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Three Essays in Health Economics

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List of Acronyms

CHE – Catastrophic Health Expenditures

DID – Difference in Difference

FFC – Fairness of Financial Contribution

GEL – Georgian Lari

HH – Households

MAP – Medical Assistance for the Poor

EMAP – Expanded Medical Assistance for the Poor

MOH – Ministry of Health

NBER – National Bureau of Economic Research

OOP – Out-of-Pocket Expenses

OOPHE – Out-of-Pocket Health Expenditure

PSM – Propensity Score Matching

SSA – Social Service Agency

UHC – Universal Health Coverage

WTO – World Trade Organization

Abstract

This dissertation comprises three chapters on health economics, which analyses the existing problems in Georgia's healthcare system and offers specific recommendations for policy makers.

The first chapter, “Household Catastrophic Health Expenditure in Georgia and its Policy Implication” is a single authored paper. The main purpose of the aforementioned paper is to identify the factors affecting the prevalence of catastrophic healthcare expenditures (CHE) in Georgia and to evaluate the Fairness in Financial Contribution index (FFC) for the fourth quarter of 2015. By using the Integrated Household Survey Database of the National Statistics Office of Georgia, the research predicts the probability of occurrences of catastrophic health expenditure via the Logistic Regression Model and methodology developed by Xu (2005). According to the results, in 2015, the FFC index equaled 0.82 illustrating that it had been worsening since 2007 (when the FFC index equaled 0.72). Existing deterioration may be explained by the launch of the Universal Health Coverage program, introduced in 2013, offering similar insurance packages both to poor and rich households. The quintile for the poor, 3.5%, is more likely to face catastrophic health expenditures, compared to the higher income quintile groups, while the main factors causing catastrophic health expenditure are the costs associated with the chronically ill, and inpatient and outpatient treatments. To improve the fairness of the Georgian healthcare system, this research suggests focusing on segments of the poor population by expanding the size of their healthcare package.

The second chapter, “Moving towards a Universal Health Coverage System: Lessons from Georgia and its Policy Implications” is the main paper of the dissertation. Which studies the effects of Expanded Medical Assistance for Poor (EMAP) and the Universal Health Coverage (UHC) programs in Georgia on healthcare utilization rates and the financial burden of the population. In 2012, the Georgian government expanded its existing program, Medical Assistance for the Poor (MAP), by including pensioners, children under five and students. In 2013, Georgia subsequently moved to the UHC program from targeted healthcare

insurance schemes. Since the initial implementation of the government's initiative there has been no research assessing the impact of EMAP or UHC. Before 2012, the main recommendations of the existing research analyzing Georgia's healthcare system was to focus on the most impoverished part of society and improve their insurance packages. Despite this, Georgia introduced UHC in 2013, instead of directing additional funds to vulnerable groups- offering better services, including medicinal benefits. The main objective of this paper is to evaluate the relevance of the decision of the Georgian government to move toward UHC in 2013 by comparing the effects of EMAP and UHC. Based on integrated data from the National Statistics Office of Georgia and using difference in difference (DID) with a matching methodology, this study reveals that EMAP had a positive effect in terms of utilization rates, but had no effect on the financial burden of participant households.

In 2012-2013 there was a 6% increase in inpatient and outpatient utilization rates. While, in evaluating the pure effect of UHC, there were no statistically significant changes in terms of healthcare service utilization or the financial burden on households without pensioners, children under five or students. The main recommendation for policy-makers is to target its budgetary resources on the most vulnerable part of society and to cover only catastrophic health expenditures for other households in need. Furthermore, it is recommended that pharmaceutical benefits be included in insurance packages, as it is currently the main out-of-pocket healthcare expenditure (OOPHE).

The third chapter, "Analyzing the Composition of Catastrophic Health Expenditures in Georgia (2012-2015)", is also a single authored paper. The main purpose of the study is to identify the composition of OOPHE which cause catastrophic health expenditure and to measure the incidence and intensities of catastrophic payments in 2012 and 2015 through the World Bank Methodology. By using the Integrated Household Survey from the National Statistics Office of Georgia's database, the study illustrates that pharmaceutical costs have a significant share in OOPHE. Moreover, medication appears to be the chief cause of

household catastrophic health expenditures, as a vast 72% of CHEs are prescription related expenses.

Furthermore, those households suffering with chronically diseased or disabled members spend 79% of their OOPHE on medicine, herewith the extent of pharmaceutical costs of OOPHE for the poor quintile is 84.7%: 16.1% greater than the rich quintile. The situation is comparable for outpatient treatments, where the proportion of medicinal expenses in OOPHE is 44%. In the case of poor households', the share amounts to 57%, which is 21.3% over the rich quintile. An analysis of these incidences illustrates that the poorest quintile group's catastrophic expenditures accounted for 16.6% in 2015, while it was 13.2% in 2012. Though, the fraction of money spent by households belonging to said quintile does not experience significant changes. Accordingly, as pharmaceutical costs cover such an extent, this policy paper offers its recommendations to the provision of whichever prescription benefits packages shall be the primary policy objective for the government, in order to truly protect poor households from financial ruin.

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Contents

List of Figures

List of Tables

Chapter 1

Household Catastrophic Health Expenditure in Georgia and its Policy Implications

Abstract

The main purpose of the present research is to identify the factors affecting the prevalence of catastrophic healthcare expenditure in Georgia and to find the Fairness in Financial Contribution index (FFC) for the fourth quarter of 2015. By using the Integrated Household Survey Database of the National Statistics Office of Georgia, the present research predicts the probability of occurrences of the catastrophic health expenditure via the methodology and the Logistic Regression Model developed by Xu (2005). The results reveal that, in 2015, the FFC index equaled 0.82, illustrating that it had been worsening since 2007 (when the index equaled 0.72). The deterioration may be explained by the launch of the UHC program, introduced in 2013, which offered comparable insurance packages both to poor and rich households, without a means testing approaches. The poor quintile is 3.5% more likely to face catastrophic health expenditures compared to the higher income quintile groups, while the main factors causing catastrophic health expenditure are costs associated with the chronically ill, and inpatient and outpatient treatments. To improve fairness within Georgia's healthcare system, this present research suggests focusing on the population's poorest members by expanding the size of their healthcare packages, for instance by incorporating prescription benefits.

1.1. Introduction

Fairness in financial contribution is determined by WHO (2000) as an intrinsic goal of health systems. Fairness in financial contribution and the protection against financial risk is based on the notion that every household should pay a fair share of their health costs. The FFC index reflects the overall inequality in households' financial contributions into the health system. According to Xu's (2005) highly discussed paper, health policy makers have long been concerned with protecting people from the possibility that ill health will lead to catastrophic financial payments and subsequent impoverishment.

The Fairness in Financial Contribution index measures whether a country collects contributions from households to finance health in an equitable manner (WHO, 2000), which notably is a common and developing problem within the process of designing and implementing healthcare systems of low and lower middle income countries like Georgia (Zoidze et al., 2012). Gotsadze et al. (2009) measured an FFC index for Georgia equating to 0.82, showing that Georgia, in 2007, had a relatively fair healthcare financing system compared to equivalent country peer groups.

Alongside measuring the FFC index, the necessity of determining the factors for catastrophic household health expenditures in Georgia were further discussed within Gotsadze's et al. (2009) paper. The Research has identified Georgia as having one of the most unprotected healthcare financing systems, along with other transitional countries (Azerbaijan, Ukraine, Vietnam and Cambodia) which feature a similarly high rate. To reduce catastrophic health expenditures, Gotsadze's et al. (2009) research suggested a greater focus on poor segment of the population by expanding government financed benefits for the poor and chronically ill, including, and broadening, inpatient coverage and implementing medication benefits. The focus on priority groups, and specifically on the poor, is a common feature of health financing reforms in other low and middle-income countries, including Cambodia (Leemput et al., 2007), China (Meessen, 2008), Indonesia (ILO, 2004), Mexico, the Philippines, Vietnam (Jowett et al., 2007), and Tunisia (Arfa & Achouri, 2008).

In 2007, the Georgian healthcare system provided assistance to the poorest sections of the society. Gotsadze's et al. (2009) and Zoidze's et al. (2012) papers measure the FFC index in

Georgia and analyze influences on catastrophic health expenditures. However, in 2013, the Georgian government launched the Universal Health Coverage program, since then, there has been no pertinent research determining either the FFC index in Georgia, its alternation, or identifying the factors that affect occurrences of catastrophic expenditure. The present research paper is aimed at analyzing the main factors triggering catastrophic health expenditures and at providing the necessary recommendations for policy makers for its reduction.

The study considers the following questions: *1. What are the main factors affecting occurrences of catastrophic healthcare expenditure at the end of 2015? And, showing whether these factors have changed since the previous research, conducted in 2007; 2. Did the FFC index change between 2007-2015?* To answer these questions, the present study uses the Integrated Household Survey Databases of the National Statistics Office of Georgia. Utilizing the distribution of health payments and the catastrophic expenditures methodology developed by Xu (2005), alongside the Logistic Regression Model, it is possible to predict the probability of the frequency of catastrophic health expenditure.

The present paper is structured as follows. Section 2 focuses on the data and the specification of the methodology. Section 3 presents the results of the research. While, section 4 discusses policy implications and offers a conclusion.

1.2. Data Description and Methodology Specification

This study uses the Integrated Household Survey Databases of the National Statistical Office of Georgia from the fourth quarter of 2015. The data includes the average monthly expenditure, OPP health expenditure, geographical variables, and the socio-economic characteristics of each household, such as age, gender, and education. The total number of observations is 2746: where each household remains in the sample for one year, and four interviews are conducted during this period. As the survey only uses information from the fourth quarter of 2015, there is no reiteration of households in the database.

In the process of the construction of the FFC index, the present study uses the equivalent size of the household, which is directly created by the National Statistics Office of Georgia. This variable is calculated for each household. The indicator depends on the sex and age of household

members. There are six groups based on sex and age, each of which have corresponding weights: *Children* (aged 0-7) with coefficient 0.64; *Adults* (aged 8-15); *Working age males* (aged 16-64) with coefficient 1; *Working age females* (aged 16-59) with coefficient 0.84; *Pension age males* (aged 65 and over) with coefficient 0.88; and *Pension age females* (aged 60 and over) with coefficient 0.76. The corresponding coefficients are assigned to every household member and then calculated for each household.

The number of equivalent adults with scale (cohabitation) effect is calculated for each household. Indicators are calculated on the base of -0.6 coefficients. Scale (cohabitation) effect signifies that the expenditures of two households with one member is greater than the expenditure of one household with two members, because certain types of expenditures (rent, utility payments, etc.) are common for all household members. In the case of a single member household, the indicator does not change and is equal to the number of equivalent adults, while in all other cases, the indicator is equal to the number of equivalent adults to the power of 0.6.

With regard to health variables, the data identifies households with a chronically sick or disabled member. This is a dummy variable, equal to 1 if the household has a chronically sick or disabled member and 0 otherwise. The data also includes utilization variables such as: inpatient and outpatient variables that are identified subsequent to a National Statistics Office survey question. The following question was asked: did any member of the household use inpatient or outpatient services within the last three months? This dummy variable equals 1 if the household had used these services and to 0 otherwise. The present study also utilizes expenditure variables that measure both total expenditure and health expenditure of a household.

In 2013, the Georgian health system experienced significant changes by transitioning to Universal Health Coverage (UHC) from a targeted healthcare program, which provided governmental support to the poor and targeted groups such as children aged (0-5), elderly people, students, children with disabilities and persons with extreme disabilities. Under this health system, these targeted groups held a basic insurance package provided by the government.

In 2013, by moving to UHC, the government of Georgia realized its 2012 pre-election promise: “Free Insurance for all”, however there were no significant changes to the insurance packages. It is noteworthy that in 2013 the UHC program pilot version was lunched, which

covered several parts of Georgia. While by the end of 2013, the UHC program was wholly implemented and fully functional. Therefore, using data from 2013 to identify factors affecting occurrences of catastrophic expenditure would be irrelevant. Equally, data from 2014 would be insufficient for the study, as at the time, awareness of the program was relatively low in Georgia. Hence the study selected the latest available data, the fourth quarter of 2015, to identify the main factors behind catastrophic health expenditures.

Fairness in Financial Contribution

To estimate catastrophic health expenditures and measure the FFC index, this research uses the methodology developed by Xu (2005). The main notion behind FFC is that every household should pay their fair share, with fairness equating to greater contributions from those households with larger financial resources. Xu (2005) develops methods to measure catastrophic health expenditure and identifies how to construct all necessary variables to measure the FFC index.

To construct the FFC index, one needs to observe the following variables: 1. *Household out-of-pocket heath expenditure* (OOP_h) 2. *Household total expenditure* (exp_h) and 3. *Food Expenditure* ($food_h$), which is the money spent on food items by a household, though expenditure on alcoholic beverages and tobacco are excluded.

Different types of methodologies exist to define the poverty line, and all of them have their own limitations, this study uses the food shared poverty line which is recommended by Xu (2005). This poverty line *(pl)* is defined as the food expenditure of a household whose food budget share is at the 50th percentile in the country. In order to minimize measurement errors, this paper uses the average food expenditures of households whose food share of total expenditure is within the 45th and 55th percentile of the total sample. Considering the scale economy of household consumption, the household equivalence scale is used (a household's equivalent size is defined by the National Statistics Office of Georgia).

$$pl = \frac{\sum W_h * eqfood_h}{W_h}, with\ \ food45 < foodexp_h < food55$$

where $foodexp_h$ is a household's food expenditure share of the total expenditure; W_h is the weight of each household, $eqfoodh_h$ is the equalized food expenditure, which is defined as:

$$eqfoodh_h = \frac{food_h}{eqsize_h},$$

where $food_h$ is the household food expenditure, while $eqsize_h$ is the equivalent household size.[1] By using the poverty line, one can construct the subsistence expenditure for each household which is the poverty line multiplied by the equivalent size of household:

$$se_h = pl * eqsize_h.$$

Using se_h, one can define a household's capacity to pay, which is a household's non-subsistence spending. When food expenditure is less than the substance of spending, it is possible to define the capacity to pay (*cpt*) as the difference between total expenditure and food expenditure. When food expenditure is more than the substance of spending, the capacity to pay will be the difference between total expenditure and the substance of spending:

$$ctp_h = \begin{cases} exp_h - se_h \quad if \quad se_h \leq food_h, \\ exp_h - food_h \quad if \quad se_h > food_h. \end{cases}$$

Finally, using a household's capacity to pay one can generate the main variable, which is used to find the FFC, the out-of-pocket health payments share of a household's capacity to pay (*oopctp*):

$$oopctp_h = \frac{oop_h}{ctp_h}.$$

The distribution of households' financial contributions across households has been summarized using the Fairness of Financial Contribution (FFC). This index is designed to weight heavily those households that have spent a very large share of their beyond subsistence effective income on health. The index thus reflects overall inequality in household financial contribution into the health system, and particularly reflects those households facing catastrophic health expenditure. The FFC is based on the mean of the cubed absolute difference between the *oopctp* a given household and the *oopctp* norm. The index is of the form:

$$FFC = 1 - \sqrt[3]{\frac{\sum_{h=1}^{n} w_h |oopctp_h - oopctp_0|^3}{\sum w_h}},$$

Where:

[1] Equivalent household size is defined in the methodology section.

$$oopctp_0 = \frac{\sum w_h OOP_h}{\sum w_h ctp_h}.$$

The FFC ranges between 0 and 1. The FFC index is close to 1 if each household's OOPHE share of a household's capacity to pay is close to the norm of OOPHE share of a household's capacity to pay. Thus, the average household's OOPHE (no matter which quintile group) is the same. When the FFC index is close to 1, it shows that a country has a fair financial system, because households' OOPHE are more or less the same.

The Logistic Regression Model

In order to define the factors which cause catastrophic health expenditures, scholars commonly use the Logistic Regression Model (Akbar et al, 2015, Puteh & Almualm, 2017, Xu et al., 2003). In this research the Logistic Regression Model will help to find the factors that lead the population to catastrophic expenses. The dependent variable is a dummy variable equal to 1 if catastrophic expenditure occurs and 0 otherwise.

The Logistic Regression Model's independent variables are those that one can define in the data charter: 1. a chronically sick or disabled member of a household (dummy variable); 2. the last inpatient service utilization used by any member of a household during the previous three months (dummy variable); 3. the last outpatient service utilization used by any member of a household during the previous three months (dummy variable); 4. household composition and demography; and 5. the expenditure quintile groups.[2] To compare households with different economic statuses, the expenditure quintile groups were defined as the share of total expenditure divided by the equivalent size of a family and then ranked from the poorest to richest.[3]

Catastrophic Health Expenditures

Catastrophic health expenditure (CHE) refers to any disbursement for medical treatment that pose a threat to a household's financial ability to maintain its subsistence needs. According to the World Health Report (2000), one of the fundamental functions of a health system is to protect a population from the financial risks associated with ill health, quantified in terms of catastrophic health expenditure and impoverishment from medical expenses. According to WHO

[2] The lowest quintile is used for the reference group.
[3] The expenditure quintile groups were defined through ranking household monthly expenditure per adult equivalent (dividing households' monthly expenditure by adult equivalent household size).

(2010), about 150 million people face catastrophic expenditure as a consequence of high out-of-pocket expenditure (OOP) for healthcare each year.

As stated by Kimani & Maina (2015), two common approaches are used to measure catastrophic health expenditure (CHE). The first, proposed by Wagstaff & van Doorslaer (2003), is related to budget share. The second, by Xu (2005), is related to a household's capacity to pay. Wagstaff and van Doorslaer defined OOP as catastrophic if they exceed certain fraction of a household's total expenditure or income in a given period. Whereas, Xu (2005) defined catastrophic health expenditure in relation to a household's non-food expenditure.

