

Income redistributive effect of health care financing in Zambia

**Arnold Mulenga
MLNARN002**

Dissertation submitted to the Health Economics Unit, Faculty of Health Sciences, University of Cape Town, South Africa in partial fulfilment of the academic requirements for the degree of Master of Public Health (Health Economics)

March, 2015

**Supervised by
Dr John Ele-Ojo Ataguba
Health Economics Unit (HEU),
University of Cape Town, South Africa**

Financial support:

The financial assistance of the National Research Foundation (NRF) towards this research is hereby acknowledged. Opinion expressed and conclusions arrived at, are those of the author and are not attributed to the NRF.

The copyright of this thesis vests in the author. No quotation from it or information derived from it is to be published without full acknowledgement of the source. The thesis is to be used for private study or non-commercial research purposes only.

Published by the University of Cape Town (UCT) in terms of the non-exclusive license granted to UCT by the author.

DECLARATION

I **Arnold Mulenga**, do hereby declare that the work in this thesis is based on my work except where acknowledgements indicate otherwise and that neither the whole work nor any part of it has been, is being or is to be submitted for another degree in this or any other university.

I empower the University of Cape Town to reproduce for the purpose of research either the whole or any portion of the contents in any manner whatsoever.

Signature

Date: 10th March, 2015

DEDICATED

To my beloved wife (Jean Zimba Mulenga), my son (Nathan Mulenga) and my mother (Theresa Musonda)

ACKNOWLEDGEMENT

Special thanks are due to my supervisor Dr John Ele-Ojo Ataguba of the Health Economics Unit (HEU) of the School of Public Health and Family Medicine, Faculty of Health Sciences, University of Cape Town, who had patience, attention to detail and understanding to read through several drafts of this thesis and offered encouragement, very constructive criticisms and useful suggestions which made this study possible.

I also wish to acknowledge and appreciate Professor Di McIntyre of the HEU for facilitating and subsequent awarding of financial support by the National Research Foundation (NRF) of South Africa. This study would not have been possible without the financial support received from NRF.

To my lovely wife (Jean Zimba Mulenga) and son (Nathan Mulenga), am greatly indebted to you for the tremendous sacrifice you had to make over the years for the realisation of this work.

For the daily prayers, moral support, encouragements and well wishes, I say thank you to my family members. You were truly my pillars of support.

I am also grateful to Dr Olukfunke Alaba and Latiefa Adams of the Health Economics Unit (HEU) and Dr Jelita Chinyonga of Ministry of Health, Zambia for their encouragement.

To my friends Mr Bwembya Josphant, Mr Simbeye Laban and Mr Kalungwe Alex, I say thank you for your encouragement and support.

To the Almighty God, am most grateful for his continuous blessings, protection and guidance throughout my life and academic career.

EXECUTIVE SUMMARY

Equity in health care financing and progress towards universal health coverage (UHC) have increasingly received recognition and growing attention for their potential to improve health outcomes globally. However, most low income countries and in particular those in sub-Saharan Africa which have borne the greater share of global disease burden have had relatively lesser success in their endeavours to improve their health care financing systems. It is only a few that have made considerable progress towards universal health coverage. Zambia, a developing country struggling with income inequalities and poor progress to achieving universal health coverage, is no exception.

The current discussion on countries moving toward universal health coverage, however, requires an understanding of the impact of the prevailing health care financing mechanisms on income distribution. Investigation of an overall income redistributive effect of health care financing thus requires assessing health care financing in relation to the principles of contributing to financing health care according to ability to pay.

Zambia is currently considering major health systems reforms toward a universal health system. Health care financing system in Zambia is however faced with numerous challenges that must be addressed prior to meeting this goal. To promote the goal of achieving universal health coverage, there is a need to measure the extent of the redistributive effect of the current health care financing mechanisms. This allows identifying which health care financing mechanisms provide financial protection and promote universal health coverage in the country.

With this growing focus on the goal of universal health coverage (UHC), health care financing mechanisms should not only relate to who pays and who receives the benefit, but also to their effects on income distribution. This is because financing of health care may have redistributive effects and equity consequences. This income redistribution may be intended or unintended. Even in the latter case, policy makers may be interested in the degree to which it occurs. This is because it has consequences for the distribution of goods and services other than health care and, ultimately, for welfare.

This study investigates the extent to which the current health care financing in Zambia redistributes income, particularly whether or not it reduces income inequality. The study seeks to evaluate an overall pattern of income redistributive effect of the current health care financing mechanisms. It specifically assesses the income redistributive effect of two broad health care financing mechanisms; general tax and out of pocket (OOP) payments. Using a standard procedure for analyzing income redistribution of health care financing in Zambia, the study decomposes the income redistributive effect of each of the two broad health care financing mechanisms into the vertical, horizontal and reranking components.

The study draws on secondary data from the 2010 Zambia Living Condition Monitoring Survey (LCMS), which is a national representative household survey with a sample size of 19,397 households. Data collected by Living Condition Monitoring Survey relate to all aspects of household decision making and well-being. It also contains information on household consumption both for durable and non-durable commodities.

In order to compute the incidence of different health care financing mechanisms, the construction of the household consumption expenditure was based on the household reported expenditure and consumption of food (frequently purchased), housing and other non-food items (less frequently purchased). The measure also takes into account consumption from other sources than purchases from the market. This means that consumption of own production, transfers received in kind from any source and wage payments, imputed rents from owner occupied housing unit were all considered in measuring the household consumption expenditure. Per capita income was computed based on total household consumption expenditure by dividing the total household income by the household size.

The study reports an overall pro poor income redistribution (reduces income inequality) with health care financing in Zambia. The findings show that direct taxes in form of personal income tax and corporate income tax are progressive health care financing mechanisms and with pro-rich income redistribution (increase income inequality). Unlike direct taxes, indirect taxes in form of value added tax, fuel levy and excise taxes were found to lead to pro poor income redistribution (reduce income inequality) and as such they favour the poor relative to the rich. General taxes were found to be progressive and induce pro-rich income redistribution. Out of pocket payments were also found to induce pro-rich income redistribution in Zambia. In all cases, except for the overall health care financing and indirect taxes the combined effect of the horizontal and reranking effects dominate the vertical effect.

The results presented in this study have provided some interesting and useful information upon which a number of recommendations for reforming the Zambian health care financing system can be based. It provides valuable insights as the country plans to expedite progress to universal health coverage with reforms in

health care financing. It can also be used as a clear policy tool for reducing income inequality in Zambia and in other countries, especially in Africa that are battling with a high level of income inequality. Therefore, for Zambia to attain universal health coverage, the country needs to have a health care financing system that ameliorates income inequalities in the country by promoting equitable and pro poor financing mechanisms. In addition, the funding pool for the health care needs to grow and this can be achieved by improving the efficiency of tax collection and increasing the budgetary allocation to the health sector.

TABLE OF CONTENTS

Declaration	ii
Dedicated	iii
Acknowledgement	iv
Executive summary	v
Table of contents	ix
List of tables	xi
List of appendices	xi
List of acronyms and abbreviations	xii
PART: A Protocol	1
1. Introduction	1
1.1.Zambia: State of the economy, general demographic and health indicators	5
1.1.1. Demographic indicators	5
1.1.2. Economic indicators	5
1.1.3. Health indicators.....	7
1.2. Health care financing system in Zambia	8
1.3. Health care provision in Zambia.....	10
1.3.1. Distribution of health facilities in Zambia by ownership.....	13
1.4. Statement of the problem	15
1.5. Research questions	21
1.6. Research objectives.....	22
1.6.1 Main objective	22
1.6.2 Sub objectives.....	22
1.7 Significance of the study	22
2.0 Research methodology	24
2.1 Scope of the study	27
2.2 Data sources	30
2.3 Research design	32
2.4 Study population	32
2.5 Data analysis.....	33
2.6 Ethics approval.....	33
2.7 Stakeholders and report dissemination	34
2.8 Limitations	34
2.9 Logistics	34
Reference	36

	PART B: Literature review	41
1	Introduction	41
2	Research strategies	41
3	Definition of key concepts	42
3.1	Equity in health care financing	42
4	Approaches to measuring equity in health care financing	43
5	Redistributive effect of health care financing	44
6	Methods for measuring progressivity in health care financing	47
6.1	Tabulation approaches	48
6.2	Summary indices	49
6.3	Decomposing redistributive effect	53
7	Empirical evidence on income redistributive effect in health care financing	57
7.1	Income redistributive effect of OOP payments for health care	58
7.2	Nature of the income redistributive effect of general taxes	61
7.3	Overall pattern of income redistributive effect of health care financing	65
8	Summary of the literature review	67
	Reference	68
	PART C: Manuscript	72
1	Introduction	72
2	Methods	76
2.1	Data	76
2.2	Measuring ability to pay	76
2.3	Computation of health care payments	77
2.4	Decomposing income redistributive effect of health care financing	78
3	Empirical results	82
4	Discussion	86
5	Conclusion	92
	Reference	93
	PART D: Appendices	97
	PART E: Policy brief	106

LIST OF TABLES

Table1: Work plan	34
Table2: Budget	35
Table1: AJL decomposition of income redistributive effect of health care payments, Zambia 2010 ...	83
Table2: Percentage decomposition of redistributive effect of Zambian health care financing, 2010 ..	85
Table3: financing incidence analysis estimation techniques	95

LIST OF FIGURES

Figure 1: Distribution of real health financing expenditure sources	8
---	---

LIST OF APPENDICES

Appendix A: Author's instructions (Applied Health Economic and Health Policy Journal)	97
---	----

LIST OF ACRONYMS AND ABBREVIATIONS

AIDS	Acquired Immunodeficiency Disease Syndrome
ATP	Ability to Pay
BG	Between Groups
BOZ	Bank of Zambia
CHAZ	Churches Health Association of Zambia
CSO	Central Statistical Office
CT	Corporate Tax
FIA	Financing Incidence Analysis
FNDP	Firth National Development Plan
GDP	Gross Domestic Product
GRZ	Government Republic of Zambia
HE	Horizontal Equity
HPCZ	Health Professionals Council of Zambia
IMR	Infant Mortality Rate
LCMS	Living Condition and Monitoring Survey
MMR	Maternal Mortality Rate
MNCH	Maternal, Neonatal and Child Health
MOFNP	Ministry of Finance and National Planning
MOH	Ministry of Health
NAC	National AIDS Council
HDI	Human Development Index
NGOs	Non-Governmental Organizations
NHA	National Health Accounts
NHSP	National Health Strategic Plan
NDPs	National Development Plans
OOP	Out of Pocket payments
PIT	Personal Income Tax
RE	Redistributive Effect
R	Reranking effect
SES	Socio Economic Status
SHI	Socio Health Insurance
SSA	Sub Saharan Africa
SNDP	Sixth National Development Plan
TB	Tuberculosis
U5MR	under 5 Mortality Rate
VAT	Value Added Tax
VE	Vertical Equity
WB	World Bank
WHO	World Health Organisation
ZDA	Zambia Development Agency
ZDHS	Zambia Demographic and Health Survey

Protocol

1. Introduction

Currently, equity in health care financing and universal health coverage dominates policy debates worldwide. Health care financing arrangements are therefore central to universal health coverage. However, the way funds are collected, pooled, and used to purchase or provide services should be carefully considered to ensure that population needs are addressed under a universal health system (Chuma, J., & Okungu, V. 2011). Although public finance system has been rightly praised for their attention to the financing and provision of services, recent studies, however, show that they have not been able to deal adequately with issues involving equity in health care financing and delivery. It has demonstrated that payments for and financing of health care services can be associated with multiple adverse effects on household living standard, thereby threatening their income sufficiency, disrupt their positions in the socioeconomic hierarchy and therefore exacerbate overall inequalities in the distribution of income (van Doorslaer et al., 2007; van Doorslaer et al., 1999).

In addressing this, World Health Assembly, in its sixty fourth reports has however re-emphasized the valuable contribution made by fair and sustainable financing structures, to the achievement of the health-related Millennium Development Goals. The report has specified three principles for equitable financing. First is financial risk protection where no one in need of health services ought not to be denied access due to inability to pay and households' livelihoods should not be threatened by the costs of care. The second principle is progressive financing implying that contributions be made according to ability to pay (ATP), and the third principle is cross subsidies from the healthy to the ill and from the wealthy to the poor

(WHR,2000; Zikusooka et al., 2009). This global call has seen some developing countries in Africa such as Ghana and Tanzania implementing health financing reforms (National Health Insurance) in line with universal health coverage (Mills et al., 2012) while Zambia has not yet. Recently, however, Zambia has shown commitment to the implementation of health financing reforms like the National Health Insurance (Ministry of Health, 2011). It is expected that national health insurance will contribute toward redressing existing inequalities in the country.

While, the Government of the republic of Zambia is committed to improving equity in access to needed health care and providing financial risk protection through the implementation of health care financing reforms aimed at achieving universal health coverage, there is need to examine the extent to which the existing financing mechanisms are equitable. This will therefore provide research outputs that would feed into an evidence based policy formulation. Indeed, equity in health care is enshrined in Ministry of Health stated vision to bring health services as close to the family as possible (Ministry of Health, 2011). Nevertheless, in the absence of health financing mechanisms that promote financial risk protection and equity, and what this strategy will be, is still to be defined. Yet, it is very likely that the government will adopt some form of strategy towards universal health coverage at a certain stage. There is no doubt, these financing reforms are designed to “provide the people of Zambia with equity of access to cost-effective, quality healthcare as close to the family as possible.” These aims were originally stated in the National Health Policies and Strategies of 1992 and were reaffirmed in the 2006-2010 National Health Strategic Plan (Ministry of Health., 2005; World Bank., 2012).

Since 2005, the Zambian economy has continued to register positive real Gross Domestic Product (GDP) growth of not less than 5 percent (CSO, 2010). According

to World Bank (2012) the Gross National Income (GNI) is around \$1,350 per capita but the distribution is unequal. For instance, in 2010, the poorest 50 per cent of the household accounted for 9.1 per cent of the total income, while the richest 10 per cent accounted for 52.6 per cent of the income (CSO, 2010). Much of this economic growth was observed during the implementation of the Fifth National Development Plan (FNDP), which covered the period 2006 and 2010. Despite this economic growth, there has been no notable corresponding improvement in the wellbeing of the people, especially in rural areas. The rate of poverty (i.e. the percentage of the population living below the national poverty line as defined by the World Bank) declined significantly over the last few years but still stands at 60.5 percent (CSO, 2010).

One of the major challenges facing Zambia today is to reduce poverty and economic inequality among the population. Despite the recent turnaround in the economy as shown by real GDP growth of more than 5 per cent, the majority of Zambians continue to live in poverty. Rural poverty is estimated at 77.9% compared with urban poverty which stood at 27.5% (CSO, 2012). These high poverty levels also have implication on the ability to contribute to social health insurance scheme (MoH, 2012).

Over the past decades, however, major methodological advancements in the measurement of income inequality and progressivity have emerged, and there has been a huge empirical interest in evaluating how health care financing arrangements affect income distribution. And one of the most often used measures of income redistribution is the redistributive effect (RE) which is equal to a difference between Gini coefficients of pre and post income payment. However, the view that the health system should be financed by households according to their ability to pay (ATP) has

widespread support, particularly in the OECD countries (Wagstaff & van Doorslaer, 2000) and relatively new in developing countries. Initially, Wagstaff et al. (1989) quantified progressivity (or regressivity) of health system financing using Kakwani's index (Kakwani, 1977). Later, Wagstaff and van Doorslaer (1997) gained further insight by applying the Aronson et al, (1994) decomposition method, which makes it possible to decompose the change in income inequality caused by financing into a vertical, horizontal and reranking effect; each effect corresponding to a different dimension of equity. Health care financing should however not be linked to utilization, and the distribution of household contributions has to be seen as an independent policy choice and consequences of which should also be examined separately. It is therefore of primary interest to measure to what extent and how financing is related to household ability to pay (ATP).

As Zambia plans to move toward universal health coverage, empirical evidence is therefore required on the distribution of the burden of the existing health care financing mechanisms. This provides the impetus for the study to assess equity in health care financing and its impact on income distribution across social economic status. Thus, this study assesses the financial incidences of various mechanisms of health care finance and their income distribution in Zambia. The study provides an overall pattern of income redistributive effect of the current health care financing mechanisms. It specifically assesses the income redistribution effect of two broad health care financing mechanisms—general tax and out of pocket (OOP) payments. Therefore, the study decomposes the redistributive effect of each of the two broad health care financing mechanisms into the vertical component, horizontal component and reranking effect.

1.1 Zambia: State of the economy, general demographic and health indicators

1.1.1 Demographic indicators

Zambia is a landlocked country in the southern region of Africa. It covers approximately 752,612 km² (ZDHS, 2007) and is surrounded by 8 other countries, namely; Democratic Republic of Congo, Tanzania, Malawi, Zimbabwe, Botswana, Namibia, Mozambique and Angola. The country's terrain mostly consists of high plateaus. However, the country has several hydrographic bodies, such as lakes and rivers. According to the Central Statistical Office (2010) estimates for 2010, the country has a population of approximately 13 million. The majority of the population (65 percent) lives in rural areas and is dependent on subsistence agriculture for its livelihood.

Zambia's economy is highly dependent on the trade activities in Lusaka and the Copperbelt, thus, majority of the population resides in and around these two major financial centers. Administratively, the country is divided into 9 provinces and 74 districts (CSO, 2010). However, during the years 2011 and 2012, twenty one (21) new more districts and one province have been created by the current Patriotic Front (PF) government making a total of 10 provinces and 103 districts. Out of the 10 provinces, Lusaka and Copperbelt provinces are predominantly urban, while the rest are predominantly rural.

