# CATASTROPHIC HEALTH EXPENDITURE AND POVERTY IN MALAWI

**M.A. (ECONOMICS) THESIS**

**By**

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## DECLARATION

I, the undersigned, hereby declare that this thesis is my own original work which has not been submitted to any other institution for similar purposes. Where other people's work has been used, acknowledgements have been made.

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Name

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Signature

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Date

## STATEMENT OF APPROVAL

The undersigned certify that this thesis represents the student's own work and effort and has been submitted with our approval.

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## DEDICATION

To God without whom, I wouldn’t have made it this far. I say Ebenezer, thus far Lord, you have brought me.

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*"Since the illness we stopped buying a whole bag of maize per month, instead we buy a pail of maize. It is now several months since we stopped using the communal public water tap because we could not pay, now we use water from the traditional well*."

During an in-depth interview conducted by Reach Trust, a woman in Lilongwe describes how accessing treatment increasespoverty for her family.

*"Poor people cannot improve their health status because they live day by day, and if they get sick they are in trouble because they have to borrow money and pay interest"*

A Vietnamese woman quoted in the Voices of the Poor

## ABSTRACT

Out-of-pocket (OOP) health payments can cause financial hardship to households, which may push them into poverty. The paper investigated the impact of OOP health payments on households' economic situation in Malawi using data from the Third Integrated Household Survey (IHS3). The study adopts the World Health Organization's approach in measuring the extent of catastrophic health expenditure and impoverishment. Within the framework of OOP health payments on household's economic status, the paper computes new poverty estimates. These poverty estimates purportedly take into account the poverty impact of OOP health payments.It is found that if OOP health payments are factored in, the level of poverty in Malawi is higher than official figures suggest. For instance, an additional of 0.93% of households fall below the poverty line after paying for health care. It also uses a logit model to identify the determinants of catastrophic health expenditures. It is found that chronically sick members, large number of illness episodes and large households are highly likely to incur catastrophic health expenditure.

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# CHAPTER ONE

# INTRODUCTION

## 1.1 Background

Good health systems respond to people's expectations and ensure that they are protected from the financial consequences of illness and death, or at least from the financial consequences associated with the use of medical care (WHO, 2000). Anecdotal evidence suggests that health systems often perform badly in this respect, apparently with devastating consequences for poor and near-poor households. The World Bank's 50-country participatory poverty study known as Voices of the Poor[1] found that poor health and illness are universally dreaded as a source of destitution, partly because of the costs of health care but also the income lost due to illness (Narayan, et.al, 2000).

Out-of-pocket (OOP) health care expenditure, where individuals and households pay for health care out of their own resources, is therefore an important feature of health care systems all over the world. Furthermore, the impact of health care financing systems on the welfare of households, particularly poor households, is regarded as an important issue faced by policy makers when developing health care systems and insurance mechanisms (Xu et al., 2003). It is widely accepted that financial protection against high levels of OOP health expenditure should be one of the primary goals in designing health sector reforms since it hasbeen argued that high levels of OOP health expenditure violate the vertical equity principle, which requires that payment should be related to ability to pay (World Health Organisation, 2000).According to the WHO, ability to pay is the proportion of household income remaining after spending for basic subsistence needs, which is called effective income (2000). Xu K, et.al. (2003) argued that effective income is a more reliable criterion for purchasing power than total income of households.

[1]Narayan D, et.al. Voices of the Poor: Can Anyone Hear Us? New York, N.Y.: Oxford University Press, 2000.

In order to reform health care systems in line with the vertical equity principle, however, it is necessary to define what is meant by an unacceptably high level of OOP health expenditure, frequently referred to as 'catastrophic' in the literature. Russel (2004) provides a comprehensive definition of catastrophic health expenditure: 'the term catastrophic implies such expenditure levels that are likely to force household members to cut their consumption of other minimum needs, trigger productive asset sales or high levels of debt and lead to impoverishment.' The premise is that households should not spend more than a specific percentage of their income on health care to allow them to maintain other basic needs (Wagstaff and Doorslaer, 2003).WHO researchers have used 40% as a threshold beyond which a household is said to have incurred catastrophic expenditures (Xu et al., 2003) when "capacity to pay" (roughly, nonfood expenditure) is used as the denominator.

### 1.1.1 Health System Financing in Malawi

Health sector financing in Malawi is composed of three main channels, these are: government financing which is through vote expenditure and subventions to other providers; donor support through government's development budget, commodity aid and direct support to programs and support to other providers and finally private expenditure which is comprised of household out of pocket expenditure, firms and insurance providers (National Health Account, 2005). Of the three, the health sector relies on government and donors to finance its activities (MoH, 2008).

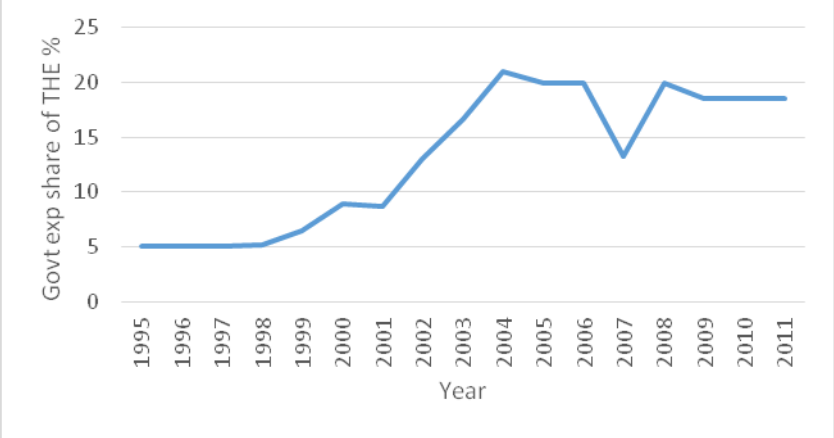
The government of Malawi has taken some significant steps towards tackling inequities in health care utilization and accessibility and also in reducing the financial burden of health care in order to achieve health related millennium development goals (MDGs) of universal health coverage. Most importantly, in2002 Malawi government launched a basic Essential Health Package (EHP) with the help from the international community, which aims to provide free access to primary health care in government clinics in order to treat some of the main ill-health problems in Malawi, such as malaria, diarrhoea, and

respiratory infections and also to ensure that nobody is denied access to health services because of their inability to pay (Oxfam, 2008).

Health expenditure per capita as of 2012 stood at $20 (WHO, 2012) though this was an increase from US$15 in 2003, the figure is still below US$34 recommended by the WHO Commission for Macroeconomics and Health to effectively provide essential health care package (EHP) services. As such despite the government announcing that essential health-care needs are free, only 9% of government and mission facilities (54 out of 585) provide the full EHP. This means that in each district, only one or two facilities have adequate EHP capacity (World Bank, 2007). As a result, OOP expenditure on health is high accounting for 12% of total health spending (NHA, 2005). This makes it the third largest source of health financing in the country.

In the recent years the proportion of government spending on health has decreased substantially (see figure 1 below). Government contributions to total health expenditure fell from 22% in 2004 to 18% in 2011 and as of 2012 it stood at 13% (WHO, 2012) and thisdoes not match the corresponding population growthrate of 2.9% per year (NSO, 2011). A Study done by Xu et al (2003) concluded that there is a negative correlation between the proportion of government health spending to total health spending (as opposed to OOP share of total health spending) and the prevalence of catastrophic health expenditures across countries.

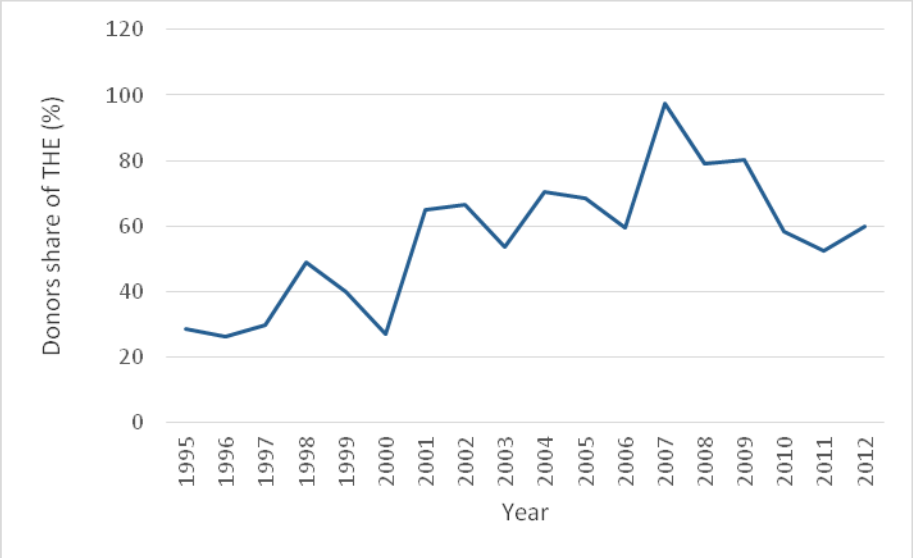
**Figure 1: Government spending on health % of Total Health Expenditure**




**Source: WHO (2011)**

Donors continue to play a significant role in health financing in Malawi even thoughtheir contributionsto health spending in Malawi have declined recently as evidenced by Figure 2 below. As of 2012 donors contributes about 60% of total health spending, making Malawi's health system one of the most donor dependent in the world. One problem with a system that depends on international aid is that the level of promised commitment is not forthcoming, both at the international and national levels. In the current climate of fiscal restraint and economic recession, we can also expect that the exponential increases in aid to health that we have witnessed in the past are under threat. Innovative financing mechanisms have the potential to make a valuable contribution to filling the health services financial gap, yet they remain an insufficiently tapped resource in Malawi.

**Figure 2: Donor contribution to Total Health Expenditure**



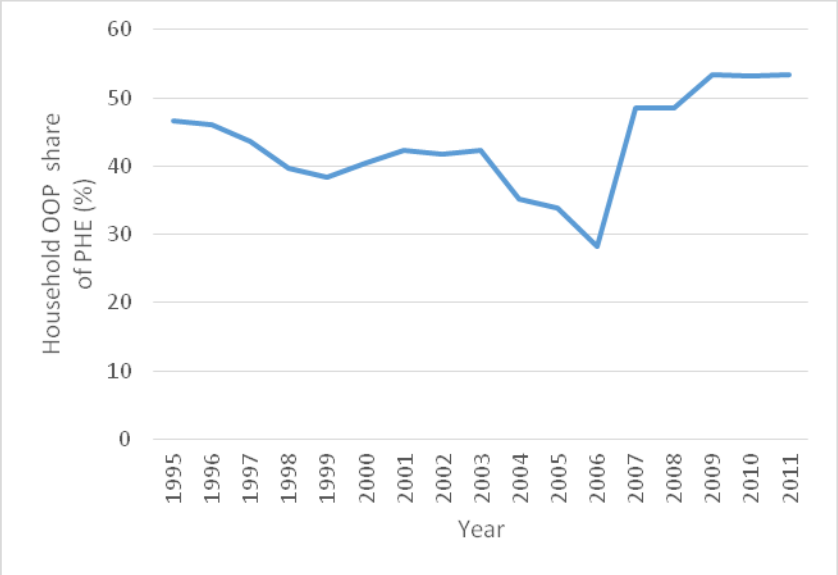

**Source: WHO (2012)**

Suffice to say that Malawi's health system faces absolute and relative inadequacy of financing to adequately fund its free primary health care services (WHO, 2011), such that about 27% of total health expenditure comes from the private sector. The private sector mainly consists of prepayment schemes and household OOP expenditures (NHA, 2007). OOP payments are expenditures borne directly by a patient where insurance does not cover the full cost of the health good or service (OECD, 2011). They include cost-sharing, self-medication and other expenditure paid directly by private households to

access health care. Total OOP spending has recently been increasing as evidenced in the figure 3 below. From 2006 the trend has been an upward one with the highest averaging at 53.4% of the private health expenditure as of 2011. This makes the households the main financing agent in the private sector.

An upward trend in OOP signals serious challenges with quality and equality of health care services offered in government hospitals and clinics. The capacity to regularly track health financing sources and their uses using National Health Accounts also appears to be weak. Furthermore, there is a growing body of evidence that payments for health care thus can easily become catastrophic (Kawabata et al, 2002), especially when the public health care system is weak or unattractive, and poor people have to make use of other services.