While the popular approach defines medical spending as "catastrophic" if it exceeds a fraction of a household's income or total expenditure in a given period. For instance, WHO (2005) indicates that health expenditure is considered catastrophic whenever it is equal to or exceeding 40% of a household's non-subsistence income. Subsistence need is defined as the minimum requirement for a household to maintain basic needs within society.[4]

Within research related to CHE and the functioning of health systems, both approaches are used to define CHE. In their studies Daneshkohan et al. (2011), Puteh & Almualm (2017), Kien et al. (2016), and Mchenga et al. (2017) define health expenditures as catastrophic if the out-of-pocket health expenditure is greater than 40% of a household's non-subsistence (non-food) expenditure.

While other scholars such as Dorjdagva et al. (2016), O'Donnell et al. (2005), Ranson (2002), Nabila (2016), and Tolla et al. (2017), classify catastrophic health expenditure as annual out-of-pocket payments above 10% of a household's total expenditure/income.

As the aim of the present research is to estimate the FFC index in Georgia and factors causing the population's CHE, it is notable that both of the studies on Georgia, with the same objectives, conducted by Gotsadze et al. (2009) and Zoidze et al. (2012), define health expenditures as catastrophic if the OOP is greater than 40% of household's non-food expenditure.

[4]The basic life needs are food, shelter, clothing and certain household goods. A household's non-subsistence income is the remaining money after their basic needs have been met.

Besides which, O'Donnell et al. (2008) notes that health spending is income elastic, hence non-food expenditure may be preferred to better detect catastrophic payments among the poor. Finally, in accordance with WHO's (2005) definition and the studies previously conducted in Georgia, the present research will also assess the expenditure as catastrophic if out-of-pocket health expenditure is over 40% of a household's non-food expenditure.

1.3. Results

The main objective of the present papers is to define the factors causing the population's catastrophic health expenditures. Variables such as utilization, geographic location, or having a chronically ill or disabled person in the household increase the probability of occurrences of catastrophic health expenditure. The number of households including the chronically ill or the disabled is very high in Georgia. Around 57% of households have at least one member with serious health conditions. According to the results of the present research, OOPs are significantly higher for the majority of households in the survey, regardless of whether they rank among the rich or poor quintile groups (Table 1.1). For instance, in the poor quintile, 96% of the expenditures incurred for the medical treatment of the chronically ill or disabled are paid by their households, similarly households from the rich quintile pay 95% of the same incurred expenditures.

Households from the poor quintile spend 34 GEL for the medical treatments of chronically ill or disabled members of the family, while their total expenditures are 229 GEL. Regarding the wealthiest quintile, the expenditures incurred for the medical treatment of chronically ill members of the household accounts to 79 GEL, out of their total healthcare expenditure 1536 GEL (Table 1.2). Therefore, the financial pressure incurred for the medical treatment of a household with chronically ill or disabled members is higher in the poor quintile compared to the rich quintile.

A similar picture holds for outpatient treatment. Regardless of the economic condition of the household (rich or poor), OOP expenditures are around 89% of OOP outpatient health expenditure share of the total outpatient health expenditure (Table 1.1). Poor households spend 20 GEL on outpatient treatments (their total expenditure accounts to 229 GEL), while the rich quintiles' spending incurred for outpatient treatment is 70 GEL (and their total expenditures,

1536 GEL). These findings illustrate that as with chronic illnesses, outpatient treatments may also be a significant reason for catastrophic health expenditures for the poor, more so than the rich.

While with inpatient treatment, 68% of expenditure incurred for treatment comes from OOP of poor households, which is 22% less in comparison with the expenditures incurred by the rich quintile (Table 1.1). Specifically, the figures reveal that inpatient treatment expenditures for the poor quintile are 59 GEL (from a total expenditure of 229 GEL), whereas the same spending for the rich quintile amounts to 305 GEL (from the total 1536 GEL). The results illustrate that expenditures for inpatient treatment incurred by poor households relatively are higher in comparison to rich households.

Furthermore, the figures, provided in Table 1.3, reinforce the judgment, which highlights that 28% of poor households incur CHE, while only 10% of the rich quintile face catastrophic health spending.

It is also noteworthy that hospitals are more accessible in urban than in rural regions, thus, the demographic variable is significant to help illustrate the related differences in CHEs. In rural areas, 28% of households face CHE, while in urban areas it is only 18%. The difference between urban and rural CHE is statistically significant in the 99% CI interval (Table 1.4).

Each of the above-mentioned variables were used as independent variables and can influence the occurrence of CHE. Therefore, this study has run the OLS and Logistic Regression Model.

In both the OLS and Logistic Regression Models all the variables, except the urban variable, are statistically significant in the 95% CI (Table 1.5). Households which have members with a chronic illness or disabilities are 10% more expected to face CHE in comparison with other households. In addition, households who had outpatient treatment are 4.4% more likely to face catastrophic expenditure, compared to those who never utilized outpatient treatments. Furthermore, households whose members had inpatient treatment are 16.75% more likely to have catastrophic health expenditure, compared to households who did not use inpatient treatments.

In regard to the quintile groups, the richest quintile suffers 3.2% less risk of having catastrophic expenditure in comparison to the poor group. Likewise, the 3rd and 4th quintiles

suffer around 3.5% less risk in comparison to the poor quintile. Finally, rural areas suffer 5% more catastrophic risk compared to the capital city.

An analysis of two papers, the present work alongside Gotsadze's et al. (2009), illustrates that in 2007-2015 there were the same variables affecting the prevalence of catastrophic expenditures of the population. This research has discerned that the FFC index in 2015 equals -0.72, which is worse than the FFC index in 2007 (-0.82). A decrease in the FFC index identifies that the health financing system, from 2007, had become less fair by 2015.

1.4. Policy Implications and Conclusion

The present research highlights specific recommendations to decrease incidences of catastrophic health expenditure. The focus on the poor population will help the Georgian government attain positive outcomes from the UHC program. According to this research the health system policies should be oriented on the following: 1. more attention should be paid to the poorest segment of the population. The size and the coverage of their insurance package should be increased. The aforementioned recommendation is based on the evidence that both during inpatient and outpatient treatment the poor quintile face more catastrophic health expenditure than the rich (Table 1.1 and 1.2). 2. The UHC package has a lack of pharmaceutical benefits for its beneficiaries, significantly increasing the occurrence of CHE for households. Therefore, the existing healthcare package should be improved through the inclusion of prescription medication for the poor. 3. Households in the rich quintile still face CHE, specifically, 1 out of 10 household is under the risk of catastrophic health expenditures (Table 1.3), hence, instead of a basic health coverage package, the government should introduce only coverage for catastrophic health expenditures.

The fact that the FFC index in Georgia worsened between 2007-2015 may be explained by the launch of the UHC program, introduced in 2013, which offers similar insurance packages both to poor and rich households. These policy recommendations may carry relevance for policy makers from other low and middle-income countries facing similar problems of high OOP and catastrophic health expenditures.

Table 1.1. Key Indicators by Consumption Quintile (HH's Level Data)

Indicator	Total	Number Obs.	Poorest Fifth	2	3	4	Richest Fifth
% of total population with chronically diseased or disabled family member	57	1580	55	63	59.16	55	51
OOP Chronic Health Expenditure share to Total Chronic Health Expenditure	96		97	97	97	97	95
% of total HH's with acute sickness during last 3 month (Outpatient)	31	863	25	29	31	31	37
OOP Outpatient Health Expenditure share to Total Outpatient Health Expenditure	89		89	90	91	87	87
% of total HH's with Stationary Treatment during Last 3 Month (Inpatient)	4	92	1	2	4	3	9
OOP Inpatient Health Expenditure share to Total Inpatient Health Expenditure	53		68	63	65	49	46
% reported to be Beneficiaries of State Program for Population below the Poverty Line	11	274	23	14	11	3	1

Table 1.2. HH's Monthly Expenditure Characteristics Mean in GEL (99 % CI)

Quintile Groups	Average Month HH's Expenditure	OOP Average Month Costs for Chronic Conditions	OOP Outpatient Care Costs	OOP Inpatient Care Costs	Share of OOP Health Expenditure to Total Expenditure %
Poorest	229	34	20	59	13
2	386	47	26	73	13
3	533	58	32	118	12
4	737	76	49	86	11
Richest	1536	79	64	305	10
Total	**684**	**58**	**40**	**195**	**12**

Table 1.3. Percentage of HH's by Quintile Groups, Facing Different Levels of Health Expenditure at Different Cut-off Points (99% CI for Cut-off Points)

	Poorest	2	3	4	Richest	Total
OOP >= 40 % of CPT	27	23	19	12	10	18
OOP = 20-40 % of CPT	22	24	20	18	10	19
OOP = 10-20 % of CPT	11	16	17	15	15	15
OOP = 0-10 % of CPT	40	37	44	55	64	48

Note: The table shows that 18% of households are facing catastrophic health expenditure. Catastrophic health expenditure is defined by a household's expenditure over 40% than their capacity to pay. The poor quintile faces a catastrophic health expenditure of 27%, which is 17% more than the rich quintile face. This indicates inequality between quintile groups with regards to the expenditure variables.

Table 1.4. Percentage of HH's by Region Groups, Facing Catastrophic Health Expenditure (99 % CI)

Region	Total
Urban OOP >= 40 % of CPT	18
Rural OOP >= 40 % of CPT	28
Tbilisi OOP >= 40 % of CPT	19

Table 1.5. Estimated Coefficients in the OLS and Logistic Model for Catastrophic Health Care Expenditure (HH's data)

	OLS Model		**Logistic Model**		**Margins, dy/dx**	
	Coefficients	P > |t|	Coefficents	P > |t|	dy/dx	P > |t|
Intercept	0.007	**0.600**	-5.157	**0.000**		
Chronic	0.0695	**0.000**	2.028	**0.000**	0.1055	**0.000**
Outpatient	0.0386	**0.000**	0.852	**0.000**	0.044	**0.000**
Inpatient	0.4206	**0.000**	3.219	**0.000**	0.1675	**0.000**
Poorest Quintile (Reference Group)						
2nd Quintile	-0.0339	**0.012**	-0.338	0.239	-0.017	0.242
3rd Quintile	-0.0399	**0.003**	-0.7498	**0.011**	-0.039	**0.014**
4th Quintile	-0.0271	**0.045**	-0.658	**0.037**	-0.034	**0.040**
Richest Quintile	-0.0394	**0.004**	-0.621	**0.051**	-0.032	**0.056**
Capital city, Tbilisi (Reference Group)						
Urban Area (not includes Tbilisi)	0.0004	0.970	0.7108	**0.059**	0.037	**0.067**
Rural Area	0.031	**0.003**	0.9553	**0.001**	0.049	**0.002**

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Chapter 2

Towards Universal Health Coverage system: Lessons Learnt from Georgia and its Policy Implications (Main Paper)

Abstract

This paper studies the effects of Expanded Medical Assistance for the Poor (EMAP) and Universal Health Coverage (UHC) programs in Georgia on healthcare utilization rates and the financial burden of the population. In 2012, the Georgian government expanded its existing program of Medical Assistance for the Poor by adding pensioners, children under five and students. In 2013, Georgia transitioned to the UHC program from targeted healthcare insurance schemes. Since the initial implementation of the government's initiative, there has been no research assessing the impact of either EMAP or UHC. Prior to 2012, the main recommendations of the prevailing research analyzing Georgia's healthcare system was to focus on the section of society in the greatest need and to improve their insurance packages. Despite this, Georgia introduced UHC in 2013, rather than directing additional funds to vulnerable groups- namely, offering better services and including prescription benefits. The main objective of this paper is to evaluate the relevance of the decision of the government of Georgia to move toward UHC in 2013 by comparing the effects of EMAP and UHC. Based on data from the National Statistics Office of Georgia and using difference in difference with a matching methodology, this study reveals that EMAP had a positive effect in terms of utilization rates, but it had no impact on the financial burden of participant households. Between 2012-2013, there was a 6% increase in inpatient and 7% increase in outpatient utilization rates. When evaluating the pure effects of UHC there were no statistically significant changes in terms of healthcare services utilization and financial burden on households without pensioners, children under five or students. Furthermore, this paper is encouraging for researchers working on cross-sectional data using a difference in difference (DID) approach due to the methodology. Cross-sectional data creates econometric problems, such as the differences in control and treatment groups on a set of baseline characteristics. The study's assessment of UHC and EMAP is performed using four grouping propensity score matching (PSM) with a DID method, which offers less biased results in the cross-sectional data.

2.1 Introduction

The primary goal of this paper is to evaluate the effects of Universal Health Coverage (UHC), introduced in Georgia in 2013, on the utilization of health services and expenditures. This paper further seeks to evaluate the targeted health reforms of the Expanded Medical Assistance for the Poor (EMAP), introduced in 2012. The investigation provides a better informed decision-making process for policy makers determining whether to insure the entire population with basic health packages or to develop targeted insurance packages for the most vulnerable households. Despite the significant influence of healthcare systems on the wellbeing of households, there has been no research conducted in Georgia on the effects of transitioning to UHC. The empirical findings of this study will benefit Georgian policy makers as they proceed to the next stages of UHC reform. The subsequent findings may also be utilized as a guide for designing an effective transitional path towards Universal Health Coverage in countries similar to Georgia, which plan to implement universal healthcare reform.

The policy makers expected UHC and EMAP to improve the population's financial protection and consumption of health services. This research, however, does not support their expectations either in terms of financial protection, either with UHC or EMAP. Nevertheless, EMAP, which covers households with pensioner, students and children, has had a greater positive effect on the utilization of health services. The combined results of UHC and EMAP also reveal a positive effect on both outpatient and inpatient visits for the households which were covered by EMAP.

Furthermore, this paper is encouraging for researchers working on cross-sectional data using a difference in difference (DID) approach due to the methodology. Cross-sectional data creates econometric problems, such as the differences in control and treatment groups on a set of baseline characteristics.

The study's assessment of UHC and EMAP is performed using four grouping propensity score matching (PSM) with a DID method, which offers less biased results in the cross-sectional data. In addition to this approach, the empirical analysis also employs the standard PSM with DID and the simple DID methods. When comparing the three methods, the four grouping

method appears to be the most valuable under statistical point of view for analyzing cross-sectional data.

In this paper, access to health services is evaluated by the inpatient and outpatient utilization rates, while financial protection is measured by individual households' out-of-pocket health expenditure (OOPHE), and catastrophic health expenditures (CHE) using various thresholds.

This research looks at the following two questions: 1. What impact did the EMAP and UHC programs have on the ratio of OOPHE to capacity to pay between 2012-2015? 2. What impact did the EMAP and UHC programs have on inpatient and outpatient utilization rates in 2012-2015? To answer these research questions, the paper uses the Integrated Household Survey Database of the National Statistics Office of Georgia.

The paper is structured as follows: section 1 reviews the existing literature and Georgia's previous healthcare system; section 2 focuses on the data and methodology; section 3 presents the results of the research; and section 4 discusses the policy implications and provides the conclusions.

2.2 An Analysis of the Existing Research

According to the World Health Organization (WHO), the core aim of UHC is to provide quality, essential health services to a population, without their being exposed to financial hardship. Numerous countries, at all levels of development, are embracing UHC to achieve a higher level of welfare for their citizens. UHC is also a decisive component within the United Nations' 2030 Agenda on Sustainable Development Goals (SDGs), which outlines the following specific health goals: to ensure financial risk protection, access to quality healthcare services and to affordable essential medication (WHO & World Bank Group, 2015).

According to the World Bank Group and WHO's joint global monitoring report on Universal Health Coverage, health programs should be measured using three significant facets: 1. who is covered; 2. which services are covered; and 3. the proportion of costs that are covered by who? (Figure 2.1). Ultimately, UHC should be implemented, such as individuals and

households are protected from "financial ruin" due to healthcare costs (McIntyre & Kutzin, 2016).

In impact evaluation literature, there are different approaches for examining the effects of healthcare reforms. The impact of Mexico's "Seguro Popular (SP)" program on financial protection was examined by Galarraga et al. (2009) and King et al. (2009) by using both OOPHE and CHE variables. In each paper, a household's healthcare spending exceeding 30% of their total capacity to pay indicated catastrophic healthcare expenditure. Another approach may be to consider health expenditure catastrophic whenever it equals or exceeds 40% of a household's non-subsistence income. Where subsistence need is defined as the minimum requirement for a household to maintain a basic standard of living. In their studies, Puteh & Almualm (2017), Kien et al. (2017), and Mchenga et al. (2017) each define health expenditure as catastrophic if the out-of-pocket healthcare expenditure is more than 40% of a household's non-subsistence (non-food related) expenditure. This paper will evaluate catastrophic expenditure using both the 30% and 40% thresholds.

Wagstaff et al. (2007) used inpatient and outpatient utilization variables to measure the impacts of the insurance program on access to health services in China. Trujillo et al. (2005) used the same variables to evaluate experiences in Colombia. These studies measure inpatient and outpatient utilization of health services via the following questions: was an individual hospitalized in the 12 months prior to the interview, and did an individual use outpatient care 30 days prior to the interview. This study differs slightly, as it uses data on inpatient and outpatient utilization over the three months prior to the day of the interview. Whilst the dummy variables are: the last inpatient service used by any member of a household over the last three months; and the last outpatient service used by any member of a household over the last three months.

The variables of the outcomes are based on how researchers evaluate healthcare reforms. This investigation evaluates reforms based on: 1. inpatient and outpatient utilization of health services, and 2. CHE at 30% and 40% thresholds, and on OOPHE.

