)	0.000000		

APPENDIX C

C1. Relation between OOP payments for private hospitalization and explanatory variables

Dependent Variable: LOOP
Method: Least Squares
Sample: 1 426
Included observations: 426

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.488416	0.358070	4.156777	0.0000
SHI	0.642322	0.041483	15.48387	0.0000
INCOME	-0.043581	0.077578	-0.561773	0.5746
AGE	-0.082158	0.128375	-0.639982	0.5225
GENDER	0.085462	0.028454	3.003477	0.0028
SURGERY	0.217761	0.034995	6.222639	0.0000
TERTIARY	0.000438	0.033950	0.012897	0.9897
PHI	-0.896236	0.042912	-20.88556	0.0000

R-squared	0.701145	Mean dependent var	3.124883
Adjusted R-squared	0.696140	S.D. dependent var	0.516647
S.E. of regression	0.284794	Akaike info criterion	0.344497
Sum squared resid	33.90290	Schwarz criterion	0.420637
Log likelihood	-65.37785	Hannan-Quinn criter.	0.374574
F-statistic	140.0960	Durbin-Watson stat	1.548786
Prob(F-statistic)	0.000000		

C2. OLS with White Heteroskedasticity (without income, age and tertiary education)

Dependent Variable: LOOP
Method: Least Squares
Sample: 1 426
Included observations: 426
White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.192759	0.118323	10.08050	0.0000
SHI	0.631392	0.040560	15.56691	0.0000
GENDER	0.089342	0.026463	3.376074	0.0008
SURGERY	0.228403	0.027863	8.197363	0.0000
PHI	-0.893096	0.076804	-11.62831	0.0000

R-squared	0.700529	Mean dependent var	3.124883
Adjusted R-squared	0.697684	S.D. dependent var	0.516647
S.E. of regression	0.284069	Akaike info criterion	0.332470
Sum squared resid	33.97273	Schwarz criterion	0.380057
Log likelihood	-65.81613	Hannan-Quinn criter.	0.351268
F-statistic	246.2036	Durbin-Watson stat	1.544015
Prob(F-statistic)	0.000000		

C3. OLS with 1st differences (without income, age and tertiary education)

Dependent Variable: DLOG(OOP)
Method: Least Squares
Date: 06/20/17 Time: 12:54
Sample (adjusted): 2 426
Included observations: 425 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.055986	0.045299	-1.235903	0.2172
D(SHI)	0.702159	0.050335	13.94959	0.0000
GENDER	0.147196	0.043254	3.403100	0.0007
SURGERY	0.084714	0.046843	1.808454	0.0713
PHI	-0.468624	0.060685	-7.722283	0.0000

R-squared	0.389371	Mean dependent var	0.001859
Adjusted R-squared	0.383555	S.D. dependent var	0.564608
S.E. of regression	0.443296	Akaike info criterion	1.222537
Sum squared resid	82.53476	Schwarz criterion	1.270208
Log likelihood	-254.7891	Hannan-Quinn criter.	1.241370
F-statistic	66.95374	Durbin-Watson stat	2.578340
Prob(F-statistic)	0.000000		

C4. Convenient regression results for incidence and intensity of catastrophic OOP health care payments at 5% threshold for SHI coverage policyholders

Incidence Results
Dependent Variable: OOP for SHI
Method: Least Squares
Sample: 1 319
Included observations: 319

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.282940	0.015184	18.63383	0.0000
CE	-0.229752	0.026303	-8.734898	0.0000

R-squared	0.193996	Mean dependent var	0.168196
Adjusted R-squared	0.191454	S.D. dependent var	0.151271
S.E. of regression	0.136022	Akaike info criterion	-1.145754
Sum squared resid	5.865109	Schwarz criterion	-1.122148
Log likelihood	184.7477	Hannan-Quinn criter.	-1.136326
F-statistic	76.29844	Durbin-Watson stat	1.445907
Prob(F-statistic)	0.000000		

Intensity Results
Dependent Variable: OOP for SHI
Method: Least Squares
Sample: 1 319
Included observations: 319

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.316074	0.019569	16.15185	0.0000
CO	-0.296097	0.033898	-8.734898	0.0000

R-squared	0.193996	Mean dependent var	0.168196
Adjusted R-squared	0.191454	S.D. dependent var	0.194953
S.E. of regression	0.175300	Akaike info criterion	-0.638382
Sum squared resid	9.741480	Schwarz criterion	-0.614776
Log likelihood	103.8219	Hannan-Quinn criter.	-0.628954
F-statistic	76.29844	Durbin-Watson stat	1.445907
Prob(F-statistic)	0.000000		

C5. Convenient regression results for incidence and intensity of catastrophic OOP health care payments at 10% threshold for SHI coverage policyholders

Incidence Results
Dependent Variable: CE
Method: Least Squares
Sample: 1 252
Included observations: 252

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.273502	0.015067	18.15246	0.0000
CE	-0.209758	0.026092	-8.039252	0.0000