**Figure 3: Household OOP as a percentage of Private Funding**




**Source: WHO (2011)**

This problem of financial burden on households is further exacerbated due to the fact that there is no social health insurance system operating in Malawi to protect and cover the underprivileged. The effect of the lack of protection is that families suffer the burden of the illness but also the economic ruin and impoverishment of financing their care, yielding increased poverty in the short and long run. Uninsured medical expenditures can

pose a major threat to living standards, this is particularly true in low and middle income countries with little formal health insurance coverage (Xu et.al, 2003), and Malawi is no exception where private health insurance only accounts for 15% of the private health expenditure (or 4% of the total health expenditure) (WHO, 2011). Reliance on OOP in financing health care leaves households exposed to risk of incurring a large medical expenses should a household member fall sick. As such, health shocks can push households into financial catastrophe resulting from health payments and lost earnings due to inability to work (Xu et.al., 2003).

Even though there is a growing interest in the effects of health expenditure on household wellbeing in developing countries on all continents. Most empirical studies on catastrophic health expenditures have been done in East, Central and South Asia, including China (Lindelow and Wagstaff, 2005), Thailand (Limwattananon, 2007), Vietnam (Wagstaff and Van Doorslaer, 2003), as well as Bangladesh, Nepal, Sri Lanka, Malaysia and the Kyrgyz Republic (Van Doorslaer et al., 2007). Among the few African countries for which detailed studies are available are Zambia (Ekman, 2007) and Uganda (Xu et al., 2006). This paper adds to the somewhat sketchy literature on catastrophe and poverty from health spending in Africa.

## 1.2 Problem Statement

Direct, OOP payment for health at point of service is considered the most inefficient and inequitable means of financing a health system (WHO, 2000). In these systems there is little room for risk pooling, reduced competition among providers, and patients pay more than they would with a prepayment scheme due to the fragmentation of risk and the urgency of treatment. Furthermore, the greatest burden tends to be placed on the family. If the cost of care exceeds the ability to pay at the time of service, catastrophic and potentially impoverishing expenditures arise or necessary care is forgone. Countries like Malawi this burden is particularly disastrous because incomes are significantly low with almost half of the population living below the poverty line (NSO, 2011). Also, because the autonomous spending is highly dependent on social networks, it means household incomes are other than cash (Chipeta, 1992). The health systems however run on cash or

finance, and so households are more likely to be exposed to catastrophic health expenditure due to this mismatch of resources.

Families are often forced to choose between satisfying other basic needs such as education, food and housing, or purchasing health care and saving loved-ones from illness, suffering and often shortening life spans. Thus, health spending can be an important additional source of poverty (Frenk et.al., 2009). If households cannot be insured against health shocks, this phenomenon may have both long as well as short-run implications (Wagstaff,2005) yet in many developing countries like Malawi there are no public pre-payment options such as social security, social insurance schemes to protect households from financial catastrophe due to health care utilization.

The threat that OOP payments pose to household living standards is increasingly recognized as a major consideration in the financing of health care (Commission on Macroeconomics and Health, 2001; OECD and WHO, 2003; World Bank, 2004) and hence calls for policy intervention. Such policy interventions can only be effective and efficient when you know the extent to which out of pocket expenditures are catastrophic and impoverishing. The present study therefore intends to answer some fundamental questionsabout OOP expenditure in health in Malawi, and their consequences on the households. The questions addressed in this paper include: What is the extent of extreme or catastrophic health payments? What are the major determining factors for catastrophic payment in health care? Who are the most vulnerable due to catastrophic payment? And how extensive is the economic impact of catastrophic payment on households?

### 1.3 Objective of the study

The main objective of this study is to investigate the relationship between household out of pocket payments for health care and poverty in Malawi. This main objective will be achieved by looking intofulfilling the following specific objectives:

i. Showing the extent of catastrophic expenditures in Malawi,
ii. Establishing the effect of OOP health payments on Poverty in Malawi,
iii. Identifying determinants of catastrophic health expenditure in Malawi.

### 1.4Hypotheses

Households in Malawi experience Catastrophic OOP health expenditure and hence reduced welfare. This hypothesis is broken into the following premises:

i. Households in Malawido not experience catastrophic OOP health expenditure,

ii. OOP reduces household welfare and leads to an increase in household poverty,

iii. Household socioeconomic characteristics, chronic disease and illness episodes do not influence catastrophic health expenditure.

### 1.5 Motivation for the study

Policy makers and program implementers must adequately understand and address fairness issues in health systems financing for successful implementation of health reforms and poverty reduction programs in Malawi. The health sector must continuously monitor health reforms to ensure that they do not contribute to widening inequities and inequalities between populations.

The study will therefore inform the debate on the proposed Essential Health Package (EHP)that aims to improve access to health care by all Malawians. Given that the health system lacks adequate resources as evidenced above to efficiently provide the EHP.The study will also provide more information on the catastrophic nature of having to pay directly out of pocket in order to access health care and advice on the effect of cost on access to health care, burden of disease and poverty. Inform debate on the methodology used for poverty computations (gross expenditure a proxy for income inclusive of health expenditure). Finally, the study will also supplement on existing literature on health financing for policy and academia.

### 1.6 Organisation of the study

The rest of the paper is organized into five chapters. Chapter 1 has provided an introduction and justification for the study. Chapter 2 contains theoretical and empirical literature focusing on catastrophic expenditure and poverty. Chapter 3 outlines the

methodology used in this study. Chapter 4 presents the results and discussion and the final chapter gives conclusion, policy implications and areas for further research/limitation

# CHAPTER TWO

# LITERITURE REVIEW

## 2.0 Introduction

Two principal methods have been used to measure financial protection in health. Both relate a household's OOP spending to a threshold defined in terms of living standards in the absence of the spending. The first method defines spending as catastrophic if it exceeds a certain percentage of the living standards measure. The second method defines spending as impoverishing if it makes the difference between a household being above and below the poverty line (Wagstaff, 2008).This chapter provides an overview of the methods and issues arising in each case, and presents empirical work in the area of financial protection in health. The chapter also reviews the determinants of catastrophic health expenditure. The chapter is outlined as follows: Section 2.1 gives the theoretical literature of catastrophic and impoverishing effects of health expenditures, empirical literature is given in section 2.2 and the last section 2.3 concludes the chapter.

## 2.1 Theoretical Literature

### 2.1.1Catastrophic Health Expenditures

Xuet al.(2003)identified three preconditions for catastrophic health expenditure: expensive health care, poor population and the lack or the failure of health insurance to cover health expense. There are two common approaches to measure catastrophic expenditure. Van Doorslaer et al.(2007) argued that catastrophic health expenditure occurs when OOP on health exceed some fraction of household income or total

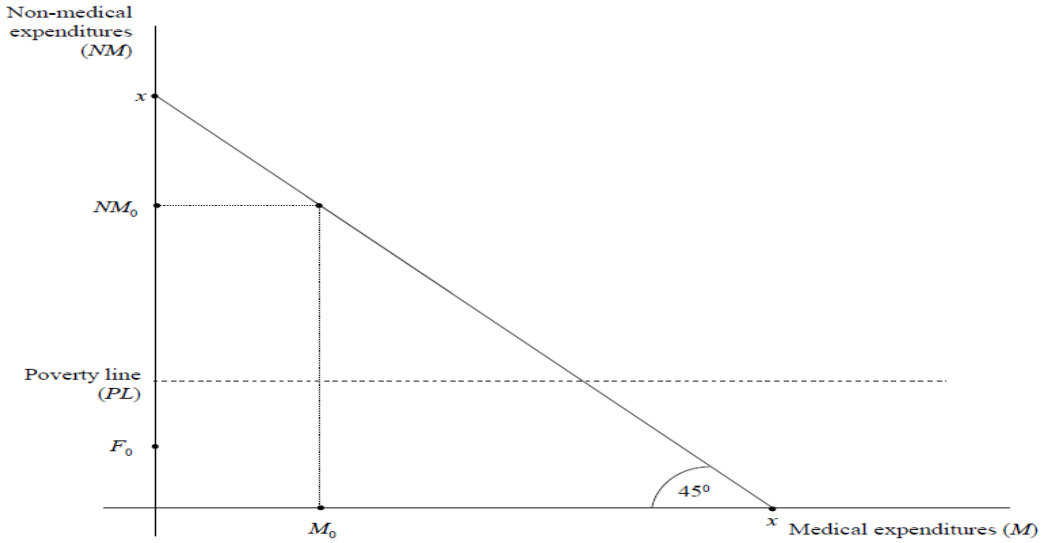
expenditure in a given period, usually within a year. An alternative definition was offered by Xu, et al. (2003), which stated that catastrophic health expenditure occurs when OOP on health exceed 40% of household's capacity to pay. They defined the household's capacity to pay as remaining income after basic subsistence needs have met.

Figure 4illustrates. The x-axis plots out-of-pocket spending on medical care (*M*) and the y-axis plots expenditure on other items such as food, housing, transport, etc, labeled non-medical spending (*NM*). The budget line is a 450 line—each dollar spent on medical care means one dollar less to spend on other things. It is this fact that underpins the concern over financial protection, the view being that medical care outlays are different from spending on other goods and services, being involuntary and the response to a unwanted health shock, and having an entirely negative effect on household welfare by depriving a household of resources that could have been spent on goods and servicesthat do contribute to welfare. In Figure 4,the household has an income equal to *x* (the intercept on both the x-axis and the y-axis), and spends $M_0$ on medical care and $NM_0$on other items. One approach is to define out-of-pocket medical spending as catastrophic ifit exceeds a certain amount in monetary terms (Waters,et.al., 2004).An alternative approach is to say spending is catastrophic if it exceeds some specified fraction of pre-payment income*x* (Wagstaff& van Doorslaer,2003), defined as the sum of observed medical outlays $M_0$ and observed non-medical spending$NM_0$. Alternatively the threshold could be defined in terms of pre-payment income less a deduction for food and perhaps other necessities too (Wagstaff & van Doorslaer, 2003): Xu, Evans, et al., 2003).

The idea is that by subtracting an expenditure on basic necessities one gets a better idea of the individual's ability to pay. One could deduct an individual's (or household's) actual food expenditure, labeled $F_0$in Figure 4. Or one could deduct an amount that represents society's view about the minimum acceptable level of expenditure on food (and perhaps other necessities) as reflected in a poverty line, labeled $PL$ in the figure. This latter approach is problematic when a household's pre-payment income falls short of the poverty line: in this case, the household's estimated 'ability to pay' is negative and it

falls below the catastrophe threshold automatically whatever its medical care outlays[2]. The precise fraction of pre-payment income (with or without some deduction for basic necessities) is, of course, arbitrary, and it makes sense to examine the sensitivity of one's results to the threshold chosen.

**Figure 4: Defining catastrophic expenditures**



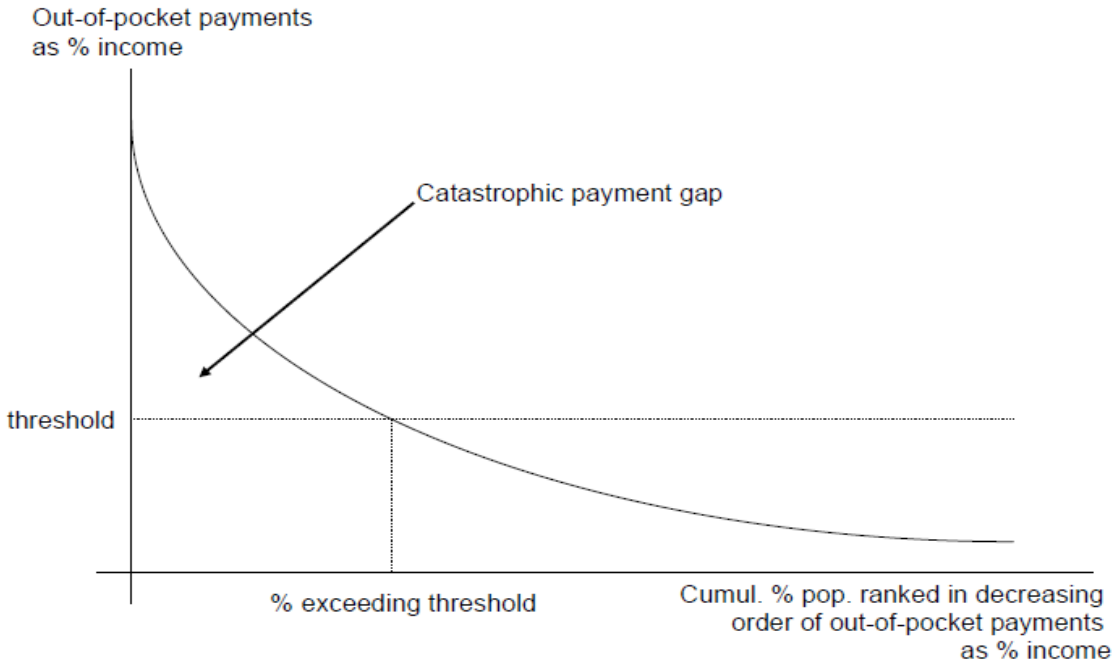

***Source: Adam Wagstaff (2008.)***

One might also want to move beyond counting the number of households who overshoot the threshold to capturing the amount by which they overshoot it, just as in the poverty literature one looks not just at the number of people in poverty but at the poverty gap; the depth below which people fall below the poverty line. The catastrophicpayment gapis simply the aggregate or average amount by which out-of-pocket spending exceeds the threshold (Wagstaff A & van Doorslaer E, 2003). Figure 5plots OOP payments as a share of income on the y-axis against the cumulative share of the population on the x-axis, ranked in decreasing order of out-of pocket payments as a share of income. By reading off the curve at the threshold one gets the catastrophic payment headcount the fraction whose payments exceed the threshold. The (aggregate) catastrophic payment gap

[2] Xu et al. use this approach. Their poverty line is just for food expenditures, which is subtracted apparently from nonmedical consumption (*NM*0) rather than pre-payment income (*x*). Ability to pay is defined as *NM*0-*PL* except for households for whom this is negative. In such cases, ability to pay is defined as *NM*0 less *actual* food expenditure. This leads to the rather unsatisfactory outcome that a household just below their poverty line could be judged to have the same ability to pay as one just above it.

is the area above the threshold line below the curve it shows the overall amount by which payments exceed the threshold in the sample.