1.1.2 Economic indicators

Despite having attained its political independence 49 years ago and enjoying relative peace and political stability, Zambia is said to be a 'developing country' and classified as a lower middle income country. The state of the economy is mixed in nature with liberal policies skewed towards private and foreign investments. Since 2006, Zambia has been implementing the Vision 2030 strategy, which aims at

transforming it into a prosperous middle-income nation by 2030. This vision is being implemented through successive 5 year National Development Plans (NDPs). Currently, the country is implementing the Sixth National development Plan (SNDP), which outlines the country's overall socio-economic development agenda for the next 5 years ending in 2015.

In addition, the country has embarked on the Private Sector Development Programme (PSDP), which is meant to attract both domestic and foreign investment in the various sectors of the economy such as health. This is to be achieved through Zambia's broad macroeconomic and social policies, which include pro-poor economic growth, low inflation, stable exchange rates and financial stability (CSO, 2010). However, Zambia's main export is copper, accounting for over 70 percent of the country's export earnings. Over the past 5 years, the country has registered consistent economic growth, averaging 6.2 percent in 2011, 7.3 percent in 2012, and significant improvements in other key macro-economic indicators (Ministry of Health, 2011; World Bank, 2012; Ministry of Finance, 2013). Notably, inflation declined from 35.2 percent at the end of 1996 to 7.9 percent at the end of 2010 (CSO, 2010) while lending rates had fallen from an average of 20 percent in 2012 to 16.3 percent as at June 2013 (Ministry of Finance, 2013).

Although the country has registered economic growth, these achievements have not yet significantly impacted on the socioeconomic status of the majority of the population, who have continued to face poverty and socio-economic deprivation. Income inequality remained high with the Gini Coefficient estimated at 0.57 (World Bank., 2012) and overall poverty level at 67 percent (ZDHS, 2007; Ministry of Health, 2011). However, recent studies by the Central Statistical Office (CSO) on Living and Condition Monitoring Survey (LCMS) have indicated a slight reduction in the

proportion of the population living below the poverty line from 62.8 percent in 2006 to 60.5 percent in 2010. But when compared between rural and urban, the rural population of Zambia remained predominantly poor with poverty levels at 77.9 percent as compared to their urban counterparts at 27.5 percent (CSO, 2010).

1.1.3 Health indicators

With regard to health indicators, Zambia has a high disease burden which is largely influenced by the high prevalence and impact of communicable diseases, particularly malaria, HIV and AIDS, Tuberculosis (TB) and Sexually Transmitted Infections (Ministry of Health, 2010). The country is also faced with a high burden of Maternal, Neonatal and Child Health (MNCH) problems, and a growing problem of Non-Communicable Diseases (NCDs), including mental health, cancers, sickle cell anaemia, diabetes mellitus, hypertension and heart diseases, chronic respiratory disease, blindness and eye refractive defects, and oral health problems (Ministry of Health, 2011). This high disease burden coupled with a growing population has contributed to the expanded demand for health services in Zambia. The rapid population growth places an increasing burden on the national economy, particularly the capacity of the health system to keep pace with the health needs of a rapidly increasing population.

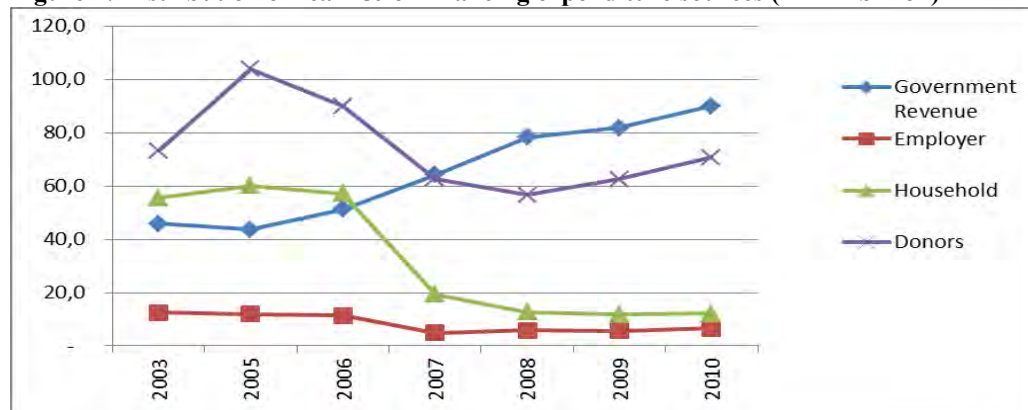
In the recent past, however, the health sector recorded significant progress in most of the key areas of health service delivery, leading to major improvements in most of the key health performance indicators during the period 2002 and 2007. The highest improvement being recorded in malaria incidence which reduced by 40 percent. It should, however, be noted that these figures, despite the reductions recorded, are still high when compared to other countries in the world or in the region (Ministry of Health, 2010; ZDHS, 2007). The latest Millennium Development Goal (MDG)

Progress Report, for example, shows that Zambia is making progress, but not fast enough to meet the targets. The under-five mortality rate is currently 119 deaths per 1,000 live births, down from 191 per 1,000 in 1992, but still far from the 2015 target of 56 per 1,000. Progress on maternal health has been similar and the mortality rate has decreased from 649 deaths per 100,000 births in 1996 to 449 per 100,000 in 2007. This is three times higher than the 2015 target of 163 (Pereira, 2009).

1.2 Health care financing system in Zambia

According to Ministry of health (2012), the health care system in Zambia is financed through a mix of various sources of financing mechanisms (e.g. general tax, out of pocket (OOP), donors and private insurance contributions). The main health care financing sources in Zambia are government, households and donors. However, the public funding dominates other health care financing mechanisms (MoH, 2010) as shown in figure1.

Figure 1: Distribution of real health financing expenditure sources (ZMK' billion)



Source: Ministry of Health; 2007-2010 NHA survey data

But government allocation to the health sector, calculated as a percentage of total the national budget stands at 8.5%, which is below the Abuja target of 15%. As a percentage of the Gross Domestic Product (GDP), health care spending represents

between 5.4% and 6.6%, which translate to approximately US\$ 28 per capita (NHSP 2011-2015).

Other sources of health care financing include user fees which, until the introduction of the User Fees Removal Policy for rural and peri-urban areas in 2006, represented about 4% of total health care financing. Even with the abolition of user fees, they continue to be a source of flexible financing for major hospitals like the University Teaching Hospital (UTH), Ndola and Kitwe Central Hospitals (MoH, 2012). Government also collects an earmarked 1% tax on interest earnings which contributes about ZMK8 billion to the Health Sector basket annually (MoH, 2012).

Private expenditure on health as a percentage of total health expenditure in 2010 on the other hand accounts for 67 percent of the total health expenditure. 24 percent was generated through general taxation while 2.3 percent of the total health expenditure was from private health insurance schemes (Masiye, Chitah & McIntyre, 2010; WHO, 2010). OOP payment as a percentage of total health expenditure was 27 percent (World Bank 2012; WHO, 2010). In a multi-country analysis undertaken by Leive and Xu (2008) to assess how households cope with OOP payments in 15 countries, Zambia was one of the countries with the highest prevalence of these out of pocket payments; ranking higher than some African countries like Malawi. Picazo and Zhao (2009) on the other hand reported that total health care spending as a percentage of GDP was 6 percent which translated to approximately US\$ 28 per capita. As a percentage of total health expenditure, government spending were 37 percent in 1995, 28 percent in 2000, 57 percent in 2004, whereas private prepaid spending as a percentage of total expenditure on health were 17 percent, 4.2 percent, 4.3 percent in 1995, 2000 and 2004. Nevertheless, estimates of government health expenditure and financing appear to differ in some of the literatures reviewed.

This may however be ascribed to the amount of donor funding in particular years, whether it was regarded as part of government health expenditure or not. Therefore, assessment of health care expenditures estimates in Zambia reveals that government expenditure as a share appeared to differ depending on whether donor funds were budget support or project support. This may therefore weaken the general taxes because external funding can be unpredictable or project specific.

1.3 Health care provision in Zambia

Zambia has a two tier medical system with considerable overlap. Approximately 2.3 percent (WHO,2010) of the population is covered by private medical insurance and makes use of modern, generally well-resourced, private sector facilities while over 80 percent (MoH/NHSP 2011 -2015) of the population depends on the state sponsored health-care of which the quality is quite variable according to geographical areas. A small but significant part of the population will access primary care in the private sector but will use the public sector for hospitalisation and specialised services.

The health sector in Zambia is liberalised and embraces diversity in ownership, though the Ministry of Health is responsible for the overall coordination and management of secondary level and tertiary health facilities, while Ministry of Community Development, Mother and Child Health (MCDMCH) is now responsible for overall coordination and management of all the health facilities providing primary health care such as district hospitals and health post (GRZ, 2012).

Despite a dual health care system with both public and private health services co-existing in Zambia, the government provides health care services which are heavily subsidised to the population through public health facilities throughout the country (MoH, 2012). The main public health provider is therefore the Ministry of Health and

the Ministry of Community Development, Mother and Child Health that provide primary, secondary and tertiary health care throughout various types of health facilities (such as health centres, district hospitals, general hospitals, central and tertiary hospitals).

Private providers also complement the health services provided by the government, though they mainly focus on curative services (MoH/NHSP, 2011-2015). Therefore, by ownership, the Zambian health sector can be divided into: public health sector, which includes health facilities and programmes under the Ministry of Health, the Ministry of Community Development Mother and Child Health, and some government line ministries and departments like Military hospitals; faith-based health sector, under the coordination of the Churches Health Association of Zambia (CHAZ); the private sector, including for-profit health services, owned by private investors, and the traditional (alternative) health sector, which however operates informally and not regulated or monitored by the Ministry of Health (MoH/NHSP, 2011-2015).

Zambia's health care system is also organized around a referral flow system that has the same structure as the overall administrative system in the country, delivering health services through several health posts, health centres, and at least one district hospital in each of Zambia's 103 districts¹ at the first level (or district/primary) of referral, one second-level (or provincial/secondary) hospital (commonly referred to as a general hospital) in each of the ten provinces and four central hospitals (i.e. University Teaching Hospital, Ndola Central Hospital and Kitwe Central Hospital, and Chainama Mental Hospital) in the whole country that function as third-level (or tertiary) hospitals (Wake, 2008; MoH/NHSP, 2011 - 2015).

The services provided at each level of care are however defined by the Basic Health Care Package recommended by the Health Professions Council of Zambia (HPCZ) in the Health Professions Act of 2009, formally known as the Medical Council of Zambia (MCZ). According to Nachuk and Kundra (2008) and Ministry of Health (2006), these health facilities are differentiated in terms of coverage as follows:

Health posts are intended to cater to populations of 500 households (3,500 people) in rural areas and 1,000 households (7,000 people) in the urban areas, or to be established within a five-kilometre radius in sparsely populated areas.

Health centres include Urban Health Centres, which are intended to serve a population of 30,000 to 50,000 people, and Rural Health Centres, serving a catchment area within a 29-kilometer radius or population of 10,000.

First-level referral hospitals are found in most of the 103 districts¹ of Zambia and are intended to serve a population of between 80,000 and 200,000 with medical, surgical, obstetric, and diagnostic services, including all clinical services to support health centre referrals.

General hospitals are second-level hospitals at the provincial level and are intended to cater to a catchment area of 200,000 to 800,000 people, with services in internal medicine, general surgery, paediatrics, obstetrics and gynaecology, dental, psychiatry, and intensive care. These hospitals are also intended to act as referral centres for the first-level institutions, including the provision of technical backup and training functions.

¹ The number of districts has increased from 74 to 95 following creation of 21 more districts by the current PF government

Central hospitals are for catchment populations of 800,000 and above, and have sub specializations in internal medicine, surgery, paediatrics, obstetrics, gynaecology, intensive care, psychiatry, training, and research. These hospitals also act as referral centres for second level hospitals.

There are also some indications that inequalities exist in the health care provision. For instance, over 80 percent of the population access health care from the public health system of which the quality is quite variable according to geographical areas, while the remaining 20 percent access care from mission facilities and other private health care institutions (CSO, 2008; MoH/NHSP, 2011 - 2015). Health centres are however the main providers of primary health services with those in rural areas catering for up to 5000 households while those in urban areas serve as many as 20,000 households (Masiye, Chitah & McIntyre, 2010). The public sector is thus overwhelmed by the volume of the users.

1.3.1 Distribution of health facilities in Zambia by ownership

The different types of health care providers are distinctly concentrated in different parts of urban and rural Zambia. Nonetheless, Ministry of Health and Ministry of Community Development Mother and Child Health facilities are found throughout the country though, in general, most facilities are concentrated in urban areas with most of its personnel and expenditures located along the urban areas (Berman et al., 1995; MoH/NHSP, 2011 - 2015). For instance, Mine hospitals and clinics, most of which are now under government control, are almost exclusively located on the Copperbelt. While, Mission hospitals are located mostly in rural areas of the more peripheral and poorer districts of the country, for-profit (private) facilities are limited to the urban centres, with private hospitals located almost exclusively along the line of rail (urban areas). The private sector (for-profit) is however responsible for a (14.6

percent) part of the health care delivery system in Zambia, while a larger (79 percent) share of the sector is under government control and the remaining share of about 6.3 percent is under the control of missionaries ((MoH/NHSP, 2011 - 2015).

While the distribution of health facilities mostly reflects demand factors (i.e. the higher cash incomes and population densities in urban areas), the distribution of private hospitals are closely parallels to the distribution of health care providers by the Ministry of Health. Further, most of these hospitals are staffed by a mix of full-time private physicians and part-time assistants, who hold full-time jobs elsewhere in Ministry of Health facilities (Berman et al., 1995). The supply of private health facilities is therefore closely related to the supply of medical personnel in the public sector.

The number of public sector Medical Officers, Medical Licentiatees, Clinical Officers, Nurses and Midwives (clinical HWs) as of December 2009 was 0.93 per 1,000 populations (CSO, 2009). These numbers are nevertheless skewed towards the urban areas, leaving the rural areas extremely vulnerable. As a result, public facilities in rural and remote areas have the lowest number of health workers, compared to urban areas. It is estimated that rural areas have seventy (70) clinical health care workers per 100,000 populations relative to one hundred fifty nine (159) per 100,000 in urban areas. The situation is so severe that there are still a number of Health facilities in the rural areas which are run by unqualified staff or only one qualified staff (MoH/NHSP, 2011–2015; World Bank, 2012).

1.4 Statement of the problem

Zambia has been struggling to meet the financial burden of escalating demand for health services arising from rapidly growing populations and changing disease patterns. Zambia like many other developing countries is overwhelmed by low absolute levels of investment in health, inequalities and elevated proportion of non-pooled out of pocket spending. The challenge thus remains for government to implement a health financing strategy that not only involves ensuring equitable financial access to quality health services, but also guarantees protection from financial devastation that comes with paying for health services (Collins et al., 1996; Masiye, Chitah & McIntyre, 2010).

Immediately after attaining independence, the Zambian government, compelled by the desire to fulfil its election manifesto, and guided by a socialist ideology, embarked on a large social programme. An important component of that programme was a rapid improvement of access to modern health care facilities for all Zambians through an increase in public financing and provision of health care. The realisation of this goal was assisted by Zambia's small population and an expanding economy, fuelled by large foreign exchange earnings from copper that allowed for large public sector allocations to the health budget (Wake et al., 2008). During these times of prosperity, privately owned (for-profit) hospitals and clinics were however discouraged as the state could afford to provide free quality health care to its people. For example, in an international comparison, Hanson and Berman (1995) found that the proportion of Zambia's private (for profit) health sector was small compared with other countries in the region.

But between 1974 and 1994, (after the first and second oil crises), the price of copper rapidly decreased, and Zambia's economy collapsed at an internationally

unprecedented rate. During this period, per capita income decreased by 50% and Zambia became the 25th poorest country in the world (Nachuk & Kundra, 2008). As the economy progressively worsened, so did public sector financing, yet health and education bore the brunt of this rapid and dramatic fall in economic performance. Hence, resource allocation to the health sector for example, dropped from US\$26 per capita in the 1970s to US\$6 per capita in the 1990s (Nakamba et al., 2002). During this period, the health system encountered a number of challenges that included the following: reduced funding and inequity in the distribution of resources; deterioration of morbidity and mortality indicators due to the poor quality of health services and increased demand for health care services resulting from an increase in population, especially in urban areas (mainly due to rural-urban migration).

These challenges however undermined equity in financing health care. Therefore, in addressing these challenges, user fees were introduced in all public health facilities in 1993 (CSO, 2008). However, the introduction of user fees defined as payments levied at the point of use of any element of public health services and may include registration cost, consultation cost, or fees for drugs has been the subject of much debate since its inception (Lagarde & Palmer, 2011; Zikusooka et al., 2009). Promoters of user fees argue that they are aimed at increasing funds to the health sector; reducing unnecessary consumption of health care services; increasing quality of services available; and consequently increasing utilisation of services (Lagarde & Palmer, 2011). Notwithstanding, recent evidence shows the negative impact of introducing user fees on health service utilisation. For instance, the uptake of curative services decreased in Kenya, Burkina Faso and Papua New Guinea following the introduction of user fees. Whether or not this decrease continued over time is nevertheless uncertain. Further analysis shows that user fees have failed to

achieve any of the success criteria initially outlined and have proven to be a discriminatory, ineffective, and uneconomical financing mechanism because contributions are expected to be made regardless of an individual's ability to pay.