R-squared	0.205415	Mean dependent var	0.168744
Adjusted R-squared	0.202236	S.D. dependent var	0.134432
S.E. of regression	0.120071	Akaike info criterion	-1.393560
Sum squared resid	3.604269	Schwarz criterion	-1.365549
Log likelihood	177.5886	Hannan-Quinn criter.	-1.382289
F-statistic	64.62957	Durbin-Watson stat	1.473015
Prob(F-statistic)	0.000000		

Intensity Results
Dependent Variable: CO
Method: Least Squares
Sample: 1 252
Included observations: 252

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.338053	0.024351	13.88249	0.0000
CO	-0.339008	0.042169	-8.039252	0.0000

R-squared	0.205415	Mean dependent var	0.168744
Adjusted R-squared	0.202236	S.D. dependent var	0.217267
S.E. of regression	0.194058	Akaike info criterion	-0.433419
Sum squared resid	9.414582	Schwarz criterion	-0.405408
Log likelihood	56.61082	Hannan-Quinn criter.	-0.422148
F-statistic	64.62957	Durbin-Watson stat	1.473015
Prob(F-statistic)	0.000000		

C6. Convenient regression results for incidence and intensity of catastrophic OOP health care payments at 15% threshold for SHI coverage policyholders

Incidence Results
Dependent Variable: CE
Method: Least Squares
Sample: 1 173
Included observations: 173

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.259880	0.015907	16.33734	0.0000
CE	-0.180767	0.027536	-6.564760	0.0000

R-squared	0.201293	Mean dependent var	0.169604
Adjusted R-squared	0.196622	S.D. dependent var	0.117329
S.E. of regression	0.105164	Akaike info criterion	-1.655103
Sum squared resid	1.891159	Schwarz criterion	-1.618649
Log likelihood	145.1665	Hannan-Quinn criter.	-1.640314
F-statistic	43.09607	Durbin-Watson stat	1.518350
Prob(F-statistic)	0.000000		

Intensity Results
Dependent Variable: CE
Method: Least Squares
Sample: 1 173
Included observations: 173

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.336985	0.029493	11.42581	0.0000
CO	-0.335158	0.051054	-6.564760	0.0000

R-squared	0.201293	Mean dependent var	0.169604
Adjusted R-squared	0.196622	S.D. dependent var	0.217539
S.E. of regression	0.194983	Akaike info criterion	-0.420312
Sum squared resid	6.501162	Schwarz criterion	-0.383858
Log likelihood	38.35701	Hannan-Quinn criter.	-0.405523
F-statistic	43.09607	Durbin-Watson stat	1.518350
Prob(F-statistic)	0.000000		

C7. Convenient regression results for incidence and intensity of catastrophic OOP health care payments at 25% threshold for SHI coverage policyholders

Incidence Results
Dependent Variable: CE
Method: Least Squares
Sample: 1 83
Included observations: 83

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.248170	0.018327	13.54127	0.0000
CE	-0.150827	0.031676	-4.761625	0.0000

R-squared	0.218698	Mean dependent var	0.172851
Adjusted R-squared	0.209052	S.D. dependent var	0.094815
S.E. of regression	0.084324	Akaike info criterion	-2.084498
Sum squared resid	0.575954	Schwarz criterion	-2.026213
Log likelihood	88.50666	Hannan-Quinn criter.	-2.061082
F-statistic	22.67307	Durbin-Watson stat	1.668999
Prob(F-statistic)	0.000008		

Intensity Results
Dependent Variable: CE
Method: Least Squares
Date: 06/20/17 Time: 11:46
Sample: 1 83
Included observations: 83

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.334416	0.039313	8.506560	0.0000
CO	-0.323536	0.067947	-4.761625	0.0000

R-squared	0.218698	Mean dependent var	0.172851
Adjusted R-squared	0.209052	S.D. dependent var	0.203386
S.E. of regression	0.180882	Akaike info criterion	-0.558143
Sum squared resid	2.650181	Schwarz criterion	-0.499857
Log likelihood	25.16292	Hannan-Quinn criter.	-0.534727
F-statistic	22.67307	Durbin-Watson stat	1.668999
Prob(F-statistic)	0.000008		

C8. Convenient regression results for incidence and intensity of catastrophic OOP health care payments at 5% threshold for SHI-PHI coverage policyholders

Incidence Results
Dependent Variable: CE
Method: Least Squares
Sample: 1 31
Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.213196	0.011155	19.11188	0.0000
CE	-0.059037	0.019171	-3.079432	0.0045

R-squared	0.246419	Mean dependent var	0.183696
Adjusted R-squared	0.220433	S.D. dependent var	0.036043
S.E. of regression	0.031824	Akaike info criterion	-3.994864
Sum squared resid	0.029370	Schwarz criterion	-3.902348
Log likelihood	63.92038	Hannan-Quinn criter.	-3.964706
F-statistic	9.482899	Durbin-Watson stat	2.141513
Prob(F-statistic)	0.004506		

Intensity Results
Dependent Variable: CE
Method: Least Squares
Sample: 1 31
Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.275078	0.034556	7.960461	0.0000
CO	-0.182881	0.059388	-3.079432	0.0045