**Figure 5: Catastrophic spending gap**



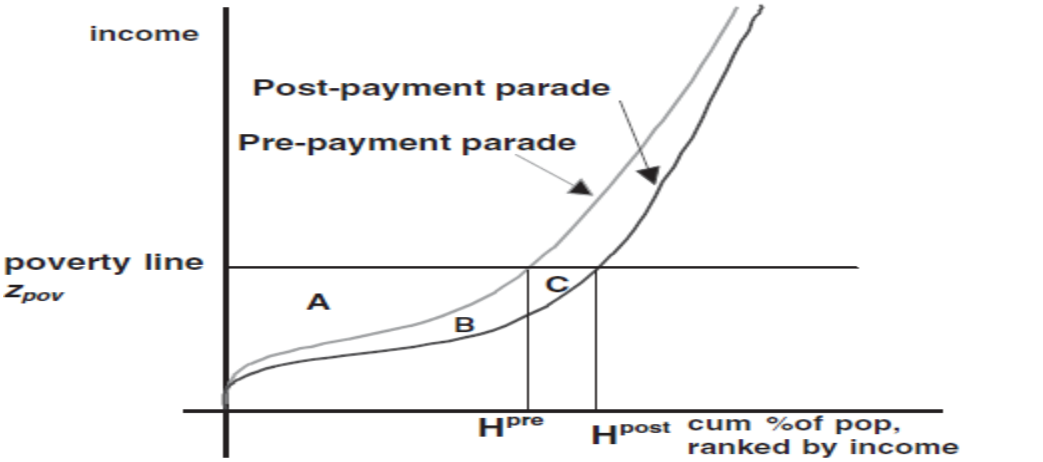

***Source: Wagstaff and van Doorslaer[6]***

### 2.1.2Impoverishing Health Expenditures

Impoverishment by OOP occurs when households who are considered to be non-poor (average consumption above the national poverty line) are pushed into poverty after payment for health care (average consumption after payment for health care is below the national poverty line).A difficulty with the "catastrophic" payment approach is that it is blind as to howfar 'catastrophic' payments actually cause hardship. One household might have spentmore than 25% of its pre-payment income on health and yet be nowhere near crossing thepoverty line as a result of the expenditure. Another might have spent just 1% of its prepaymentincome and yet have crossed the poverty line. An alternative perspective tocatastrophic health expenditures is that of impoverishment, the core idea being that noone ought to be pushed into poverty or further into poverty because of health careexpenses.

Figure 6 below provides a simple framework for examining the impact of OOP payments on the two basic measures of poverty; the headcount and the poverty gap. The figure is a variant on Pen's parade. The two parades plot income (before and after out-of-pocket payments) along the y-axis against the cumulative percentage of individuals ranked by pre-payment income along the x-axis. Reading off each parade at the poverty line gives the fraction of people living below poverty, while the area below the poverty line above each parade gives the poverty gap.

**Figure 6: Poverty impact on pen's parade – before and after out-of-pocket payments**

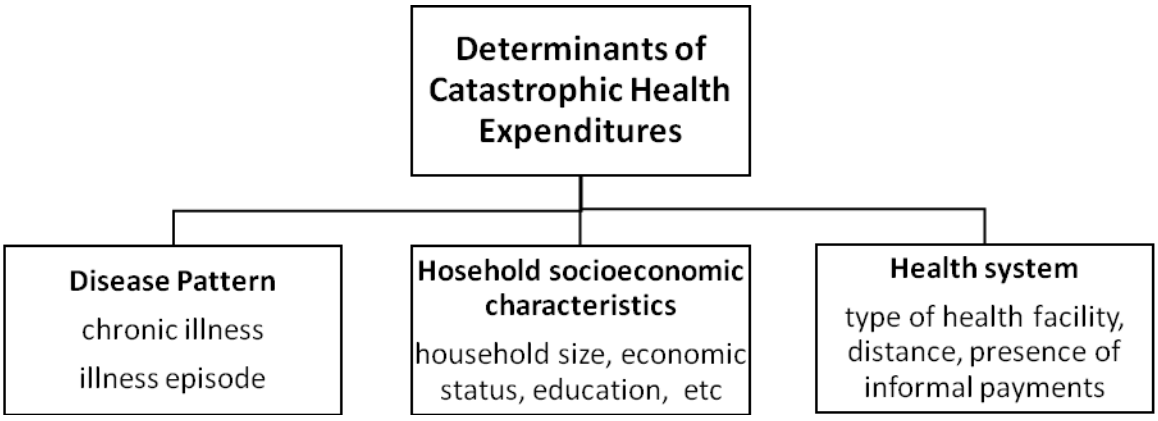



***Source: O'Donnell, van Doorslaer, Wagstaff & Lindelow (2007)***

### 2.1.3 Determinants of catastrophic expenditure: Conceptual Framework

There are different determinants of catastrophic health expenditures. According to Owen O'Donnell & van Doorslaer et.al. (2005) and studies done by Tin Su & Kouyate` et.al. (2006) the main factors that are likely to be associated with the risk of catastrophic health expenditures are related to the following: household and community characteristics, health system characteristics and patterns of illness all of which relates to demand for health care. Figure 7 below shows the different factors that influence an individual or household to incur catastrophic expenditures.

**Fig 7: Framework of catastrophic expenditures and its Main Determinants**




***Sources: generated by author based on the study by Xu et.al (2006)***

On the household socioeconomic characteristics other risk factors include: age composition of household members, employment status of the household head, sex of the head, and to a lesser extent the gender composition of the household.

## 2.2 Empirical Studies

### 2.2.1 Catastrophic expenditures: Empirical studies

A number of studies have been carried out to assess the prevalence of catastrophic health expenditures. This section discusses the findings in other countries. Since there are no studies on catastrophic health expenditures in Malawi, most of the empirical literature will be extracted from other countries both developed and developing countries.

Xu et al. (2007) have recently produced estimates for 89 countries covering 89% of the world's population, again using the 40% threshold. Their estimates range from 0% in the Czech Republic,Slovakia and the United Kingdom to more than 10% in Brazil and Vietnam. Several OECD countries; Portugal, Spain, Switzerland and the United States all record rates in excess of 0.5%.Van Doorslaer et al. (2007) look at catastrophic spending in 10 Asian territories. They find relatively low rates in Malaysia, Sri Lanka and Thailand, and relatively high rates in China, Vietnam and Bangladesh. This study also

looks at the distribution by pre-payment income of those experiencing catastrophic payments. For the most part, they find that catastrophic spending is concentrated among the better off, though this depends to some degree on the threshold chosen. Taiwan (China) is the exception: catastrophic spending is concentrated among the poor whatever the threshold. A different picture emerges in the study by Waters et al. (2004) of the United States: they find a higher incidence of catastrophic spending among poor families, as well as those with multiple chronic conditions.

A number of studies explore how policies and institutions impact on the incidence of catastrophic health spending. Xu et al. (2007) find that rates of catastrophic spending are higher in poorer countries and in countries with limited prepayment systems. In their most recent study[3], they find that (controlling for whether prepayment as a share of health spending exceeds 50%) whether a country operates a tax-financed financing system or a social health insurance system makes no difference to the incidence of catastrophic spending. Looking at their cross-country differences, Van Doorslaer et al. (2007) speculate that the low incidence of catastrophic spending in Sri Lanka, Malaysia and Thailand reflects the low reliance on OOP spending in financing health care and the limited use of user fees in the public sector. By contrast, the high rate of incidence in Korea is argued to reflect the high co-payments in that country's social insurance system and the partial coverage of inpatient care.

Several country-level studies conclude that insurance reduces the risk of catastrophic health spending. Gakidou et al. (2006) and Knaul et al. (2006) find that the introduction of the Popular Health Insurancescheme in Mexico from 2001 onwards led to a reduction in the incidence of catastrophic health expenditures. Limwattananon et al. (2007) find that rates of catastrophic spending in Thailand were lower after the universal health care scheme was introduced in 2001. Habicht et al. (2006) find that the risk of catastrophic spending in Estonia has increased during the late 1990s and early 2000s, and attribute this in part to rising co-payments (and hence a decrease in the depth of coverage) linked to a

[3]Xu K, Evans DB, Carrin G, Aguilar-Rivera AM, Musgrove P, et al. Protecting households from catastrophic health spending. *Health Aff (Millwood)*2007; 26(4)**:**972-83.

decline (in real terms) in government health spending, and in part to a graying of the population and the elderly having shallower coverage, especially for medicines.

Other studies point to the limitations of insurance to reduce and eliminate catastrophic spending. Wagstaff and Pradhan(2005) find that the introduction of a social health insurance scheme in Vietnam in 1993 reduced the incidence of catastrophic expenses, while Wagstaff (2007) finds that the subsequent extension of the scheme to the poor (financed through general revenues) also did so; however, the percentage reductions were estimated to be small, and high rates of catastrophic spending are observed even among those with insurance. One factor explaining these results is that insurance appears to have increased the utilization of services in Vietnam. Xu et al. (2006) find that rates of catastrophic OOP spending among the population as a whole fell in Uganda after the removal of user fees in 2001; however, the rate among the poor increased. They speculate that this was due to the frequent unavailability of drugs at government facilities after the removal of user fees which forced patients to buy drugs from private pharmacies, and that informal payments to health workers increased to offset lost revenues from fees. Devadasan et al. (2007) look at the effects of two community health insurance schemes in India on the risk of catastrophic OOP payments, and conclude that the schemes reduced the risk but only by half. They attribute the limited impact to benefit packages having low maximum limits, the exclusion of some conditions from the package, and the use of the private sector for some inpatient admissions.

Ekman (2007) finds that insurance increases the risk of catastrophic spending in Zambia. He suggests that the amount of care per illness episode may have increased, and that quality assurance and the oversight of service providers is important in determining how far insurance reduces the risk of catastrophic spending. Three recent studies from China reinforce these points. Wagstaff and Lindelow (2008) find that China's urban insurance scheme increasesthe risk of catastrophic OOP spending, and attribute the results in part to weak regulation of providers coupled with a fee-for-service payments system and a fee schedule that allows providers to make profits on drugs and high-tech care results in insured patients receiving more complex care and from higher-level (and hence more costly) providers. Wagstaff et al (2007) find that China's new rural insurance scheme

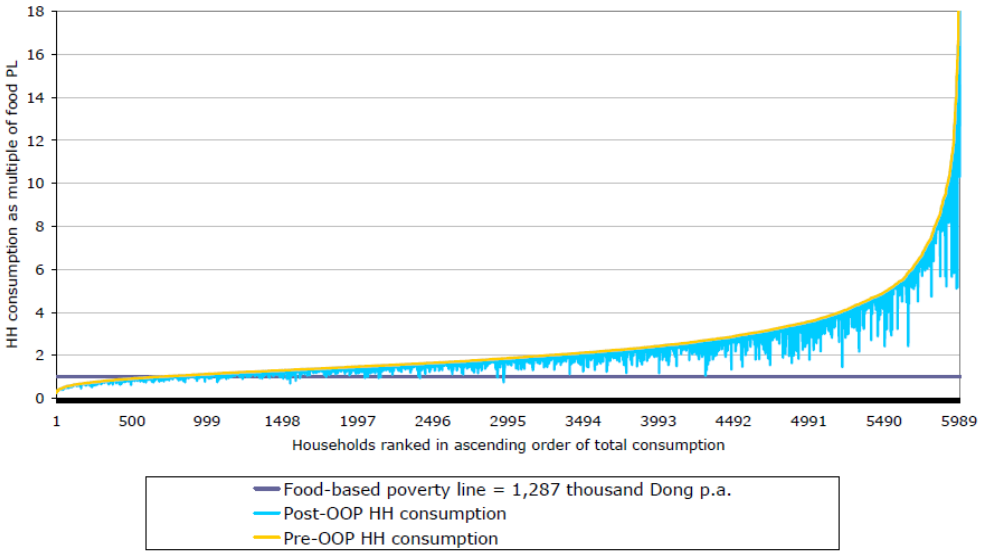
does not appear to have reduced the incidence of catastrophic health spending; they attribute this to the exclusions, high deductibles, low reimbursement ceilings, and similar supply responses to those seen in the urban setting. By contrast, Wagstaff and Yu (2007) find that supply-side interventions in rural China (including the introduction of treatment protocols and essential drug lists) didreduce the incidence of catastrophic health spending.