2.2.1 The Georgian Experience

In accordance with WHO Guidelines on Healthcare Programs, since 2006, the Georgian government has been developing its own social and healthcare system. The Georgian healthcare

system has experienced diverse, large-scale reforms within this short period. Crucially, the system was adapted several times between 2006 and 2013, with the transformation of services, insurance coverage, financial protection methods and the scope of funding.

In 2006, the Georgian government launched an essential social policy, in which it established the Social Service Agency (SSA) to identify poor people based on a scoring and proxy means testing system. This scheme was based on each household's welfare index. The lower the welfare index, the lower the welfare of the household. The SSA evaluated each applicant (household) based on the information collected from their SSA survey. In order to become recipients of MAP, households must first be registered in the SSA database and then assigned a score of 70,000 or less, via the SSA survey (Table 2.3).[5] The proxy means test uses over 80 variables to determine each household's welfare status. The main groups of variables are the following: the different types of properties owned; income; utility expenses; level of education; household size; and geographical location. There were no Georgian regions excluded from the program, with the exception of occupied territories. Different weights were applied to the variables depending on each regions' development level. Similar proxy means tests have been implemented in other middle-income countries including Mexico, Honduras, Jamaica, Colombia, Russia, and Egypt (Coady et al., 2004).

In 2007, the Georgian government launched the Medical Assistance for the Poor (MAP) program, which was based on principles similar to the various health financing reforms in other low and middle-income countries like Tunisia (Arfa & Achouri, 2008), Mexico (Coady et al., 2004), and the Philippines (Jowett & Hsiao, 2007). MAP was focused on the poorest segments of the population, identified by the SSA, and offered coverage for urgent outpatient and inpatient treatments. From 2007 to 2012, minor changes were made to Georgian healthcare programs, and in May 2012, the government further expanded the program to include both children under the age of six and the retired (EMAP), who were previously ineligible as recipients of MAP. Thus, EMAP offered coverage to households identified by the SSA, in addition to all pensioners, children under the age of six and to students. After these modifications to MAP, approximately 50% of the total population was covered (Zoidze et al., 2012). Finally, in the third quarter of 2013, the UHC program was introduced to cover the entire population. While, between 2011 and

[5] There were 481,505 registered households, with households scoring below 100,000 obtaining social assistance and those below 70,000 receiving medical assistance from the government.

2015, no significant changes were introduced to the insurance packages offered to the households identified by the SSA (Table 2.5).

A few notable research papers have provided an in-depth analysis and assessment of the reforms conducted between 2007 and 2012. For instance, a study by Gotsadze et al. (2009) made recommendations to the Georgian government to focus on the financial protection of the poor, and to extend the benefits for the poor and the chronically ill by including and expanding inpatient coverage and with co-payments for medication. Pharmaceutical expenditure was found to be one of the main causes of impoverishment, thus adding a co-payment mechanism for medicine would improve the financial protection of the poorest households.

An additional piece of research by Zoidze et al. (2012), using data from 2007-2010, found that MAP had a positive impact in reducing expenditure for inpatient services and households' total healthcare costs. However, MAP insurance had almost no effect on health services utilization or on household's expenditure on outpatient medication. Analyzing the effects of MAP, Zoidze et al. (2012) further recommended the inclusion of additional co-payments for medication.

The general trends of this study's variables are also noteworthy in the outcome of outpatient and inpatient visits, and CHE and OOP for the population: for instance, statistics from the Ministry of Health show an increase in outpatient utilization. From 2012 to 2015, individual average outpatient visits to hospitals increased by 1.3 visits per person. There is a similar trend for inpatient health services, which increased by 4253 for every 100,000. This research will further evaluate whether these increases were stimulated by UHC and EMAP. In terms of OOP, the WHO statistics identify that OOPHE per capita in Georgia increased by only 4% from 2012 to 2014, and decreased by 14.1% from 2014 to 2015. This contradicts UNICEFs research on OOP, which shows an increase of 31% from 2013 to 2015 (UNICEF, 2013 & 2015). These statistics do not show whether this change is due to UHC or to other factors. This research primary focuses on UHC and EMAPs effects on the OOPHE and CHE of households.

2.3 Data

The data is derived from the Integrated Household Survey of the National Statistics Office of Georgia, conducted in the first quarters of 2011-2015. The data is cross-sectional, and each household remains in the sample for one year and is interviewed four times during that period. Because the UHC program does not cover individuals with private insurance, to avoid compromising the results, households where at least one member is the beneficiary of private insurance are removed from the sample. The sample size for each year is shown in Table 2.4. The majority of these observations, 15.6%, were withdrawn due to private insurance in 2013, and the least, 9.6%, in 2015.

In 2011, the National Statistics Office of Georgia included a new variable in the survey concerning insurance types. This variable provides information regarding the type of insurance for each member of a household, including state insurance, insurance at an employer's expense or at an individual's expense. The absence of this variable before 2011 limited the opportunity to study how insurance packages have changed over time. Due to this data limitation, it is not possible to create control or treatment groups prior to 2011.

The data includes the following general information about households: size, the number of children and pensioners in a family, and geographical characteristics (living in urban or rural regions). The data also reports household monthly expenditure, such as healthcare costs, food expenditure, etc. It also includes subjective evaluations of each household's financial conditions, based on living conditions. In order to avoid the effects of inflation on expenditure variables, they have been adjusted to 2011 prices. General inflation statistics have been taken from the National Statistics Office of Georgia. While, the first three months of each year have been adjusted to the corresponding months of 2011 (Table 2.2).

Tables 2.7-2.11 report the baseline descriptive statistics for the characteristics and the outcomes studied within the control and treatment groups. Treatment group 1 has the highest level of education and comfort of living. As this group does not include pensioners or children, their need for healthcare services and their OOPHE is the lowest. The control group was created mostly from poor households, and therefore their standard of living is the lowest among the three groups. In 2011, around 70% of the control group lived in rural areas. In terms of the head of a

household's educational level and comfort of living, their indicators are the lowest compared to the other groups.

2.4 Methodology

2.4.1 Control and Treatment Groups

The present study uses the following three different methods to estimate the impact of reforms: 1. DID with covariates; 2. DID with PSM and covariates; and 3. DID with four grouping PSM and covariates. These matching approaches alongside the DID method is increasingly common in the impact evaluation literature (Wagstaff et al, 2007, Shen & Zuckerman, 2005, & Stuart et al, 2014). The choice of the empirical approach has critical importance on the robustness of the results. This section will elaborate on the advantages and limitations of these various methods within the study.

Households are classified as a "control" if they were insured by the MAP program before EMAP or UHC were introduced. The first treatment group includes households that do not belong to the control group and where there is neither a pensioner, a student nor a child aged below six. Meanwhile, all households that are not in the control group or in treatment group 1, are comprised of treatment group 2 (households in which members were covered under EMAP). Therefore, the control and treatment groups contain the entire population, excluding households with at least one member with private insurance.

According to the Household Survey, around 19% of all households are in the control group (448 households). While, approximately 28% of households (690) are in treatment group 1, and 53% (1302 households) are in treatment group 2 (Table 2.6).

2.4.2 Limitations

According to Stuart et al. (2014), there are two potential types of selection bias that are of concern to DID studies: across time and across groups. The former, selection bias across time, occurs when treatment groups and control groups change in composition over time. Therefore, the control group from the pre-treatment period differs from the control group of the post-treatment period. Whereas, selection bias across groups occurs when treatment groups and control groups have different baseline characteristics, consequently they would be poor

counterfactuals to each other. Both types of bias are especially relevant when, firstly, the control and treatment groups are not selected randomly and, secondly, the analysis is based on cross-sectional data.

In the present study, the selection bias across groups is due to the control groups consisting of households with low income. In 2011, the independent variables, which are described in Table 2.1, are statistically different between the control groups and the treatment groups (Table 2.7). Furthermore, only 31% of the households in the control group were living in urban areas, while 58% of households in treatment group 1 and 49% of households in treatment group 2 resided in urban areas. These differences are statistically significant at the 1% level and indicates that control and treatment groups are different from each other (Tables 2.7-2.11).

Selection bias across time is also substantial. For instance, treatment group 1, treatment group 2, and the control group all altered certain baseline characteristics over time, such as the comfort of living or whether a family had chronic member in family. In 2014, in treatment group 1, a further 9% households had three or more facilities compared to 2011, and this difference is statistically significant at the 1% level (Tables 2.12-2.15).

2.4.3 Method 1 - DID with Covariates

This method is a standard DID analysis-

$$Y = \beta_0 + \beta_1 T + \beta_2 S + \beta_3 (TxS) + \beta_4 X + \varepsilon$$

where Y is the outcome of interest, T is the dummy variable equal to-

$$T = \begin{matrix} 1 \text{ if year} = \text{post treatment period} \\ 0 \text{ if year} = \text{pre treatment period} \end{matrix}$$

and S represents the group where-

$$S = \begin{cases} 1 \text{ if group} = \text{"Treatment group 1"} \\ 0 \text{ if group} = \text{"Control group"} \end{cases}$$

or-

$$S = \begin{cases} 1 \text{ if group} = \text{"}Treatment\ group\ 2\text{"} \\ 0 \text{ if group} = \text{"}Control\ group\text{"} \end{cases}$$

In this regression, β_1 measures the differences between the control group in the post-treatment and pre-treatment periods.β_2 captures the differences between the control group and the treatment groups in the pre-treatment period. Meanwhile, β_3 measures the outcome of the DID.

As previously mentioned, the characteristics of the control group and the treatment groups of this study differ both across groups as well as across time. Hence, the use of a standard DID methodology would result in biased estimations.

2.4.4 Method 2 - DID with PSM and Covariates

Propensity score matching was first introduced by Rosenbaum and Rubin (1983). PSM is routinely used to mitigate selection biases across groups, and the use of this method is beneficial when a study uses cross-sectional data (Wagstaff et al., 2007, Stuart et al., 2014). Crucially, PSM is needed when baseline characteristics of a control group and treatment groups are different. In the present study, the control group and the treatment groups are statistically different from each other, and this method allows for the effect of these differences to be diminished. Several studies have relied on this solution using a DID method to evaluate insurance programs (Shen & Zuckerman, 2005, Wagstaff et al., 2007). For instance, Shen & Zuckerman (2005) evaluated Medicaid in the USA by considering program beneficiaries as a treatment group and privately insured individuals as a control group. Their study faced a problem as privately insured individuals have different characteristics, such as levels of income and education, when compared to the Medicaid program participants. PSM was chosen to mitigate such biases. For example, before their weighting, the control group included only 4% of poor households, while the treatment group contained 57%. After weighting however, the control group covered 56% of poor households. Wagstaff et al. (2007) also used PSM with DID to manage the selection bias caused by the voluntary nature of the New Cooperative Medical Scheme (NCMS) in China. Where participates enrolled voluntarily in the program, therefore selection was not random.

The limitations of PSM are that it removes any bias caused by selection on observable variables, but there is the possibility of bias due to unobservable variables.

The main weakness of this combined DID with PSM method is that it cannot solve the selection biases that exist across time. Weights, which are generated by PSM, bring the control

group and treatment groups closer in a given year. For example before matching, the difference between variable comfort for treatment group 2 in 2014 and 2015 was 4%, which was not statistically significant (Table 2.12). After PSM, the difference becomes 5% significant in 95% CI. The results, illustrated in Table 2.20, show that PSM did not solve the selection bias within groups across time.

2.4.4 Method 3 - DID with Four Grouping PSM and Covariates

The main method used in this study is a four grouping PSM, which mitigates limitation biases across time and across groups. The present study uses the method proposed by Stuart et al. (2014). The four grouping PSM in DID is the most appropriate for this research, as it provides unbiased estimators even when the data is cross-sectional and has both limitations. The key assumption for this method is that, group composition over time is not affected by the program of interest. A second key assumption is that, the trends across time are similar for control and treatment group. Furthermore, as with the PSM with DID method, four group PSM weighting does not account for unobserved characteristics that could lead to different trends. Utilizing the four group weighting strategy, the present study weighted four groups (pre-treatment, post-treatment, pre-control, post-control) to make them similar, within a set of key observable characteristics. The propensity score is defined as the probability of households, considering their set of observable covariates that will fall into one of the four groups. For example, for each household, the present study calculates the probability of it being in the pre-treatment, post-treatment, pre-control and the post-control groups. Independent variables chosen for calculating propensity score are presented in Table 2.1. Each household will have four resulting propensity scores, $e_g(Xi)$: the probability of being in group g, where g=1,2,3,4. Each of the four groups is weighted to be similar to group 1, which is the treatment group from the pre-treatment period. Hence, the study has four results for each household, and once weighted they receive one score.

The following equation gives the weights for household i:

$$Wi=e_1(Xi)/e_1(Xi).$$

Here g shows to which the household truly belonged. Households from group 1 receive a weight of 1, while individuals in other groups receive a weight that is proportional to the

probability of their being in group 1, relative to the probability of being in the group they were truly in.

Conducting the balance test, which elaborates when matching was successful, showed that the control group and treatment groups moved closer to each other. For example, in 2011, in treatment group 1 there were 27% more households living in urban areas compared to the control group before matching. After matching though, the difference was only 1% according to the PSM and 4% according to the four grouping PSM. There are five different sets of results with four grouping comparison of the control group and treatment groups over the different years. This was necessary for the study, as four grouping brings pre-treatment closer to the other three groups (see Tables 2.16-2.19). Also, the four grouping PSM have a positive impact on the problems associated with changes in group composition across time. For example, after the four grouping PSM, the differences between years for treatment group 2 in the chronic variable become almost zero, and the same is true for treatment group 1 (Table 2.21).

When using a DID method, trend assumptions must be satisfied, thus the control group and treatment groups should follow the same trend before any reforms are implemented. Due to data limitations, as control groups could not be identified before 2011, the trends could also not be observed prior to 2011. UHC was implemented in the second quarter of 2013, therefore comparing control and treatment groups prior to UHC allows for trend assumptions to be tested, and thus it is possible to ascertain whether the control group and treatment groups had different trends prior to the reform.

The targeted health reform EMAP took place in the second quarter of 2012, consequently trend assumptions could only be checked by comparing the first quarters of 2011 and 2012. Subsequently, the study is limited to observing only a few periods. Nevertheless, for all the dependent variables, in 2011 and 2012, the trend assumption is fulfilled when the comparing control and treatment group 2 (Tables 2.24 & 2.25).

Comparing the control group and treatment group 1 using a standard DID with covariates, catastrophic healthcare expenditure, with a 30% threshold variable, was found to contradict trend assumptions in 2011-2013. A disadvantage of this method is that it allows for biased estimators, when the previously selection biases exist. After using PSM and the four

grouping PSM, all the results confirm the existence of similar trends between the control group and treatment groups (see Tables 2.22 & 2.23).

2.5 Results and Discussion

As MAP was expanded in the first quarter of 2013, a comparison of 2012 with 2013 reveals EMAP's effects on treatment group 2. The results from these years show no decrease or increase in the financial variables for treatment group 2, however there was a 6% increase in inpatient and 7% increase outpatient utilization (Tables 2.24 & 2.25). This reveals that insuring pensioners, children and students did not decrease the financial burden on their families, although it did increase their use of medical services.

Between 2012-2013, for treatment group 2 CHE at the 40% threshold decreased by 1%, while at 30% they decreased by 2%. While in the control group CHE decreased by 1%, at the 30% threshold and increased by 1% at the 40% threshold (Table 2.26). These numbers indicate that there was no significant change in CHE in 2012-2013 for either group. Our estimation also showed no statistically significance changes for these two variables (Table 2.24). The finding is further corroborated by previous research conducted on the MAP program. Recommendations from these studies shows the most significant factor was insufficient insurance packages. Their main recommendation was to add medication to the insurance package of MAP, as 60% of household health expenditure was spent on pharmaceuticals. When expanding MAP, this recommendation was disregarded, therefore in terms of financial variables, there were no significant improvements for households.

On average, out-of-pocket health expenditure decreased by 3 GEL (approximately 1.2 US dollars) for the control group in 2012-2013. However, there was a 12 GEL (approximately 5 US dollars) increase for treatment 2 group (Table 2.26). The regression results showed that the reform had no effect on OOPHE (Table 2.24). The WHO statistics for Georgia also showed that OOPHE only increased by 2.7 international dollars. Therefore, one can conclude that in terms of the financial burden on the population, EMAP had no significant effect on treated households.

Whereas in 2014, the UHC scheme was already in place, and all members of treatment group 2 had insurance. Therefore, comparing treatment group 2 from 2012 to 2014 offers an estimation for the joint effects of the UHC and EMAP programs.

From 2012 to 2014, the CHE for treatment group 2, for the 40% and 30% thresholds, decreased by 4% and 5% respectively. Whilst, the CHE for the control group experienced a 5% decrease at the 40% threshold, with 3% decrease for the 30% threshold (Table 2.27). The subsequent regression showed that the reform had no statistically significant effect on CHE for these years. There is also no improvement in terms of OOPHE (Table 2.24). UNICEF research in 2013 and 2015 examined OOPHE for a given year, with prices normalized for 2009. Their statistics showed no decrease in OOPHE and confirmed that the financial burden for the population does not decrease.