R-squared	0.246419	Mean dependent var	0.183696
Adjusted R-squared	0.220433	S.D. dependent var	0.111652
S.E. of regression	0.098581	Akaike info criterion	-1.733533
Sum squared resid	0.281829	Schwarz criterion	-1.641017
Log likelihood	28.86976	Hannan-Quinn criter.	-1.703375
F-statistic	9.482899	Durbin-Watson stat	2.141513
Prob(F-statistic)	0.004506		

C9. Econometric results of the convenient regression formula for calculating Kakwani SHI contributions index

Dependent Variable: SHI contributions
Method: Least Squares
Sample: 1 426
Included observations: 426
White Heteroskedasticity-Consistent Standard
Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.015012	0.004457	-3.368411	0.0008
$SHI\ \pi_{\kappa}$	0.029954	0.013040	-2.297057	0.0221

R-squared	0.020007	Mean Dependent var	0.000000
Adjusted R-squared	0.017696	S.D. Dependent var	0.061203
S.E. of regression	0.060659	Akaike info criterion	-2.722409
Sum squared resid	1.560122	Schwarz criterion	-2.743374
Log likelihood	590.3930	F-statistic	8.656267
Durbin – Watson stat	1.733261	Prob (F-statistic)	0.003438

C10. Econometric results of the convenient regression formula for calculating Kakwani PHI premiums index

Dependent Variable: PHI premiums
Method: Least Squares
Sample: 1 64
Included observations: 64
White Heteroskedasticity-Consistent Standard
Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.131577	0.017706	7.431188	0.0000
$PHI\ \pi_{\kappa}$	0.259105	0.029041	-8.921952	0.0000

R-squared	0.498418	Mean Dependent var	0.000000
Adjusted R-squared	0.490328	S.D. Dependent var	0.106772
S.E. of regression	0.076226	Akaike info criterion	-2.279485
Sum squared resid	0.360242	Schwarz criterion	-2.212020
Log likelihood	74.94353	F-statistic	61.60883
Durbin – Watson stat	1.367243	Prob (F-statistic)	0.000000

C11. Econometric results of the convenient regression formula for calculating Kakwani aggregate OOP payments index

Dependent Variable: OOP payments aggregate
Method: Least Squares
Sample: 1 426
Included observations: 426
White Heteroskedasticity-Consistent Standard
Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.138592	0.013443	10.30937	0.0000
$OOP\ \pi_{\kappa}$	-0.276533	0.023692	-10.71193	0.0000

R-squared	0.243163	Mean Dependent var	0.000000
Adjusted R-squared	0.241378	S.D. Dependent var	0.162076
S.E. of regression	0.141166	Akaike info criterion	-1.073071
Sum squared resid	8.449454	Schwarz criterion	-1.054036
Log likelihood	230.5641	F-statistic	136.2260
Durbin – Watson stat	1.837951	Prob (F-statistic)	0.000000

C12. Econometric results of the convenient regression formula for calculating Kakwani OOP SCI payments index

Dependent Variable: OOP SCI payments
Method: Least Squares
Sample: 1 426
Included observations: 426
White Heteroskedasticity-Consistent Standard
Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.156555	0.022245	7.019628	0.0000
$OOP\ SCI\ \pi_{\kappa}$	-0.311578	0.035834	-8.694951	0.0000

R-squared	0.201150	Mean Dependent var	0.000000
Adjusted R-squared	0.199266	S.D. Dependent var	0.200782
S.E. of regression	0.179667	Akaike info criterion	-0.590738
Sum squared resid	13.68684	Schwarz criterion	-0.571703
Log likelihood	127.8271	F-statistic	106.7631
Durbin – Watson stat	1.848308	Prob (F-statistic)	0.000000

C13. Econometric results of the convenient regression formula for calculating Kakwani OOP FPC payments index

Dependent Variable: OOP FPC payments
Method: Least Squares
Sample: 1 426
Included observations: 426
White Heteroskedasticity-Consistent Standard
Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.111748	0.011843	9.435963	0.0000
$OOP\ FPC\ \pi_{\kappa}$	-0.222972	0.022681	-9.830890	0.0000

R-squared	0.223593	Mean Dependent var	0.000000
Adjusted R-squared	0.221762	S.D. Dependent var	0.136282
S.E. of regression	0.120225	Akaike info criterion	-1.394214
Sum squared resid	6.128550	Schwarz criterion	-1.375180
Log likelihood	298.9677	F-statistic	122.1053
Durbin – Watson stat	1.678402	Prob (F-statistic)	0.000000

C14. Econometric results of the convenient regression formula for calculating Kakwani OOP FPP payments index

Dependent Variable: OOP FPC payments
Method: Least Squares
Sample: 1 426
Included observations: 426
White Heteroskedasticity-Consistent Standard
Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.101360	0.022261	4.553260	0.0000
$OOP\ FPP\ \pi_{\kappa}$	-0.202245	0.040535	-4.989440	0.0000

R-squared	0.057644	Mean Dependent var	0.000000
Adjusted R-squared	0.055422	S.D. Dependent var	0.243455
S.E. of regression	0.236612	Akaike info criterion	-0.040102
Sum squared resid	23.73784	Schwarz criterion	-0.021067
Log likelihood	10.54179	F-statistic	25.93623
Durbin – Watson stat	2.210910	Prob (F-statistic)	0.000000

C15. Econometric results of the convenient regression formula for calculating Kakwani OOP IPP payments index