Apart from the direct costs of health services, poor people encounter other economic barriers such as high transport costs, and the opportunity cost of missing work. As a result, the fusion of indirect costs and out of pocket payments has in actual fact prohibited poor people from the formal health-care system. Opponents of out of pocket payments on the other hand argue that these payments are often made through anguish, selling of assets, high interest loans from local money lenders, borrowing from relatives or friends and, therefore, inflict financial burden and poverty on some households seeking care and they do not provide any protection from devastating illness, and affects the poor most of all (Lagarde & Palmer, 2011; Masiye, Chitah & McIntyre, 2010). User fees were also seen to impose financial hardship and financial barriers to access health care in some countries especially in developing countries like Zambia.

Certainly, this policy on cost recovery through user fees did not last so long. The late 1990s, for instance, witnessed a renewal of interest in equity (Gwartkin et al., 2004) with evidence particularly from African countries starting to show that the expectations of cost recovery policies have not been fully met (Jones, 2006). In 2006, Zambia removed user fees at all the public facilities in rural areas and in November 2011 user fees for primary healthcare were further eliminated in urban areas, but were maintained at tertiary hospitals such as the University Teaching Hospital (UTH) and Central hospitals in Ndola and Kitwe (Cuesta, Suarez-Becerra & Kabaso, 2012; Ministry of Health, 2011).

Following the removal of user fees, a recent study reported that utilisation of health services has increased by 50 percent, particularly among the population aged 5 years and above, living in rural areas (Masiye, Chitah & McIntyre, 2010). These results reflect those of other countries such as Uganda, where user fees were abolished in 2001 and subsequent studies showed that the most poor benefited more (Yates, 2009). Of great concern is that although removing user fees may lead to increased utilisation of health services, the quality of health care in most cases may be compromised because of the scarcity of finances to support the adequate provision of drugs and skilled health workers in health facilities and the decline in the quality of health services may cause some consumers to go to private facilities where they are forced to pay higher fees thereby making them poorer (Anyangwe, Mtonga & Chirwa, 2006; Gottret & Schieber, 2006).

Currently, there has been a great deal of interest among international organisations (World Bank, 2005; WHO, 2000; WHO, 2005) in developing health financing systems that ensure that people have access to health care without facing financial hardships. Zambia is however in the process of implementing these financing reforms (social health insurance scheme) (MoH, 2012). Although equity has long been considered as an important goal in the health sector as stated in the Ministry of Health vision, inequalities between the poor and the better off persist (World Bank, 2012).

As a result, the poor tend to suffer higher rates of mortality and morbidity than do the better-off (CSO, 2012). They often use health services less, despite having higher levels of need (Phiri, & Ataguba, 2014). Thus, the “inverse care law” which was described by Tudor (1971) more than three decades ago, and according to which the poor shoulder the greatest burden of the disease and receive a smaller share of

health care than do healthy and better off people, remains alive. Consequently, the poor and disadvantaged often face greater disease and financial burden (World Bank, 2012). Indeed, some non-poor households may be made poor precisely because of health shocks that necessitate out of pocket spending on health.

Hence, as countries like Zambia commit to improving equity in health care financing through the implementation of health financing reforms that are aimed at improving health financing and debate increases on the relative merits and demerits of various financing mechanisms, it is important that better evidence be made available on equity implications. For instance, the WHO Health Financing Strategy for Africa (2006) stressed that government must strive to not only ensure equitable financial access to quality health services; but also guarantee protection from financial devastation that comes with paying for health services.

Further, the 58th World Health Assembly (2005) recommended that Member States like Zambia should ensure that health financing includes a prepayment scheme of financial contributions in order to increase risk-sharing and protect citizens against financial devastation and impoverishment linked to paying for health services. This is because prepayment enables pool members to make advance payments for average expected expenditures, thereby lessening uncertainty and ensuring equity in financing (Zikusooka et al., 2009).

On the other hand, World Health Organisation (2010) urged member states to aim for affordable universal health coverage for all citizens on the basis of equity. Although the generally accepted core of universal health coverage is that the health system should be financed in accordance with the ability to pay (Mills et al., 2012), health care financing should however not only relate to who pays and who receives

the benefit, but also to their effects on the distribution of income (van Doorslaer et al., 1999). This is because of the effect that financing health care can have on income distribution despite its primary core of providing resources to the health sector (Bilger, 2008; Ataguba, 2010).

Since financing health care impacts on income distribution in a country, it is generally agreed that a progressive health care financing system, that places less burden on the poor than the rich, is preferred to a regressive one. As a result, regressive health care financing is normally regarded as inequitable (Wagstaff, 2002) and unfair. Thus, this lack of a health care financing strategy that provides financial protection in the health sector in Zambia implies that many households, rural and urban, face a financial burden when seeking health services. However, some countries where out of pocket payments have remained predominantly high have introduced user fee exemptions as a measure of equity. But many empirical studies have shown that user fees exemptions have not rightly been implemented and targeted (McIntyre et al., 2010).

For example, Zambia introduced exemption policies soon after the introduction of user fees. Implementation of these policies in Zambia like in many other countries has however been found to be very ineffective in reaching the target population (Masiye, Chitah & McIntyre, 2010). Hence the equity objectives they were meant to achieve were not successful. Certainly, in other countries like Ghana and Tanzania (Mill, 2012) out of pocket payments are replaced with alternative mechanisms of health care financing such as prepayment schemes (such as mandatory health insurance schemes) which do not require people to pay at the point of use of health services. Nonetheless, prepayment schemes (e.g. voluntary private prepayment) in Zambia are almost insignificant and where they are found they are only accessible

by people of high socio-economic status. This is a small proportion of the Zambian population.

On the other hand, out of pocket payments defined as payments made by households directly to health providers at the point of receiving health services may not be a good source of health care financing. This is because payments are mostly made at the point of use of health services. This tends to be inequitable in the sense that both the poor and rich are made to face similar health costs (e.g. in countries where there are no sliding payments for OOP).

But equity in financing requires that payments are made according to ability to pay (ATP). This is a desirable policy objective in most countries, both developing and developed. For this reason, health financing reforms ought to reduce inequities due to OOP payments and public funding system. This study therefore intends to provide empirical evidence on redistributive effect of two broad mechanisms of health care financing (general tax and out of pocket payment) in Zambia. The study thus seeks to answer the following questions:

1.5 Research Questions

1. What is the nature of the income redistributive effect of public health finance (general tax) in Zambia?
2. What is the nature of the income redistributive effect of out of pocket (OOP) payments for health care in Zambia?
3. What is the overall pattern of income redistributive effect of health care financing in Zambia?

4. What are the implications of the current income redistributive effect of health care financing for pursuing universal health coverage in Zambia?

1.6 Research objectives

1.6.1 Main objective

The main aim of the study is to assess the income redistributive effect of two broad health care financing mechanisms (general tax and out of pocket payments) in Zambia.

1.6.2 Sub objectives

- 1 To investigate and describe the nature of the income redistributive effect of public health finance (general tax) in Zambia
- 2 To assess and describe the nature of the income redistributive effect of out of pocket (OOP) payments for health care in Zambia
- 3 To establish the overall pattern of income redistributive effects of health care financing in Zambia
- 4 To analyse and describe the implications of the current income redistributive effects of health care financing for pursuing universal health coverage in Zambia

1.7 Significance of the study

The need for health care financing mechanisms that are equitable in Zambia cannot be over-emphasized. It is necessary that health care financing mechanisms are in such a way that they are related to ability to pay. Thus, the significance of this study is to inform and support the on-going policy dialogue with empirical based evidence about equity performance of the health sector and reforms needed to enhance equity

as well as expand our knowledge of the characteristics of equity as a basis of addressing these inequalities.

Certainly, the starting point in considering equity in financing health care is the requirement that health care ought to be financed according to the ability to pay (O'Donnell et al., 2008). This is the principle of vertical equity, which requires that individuals with unequal ability to pay should pay disproportionately unequally. Consequently, an equitable health care system would be one in which payments for health care are positively related to the ability to pay. However, it is not still clear whether or not the existing health care financing mechanisms (out of pocket payments and tax) are equitable and can foster equity in the financing of health care in Zambia. This study will thus provide an empirical assessment of income distribution of financing health care in Zambia and its equity implications. Such evidence is important in formulating policies that will provide for an equitable health financing system in the country.

This study will also employ new methodological tools that have been developed to improve the measurement of equity in financing health care by decomposing these financing mechanisms. Therefore, it is not adequate only to talk about inequalities, but also necessary to demonstrate objectively the existence of inequalities that are not only unfair and unjust, and yet mutable (Andersen, 1995).

Even though there is considerable amount of theoretical literature on equity in health care financing, very few studies if any have attempted to look at the income redistributive effect of public finance (general tax) and out of pocket (OOP) payments for health care in Zambia. In the past, for example, most studies on healthcare financing in developing countries like Zambia have focused on describing

distributions of health spending by socioeconomic groups, using simple tabulations and summary indices as opposed to decomposition methods employed in the context of developed countries (McIntyre et al, 2005).

This study will therefore contribute to a better understanding of health care financing inequities arising from two broad health care financing mechanisms; general tax and out of pocket (OOP), and their implications as the country plans to move towards universal health coverage. It is also intended that the findings of this study will be used to inform future development and implementation of policy on health care financing reforms in Zambia.

This study therefore investigates the extent to which financing health care in Zambia redistributes income, particularly whether or not it reduces income inequality. This study, thus, seeks to decompose health care finances into horizontal, vertical and re ranking.

2. Research methodology

This study uses the Aronson- Johnson and Lambert (1994) methodology (hereafter AJL) to evaluate income redistribution associated with paying for health care in Zambia and adopt the conceptual and analytical frameworks for analysing financing equity using household survey data proposed by O'Donnell et al (2008). This framework has been widely used in many studies on progressivity and redistributive effect of health financing for analysing how equitable OOP payments and taxes are in financing health services (Wagstaff & van Doorslaer, 1992; van Doorslaer et al., 1999; O'Donnell, van Doorslaer et al., 2008).

Aronson et al (1994) model demonstrated that redistributive effect can be decomposed into three components; progressivity effect (V), horizontal equity (H)

and re-ranking(R). By simultaneously revealing these three different dimensions of equity, the AJL decomposition constitutes a useful tool for assessing the fairness of health system financing (Bilger, 2008). van de Ven et al. (2001) (hereafter VCL) on the other hand showed that the expression of the AJL decomposition is not adequate when near-equal households are grouped, and proposed a criterion for choosing the bandwidth. However, this criterion requires financing to be progressive, which is not the case with many financing sources of the health system like in Zambia. Furthermore, VCL do not solve the theoretical problem raised by grouping, which is not to measure the horizontal inequality in the classical sense (Bilger, 2008).

Moreover, a measure of redistributive effect that has gained some attention in income redistribution studies is the Reynolds and Smolensky Index (Reynolds & Smolensky, 1977). There is however a fundamental assumption underlying the Reynolds and Smolensky (1977) index that assumes horizontal equity (equal treatment of equals) (Ichoku, 2006). Horizontal inequity is however more likely to be the norm rather than an exception (Ichoku, 2006). Indeed, the Reynolds & Smolensky (1977) index has further exposed another weakness of not taking into account the reranking effect. This calls for the model like the AJL that decomposes health care financing mechanisms into V, R and H.

The overall influence of a given financing on income redistribution can thus be measured by ways of redistributive effect (RE), defined as difference between the pre and post financing inequalities indices (Reynolds & Smolensky, 1977). This method of decomposition is especially useful for cross sectional data like the one to be used for this study (Lambert, 1993).

Although, one way of measuring the redistributive effect of any payment on the redistribution of incomes is to compare the inequality as measured by the Gini coefficient of pre-payment income with the inequality in post-payment incomes, the redistributive impact can be defined as the reduction in the Gini coefficient caused by the payment. Hence,

$$RE = G^X - G^{X-P} \dots\dots\dots (1)$$

where G^X and G^{X-P} are the pre-payment and post-payment Gini coefficients respectively, where X denotes pre-payment income, or more generally some measure of ability to pay (O'Donnell & Wagstaff, 2008; Wagstaff & Van Doorslaer, 2001), and P denotes the payment. However, Aronson, Johnson and Lambert, (1994) showed that equation (1) RE can be written as;

$$RE = V - H - R \dots\dots\dots (2)$$

where V is vertical redistribution, H is horizontal inequity and R is the degree of reranking.

The horizontal effect (H) and re-ranking (R) effects however can never be negative. The vertical effect (V) on the other hand measures the progressivity or regressivity of the financing in the absence of both the H and R . In order to be able to distinguish and compute these components, there is need to artificially create groups of pre-payment equals. This is done by defining certain pre-payment income intervals, and then labelling all households with incomes in that range as equals. Equation (2) is therefore an important result because it reveals that a progressive financing has a reduced redistributive power in the presence of horizontal inequality or re-ranking (Bilger, 2008).

But, the pursuit of equity in health care financing is embedded in various theories of distributive justice that defines how countries handle equity in health care. The way a country defines equity in health care financing depends on which theory of social justice they follow, that is for example, egalitarian or libertarian. The egalitarian viewpoint suggests that a state sector should predominate, with health care being distributed according to “need” and financed according to “ability to pay”. The libertarian viewpoint, suggest a mainly private health care sector, with health care being rationed primarily according to willingness and ability to pay (Wagstaff & van Doorslaer, 1998). Therefore, this study follows the egalitarian perspective where health care is financed according to ability to pay.

2.1 Scope of the study

This is a quantitative study restricted to two mechanisms of health care financing; general tax and out of pockets payments. By narrowing down to two mechanisms of health care financing (general tax and out of pocket payments), the study excludes donor funds and private health insurance as they are very low (2.3% as private prepaid of total health expenditure in 2011 according to 2010 WHO data base), Although there is a significant donor funding to the health care, it will not be measured separately, because the burden of grants falls on citizens of the donor country and interest payments on loans are paid back through general tax revenue. The burden will therefore be captured through tax incidence analysis. However, assessment of income redistribution effect in health care finance requires examination of all sources of health sector funding and not simply those payments that are made exclusively for health care.

So, in addition to out of pocket payments defined as payments made by households directly to health providers at the point of receiving health services as well as

earmarked health taxes, the distributional burden of all direct and indirect taxes is relevant in this case where some health care is financed from general government revenues.

Out of pocket payments are however not reimbursed by any prepayment scheme. They could either be paid at a public or private facility. In this analysis, out of pocket payments will include costs of medicines, fees to medical personnel (e.g. Doctors / Medical Assistant / Nurses /Dentist, etc.), payments to hospital/health centre/surgery and fees to traditional healers. Nevertheless, expenditure on health-related transportation will be excluded. This circumvents imputation of transport costs for households using private means of transportation. Hence, total out of pocket payments for each household will be adjusted by adult-equivalent household size to reflect each household member's out of pocket payments payment experience.

While on direct tax, personal income tax will be calculated using household reported income and reported consumption expenditure as a proxy of income and compared with reported income tax. Since, there is no consensus in the literature as to how to deal with corporate income tax in terms of incidence assumptions (Nevin 1963; Bradford, 1981; Kotlikoff & Summers, 1987) and it is generally assumed that shareholders and consumers bear the burden of the tax through lower profits and higher prices on goods and services respectively (Martinez & Vasquez 2001). It has however been observed that a market condition and extent of competition can affect the allocation of the burden of the corporate tax, with consumers being more likely to bear the burden as the degree of monopoly power increases (Herberger 1962; Mtei & Borghi, 2010).

Three scenarios will therefore be considered for the calculation of corporate tax: Initially, consumer bear all corporate tax through an increase in commodity prices; it therefore implies that corporate tax revenue will be allocated to households based on their share of consumption of domestically manufactured goods and services. Secondly, that shareholders bear all corporate tax through reductions in dividends, this means that corporate tax will be allocated to the households in the first and second richest quintiles who reported owning dividends, based on their share of total dividend ownership. As a result, one would expect shareholders to be concentrated among the higher income groups. And finally that the burden of corporate tax is shared equally between consumers and shareholder hence, the burden of corporate tax is assumed to be shared evenly between households consuming domestically manufactured goods and dividend owners. The incidence of consumption taxes will therefore be analysed by applying a respective tax rate to the reported consumption of goods and services which qualify for such taxation.

Wagstaff and van Doorslaer et al. (1999), for example, posit that assumptions must also be made about distributions of financing sources that cannot be estimated from the survey data. It will therefore be assumed that missing direct taxes are distributed as a weighted average of the direct taxes for which distributions can be estimated and likewise for indirect taxes. Non-tax government revenues are nevertheless assumed to be distributed as a weighted average of all other payments. Thus, the study will consider the distribution of financing across the domestic population only and so exclude foreign aid completely from the analysis.

In this study, observations with zero or a missing value of disposable income will be eliminated from the data while household weights will be applied for the calculation of Gini coefficients. We will also describe payments for health care both in the

aggregate by source and at the household level, in relation to ability to pay (ATP). To do this, both macro and micro data will be used. The macro data will be mostly from National Health Accounts (NHA) estimates while micro data will be from household expenditure or socio-economic surveys.

In order to describe the distribution of total health payments in relation to ability to pay, we will combine the micro and macro data. The micro data will give the distribution of each of the two mechanisms of health care finance, while, the macro data will provide the weight to be attached to each distribution when aggregating to obtain the distribution of total payments.

2.2 Data sources

Household surveys are implemented on a regular basis in many countries and are probably the most important source of data for health equity analysis (O'Donnell et al, 2008). In this study, the latest 2010 Zambia Living Condition Monitoring Survey (LCMS) data were used to analyse income redistribution of out of pocket payments and taxes. The LCMS was conducted by Central Statistical Office (CSO) between January and April 2010 and CSO used a two staged stratified cluster sampling design (CSO, 2010).