Nevertheless, EMAP had a positive effect on healthcare service utilization in 2012-2013. The statistics on healthcare services from the Ministry of Health shows the same trend, revealing individuals' average use of outpatient services increased by 0.4 per person in 2012-2013. Furthermore, there was an increase in inpatient utilization of healthcare services by 711.3 for every 100,000 of the population. The regression results showed that there were 7% reform effects for outpatient and 6% for inpatient utilization of healthcare services (Table 2.25)

The joint effect of EMAP and UHC increased inpatient utilization of healthcare services by 6% in 2012-2015 (Table 2.25). The Ministry of Health statistics reveal the same trend in improvement, with an increase from 9367.1 to 12,221 for every 100,000 people for inpatient healthcare services in 2012-2015.

The analysis does not show any combined effect of the programs on outpatient visits when comparing 2012 to 2015 (Table 2.25). The Ministry of Health statistics on outpatient visits show there was a drastic increase from the individual average of 2.3 to 3.6 per person. This increase was primarily caused by the prescription medication reform in September 2014, which forced individuals to visit a doctor in order to obtain medicine. Prior to this reform, individuals could buy any medication without visiting a doctor. Thereafter pharmacies often hired doctors to prescribe a patient's desired medication. In this research, the outpatient variables do not include such visits, therefore the study identifies a pure change of outpatient health services. In 2012-2015 there was no statistically significant increase for outpatient health services utilization.

The inpatient utilization rate may have increased simply because households could not afford inpatient care before insurance, and the government programs offered them the opportunity to receive healthcare services. Furthermore, the government's inefficiency in

monitoring hospitals provided them incentives for manually increasing inpatient utilization, in order to receive additional governmental funding. This notion is supported by the fact that governmental spending on UHC dramatically increased over the three years, with expenditure building 15% each year from 2013 (Figure 2.2).

Reviewing the EMAP program, one can see that insuring pensioners, children and students did not decrease the financial burden on their families, however it certainly increased their use of medical services. These results could imply that the expanded MAP allowed these families the opportunity to spend an equivalent amount of money on better healthcare. Moreover, as insurance did not cover medicine, the money families saved from the free medical services was consequently budgeted for medication. A further explanation for the increase in utilization relates to the moral hazards associated with insurance programs. Overall, the improved MAP had a positive impact on treatment group 2 in terms of utilization, yet if the aim of this program was to decrease the financial burden of healthcare, the insurance package still requires improvement and ought to include a co-payment mechanism for medication.

EMAP did not cover any member of treatment 1 group, so the comparison of the control and the first treatment group reveals the effects of the UHC program. Despite the expectations, UHC showed no improvement in regards of OOPHE, CHE, inpatient or outpatient utilization rates for treatment. One could argue that treatment group 1 had less need for the program compared to the other groups, therefore insurance had less impact on their use of healthcare services. The descriptive statistics from Table 2.9 illustrate that treatment group 1 had less CHE and OOPHE compared to the control and the second treatment group. Ultimately, they were spending less money on healthcare and they were, in general, using fewer inpatient and outpatient healthcare services.

In conclusion, EMAP and UHC had a mutually positive effect on households with pensioners and children, where inpatient and outpatient visits both increased. This research furthermore shows that EMAP and UHC had no significant effects on the financial protection of the population. Therefore, policy makers should take into account the recommendations made by other significant research and include co-payments for pharmaceuticals. This research has also led to the conclusion that a more targeted approach, like EMAP, which focuses on such

aforementioned vulnerable groups, could be a crucially effective tool for increasing the utilization rates of healthcare services.

2.6 Conclusion

This paper has reported findings on the impact of Universal Health Coverage and Expanded Medical Assistance for the Poor in Georgia, focusing on healthcare services utilization and the financial burden for the population. The impacts are estimated by combining difference-in-differences and matching methods. The results reported three different methods: simple DID, PSM with DID and DID with four grouping PSM. Combining DID with a matching method is arguably the most effective way to deal with selection biases in estimating the impact of health insurance. This paper also shows that the four grouping PSM performs better compared to the other two methods for mitigating selection biases.

The results suggest that EMAP had a positive impact on the utilization of healthcare services, but no effect on CHE or OOPHE. This resulted in treatment group 2 having a 6% increase in inpatient and 7% increase in outpatient utilization of healthcare services between 2012-2013. While in 2012-2015, the combined effect of UHC and EMAP had a 6% increase in inpatient utilization of healthcare services (Table 2.25). This finding is not surprising and is consistent with the relevant studies in healthcare. Insurance programs are clearly associated with higher rates of utilization. Despite this, UHC had no impact on the rate of utilization of treatment group 1. This could be explained by the fact that households in this group do not have pensioners or children under five years old. Their rate of utilization was furthermore already the lowest among the control and treatment groups prior to UHC.

The financial burden for the population was not affected by UHC or EMAP for either treatment group. This is consistent with the previous literature on Georgian insurance programs. Insurance programs do not include pharmaceutical benefits, even after the introduction of the UHC program. Previous researchers have concluded that pharmaceutical costs were one of main sources of financial burden for families, as they account for 60% of OOPHE. Nevertheless, households increased their access to healthcare services, without increasing their health expenditure.

This paper's results suggest that a more targeted approach, like EMAP, had a greater positive effect on the well-being of the population. Yet policy makers should still focus on vulnerable groups and increase their insurance package coverage, as pharmaceutical benefits would be crucial in order to decrease CHE and OOPHE.

Table 2.1 Variable Names and Definitions

Independent Variables:

1. Education - When the head of a household has a higher education or above it equals 1, otherwise 0.
2. Urban - A geographical variable. Equals 1 if a HH lives in an urban area and equals 0 if a HH lives in a rural area.
3. Chronic - If a HH has a chronically ill or disabled member it equals 1, otherwise 0.
4. Living m^2 - This variable shows how many m^2 per member of a home. (For example, if a house is 100 m^2 and 4 people live there, the variable equals 25 m^2.)
5. Comfort - A dummy variable, which equal 0 if a household has fewer than 3 'facilities'. And equals 1 if a HH's has more. Facilities are the following: 1. Individual system of hot water. 2. Electricity. 3. Central system of gas. 4. Liquid gas supply. 5. Individual heating system. 6. Land line phone 7. The internet.
6. Size of HH's - Size of a Household.
7. Age 70 - A dummy variable and shows if household has a member with age over 70, equals 1 if it had, otherwise 0.
8. Quintiles - Total expenditure quintile groups.

Dependent Variables:

1. Cata 40 - Catastrophic health expenditure with a 40% threshold.
2. Cata 30 - Catastrophic health expenditure with a 30% threshold.
3. OOP_Health_Exp – Out-of-pocket health expenditure.
4. Outpatient - The last outpatient visit by any member of a household during the last three months (dummy variable.)
5. Inpatient - Inpatient utilization by any member of a household during the last three months (dummy variable.)

Figure 2.1 Measuring UHC Program in Three Dimensions

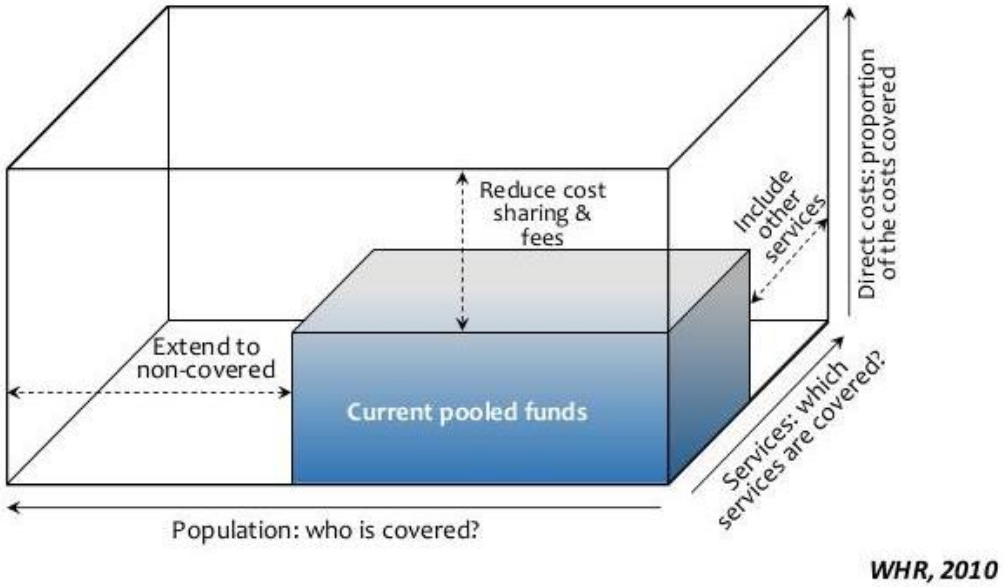

Figure 2.2 The Difference between Planned and Actual State Budget in 2013, 2014 and 2015

		2013	2014	2015
Universal Public Health (Budget code: 35 03 01)	*Actual Expenditure*	69.916	338.471	573.620
	Planned Expenditure		200.000	470.000
Difference Between Actual and Planned			138.471	103.620
Population Healthcare (Budget code: 35 03)	*Actual Expenditure*	435.516	588.279	790.577
	Planned Expenditure		605.849	13.000
Difference Between Actual and Planned			-17.570	777.577

Table 2.2 CPI - Adjusted Costs by Years (2011 is a reference year)

2011			2012			2013			2014			2015		
I	II	III	I	II	III	I	II	III	I	II	III	I	II	III
1.000	1.000	1.000	0.995	1.021	1.022	1.011	1.043	1.044	0.983	1.008	1.009	0.969	0.995	0.984

Table 2.3 Distribution of Registered Households Across Different Score Groups

	No more than 57,000	**57,001-70,000**	**70,001-100,000**	**100,001-200,000**	**All**
Households	128,622	48,899	158,936	145,048	481,505

Table 2.4 Distribution of Households where One Member has Private Insurance 2011-2015

Year	**Total Number of Obs.**	**At least one member of HH has private insurance**	**Percentage**
2011	2748	296	10.8
2012	2855	367	12.9
2013	2751	429	15.6
2014	2800	290	10.4
2015	2748	264	9.6

Table 2.5 Service Packet Coverage

Services	Service Converge 2009	Service Converge 2013	State cost coverage 2009	State cost coverage 2009
Planned outpatient services	-Family or district doctor and nurse service, if necessary, at home services -Instrumental examination by a doctor -Clinical-laboratory examination by a doctor's prescription -Service of the family or village physician specialists -Necessary examination for disability status/excluding high-tech examinations -For the examination of people with disabilities, in particular, an examination to obtain the status of disability, except for high-tech studies (computer tomography and nuclear-magnetic resonance studies) -Issuing of all types of medical information, conclusions and prescriptions (including reciprocating medication for incurable patients), except for the form №IV-100	-Service of the family or village or district physician and nurses, including vaccination provided by the National Prophylactic Vaccination National Schedule -Health status and risk factor assessment, preventive measures, diagnosis and management of diseases, palliative care. -Outpatient services provided by physicians and specialists by the designation of the family, village or district doctor; -Any type of instrumental examination on the outpatient level by the doctor's prescription -Electrocardiograph, ultrasound and X-ray examinations (X-ray, radiography, mammography) -Clinical-laboratory studies on outpatient level at the outpatient level -Necessary examination for disability status/excluding high-tech examinations -For the social examination of persons with disabilities, in particular, an examination to obtain the status of disability, (computer tomography and nuclear-magnetic resonance studies) -Issuing of all types of medical information, conclusions and prescriptions (including reciprocating medication for incurable patients) except for the form №IV-100	Fully covered/no co-payment 100%	Fully covered/no co-payment 100%
Emergency outpatient services	-Including provision of specific serum and vaccine services purchased within the state healthcare programs	-Emergency medical services and medical transportation -Services provided by the Emergency Brigade and in case of necessity - provide patient hospitalization by medical examination at the nearest relevant clinic -Handling referral cases of critical and urgent situations, consultation on the site of the referral brigade, stabilization of the condition, medical transportation of complicated cases (with special equipment)	Fully covered/no co-payment 100%	Fully covered/no co-payment 100%
Emergency inpatient services	-Including infectious diseases and palliative care of incurable patients -Hospitalization related to complicated pregnancy, childbearing or lungs	-Emergency hospital services, including infectious diseases and palliative care for incurable patients, -Hospitalization related to complicated pregnancy, childbirth -Emergency hospital services, including infectious diseases and pulse incurable patients -Hospitalization related to complicated pregnancy, childbearing.	Fully covered/no co-payment 100% The limit for a single case is 15,000 GEL	Fully covered/no co-payment 100% The limit for a single case is 15,000 GEL
Planned surgical operations	-All types of laboratory and instrumental diagnosis carried out during the pre-operative, operation and post-operative periods related to planned surgical operations (including day-to-day hospital), including planned surgical hospitalizations	-All types of laboratory and instrumental investigations carried out during the pre-operative, operation and post-operative periods related to planned surgical operations (including day care), as well as planned surgical hospitalization:	Fully covered/no co-payment 100% Annual limit - 15,000 GEL	Fully covered/no co-payment 100% Annual limit - 15,000 GEL
Treatment and diagnosis of oncological diseases	-Chemotherapy and radiation therapy, as well as research and medication related to these procedures	-Chemotherapy and radiation therapy, as well as studies and medication related to these procedures.	Fully covered/no co-payment 100% Annual limit - 12,000 GEL	Fully covered/no co-payment 100% Annual limit - 12,000 GEL
Childbirth	-Physical Delivery	-Physical Delivery	Limit - 500 GEL	Limit - 500 GEL
	-Caesarean	-Caesarean	Limit - 800 GEL	Limit - 800 GEL
Medicinal Benefits	-According to the list of medicines	-According to the list of medicines	50% - Co-funded Limit - 50 GEL	50%- Co-funded Limit - 50 GEL

Table 2.6 Distribution of Observations among Groups 2011-2015

		2011	2012	2013	2014	2015
Control Group	N. obs	445	499	494	442	414
	% of Total	18%	20%	21%	18%	17%
Treatment 1	N. obs	730	698	596	727	701
	% of Total	30%	28%	26%	29%	28%
Treatment 2	N. obs	1277	1291	1232	1341	1369
	% of Total	52%	52%	53%	53%	55%

Table 2.7 Illustration of Selection Bias in 2011/Characteristic Differences Between Groups

	Control Group		Treatment 1 Group		Treatment 2 Group		Difference between Control and Treatment 1 Groups	Difference between Control and Treatment 2 Groups
	mean	*se*	mean	*se*	mean	*se*		
Independent variables								
Education	0.36	*0.02*	0.56	*0.02*	0.44	*0.01*	0.20***	0.08***
Family size	3.26	*0.10*	3.18	*0.05*	3.91	*0.06*	-0.07	0.65***
Comfort	0.22	*0.02*	0.50	*0.02*	0.50	*0.01*	0.28***	0.28***
Living_M2	30.61	*1.30*	28.38	*0.98*	27.04	*0.66*	-2.23	-3.57***
Urban	0.31	*0.02*	0.58	*0.02*	0.49	*0.01*	0.26***	0.18***
age70	0.42	*0.02*	0.00	*0.00*	0.51	*0.01*		0.09***
chronic	0.58	*0.02*	0.33	*0.02*	0.57	*0.01*	-0.25***	-0.01
quintile_1	0.25	*0.02*	0.18	*0.01*	0.16	*0.01*	-0.07***	-0.09***
quintile_2	0.30	*0.02*	0.19	*0.01*	0.17	*0.01*	-0.11***	-0.13***
quintile_3	0.19	*0.02*	0.21	*0.02*	0.20	*0.01*	0.02	0.01
quintile_4	0.17	*0.02*	0.19	*0.01*	0.23	*0.01*	0.02	0.06***
quintile_5	0.09	*0.01*	0.23	*0.02*	0.23	*0.01*	0.14***	0.14***
Dependent variables:								
cata40	0.26	*0.02*	0.10	*0.01*	0.17	*0.01*	-0.16***	-0.09***
cata30	0.33	*0.02*	0.15	*0.01*	0.24	*0.01*	-0.18***	-0.09***
OOP_Health_Exp	47.67	*5.69*	41.83	*6.78*	59.69	*6.52*	-5.84	12.01
inpatient	0.05	*0.01*	0.03	*0.01*	0.03	*0.00*	-0.02	-0.02**
outpatient	0.16	*0.02*	0.13	*0.01*	0.17	*0.01*	-0.03	0.01

*** Significance at 1 %. ** Significance at 5% * Significance at 10%.

Table 2.8 Illustration of Selection Bias in 2012/Characteristic Differences Between Groups

	Control Group		Treatment 1 Group		Treatment 2 Group		Difference between Control and Treatment 1 Groups	Difference between Control and Treatment 2 Groups
	mean	*se*	mean	*se*	mean	*se*		
Independent variables								
Education	0.31	*0.02*	0.59	*0.02*	0.46	*0.01*	0.28***	0.15***
Family size	3.18	*0.08*	3.21	*0.05*	3.85	*0.06*	0.04	0.68***
Comfort	0.21	*0.02*	0.55	*0.02*	0.48	*0.01*	0.34***	0.27***
Living_M2	30.39	*1.25*	29.10	*0.87*	31.34	*0.82*	-1.28	0.96
Urban	0.35	*0.02*	0.56	*0.02*	0.49	*0.01*	0.22***	0.14***
age70	0.42	*0.02*	0.00	*0.00*	0.54	*0.01*		0.13***
chronic	0.61	*0.02*	0.29	*0.02*	0.60	*0.01*	-0.32***	-0.01
quintile_1	0.33	*0.02*	0.17	*0.01*	0.14	*0.01*	-0.16***	-0.19***
quintile_2	0.26	*0.02*	0.18	*0.01*	0.19	*0.01*	-0.08***	-0.08***
quintile_3	0.20	*0.02*	0.19	*0.02*	0.20	*0.01*	-0.01	0.00
quintile_4	0.14	*0.02*	0.22	*0.02*	0.22	*0.01*	0.07***	0.07***
quintile_5	0.06	*0.01*	0.24	*0.02*	0.26	*0.01*	0.18***	0.19***
Dependent variables:								
cata40	0.26	*0.02*	0.08	*0.01*	0.15	*0.01*	-0.18***	-0.11***
cata30	0.34	*0.02*	0.10	*0.01*	0.23	*0.01*	-0.24***	-0.11***
OOP_Health_Exp	42.45	*4.02*	34.51	*4.26*	63.11	*5.44*	-7.94	20.66**
inpatient	0.05	*0.01*	0.02	*0.01*	0.03	*0.00*	-0.02**	-0.02**
outpatient	0.14	*0.02*	0.10	*0.01*	0.15	*0.01*	-0.04*	-0.01