Dependent Variable: OOP FPC payments
Method: Least Squares
Sample: 1 426
Included observations: 426
White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.133633	0.038888	4.436370	0.0000
$OOP\ IPP\ \pi_{\kappa}$	-0.266640	0.065917	-4.045086	0.0001

R-squared	0.038864	Mean Dependent var	0.000000
Adjusted R-squared	0.036597	S.D. Dependent var	0.390902
S.E. of regression	0.383682	Akaike info criterion	0.926680
Sum squared resid	62.41792	Schwarz criterion	0.945715
Log likelihood	-195.3828	F-statistic	17.14478
Durbin – Watson stat	1.890777	Prob (F-statistic)	0.000000

APPENDIX D

D1. Hausman Test

Correlated Random Effects - Hausman Test
Equation: EQ01
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	11.076724	8	0.1974

D2. Panel Unit Root Test - Variable: GGD/GDP

Panel unit root test: Summary
Series: GGD/GDP
Sample: 1995 2013
Exogenous variables: Individual effects
User specified lags at: 1
Newey-West bandwidth selection using Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-0.24338	0.4039	26	442
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	2.37523	0.9912	26	442
ADF - Fisher Chi-square	41.0238	0.8635	26	442
PP - Fisher Chi-square	36.2355	0.9525	26	468

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

D3. Panel Unit Root Test - Variable: D(GGD/GDP)

Panel unit root test: Summary
Series: D(GGD/GDP)
Sample: 1995 2013
Exogenous variables: Individual effects
User specified lags at: 1
Newey-West bandwidth selection using Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-2.38845	0.0085	26	416
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-2.53958	0.0055	26	416
ADF - Fisher Chi-square	78.9713	0.0093	26	416
PP - Fisher Chi-square	133.272	0.0000	26	442

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

D4. Panel Unit Root Test - Variable: GDP

Panel unit root test: Summary
Series: GDP
Sample: 1995 2013
Exogenous variables: Individual effects
User specified lags at: 1
Newey-West bandwidth selection using Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-6.23284	0.0000	26	442
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-4.29657	0.0000	26	442
ADF - Fisher Chi-square	105.505	0.0000	26	442
PP - Fisher Chi-square	168.154	0.0000	26	468

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

D5. Panel Unit Root Test - Variable: GGHE/THE

Panel unit root test: Summary
Series: GGHE/THE
Sample: 1995 2013
Exogenous variables: Individual effects
User specified lags at: 1
Newey-West bandwidth selection using Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-3.55250	0.0002	26	442
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.74151	0.0408	26	442
ADF - Fisher Chi-square	74.1099	0.0237	26	442
PP - Fisher Chi-square	88.5404	0.0012	26	468

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

D6. Panel Unit Root Test - Variable: INFLAT

Panel unit root test: Summary
Series: INFLAT
Sample: 1995 2013
Exogenous variables: Individual effects
User specified lags at: 1
Newey-West bandwidth selection using Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-10.0622	0.0000	26	442
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-7.64411	0.0000	26	442
ADF - Fisher Chi-square	160.893	0.0000	26	442
PP - Fisher Chi-square	387.685	0.0000	26	468

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

D7. Panel Unit Root Test - Variable: OOP/THE

Panel unit root test: Summary
Series: OOP/THE
Sample: 1995 2013
Exogenous variables: Individual effects
User specified lags at: 1
Newey-West bandwidth selection using Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-2.86986	0.0021	26	442
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.14552	0.4421	26	442
ADF - Fisher Chi-square	52.4890	0.4549	26	442
PP - Fisher Chi-square	90.7202	0.0007	26	468

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

D8. Panel Unit Root Test - Variable: PHI/PvtHE

Panel unit root test: Summary
Series: PHI/PvtHE
Sample: 1995 2013
Exogenous variables: Individual effects
User specified lags at: 1
Newey-West bandwidth selection using Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-3.48538	0.0002	26	442
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.17028	0.1209	26	442
ADF - Fisher Chi-square	69.0813	0.0566	26	442
PP - Fisher Chi-square	57.6922	0.2730	26	468

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

D9. Panel Unit Root Test - Variable: PHI/THE

Panel unit root test: Summary
Series: PHI/THE
Sample: 1995 2013
Exogenous variables: Individual effects
User specified lags at: 1
Newey-West bandwidth selection using Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-5.70412	0.0000	26	442
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.70559	0.0440	26	442
ADF - Fisher Chi-square	77.2860	0.0130	26	442
PP - Fisher Chi-square	69.2271	0.0553	26	468

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

D10. Panel Unit Root Test - Variable: UNEMPL

Panel unit root test: Summary
Series: UNEMPL
Sample: 1995 2013
Exogenous variables: Individual effects
User specified lags at: 1
Newey-West bandwidth selection using Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-2.69168	0.0036	26	442
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-2.75981	0.0029	26	442
ADF - Fisher Chi-square	85.7255	0.0022	26	442
PP - Fisher Chi-square	59.3105	0.2265	26	468