### 2.2.2 Impoverishing expenditures: Empirical studies

Like the case with catastrophic expenditures, there are no studies on the impact of household health expenditures on their welfare in Malawi and as such most studies under this section will also be extracted from other countries. Wagstaff and van Doorslaer (2003) assessed health care payments and poverty in Vietnam in 1993 and 1998. Figure 8shows their pre-payment income Pen parade for Vietnam in 1998. Also shown in this 'paint drip' chart are the OOP payments of the households in the chart, along with a food based poverty line. The difference between the pre-payment and post-payment povertyheadcount is around 3.5 percentage points, while the difference between the pre-payment and post-payment (normalized) poverty gaps isaround one percentage point. In 1993, the difference between the pre-payment and post payment poverty headcounts was 4.4 percentage points, so that the fall in the headcount is larger for post-payment income than for pre-payment income. This reflects the fall in the share of income absorbed by health spending over this period in Vietnam[4].

[4]Wagstaff A. Reflections on and alternatives to WHO's fairness of financial contribution index. *Health Econ* 2002; 11(2)**:**103-15.

**Figure 8: OOP payments and poverty, Vietnam 1998**




***Source: Wagstaff and van Doorslaer (2003).***

Results for rural China over the same period show a reduction in the difference between pre-payment and post-payment headcounts. However, Gustafsson and Li (2004) find the opposite result in their analysis of changes between 1988 and 1995: the poverty headcount fell by 2.2 percentage points at the dollar-a-day poverty line if health expenditures are not deducted from disposable income and by only 0.7% points if they are. This reflects the fact that the share of income spent on health care increased in rural China during the period 1988-95.A couple of studies have looked at trends before and after the introduction of a reform. Limwattananon et al. (2007) find that rates of impoverishment in Thailand were lower after the universal health care scheme was introduced in 2001, but not zero. They attribute the failure of the scheme to eliminate impoverishment from OOPexpenses to people bypassing their designated provider and hence making themselves unnecessarily liable for OOP payments and non-coverage of certain interventions including renal dialysis and chemotherapy.

Knaul et al. (2006)report that the difference between the pre-payment and post-payment poverty gap narrowed following the introduction of the Popular Health Insurance scheme in Mexico.Van Doorslaer et al. (2006) use data from 11 Asian countries to compare pre-payment and post-payment poverty headcounts and poverty gaps using the World Bank's

dollar-a day poverty line (as well as its $2-a-day poverty line). They find that the dollar-a-day poverty headcount is, on average, almost three percentage points higher after deducting OOP spending from household consumption. In Bangladesh and India, the difference is almost four percentage points. In Malaysia and Sri Lanka, by contrast, the difference is just 0.1 and 0.3 percentage points respectively.

Van Doorslaer et al. (2006) examined whether OOP on health exacerbate poverty in 11 countries in Asia. They obtained data on OOP from nationally representative surveys, and subtracted these OOP from total household income. Thereby calculating the poverty estimates (poverty headcount and poverty gap) after making OOP. They compared poverty estimates after making OOP to the conventional poverty estimates. They found that poverty estimates after paying for health care were much higher than the conventional estimates, ranging from an additional 1.2% in Vietnam to 3.8% in Bangladesh (Doorslaer, et al., 2006). They concluded that OOP are likely to inflate the extent of poverty. Therefore, poverty alleviation policies should take OOP into account.

### 2.2.3 Determinants of Catastrophic health Expenditures: Empirical studies

No clear pattern of the socioeconomic distribution of health expenditure within developing countries has been found in the existing literature. For example, Makinen et al. (2000) reviewed household survey data from eight developing countries and countries in transition and found that there was no distinctive pattern in health expenditure as a proportion of income by income quintiles. In Burkina Faso, Paraguay and Thailand, regressive trends were found (i.e. the wealthier quintiles spend a lower percentage of their total consumption on health care than poorer quintiles), whereas in Guatemala and South Africa, progressive trends were identified. Moreover, wealthier households were found to be more likely to seek health care when they need it than poorer households, which may reflect concerns regarding its affordability amongst the poor.

In a similar vein, Xu et al. (2003) used household survey data from 59 countries to investigate the levels and determinants of catastrophic health expenditure. The findings indicated different patterns of catastrophic health expenditure across countries. In

countries with advanced social protection systems such as Canada, the Czech Republic, Denmark, the UK, Germany and France, the proportion of households incurring catastrophic health expenditure was less than 0.1%. Catastrophic health expenditure was found to be common in some countries in transition, middleincome countries, in certain Latin American countries and several low-income countries with over 10% in Vietnam and Brazil. Lower income groups were generally found to be more likely to incur catastrophic health expenditure as compared to higher income groups. However, the highest rate of catastrophic health expenditure was not observed in the lowest income group, which may again reflect issues regarding the affordability of health care.

With respect to the factors that are likely to be associated with the risk of catastrophichealth expenditure, in general, catastrophic health expenditure is associated with poverty or low income, unemployment, low levels of insurance coverage and having disabled, chronically ill or aging household members. Wyszewianski (1986), for example, found that ageing, unemployment and poverty were the most important risk factors in the U.S. for incurring catastrophic health expenditure. Similarly, Berki (1986) stated that poverty and nothaving health insurance coverage were among the risk factors associated with catastrophic expenditure on health care. O'Donnell and Doorslaer (2005) investigated sources of variation in the incidence of catastrophic expenditure on health care across six Asian countries using household surveys. They found that having a highly educated household head, insurance coverage and living in an urban area were all inversely associated with the probability of incurring catastrophic health expenditure.

The relationship between health insurance and its effect OOP health expenditure is a widely discussed issue in the existing literature (e.g. Sepehri et al. 2006). Although it is expected that insurance coverage provides financial protection from catastrophic health expenditure, it is also possible for health insurance to create demand inducement, which may result in high levels of OOP health expenditure (Wagstaff and Lindelow, 2008). As Kawabata et al. (2002) argue, under insurance coverage, catastrophic health expenditure may not simply go away if the benefit package does not cover all of the health expenditure.

## 2.3 Conclusion

From the literature reviewed above, it has been shown that OOP expenditures can be catastrophic and may push households into poverty and it could also be observed that there are many factors that are argued to be the determinants of catastrophic health expenditures in general. The choice however of which variables would be used in the present study was dependent on the data availability. Nevertheless most of the important micro determinants of catastrophic health expenditures are household socioeconomic characteristics and illness patterns of a household were analyzed.

# CHAPTER THREE

# METHODOLOGY

## 3.0 Introduction

This chapter discusses the modeling framework used in the study. In the paper a catastrophic payment is defined based on a household's capacity to pay (Russell, 1996: WHO, 2000). The estimation of a household's capacity to pay or non-subsistence income requires data on total household expenditure (or income) and subsistence expenditure. Although both income and expenditure were reported in Intergraded Household Survey, reported consumption expenditure is used to measure a household's capacity to pay. Also, it is used to define whether a family faced a catastrophic expenditure. Therefore, expenditure quintiles rather than income quintiles are used. Such a choice can be explained by at least two different reasons. On the one hand, the variance of current expenditure over time is smaller than the variance of current income. Income data reflect random shocks, and expenditure data better reflect the notion of effective income. On the other hand, expenditure data are more reliable than income data in most household surveys. That is particularly true in developing countries, where the informal sector is typically large and survey respondents may not wish to reveal their true income for various reasons (Xu, K. et al., 2003; Deaton, 1992).The study used household non-food expenditure as a proxy for capacity to pay

Catastrophic health expenditure is defined at four threshold levels, 10%, 20%, 30% and 40% of capacity to pay, where the choice of these threshold levels is based on the existing literature, allowing us to provide a comprehensive picture of catastrophic health expenditure and to explore the sensitivity of the results. The methods adopted are those proposed by Wagstaff and Doorslaer (2003) in their investigation of changes in Vietnam over the period 1993-98. Additionally, a logit model is also used to identify the

determinants of catastrophic health expenditure. The chapter is outlined as follows: first presented under section 3.1 is the analytical framework, then explanatory variables and their justification for inclusion are provided in section 3.2 and finally the last section 3.3 discusses the data and the sample size in the study

## 3.1 Analytical Framework

### 3.1.1Extent of Catastrophic Expenditures

Let $R_i$ be the share of health care expenditure in non-food expenditure for household $i$ and $Z$ be the threshold beyond which household $i$ incurs catastrophic expenditure.

$$R_i = \frac{H_{percapitaexp}}{NF_{percapitaexp}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

Where $H_{percapitaexp}$ is the health expenditure per capita of household $i$ and $NF_{percapitaexp}$ is the nonfood per capita expenditure of household $i$ . Then household $i$ is said to have incurred catastrophic expenditure if $R_i > Z$. If we define an indicator $E_i$ as 1 if $R_i$>Z and 0 otherwise. Then an estimate of the head count is given by:

$$HC = \frac{1}{N}\sum_{i=1}^{N} \mathrm{E}i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

Where $HC$ is the catastrophic head count, $N$ is the sample size. $HC$ estimates the share of individuals in the total population whose health care costs, expressed as a proportion of income, exceeds a given discretionary fraction of their income $Z$. However, it does not measure the amount by which these payments exceed the chosen threshold. To do that we estimate the average overshoot;

Which is given as follows:

$$O = \frac{1}{N}\sum_{i=1}^{N} O_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3$$

The catastrophic payment overshoot gives the average amount by which payments, as a proportion of income, exceed the threshold $Z$. Where $O_i$ is the amount by which household $i$ share of health expenditure in non-food expenditure exceeds the chosen threshold and is estimated as follows:

$$O_i = E_i(R_i - Z) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 4$$

The incidence and intensity of the occurrence are related through the mean positive gap (MPG)which is defined as the gap over the headcount as follows:

$$MPG = \frac{O}{HC} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 5$$

The $MPG$ measures payments in excess of the threshold average over all households. We can write:

$$O = HC\ X\ MPG \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 6$$

Making clear that the mean overshoot is increasing with both the incidence and the intensity of catastrophic payments.

### 3.1.2 Impoverishment and Poverty Measures

An alternative perspective of the impact household expenditure on health is that of impoverishment, the core idea being that no one ought to be pushed into poverty or further into poverty because of health care expenses. This position is evident in the discussions in the World Bank's 2000/2001 and in its Voices of the Poor consultative exercise. The conventional methodology of measuring poverty defines a poverty line expressed in monetary values. Households in poverty are those whose level of expenditure is below the poverty line (The World Bank, 2011). Additionally, the normalized poverty gap is commonly used to reflect the intensity of poverty. It estimates the amount to which households fall below the poverty line as a percentage of that line(Doorslaer, et al., 2006).

A household is impoverished by OOP when its total spending falls below the poverty line after paying for health care. Therefore, the difference in the poverty headcounts before and after OOP for health reflects the poverty impact of OOP for health or what is called the impoverishment impact.

Let $X_i$ be the per capita total expenditure of individual $i$ and $PL$ the national poverty line. Then individual $i$ is said to be poor if $X_i < PL$.

The thesis explores the impact of OOP for health on the poverty head count, poverty gap and normalized poverty gap. The poverty measures are calculated before and after accounting for OOP health expenditures. The differences reflect the impact of OOP on poverty estimates and intensity.

The measures of poverty impact of OOP expenditures are therefore defined as follows;

$$PI^H = HC^{net} - HC^{gross} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 7$$

$$PI^G = Gap^{net} - Gap^{gross} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 8$$

$$PI^{NGap} = NGap^{net} - NGap^{gross} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 9$$

Where $PI^H$ measures the impact on the poverty head count, $PI^G$ measures the impact on the poverty gap and finally $PI^{NGap}$ measures the impact on the normalized poverty gap.