*** Significance at 1 %. ** Significance at 5% * Significance at 10%.

Table 2.9 Illustration of Selection Bias in 2013/Characteristic Differences Between Groups

	Control Group		Treatment 1 Group		Treatment 2 Group		Difference between Control and Treatment 1 Groups	Difference between Control and Treatment 2 Groups
	mean	*se*	mean	*se*	mean	*se*		
Independent variables								
Education	0.33	*0.02*	0.57	*0.02*	0.49	*0.01*	0.24***	0.16***
Family size	3.01	*0.08*	3.07	*0.06*	3.94	*0.06*	0.05	0.93***
Comfort	0.20	*0.02*	0.49	*0.02*	0.51	*0.01*	0.28***	0.30***
Living_M2	34.08	*1.41*	30.80	*1.11*	28.55	*0.73*	-3.28*	-5.53***
Urban	0.36	*0.02*	0.53	*0.02*	0.49	*0.01*	0.17***	0.13***
age70	0.41	*0.02*	0.00	*0.00*	0.49	*0.01*		0.08***
chronic	0.63	*0.02*	0.36	*0.02*	0.63	*0.01*	-0.26***	0.00
quintile_1	0.33	*0.02*	0.18	*0.02*	0.13	*0.01*	-0.15***	-0.20***
quintile_2	0.24	*0.02*	0.19	*0.02*	0.18	*0.01*	-0.05**	-0.06***
quintile_3	0.20	*0.02*	0.18	*0.02*	0.21	*0.01*	-0.02	0.01
quintile_4	0.15	*0.02*	0.21	*0.02*	0.22	*0.01*	0.06***	0.07***
quintile_5	0.08	*0.01*	0.24	*0.02*	0.25	*0.01*	0.15***	0.17***
Dependent variables:								
cata40	0.32	*0.02*	0.11	*0.01*	0.13	*0.01*	-0.21***	-0.19***
cata30	0.41	*0.02*	0.15	*0.01*	0.21	*0.01*	-0.26***	-0.20***
OOP_Health_Exp	57.86	*5.54*	39.23	*3.55*	74.68	*6.81*	-18.63***	16.82
inpatient	0.05	*0.01*	0.03	*0.01*	0.04	*0.01*	-0.02	-0.01
outpatient	0.15	*0.02*	0.15	*0.01*	0.16	*0.01*	0.00	0.01

*** Significance at 1 %. ** Significance at 5% * Significance at 10%.

Table 2.10 Illustration of Selection Bias in 2014/Characteristic Differences Between Groups

	Control Group		Treatment 1 Group		Treatment 2 Group		Difference between Control and Treatment 1 Groups	Difference between Control and Treatment 2 Groups
	mean	***se***	**mean**	***se***	**mean**	***se***		
Independent variables								
Education	0.29	*0.02*	0.63	*0.02*	0.49	*0.01*	0.34***	0.20***
Family size	3.16	*0.09*	3.14	*0.05*	3.83	*0.06*	-0.02	0.68***
Comfort	0.21	*0.02*	0.59	*0.02*	0.58	*0.01*	0.38***	0.37***
Living_M2	34.60	*1.51*	31.78	*1.03*	30.74	*0.76*	-2.81	-3.86**
Urban	0.32	*0.02*	0.54	*0.02*	0.50	*0.01*	0.22***	0.18***
age70	0.44	*0.02*	0.00	*0.00*	0.54	*0.01*		0.10***
chronic	0.70	*0.02*	0.34	*0.02*	0.67	*0.01*	-0.36***	-0.03
quintile_1	0.37	*0.02*	0.19	*0.01*	0.12	*0.01*	-0.18***	-0.25***
quintile_2	0.26	*0.02*	0.17	*0.01*	0.18	*0.01*	-0.09***	-0.08***
quintile_3	0.20	*0.02*	0.18	*0.01*	0.21	*0.01*	0.02	0.01
quintile_4	0.13	*0.02*	0.20	*0.01*	0.23	*0.01*	0.07***	0.09***
quintile_5	0.04	*0.01*	0.26	*0.02*	0.26	*0.01*	0.22***	0.22***
Dependent variables:								
cata40	0.30	*0.02*	0.07	*0.01*	0.11	*0.01*	-0.23***	-0.19***
cata30	0.39	*0.02*	0.10	*0.01*	0.18	*0.01*	-0.29***	-0.21***
OOP_Health_Exp	55.93	*8.01*	45.20	*7.01*	71.60	*4.41*	-10.73	15.67*
inpatient	0.04	*0.01*	0.02	*0.00*	0.04	*0.01*	-0.02**	0.00
outpatient	0.12	*0.02*	0.11	*0.01*	0.14	*0.01*	-0.01	-0.02

*** Significance at 1 %. ** Significance at 5% * Significance at 10%.

Table 2.11 Illustration of Selection Bias in 2015/Characteristic Differences Between Groups

	Control Group		Treatment 1 Group		Treatment 2 Group		Difference between Control and Treatment 1 Groups	Difference between Control and Treatment 2 Groups
	mean	*se*	mean	*se*	mean	*se*		
Independent variables								
Education	0.36	*0.02*	0.54	*0.02*	0.49	*0.01*	0.18***	0.13***
Family size	3.12	*0.09*	3.14	*0.05*	3.86	*0.06*	0.02	0.74***
Comfort	0.28	*0.02*	0.62	*0.02*	0.62	*0.01*	0.34***	0.34***
Living_M2	34.66	*1.57*	32.34	*0.90*	32.55	*0.75*	-2.32	-2.10
Urban	0.37	*0.02*	0.51	*0.02*	0.49	*0.01*	0.14***	0.12***
age70	0.42	*0.02*	0.00	*0.00*	0.50	*0.01*		0.08***
chronic	0.67	*0.02*	0.35	*0.02*	0.66	*0.01*	-0.32***	-0.01
quintile_1	0.34	*0.02*	0.18	*0.01*	0.15	*0.01*	-0.16***	-0.19***
quintile_2	0.25	*0.02*	0.19	*0.01*	0.19	*0.01*	-0.06***	-0.07***
quintile_3	0.18	*0.02*	0.17	*0.01*	0.22	*0.01*	-0.01	0.04***
quintile_4	0.13	*0.02*	0.21	*0.02*	0.22	*0.01*	0.08***	0.09***
quintile_5	0.10	*0.01*	0.25	*0.02*	0.22	*0.01*	0.15***	0.12***
Dependent variables:								
cata40	0.32	*0.02*	0.09	*0.01*	0.15	*0.01*	-0.24***	-0.17***
cata30	0.40	*0.02*	0.12	*0.01*	0.23	*0.01*	-0.28***	-0.17***
OOP_Health_Exp	88.55	*25.76*	49.92	*4.95*	80.27	*5.53*	-38.63*	-8.28
inpatient	0.04	*0.01*	0.04	*0.01*	0.03	*0.00*	0.00	-0.01
outpatient	0.18	*0.02*	0.13	*0.01*	0.18	*0.01*	-0.05**	0.00

*** Significance at 1 %. ** Significance at 5% * Significance at 10%.

Table 2.12 Differences within Groups Across Time (Education, Family size, Comfort)

	Control Group				Treatment 1 Group				Treatment 2 Group			
	2011	**2012**	**2013**	**2014**	**2011**	**2012**	**2013**	**2014**	**2011**	**2012**	**2013**	**2014**
Education												
2012	-0.04				0.03				0.02			
2013	-0.02	0.02			0.01	-0.02			0.05	0.03		
2014	-0.07	-0.03	-0.04		0.07*	0.04	0.06		0.05*	0.03	0.00	
2015	0.00	0.04	0.02	0.07	-0.03	-0.06	-0.04	-0.10***	0.05	0.03	0.00	0.00
Family size												
2012	-0.08				0.03				-0.06			
2013	-0.24	-0.16			-0.12	-0.15			0.03	0.09		
2014	-0.10	-0.02	0.14		-0.05	-0.07	0.07		-0.08	-0.02	-0.11	
2015	-0.14	-0.05	0.11	-0.03	-0.04	-0.07	0.07	0.00	-0.05	0.00	-0.08	0.02
Comfort												
2012	-0.01				0.05				-0.02			
2013	-0.02	-0.01			-0.01	-0.07			0.00	0.03		
2014	-0.02	-0.01	0.00		0.09***	0.04	0.10***		0.08***	0.10***	0.07***	
2015	0.06	0.07	0.08*	0.07*	0.12***	0.07*	0.14***	0.03	0.11***	0.14***	0.11***	0.04

*** Significance at 1 %. ** Significance at 5% * Significance at 10%.

Table 2.13 Differences within Groups Across Time (Urban, Age70, chronic)

	Control Group				Treatment 1 Group				Treatment 2 Group			
	2011	2012	2013	2014	2011	2012	2013	2014	2011	2012	2013	2014
Urban												
2012	0.03				-0.01				0.00			
2013	0.04	0.01			-0.04	-0.03			0.00	0.00		
2014	0.00	-0.03	-0.04		-0.04	-0.02	0.01		0.00	0.01	0.00	
2015	0.05	0.02	0.01	0.05	-0.07	-0.05	-0.02	-0.03	0.00	0.00	0.00	-0.01
age70												
2012	0.00								0.03			
2013	-0.01	-0.01							-0.02	-0.06**		
2014	0.02	0.02	0.03						0.03	-0.01	0.05	
2015	0.00	0.00	0.01	-0.02					-0.01	-0.05	0.01	-0.04
chronic												
2012	0.03				-0.04				0.03			
2013	0.05	0.02			0.04	0.07*			0.06**	0.03		
2014	0.12***	0.09**	0.07		0.01	0.05	-0.02		0.10***	0.07***	0.04	
2015	0.09**	0.06	0.05	-0.03	0.03	0.06	-0.01	0.01	0.09***	0.06***	0.03	-0.01

*** Significance at 1 %. ** Significance at 5% * Significance at 10%.

Table 2.14 Differences within Groups Across Time (Quintile 1, 2, 3)

	Control Group				Treatment 1 Group				Treatment 2 Group			
	2011	**2012**	**2013**	**2014**	**2011**	**2012**	**2013**	**2014**	**2011**	**2012**	**2013**	**2014**
quintile_1												
2012	0.08*				-0.01				-0.02			
2013	0.09*	0.00			0.00	0.01			-0.03	0.00		
2014	0.12***	0.04	0.04		0.01	0.02	0.01		-0.04**	-0.02	-0.01	
2015	0.09**	0.01	0.01	-0.03	0.00	0.01	0.00	-0.01	-0.01	0.01	0.02	0.03
quintile_2												
2012	-0.04				-0.01				0.01			
2013	-0.06	-0.03			0.00	0.01			0.00	-0.01		
2014	-0.04	-0.01	0.02		-0.02	-0.01	-0.01		0.01	-0.01	0.00	
2015	-0.05	-0.01	0.02	0.00	0.00	0.01	0.00	0.02	0.01	0.00	0.01	0.01
quintile_3												
2012	0.01				-0.01				0.00			
2013	0.01	0.00			-0.02	-0.01			0.01	0.01		
2014	0.01	0.00	0.00		-0.03	-0.02	-0.01		0.01	0.01	0.00	
2015	-0.01	-0.02	-0.02	-0.02	-0.04	-0.03	-0.02	-0.01	0.02	0.02	0.01	0.01

*** Significance at 1 %. ** Significance at 5% * Significance at 10%.

Table 2.15 Differences within Groups Across Time (Quintile 4, 5)

	Control Group				Treatment 1 Group				Treatment 2 Group			
	2011	**2012**	**2013**	**2014**	**2011**	**2012**	**2013**	**2014**	**2011**	**2012**	**2013**	**2014**
quintile_4												
2012	-0.03				0.02				-0.02			
2013	-0.02	0.01			0.02	0.00			-0.01	0.01		
2014	-0.03	-0.01	-0.01		0.01	-0.01	-0.01		0.00	0.01	0.00	
2015	-0.04	-0.01	-0.02	0.00	0.02	-0.01	0.00	0.01	-0.01	0.01	0.00	-0.01
quintile_5												
2012	-0.03				0.01				0.03			
2013	-0.01	0.02			0.01	0.00			0.02	0.00		
2014	-0.05**	-0.02	-0.04		0.03	0.02	0.02		0.03	0.00	0.00	
2015	0.01	0.04	0.02	0.06***	0.02	0.01	0.02	0.00	-0.01	-0.04	-0.03	-0.04

*** Significance at 1 %. ** Significance at 5% * Significance at 10%.

Table 2.16 Balance Test for Treatment Group 1 (differences between control and treatment group 1 before and after matching)

Year	Covariates	Before matching		After matching with PSM		After matching with 4Grouping PSM - 2011		After matching with 4Grouping PSM - 2012		After matching with 4Grouping PSM - 2013		After matching with 4Grouping PSM - 2014		After matching with 4Grouping PSM - 2015	
		diff	P-value	diff	P-value	diff	P-value	diff	P-value	diff	P-value	Diff	P-value	diff	P-value
	Education	-0.20	0.00	0.00	0.89			0.02	0.64	0.02	0.67				
	Comfort	-0.28	0.00	-0.03	0.41			-0.05	0.24	-0.06	0.17				
	Urban	-0.27	0.00	-0.01	0.60			-0.04	0.42	-0.04	0.39				
2011	**Chronic**	0.25	0.00	0.01	0.78			0.01	0.76	0.02	0.54				
	Quintile1	0.07	0.01	0.03	0.39			0.04	0.17	0.04	0.17				
	Quintile2	0.11	0.00	0.01	0.79			0.02	0.55	0.03	0.30				
	Quintile3	-0.02	0.46	0.01	0.88			0.01	0.82	0.01	0.84				
	Quintile4	-0.02	0.27	-0.01	0.59			-0.03	0.29	-0.03	0.23				
	Quintile5	-0.14	0.00	-0.02	0.36			-0.04	0.25	-0.05	0.15				
	Education	-0.28	0.00	0.00	0.88	-0.02	0.66			-0.01	0.78	-0.01	0.78	-0.02	0.73
	Comfort	-0.34	0.00	-0.01	0.77	-0.05	0.31			-0.05	0.37	-0.05	0.34	-0.06	0.26
	Urban	-0.22	0.00	-0.05	0.18	-0.08	0.05			-0.11	0.01	-0.11	0.02	-0.11	0.01
2012	**Chronic**	0.32	0.00	-0.01	0.90	0.02	0.73			0.01	0.72	0.02	0.65	0.01	0.85
	Quintile1	0.16	0.00	0.01	0.73	0.02	0.39			0.03	0.33	0.03	0.38	0.03	0.34
	Quintile2	0.08	0.00	-0.01	0.84	0.01	0.74			0.01	0.59	0.02	0.47	0.01	0.64
	Quintile3	0.01	0.68	0.00	0.92	-0.01	0.64			-0.01	0.70	-0.02	0.57	-0.01	0.80
	Quintile4	-0.07	0.00	0.00	0.96	0.00	0.99			-0.02	0.69	-0.01	0.81	0.00	0.99
	Quintile5	-0.18	0.00	0.00	0.99	-0.02	0.67			-0.02	0.72	-0.02	0.68	-0.04	0.51
	Education	-0.24	0.00	-0.01	0.84	-0.01	0.81	-0.01	0.79			0.00	0.89	-0.01	0.81
	Comfort	-0.28	0.00	-0.02	0.53	-0.04	0.37	-0.04	0.43			-0.03	0.34	-0.04	0.30
	Urban	-0.17	0.00	-0.02	0.47	-0.05	0.22	-0.07	0.11			-0.06	0.18	-0.07	0.11
2013	**Chronic**	0.26	0.00	0.02	0.64	0.04	0.25	0.02	0.48			0.03	0.30	0.02	0.50
	Quintile1	0.15	0.00	0.01	0.87	0.03	0.29	0.04	0.26			0.02	0.41	0.02	0.37
	Quintile2	0.05	0.06	0.01	0.67	0.02	0.52	0.02	0.51			0.03	0.26	0.03	0.39
	Quintile3	0.02	0.49	0.01	0.63	0.02	0.66	0.02	0.59			0.00	0.83	0.01	0.67
	Quintile4	-0.06	0.01	0.00	0.83	0.02	0.68	0.02	0.59			0.01	0.76	0.02	0.53
	Quintile5	-0.15	0.00	-0.04	0.11	-0.08	0.01	-0.10	0.00			-0.08	0.01	-0.09	0.00