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

D10. Panel Unit Root Test - Variable: GE/GDP

Panel unit root test: Summary
Series: GE_GDP
Sample: 1995 2013
Exogenous variables: Individual effects
User specified lags at: 1
Newey-West bandwidth selection using Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-2.51078	0.0060	26	442
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.69599	0.2432	26	442
ADF - Fisher Chi-square	54.4956	0.3798	26	442
PP - Fisher Chi-square	46.2779	0.6974	26	468

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

D11. Kao Co-integration Test

Kao Residual Cointegration Test
Series: GGD/GDP GDP GE/GDP GGHE/THE INFLAT OOP/THE PHI/PvtHE PHI/THE UNEMPL
Sample: 1995 2013
Included observations: 494
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
Lag selection: fixed at 1
Newey-West bandwidth selection using Bartlett kernel

	t-Statistic	Prob.
ADF	-0.696555	0.2430
Residual variance	23.30392	
HAC variance	41.03523	

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID)
Method: Least Squares
Date: 04/02/16 Time: 11:59
Sample (adjusted): 1997 2013
Included observations: 442 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.097534	0.022562	-4.323003	0.0000
D(RESID(-1))	0.272503	0.046437	5.868294	0.0000

R-squared	0.070928	Mean dependent var	0.758835
Adjusted R-squared	0.068816	S.D. dependent var	5.456025
S.E. of regression	5.264948	Akaike info criterion	6.164534
Sum squared resid	12196.66	Schwarz criterion	6.183047
Log likelihood	-1360.362	Hannan-Quinn criter.	6.171836
Durbin-Watson stat	1.998901		

D11. Wald Test

Test Statistic	Value	df	Probability
F-statistic	497.8831	(9, 416)	0.0000
Chi-square	4480.948	9	0.0000

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(1)	0.175169	0.027401
C(2)	0.001465	0.005997
C(3)	0.005449	0.025041
C(4)	0.266187	0.030260
C(5)	0.022696	0.030316
C(6)	0.118089	0.021379
C(7)	-0.851283	0.019199
C(8)	-1.170153	0.072455
C(9)	0.061801	0.070731

Restrictions are linear in coefficients.

D12. Regressions for OOP expenditures as a share (%) of THE (Static and Dynamic Model) (1995-2013)

Static Model
Dependent Variable: OOP/THE
Method: Panel EGLS (Two-way random effects)
Sample: 1995 2013
Periods included: 19
Cross-sections included: 26
Total panel (balanced) observations: 494
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	93.00866	1.592109	58.41853	0.0000
GGD/GDP	0.003086	0.003818	0.808313	0.4193
GDP	-0.015218	0.023023	-0.660988	0.5089
GE/GDP	-0.118530	0.054008	-2.194655	0.0287
INFLAT	0.069374	0.018656	3.718600	0.0002
UNEMPL	0.098287	0.023855	4.120184	0.0000
GGHE/THE	-0.929176	0.022412	-41.45935	0.0000
PHI/PvtHE	0.033657	0.022122	1.521408	0.1288
PHI/THE	-1.036900	0.059876	-17.31742	0.0000

Effects Specification

	S.D.	Rho
Cross-section random	2.616989	0.8506
Period random	0.000000	0.0000
Idiosyncratic random	1.096570	0.1494

Weighted Statistics

R-squared	0.860977	Mean dependent var	2.079768
Adjusted R-squared	0.858684	S.D. dependent var	2.924116
S.E. of regression	1.099236	Sum squared resid	586.0348
F-statistic	375.4533	Durbin-Watson stat	0.388360
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.951774	Mean dependent var	21.73475
Sum squared resid	3620.248	Durbin-Watson stat	0.062867

Dynamic Model
Dependent Variable: OOP/THE
Method: Panel Generalized Method of Moments
Transformation: First Differences
Sample (adjusted): 1997 2013
Periods included: 17
Cross-sections included: 26
Total panel (balanced) observations: 442
Difference specification instrument weighting matrix
Instrument list: @DYN(OOP_THE,-2) @SYSPER

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OOP_THE(-1)	0.175169	0.027401	6.392801	0.0000
GGD/GDP	0.001465	0.005997	0.244294	0.8071
GDP	0.005449	0.025041	0.217609	0.8278
GE/GDP	0.266187	0.070731	3.763395	0.0002
INFLAT	0.022696	0.030316	0.748643	0.4545
UNEMPL	0.118089	0.021379	5.523496	0.0000
GGHE/THE	-0.851283	0.030260	-28.13191	0.0000
PHI/THE	-1.170153	0.072455	-16.15011	0.0000
PHI/PvtHE	0.061801	0.019199	3.218879	0.0014

Effects Specification

Cross-section fixed (first differences)
Period fixed (dummy variables)

Mean dependent var	-0.221228	S.D. dependent var	1.386274
S.E. of regression	0.773084	Sum squared resid	248.6263
J-statistic	256.9563	Instrument rank	170.000000

D13. Robustness check: Regressions for OOP expenditures as a share (%) of THE (Static and Dynamic Model) for all countries without GGD/GDP, GDP and PHI/PvtHE (1995-2013)