The 2010 LCMS collected data on the living conditions of households and persons in the areas of education, health, economic activities and employment, child nutrition, death in the households, income sources, income levels, food production, household consumption expenditure, access to clean and safe water and sanitation, housing and access to various socioeconomic facilities and infrastructure such as schools, health facilities, transport, banks, credit facilities and markets (CSO, 2010).

The merits of using this kind of the data are that the data are nationally representative of the country as well as for subpopulations. The survey has also rich data on health, living standards, and other complementary variables. Furthermore, the LCMS is often conducted on a regular basis. It is used to update the consumer price index in the country. Notwithstanding the potential for using the LCMS dataset for health equity analysis, it is important to be aware of the common weaknesses of such data. In particular, sampling and non-sampling errors can be important and the data may not be representative of very small subpopulations.

From the many variables in the data set, analysis was based on those variables that are related to household income, total number of persons in a household and household weight (which is used in order to correct for sample bias or non-sampling errors) to measure income inequality and the redistributive effect.

For each of the health financing mechanisms (taxes and direct out-of-pocket payments), each household's total payments was therefore estimated using standard assumptions made in health care financing incidence studies (O'Donnell et al., 2008). However, for taxes, only the proportion of tax revenue that is allocated to the health sector was considered.

Hence, the assumption was that an equal proportion of each tax category is allocated to health care funding. The following tax categories were therefore considered: personal income tax, corporate income tax, value-added tax (VAT), fuel levy, and excise taxes.

2.3 Research design

This is a cross sectional study carried out on 2010 Zambia Living Condition Monitoring Survey (LCMS). A cross-sectional design is chosen specifically to meet the study's objectives.

2.4 Study population

The unit of analysis is an important issue in income distribution studies. It is evident that the ultimate source of concern is the welfare of the individual. However, an individual is often not the appropriate unit of analysis. For instance, children and spouses working at home do not have recorded income, but may nevertheless be enjoying a high standard of living as a result of income sharing with parents and spouses.

Studies have used the household income per capita (or per member) measure to adjust total incomes according to the number of persons in the household. However, in the last decades, equivalence scales have been widely used in the literature on income distribution (Figini, 1998). Therefore, the unit of analysis in this study will be the households and equivalent adult economies of scales will be applied following Deaton et al., (2002) recommendation. The survey consisted of approximately 20,000 households (i.e. 102,882 individuals) (CSO, 2010). However, in this study, as earlier stated, the unit of analysis is the household. After cleaning the data by excluding those with missing information on health expenditure and other variables of interest, a total of 19,397 households were left in the study for analysis.

2.5 Data analysis

Analysis of data for this study was carried out using the World Bank ADePT software for economic analysis (www.worldbank.org/adept). The ADePT software uses STATA codes developed by O'Donnell et al, (2008) in their manual which is widely used to analyse equity in health care financing using household data.

2.6 Ethics approval

The protocol was handed in to the ethics committee at the University of Cape Town Research and Ethics for ethical approval, and permission was sought from Zambia Central Statistical Office to use their dataset. Once ethical approval was granted and permission given, data analysis began immediately. Since, this study was based on secondary dataset; the analysis did not at all contain information on any single individual or household in the dataset. The dataset used was already coded and no individual or household could be identified.

2.7 Stakeholders and report dissemination

A copy of the thesis report and findings will be publicly available to all the stakeholders. Particularly, the policy recommendation section of the thesis will also be publicly available and disseminated to all the stakeholders including Ministry of Health, Zambia. In addition, findings of this research are presented in a manuscript of an article for submission to an appropriate peer reviewed journal. Additionally, a policy brief will be published. While research findings will be presented at any appropriate conference(s).

2.8 Limitations

Anticipated limitations of the study relates to the use of the secondary data in the assessment of the income redistribution of health care financing mechanisms. The LCMS is a large National household survey of reported income and expenditure. This national dataset has been designed for several purposes such as monitoring the living conditions of the Zambian population. In addition, the scope, focus, and measurement approaches can vary across surveys and over time, limiting the scope for comparisons across countries.

2.9 Logistics

Once dataset is obtained, data analysis will commence immediately. Table 1 and 2 below summarized the work plan and a budget.

Table 1: Work Plan

Activities	November-December 2013	January 2014	February 2014	March 2014	April 2014	May 2014	June 2014
Protocol writing							
Structured literature review							
Data analysis							
Manuscript							
Submission							

Table 2: Budget

S/No	item	Description	Rate (ZAR)	Quantity	Total Cost(ZAR)
1	Transport	Data collection	3500	1	3500
		Travel expenses	3000	2	6000
2	stationary	Protocol	0.5/page	30 pages	15
		Manuscript	0.5/page	30 pages	15
		Policy Brief	0.5/page	6pages	3
		Binding	30 per copy	3	90
		Data storage device(CD, USB drive)	200	1	200
3	Communication	Internet (bundles)per month	400	6	2400
4	Dissemination	Conference/seminar	4000	1	4000
5		TOTAL			18,223

Reference

- Andersen, R. & Newman J.F. 1973. Societal and individual determinant of medical care utilization in the US. *Milbank Memorial Fund Quarterly Journal* 51:95- 124
- Anyangwe, S.C., Mtonga, C. & Chirwa, B. 2006. Health inequities, environmental insecurity and the attainment of the millennium development goals in sub-Saharan Africa: The case study of Zambia. *International Journal of Environmental Research and Public Health*. 3(3):217-227.
- Aronson, R., Johnson, P. and Lambert, P. 1994. Redistributive effect and unequal Income Tax Treatment. *Economic Journal*; 104; 262-270.
- Ataguba, J.E. & McIntyre, D. 2012. Paying for and receiving benefits from health services in South Africa: Is the health system equitable? *Health Policy and Planning*. 27(suppl 1):i35-i45.
- Ataguba, J. & Akazili, J. 2010. Health care financing in South Africa: moving towards universal coverage. *Continuing Medical Education*. 28(2).
- Berman, P. 1995. Zambia: Non-governmental health care provision. data for decision making project, department of population and international health, Harvard School of Public Health, Boston, Massachusetts
- Bilger, M. 2008. Progressivity, horizontal inequality and reranking caused by health system financing: A decomposition analysis for Switzerland. *Journal of Health Economics*. 27(6):1582-1593. DOI:<http://dx.doi.org/10.1016/j.jhealeco.2008.07.009>.
- Bradford, D. F. 1981. The incidence and allocation effects of a tax on corporate distributions, *Journal of Public Economics* 15: 1-22.
- Central Statistical Office, 2010 . Zambia census of population and housing, Lusaka, Zambia www.zamstats.gov.zm/about_us/abt_publications.htm, accessed on 4th December, 2013
- Central Statistical Office ,2008. The 2006 Zambia Living Conditions Monitoring Survey. Lusaka: Zambia. www.zamstat.org.zm, accessed on 7th January, 2014.
- Central Statistical Office, 2007, Zambia demographic and health survey, Lusaka , Zambia www.zamstat.org.zm, accessed on 24th November, 2013.
- Chuma, J., & Okungu, V. 2011. Viewing the Kenyan health system through an equity Lens: implications for universal coverage. *International Journal for Equity in Health*, 10:22. doi:10.1186/1475-9276-10-22
- Collins, D., Quick, J., Musau, S., Kraushaar, D. & Hussein, I. 1996. The fall and rise of cost sharing in Kenya: The impact of phased implementation. *Health Policy and Planning*. 11(1):52-63.
- Cuesta, J., Suarez-Becerra, P. & Kabaso, P. 2012. How pro-poor and progressive is social spending in Zambia? Washington D.C. World Bank Publications

- Deaton, A. & Zaidi, S. 2002. Guidelines for constructing consumption aggregates for welfare analysis. LSMS Working Paper Number 135, Washington D. C. World Bank Publications.
- Gottret, P.E. & Schieber, G.J. 2006. Health financing revisited, Washington D.C. World Bank Publications.
- Government of the Republic of Zambia, 2012. Joint press release on the reorganization of the health sector, Lusaka, Zambia
- Government of the Republic of Zambia, Ministry of Health , National Health Strategic Plan 2011-2015; Towards attainment of health related millennium development goals and other national health priorities in a clean, caring and competent environment, Lusaka, Zambia
- Gwatkin, D. R., Bhuiya, A. and Victora, C. G. 2004. Making health systems more equitable. *The Lancet*;365;9441;1273-1280.
- Health Professionals Council of Zambia. 2009. Health professions Act, 2009. Lusaka, Zambia
- Herberger, A. C. 1962. The incidence of corporation income tax. *Journal of Political Economy* 70:215 - 240.
- Jones, A.M. 2006. *The Elgar companion to health economics*. Edward Elgar Publishing Ltd, UK.
- Kakwani, N. 1977.Measurement of tax progressivity: An international comparison. *Economic Journal*; 87; 345; 71-80.
- Kotlikoff, L. J. and L. H. Summers 1987. Tax incidence. *The Handbook of Public Economics*, 1043 - 1092. Amsterdam, North-Holland.
- Lagarde, M. & Palmer, N. 2011. The impact of user fees on access to health services in low-and middle-income countries. *Cochrane Database syst rev.* 4(1).
- Lambert, J. P. 1993. *The distribution and redistribution of income: A mathematical analysis*. Manchester, Manchester University Press.
- Leive A & Ke Xu, 2008. Coping with out of pocket health payments: Empirical evidence from 15 African countries. *Bulletin of the World Health Organization* 86(11) 849-856.
- Mackenbach JP, Stirbu I, Roskam AJR, Schaap MM, Menvielle G,Leinsalu M, Kunst AE 2008. socioeconomic inequalities in health in 22 European countries. *N Engl J Med* 358:2468–2481
- Masiye, F., Chitah, B.M. & McIntyre, D. 2010. From targeted exemptions to user fee abolition in health care: Experience from rural Zambia. *Social Science and Medicine*. 71(4):743-750.

- Martinez-Vasquez, J. 2001. The impact of budgets on the poor: tax and benefit incidence. International Studies Program, Working paper 01-10. Georgia State University**
- McIntyre, D., Gibson, L. & Mutyambizi, V. 2005. Promoting equitable health care financing in the African context: Current challenges and future prospects. EQUINET. Harare**
- Mills, A., Ataguba, J.E., Akazili, J., Borghi, J., Garshong, B., Makawia, S., Mtei, G., Harris, B. et al. 2012a. Equity in financing and use of health care in Ghana, South Africa, and Tanzania: Implications for paths to universal coverage. The Lancet. 380(9837):126-133.**
- Ministry of Finance. 2011. Sixth National Development Plan 2011 – 2015. Ministry of Finance and National Planning, Lusaka. Zambia. www.mofnp.gov.zm, accessed on 18th November, 2013**
- Ministry of Finance, 2010. Budget speech-2010, Government of the Republic of Zambia. Ministry of Finance and National Planning. Lusaka, Zambia. www.mofnp.gov.zm, accessed on 13th January, 2014**
- Ministry of Health, 2012. Report on design of social health insurance scheme for the Government of Zambia. Ministry of Health, Lusaka, Zambia. www.moh.gov.zm, accessed on 18th November, 2013**
- Ministry of Health, 2011. National Health Strategic Plan 2011-2015. Ministry of Health, Lusaka, Zambia. www.moh.gov.zm, accessed on 18th November, 2013**
- Ministry of Health, 2010. National Health Strategic Plan 2006-2010. Ministry of Health, Lusaka, Zambia. www.moh.gov.zm, accessed on 18th December, 2013**
- Ministry of Health, 2005. National Health Strategic Plan: 2006-2010. Ministry of Health, Lusaka, Zambia. www.moh.gov.zm accessed on 18th December, 2013**
- Mtei, G. & Borghi, J. 2010. Report on SHIELD Work Package. 2. An assessment of health care financing progressivity in Tanzania. Health Economics Unit, University of Cape Town**
- Nachuk, S. & Kundra, S.S. 2008. Public stewardship of private providers in mixed health systems.**
- Nakamba P., C. Hongoro, B., McPake, B. Chirwa and B. B. Sund. 2002. Health sector reform what about hospitals. The Case of Zambia (in eds. Par Ericksson, V. Diwan and I. Karlberg ,2002). The Nordic School of Public Health, Goteborg, Sweden**
- Nevin, E. 1963. Taxation for growth-A factor tax. Westminster Bank Review: 13 - 25.**

- O'Donnell, O.A. & Wagstaff, A. 2008. *Analysing health equity using household survey data: a guide to techniques and their implementation*. Washington D.C. World Bank Publications.
- Pereira, J. 2009. *Zambia aid effectiveness in the health sector*, Lusaka, Zambia
- Picazo, O.F. & Zhao, F. 2009. *The Zambia health sector public expenditure review: accounting for resources to improve effective service coverage*. Washington D.C. World Bank Publications.
- Phiri, J. & Ataguba, J.E. 2014. Inequalities in public health care delivery in Zambia. *International Journal for Equity in Health*. 13(1): .
- Smits J, Monden C ,2009. Length of life inequality around the Globe. *Soc Sci Med* 86:1114–1123
- Sambo, G L, Kirigia M J & Ki-Zerbo, G 2011, 'Health financing in Africa: overview of a dialogue among high level policy makers ', From fifteenth ordinary session of the assembly of the African Union Kampala, Uganda. 19-27 July 2010. *BMC Proceedings* 2011, 5(Suppl 5):S2, pp.1-5,
- Reynolds, M. & Smolensky, E. 1977. *Public expenditures, taxes, and the distribution of income: The United States, 1950, 1961, 1970*. Academic Press, New York.
- Tudor, H. J. 1971. The inverse care law: *Lancet*;1; 405-412.
- Van Doorslaer, E., Wagstaff, A., Van der Burg, H., Christiansen, T., Citoni, G., Di Biase, R., Gerdtham, U., Gerfin, M. et al. 1999. The redistributive effect of health care finance in twelve OECD countries. *Journal of Health Economics*. 18(3):291-313.
- van Doorslaer, E., Wagstaff, A., Bleichrodt, H., Calonge, S., Gerdtham, U. G., Gerfin, M., Geurts, J., Gross, L., Hakkinen, U., Leu, R. E., O'Donnell, O., Propper, C., Puffer, F., Rodriguez, M., Sundberg, G. and Winkelhake, O. 1997. Income-related inequalities in health: some international comparisons. *Journal of Health Economics*;16;1;93-112.
- Wagstaff, A. 2002. Reflections on and alternatives to WHO's fairness of financial contribution index. *Health Economics*. 11(2): 103-115.
- Wagstaff, A. & Doorslaer, E. 2001. *Paying for health care: quantifying fairness, catastrophe, and impoverishment, with applications to Vietnam, 1993-98*. World Bank Policy Research Working Paper. 2715: .Washington D.C, World Bank.
- Wagstaff, A. and van Doorslaer, E. 2000. Measuring and testing for inequity in the delivery of health care. *Journal of Human Resources*; 35;4;716-733.
- Wagstaff, A. and van Doorslaer, E, 2000. Equity in health care finance and delivery. In: Culyer, A. J. and Newhouse, J. P. (Eds), *Handbook of Health Economics*. vol.1. Elsevier: North Holland; 1803-62.
- Wagstaff, A. and van Doorslaer, E. 1997. Progressivity, horizontal equity and reranking in health care finance: a decomposition analysis for the Netherlands. *Journal of Health Economics*;16;5;499-516.

- Wagstaff, A. & van Doorslaer, E. 1993. Equity in the finance of health care: concepts and definitions. In: van Doorslaer, E., Wagstaff, A. & Rutten, F. (eds.) Equity in the finance and delivery of health care: an international perspective. Oxford: Oxford University Press
- Wagstaff, A. & van Doorslaer, E. 1992. Equity in the finance of health care: some international comparisons. *Journal of Health Economics*. 11(4): 361-387.
- Wagstaff, A., van Doorslaer, E. and Paci, P. 1989. Equity in the finance and delivery of health care: some tentative cross country comparisons. *Oxford Review of Economic Policy*;5;1;89-112.
- Wake, W., D. Mudenda, Sundewall J, Mphuka C. M Maimbolwa, W, Jonsson D, Forsberg ,2008. Private health care in Zambia: findings from provider and client surveys in two Districts, Unpublished Report
- World Bank. 2012. Health equity and financial protection report. Zambia. Washington, D.C.: World Bank Publications.
- World Bank. 2012. How pro poor and progressive is social spending in Zambia. Policy Research Working Paper 6052, Washington, D.C.: World Bank Publications.
- World Health Assembly, 2005. Sustainable health financing, universal coverage and social health insurance, resolution WHA58.33. Geneva: World Health Organisation
- World Health Organization, 2010. Health systems financing: the path to universal coverage. Geneva: World Health Organization
- World Health Organization, 2010. National Health Account Database, Geneva: World Health Organisation <http://apps.who.int/nha/database/DataExplorerRegime.aspx>.
- World Health Organization, 2000. The World Health Report 2000. health systems. Geneva: World Health Organization.
- World Health Organisation. 2006. Health financing: a strategy for the African region. Regional Committee for Africa; Fifty Sixth Session; Addis Ababa, Ethiopia, 28 August–1 September 2006. Geneva. World Health Organization
- Yates, R. 2009. Universal health care and the removal of user fees. *The Lancet*. 373(9680):2078-2081.
- Yazbeck, A.S .2009. Attacking inequality in the health sector. a synthesis of evidence and tools. Washington DC. The World Bank,
- Zikusooka, C., Kyomuhang, R., Orem, J. & Tumwine, M. 2009. Is health care financing in Uganda equitable? *African Health Sciences*. 9(2).