Table 2.17 Balance Test for Treatment Group 1

Year	Covariates	Before matching		After matching with PSM		After matching with 4Grouping PSM - 2012		After matching with 4Grouping PSM - 2013	
		diff	P-value	diff	P-value	diff	P-value	diff	P-value
2014	Education	-0.34	0.00	-0.06	0.11	-0.13	0.01	-0.09	0.04
	Comfort	-0.38	0.00	-0.05	0.23	-0.10	0.09	-0.09	0.06
	Urban	-0.22	0.00	-0.05	0.19	-0.08	0.13	-0.07	0.11
	Chronic	0.36	0.00	0.03	0.45	0.03	0.45	0.05	0.27
	Quintile1	0.18	0.00	0.03	0.41	0.08	0.02	0.06	0.04
	Quintile2	0.09	0.00	0.04	0.29	0.01	0.67	0.02	0.52
	Quintile3	0.02	0.37	-0.01	0.76	-0.02	0.54	-0.01	0.74
	Quintile4	-0.07	0.00	-0.01	0.81	-0.03	0.55	-0.02	0.52
	Quintile5	-0.22	0.00	-0.05	0.16	-0.05	0.32	-0.06	0.25
2015	Education	-0.18	0.00	0.05	0.20	0.08	0.08	0.06	0.18
	Comfort	-0.34	0.00	0.05	0.26	0.11	0.04	0.07	0.13
	Urban	-0.14	0.00	0.00	0.85	0.05	0.36	0.04	0.41
	Chronic	0.32	0.00	-0.05	0.25	-0.04	0.19	-0.02	0.52
	Quintile1	0.16	0.00	-0.03	0.40	-0.04	0.23	-0.03	0.37
	Quintile2	0.06	0.03	-0.02	0.59	-0.05	0.08	-0.02	0.47
	Quintile3	0.01	0.61	0.00	0.97	0.01	0.90	0.01	0.76
	Quintile4	-0.08	0.00	-0.01	0.86	-0.01	0.92	-0.02	0.59
	Quintile5	-0.15	0.00	0.05	0.30	0.08	0.16	0.06	0.28

Table 2.18 Balance Test for Treatment Group 2 (differences between control and treatment group 1 before and after matching)

Year	Covariates	Before matching		After matching with PSM		After matching with 4Grouping PSM - 2011		After matching with 4Grouping PSM - 2012		After matching with 4Grouping PSM - 2013		After matching with 4Grouping PSM - 2014		After matching with 4Grouping PSM - 2015	
		diff	P-value	diff	P-value	diff	P-value	diff	P-value	diff	P-value	Diff	P-value	diff	P-value
	Education	-0.08	0.00	-0.03	0.37			-0.04	0.26						
	Family size	-0.65	0.00	0.06	0.69			0.13	0.47						
	Comfort	-0.28	0.00	-0.02	0.55			-0.03	0.51						
	Urban	-0.18	0.00	0.02	0.69			0.00	0.82						
2011	age70	-0.09	0.00	-0.02	0.51			-0.03	0.40						
	chronic	-0.01	0.72	0.04	0.32			0.04	0.21						
	Quintile1	0.08	0.00	0.01	0.58			0.01	0.58						
	Quintile2	0.13	0.00	0.01	0.50			0.03	0.31						
	Quintile3	-0.01	0.73	-0.01	0.78			-0.01	0.76						
	Quintile4	-0.06	0.00	-0.01	0.53			-0.02	0.64						
	Quintile5	-0.14	0.00	-0.01	0.82			-0.02	0.63						
	Education	-0.15	0.00	-0.02	0.55	-0.03	0.49			-0.03	0.39	-0.03	0.38	-0.04	0.27
	Family size	-0.68	0.00	-0.22	0.07	-0.37	0.01			-0.33	0.02	-0.32	0.02	-0.33	0.02
	Comfort	-0.27	0.00	-0.03	0.34	-0.04	0.28			-0.06	0.11	-0.06	0.08	-0.06	0.09
2012	Urban	-0.14	0.00	0.02	0.63	0.05	0.19			0.03	0.34	0.04	0.29	0.05	0.13
	age70	-0.13	0.00	-0.03	0.22	-0.06	0.09			-0.05	0.10	-0.06	0.08	-0.06	0.07
	chronic	0.01	0.70	-0.01	0.64	-0.02	0.62			-0.02	0.62	-0.02	0.55	-0.01	0.69
	Quintile1	0.19	0.00	0.00	0.73	0.01	0.55			0.02	0.52	0.01	0.73	0.02	0.50
	Quintile2	0.08	0.00	0.01	0.45	0.03	0.25			0.04	0.18	0.04	0.19	0.03	0.24
	Quintile3	0.00	0.82	0.00	0.88	0.00	0.92			0.00	0.99	0.01	0.79	0.01	0.80
	Quintile4	-0.08	0.00	-0.01	0.88	-0.02	0.61			-0.01	0.70	-0.01	0.76	-0.01	0.74
	Quintile5	-0.20	0.00	-0.02	0.40	-0.02	0.55			-0.03	0.34	-0.04	0.31	-0.04	0.28
	Education	-0.16	0.00	0.00	0.98			0.01	0.86						
	Family size	-0.93	0.00	-0.11	0.37			-0.18	0.22						
	Comfort	-0.30	0.00	-0.01	0.82			-0.01	0.92						
	Urban	-0.13	0.00	0.02	0.51			0.03	0.42						
2013	age70	-0.08	0.01	-0.02	0.45			-0.03	0.46						
	chronic	0.00	0.94	0.01	0.77			0.02	0.60						
	Quintile1	0.20	0.00	0.01	0.77			0.01	0.61						
	Quintile2	0.06	0.01	0.01	0.95			0.00	0.84						
	Quintile3	-0.01	0.73	0.00	0.88			0.00	0.89						
	Quintile4	-0.07	0.00	0.00	0.99			0.01	0.78						
	Quintile5	-0.17	0.00	0.00	0.90			-0.01	0.78						

Table 2.19 Balance Test for Treatment Group 2 (differences between control and treatment group 2 before and after matching)

Year	Covariates	Before matching		After matching with PSM		After matching with 4Grouping PSM - 2012	
		diff	P-value	diff	P-value	diff	P-value
	Education	-0.20	0.00	-0.06	0.10	-0.06	0.11
	Family size	-0.68	0.00	-0.07	0.74	0.01	0.99
	Comfort	-0.37	0.00	-0.07	0.09	-0.07	0.16
	Urban	-0.18	0.00	0.02	0.52	0.04	0.37
2014	**Age70**	0.10	0.00	-0.07	0.03	-0.08	0.03
	chronic	0.03	0.23	0.01	0.85	0.01	0.98
	Quintile1	0.25	0.00	0.02	0.43	0.02	0.36
	Quintile2	0.08	0.00	0.02	0.47	0.02	0.43
	Quintile3	-0.01	0.60	0.01	0.71	0.00	0.96
	Quintile4	-0.09	0.00	-0.01	0.57	-0.01	0.74
	Quintile5	-0.22	0.00	-0.03	0.45	-0.03	0.53
	Education	-0.13	0.00	0.01	0.71	0.01	0.83
	Family size	-0.74	0.00	-0.33	0.01	-0.43	0.01
	Comfort	-0.34	0.00	-0.03	0.43	-0.02	0.56
	Urban	-0.12	0.00	0.00	0.91	0.02	0.53
2015	**Age70**	-0.08	0.01	0.01	0.71	0.02	0.60
	chronic	0.01	0.67	-0.02	0.58	-0.01	0.97
	Quintile1	0.19	0.00	0.02	0.39	0.02	0.28
	Quintile2	0.07	0.01	0.00	1.00	0.01	0.78
	Quintile3	-0.04	0.09	-0.01	0.91	0.00	0.82
	Quintile4	-0.09	0.00	-0.03	0.26	-0.01	0.72
	Quintile5	-0.12	0.00	0.01	0.78	-0.02	0.73

Table 2.20 Differences within Groups Across Time after PSM

	Control group				Treatment 1				Control group				Treatment 2			
Comfort	2011	2012	2013	2014	2011	2012	2013	2014	2011	2012	2013	2014	2011	2012	2013	2014
2012	0.02				0.01				-0.03				-0.02			
2013	-0.03	-0.05			-0.04	-0.04			-0.01	0.03			-0.02	0.03		
2014	0.02	0.00	0.05		0.05	0.04	0.08**		0.01	0.04	0.02		0.06**	0.08***	0.08***	
2015	0.18***	0.16***	0.21***	0.16***	0.10***	0.10***	0.13***	0.06	0.10**	0.13***	0.11***	0.09*	0.11***	0.13***	0.13***	0.05**
Chronic	2011	2012	2013	2014	2011	2012	2013	2014	2011	2012	2013	2014	2011	2012	2013	2014
2012	-0.01				0.00				0.03				0.03			
2013	0.07	0.09*			0.07	0.07			0.08	0.05			0.07***	0.04		
2014	0.09**	0.11**	0.02		0.07**	0.07*	0.01		0.13***	0.10**	0.05		0.12***	0.09***	0.05	
2015	0.00	0.01	-0.07	-0.09*	0.06	0.06	-0.01	0.02	0.09**	0.06	0.02	-0.03	0.10***	0.07***	0.03	-0.01

Table 2.21 Differences within Groups Across Time after Four Grouping PSM

	Control group				Treatment 1				Control group				Treatment 2			
Comfort	2011	2012	2013	2014	2011	2012	2013	2014	2011	2012	2013	2014	2011	2012	2013	2014
2012	0.00				0.00				-0.02				0.00			
2013	0.02	0.01			0.00	0.00			0.03	0.06**			0.00	0.00		
2014	-0.02	-0.04	-0.04		0.00	0.01	0.00		-0.01	0.00	-0.08***		0.00	0.00	0.00	
2015	0.14***	0.16***	0.12***	0.18***	0.00	0.00	0.00	0.00	0.03	0.05	-0.03	0.03	0.00	0.01	0.0	0.00
Chronic	2011	2012	2013	2014	2011	2012	2013	2014	2011	2012	2013	2014	2011	2012	2013	2014
2012	0.00				0.00				0.04				0.00			
2013	0.02	0.01			0.00	0.00			0.04	0.00			0.00	0.00		
2014	0.01	0.02	0.01		0.01	0.00	0.00		0.03	0.00	0.00		0.00	0.00	0.00	
2015	-0.04	-0.05*	-0.05	-0.09***	0.00	0.00	0.00	-0.01	0.00	-0.03	-0.03	-0.04	0.00	-0.01	-0.01	0.00

Table 2.22 Results for Treatment Group 1 (Financial Variables)

			Number of Observations	DID with covariates	R-squared	Number of Observations	DID with PSM and covariates	R-squared	Number of Observations	DID with 4grouping and covariates	R-squared
Cata40	Trend assumption	2011-2012	2337	0.00	0.12	2337	0.01	0.12	2337	-0.02	0.11
		2011-2013	2235	-0.04	0.14	2235	-0.05	0.11	2235	-0.05	0.10
		2012-2013	2252	-0.04	0.14	2252	-0.06	0.11	2252	-0.03	0.10
	UHC reform effect	2013-2014	2233	0.02	0.15	2233	0.05	0.12	2233	0.04	0.10
		2013-2015	2172	-0.01	0.16	2172	-0.01	0.11	2172	0.01	0.10
Cata30	Trend assumption	2011-2012	2337	-0.03	0.17	2337	-0.04	0.15	2337	-0.07	0.13
		2011-2013	2235	-0.07**	0.18	2235	-0.06	0.15	2235	-0.05	0.12
		2012-2013	2252	-0.05	0.19	2252	-0.02	0.15	2252	0.02	0.12
	UHC reform effect	2013-2014	2233	0.01	0.21	2233	0.03	0.16	2233	0.03	0.13
		2013-2015	2172	0.00	0.20	2172	-0.02	0.15	2172	0.00	0.13
OOP	Trend assumption	2011-2012	2337	-5.87	0.07	2337	-1.43	0.10	2337	-8.69	0.10
		2011-2013	2235	-15.41	0.07	2235	-14.41	0.09	2235	-21.34	0.08
		2012-2013	2252	-10.36	0.12	2252	-12.90	0.13	2252	-12.74	0.13
	UHC reform effect	2013-2014	2233	7.14	0.08	2233	-2.42	0.09	2233	2.74	0.08
		2013-2015	2172	-18.12	0.05	2172	-0.19	0.05	2172	7.70	0.04

*** Significance at 1 %. ** Significance at 5% * Significance at 10%.

Table 2.23 Results for Treatment Group 1 (Health Status and Utilization Variables)

			Number of Observations	DID with covariates	R-squared	Number of Observations	DID with PSM and covariates	R-squared	Number of Observations	DID with 4grouping and covariates	R-squared
Inpatient	Trend assumption	2011-2012	2337	-0.01	0.03	2337	-0.02	0.07	2337	-0.04	0.08
		2011-2013	2235	0.00	0.03	2235	-0.01	0.04	2235	-0.03	0.04
		2012-2013	2252	0.01	0.03	2252	0.01	0.06	2252	0.01	0.08
	UHC reform effect	2013-2014	2233	-0.01	0.02	2233	0.00	0.04	2233	0.00	0.04
		2013-2015	2172	0.02	0.05	2172	0.01	0.05	2172	0.02	0.05
Outpatient	Trend assumption	2011-2012	2337	-0.01	0.01	2337	-0.03	0.02	2337	-0.05	0.02
		2011-2013	2235	0.03	0.01	2235	0.02	0.01	2235	0.02	0.01
		2012-2013	2252	0.04	0.01	2252	0.05	0.01	2252	0.07	0.01
	UHC reform effect	2013-2014	2233	-0.02	0.02	2233	-0.02	0.03	2233	-0.02	0.02
		2013-2015	2172	-0.06	0.03	2172	-0.04	0.02	2172	-0.03	0.02

*** Significance at 1 %. ** Significance at 5% * Significance at 10%.

Results shows β_3 coefficient from the regression below, which is the outcome of a DID. For example, in 2011-2012, the DID with covariates method shows that there was a 1% increase in inpatient utilization of healthcare services.

$$Y = \beta_0 + \beta_1 T + \beta_2 S + \beta_3 (TxS) + \beta_4 X + \varepsilon$$

Table 2.24 Results for Treatment Group 2 (Financial Variables)

			Number of Observations	DID with covariates	R-squared	Number of Observations	DID with PSM and covariates	R-squared	Number of Observations	DID with 4grouping and covariates	R-squared
Cata40	Trend assumption	2011-2012	3461	-0.02	0.11	3461	-0.02	0.11	3461	-0.03	0.10
	EMAP reform effect	2012-2013	3464	-0.08***	0.11	3464	-0.05	0.10	3464	-0.03	0.09
	Joint effect of EMAP and UHC	2012-2014	3528	-0.06**	0.10	3528	-0.03	0.09	3528	0.01	0.09
		2012-2015	3531	-0.06**	0.11	3531	-0.03	0.11	3531	0.01	0.10
Cata30	Trend assumption	2011-2012	3461	-0.02	0.13	3461	-0.04	0.13	3461	-0.06	0.12
	EMAP reform effect	2012-2013	3464	-0.09***	0.13	3464	-0.04	0.11	3464	-0.02	0.10
	Joint effect of EMAP and UHC	2012-2014	3528	-0.08***	0.13	3528	-0.04	0.12	3528	-0.02	0.11
		2012-2015	3531	-0.06*	0.12	3531	0.01	0.14	3531	0.02	0.12
OOP	Trend assumption	2011-2012	3461	-0.28	0.07	3461	-3.30	0.08	3461	-9.56	0.11
	EMAP reform effect	2012-2013	3464	-3.71	0.08	3464	11.27	0.09	3464	20.55	0.09
	Joint effect of EMAP and UHC	2012-2014	3528	-7.80	0.09	3528	-27.21	0.11	3528	-15.34	0.12
		2012-2015	3531	-18.76	0.07	3531	-9.92	0.07	3531	0.22	0.06

*** Significance at 1 %. ** Significance at 5% * Significance at 10%.

Table 2.25 Results for Treatment Group 2 (Health Status and Utilization Variables)

		DID with covariates	Number of Observations	DID with covariates	R-squared	Number of Observations	DID with PSM and covariates	R-squared	Number of Observations	DID with 4grouping and covariates	R-squared
Inpatient	Trend assumption	2011-2012	3461	0.00	0.03	3461	-0.03	0.07	3461	-0.04	0.10
	EMAP reform effect	2012-2013	3464	0.01	0.04	3464	0.04	0.06	3464	0.06*	0.07
	Joint effect of EMAP and UHC	2012-2014	3528	0.02	0.04	3528	0.04	0.06	3528	0.05	0.07
		2012-2015	3531	0.02	0.04	3531	0.05*	0.07	3531	0.06*	0.09
Outpatient	Trend assumption	2011-2012	3461	-0.01	0.04	3461	-0.03	0.04	3461	-0.04	0.03
	EMAP reform effect	2012-2013	3464	0.00	0.02	3464	0.05*	0.03	3464	0.07*	0.02
	Joint effect of EMAP and UHC	2012-2014	3528	0.00	0.03	3528	0.00	0.04	3528	-0.01	0.05
		2012-2015	3531	-0.01	0.04	3531	0.00	0.04	3531	0.03	0.03

*** Significance at 1 %. ** Significance at 5% * Significance at 10%.

Results shows β_3 coefficient from the regression below, which is the outcome of a DID. For example, in 2012-2015, the DID with PSM and covariates method shows that there was a 7% increase in inpatient utilization.

$$Y = \beta_0 + \beta_1 T + \beta_2 S + \beta_3 (TxS) + \beta_4 X + \varepsilon$$

Table 2.26 Descriptive Statistics for the Control and Treatment Group 2 in 2012-2013- Adjusted Using the Four Grouping Propensity Score Method