Static Model
Dependent Variable: OOP/THE
Method: Panel EGLS (Two-way random effects)
Sample: 1995 2013
Periods included: 19
Cross-sections included: 26
Total panel (balanced) observations: 494
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	92.02320	1.427695	64.45579	0.0000
GE/GDP	-0.087942	0.046104	-1.907489	0.0570
GGHE/THE	-0.919179	0.020572	-44.68114	0.0000
INFLAT	0.066602	0.018613	3.578345	0.0004
PHI/THE	-0.960390	0.034087	-28.17440	0.0000
UNEMPL	0.113984	0.020586	5.536893	0.0000

Effects Specification

	S.D.	Rho
Cross-section random	2.456781	0.8316
Period random	0.000000	0.0000
Idiosyncratic random	1.105728	0.1684

Weighted Statistics

R-squared	0.862213	Mean dependent var	2.232324
Adjusted R-squared	0.860801	S.D. dependent var	2.958451
S.E. of regression	1.103779	Sum squared resid	594.5442
F-statistic	610.7396	Durbin-Watson stat	0.389272
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.951992	Mean dependent var	21.73475
Sum squared resid	3603.864	Durbin-Watson stat	0.064220

Dynamic Model
Dependent Variable: OOP/THE
Method: Panel Generalized Method of Moments
Transformation: First Differences
Sample (adjusted): 1997 2013
Periods included: 17
Cross-sections included: 26
Total panel (balanced) observations: 442
Difference specification instrument weighting matrix
Instrument list: @DYN(OOP_THE,-2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OOP/THE(-1)	0.237649	0.025926	9.166306	0.0000
GE/GDP	0.154133	0.056430	2.731406	0.0066
GGHE/THE	-0.827283	0.031103	-26.59803	0.0000
PHI/THE	-0.996707	0.047913	-20.80253	0.0000
INFLAT	0.030693	0.023874	1.285622	0.1993
UNEMPL	0.100076	0.016322	6.131226	0.0000

Effects Specification

Cross-section fixed (first differences)

Mean dependent var	-0.221228	S.D. dependent var	1.386274
S.E. of regression	0.794993	Sum squared resid	275.5582
J-statistic	265.6246	Instrument rank	153.000000

D14. Robustness check: Regressions for OOP expenditures as a share (%) of THE (Static and Dynamic Model) for all explanatory variables and without Chile, France and the USA (1995-2013)

Static Model
Dependent Variable: OOP_THE
Method: Panel EGLS (Two-way random effects)
Sample: 1995 2013
Periods included: 19
Cross-sections included: 23
Total panel (balanced) observations: 437
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	92.58004	1.702303	54.38516	0.0000
GDP	-0.017209	0.025127	-0.684889	0.4938
DEBT	0.004988	0.004188	1.191120	0.2343
GE/GDP	-0.139794	0.058153	-2.403875	0.0166
INFLAT	0.070065	0.019943	3.513290	0.0005
UNEMPL	0.088927	0.025680	3.462921	0.0006
GGHE/THE	-0.918218	0.024372	-37.67454	0.0000
PHI/THE	-1.042287	0.067691	-15.39770	0.0000
PHI/PvtHE	0.035199	0.024646	1.428215	0.1540

Effects Specification

	S.D.	Rho
Cross-section random	2.529690	0.8268
Period random	0.000000	0.0000
Idiosyncratic random	1.157920	0.1732

Weighted Statistics

R-squared	0.849978	Mean dependent var	2.293228
Adjusted R-squared	0.847174	S.D. dependent var	2.959396
S.E. of regression	1.156916	Sum squared resid	572.8582
F-statistic	303.1149	Durbin-Watson stat	0.387386
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.952842	Mean dependent var	21.95807
Sum squared resid	2994.173	Durbin-Watson stat	0.074116

Dynamic Model
Dependent Variable: OOP_THE
Method: Panel Generalized Method of Moments
Transformation: First Differences
Date: 11/18/16 Time: 14:57
Sample (adjusted): 1997 2013
Periods included: 17
Cross-sections included: 23
Total panel (balanced) observations: 391
White period instrument weighting matrix
White period standard errors & covariance (d.f. corrected)
Instrument list: @DYN(OOP_THE,-2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OOP/THE(-1)	0.213889	0.036206	5.907528	0.0000
GDP	0.018243	0.028576	0.638403	0.5236
DEBT	-0.032129	0.049524	-0.648762	0.5169
GE/GDP	0.134415	0.128203	1.048454	0.2951
INFLAT	0.004659	0.025474	0.182904	0.8550
UNEMPL	0.139223	0.058991	2.360076	0.0188
GGHE/THE	-0.797551	0.055628	-14.33732	0.0000
PHI/THE	-1.071201	0.251582	-4.257857	0.0000
PHI/PvtHE	0.056960	0.054991	1.035794	0.3010

Effects Specification

Cross-section fixed (first differences)

Mean dependent var	-0.214703	S.D. dependent var	1.437695
S.E. of regression	0.828268	Sum squared resid	262.0627
J-statistic	16.31880	Instrument rank	23.000000

D15. Robustness check: Regressions for OOP expenditures as a share (%) of THE (Static and Dynamic Model) both excluding Chile, France and the USA and GGD/GDP, GDP and PHI/PvtHE (1995-2013)