LITERATURE REVIEW

1. Introduction

This chapter reviews literature on relevant concepts for this study. Literature on equity in health care financing, measurement of progressivity and income redistributive effect studies are reviewed. The chapter begins by introducing the search strategies used in obtaining relevant studies, and defining key concepts used in the study. This is then followed by methods for measuring equity and income redistributive effect in health care financing, and a review of empirical studies on decomposing inequality in health financing mechanisms. The final part of this chapter is a summary of the literature reviewed.

2. Research strategies

Google Scholar and PubMed are the main search engines used to source relevant articles. Others include Science Direct and Science Citation Index. Key websites, including those of World Health Organisation and the World Bank, were also used for the search. The search terms used include “financing incidence”, “redistributive effect”, “progressivity and regressivity” and “health financing equity”. In this study, searches were however restricted to reports in English. Articles from both developing and developed countries were included in the review. An assessment of the quality of the evidence was done by critically reviewing the methods used in each study relative to the internationally established methods for financing incidence analyses and analyses of decomposition of redistributive effect of health care financing.

3. Definition of key concepts

In the following subsections, some key concepts that are used in this study are explained.

3.1 Equity in health care financing

Equity, like efficiency, is a goal that is pursued by policy makers in all types of health care systems. It is widely acknowledged to be an important goal in the field of health care (Wagstaff, Doorslaer & Paci, 1989). The pursuit of equity in health care financing is embedded in various theories of distributive justice that defines how countries handle equity in health care financing (Ataguba, 2012). Two generally dominant approaches to discussing equity are the egalitarian and libertarian approaches. Egalitarians would judge equity by assessing the extent to which health care is distributed according to need, and financing according to ability to pay (Wagstaff, Doorslaer & Paci, 1989). In contrast, the libertarian approach points towards a mainly private health care sector, with health care being rationed primarily according to willingness and ability to pay (Wagstaff, Doorslaer & Paci, 1989). However, when looking at health care financing, most policy makers and analysts appear to accept the principle that equity means that payments for health care should be according to ability to pay rather than in relation to the amount of health care received (O'Donnell & Wagstaff, 2008). Hence, equity in health care financing is mainly based on how progressive (or regressive) the health care financing mechanisms is (O'Donnell & Wagstaff, 2008).

Notwithstanding, one way of assessing equity in health care financing is to look at the relative progressivity of the health care financing mechanisms (e.g. general tax, out of pocket payments, private health insurance, social health insurance and

community based health insurance) individually and collectively (O'Donnell & Wagstaff, 2008).

4. Approaches to measuring equity in health care financing

Equity in health care financing is associated with financing health care according to ability to pay (Ataguba, 2012). On this Wagstaff, (2002 p.114) notes that “most policy makers feel comfortable with the ability principle as the underlying principle of health care finance” and it is “most unlikely that, if any, most interpreted this in terms of a hard and fast rule on proportionality.” But, it is rarely the case to have policy makers specify either how ability to pay is to be defined or the preferred progressivity relationship between payments and ability to pay (Ataguba, 2012;Wagstaff & Doorslaer, 2001; Wagstaff & van Doorslaer, 1993).

Generally, the current literature on equity in health care financing is based on the horizontal equity principle and the vertical equity principle. These two related principles are however closely linked to the ability to pay principle. The vertical equity concept involves the unequal but equitable treatment of equals or reducing welfare gaps between unequal individuals. In health care financing, this vertical equity principle is linked to the analysis of progressivity and it requires that households, individuals or groups with different abilities to pay, pay appropriately different amounts for the health care (Ataguba, 2012).

Horizontal equity principle on the other hand requires that households, individuals or groups with the same ability to pay make the same contribution to health care (Cissé, Luchini & Moatti, 2007; Wagstaff & Van Doorslaer, 2000; Culyer & Wagstaff, 1993). The operation of horizontal equity (HE) is rarely questioned because of its intuitive appeal. Still, policy makers disagree on the extent to which the vertical

equity principle could and should be implemented and how great any differential payments would be that should be described as vertical equity (Ataguba, 2012).

Another notion used in describing equity in health care financing is the absence of reranking of individuals, households or groups as a result of health care payments (Ataguba, 2012; Duclos, et al., 2003; Wagstaff, 2002; Van Doorslaer et al., 1999; Gerdtham & Sundberg, 1998; Wagstaff & van Doorslaer, 1997). The general view here is that households should maintain their prepayment ranks even after making payments for health care. Therefore, a violation of this entails a reranking of households (Ataguba, 2012).

Studies in the context of developed countries that assess equity in health care financing have however demonstrated that different forms of health care financing schemes or mechanisms may be associated with horizontal inequality and reranking effect² (Van Doorslaer et al., 1999; Gerdtham & Sundberg, 1998; Wagstaff & van Doorslaer, 1997). This is more likely in the context of developing countries where income protection mechanisms are still far underdeveloped and where high proportions of health care expenditures are financed by households through OOP payments (Musgrove et al., 2002).

5. Redistributive effect of health care financing

Redistribution can occur when payments toward the financing of health care are mainly compulsory and independent of utilization; most obviously when health care is partly financed from government tax revenues (O'Donnell & Wagstaff, 2008). Contributions toward the finance of health care may thus redistribute disposable income. Redistribution can be vertical and horizontal (O'Donnell & Wagstaff, 2008).

² These concepts will be further discussed in the next chapter of the thesis.

The former occurs when payments are disproportionately related to ability to pay (ATP). The extent of vertical redistribution can therefore be inferred from measures of progressivity, while horizontal redistribution occurs when persons with equal ATP contribute unequally to health care payments (O'Donnell & Wagstaff, 2008). Since equity in health care financing relates to ability to pay (income), redistribution involves taking away some resources from the rich and distributing these to the poor or from the poor to the rich.

However, such redistribution may extend beyond income, money or health care payments to the distribution of other social goods and services which enhance welfare (O'Donnell & Wagstaff, 2008). Thus, in general, health care financing systems may well have some income redistributive effects (O'Donnell & Wagstaff, 2008). These may be intended or unintended, pro poor or pro rich. Pro poor redistribution means that the distribution of income net of taxes and payments is more equal than the distribution of gross income (Ataguba, 2012).

However, in many empirical studies of the redistributive effect of health care financing, the redistributive effect (RE) is measured as the difference between the Gini index of income before any payment (G_X) and the Gini index of post payment income (G_{X-T}) (Reynolds & Smolensky, 1977). This distributive effect has been decomposed into three main components – horizontal, vertical and reranking (Aronson, Johnson & Lambert, 1994).

While the analysis of progressivity and distribution of the burden of payments may show and provide insights into some aspects of vertical equity, it cannot reveal distinctively the extent of horizontal inequity and the reranking or rank reversal that can be induced by health care payments. This is attributed to the fact that the

methods only capture how such payments vary with some measure of ability to pay (Ataguba, 2012).

It is nonetheless worth noting that horizontal inequities could arise in a vertical equitable health care payment system or tax because of, for example, variations in tax or payment rates across regions and provinces, the existence of tax deductibles for certain categories of individuals, differences in the incidence of illness faced, risked rated contributions to health insurance schemes and differences in the sources of income (such as formal employment or informal employment) (Wagstaff & van Doorslaer, 1997).

With respect to personal income tax, where most of these analytical techniques have been developed and applied, horizontal inequity can still occur—though it is less of a concern in this context as the tax rates are usually progressively structured with income (Wagstaff & van Doorslaer, 1997). However, in the context of indirect taxes (e.g. value added tax, excise taxes and sales taxes) and other payments, because these are associated with the individual's tastes, choice, life styles and level of consumption, differential treatments can arise (van Doorslaer et al., 1999) and may not be closely linked to ability to pay (Wagstaff & van Doorslaer, 1997). Since there is some degree of choice involved when one considers the non-compulsory payments, it may be difficult to label some of these treatments as inequitable.

Generally, the primary objective of any health care financing is not to redistribute income, but to generate resources for the health care system (Bilger, 2008) and to ensure that households are fairly treated when financing health care (Ataguba, 2012). But, for health care financing to have a redistributive effect, voluntary payments and payments made at the point of consumption are to be avoided

(O'Donnell & Wagstaff, 2008). The methodologies that are often used in such analysis are as discussed in the methodological section.

6. Methods for measuring progressivity in health care financing

There are various ways in the literature for measuring progressivity. Assessing progressivity in health care financing however involves relating health care payments to household's income or some other measure of ATP (O'Donnell & Wagstaff, 2008). Yet, depending on what proportion of income is paid by the rich and poor, the relationship can be progressive, proportional or regressive (Ataguba, 2012). A progressive mechanism or system is one in which health care payments rise as a proportion of income as income rises, whilst a regressive system is one in which payments falls as a proportion of income as income rises and a proportion system is one in which health care payments account for the same proportion of income for everyone, irrespective of their income (Ataguba, 2010).

According to (Ataguba, 2012), this, however, raises certain crucial questions: what is the preferred relationship between income and health care payments? Should it be progressive? If so, how progressive should it be? Such progressivity has however no agreed extent (Wagstaff, 2002), and what is equitable tends to vary from one country to another (or from one society to another society) (Ataguba, 2012).

But, regardless of the choice of method, when one is interested in examining progressivity in the entire health care system, two major steps are however involved. Initially, the relative progressivity of each financing mechanism is assessed, secondly, progressivity in the overall system is evaluated (O'Donnell & Wagstaff, 2008) taking into consideration the relative contribution of each financing mechanism in the overall financing system.

6.1 Tabulation approaches

There are a number of ways of measuring the burden of health care financing. While there is considerable amount of empirical evidence on redistributive effects of taxation, very few studies have investigated the income redistributive effects of health care financing. In fact, many of those who carried out these studies used simple tabulation methods to examine the redistributive effects of health care financing.

Thus, the simplest and crudest method used by some researchers is to compare different quantiles' shares of income spent on the health care and try to deduce progressivity (Hurst, 1992). This method is based on the tabulation of total contributions to health care financing relative to income across social economic groups. It follows by grouping households into quantiles (e.g. quintiles, or deciles). Hence, for each quantile, the share of income spent on health care through each mechanism (e.g. OOP, tax,) is computed. For example, Ataguba & McIntyre (2012) and Ataguba (2010) used tables to demonstrate how average payments for health care financing mechanism varied according to income groups. Others studies include in Egypt (in 1997) (O'Donnell & Wagstaff, 2008).

This type of approach of 'tabulation' has however some limitations; it is not sensitive to variations that may occur close to the cut-off points for categorising households; in addition, it does not show a holistic picture of how payments to income ratio vary across the entire distribution of income and the exact extent of progressivity cannot be obtained simply by looking at these ratios (Ataguba, 2012). Indeed, in some instances, it could be difficult to distinguish which mechanism is more progressive or regressive than the other (Ataguba, 2012; Musgrave & Thin, 1948; Kakwani, 1977).

In fact, these methods do not provide information regarding the level of progressivity (regressively) of different health care financing mechanisms. Therefore, it can be difficult to assess progressivity when the bars are almost similar in height or when the bars in different quintiles alternate in height (i.e., no clearly discernible pattern). This is because equity consideration is concerned more about each household's relative distribution.

Hence, this method might not be fully appropriate to inform the policy debates involved in health sector reform. Accordingly, some of the justifications for this challenge appears to derive from conceptual and measurement issues that underlie the measurement methods of inequalities (Ataguba, 2012), while others are related to the structure of health care financing systems in developing countries (Ataguba, 2012).

6.2 Summary indices

Although analysis of equity in financing of health care has drawn extensively on insights and similarities from normative public finance and income redistribution literature (Wagstaff & Van Doorslaer, 2000) in recent past, however, there has been improvement in methodologies employed in the analysis of redistributive effects of health care financing. These studies have gone beyond descriptive analysis to develop a single measure of progressivity. Most studies have relied extensively upon Kakwani (1977) model to analyse tax progressivity.

Due to some of the limitations of tabulations methods as earlier stated, some more formal indices and curves have been developed and used in the assessment of progressivity. These include some forms of the Lorenz curve (Lorenz, 1905), Gini index, and concentration curves and indices. However, the popular indices are the

Suits index of progressivity (Suits, 1977) and the Kakwani index (1977), though the earliest is the Musgrave and Thin index (Musgrave & Thin index, 1948) (as referenced in Ataguba, 2012).

The Musgrave and Thin index compares inequality in prepayment income with that of the post payment income. Thus, under the Musgrave and Thin method, if inequality in post payment income is less than in prepayment income, the health care financing mechanism is said to be progressive while a regressive mechanism worsen inequality in the post payment income. However, Kakwani (1977) noted that this is not in line with the definition of progressivity – a relative measure as opposed to an absolute measure. This is because a measure of progressivity should not capture this effect as it measures deviation from proportionality. Hence, this has limited the use of the Musgrave and Thin methodology in today's empirical applications (Ataguba, 2012).

While the Musgrave and Thin methodology has some limitation, The Suits index (1977) of progressivity compares the Lorenz curve of prepayment income with the relative concentration curve of payments. However, the Suits index has also been criticised as being sensitive to the choice of some weighting factor that is based on the slope of the Lorenz curve. This is due to the fact that it assigns greater weights to deviations from proportionality at higher income groups than departures from proportionality at lower income groups (Ataguba, 2012).

Kakwani (1977) on the other hand proposed a method for assessing progressivity. The Kakwani index compares the concentration curve of payments with the Lorenz curve of prepayment income. This index is twice the area between these curves. It is computed as:

$$\Pi_K = C_T - G_X \dots\dots\dots (1)$$

where Π_K is the Kakwani index, C_T is the concentration index of payments and G_X is the Gini index of prepayment income. Thus, a progressive (regressive) payment occurs when $C_T > G_X$ ($C_T < G_X$), while a proportional payment occurs when $C_T = G_X$. In this case, $\Pi_K > 0$ indicates a progressive payment while $\Pi_K < 0$ a regressive payment and $\Pi_K = 0$ a proportional payment.

The Kakwani index has however been widely used in applied research in health economics and public economics (O'Donnell & Wagstaff, 2008). One of the characteristic of the Kakwani index is that it is additively separable. This property makes it easier to obtain the overall progressivity of health care financing when the Kakwani indices of each financing mechanism are known and relative contribution of each mechanism to the overall health care financing. Thus, the overall progressivity is computed as follows;

$$\Pi_K = \sum_i w_i \Pi_K^i \dots\dots\dots (2)$$

where Π_K^i is the Kakwani index of health care financing mechanism i and w_i is the relative share of health care financing mechanism i (i.e. general tax, OOP) in the overall health care financing. These shares are however obtained from an external source such as the National Health Accounts (NHA) (O'Donnell & Wagstaff, 2008).

While it may be relatively simple to judge progressivity of any health care payment mechanism from the value of the Kakwani index (Π_K), the Lorenz and concentration curves may intersect or cross each other. When this happens the value of the index provides an ambiguous conclusion. However, statistical dominance is used to ascertain progressivity of the mechanism across the entire income distribution.

Wagstaff and others have extended and applied these models in the field of health care financing (Wagstaff et al., 1999). For example, Wagstaff, Doorslaer & Paci, (1989) employed the Kakwani index to confirm the descriptive findings from the previous studies in USA, UK and Netherlands. Their results showed that total contributions to health care payments in USA, and Netherlands were regressive, though more regressive in USA than in the Netherland, while in UK it was progressive. However, OOP payments were more regressive in USA but progressive in the Netherlands.

Mostly, conclusion about equity characteristics of various forms of health care financing are typically inferred using the summary measures of inequality such as the Kakwani index of progressivity (Kakwani, 1977) and the Reynolds-Smolensky index of redistribution (Reynolds & Smolensky, 1977). These indices are derived from the general class of Gini type indices and rank based measures. They are related to the normative notion of unequal treatment of unequal's and could serve to assess the degree to which health care is financed according to ATP and the extent to which such financing are associated with (dis)equalizing or equalizing effect on the prevalent income inequality, which is a measure of vertical or redistributive effect (Ataguba, 2012). They provide a single value measure of magnitude of inequality prevailing in a distribution and facilitate comparisons both within and across countries (Wagstaff & Van Doorslaer, 1992).

These methods were however initially introduced into the literature of health economics by Wagstaff, Doorslaer and Paci (1989), and were shown to be particularly useful for providing comparative information about equity of various sources of financing across and within high income countries where health systems provide almost universal coverage (Wagstaff et al., 1999).

6.3 Decomposing redistributive effect

While the summary indices make some good improvement, an exclusive reliance on such indices might not reveal the actual equity implications of health care financing across different groups of the population. Klavus (2001), for instance, argues that due to its generality, a summary measure can indicate significant progressivity or regressivity in situations where such outcomes apply only to some part of income distribution. Although the inequality assessment given by the summary measure would not be incorrect, it would certainly yield an imperfect description of the nature of inequality prevailing in the distribution.

For that reason, such constraint might be particularly problematic in the context of developing countries like Zambia. This is because relative discrepancies in the living standards across different groups of population predominate and represent a common trend in the prevalent distribution, whereas the lack of universal health coverage means that large proportions of health expenditures are funded directly through out of pocket payments (Gottret & Schieber, 2006).

Additionally, the random nature of illnesses may result in a widely diverse health needs and consequently, varied health care payments across differently groups of the population. Therefore, in situations such as Zambia, where health care financing is dominated by out of pocket payments and general tax, such random nature of illnesses may occasionally culminate into expenditures constituting relatively high shares of households' resources disturbing their material living standard or even pushing them below poverty lines (Xu et al., 2003).

Consequently, the extent to which health care payments are distributed according to the ATP principle is expected to vary significant across the different groups reflecting

mainly the underlying distribution of health care need. Certainly, the financial burden that direct payments impose in particular on the lowest income groups may lead to them using disproportionately less health care despite their greater need and thus, the deterrent effect would be probably greater for the poor than for the rich (Ataguba, 2012; Le Grand, 1991).