Conventional poverty measures[5] before OOP deduction are calculated as follows:

$$P_\alpha = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{PL - X_i}{PL}\right)^\alpha \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 10$$

Where $n$ is the number of households in the sample, $\alpha$ is some non-negative parameter, $PL$ is the poverty line, $X$ denotes consumption per capita , $i$ represents individuals, and $q$ is the number of individuals with consumption below the poverty line.

[5] See NSO (2011) for a detailed explanation about the estimation of the poverty measures.

The headcount (HC) index ($\alpha = 0$) gives the share of the poor in the total population, i.e., it measures the percentage of population whose consumption is below the poverty line. This is the most widely used poverty measure mainly because it is very simple to understand and easy to interpret. However, it has some limitations. It takes into account either how close or far the consumption levels of the poor are with respect to the poverty line nor the distribution among the poor.

The poverty gap ($\alpha = 1$) is the average consumption shortfall of the population relative to the poverty line. Since the greater the shortfall, the higher the gap, this measure overcomes the first limitation of the headcount. Finally, the severity of poverty or the normalized poverty gap ($\alpha = 2$) is sensitive to the distribution of consumption among the poor, a transfer from a poor person to somebody less poor may leave unaffected the headcount or the poverty gap but will increase this measure. The larger the poverty gap is, the higher the weight it carries.

The net of health payments poverty measures are given by replacing $X_i$ with $K_i = X_i - H_{percapitaexp}$ in equation 10. $K_i$ is the consumption per capita net of health payments.

### 3.1.3 Determinants of Catastrophic Health Expenditure

Reporting the scale of the catastrophic medical expenditures that households are exposed to and those actually incurred is important. However, this gives less evidence on the sources of variation in the incidence of catastrophic payments. It is important to know whether it is the rich or the poor, the old or the young, large households or small households, urban or rural dwellers, that are most likely to incur such expenditures. Identification of the sources of variation in the incidence of catastrophic payments tells us which groups are most in need of protection against catastrophic risks. It also helps formulate the appropriate policy response to evidence of catastrophic payments. For example, a greater likelihood of catastrophic payments among rural households suggests

that this population has the greatest need for the development of risk pooling mechanisms of health financing.

Given the dichotomous nature of the dependent variable catastrophic expenditure, a logit regression model[6] is used to investigate the determinants of catastrophic health expenditures. This model is adopted from WHO report (Xu, 2005).

The analysis unit for considering catastrophic expenditure is the household. The dependent variable $E$ is defined as 1 where a household incurred catastrophic expenditure, and 0 otherwise. The probability of a household facing catastrophic expenditure is$\Pr[E=1|X]$whereas $\Pr(E=0|X)$ is the probability of a household not facing catastrophic expenditure. The odds ratio $(OR)$ is therefore given as follows:

$$OR = \frac{\Pr(E=1|X)}{\Pr(E=0|X)} \quad \text{.....11}$$

$$OR = \frac{\Pr(E=1|X)}{1-\Pr(E=1|X)} \quad \text{.....12}$$

Where $X$ is a vector of explanatory variables, after logit transformation, the linear model can be written as:

$$Y = ln\left[\frac{\Pr(E=1|X)}{1-\Pr(E=1|X)}\right] = X\beta \quad \text{.....13}$$

Where $Y$ measures the log odds ratio or the total probability or the total effect of the determinants on catastrophic expenditures, $\beta$ a vector of parameters and measures the marginal contribution of each variable. The variables are grouped in these categories: household characteristics (age household head, sex of the household head, schooling years, children under five years, aged members above 60 years, household size), Economic Variables (Expenditure quintile (dummy variable with several categories), household head works/not), health variables (presence of a chronically ill member, number of illness episode in the family and distance to the nearest health facility) and Residence (rural/urban).

[6]See Greene (2003) 5th edition

### 3.1.4 Explanatory Variables: Apriori sign and Justification for inclusion

Table 1 below provides a summary of the expected signs of the independent variables included in the logit model.

**Table 1: Expected signs of independent variables in the logit equations**

| Variable | Measure | Expected sign (+, -,?) |
|---|---|---|
| Expenditure | Quintile | ? |
| Household size | Number of people | + |
| Distance from facility | Kilometres | + |
| Schooling years/ household | Number of years | - |
| Chronically ill member | Yes/No | + |
| illness episodes | Number of attacks | + |
| Age of household head | Years | + |
| Hh head employment status | Employed/unemployed | - |
| Residence | Rural/Urban | ? |
| Children less than 5yrs old | Number of children | + |
| Adults more than 64yrs old | Number of Adults | + |
| Sex of the hh head | Male/female | - |

### 3.1.5 Justification for the inclusion and the expected sign

***Residence*** is place of residence and intends to capture the effect that rural/urban residence has on catastrophic health expenditures.It is captured as dummy and assumes a value of 1 if urban and 0 otherwise.Location is relevant to expenditures on health care. While proximity to health services may raise utilisation of health care in urban areas, travel costs will raise expenditures in rural areas although such expenses are often not recorded in the data. Lack of health services in rural areas increases reliance on medicines, which usually must be paid for. Location also reflects living conditions that impact on medical expenditures through health. With this it is difficult to know apriori the sign of residence in relation to catastrophic expenditures.

***Sexhead*** is the sex of the household head. It is captured as a dummy and assumes a value of 1 if Male and 0 female. This is included in order to assess the gender inequalities of financial burden in accessing health care. Women often feel the impact of ill health more than men. Female-headed households especially are pushed further into poverty after

accessing care. This has to do with the issue of capacity to pay. So female headed households are more likely to incur catastrophic expenditures than male headed households holding other factors constant.

***Employstatus***is a dummy variable capturing the employment status of household head. It takes the value of 1 if he/she works and 0 otherwise. This is expected to have negative sign holding other factors constant because people with permanent jobs are likely to have stable and predictable income sources hence can manage to pay more for health care without encountering catastrophic expenditure than those with temporary jobs or not working at all whose income is unpredictable.

***Schooling years***captures the education status of household members.As Michael Grossman (1972) explained, education is a factor that affects the demand for health care, as more-educated households may be more efficient in maintaining health and make more effective use of health care and preventive services (Hence, the Maximum number of school years per household may be a proxy indicator reflecting the effect of health care use in maintaining households' health) hence reduce the likelihood of incurring catastrophic expenditure, assuming other factors are constant.

***Expenditure quintile***is household consumption expenditure quintile and is a dummy variable divided in five categories. This variable is used to measure the economic status of the household. Household consumption is preferred as a proxy of the economic status because in countries like Malawi it is easy to measure as most of the people are engaged in the informal sector. While health determines exposure to risks, income determines health expenditures actually incurred. The poor must devote a large fraction of their limited budgets to food and shelter, possibly leaving little to spend on medicine. They may be forced to absorb illness shocks by forgoing treatment, possibly with long-term consequences for health and earnings.

No clear pattern of the socioeconomic distribution of health expenditure within developing countries has been found in the existing literature. For example, Makinen et al. (2000) reviewed household survey data from eight developing countries and countries

in transition and found that there was no distinctive pattern in health expenditure as a proportion of income by income quintiles. In Burkina Faso, Paraguay and Thailand, regressive trends were found (i.e. the wealthier quintiles spend a lower percentage of their total consumption on health care than poorer quintiles), whereas in Guatemala and South Africa, progressive trends were identified. Moreover, wealthier households were found to be more likely to seek health care when they need it than poorer households, which may reflect concerns regarding its affordability amongst the poor. As such it is difficult to say apriori the sign of this variable.

***Chronicdisease*** is a dummy variable capturing chronic illnesses in the household. It takes the value of 1 if at least one of the household member has chronic illness and 0 otherwise. For individuals with a chronic illnesses, high out of pocket expenditures can be burdensome[7]. By definition, chronic illnesses are long-term conditions, and they often require frequent monitoring, ongoing treatment and use of medications, and hospitalization to deal with acute flare-ups of symptoms. Thus the presence of a chronically ill member in a household implies more and regular expenses for the drugs and hospital treatment. Total expenditures for the care of chronic illness are high and persist over time(B. G. Druss et al., 2002).Therefore, it is expected to have a positive sign

***Illenessepi*** is an ordinal variable capturing the number of illness attacks in a household. It is expected to have a positive sign as those who encountered more than one illness episode are likely to have sort health care services a lot of times than those with none or a few illness attacks. This in turn increases their risk of incurring catastrophic expenditures and it is also based on the finding by Okoto (2003).

***Distance***is a continuous variable measured in kilometres. This measures the distance to the nearest health service provider. It is expected to have a positive sign as the longer the distance to a health facility the more costs a household has to incur to access health care hence the probability of catastrophic expenditure increases.

***Hhsize*** is a continuous variable which captures the size of the household. Household size is a possible determinant of catastrophic payments. If economies of scale in the

[7]See W. Hwang, W. Weller, H. Ireys et al., "Out-of-Pocket Medical Spending for Care of Chronic Conditions," *Health Affairs,* Nov./Dec. 2001 20(6):267–78.

consumption of medical care are limited relative to those of other items, then the household budget share devoted to health care should rise with household size. A household can get by with one cooker whether there are 2 or 10 household members but two sick individuals need twice as many pills as one. Further, the risk that someone in the household will contract illness increases with the size of the household and if illness probabilities are dependent, due to contagious disease for example, the proportion of a household that is sick will be greater for larger households. For these reasons, one would expect the probability of catastrophic payments to be a positive function of household size. On the other hand, larger households have a larger supply of informal carers that can substitute for formal medical care and so constrain health costs.

***Age head***is a continuous variable capturing the age of the household head in years. This is expected to positively correlate with catastrophic expenditure because aged people are more prone to diseases and the older the head of the household, the lower the productivity. This in turn affects household income, which reduces the capacity to pay thereby increasing the probability of a household to incur catastrophic expenditure.

***Children<5yrs*** refers to the number of children less than 5years old and it is continuous variable. We are expecting a positive relationship between this variable and catastrophic expenditure. This is because children in this age group are prone to various diseases like malaria, diarrheal, pneumonia and nutritional deficiencies and as such a household with more children under the age of 5 is more likely to encounter catastrophic expenditure than a house with none or fewer under 5 children.

***Adults >60yrs***refers to the number of Adults more than 60years old and it is a continuous variable. Aged individuals just like children under the age of 5 years are more vulnerable to sickness attacks and so they are more likely to demand more health care. When other factors are held constant, it can be concluded that the higher the number of aged members in a household, the higher the risk of incurring catastrophic expenditures.

### 3.1.6Diagnostic Test

Another important issue is the examination of the robustness and reliability of the regression results. Diagnostic tests are therefore used to check any possible problems that may make our analysis less meaningful. One such important test is to examine how well the model fits the data.In maximum likelihood estimation, there are basically three classical test statistics, namely the likelihood ratio, the Lagrange multiplier and the Wald principles. All these statistics have the same distribution asymptotically.

Under the null hypothesis, if there are r restrictions, they are distributed as $\chi^2(r)$. In the present study, we will employ the Wald statistic test, which is conceptually the simplest of the three.

## 3.2 Data and Sample

The raw data used in thiswork comes from the third round of the integrated household survey (IHS3) conducted by the national statistics office from March 2010 to March 2011. The survey was a cross sectional design with a nationally representative sample of 12271 households. The sample was drawn using a two-stage stratified random sampling procedure from a sample frame using the 2008 Malawi Population and Housing Census. This dataset has extensiveinformation on household socio-economic characteristics including geographic anddemographic data and a health module. The thesis uses IHS3 because it is the latest national representative survey. Our study used the household as the unit of analysis.

## 3.3 Conclusion

This chapter outlined the methodology that is used in the study. It has presented the analytical framework and also the derivation of the logit model and how it is employed. Furthermore, the specification of the model as well as the definition and justification of the variables used in the logit have been discussed. The chapter further presented the diagnostic test conducted in the study.

# CHAPTER FOUR

# RESULTS AND INTERPRETATION

## 4.0 Introduction

This chapter presents and interprets the results of the study. The first section of this chapter presents socioeconomic and demographic profile of households that were sampled in the study. The second section provides the extent of catastrophic health expenditure and impoverishment while the third section presents the logit modeleconometric results.

## 4.1 Demographic and Socioeconomic Profile

This section provides the descriptive statistics of the households that incurred catastrophic health expenditures. Of the 12271 households in the survey, 1502 households incurred catastrophic health expenditures. The demographic profile provides the age of the household members and household size whereas the economic profiles divides households into quintiles according to their total annual per capita expenditure. Additionally, it describes the factors that are associated with high health care utilization. The information presented in this profile will help in better understanding of the study results.