Dependent variables	Control Group				Treatment Group 2			
	2012		2013		2012		2013	
	mean	se	mean	se	mean	se	mean	se
cata40	0.26	0.02	0.27	0.02	0.15	0.01	0.14	0.01
cata30	0.36	0.02	0.35	0.02	0.23	0.01	0.21	0.01
OOP_Health_Exp	84.00	7.67	80.81	7.84	59.10	5.06	71.53	7.03
Outpatient	0.17	0.02	0.13	0.02	0.14	0.01	0.16	0.01
Inpatient	0.11	0.01	0.07	0.01	0.02	0.00	0.04	0.01

Table 2.27 Descriptive Statistics for the Control and Treatment Group 2 in 2012-2014- Adjusted Using the Four Grouping Propensity Score Method

Dependent variables	Control Group				Treatment Group 2			
	2012		2014		2012		2014	
	mean	se	mean	se	mean	se	mean	se
cata40	0.26	0.02	0.21	0.02	0.15	0.01	0.11	0.01
cata30	0.35	0.02	0.32	0.02	0.23	0.01	0.18	0.01
OOP_Health_Exp	83.68	7.64	108.25	16.53	59.10	5.06	64.30	4.29
Outpatient	0.17	0.02	0.19	0.02	0.14	0.01	0.14	0.01
Inpatient	0.11	0.01	0.07	0.01	0.02	0.00	0.04	0.01

Table 2.28 Descriptive Statistics for the Control and Treatment Group 2 in 2012-2015- Adjusted Using the Four Grouping Propensity Score Method

Dependent variables	Control Group				Treatment Group 2			
	2012		2015		2012		2015	
	mean	se	mean	se	mean	se	mean	se
cata40	0.27	0.02	0.26	0.02	0.15	0.01	0.16	0.01
cata30	0.36	0.02	0.32	0.02	0.23	0.01	0.23	0.01
OOP_Health_Exp	84.29	7.71	113.62	29.87	59.10	5.06	87.63	8.71
Outpatient	0.17	0.02	0.18	0.02	0.14	0.01	0.18	0.01
Inpatient	0.11	0.01	0.06	0.01	0.02	0.00	0.04	0.01

Table 2.29 Descriptive Statistics for the Control and Treatment Group 1 in 2013-2014- Adjusted Using the Four Grouping Propensity Score Method

Dependent variables	Control Group				Treatment Group 1			
	2013		2015		2013		2015	
	mean	se	mean	se	mean	se	mean	se
cata40	0.25	0.02	0.18	0.02	0.11	0.01	0.08	0.01
cata30	0.31	0.02	0.25	0.02	0.15	0.01	0.11	0.01
OOP_Health_Exp	66.89	6.97	80.31	14.23	36.79	3.42	48.88	8.58
Outpatient	0.15	0.02	0.17	0.02	0.14	0.01	0.11	0.01
Inpatient	0.08	0.01	0.07	0.01	0.03	0.01	0.02	0.00

Table 2.30 Descriptive Statistics for the Control and Treatment Group 1 in 2013-2015- Adjusted Using the Four Grouping Propensity Score Method

Dependent variables	Control Group				Treatment Group 1			
	2013		2015		2013		2015	
	mean	se	mean	se	mean	se	mean	se
cata40	0.25	0.02	0.18	0.02	0.11	0.01	0.08	0.01
cata30	0.31	0.02	0.25	0.02	0.15	0.01	0.11	0.01
OOP_Health_Exp	66.89	6.97	80.31	14.23	36.79	3.42	48.88	8.58
Outpatient	0.15	0.02	0.17	0.02	0.14	0.01	0.11	0.01
Inpatient	0.08	0.01	0.07	0.01	0.03	0.01	0.02	0.00

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Chapter 3

Analyzing Incidences and Intensities of Out-of-pocket Health Expenditures in 2012-2015

Abstract

The main purpose of the present paper is to examine the incidences and intensities of catastrophic payments in both 2012 and 2015, through World Bank Methodology, as well as identify which constituent elements of out-of-pocket health expenditure produce households' catastrophic health expenditures. By using the Integrated Household Survey Database of National Statistics Office of Georgia, the present study illustrates that medication costs a have significant share in a household's health expenditure. Equally, medicine appears to be the chief cause of household catastrophic health expenditures. Specifically, 72% of CHEs are related to pharmaceutical spending.

Furthermore, households with chronic diseases or disabled members spend 79% of their OOPHE on medicine, herewith the share of medication spending in OOP for the poor quintile is 84.7%, which is 16.1% more compared to the rich quintile. There is a similar situation for outpatient treatments, where the proportion of OOP pharmaceutical spending is 44% for outpatient treatments. In the case of poor household, this accounts for 57%, which is 21.3% greater than the rich quintile. An analyses of these incidences highlights that the poorest quintile group have catastrophic expenditures that amount to 16.6% in 2015, while it was 13.2% in 2012. The fraction of money spent by households belonging to the aforesaid quintile does not experience significant changes. Accordingly, the present policy paper offers recommendations to whichever provision of prescription benefits packages for the poor shall be the primary policy objective for the government, in order to wholly protect households from financial ruin.

3.1. Introduction

The first chapter of the dissertation aimed at identifying factors causing catastrophic health expenditures in Georgia, which revealed that, more so than other groups, the most vulnerable households of the population were suffering from catastrophic health expenditures. The first chapter discerned that outpatient treatments, as well as having chronically ill members within households, were the greatest and most widespread factors causing CHE. However, the aforementioned study was limited to understanding which elements of outpatient treatments were the leading factors (outpatient service costs, outpatient prescription costs, and other indirect costs, which can be associated with outpatient treatments) behind CHEs. Therefore, the present study is aimed at determining the constituent elements of outpatient treatments, as well as the service costs necessary for chronically ill members of a household. The results of the present study will have crucial importance for policy makers, since it will transmit significant information in order to demonstrate the areas where the healthcare budget should be directed in order to protect households from financial hardship.

It is noteworthy that, since 2012, there has been no relevant research conducted in Georgia that has examined the composition of out-of-pocket health expenditure. However, the examination conducted by Gotsadze et al in 2009 indicated that: "the decrease of prevalence of catastrophic health expenditure is a policy objective of the government, which can be achieved by focusing on increased financial protection offered to the poor and expanding government financed benefits for the poor and chronically ill by including and expanding inpatient coverage and adding drug benefits." Zoidze's et al (2012) research also acknowledged that prescription costs were the main constituent element in the composition of OOPHE instigating CHE.

In 2013, UHC was introduced in Georgia. An in-depth analyzes of the State Healthcare program for socially vulnerable and targeted groups (2009)[6] and the Universal Healthcare Program (2013), demonstrate that there have been no significant changes, including related to pharmaceutical benefits. Since the introduction of UHC, there have been no improvements to prescription benefits, and there is a high probability that medicine related costs still create a significant share in the composition of OOPHE and represent a principal factor in households' financial ruin. Therefore, this study will explore the proportion of

[6] The healthcare program prior to the introduction of UHC.

medicinal spending in the composition of OOPHE and its dynamics within the set timeframe, 2012-2015.

The present research will use the World Bank Methodology, which helps to measure both incidences and intensity. In measuring incidences, the present study analyzes how the number of households which experienced CHE have changed during the timeframe, or how the number of households' OOPHE have changed towards the given threshold. While measuring intensity, the present study identifies how the spending of households has adapted compared to the prescribed threshold both in 2012 and 2015.[7]

The present paper asks following research questions: *1. How the number of households (incidences) experiencing CHE has changed after the launch of the UHC program? 2. How the share of OOP to non-food health expenditure (intensity) changed subsequent to the launch of UHC? 3. Which constituent elements of OOP cause households' CHE?*

The results of this study include essential information for policy makers, as its examination contains the composition of catastrophic health expenditure within different quintile groups of the population. Therefore, the study reveals the highlighted necessities of the aforementioned groups. Furthermore, the information enables policy makers to develop health insurance packages commensurate with the necessities of different quintile groups.

For instance, the necessities of the poor and rich quintile are dramatically disparate. Where the poor quintile has the need of state support for medication, the rich quintile may only require support for those expenses which exceed catastrophic health expenditure.[8] Consequently, the same insurance package for everybody would be neither effective nor efficient at protecting the population from financial hardship.

Furthermore, the present study will show a tangible illustration of the importance of similar research for other developed countries similar to Georgia. Such research would allow policy makers to establish and develop budget efficient healthcare programs initially based on the necessities of each distinguished group within a population.

The present paper is structured as follows. Section 2 focuses on the data specification and methodology. In particular, it describes the empirical method suggested by the World

[7] The present study has chosen its timeframe, as it allows a comparison between the conditions of households before and after the introduction of the Universal Health Coverage program.
[8] The type of insurance package which only provides support for expenses exceeding CHE could be developed.

Bank. Section 3 presents the results of the research. While, section 4 discusses the policy implications and makes it conclusions.

3.2. Data Definition and Methodology Specification

In this study, we use the Integrated Household Survey Databases of the National Statistical Office of Georgia (from the fourth quarters of 2012 and 2015). The data includes average monthly expenditure, OOP, and the socio-economic characteristics of each household, such as age, gender, and education. The number of observations are 2784 and 2746, from 2012 and 2015 respectively (Table 3.1).

In the process of constructing the incidences and intensities, the present study used the Equivalent Size of the Household, which was created by the National Statistics Office of Georgia. This variable is calculated for each household, where the indicator is dependent on the sex and age of household members. There are six groups, based on sex and age. Each have corresponding weights: *Children* aged 0-7 with coefficient 0.64; *Children* aged 8-15 and *Working age males* (aged 16-64) with coefficient 1; *Working age females* (aged 16-59) with coefficient 0.84; *Pension age males* (aged 65 and more) with coefficient 0.88; and *Pension age females* (aged 60 and more) with coefficient 0.76. The corresponding coefficients are assigned to every household member and then calculated for each household.

The number of equivalent adults with scale (cohabitation) effect is calculated for each household. The indicators are calculated on the base of 0.6 coefficients, where scale (cohabitation) effect denotes that expenditure of a single-person household is higher than expenditure of a two-person household, because certain outlays (rent of dwelling, utility payments, etc.) are jointly disbursed within a household. In the case of single member households, the indicator does not change and is equal to the number of equivalent adults. Whereas in all other cases, the indicator is equal to the number of the equivalent adults to the power of 0.6. In both 2012 and 2015, the household equivalent size equaled 1.9 (Table 3.1).

In regard to health variables, the present study comprises households with chronically sick or disabled members. Households with a chronically ill or disabled member in the family represent the dummy variable which equals 1, otherwise it equates to 0. The data also includes utilization factors, such as inpatient and outpatient variables. To identify the utilization variables, the National Statistics Office of Georgia asked the following question: “did any member of the household use inpatient or outpatient services within the last 3

months? Inpatient and outpatient variables represent the dummy, which equals 1 if a household has used inpatient/outpatient service and otherwise it equals 0.

The present study also constructs expenditure variables that measure both total expenditure and out-of-pocket health expenditure of a household. In 2012, the average total consumption of a household amounted to 676.6, GEL, while in 2015, it was 655.8 GEL. Though, OOPHE slightly decreased in 2015 and amounted to 59.1 GEL (Table 3.1).

The data from the present study also provides information on prescription costs incurred from outpatient treatments, as well as necessary services utilized for chronic illnesses. Based on this evidence, the present study identifies the proportion of OOP outpatient drug expenditure to OOPHE. The share of pharmaceutical costs incurred were commonly identified between chronically ill members of household. The comparison of these two variables within the given timeframe will demonstrate the importance of medication benefits as part of the composition of OOPHE.

To analyze the incidences and intensity of catastrophic health payments, the present study uses the World Bank Methodology, which O'Donnell et al. (2008) describes in *Analyzing Health Equity Using Household Survey Data, the Guide to Techniques and Their Implementation*. Health expenditure is regarded as catastrophic whenever the share of OOPHE is greater than 40% of household non-food expenditure. This research regards non-food expenditure as a denominator, since it detects CHE better than using total expenditure. A potential problem related to the usage of total household expenditure is that the budget share may be lower for poor households. Poor households' foremost costs are related to items essential for sustenance, such as food, leaving little to spend on healthcare. Therefore, poor households that cannot afford catastrophic payments are ignored. Thus, a solution is to define catastrophic payments not with respect to total expenditures, but in relation to non-food expenditures.

According to the World Bank Methodology, an incidence of catastrophic payments is defined as the fraction of households whose share of healthcare costs into non-food expenditure exceeds the chosen threshold:

$$H = \frac{\sum_1^N E_i}{N}$$

where H is titled the headcount, which measures incidences of catastrophic health payments. While, N is the number of households and E_i is an indicator which equals 1 if the OOP of non-food expenditure exceeds the given thresholds (Z is the threshold) otherwise it equals 0.

$$E_i = \begin{cases} 1 & if \dfrac{OOP}{nonfood\ Expenditure} > z \\ 0 & if\ otherwise \end{cases}$$

This study will measure headcounts using five different thresholds: 10%, 15%, 25%, 30% and 40%. For instance, in the case of a 40% threshold, the headcount measures the fraction of households which spend more than 40% of non-food expenditure on healthcare costs.

The comparison of headcounts towards the given thresholds in 2012 and 2015 will provide an opportunity to gauge how the number of households change during the given timeframe in the different quintile groups.

The expenditure quintile groups were defined through raking household monthly expenditure per adult equivalent by dividing household monthly expenditure with equivalent household size.

As mentioned, the headcount measures incidences of catastrophic payments, but it does not reflect the amount by which households exceed the given threshold. While incidences of catastrophic payments measured by overshoot, captures the average degree by which payments (as a proportion of non-food expenditure) exceeds the threshold Z. This is measured by the following equation:

$$\mathrm{O} = \frac{\sum_1^{\mathrm{N}} \mathrm{O_i}}{\mathrm{N}}$$

where-

$$\mathrm{O_i} = \mathrm{E_i}\left(\frac{OOP}{nonfoodExpnditure} - \mathrm{Z}\right)$$

Similar to incidence, in the case of the headcount, E_i is indicator which equals 1 if the OOP share of non-food expenditure exceeds the given thresholds, otherwise it equals 0.

For example, in the case of the 40% threshold, then overshoot shows the average amount of money spent by households which exceeds the given threshold. To summarize, headcount captures only the incidences of anything catastrophic occurring, while overshoot captures the intensity of the occurrence. It is also noteworthy to mention the limitation of measuring incidences and intensities of catastrophic payments. The measurement of the incidences and intensity of catastrophic payments is insensitive to the distribution of catastrophic payments, as in the headcount all households exceeding the threshold are counted equally, while overshoot captures all money spent on healthcare in excess of the threshold, irrespective of whether they are made by the poor or the rich.

For example, if there is a diminishing marginal utility of income, the opportunity cost of health spending by the poor will be greater than that by the rich. While placing a social welfare interpretation on measures of catastrophic payments, it might be argued that they should be weighted to reflect the differential opportunity cost. In accordance to the World Bank Methodology, the distribution of catastrophic payments in relation to income could be measured by concentration indices (O'Donnell et al., 2008).

For example, in the case of the 40% threshold, the headcount equals 15% and signifies that 15% of households spend more than 40% of their non-food expenditure on healthcare, while this does not provide information on the type of households they are, poor or rich: which is the very reason the World Bank Methodology offers the opportunity to measure the concentration index, and the same is true for overshoot.

Two forms of concentration index exist, one for intensity, C_O, and another for incidence, C_E. When C_E is positive, it means that there is greater tendency for the better-off to exceed the given payment threshold. There is a similar interpretation is with C_O. One way of adjusting the headcount and overshoot measures of catastrophic payments, to take into account the distribution of the payments, is to multiply each measurement by the complement of the respective concentration index (Wagstaff & van Doorslaer, 2003):

$$H^W = H(1 - C_E)$$

and-

$$O^W = O(1 - C_O)$$

In particular, the weight of H^W equals 2 if a household represents the lowest group and the weight declines linearly with income distribution, consequently the richest household receives 0.

The same is true in relation to O^W. If those who exceed the catastrophic payments threshold are poorer, the concentration index C_E will be negative, and this will make H^W greater than H.

The comparison of data of both 2012 and 2015 will provide the opportunity to see tendency dynamics of incidences and intensities within the given time.

This research is aimed at determining the significance of prescription costs in the incidences of households' catastrophic health expenditure. Therefore, the study has constructed a variable OOP medication spending share of non-food expenditure.

3.3. Results and Discussion

With the help of incidence patterns, this work examines how the number of households experiencing CHE have changed since the Georgian government has introduced the UHC program. Additionally, through the study of intensity, the study explores the range of CHE within the given timeframe. The results demonstrated that the condition of households in relation to CHE has not changed since the launch of the UHC program, and CHE still represents a significant challenge on the path to protecting the population from financial ruin.

For the present study, health expenditure is deemed catastrophic when the OOP divided by non-food expenditure is greater than 40%. The necessary calculations have revealed that, within 2012-2015, the number of households facing catastrophic health expenditures increased from 12.1% to 13.5%. Whereas, the fraction of money spent in cases of CHE decreased from 59% to 55.8%, which highlights that more households face CHE, even though the amount of money spent on healthcare is less than in 2015 (Table 3.2). Such a comparison does not provide the opportunity to analyze the condition of different quintile groups. Therefore, the present study observes dynamics of the incidences and intensities in different quintile groups.

In the case of the poorest quintile group, catastrophic expenditures accounted for 16.6% in 2015, while they amounted to 13.2% in 2012. The fraction of money spent by

households belonging to this quintile does not experience statistically significant changes. This demonstrates that following the implementation of UHC in 2013, OOP catastrophic health expenditures of poor households remain unchanged. Furthermore, the number of households facing catastrophic health expenditures increased in 2015 compared to 2012 (Table 3.2).