In this regard, health care financing systems can be only mildly regressive or even progressive, on average, and thus deemed vertically equitable but such result may conceal an inequitable distribution of health care utilisation with respect to need. Also, a similar argument holds for the various forms of health care payments (i.e. the degree to which the progressive source of financing through prepayments schemes are related to ATP and thus, redistribute income would be questioned by the extent of coverage of insurance benefits across different groups of population).

As a result, a more revealing analysis may require going beyond the summary measures to examine inequalities at disaggregate levels. Hence, a decomposing analysis approach which has been previously explored in the literature of health care financing such as the Aronson, Johnson & Lambert, (1994) model and the Duclos, Jalbert & Araar, (2003), may lend itself better to such interpretation.

The most popular way of measuring the redistributive effect of any compulsory health care payment on income distribution is to compare inequality in prepayment incomes as measured by e.g. the Gini coefficient with inequality in post payment incomes (O'Donnell & Wagstaff, 2008). Income redistributive effect is therefore measured by the change in income inequality brought about by health care financing. Pre disposable income is thus the household's disposable income adjusted up as if no tax had been paid toward public health finance while post health

disposable income is the household's disposable income less the amount of household private finance directed toward health care (Ataguba, 2012).

Each Gini coefficient however can take on the values on interval $[0, 1]$. The RE on the other hand can take on the values on the interval $[-1, 1]$. RE can thus be computed simply as the difference between G_X and G_{X-T} (Wagstaff & Doorslaer, 2001). According to Wagstaff and Doorslaer (2001), when the RE is positive, income redistribution is said to be pro poor, and when it is negative income redistribution is said to be pro rich. In other words, a positive RE will entail an improvement of income inequality while a negative indicates an exacerbation of income inequality due to payments for health care.

Aronson, Johnson and Lambert, (1994) model (hereafter AJL), however, makes it clear that the redistributive effect of income tax of a particular health care financing system will depend not only on its progressivity, but also on the extent of any horizontal inequity associated with the system and on the extent of any reranking resulting from it. The first of these issues, regardless, has received a good deal of attention recently in the literature on health care financing (Wagstaff & van Doorslaer, 1997). The second and third issues, by contrast, have received less attention, particularly in developing countries.

Depending on the extent of horizontal inequity and reranking involved in health care finance, a progressivity analysis can therefore give a misleading impression about the income redistribution associated with the financing system. For example, the introduction of differential treatment of households on similar equivalent incomes will tend to reduce the redistributive effect of a progressive financing system. Conversely, introducing differential treatment into a regressive system will tend to

worsen its redistributive effect. Therefore, knowing only the progressivity characteristics of the financing system means that one has only a partial picture of the income redistribution associated with the financing system in question (Wagstaff & van Doorslaer, 1997).

Redistributive effect may therefore be conceptualised as the equalising or disequalising effects associated with the transition between the pre- and post-health payment income. A measure of redistributive effect that has gained some attention in income distribution studies is the Reynolds and Smolensky Index (Reynolds & Smolensky, 1977). There is, however, a fundamental assumption underlying the Reynolds and Smolensky (1977) index that assumes horizontal equity (equal treatment of equals) or in other words individuals with the same income levels are assumed to contribute the same amount to finance the health care (Ichoku, 2006).

But this raise a question of how practical is it in real world. Definitely, this can be argued to be a plausible assumption because in practice households at the same level of income may vary when financing their health care because of the randomness nature of the illness. Therefore, horizontal inequity is more likely to be the norm rather than an exception (Ichoku, 2006).

Indeed, the Reynolds & Smolensky, (1977) index has further exposed another weakness of not taking into account the reranking effect. For example, in many developing countries like Zambia it is generally known that health care payments may push households below a poverty line or change its income position after financing health care. Thus, this reranking effect can result in households having different position in the pre and post income. In this regard, horizontal inequity may

in certain circumstances be regarded as more damaging and discriminatory than even the vertical inequity. It thus deserves no less attention than vertical equity.

Hence, this calls for the inclusion of these three components (vertical, horizontal and reranking). Unfortunately, however, Reynolds & Smolensky, (1977) is based on the assumption of no horizontal and reranking effect in the transition from the pre to post payment income (Wagstaff & Doorslaer, 2001). For this reasons, it requires to look for an approach that decomposes the redistributive effect into these three components (vertical, horizontal and reranking). Therefore, models decomposing the income redistributive effect of finance systems into vertical and horizontal effects such as Aronson, Johnson & Lambert, (1994) and Duclos, Jalbert & Araar, (2003) models are extensively used.

7. Empirical evidence on income redistributive effect in health care financing

Empirical studies that have been undertaken to assess income redistributive effect of health care financing have been mainly conducted in developed countries. The initial study was conducted in 1997 in Netherland (Van Doorslaer et al., 1999; Gerdtham & Sundberg, 1998; Wagstaff & van Doorslaer, 1997), second in 1998 for Sweden (Van Doorslaer et al., 1999; Gerdtham & Sundberg, 1998; Wagstaff & van Doorslaer, 1997). From that time, only a few more studies have been conducted and these have been concentrated within the developed countries (Bilger, 2008; Van Doorslaer et al., 1999) or selected countries in Asia (Cavagnero & Bilger, 2010; Wagstaff & Van Doorslaer, 2001). Furthermore, most of the empirical studies on equity in health care financing have been conducted in the developed and middle-income countries whose health systems are financed by a mixture of two or more of the health care financing mechanisms. However, the only studies in Africa were conducted in

Nigeria (Ichoku, 2006) (as referenced in Ataguba, 2012) and recently in South Africa (Ataguba, 2012). In addition, empirical evidence about equity implications of the existing health care financing mechanisms in developing countries remains comparatively sparse (Cissé, Luchini & Moatti, 2007).

Literature in this section is thus organised according to the following themes: nature of the income redistributive effect of OOP payments for health care, nature of redistributive effect of general tax and overall pattern of redistributive effect of health care financing, and the implications of redistributive effect for pursuing universal health coverage.

7.1 Income redistributive effect of OOP payments for health care

OOP payments can be categorized into four; user fees paid directly to health care providers in public health care facilities; co-payments made by members of a health insurance scheme, which reimburses only a portion of the cost of health service paid by a member (McIntyre, Gilson & Mutyambizi, 2005) under the table (unofficial) payments made as a so called gift; and finally, in some instances as precondition for service to health care providers (McIntyre, Gilson & Mutyambizi, 2005). OOP payments are typically perceived to be the most regressive instrument of health care finance (O'Donnell et al., 2008). This is partly related to the fact that those with the lowest income levels tend to bear the greatest burden of ill-health and thus bear the greatest financing burden as payment is directly linked to use of health services.

Since OOP payments are made at the point of health service utilization, households and individuals are therefore not protected from the unexpected burden of health care costs. As a result, there is no risk pooling with such payments—the entire financial burden of health care cost falls on an individual or household. Hence, this

situation poses major challenges for equity and financial protection of households (McIntyre, 2012; Kutzin, 2001). OOP payments tend to place a disproportionately higher burden on the poorer households than the rich income earners (Cissé, Luchini & Moatti, 2007).

With respect to its impacts on equity, OOP payments are said to be associated with negative income redistribution (Ataguba, 2012). Most of the equity studies in health care financing have shown that OOP payment is the most regressive (pro rich) of all the forms of health care financing mechanisms because of the connection with utilization of health services (Ataguba, 2012; O'Donnell & Wagstaff, 2008; Leive & Xu, 2008; Cissé, Luchini & Moatti, 2007; Van Doorslaer et al., 1999).

Wagstaff and Doorslaer, (2001) for example found that in Vietnam (in 1993) the regressive vertical effect induced by OOP payments accounted for 47 percent of total income redistribution while in South Africa, Ataguba (2012) found that OOP payments were pro rich and vertical component accounted for about 51 percent of income redistribution induced by OOP payments. These results are however similar to those obtained from Palestine (West Bank) where in 2004 regressive vertical effect accounted for 43 percent of the total income redistribution (Abu-Zaineh et al., 2009).

In the case of South Africa, Ataguba (2012) found that even though OOP payments make up about 14 percent of total health care financing, the pro rich redistribution induced is not equitable and would reduce the extent to which overall health care financing redistributes income. While evidence from other studies, particularly, those conducted in low and middle income countries suggests that OOP payments can be progressive if the lowest income earners, who are least able to afford the health

services, rarely use these services (O'Donnell & Wagstaff, 2008). In this regard, McIntyre, (2007) has observed that progressivity can be argued as misleading since it refers to equitable financing and yet inequitable access to health care services.

A recent comparative study of health care financing conducted by the EQUITAP (2005) in Asian countries revealed that OOP payments were concentrated among the higher income groups. For example, the highest income earners contributed more than half of OOP payments in Indonesia, Sri Lanka, Philippines and Thailand. In these countries, the poor did not only pay less in absolute terms but also less as a proportion of household resources (O'Donnell et al., 2008).

Some of the factors contributing to this scenario are that OOP payments in these countries are for the private health care, which is mainly used by the rich and even though there are charges at the public health facilities, that are very modest and the poor are exempted. While in some countries where social health insurance exists, most of OOP payments are linked to co-payments which are evenly spread across the population (O'Donnell et al., 2008). However, contrary to the principle of equity of paying according to ability to pay and benefits distributed according to need, the rich despite paying more than the poor in these countries, benefited more than the poor from the health services.

Interestingly, however, some studies have reported negative redistribution with out of pocket payments and yet with a progressive vertical effect (Cavagnero & Bilger, 2010). In such countries, the combination of horizontal and reranking effects dominates the progressive vertical effect. In Argentina (in 1997), for instance, about 182 percent of the reduction in redistributive power of out of pocket payment is caused by differential treatment in the form of horizontal inequity and

reranking(Cavagnero & Bilger, 2010). In Argentina (in 2002) out of pocket payments were however found to be progressive and redistribute income favourably towards the poor. The general negative redistribution associated with out of pocket payments thus points to the inequitable nature of such payments. Even when they turn out to have a progressive vertical effect, it is a result of the exclusion faced by the poor on the grounds that they cannot afford the cost of treatment (Ataguba, 2012).

van Doorslaer et al., (1999) noted that for out of pocket payments there is a relatively large gap between the actual and baseline redistributive effect. In this case, the gap is not only due to the random nature of illness, but is also probably as a result of variation in liability for co-payments at each income level. This variation may not only reflect differences in private insurance coverage but also differences in public coverage, due, for example, to variations across localities in co-payments rules, to exemptions from prescription charges.

Although there are situations where out of pocket payments result in substantial differential treatment, in general, most studies show that the vertical effect substantially dominates the horizontal and reranking effects (Ataguba, 2012). For example, the study in the Netherlands indicates that the vertical effect accounts for about 82 percent of the negative redistribution associated with out of pocket expenditures (Wagstaff & van Doorslaer, 1997) while in Switzerland (Bilger, 2008) reports that the vertical effect accounts for 78 percent of the negative redistribution resulting from out of pocket payments.

7.2 Nature of the income redistributive effect of general taxes

Generally, public funds are derived mainly from general tax revenues such as direct taxes (personal income tax, corporate income tax) or indirect taxes (like VAT,

custom duties) and other specific taxes (such as levies, grants and other transfers from individuals to the government). Other forms of funds also include donor funding which can take the form of loans which have to be repaid along with interest charges or aid grants (budget support) which do not have to be repaid (Al-Duaj, 2009;McIntyre,2007).The extent of equity within these health care systems is however dependent on several other factors such as the mix in general tax (direct and indirect taxes) and specific taxes; other public revenue sources and the type of external assistance received (Gottret & Schieber, 2006).

With respect to taxes, direct income tax has generally been found to be progressive. This is particularly so because of the tax rates which are mainly structured progressively in many countries. Although direct taxes such as personal income tax tend to be progressive, the extent of pro poor redistribution varies significantly between countries depending on the nature of the structure of and rates of the tax. In addition, direct tax depends on the proportion of the population falling within each taxable income stratum (Ataguba, 2012). In all the countries where studies have been conducted and reported, the redistributive effect was positive (in a review by Ataguba, 2012).

Although direct taxes such as personal income tax (PIT) tend to be progressive, the extent of pro poor redistribution varies significantly between countries depending on the nature of the structure of and rates of the tax. In addition, direct tax depends on the proportion of the population falling within each taxable income stratum (Wagstaff et al., 1999). For example, in South Africa the redistributive effect of direct taxes was pro poor with the vertical effect dominating (Ataguba.2012). While, in Argentina, Denmark, Finland, Germany Ireland, Italy, Netherlands, Portugal, Sweden, Switzerland, the United Kingdom and the United States direct taxes were reported as

progressive and the contribution of the vertical effect to overall redistribution ranged between 100 percent and 143 percent (Ataguba,2012).

In low income countries such as Bangladesh and Sri Lanka the poorest 20 percent of households make virtually no contribution to direct taxes and the richest fifth percent contribute more than 90 percent of the direct tax revenue (O'Donnell et al., 2008). Certainly, this makes the direct taxes of these countries more pro poor (progressive) than in China where direct tax paid by the poorest fifth of households is significant due to an agricultural tax which is concentrated on the poor that outweighs the effect of PIT paid mainly by the better off (O'Donnell et al., 2008).

Therefore, the positive redistribution usually associated with financing health care through direct taxes is mainly the result of progressive direct taxes. For instance, in the case of Portugal, the reported differential treatment (horizontal inequity and reranking) is linked to differences in tax structure between wage earners and the self-employed such that individuals that earn a similar income end up making differential tax payments (van Doorslaer et al., 1999). Whereas, in countries such as Denmark, Sweden and the United States, differential treatments, though small, were attributed to geographical/regional differences in tax structure (van Doorslaer et al., 1999). While, in other countries such as Germany, Italy and Ireland the pro poor vertical effect accounts for all of the redistribution because there were no significant differential treatments (van Doorslaer et al., 1999).

While direct taxes have shown to reduce income inequality, indirect taxes on the other hand have been shown to worsen inequality in income. Most studies have shown that health care financing through indirect taxes increases income inequality. Indirect taxes that finance health care are therefore pro rich in their redistributive

effect. Ataguba (2012), for instance, in his study on distributional impact of health care finance in South Africa found that the redistributive effect associated with financing health care using indirect taxes increases income inequality. This is consistent with other studies conducted in other countries such as Portugal (in 1990), Argentina (in 2002), Italy (in 1991), and United Kingdom (in 1992) where the income redistributive effect of health care financing through indirect taxes increases income inequality (Cavagnero & Bilger, 2010; Van Doorslaer et al., 1999).

Even though, indirect taxes are generally regressive as they are usually levied at a flat rate and result in lower income earners paying a higher proportion of their incomes than the higher income earners (Wagstaff et al., 1999), in certain circumstances, particularly, in low and middle income countries such as Thailand and Nepal, they have been found to be slightly progressive due to the exemption of basic foodstuffs from VAT, thereby protecting the poor from paying for these taxes (O'Donnell et al., 2008).

So, what are the factors contributing to the increases in income inequality through indirect taxes? The major drivers of the negative redistribution associated with indirect taxes have been attributed to the vertical effect (Ataguba, 2012). However, in some countries like Netherland, Sweden, Italy, Germany, Switzerland and Denmark the pro rich vertical effect accounts for all the negative income redistribution (Wagstaff & van Doorslaer, 1997).

Bringing together the direct and indirect taxes, general taxes tend to be a pro poor (progressive) financing mechanism (Ataguba, 2012). For example, in Denmark (in 1987) and in Switzerland (in 1992) the redistributive effect of general taxes was pro poor (van Doorslaer et al., 1999). In all these countries, the pro poor vertical effect

associated with general taxes dominates the horizontal and reranking effects (Ataguba, 2012).

However, the level of progressivity of general tax depends to a large extent on the progressivity of its components (direct and indirect taxes) and their relative share of total tax revenue (van Doorslaer et al., 1999). Therefore, if direct tax which is often typically progressive forms a large component of overall tax, then general tax can be pro poor (progressive). By contrast, if indirect taxes which tend to be regressive are given stronger emphasis in the overall tax system then tax incidence can be pro rich (regressive) (Ataguba, 2012).

7.3 Overall pattern of income redistributive effect of health care financing

The redistribution associated with total health care financing (public health care financing and private health care financing) varies depending on the relative importance of each health care mechanism and their relative vertical, horizontal and reranking effects. For example, the redistributive effect associated with public financing sources is mixed across the twelve (12) OECD countries (van Doorslaer et al., 1999).

While Germany, Netherlands, and Switzerland record pro poor redistribution, the rest of the countries show pro poor redistribution and these are again largely attributed to the vertical effect. Nevertheless, the combination of all the private health care financing sources, on average, induced pro rich redistribution in all except in Netherlands of the OECD countries. This pro poor redistribution in the Netherlands is attributed to the pro poor redistribution in the private insurance that dominates the pro rich redistribution noted for out of pocket payments (van Doorslaer et al., 1999).

By and large, many countries record negative income redistribution for overall health care financing which is caused mainly by regressive vertical effects. These countries, for example, include Denmark, Germany, Netherlands, Palestine, Portugal, Switzerland and the United States (Abu-Zaineh et al., 2009; Bilger, 2008; van Doorslaer et al., 1999; Wagstaff & van Doorslaer, 1997; Wagstaff & van Doorslaer, 1997).