The study suggests that almost 90% of the households that were surveyed live in rural areas. With respect to household characteristics the average household size is about 4 members. Slightly over half of the households, have children less than five years old while nearly 21%of households have at least one aged member. Nearly 70% of the households have members with atleast primary education and only 0.60% of the

households had members gone to university whereas nearly 3% of the households had members who had gone to a training college(see table 2 below).

**Table 2: Households Composition by Residence, Size, Age and Education attainment**

| Household | Frequency | Percentage |
|---|---|---|
| **Residence** | | |
| Urban | 188 | 12.52 |
| Rural | 1314 | 87.48 |
| **Household Size** | | |
| 1 | 123 | 8.19 |
| 2 | 182 | 12.12 |
| 3 | 289 | 19.24 |
| 4 | 269 | 17.91 |
| 5 | 212 | 14.11 |
| 6 | 184 | 12.25 |
| 7+ | 243 | 16.18 |
| **Household age Composition** | | |
| Households with Children (less than 5 yrs) | 782 | 52.06 |
| Households with aged member (more than 60yrs) | 315 | 20.97 |
| **Schooling yrs per household** | | |
| 0-8yrs (Primary education) | 1015 | 67.57 |
| 9- 14yrs (sec education) | 443 | 29.49 |
| 15-19 yrs (University) | 9 | 0.60 |
| 20-23yrs (Training College) | 35 | 2. 94 |

The analysis also shows that majority of households are headed by males and over 80% of household heads are unemployed(See Table 3).

**Table 3: Household heads by sex, Employment status and Education level per household**

| Household Headship | Frequency | Percentage |
|---|---|---|
| **Sex** | | |
| Male | 997 | 66.38 |
| Female | 505 | 33.62 |
| **Employment Status** | | |
| Employed | 247 | 16.44 |
| Unemployed | 1255 | 83.56 |

### 4.1.1 Expenditure Quintiles

The expenditure quintile is constructed based on the per capita annual consumption expenditure per household.The data indicate that the average per capita annual consumption expenditure was MK 59, 699.80 (US$136.93)of whichalmost60%was spent on food. There are significant differences in the mean values of per capita consumption expenditure across quintiles. The average household expenditure of the richest quintile is nearly nine times of the poorest quintile. The average expenditure of the middle quintile is almost 32% higher than the second quintile whereas the average expenditure of the fourth quintile is 34% higher than the middle quintile (see Table 4).

**Table 4:Expenditure Quintiles**

| Quintiles | N | % | Average annual per capita consumption expenditure |
|---|---|---|---|
| Poorest | 264 | 17.58 | 17160.34 |
| Second | 333 | 22.17 | 29140.16 |
| Middle | 315 | 20.97 | 42833.15 |
| Fourth | 324 | 21.57 | 64973.40 |
| Richest | 266 | 17.71153726.58 | |
| Total | 1502 | 100.00 | 59699.80 |

The descriptive data analysis suggests more than 40% of rural households are in the poorest two quintiles while only 14% of rural households are in the richest quintile. Whereas, 68% of the urban households reside in the urban areas. This suggests that urban households represent the majority of the richest quintile. The proportion of rural households declines steadily across expenditure quintiles while the proportion of urban households increases progressively across expenditure quintiles (See Table 5).

**Table 5: Expenditure Quintile by residence**

| **Quintiles** | **Urban** | | **Rural** | |
|---|---|---|---|---|
| N | % | N | % | |
| Poorest | 8 | 4256 | 19 | |
| Second | 19 | 10314 | 24 | |
| Middle | 3318 | 28222 | | |
| Fourth | 41 | 2228 | 121 | |
| Richest | 87 | 46 | 17914 | |
| Total | 188 | 100 | 1314 | 100 |

### 4.1.2 Health Utilization and Health Expenditure

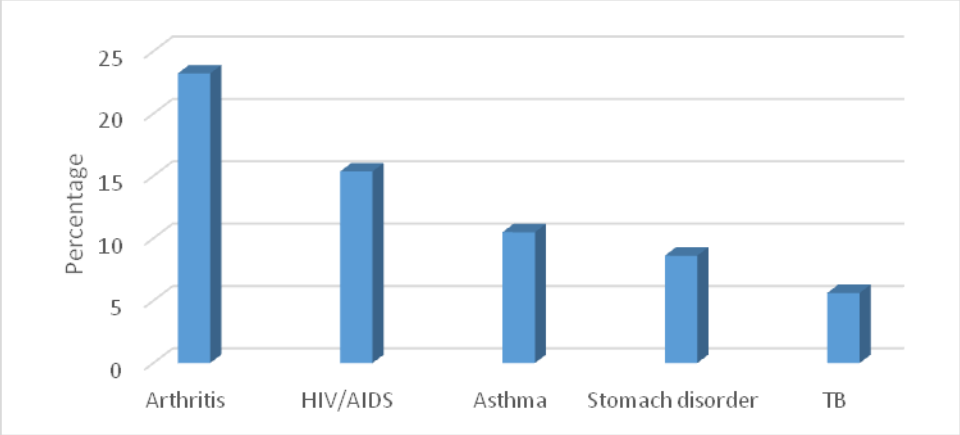
This section provides a descriptive analysis of factors that are associated with health care service utilization. The data suggests that all of the households used in the study had atleast one illness episode and the average number of illness episodeswas 1.8 per household. Households with children under five years are likely to utilize health care service frequently (Cavagnero, Xu, & Rivera, 2006) so are households with aged member(s). The proportion of households with children under five years declines steeply across quintiles. This suggests a positive correlation between household size and economic status of the household. Based on the table below, the proportion of households with aged member does vary across expenditure quintiles; the first three quintiles have a relatively larger proportion of households with an aged member than the last two quintiles.Chronic illness is one of the key determinants of health care utilization. Ironically, the descriptive analysis suggests that chronic illness is less common among poor households than rich households. The proportion of households with chronic sickness rises significantly across expenditure quintiles(Table 6).

**Table 6: Households with children, aged, chronic sick member by Expenditure Quintiles**

| Quintiles | Poorest | Second | Middle | Fourth | Richest |
|---|---|---|---|---|---|
| N | 264 | 333 | 315 | 324 | 266 |
| Households with Children less than 5yrs (%) | 70.5 | 62.2 | 50.2 | 46 | 30.8 |
| Households with aged member (%) | 27.7 | 31.8 | 31.4 | 23.8 | 21.1 |
| Households with chronic sick member (%) | 15.9 | 18 | 16.2 | 21 | 17.3 |

The data indicate that in general almost 18% of households have at least one chronic sick member. Arthritis is the most common followed by HIV/Aids (See figure 9).

**Figure 9- Distribution of Chronic Diseases by type**



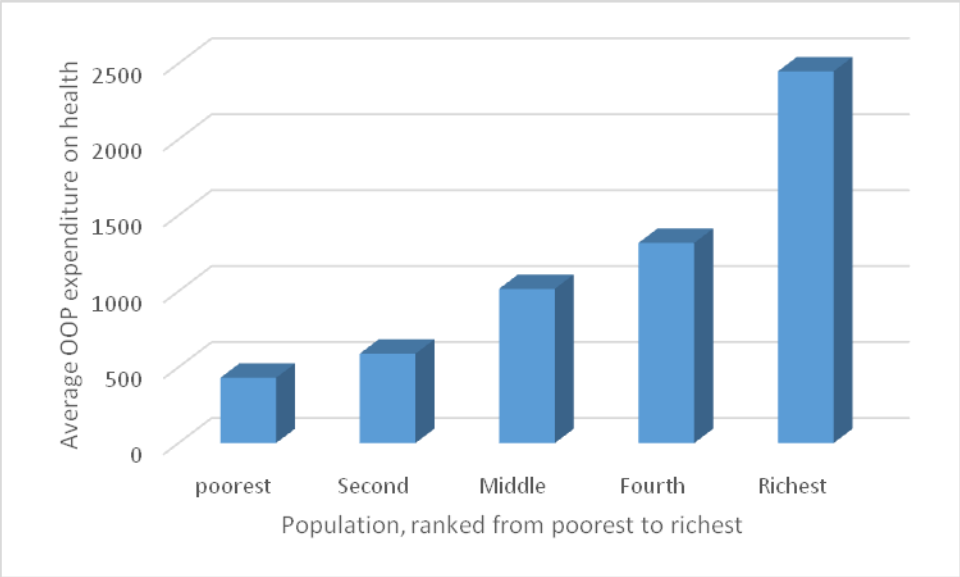

***Source: Author based on NSO (2011) data***

### 4.1.3 Distribution of OOP Health Payments

The Figure below depicts the distribution of OOP expenditures on health across expenditure quintiles. The data shows that on average the poorest two quintiles spend MK500-MK600 per

person on health while the richest quintile spends almost is MK2500 per person on health. Also the richest quintile spends five times the poorest quintile on health care.

**Figure 10: OOP payments by expenditure quintile**




***Source: Author based on NSO(2011) data***

### 4.2 Catastrophic Health Expenditures

Table 7below presents measures of the incidence and intensity of catastrophic health expenditures in Malawi.Data analysis suggests that OOP drive 0.73%-9.37% of households in Malawi to encounter catastrophic health expenditures as we decrease the threshold from 40%-10%. And as we increase the threshold from 10%-40% the mean overshoot drops from 1.01 percent of expenditure to only 0.08 percent. Unlike the head count and the overshoot, the mean overshoot among those exceeding the threshold (MPO) need not decline as the threshold is raised. Those spending more than 10 percent of non- food expenditure, on average spent 20.76% (10% + 10.76%) on health care whereas those spending more than 40 percent of the non-food expenditure, on average spent 51.63% on health care.

In general, both the incidence and intensity are higher at lower thresholds and, in all cases, as thresholds increase, the MPG increases. Much of the increase in the MPG is due to a modest decline in the mean gap, relative to the headcount as the threshold is raised.

The interpretation is that the 'catastrophic' effect of health costs manifests itself more as an increase in poverty incidence than a deepening of poverty among those who are already poor.

***Table 7: Incidence & Intensity of Catastrophic Health Payments in Malawi***

*Incidence and Intensity of Catastrophic Health Payments, Malawi 2011Defined with Respect to Nonfood Expenditure, Various Thresholds*

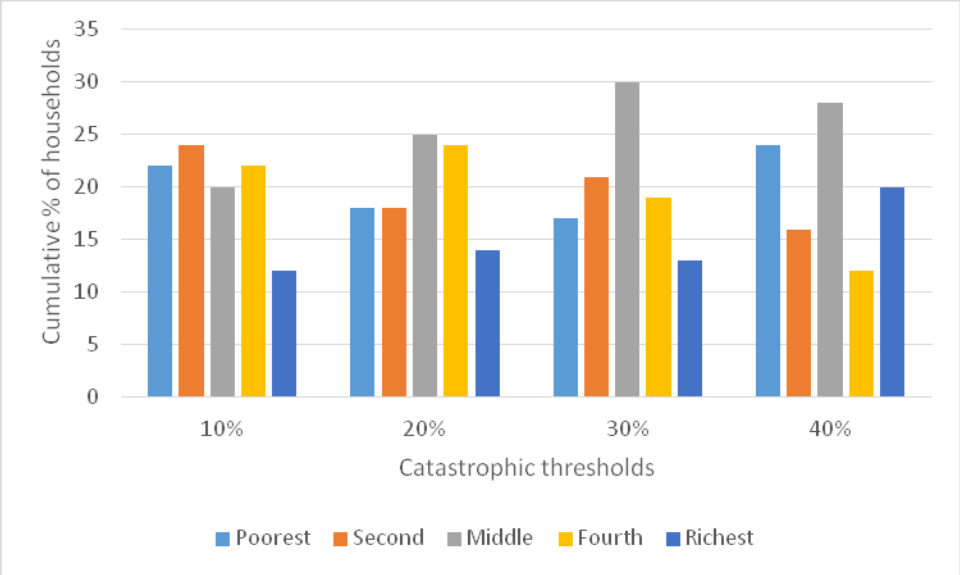
| *Catastrophic payments measures* | *Threshold budget share, z* | | | |
|---|---|---|---|---|
| *OOP health spending as share of non-food expenditure* | *10%* | *20%* | *30%* | *40%* |
| Head Count (H) | 9.37% | 3.41% | 1.61% | 0.73% |
| Standard Error | 0.26% | 0.16% | 0.11% | 0.08% |
| Overshoot (O) | 1.01% | 0.43% | 0.20% | 0.08% |
| Standard Error | 0.04% | 0.03% | 0.02% | 0.01% |
| Mean Positive Overshoot (MPO) | 10.76% | 12.64% | 12.15% | 11.63% |

Analysing incidence of catastrophic expenditures across expenditure quintiles, it is shown that the first three quintiles have the highest proportion of the catastrophic health expenditures whereas as the last two have the lowest proportion across all thresholds (figure 11 below). From the graph we can see that there is a relationship between the extent of catastrophic health expenditure within each quintile and the ranking of the quintile in general, as households in the first three poorest quintiles are more likely to encounter catastrophic health expenditure compared to the other two quintiles. However of all the quintiles, households in the middle quintile are the ones experiencing more catastrophe due to health care in almost all thresholds. This could be because households belonging to the first two quintiles have the lowest capacity to pay for health care and so may choose to sacrifice health care and also that most choose to use the public health system.