Whilst in the rich quintile, the number of households facing CHE saw no change in 2012-2015, and amounted to 11%. However, the share of OOP to non-food expenditure, for the given 40% threshold, diminished by 8.4% and accounted for 57.2% in 2015 (Table 3.2). A similar situation is seen in relation to the fourth quintile. Therefore, according to the available data, it is obvious that the economic condition of the rich quintile improved over that of the poor quintile (2012-2015).[9]

In 2009, Georgia introduced a state insurance program, covering the socially vulnerable part of the population: including children aged 0-6, students, pensioners and people with disabilities. While research conducted by Gotsadze et al. in 2009, and by Zoidze et al. in 2012, initiated recommendations to enhance insurance packages for these groups, including support for medication, the government, in 2013, took the decision to implement UHC. The data analyzed within this study raises questions in relation to the efficiency of the UHC program, as it ought to be aimed at assisting the condition of the most impoverished parts of society. The aforementioned results might be explained by the decision of the Georgian government, in 2013, to insure the entire population, regardless of their socio-economic condition. As UHC failed to compromise on improvements to insurance packages for the poor, this could be considered a source for the poor quintile still facing financial hardship.

As described in the methodology section, headcount and overshoot demonstrates how the number of households facing catastrophic health expenditures have increased during the timeframe, as well as adjustments to the fraction of money when households incur CHE. However, headcount and overshoot do not provide information concerning the socio-economic conditions of households facing CHE. For that reason, in the second part of the discussion, the research will consider concentration indexes.

[9] Figure 3.1 illustrates the results reflected in Table 3.3.
The blue line highlights the year 2015, while red line displays the records of 2012.

Table 3.3 illustrates the changes of concentration indexes in 2012-2015. Thus, one can discern that the 40% threshold headcount concentration index is negative, denoting that the worse-off are more likely to incur catastrophic health expenditures, both in 2012 and in 2015. Consequently, it is apparent that the ranked weighted headcount is greater than the headcount. The concentration index is also negative against every threshold, not only in case of 40%. This signifies that the prescribed threshold of the worse-off is more likely to exceed the threshold than the better-off.

The study reveals that the situation is slightly different concerning the overshoot concentration index. In 2012, the overshoot concentration index was positive, whereas in 2015, for the 40% threshold, it appears to be negative. This reveals that in 2012, overshoot tends to be greater among the better-off, while in 2015, overshoot tends to be greater among the worse-off. The situation also appears to be the same in cases of the 25% and 30% thresholds.

To summarize, in both 2012 and 2015, poor households were more likely to incur catastrophic health expenditures. Therefore, the financial hardship of this section of the population still represents a challenge for the government, even after the launch of the UHC program. Accordingly, the determination of expenses that led households to financial ruin (when CHE occurred) ought to be a critical objective for policy makers.

Table 3.4 illustrates composition of OOP, and it reveals that households with chronic diseases or disabled member in the family spend 79% of their OOP on medication. Whereas, the share of OOP for pharmaceuticals for the poor quintile is 84.7%, which is 16.1% greater than the rich quintile. The situation is similar in the case of outpatient treatments. The proportion of OOP prescription spending is 44% for outpatient treatments. Particularly noteworthy is the share of poor households, which account for 57%, a remarkable 21.3 % more compared to the rich quintile. As revealed in Table 3.4, prescription costs comprise a large share of out-of-pocket health expenditures, furthermore, such costs appear to be the main reason behind households' catastrophic health expenditures. Table 3.5.2 illustrates that, in 2015, 13.53% of households faced CHE, where Table 3.5.1 identifies that 9.8% of those

expenses (CHE) are related to medication.[10] These results illustrate that around 72% of CHE is related to spending on medicine.

The data reveals that pharmaceutical costs have the largest share in OOPHE, as well as other expenses related to medication, both of which represent the main factors generating CHE. Consequently, based on the information revealed, the introduction of medication benefits ought to be the principal policy objective for the government, in order to develop efficient healthcare packages and assist households close to financial ruin

3.4. Conclusion and Policy Implication

Even within the limited number of research projects examining Georgia's healthcare system and the governmental reforms, it has been acknowledged that improvements to health packages for the most vulnerable part of the population should become the primary policy objective for policy makers. Gotsadze et al. (2009) indicated that: "the decrease of prevalence of catastrophic health expenditure is a policy objective of the government, which can be achieved by focusing on increased financial protection offered to poor and expanding government financed benefits for the poor and chronically ill by including and expanding inpatient coverage and adding drug benefits." Zoidze's et al. (2012) research also acknowledged that medicine costs were the main constituent element of OOP, which subsequently cause CHE.

The policy recommendations were clearly indicating direct budget funds be distributed to those of the population in the most need. Nevertheless, the Georgian government introduced the UHC program in 2013, which covers the entire population, regardless of the socio-economic conditions of households. Since healthcare reforms did not include any significant changes for insurance packages for the poor, this study has revealed that even after the introduction of UHC, the most vulnerable part of the population still experiences financial ruination.

Although, it is clear that the most vulnerable part of the population has suffered the most from CHE, there has been no relevant research to provide a clear assessment of the composition of catastrophic health expenditures. This study therefore aimed to fill the request need. Analyzing the composition of CHE revealed that pharmaceutical costs are a significant

[10] The present study constructed a variable for Table 3.5.1. OOP prescription spending divided by non-food medicine spending, which demonstrates that in 9.8% of households this share is more than 40%.

element of out-of-pocket health expenditure, in addition, medicine appears to be main cause of household catastrophic health expenditure: notably, 72% of CHE is related to prescription spending (Table 3.4).

Hence, as medication costs still comprise a prominent share in CHE, the present policy paper recommends whichever provision of prescription benefits in healthcare packages are to be the key policy objective for the government, in order to fully protect households from financial ruin.

Table 3.1 General Statistics

Year		N	mean
2015			
	Household size	2746	1.9
	Total consumption	2746	677.6
	Non-food consumption	2746	350.5
	Out-of-pocket	2746	55.4
2012			
	Household size	2784	1.9
	Total consumption	2784	655.8
	Non-food consumption	2784	342.7
	Out-of-pocket	2784	59.1

Figures 3.1 Shares of Health Payments in 2012 and 2015

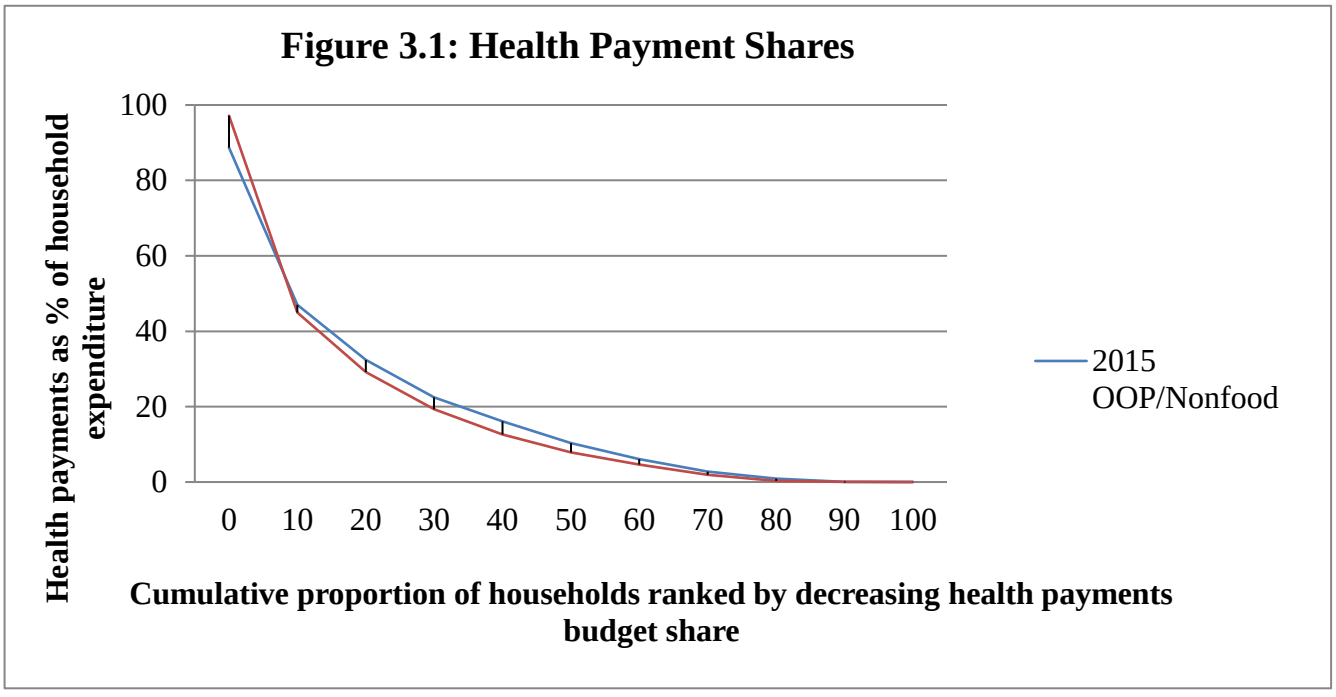

Table 3.2 Incidence and Intensity of Catastrophic Health Payments, Using Non-food

	10%			15%			25%			30%			40%		
	2015	2012	*DIF 2015-2012*	2015	2012	*dif 2015-2012*	2015	2012	*dif 2015-2012*	2015	2012	*dif 2015-2012*	2015	2012	*dif 2015-2012*
Headcount (H)															
Lowest Quintile	0.570	0.511	**0.059****	0.493	0.395	**0.098***	0.351	0.267	**0.084***	0.288	0,211	**0.077***	0.166	0.132	**0.034*****
Std. Dev	*0.496*	*0.500*		*0.500*	*0.489*		*0.478*	*0.443*		*0.453*	*0,408*		*0.372*	*0.339*	
2	0.572	0.467	**0.106***	0.483	0.392	0.091*	0.290	0.262	0.027	0.223	0,207	0.016	0.128	0.136	-0.008
Std. Dev	*0.495*	*0.499*		*0.500*	*0.489*		*0.454*	*0.440*		*0.417*	*0,406*		*0.335*	*0.343*	
3	0.522	0.476	0.046	0.427	0.379	**0.049*****	0.268	0.217	**0.051****	0.218	0,190	0.028	0.146	0.102	**0.044****
Std. Dev	*0.500*	*0.500*		*0.495*	*0.486*		*0.443*	*0.413*		*0.413*	*0,393*		*0.353*	*0.302*	
4	0.480	0.465	0.015	0.382	0.366	0.016	0.251	0.245	0.006	0.198	0,200	-0.002	0.127	0.118	0.009
Std. Dev	*0.500*	*0.499*		*0.486*	*0.482*		*0.434*	*0.430*		*0.399*	*0,401*		*0.333*	*0.323*	
Highest Quintile	0.381	0.346	0.035	0.291	0.272	0.019	0.193	0.189	0.004	0.161	0,158	0.004	0.110	0.117	-0.007
Std. Dev	*0.486*	*0.476*		*0.455*	*0.446*		*0.395*	*0.392*		*0.368*	*0,365*		*0.313*	*0.322*	
Total	0.505	0.453	**0.052***	0.415	0.361	**0.054***	0.270	0.236	**0.034***	0.217	0,193	**0.0241****	0.135	0.121	**0.014*****
Std. Dev	*0.500*	*0.498*		*0.492*	*0.481*		*0.444*	*0.425*		*0.413*	*0,395*		*0.342*	*0.326*	
Average OOP															
Lowest Quintile	0.336	0.304	**0.033****	0.369	0.357	0.013	0.440	0.433	0.007	0.476	0.477	-0.001	0.570	0.556	0.015
Std. Dev	*0.178*	*0.175*		*0.168*	*0.165*		*0.150*	*0.147*		0.141	0.135		*0.114*	*0.109*	
2	0.299	0.321	**-0.022*****	0.332	0.360	**-0.027****	0.423	0.440	-0.017	0.4663	0.4838	-0.018	0.551	0.557	-0.007
Std. Dev	*0.161*	*0.178*		*0.154*	*0.169*		*0.127*	*0.131*		*0.125*	*0.140*		*0.098*	*0.116*	
3	0.309	0.300	0.010	0.351	0.344	0.007	*0.442*	*0.455*	-0.013	0.4806	0.4815	-0.001	0.545	0.604	**-0.059***
Std. Dev	*0.171*	*0.185*		*0.162*	*0.183*		0.137	0.169		*0,124*	*0.165*		*0.100*	*0.132*	
4	0.309	0.313	-0.004	0.355	0.364	-0.010	0.437	0.449	-0.012	0.4813	0.4881	-0.007	0.553	0.591	**-0.038****
Std. Dev	*0.173*	*0.191*		*0.165*	*0.184*		*0.145*	*0.169*		*0.132*	*0.610*		*0.113*	*0.135*	
Highest Quintile	0.313	0.361	**-0.047****	0.374	0.426	**-0.052****	0.466	0.529	**-0.0631****	0.5032	0.5782	-0.075	0.572	0.656	**-0.084***
Std. Dev	*0.196*	*0.247*		*0.186*	*0.239*		*0.164*	*0.219*		*0.153*	*0.206*		*0.137*	*0.182*	
Total	0.314	0.317	**-0.003**	0.355	0.366	-0.012	0.440	0.457	**-0.017****	0.480	0.498	**-0.018****	0.558	0.590	**-0.032***
Std. Dev	*0.175*	*0.194*		*0.166*	*0.187*		*0.146*	*0.172*		*0.135*	*0.164*		*0.112*	*0.140*	

Table 3.3 Distribution-sensitive Catastrophic Payments Measures, Using Non-food

	10%		15%		25%		30%		40%	
	2015	**2012**	**2015**	**2012**	**2015**	**2012**	**2015**	**2012**	**2015**	**2012**
Concentration index, C_E	-0.075	-0.059	-0.102	-0.062	-0.109	-0.064	-0.104	-0.056	-0.071	-0.038
Standard error	*0.01*	*0.01*	*0.02*	*0.02*	*0.02*	*0.02*	*0.02*	*0.02*	*0.03*	*0.03*
Rank-weighted headcount, H_W	54.324	48.060	45.778	38.387	29.973	25.135	24.003	20.425	14.499	12.557
Standard error	*1.27*	*1.22*	*1.27*	*1.18*	*1.16*	*1.04*	*1.08*	*0.95*	*0.85*	*0.77*
Headcount (H)	50.5	45.4	41.5	36.1	27.0	23.6	21.7	19.3	13.5	12.1
Standard error	*1.13*	*1.07*	*1.10*	*1.02*	*0.97*	*0.89*	*0.90*	*0.82*	*0.72*	*0.65*
Concentration index, C_O	-0.093	-0.028	-0.095	-0.020	-0.087	0.009	-0.080	0.027	-0.075	0.075
Standard error	*0.02*	*0.02*	*0.02*	*0.02*	*0.03*	*0.03*	*0.03*	*0.03*	*0.04*	*0.04*
Rank-weighted overshoot, O_W	11.800	10.115	9.313	7.971	5.578	4.843	4.229	3.721	2.301	2.127
Standard error	*0.41*	*0.38*	*0.37*	*0.34*	*0.28*	*0.26*	*0.24*	*0.22*	*0.17*	*0.16*
Overshoot (O)	10.8	9.8	8.5	7.8	5.1	4.9	3.9	3.8	2.1	2.3
Standard error	*0.35*	*0.35*	*0.31*	*0.31*	*0.24*	*0.24*	*0.20*	*0.21*	*0.14*	*0.16*

Table 3.4 Compositions of Out-of-Pocket Health Expenditure

Outpatient, Inpatient and Chronic Treatment Medicinal share on OOP	Poor		2		3		4		Richest		Total	
Outpatient Medicine / OOP		**Std.Dev**		**Std.Dev**		**Std.Dev**		**Std.Dev**		**Std.Dev**		**Std.Dev**
Headcount (H) – 2015	0.570	*0.380*	0.454	*0.344*	0.429	*0.360*	0.438	*0.359*	0.373	*0.357*	0.444	*0.364*
Headcount (H) – 2012	0.555	*0.419*	0.518	*0.370*	0.484	*0.387*	0.489	*0.369*	0.403	*0.364*	0.487	*0.383*
Chronic Medicine/ OOP		**Std.Dev**		**Std.Dev**		**Std.Dev**		**Std.Dev**		**Std.Dev**		**Std.Dev**
Headcount (H) - 2015	0.847	*0.265*	0.817	*0.271*	0.804	*0.283*	0.786	*0.304*	0.686	*0.364*	0.790	*0.301*
Headcount (H) - 2012	0.818	*0.314*	0.815	*0.303*	0.784	*0.312*	0.701	*0.340*	0.649	*0.398*	0.756	*0.339*

Table 3.5 Out-of-Pocket Pharmaceutical Spending as a Share of Non-food and Out-of-Pocket Share of Non-food

Table 3.5.1 Out-of-Pocket Pharmaceutical Spending as a Share of Non-food

Threshold budget share morer than 40%		
Out-of-pocket pharmaceutical spending as a share of non-food	40%>	
		Std.Dev
Headcount (H) - 2015	0,098	*0,297*
Headcount (H) - 2012	0,070	*0,255*

Table 3.5.2: Out-of-Pocket Share of Non-Food

Threshold budget share more than 40%		
Out-of-pocket spendinge share of non-food	40%>	
		Std.Dev
Headcount (H) – 2015	0,1353	*0,3421*
Headcount (H) – 2012	0,1209	*0,3260*

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