Typically, the pro rich redistribution of health care financing is attributed to a regressive vertical effect in indirect taxes. But, to a lesser extent, this pro rich redistributive effect could also be associated with the consumption patterns that exist among households with similar incomes. In the case of Portugal, for example, differential treatment was associated with multiple value added tax (VAT) rates on different goods and services (van Doorslaer et al., 1999). However, a few countries such as Argentina, France, Italy, South Africa and Sweden (Cavagnero & Bilger, 2010; van Doorslaer et al., 1999) have recorded a positive income redistributive effect with overall health care financing.

In summary, the overall pattern of income redistributive effect of health care financing depends largely on the structure and relative share of the various forms of health care financing mechanisms (e.g. general tax, OOP) in the overall tax system. If general taxes, for example, which is often typically progressive (pro poor) forms a large component of overall health care financing, then the overall health care financing may be pro poor (or progressive) thereby reducing income inequality. By contrast, if OOP which tends to be regressive (or pro rich), is given stronger emphasis in the overall health care financing system then financing incidence can be pro rich and hence, worsen the income inequality (Ataguba, 2012).

8. Summary of the literature review

It has been revealed that equity is a difficult concept to define and yet remains a very critical policy goal. Overall, empirical evidence on alternative financial contribution mechanisms shows that OOP payments are the most pro rich (regressive) or as minimum, the least pro rich (progressive), particularly, if the poorest do not use the health services because they are required to pay for these services. While general taxes are usually the most pro poor (progressive) forms of health care financing mechanisms.

Internationally, there is a general consensus to reduce a country's reliance on OOP payments and efforts are made to promote alternative health care financing (pre-payment) that would provide financial risk protection against catastrophic health payment. While there are competing methodologies for evaluating the income redistributive effect of health care financing, this review shows that there are very few studies that have assessed income redistribution of health care financing in developing countries, particularly in Africa.

Even though there is considerable amount of theoretical literature on equity in health care financing, no study has attempted to look at the income redistributive effect of public finance (general tax) and OOP payments for health care in Zambia. Most studies on health care financing in Zambia have focused on describing distributions of health care financing by socioeconomic groups, using simple tabulations and summary indices as opposed to decomposition approaches. This study will therefore fill this gap by moving beyond these summary measures of assessing equity in financing health care and apply a decomposition framework.

Reference

- Abu-Zaineh, M., Mataria, A., Luchini, S. & Moatti, J. 2009. Equity in health care finance in Palestine: the triple effects revealed. *Journal of Health Economics*. 28(6): 1071-1080.
- Al-Duaj, N. 2009. Health financing: Strategies for reform, health financing, Kuwait Health Initiative.
- Aronson, J.R., Johnson, P. & Lambert, P.J. 1994. Redistributive effect and unequal income tax treatment. *The Economic Journal*. 262-270.
- Ataguba, J. 2012. Distributional impact of health care finance in South Africa, Cape Town, PhD thesis, University of Cape Town.
http://uctscholar.uct.ac.za/PDF/92493_Ataguba_J.pdf, accessed on 27/03/2014
- Ataguba, J. & Akazili, J. 2010. Health care financing in South Africa: moving towards universal coverage. *Continuing Medical Education*. 28(2).
- Ataguba, J.E. & McIntyre, D. 2012. Paying for and receiving benefits from health services in South Africa: is the health system equitable? *Health Policy and Planning*. 27 Suppl 1i35-45. DOI:czs005 [pii].
- Belli, P., Gotsadze, G. & Shahriari, H. 2004, Out of pocket and informal payments in health sector: evidence from Georgia, *Health Policy*. 70(1); 109-123.
- Bilger, M. 2008. Progressivity, horizontal inequality and reranking caused by health system financing: A decomposition analysis for Switzerland. *Journal of Health Economics*. 27(6): 1582-1593. DOI:<http://dx.doi.org/10.1016/j.jhealeco.2008.07.009>.
- Cavagnero, E. & Bilger, M. 2010. Equity during an economic crisis: Financing of the Argentine health system. *Journal of Health Economics*. 29(4): 479-488.
- Cissé, B., Luchini, S. & Moatti, J.P. 2007. Progressivity and horizontal equity in health care finance and delivery: What about Africa? *Health Policy*. 80(1): 51-68.
- Culyer, A.J. & Wagstaff, A. 1993. Equity and equality in health and health care. *Journal of Health Economics*. 12(4): 431-457.
- Duclos, J., Jalbert, V. & Araar, A. 2003. Classical horizontal inequity and reranking: an integrating approach. In: Amiel, Y. & Bishop, J.A. (eds) *Fiscal policy, inequality and welfare (Research on economic inequality volume 10)*. Bingley: Emerald Group Publishing Limited.
- EQUITAP. 2005. Who pays for health care in Asia? EQUITAP Project: Working Paper Number 1, Colombo, Institute of Policy Studies.
- Gerdtham, U. & Sundberg, G. 1998. Redistributive effects of Swedish health care finance. *The International Journal of Health Planning and Management*. 13(4): 289-306.

- Gottret, P.E. & Schieber, G.J. 2006. Health financing revisited. Washington D.C, World Bank Publications.
- Hurst, J.1985. Financing health care in the US, Canada and Britain. Kings Fund, London
- Ichoku, H. E. 2006. A distributional analysis of health care financing in developing country: A Nigerian case study applying a decomposable Gini index, Cape Town, PhD thesis, University of Cape Town.
- James, C. D., Hanson, K., McPake, B., Balabanova, D., Gwatkin, D., Hopwood, I., ... & Xu, K. 2006. To retain or remove user fees?. *Applied Health Economics and Health Policy*, 5(3): 137-153.
- Kakwani, N. 1977. Measurement of tax progressivity: An international comparison. *Economic Journal* .87(345): 71-80
- Kidson, C. 1999. Equity: How much at century's end? *Southeast Asian Journal of Tropical Medicine and Public Health*.30 (4):605-607.
- Klavus, J. 2001. Statistical inference of progressivity dominance: an application to health care financing distributions. *Journal of Health Economics*. 20(3): 363-377.
- Kutzin, J. 2001. A descriptive framework for country-level analysis of health care financing arrangements. *Health Policy*. 56(3): 171-204.
- Lambert, J. P. 1993. The distribution and redistribution of Income: A mathematical analysis. Manchester, Manchester University Press.
- Le Grand, J. 1991. Equity and choice: an essay in economics and applied philosophy, London, Routledge.
- Leive, A. & Xu, K. 2008, Coping with out of pocket health payments: empirical evidence from 15 African countries, *Bulletin of the World Health Organization*. 86: 849-856.
- Lorenz, M. O. 1905. Methods for measuring the concentration of wealth. *Journal of the American Statistical Association*. 9: 209-219;
- McPake, B. and Mills, A. 2000. What can we learn from international comparisons of health systems and health system reform? *Bulletin of the World Health Organization*, 78(6):811-20.
- McIntyre, D. 2012. Health service financing for universal coverage in East and Southern Africa. EQUINET Discussion Paper 95. Health Economics Unit. University of Cape Town.
- McIntyre, D. 2007. Learning from experience: Health care financing in low- and middle-income countries. Global Forum for Health Research. www.globalforumhealth.org accessed on 26 July, 2013

- McIntyre, D., Gilson, L. & Mutyambizi, V. 2005. Promoting equitable health care financing in the African context: Current challenges and future prospects. EQUINET: Harare.
- Mills, A., Ataguba, J.E., Akazili, J., Borghi, J., Garshong, B., Makawia, S., Mtei, G., Harris, B. et al. 2012. Equity in financing and use of health care in Ghana, South Africa, and Tanzania: implications for paths to universal coverage. *The Lancet*. 380(9837): 126-133.
- Musgrove, P., Zeramdini, R. and Carrin, G. 2002. Basic patterns in national health expenditure. *Bulletin of the World Health Organization*. 80(2):134-42
- Musgrave, R. A. & Thin, T. 1948. Income tax progression, 1929-48. *The Journal of Political Economy*. 56; 498-514.
- O'Donnell, O., Van Doorslaer, E., Rannan-Eliya, R.P., Somanathan, A., Adhikari, S.R., Akkazieva, B., Harbianto, D., Garg, C.C. et al. 2008. Who pays for health care in Asia? *Journal of Health Economics*. 27(2): 460-475.
- O'Donnell, O.A. & Wagstaff, A. 2008. *Analysing health equity using household survey data: a guide to techniques and their implementation*, Washington D.C, World Bank Publications.
- Reynolds, M.O. & Smolensky, E. 1977. *Public expenditures, taxes, and the distribution of income: The United States, 1950, 1961, 1970*. Academic Press, New York.
- Suits, D.B. 1977. Measurement of tax progressivity. *American Economic Review*. 67(4): 747-752.
- Van De Ven, J., Creedy, J. & Lambert, P.J. 2001. Close equals and calculation of the vertical, horizontal and reranking effects of taxation. *Oxford Bulletin of Economics and Statistics*. 63(3): 381-394.
- van Doorslaer, E., Wagstaff, A., Van der Burg, H., Christiansen, T., Citoni, G., Di Biase, R., Gerdtham, U., Gerfin, M. et al. 1999. The redistributive effect of health care finance in twelve OECD countries. *Journal of Health Economics*. 18(3): 291-313.
- Wagstaff, A. 2002. Reflections on and alternatives to WHO's fairness of financial contribution index. *Health Economics*. 11(2): 103-115.
- Wagstaff, A. & Doorslaer, E. 2001. *Paying for health care: quantifying fairness, catastrophe, and impoverishment, with applications to Vietnam, 1993-98*. World Bank Policy Research Working Paper. 2715. Washington D.C, World Bank Publications.
- Wagstaff, A., Doorslaer, E. & Paci, P. 1989. Equity in the finance and delivery of health care: some tentative cross-country comparisons. *Oxford Review of Economic Policy*. 5(1): 89-112.
- Wagstaff, A. & van Doorslaer, E. 1993. Equity in the finance of health care: concepts and definitions. In: van Doorslaer, E., Wagstaff, A. & Rutten, F. (eds.) *Equity in the finance and delivery of health care: an international perspective*. Oxford: Oxford University Press

- Wagstaff, A. & Van Doorslaer, E. 1992. Equity in the finance of health care: some international comparisons. Journal of Health Economics. 11(4): 361-387.**
- Wagstaff, A. & van Doorslaer, E. 1997. Progressivity, horizontal equity and reranking in health care finance: a decomposition analysis for the Netherlands. Journal of Health Economics. 16(5): 499-516.**
- Wagstaff, A. & Van Doorslaer, E. 2000. Equity in health care finance and delivery. In: Culyer,A.J & Newhouse,J.P(eds) Handbook of Health Economics. 11803-1862. Amsterdam : North - Holland.**
- Wagstaff, A., Van Doorslaer, E., van der Burg, H., Calonge, S., Christiansen, T., Citoni, G., Gerdtham, U., Gerfin, M. et al. 1999. Redistributive effect, progressivity and differential tax treatment: Personal income taxes in twelve OECD countries. Journal of Public Economics. 72(1): 73-98.**
- Xu, K., Evans, D. B., Kawabata, K., Zeramdini, R., Klavus, J. and Murray, C. J. 2003. Household catastrophic health expenditure: a multi country analysis. Lancet. 362(9378): 111-7**

MANUSCRIPT

Assessing income redistributive effect of health care financing in Zambia

Arnold Mulenga

Abstract

Background: Internationally, there is a debate on the need to promote a progressive and an equitable health care financing system. However, many African countries still do not have equitable health systems. The current discussion on countries moving toward universal health coverage, however, requires an understanding of the impact on income inequality of the prevailing health care financing mechanisms. An investigation of the overall income redistributive effect of health care financing thus requires assessing health care financing in relation to the principles of contributing to financing health care according to ability to pay. Zambia is currently considering major health systems reforms toward a universal health system. This paper investigates the overall pattern of income redistributive effect of two broad existing health care financing mechanisms in Zambia – general taxes and out of pocket payments.

Method: Cross sectional analysis was performed using the 2010 nationally representative Zambian Living Condition and Monitoring Survey dataset with a sample size of 19,397 households. A standard procedure was used to decompose income redistribution associated with health care financing into vertical, horizontal and reranking components. Redistributive effect of each finance mechanism and the overall health care financing system were assessed.

Results: Financing health care in Zambia through direct taxes, general taxes and out of pocket payments induce pro rich income redistribution estimated at -0.0049, -0.0039, and -0.0067 respectively while indirect taxes induce pro poor income redistribution estimated at 0.0011. Overall health care financing induces positive income redistributive effect estimated at 0.0004. In all cases, except for the total health care financing and indirect taxes, the combined effects of the horizontal and reranking components dominate the vertical effect.

Conclusion: This paper reports that overall, health care financing redistributes incomes from the rich to the poor in Zambia. However, this is not the case for some individual mechanisms such as direct taxes and out of pocket payments. The findings in this paper should help shape policy toward ensuring an equitable and efficient health care financing system in Zambia.

Keywords: health care financing; redistributive effect; progressivity; horizontal equity; reranking effect.

Key points for decision makers

- Paying for health care in Zambia places a heavier burden on the rich relative to the poor. It also improves income inequality.
- Although, total health care financing reduces income inequality, some sources of health care financing like out of pocket payments and direct taxes increase income inequality.
- One possible way to improve the current income inequality of some individual sources of health care financing would be to pay attention to those that worsen income inequality in Zambia.
- Increasing the number of income tax thresholds than what is currently in existence in Zambia could improve income inequality associated with paying for health care through direct taxes. This is because, with more categories, one can discriminate, more favourably, between the rich and the poor more.
- Out of pocket payments should form a relatively small share of total health care financing in Zambia because such payments are regarded as unfair and they contribute to an increase in income inequality.

1. Introduction

Equity in financing of health care is a subject of major concern particularly in developing countries. The current focus of the international debate is on the need to move away from excessive reliance on out of pocket (OOP) payment as a source of health financing towards a system which incorporates a greater element of risk pooling and thus affords greater protection for the poor [1]. Zambia, a developing country struggling with income inequalities and poor progress toward achieving universal health coverage, is no exception. In this regard, Zambia intends to carry out health reforms. The proposed social health insurance scheme for Zambia aims to achieve a universal health system. However, the best way to identify the health care financing mechanism that is best suited to achieving this goal is to consider international evidence on funding in universal health systems [2].

In Zambia, health care system is financed through a mix of various sources of health care financing mechanisms (e.g. general tax, out of pocket (OOP), donors and private insurance contributions). The main health care financing sources in Zambia are the Government of the Republic of Zambia, households and donors [3].

However, the public funding dominates other health care financing mechanisms [3]. Zambia spends 6.2 per cent (2009) of its gross domestic product (GDP) on health [4]. This is similar to the spending levels in other lower middle-income countries in Africa, which spent an average of 5.8 per cent (2009) of their GDP on health (e.g. Angola, Congo, Cote d'Ivoire, Ghana, Nigeria, Senegal, Swaziland, and Sudan) [5]. Government spending on health has however increased slightly over time as a percentage of the total government budget. In 2010, for instance, 16.4 per cent of Zambia's total government expenditures were spent on health, up from 14.7 percent and 15.7 percent in 2005 and 2009 respectively [4, 5]. Government also accounts for 60 per cent of total health expenditures while OOP expenditures only accounts for 26.3 per cent of total health expenditures in 2010 [4]. Although government health expenditure as a proportion of total government expenditure has significantly increased, it is still way below the Abuja declaration target of 15 percent of government health expenditure as a share of total government expenditure [5]. One of the major challenges facing Zambia today is to reduce income inequality and poverty among the population. Despite the recent turnaround in the economy as shown by real GDP growth of more than 5 per cent, the majority of Zambians continue to live in poverty [6]. Income inequality remained high. In 2010, for example, the Gini coefficient was estimated at 0.66 compared to 0.55 in 2006 [5, 6], implying that income inequality has increased.

The situation is further compounded by the inequalities and inequities in the distribution of wealth and socioeconomic infrastructure across the country, which currently favours the urban areas and adversely impacts on the provision of social services such as health in rural hard to reach areas [6]. Poverty also continues to be at a high level with 64 percent of the population living below the US\$1 a day mark

and 68 percent living under the national poverty line in 2010. Rural poverty is equally a major problem with 78 percent of the rural population currently living below the poverty line compared to 28 percent for the urban population [6].

Since financing health care impacts on income distribution in a country, it is generally accepted that a pro poor (or progressive) health care financing system that places less burden on the poor than on the rich, is preferred to a pro rich (or regressive) one [7]. This is because regressive health care financing is usually regarded as inequitable [8] and unfair. Thus, it is expected that a good financing system contributes to the overall reduction in income inequality through a pro poor income redistributive process [7].

Although the assessments of progressivity and redistributive effect of a tax system have long attracted the attention of researchers [9], measuring the overall impact of health care financing on income distribution is a relatively new area of analysis in the context of developing countries [8]. Recent empirical evidence mainly from Organisation for Economic Cooperation and Development (OECD) countries and a number of middle income countries has already indicated that different health care financing mechanisms may differently affect the prevailing income distribution of a country and, consequently, the associated degree of overall income inequality [10].

This paper presents the assessment of income redistributive effect of two broad health care financing mechanisms (general tax and out of pocket payments) using the Aronson et al. [17] model. The paper decomposes the income redistributive effect of each of the two broad health care financing mechanisms into the vertical, horizontal and reranking components. This paper is organized as follows; the next section summarizes the methodology regarding the data, variable definitions and

methods, empirical results on income redistributive effect for the health care financing mechanisms follow. The penultimate section discusses the redistributive effect, and compares it with other studies. The last section draws the conclusions.