This negative influence ofhealth systems on households that can lead to impoverishment has long been ignored on the healthpolicyagenda in Malawi. The results in this study are

consistent with earlierstudies, in which poor households were less able to cope with any given level of health expenditure than richer households[8-9].Once the issue has been identified, however, catastrophic payments can quickly become priorities in national health-policy debates, as is the case in Mexico and Iran.

**Figure 11: Catastrophic expenditure by expenditure quintile**




***Source: Author based on NSO (2011) data***

### 4.3 Impoverishing health expenditures

A limitation of the catastrophic expenditure approach is that it does not provide an indication of the extent to which the catastrophic payment negatively affects household's living standards. For relatively well-off households, spending 25% of pre-payment income on health for example,may not bring them anywhere near the poverty line, while for other households spending only a very small percentage of income on health may be impoverishing. Under this section we explicitly look at the effect of health carepayments on the incidence and depth of poverty. We compare the headcount and poverty gap measures before and after expenditure on health care is taken into consideration.

[8] See Arhin-Tenkorang D. Mobilizing resources for health: the case for user fees revisited.http://www2.cid.harvard.edu/cidwp/081.pdf (accessed March 24, 2014).

[9] See Wagstaff A. Poverty and health sector inequalities. *Bull World Health Organ* 2002; **80:** 97–105.

***Table 8: Measures of Poverty Based on Consumption Gross and Net of Spending on HealthCare, Malawi 2011***

| *Gross of health Payments (1)* | *Net of health Payments (2)* | *Difference* | | |
|---|---|---|---|---|
| *(3) = (2)-(1)* | *[(3)/(1)]*100* | *Absolute* | *Relative* | |
| **K37, 002 /YR PL** | | | | |
| Poverty Head count | 50.98% | 51.91% | 0.93% | 1.82% |
| Poverty Gap | 0.190434 | 0.195279 | 0.48% | 2.54% |
| Normalized Poverty gap | 9.37% | 9.67% | 0.30% | 3.22% |
| Normalized MPG | 18.37% | 18.63% | 0.26% | 1.42% |

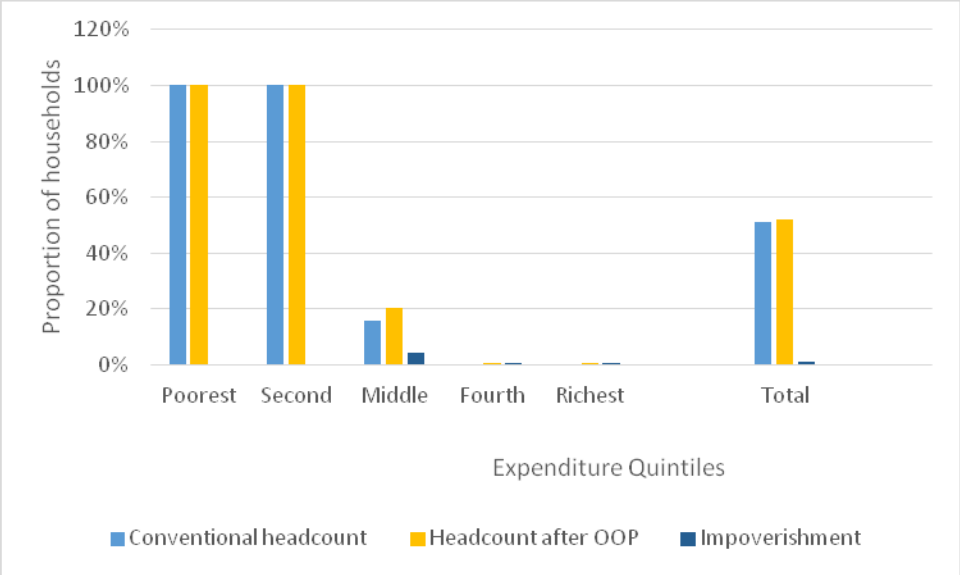
Table 8 above demonstrates the sensitivity of poverty measures in Malawi to the treatment of health payments. Estimates are presented for the K 37, 002 per person per year poverty line. The living standards measure used is per capita household consumption. The conventional methodology of measuring poverty suggests that 51%[10]of households are poor that is spend below the poverty line. If OOP payments for health care are netted out of household consumption, this percentage rises to 51.9%. So about 0.90% of the Malawian population is not counted as living in poverty but would be considered poor if spending on health care is discounted from household resources. This represents a substantial rise of 1.76% in the estimate of poverty. The estimate of the poverty gap also rises by almost 2.54%, from MK0.190434 to MK0.195279. Expressed as a percentage of the poverty line, the poverty gap increases from 9.37% of the poverty line to 9.67% when health payments are netted out of household consumption. The mean positive poverty gap increases slightly. This suggests that the rise in the poverty gap is due to the deepening of the poverty of the already poor and not because more households are being brought into poverty. These results confirms those from Vietnam[11] that conventional poverty measures underestimate poverty levels.

[10]The thesis estimate of the poverty headcount is very similar to the estimate of Malawi's National Statistics Office which is 50.7% (NSO, 2011).

[11]See Wagstaff & van Doorslaer (2003): Catastrophe and impoverishment in paying for health care: with applications toVietnam1993-1998

Analysing the poverty impact of catastrophic health expenditures across income quintiles. It can be seen that the proportion of impoverishment at poorest quintile is negligible, as households in the poorest quintile already live below the poverty line. However, the impact of health payments on household welfarereaches to the middle quintile, which has the highest proportion of households being pushed into poverty due to health care payments.Negligible amount of the households at fourth and richest quintiles are impoverished by health payments (Figure 12).

**Figure 12: Impoverishment by expenditure quintile**




***Source: Author based on NSO (2011) data***

Our results are similar to those Van Doorslaer et al. (2006) found in Asia. Van Doorslaer and others found that poverty estimates after paying for health care were much higher than conventional estimates, ranging from an additional 1.2% in Vietnam to 3.8% in Bangladesh (Doorslaer, et al., 2006). They concluded that OOP health expenditures are likely to inflate the extent of povertyand we find it imperative to establish the impact of OOP health expenditures on welfare in Malawi. Even poverty alleviation policies should take OOP into account.

### 4.3 Determinants of Catastrophic Health Expenditures

The purpose of this section is to analyse sources of variation across households incurring catastrophic health expenditures. All cut-off levels were used for a multivariate logistic analysis. Different regression models were run for different expenditure quintiles to see whether the factors that relate to catastrophic expenditures are the same across the income quintiles. However, it was found that models in the lowest income quintiles were insignificant and we concluded that the results were irrelevant. We hence run only one model and included expenditure quintile as a dummy variable.

The marginal effects from the logit model are presented in Table 9 below, whereas the odds ratio table is presented in the Appendix 1.Table 9 shows the risk factors associated with experiencing catastrophic health expenditure are robust across all definitions (i.e. different threshold levels) of catastrophic health expenditure in the model. Based on the log likelihood test, the model goodness of fit was satisfactory, and in case of heteroscedasticity as it is the main problem in cross section data, robust standard errors have been used.

***Table 9: Logit Model Results: Determinants of catastrophic expenditures***

| *Variable* | *Marginal Effects* | | | |
|---|---|---|---|---|
| *10%* | *20%* | *30%* | *40%* | |
| **Intercept** | -1.829*** | -2.835*** | -3.674*** | -3.935*** |
| **Pattern of Illness** | | | | |
| Illness episodes | 0.0416*** | 0.0163*** | 0.0127*** | 0.0076*** |
| Chronic Illness (y=1) | 0.0450* | 0.0533*** | 0.0387*** | 0.0221*** |
| **Household Characteristics** | | | | |
| Maximum number of school yrs/HH | -0.009*** | -0.0052** | -0.0043** | -0.0012 |
| Sex of the hh head (male=1) | -0.0020 | 0.0014 | 0.0055 | 0.0072 |
| Household size | 0.0158*** | 0.0102** | 0.0042* | -0.0001 |
| Residence (Urban=1) | -0.0542 | -0.0493* | -0.0376 | -0.0185 |
| Children <= 5yrs | 0.0038 | -0.0135 | -0.0081 | -0.0041 |
| Adults >= 60yrs | 0.0421* | 0.0211 | 0.0132 | 0.0046 |
| Distance to nearest health facility | 0.0005 | -0.0000 | 0.0000 | -0.0000 |
| Age of the household head | -0.0014 | -0.0011** | -0.0009** | -0.0003 |
| Household head employment status (y=1) | 0.0065 | 0.0141 | 0.0154 | 0.0037 |
| **Economic Status** | | | | |
| Household Income Quintile | | | | |
| 2 | -0.0050 | -0.0052 | 0.0047 | -0.0090 |
| 3 | -0.0072 | 0.0285 | 0.0292* | 0.0027 |
| 4 | 0.0150 | 0.0233 | 0.0055 | -0.0127 |
| (Highest) 5 | 0.0023 | 0.0240 | 0.0233 | 0.0049 |
| Log likelihood | -683.530 | -350.619 | -201.905 | -112.856 |
| $\chi^2(15)$ | 81.72 | 53.21 | 58.64 | 50.11 |
| Prob>$\chi^2(15)$ | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Pseudo $R^2$ | 0.0558 | 0.0660 | 0.1195 | 0.1127 |

Note: ***, **, *, indicates significance at 1%, 5% and 10% level, respectively.
Quintile 1 is our reference group

In accordance with aprioriexpectations, all variables in the pattern of illness group were significant. The average number of illness episodes in a household significantly increased the probability of catastrophic expenses. An increase by one for average illness episode among household members increased the probability of catastrophic expense by 0.0076-

0.0146 at different thresholds levels. The presence of a member with a chronic illness in a household increased the probability of catastrophic consequence by 0.0221-0.0533 times at different thresholds.

Among household characteristics, the number of school years per household was significant in reducing the probability of incurring catastrophic expenditures in 10-30% thresholds. An increase by one of the number of school years of the household member reduced catastrophic consequence by 0.043-0.009 times in the first three thresholds. The results also indicate that there is a statistically significant and positive association between the likelihood of catastrophic health expenditure and household size. An increase by one member to the household size increased the probability of catastrophic expenditures by 0.0042-0.0158 times. Age of the household head significantly reduced catastrophic expenditures in the 20% and 30% thresholds. An increase by one unit in the age of the household head, reduced the probability of incurring catastrophic expenditures by 0.0011 times and 0.0009 times in the 20% and 30% threshold respectively, whereas as residence and number of aged members in a household had a weak association to catastrophic expenditures in the 20% threshold and 10% threshold respectively.

Male headed household is not a protective factor against catastrophic expenditure. The sex of household head didn't have a significant impact on the probability of facing catastrophic health expenditure. Distance to the nearest health facility as well as the average number of children less than 5years old in a household does not influence catastrophic expenditures. On the basis of economic status, our results,showed that economic status was not a significant factor in determining catastrophic expenditure. These results are very different from results reported in macroeconomic data (Xu et.al., 2003) and most studies from developed countries (Merlis, 2002; Berki, 1986; & Wateret.al., (2004)). Nevertheless, our results are somehow similar to studies from other developing countries where no clear pattern of the socioeconomic distribution of health expenditure has been found. For example, Makinen et al. (2000) reviewed household survey data from eight developing countries and countries in transition and found that

there was no distinctive pattern in health expenditure as a proportion of income by income quintiles.

Our analysis has however, shown that number of illness episodes, presence of a member with chronic illness and household size were important factors that lead to catastrophic expenditures. Whereas maximum number of school years per household and age of the household head (strongly significant in 20% and 30% thresholds) were protective factors against catastrophic expenditures.The results have shown that household size significantly influences catastrophic expenditures. These results are similar to those found in selected Asian countries[12]. In Bangladesh and Thailand, the incidence of catastrophic payments also rises with household size. In general, larger households are more likely to be concentrated in the lower socioeconomic quintiles and have more dependent individuals and, thus, they are more likely to have limited resources for health care.

The results further indicate that the presence of chronically ill individuals in thehousehold is positively associated with the probability of seeking health care and has thelargest marginal effect in the model. This finding indicates that the presence of a chronically ill individual in the household appears to be the most important risk factor forincurring catastrophic health expenditure. This is similar to reports from developed countries (Water et.al., 2004).The possible reason for higher probabilities of incurring catastrophic expenditure due to chronic illness rather than inpatient care is long term or life time treatment for chronic illness.