Static Model
Dependent Variable: OOP_THE
Method: Panel EGLS (Two-way random effects)
Sample: 1995 2013
Periods included: 19
Cross-sections included: 23
Total panel (balanced) observations: 437
Swamy and Arora estimator of component variances
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	91.66651	5.673070	16.15818	0.0000
GE/GDP	-0.097470	0.104173	-0.935658	0.3500
INFLAT	0.066945	0.060170	1.112597	0.2665
UNEMPL	0.109611	0.038162	2.872240	0.0043
GGHE/THE	-0.911423	0.065825	-13.84623	0.0000
PHI/THE	-0.956591	0.120930	-7.910286	0.0000

Effects Specification

	S.D.	Rho
Cross-section random	2.393008	0.8076
Period random	0.000000	0.0000
Idiosyncratic random	1.167989	0.1924

Weighted Statistics

R-squared	0.851081	Mean dependent var	2.443467
Adjusted R-squared	0.849353	S.D. dependent var	2.993703
S.E. of regression	1.161954	Sum squared resid	581.9093
F-statistic	492.6366	Durbin-Watson stat	0.388441
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.952515	Mean dependent var	21.95807
Sum squared resid	3014.920	Durbin-Watson stat	0.074973

Dynamic Model
Dependent Variable: OOP_THE
Method: Panel Generalized Method of Moments
Transformation: First Differences
Sample (adjusted): 1997 2013
Periods included: 17
Cross-sections included: 23
Total panel (balanced) observations: 391
White period instrument weighting matrix
White period standard errors & covariance (d.f. corrected)
Instrument list: @DYN(OOP_THE,-2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OOP/THE(-1)	0.233628	0.012946	18.04698	0.0000
GE/GDP	0.067347	0.026528	2.538738	0.0115
INFLAT	0.021114	0.011373	1.856507	0.0641
UNEMPL	0.095839	0.012889	7.435695	0.0000
GGHE/THE	-0.787377	0.021822	-36.08111	0.0000
PHI/THE	-1.011008	0.050547	-20.00129	0.0000

Effects Specification

Cross-section fixed (first differences)

Mean dependent var	-0.214703	S.D. dependent var	1.437695
S.E. of regression	0.835954	Sum squared resid	269.0453
J-statistic	21.25445	Instrument rank	23.000000

D16. Robustness check: Regressions for OOP expenditures as a share (%) of THE (Static and Dynamic Model) lasting from 2005 to 2013, including all variables and countries

Static Model
Dependent Variable: OOP_THE
Method: Panel EGLS (Two-way random effects)
Date: 04/02/16 Time: 12:18
Sample: 2005 2013
Periods included: 9
Cross-sections included: 26
Total panel (balanced) observations: 234
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	93.91169	2.019684	46.49822	0.0000
DEBT	-0.004473	0.003417	-1.309281	0.1918
GDP	-0.009496	0.016112	-0.589357	0.5562
GG_GDP	-0.008409	0.049397	-0.170237	0.8650
GGHE_THE	-0.946793	0.025249	-37.49881	0.0000
INFLAT	-0.023611	0.027664	-0.853499	0.3943
PHI_PVTHE	0.022924	0.020318	1.128222	0.2604
PHI_THE	-1.091444	0.078249	-13.94832	0.0000
UNEMPL	0.039995	0.019217	2.081175	0.0385

Effects Specification

	S.D.	Rho
Cross-section random	2.632283	0.9627
Period random	0.000000	0.0000
Idiosyncratic random	0.517835	0.0373

Weighted Statistics

R-squared	0.901396	Mean dependent var	1.338849
Adjusted R-squared	0.897890	S.D. dependent var	1.619076
S.E. of regression	0.517369	Sum squared resid	60.22591
F-statistic	257.1077	Durbin-Watson stat	1.003930
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.943652	Mean dependent var	20.46094
Sum squared resid	1597.243	Durbin-Watson stat	0.037854

Dynamic Model
Dependent Variable: OOP_THE
Method: Panel Generalized Method of Moments
Transformation: First Differences
Sample: 2005 2013
Periods included: 9
Cross-sections included: 26
Total panel (balanced) observations: 234
Difference specification instrument weighting matrix
Instrument list: @DYN(OOP_THE,-2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OOP_THE(-1)	0.173494	0.030906	5.613536	0.0000
DEBT	-0.008072	0.004250	-1.899282	0.0588
GDP	0.006008	0.015989	0.375776	0.7074
GG_GDP	0.088653	0.064610	1.372120	0.1714
GGHE_THE	-0.854402	0.034336	-24.88385	0.0000
PHI_THE	-0.999533	0.086441	-11.56320	0.0000
PHI_PVTHE	0.024451	0.020810	1.175000	0.2412
INFLAT	0.003912	0.028069	0.139356	0.8893
UNEMPL	0.093123	0.019432	4.792184	0.0000

Effects Specification

Cross-section fixed (first differences)

Mean dependent var	-0.235225	S.D. dependent var	1.167668
S.E. of regression	0.613443	Sum squared resid	84.67029
J-statistic	196.1332	Instrument rank	117.000000

D17. Robustness check: Regressions for OOP expenditures as a share (%) of THE (Static and Dynamic Model); excluding GE/GDP and PHI/PvtHE and replacing GGHE/THE and PHI/THE by GGHE/GDP and PHI per capita, respectively (1995-2013)