Persistent (chronic illness) health events or "shocks" can be more difficult to deal with financially than frequent, yet smaller, health shocks. Despite the existing essential health care package that covers inpatient services at public facilities and the fact that most poor households report low levels of spending, why do households that utilize public facilities have increased likelihood of incurring catastrophic health spending? Other spending is

[12]O'Donnell & van Doorslaer (2005) ; Explaining the incidence of catastrophic expenditures on health care: Comparative evidence from Asia

incurred when any member of a household is hospitalized; these include transportation and food. Better-off groups, are more likely to use private facilities in times of a health shock as serious as chronic disease, which might cause a higher proportion of OOP payments as a share of household resources and result in catastrophic level health spending.

Number of illness episodes was found to be an important determinant of catastrophic expenditures. This is because health seeking behavior increases with the number of illness episodes a household encounters, and so this increases the probability of catastrophic expenditures.The results also support the protective effects of educational attainmenton the probability of incurring catastrophic health expenditure. Households with more educated members are associated with less likelihood of incurring catastrophic spending for health care, a finding similar to those of other reports[13]. The interpretation of the negative education effect is that education is a factor that affects the demand for health care and it makes households more efficient in maintaining health (Grossman, 1972). An educated household may make more effective use of modern medicine and be less likely to incur large expenditures on self-medication and traditional therapies.

Finally,the results also show that age of the household head in years was one of the main factors that reduced catastrophic expenditure. This is contrary to apriori expectation, as it is expected that as the head gets older, they will be demanding more health care and hence putting the household at a risk of incurring catastrophic expenditure.

### 4.5 Conclusion

Although all key determinants were found to be significant at all thresholds in the logit model except for household size and age of the household, their magnitudes and levels of significance were different. Thus, setting only one cut-off value may result in inaccurate estimation leading in misinterpretation of the importance of variables. The present study suggest that different thresholds/cut-off levels be used for comparison.

[13]Xu et al., "Understanding the Impact of Eliminating User Fees."

# CHAPTER FIVE

# CONCLUSIONS AND POLICY IMPLICATIONS

## 5.0 Introduction

This chapter presents the conclusion and policy implications of this study. The chapter is outlined as follows: Section 5.1 gives a summary of the study results; Section 5.2 gives the policy recommendations that can be driven from the results that have been obtained; Section 5.3 gives limitations of this study; and finally Section 5.4 outlines areas for further research.

## 5.1 Summary of the study

This paper has explored the risk factors associated with experiencing catastrophic health expenditure at the household level in Malawi, which is an area of particular policy interest given the ongoing implementation of the essential health care package. Health financing in Malawi is facing numerous obstacles that challenge the goal of providing free health care as suggested by the constitution. The Malawian health system isone of the most donor dependent health systems in Africa. Additionally, the poor quality of public health care service pushes households to expensive private health providers. The country does not have any social insurance scheme that protects households from financial risks associated with illness. This suggests that Malawi possesses an environment conducive to the growth of catastrophic health expenditures.

Households at different expenditure quintiles are all subject to catastrophic health expenditure with different degrees. Results from the study have shown that OOP drive 0.73-9.37%of all households to encounter financial catastropheacross the different thresholds. The first three poorest quintiles are most unprotected against catastrophic payments, more especially the middle quintile households. The analysis also suggests that 0.93%of households fell below the poverty line after paying for health care. Almost 5% of the households in the third quintile have been pushed into poverty because of health payments. OOP have exacerbated the poverty gap as well. The poverty effect of OOP has exacerbated the poverty gap by 3.22%. In effect, OOP have exacerbated the poverty estimates but they have not influence the income distribution. The econometric analysis suggests that factors such as chronic illness, number of illness episodes and household size are all related to catastrophic health expenditure. These determinants should prompt policy concerns to protect such households. Given these results the paper argues that reducing reliance on OOP and increasing public health investments would not only increase access to health care and subsequently improve citizens' health but also would protect households from financial risks arising from health payments. While our analyses are not without their limitations, there is no doubt that health expenditure contributes substantially to the impoverishment of households, increasing the incidence of poverty and pushing poor households into deeper poverty.

### 5.2 Policy Implications

Based on the above findings, board policy areas that aim to protect households from catastrophic health payments and impoverishment should be explored;

Policies such as developing an exemption scheme for poor households with chronic sick member are needed to reduce the extent of catastrophic payments and impoverishment. While disease control programmes in sub-Saharan African have traditionally focused on infectious diseases for instance HIV/Aids, we suggest caution in adopting this approach, as the imminent chronic non-communicable disease burden would have a greater impact on catastrophic expenses. Based on the descriptive results we have seen that 18% of the

households with a chronically ill individual, arthritis was the most common disease accounting for 23% whereas HIV/Aids account for about 15%.

The government of Malawi can also revisit ways on how to reduce the population growth as household size is also one of the risk factors of catastrophic health expenditures. Our results have shown that poor households are more likely to have large families. From the results we have also seen that most poor households reside in rural areas from which it is difficult to have access to health facilities meaning that these people do not have access to family planning methods which are mostly found in health facilities.

Government should find innovative ways of sensitizing the population on the importance of education. Educated households are efficient users of health (Grossman, 1972).Better employment opportunities also arise when one is more educated. This presents another policy dimension whereby the government will indirectly reduce the incidence of catastrophic expenditures due to disease and widen income earning capacity byencouraging households to be educated. Thus, the government of Malawi should be in the forefront sensitizing citizens and encouraging them on the benefits of being educated. This is a long chain that eventually leads to individuals being empowered economically and earn income. Even though every individual may not attend tertiary institutions, there are other vocational training institutions that provide specialized training that would enable one generate income and be similar in status to the one working. Thus, education is very important in terms of economic empowerment in the future and the benefits will eventually trickle down to the whole household.

Alternative sources of health financing should also be explored to ensure sustainable and reliable flow of finances into the health sector. These include; Introduce Social insurance schemes and improve community based health insurance and Micro health insurance in Malawi and expenditure smoothening policies to cater for the aged, child headed households, and increase on availability of social services; reducing on the burden of having to pay directly out of pocket so as to access health care. The implementation of the essential health care package should be revisited so that it achieves its initial objective

of increasing access to health care and reducing the financial burden of care for Malawians.The ***"mutuelles de sante"*** model of Rwanda could be emulated as a spring board to the long awaited Social Insurance scheme.

The systematic review by Ekman (2007), found strong evidence that community based health insurance schemes "do provide effective protection to the members of the schemes by significantly reducing the level of OOP payment for care", even though some of the evidence was mixed. There was also moderately strong evidence to suggest that CBHI schemes provide financial protection by increasing access to health care in their operating areas. Access to care was assessed mainly by measuring utilization rates, comparing members and non-members, and conducting before-after appraisals of utilization of services.

Government should increase public investment in health by increasing the health share on the government budget, earmarked taxes on tobacco and alcohol for health and earmarked taxes on polluting industries.Improve the effectiveness of health spending by driving improvements in the quality of service provision and increasing the predictability of resource flows to providers. Finally, there is need to adjustment in Poverty Computation Methodologies, instead of using total household expenditure to compute poverty estimates in Malawi there is need to use expenditure net of health care costs so as not to understate poverty levels that may misinform policy. The 2010/2011 analysis could have understated poverty to about 1.69% associated with health care payments which do not add to household welfare.

Many African health systems are weak and strengthening health systems is a fundamental first step towards increasing the efficiency and effectiveness of health spending. Health system strengthening including the development of sound public expenditure management systems is the basis for the effective use of available health financing. Increased attention to resource tracking, using tools such as National Health Accounts, would enhance the monitoring of the burden of health financing placed on households as well as highlighting all other sources and uses of health funds. Ensuring efficiency and

transparency of resource flows to the operational levels where services are delivered is vital to achieving the objectives of health spending.

Poor households in Malawi, as in many African countries, still face difficult choices seeking care when they are ill will improve their health, but the act of seeking care can result in financial catastrophe. This is a key challenge for policy makers over the next decade. At present large quantities of external funds for health are flowing into many African countries which enables services to be heavily subsidized. However, the challenge will be to build sustainable financingsystems which reduce barriers to access care while at the same time protecting people against the financial risks of accessing care.

### 5.3 Limitations for the study

The interpretation of these findings needs to be tempered by the limitations of the methodologies employed. First, since health expenditure can only be incurred if sick individuals actually seek care, and those towards the lower end of the income distribution tend to face greater physical and financial obstacles to seeking care, we expect that, in general, the estimates generated by thisanalysis will underestimate the true effect of health expenditure on poverty, creating the impression of a greater degree of financial protection than the system actually provides.

Second, we are only measuring financial protection in the current period. OOP payments in the current period may be financed by sources other than current income, such as dis-saving, borrowing and depletion of assets, which allows households to smooth non-health consumption in the period in which ill health occurs. While this coping mechanism may protect households from impoverishment in the short run, and result in estimates that (correctly) suggest adequate financial protection in the current period, eventually these expenditures will have to be financed. The replenishment of assets and the repayment of loans may impose substantial financial hardship in subsequent periods. However, because of thecross-sectional data used in this study and the lack of information on the means offinancing health payments, this study does not identify the sources of coping

strategiesto absorb health shocks. Moreover, the economic consequences for householdswith illnesses that require the use of health care include the impact of direct costs(medical treatment and related financial costs) and indirect costs (productive timelosses due to illness).However, the results focus on financial catastrophe due to OOP spending for health care; this is only one aspect of the financial consequencesof illness, and there are no longitudinal data available to explore the issuefurther.

And lastly, the indirect costs of seeking care, such as transport, food, accommodation, and lost earnings associated with illness usually are not included in income and expenditure surveys. In addition, some poor households may decrease food expenditures for meeting health care needs; therefore, the presented analysis may underestimate the financial consequences of obtaining care.

### 5.4 Areas of further research

The thesis opens the field for future research on the optimum amount of funds that are needed for achieving universal health coverage in Malawi. Future research should assess the efficacy of untraditional health financing mechanisms on protecting households against catastrophic health expenditure and impoverishment. These untraditional mechanisms include micro banking on health, social capital and community based health insurance. The role of traditional medicine in reducing catastrophic health expenditures. Last but not least, regional variations in catastrophic health expenditures and factors that account to such variations should also be explored in the future.

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## APPENDICES

***Appendix 1: Log Odds ratio for the Logit Models***

| *Variable* | *Log Odds Ratio* | | | |
|---|---|---|---|---|
| *10%* *20%* *30%* *40%* | | | | |
| **Pattern of Illness** | | | | |
| Average illness episodes | 1.3370*** | 1.3067*** | 1.4905*** | 1.6139*** |
| Chronic Illness (y=1) | 1.3692* | 2.3907*** | 3.3614*** | 4.0512*** |
| **Household Characteristics** | | | | |
| Maximum number of school yrs/HH | 0.9367*** | 0.9183** | 0.8727** | 0.9242 |
| Sex of the hh head (male=1) | 0.9864 | 1.0232 | 1.1895 | 1.5735 |
| Household size | 1.1164*** | 1.1816** | 1.1785* | 0.9943 |
| Residence (Urban=1) | 0.6850 | 0.4462* | 0.3083 | 0.3101 |
| Children <= 5yrs | 1.0270 | 0.8020 | 0.7747 | 0.7699 |
| Adults >= 60yrs | 1.3423* | 1.4118 | 1.5112 | 1.3375 |
| Distance to nearest health facility | 1.0032 | 0.9988 | 1.0031 | 1.0005 |
| Age of the household head | 0.9906 | 0.9819** | 0.9753** | 0.9784 |
| Household head employment status (y=1) | 1.0466 | 1.2585 | 1.6188 | 1.2645 |
| **Economic Status** | | | | |
| Household Income Quintile | | | | |
| 2 | 0.9652 | 0.8988 | 1.2068 | 0.5462 |
| 3 | 0.9501 | 1.5855 | 2.3681* | 1.1386 |
| 4 | 1.1077 | 1.4753 | 1.2403 | 0.3712 |
| (Highest) 5 | 1.0164 | 1.4892 | 1.9161 | 1.2569 |
| Log likelihood | -683.529 | -350.619 | -201.905 | -112.856 |
| $\chi^2(15)$ | 81.72 | 52.21 | 58.64 | 50.11 |
| Prob>$\chi^2(15)$ | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Pseudo $R^2$ | 0.0558 | 0.0660 | 0.1195 | 0.0949 |
| Observations | 1502 | 1502 | 1502 | 1502 |

Note: ***, **, *, indicates significance at 1%, 5% and 10% level, respectively.