Static Model
Dependent Variable: OOP_THE
Method: Panel EGLS (Cross-section random effects)
Sample: 1995 2013
Periods included: 19
Cross-sections included: 26
Total panel (unbalanced) observations: 481
Swamy and Arora estimator of component variances
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	41.04290	2.226282	18.43563	0.0000
DEBT	0.017699	0.005255	3.368132	0.0008
GDP	-0.086782	0.042794	-2.027897	0.0431
INFLAT	0.101560	0.051959	1.954617	0.0512
UNEMPL	-0.067976	0.066237	-1.026259	0.3053
GGHE_GDP	-1.817854	0.093935	-19.35233	0.0000
LOG(PHI)	-1.977723	0.392135	-5.043481	0.0000

Effects Specification

	S.D.	Rho
Cross-section random	5.334235	0.8525
Idiosyncratic random	2.219071	0.1475

Weighted Statistics

R-squared	0.367467	Mean dependent var	2.086921
Adjusted R-squared	0.359460	S.D. dependent var	2.905115
S.E. of regression	2.325065	Sum squared resid	2562.409
F-statistic	45.89469	Durbin-Watson stat	0.272597
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.472853	Mean dependent var	21.73114
Sum squared resid	39133.49	Durbin-Watson stat	0.017849

Dynamic Model
Dependent Variable: OOP_THE
Method: Panel Generalized Method of Moments
Transformation: First Differences
Sample (adjusted): 1997 2013
Periods included: 17
Cross-sections included: 26
Total panel (unbalanced) observations: 431
White period instrument weighting matrix
White period standard errors & covariance (d.f. corrected)
Instrument list: @DYN(OOP_THE,-2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OOP_THE(-1)	0.561180	0.021815	25.72412	0.0000
DEBT	0.005045	0.010894	0.463079	0.6435
GDP	0.070284	0.009160	7.672645	0.0000
INFLAT	0.037859	0.021382	1.770599	0.0773
UNEMPL	0.063370	0.034149	1.855675	0.0642
GGHE_GDP	-0.754488	0.066914	-11.27550	0.0000
LOG(PHI)	-0.931869	0.141154	-6.601773	0.0000

Effects Specification

Cross-section fixed (first differences)

Mean dependent var	-0.219803	S.D. dependent var	1.307304
S.E. of regression	1.452476	Sum squared resid	894.5068
J-statistic	20.68797	Instrument rank	26.000000

D18. Robustness check: Regressions for OOP expenditures as a share (%) of THE (Static and Dynamic Model); excluding GE/GDP and PHI/PvtHE and replacing GGHE/THE and PHI/THE by GGHE per capita and PHI per capita, respectively (1995-2013)

Static Model
Dependent Variable: OOP_THE
Method: Panel EGLS (Cross-section random effects)
Sample: 1995 2013
Periods included: 19
Cross-sections included: 26
Total panel (unbalanced) observations: 481
Swamy and Arora estimator of component variances
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	90.39645	15.75261	5.738506	0.0000
DEBT	0.016365	0.014566	1.123495	0.2618
GDP	-0.090943	0.088277	-1.030199	0.3034
INFLAT	0.003192	0.075037	0.042534	0.9661
UNEMPL	-0.210962	0.104080	-2.026930	0.0432
LOG(GGHE)	-8.991886	1.763910	-5.097700	0.0000
LOG(PHI)	-0.560260	1.140677	-0.491165	0.6235

Effects Specification

	S.D.	Rho
Cross-section random	8.485200	0.9440
Idiosyncratic random	2.066823	0.0560

Weighted Statistics

R-squared	0.444782	Mean dependent var	1.225684
Adjusted R-squared	0.437754	S.D. dependent var	2.750032
S.E. of regression	2.062052	Sum squared resid	2015.475
F-statistic	63.28647	Durbin-Watson stat	0.324307
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.579205	Mean dependent var	21.73114
Sum squared resid	31238.32	Durbin-Watson stat	0.020924

Dynamic Model
Dependent Variable: OOP_THE
Method: Panel Generalized Method of Moments
Transformation: First Differences
Sample (adjusted): 1997 2013
Periods included: 17
Cross-sections included: 26
Total panel (unbalanced) observations: 431
White period instrument weighting matrix
White period standard errors & covariance (d.f. corrected)
Instrument list: @DYN(OOP_THE,-2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OOP_THE(-1)	0.444300	0.019382	22.92315	0.0000
DEBT	0.011019	0.015806	0.697119	0.4861
GDP	0.066794	0.008715	7.664488	0.0000
INFLAT	-0.004191	0.023639	-0.177287	0.8594
UNEMPL	-0.077406	0.032182	-2.405243	0.0166
LOG(GGHE)	-5.458674	0.249633	-21.86677	0.0000
LOG(PHI)	-0.410819	0.203508	-2.018686	0.0441

Effects Specification

Cross-section fixed (first differences)

Mean dependent var	-0.219803	S.D. dependent var	1.307304
S.E. of regression	1.333738	Sum squared resid	754.2357
J-statistic	23.29112	Instrument rank	26.000000

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