2. Methods

2.1 Data

This study draws on secondary data from the latest 2010 Zambian Living Condition Monitoring Survey (LCMS), which is commonly known as Indicator Monitoring Survey (IMS). LCMS is a nationally representative household survey designed to provide household level data for the evaluation of various government policies on the living conditions of the Zambian population [6]. The survey was conducted by Central Statistical Office between January and April 2010 and it used a two staged stratified cluster sampling strategy [28]. The first stage involved the selection of one thousand (1000) Standard Enumeration Areas (SEAs) with Probability Proportion to Size (PPSs) [28]. Subsequently, approximately twenty thousands (20,000) households are systematically selected across the SEAs, which comprised both rural and urban locations and the nine (9) provinces. With a household response rate of 98 percent [6], the complete dataset contains a total sample size of 19,397 households (i.e. 102,882 individuals) [28]. In terms of the content, the 2010 LCMS contains information about households' socio-demographic characteristics including, health, economic activities, gross monthly income and expenditures [6]. The study linked health care payments to social economic status within household to determine the burden of health care payments.

2.2 Measuring ability to pay

There are many alternative approaches for measuring household living standard or ability to pay. These include reported income, consumption expenditure and assets

or a composite index of social economic status. However, each measure presents both practical and conceptual challenges and there appears to be no “best” measure to use [11]. Given the lack of well organised labour markets and a high variability of income in a developing country context [12] such as Zambia, this paper uses annual household consumption expenditure as a proxy for income. This is defined as the final use of goods and services excluding the intermediate use of goods and services in the production of others [11].

Household consumption expenditure is a better measure than income particularly in developing countries with a large informal sector because of its smoothing effect which reflects long term average wellbeing and it is less understated than income [13].

The construction of the household consumption expenditure was based on the household reported expenditure and consumption of food (frequently purchased), housing and other non-food items (less frequently purchased). Moreover, the measure takes into account consumption from other sources than purchases from the market. This means that consumption of own production, transfers received in kind from any source, imputed rents from owner occupied housing unit were all considered in measuring the household consumption expenditure. Per capita income was computed based on total household consumption expenditure by dividing by the household size.

2.3 Computation of health care payments

Health care payments were computed for two broad health care financing mechanisms; general taxes and out of pocket payments. For each mechanism, a household’s total payments were estimated using standard assumptions made in

health care financing burden studies [11]. In the case of taxes, only the proportion of tax revenue that is allocated to the health sector (8.2 percent) in 2010 [14] was considered. The following tax categories were then considered; personal income tax, corporate income tax, value added tax, fuel levy and excise tax. For corporate income tax, however, there is no consensus in the literature as to how to extract it in terms of who bears the final burden [15]. It is generally assumed that shareholders and consumers bear the burden of the tax through lower profits and higher prices on goods and services respectively [15]. In this study, it is assumed that the burden of corporate tax is shared equally (50% / 50%) between consumers and shareholders.

Out of pocket (OOP) payments included costs of medicines, fees to medical personnel (e.g. doctors / medical assistant / nurses / dentist, etc.) and payments to hospital/health centre/surgery. Expenditures on health related transportation were nevertheless excluded. In this study, total taxes and out of pocket (OOP) payments for each household were adjusted by household size to generate per capita estimates. Income tax was calculated from reported income and indirect taxes from reported expenditure of taxed items. Table 3 shows the computation of health care payments in Zambia.

2.4 Decomposing income redistributive effect of health care financing

One way of measuring the redistributive effect of any payment on the distribution of incomes is to compare the inequality as measured by the Gini coefficient of pre-payment income with the inequality in post-payment incomes [11]. There are however different ways of decomposing and measuring the redistributive effect. This includes the Duclos, Jalbert and Araar [16] model and Aronson, Johnson and Lambert [17] model. This paper adopts the most popular approach i.e., the Aronson, Johnson and Lambert [17] model hereafter AJL.

The AJL model demonstrated that redistributive effect can be decomposed into three components; progressivity effect, horizontal equity and re-ranking effects [18]. Here, redistribution through progressivity in the relationship between payments and ATP can be distinguished from that due to the unequal treatment of equals, and that due to health payments that change the position of individuals or groups in the post payments distribution of income [9].

Redistributive effect can be defined as the change in the Gini coefficient caused by the payment. Hence,

$$RE = G^X - G^{X-P} \dots\dots\dots (1)$$

where G^X and G^{X-P} are the pre-payment and post-payment Gini coefficients respectively. X denotes per capita pre-payment income, and P denotes the payment [11, 18]. It is likely that individuals change ranking as a result of payments and different people at the same pre-payment income end up paying dramatically different amounts of their income toward health care. As the tax literature shows, the total redistributive effect in such cases ought to be computed as the difference between a vertical equity component attributable to the degree to which, on average, payments are progressive, and the combined effect of a horizontal equity and a reranking [18]. Aronson, Johnson and Lambert [17] showed that equation (1) can be written as;

$$RE = V - H - R \dots\dots\dots (2)$$

where V is vertical income redistribution which according to Bilger [19] measures the extent to which a financing mechanism or system is pro poor or pro rich in the absence of both the H and R components. H captures the horizontal inequity; and R

is the degree of reranking defined as a change in the order of income distribution [18]. H and R effects are not expected to be negative [7]. However, one implication is that payments could be proportional to ATP on average (i.e., $V = 0$), and yet payments could produce redistributive effect because H and R are non-zero (households at a given level of ATP pay different amounts on health care) [18].

The vertical redistribution component which represents the redistribution that would arise if there were horizontal equity in payment can then be defined as;

$$V = G^X - G^0 \dots\dots\dots (3)$$

where G^0 is the between groups³ Gini coefficient for post payment income. This can be computed by replacing all post payments incomes with their group means. However, V effect can further be decomposed into two components: a payment rate effect and a progressivity effect [17] as indicated in equation (4).

$$V = \left[\frac{g}{1-g} \right] K \dots\dots\dots (4)$$

where g is the sample average payment rate (as a proportion of income) and K is the Kakwani index of payment that would arise if there were horizontal equity in health care payments. It is computed as the difference between the between groups concentration index for payments and G^X [7].

Horizontal inequity (H) is measured as:

$$H = \sum_j \alpha_j G_j^{X-P} \dots\dots\dots (5)$$

³These are close rather than the exact equal groups artificially created because of the sparsity or absence of exact equals in typical sample data. In this case, analyst needs to use bands to allocate income units to households or individuals with similar ability to pay (income). Although in this context the choice of income intervals or bandwidth is of critical importance, such a choice does not affect the measure of (H + R) per se but only their relative magnitudes [7].

Where α_j is the product of each group's population share and its post payments income share and G_j^{X-P} is the weighted sum of the group (j) specific post payment income Gini coefficient. Since the Gini coefficient for each group of payments is nonnegative, H is also nonnegative and any horizontal inequity (H) can only reduce redistribution, but not increase it. This simply implies that any horizontal inequity will always make a post payment distribution of incomes more unequal than it would have been in its absence [7].

Reranking (R) shows the extent of reranking of households that occurs in the move from the prepayment to the post payment distribution of income [7]. It is measured as

$$R = G^{X-P} - C^{X-P} \dots\dots\dots (6)$$

where C^{X-P} is a post payment income concentration index that is obtained by initially ranking households by their prepayment incomes and then, within each group of prepayment "equals," by their post payment income. R cannot be negative because the concentration curve of post payment income cannot lie below the Lorenz curve of post payment income. If the two curves coincide (and the two indices are equal), then no reranking occurs [7]. In summary, total redistributive effect can be decomposed into four components: an average rate effect (g), the departure-from-proportionality or progressivity effect (K), a horizontal inequity effect (H), and a reranking effect (R) [11].

But, practical application of the AJL model requires an arbitrary choice of income intervals to define "equals" in order to be able to distinguish and compute V, H and R components [7]. Because of the absence of "exact income of equals" in real surveys data, equals are obtained by defining certain pre-payment income intervals, and then labelling all households with incomes in that range as equals [11]. This principle of

“close income equals” [17] divides the study sample into artificial groups of income based on certain definitions of income bandwidths [18]. The choice of bandwidth inevitably affects the computed values of H and R individually. Specifically, as the bandwidth is narrowed, H falls and R rises. However, their sum ($H + R$) does not change [18, 20].

Arbitrary specification of the bandwidth has however been considered as one of the limitations of the AJL method. Urban and Lambert [20], for instance, argue that such practice can lead to misleading results because of the possibility of both intra groups reranking (i.e. the extent to which the payments schedule induces changes in ranking order of individuals within the specified groups of close income equals) and the entire groups reranking (i.e. the extent to which the payment schedule induces changes in ranking order of the whole groups of close income equals which also is dependent on the size of the chosen income bands, and thus arbitrary in a normative context).

Despite these constraints, the Aronson, Johnson and Lambert [17] model has been extensively applied in health care financing. This model, for example, was applied in the Netherlands [21], in Germany, Italy, United Kingdom, United States, Switzerland, Denmark and Finland [22] and in South Korea [23]. In Africa the model has been used in South Africa [7] and in Nigeria [24]. However, to the knowledge of the author, no study has applied the AJL model in the context of Zambia, a low middle-income country in the sub Saharan region where income inequality is high.

3. Empirical results

Table 2 shows the income redistribution of health care financing in Zambia, along with the corresponding values of V, H and R. As depicted in table 2, financing health

care in Zambia through direct taxes is pro rich implying that direct tax increases income inequality. The redistributive effect was estimated at -0.0049. This increase in income inequality associated with direct taxes arises from a negative effect of reranking and horizontal inequity that dominates the positive vertical effect. The vertical effect associated with direct taxes is estimated at 0.0024. This vertical effect is however smaller than the combined effects of horizontal inequity and reranking estimated at 0.0004 and 0.0069 respectively. This implies that unequal households are treated unequally and equal households end up being treated unequally in contributing to direct taxes while some households are reranked in the redistributive process.

Table1: AJL decomposition of income redistributive effect of health care payments, Zambia 2010

Finance source	V	H	R	RE
Direct taxes	0.237862	0.037179	0.693166	-0.492483
Indirect taxes	0.13023	0.004722	0.011466	0.114042
General taxes	0.374677	0.043716	0.718275	-0.387314
Out of pocket payments	0.429742	0.115798	0.982467	-0.668523
Total health care payments	0.065039	0.006951	0.02167	0.036418

Note: All figures are multiplied by 100 to enhance readability

Unlike direct taxes, financing health care through indirect taxes in form of value added tax, fuel levy and excise taxes induce a pro poor income redistributive effect (decrease income inequality) as indicated in table 1. The pro poor income redistributive effect associated with indirect taxes was estimated at 0.0011 meaning that financing health care in Zambia through indirect taxes reduces income inequality. The vertical effect was estimated at 0.0013 which dominates both the horizontal inequity estimated at 0.00005 and reranking effect estimated at 0.0001. This implies that unequal households are treated unequally and equal households

end up being treated unequally in contributing to indirect taxes while some households were reranked in redistributive process.

Bringing together direct taxes and indirect taxes, table 2 shows that financing health care through general taxes in Zambia induces pro rich income redistribution. The redistributive effect associated with general taxes is estimated at -0.0039 meaning that general taxes redistribute income in favour of the rich. The vertical effect is estimated at 0.0037 while horizontal inequity and reranking are estimated at 0.0004 and 0.0072 respectively, indicating that unequal households are treated unequally and equal households end up being treated unequally in contributing to general taxes while some households were reranked in the redistributive process. The vertical effect associated with general taxes is however smaller than the combined effects of reranking and horizontal inequity. This pro rich income redistributive effect associated with general taxes is as a result of the pro rich income redistributive effect associated with direct taxes estimated at -0.0049 which offset the pro poor income redistributive effect attributed to indirect taxes estimated at 0.0011.

Out of pocket payments also increase income inequality in Zambia as indicated in table 1. The redistributive effect was estimated at -0.0067 implying that OOP payments favour the rich relative to the poor. The vertical effect was estimated at 0.0043 which is smaller than the combined effects of horizontal inequity and reranking estimated at 0.0012 and 0.0098 respectively. This implies that unequal households are treated unequally and equal households end up being treated unequally while some households were reranked in the redistributive process. In the case of out of pocket payments in Zambia, it can be argued that the income redistributive effects observed are linked to the random nature of the illness and

access barriers to health services that individuals and households in particular the poor are faced with.

Overall, health care financing in Zambia is pro poor in redistributing income. The overall income redistributive effect was estimated at 0.0004. In this case, the vertical effect was estimated at 0.0007. This shows the degree to which income inequality decreases due to the unequal treatments of unequals. On the other hand, horizontal inequity and reranking were estimated at 0.00007 and 0.0002 respectively implying that equal households end up being treated unequally while some households were reranked in the redistributive process. The decrease in income inequality in the overall health care financing arises from the dominant effect of general taxes over OOP payments.

Table 2: Percentage decomposition of redistributive effect of Zambian health care financing, 2010

index	Direct taxes	Indirect taxes	General taxes	Out of pocket payments	Overall health care payments
RE	100.0%	100.0%	100.0%	100.0%	100.0%
V	- 48.3%	114.2%	-96.7%	-64.3%	165.8%
H	-7.5%	4.1%	-11.3%	-17.3%	19.1%
R	- 140.7%	10.1%	-185.4%	-147.0%	59.5%

Contributions of vertical effect (V), horizontal equity (H) and reranking (R) to the overall redistributive effect may be better reflected by expressing them as a percentage of the redistributive effect [21]. These are shown in table 3. Here, direct taxes would have been 148.2% less pro rich in the absence of differential treatment. Majority of this differential treatment is attributed to reranking 140.7% while 7.5% is caused by horizontal inequity. For indirect taxes, the increase in income redistribution attributed to indirect taxes would have been 14.2% more pro poor in

the absence of differential treatment. Of this 10.1% is associated with reranking and 4.1% is due to horizontal inequity. As table 3 shows, general taxes would have been 196.7% less pro rich in the absence of differential treatments. The major source of this effect comes from reranking 185.4% while 11.3% comes from horizontal inequity.

Out of pocket payments also show a fairly high level of differential treatment. The increase in income inequality would have been 164.3% lesser in the absence of differential treatment. Reranking alone accounts for about 147.0% of this effect and horizontal inequity accounts for 17.3%.

As depicted in table 2, overall health care financing induces a pro poor income redistribution effect in Zambia. The decrease in income inequality would have been 78.6% more in the absence of differential treatment. Reranking alone accounts for 59.5% and horizontal inequity accounts for 19.1%.

4. Discussion

In many developed and developing countries the promotion of a progressive and equitable health care financing system is an important goal [7]. This study decomposes health care financing in Zambia into vertical effect (V), horizontal equity effect (H) and reranking (R). Using the AJL model, this study has revealed that financing health care through direct taxes is progressive and yet increases income inequality. The redistributive effect is estimated at -0.0049, vertical effect estimated at 0.0024 and the combined effect of the differential treatments estimated at 0.0073.

The differential treatments (H and R) associated with direct taxes in Zambia dominate the vertical effect. Van Doorslaer et al., [22], for instance, noted that there

are a number of institutional factors that are likely to give rise to non-zero values of H and R. In the case of Zambia, the non-zero values of H and R can be associated with some forms of income exemptions from income tax that exist in Zambia. Non-zero values of H and R can also be attributed to some forms of expenditures like dividends payments which are tax deductible in Zambia.

In contrast to the findings of direct taxes in Zambia, the redistributive effect was positive in other countries. This includes Denmark (in 1987), Germany (in 1988), South Africa (in 2005/06), Finland (in 1990), Argentina (in 1997), Italy (in 1991), Netherlands (in 1997 and 1992), Portugal (in 1990), Sweden (in 1990), Switzerland (in 2008), USA (in 1987) and UK (in 1992) [7, 19, 21, 22]. In all these studies, the vertical effect dominates the H and R effects.

Results from countries such as Sweden, USA and Denmark, differential treatments were associated with regional/geographical differences in tax structure. While in Portugal, differential treatments were attributed to differences in tax structure between wage earners and the self-employed such that individuals that earns a similar income end up making differential tax payments [22].

Since direct taxes are progressive and yet induce pro rich income redistribution in Zambia there can still be room to address them in such a way that they become more progressive and pro poor income redistribution. This can be done by increasing the number of income tax thresholds than what is currently in existence. With more categories, one can discriminate between the rich and the poor more. In this study, the pro rich income redistribution of direct taxes could be attributed to the fact that although the analysis of income redistributive effect was based on the entire population, those that do not pay income tax are likely to be poor and have zero

values and when they pay such tax (given the few bands), it could lead to this pro – rich income redistribution.

Unlike direct taxes, indirect taxes in Zambia reduce income inequality (i.e., pro poor). The pro poor income redistribution of indirect taxes is attributed to the pro poor income redistribution of fuel levy, excise taxes and value added tax (VAT). The redistributive effect associated with financing health care through indirect taxes was estimated at 0.0011. This result is consistent with those reported in other studies. Results elsewhere such as China, Bangladesh, Indonesia, Korea Republic, Kyrgyz Republic and Nepal recorded the positive income redistributive effect estimated at 0.00024, 0.00058, 0.00077, 0.00017, 0.00018, 0.0006 and 0.00056 respectively [25].

While in other studies such as in Italy (in1999), Portugal (in 1990), United Kingdom (in 1992), Germany (in1988), Finland (in 1990), Switzerland (in 1998) and Netherlands (in 1987), using the AJL approach, recorded negative income redistributive effects estimated at -0.0014, -0.002, -0.0018, -0.0007, -0.0025, -0.00019 and -0.0006, respectively [16,17,19] while in South Africa (in 2012) using the Duclos et al. (2003) approach reported pro rich income redistributive effect estimated at –0.0012 (17) . In all the previous studies the vertical effect is the key driver of the negative redistribution associated with indirect taxes (see [7]).

Differential treatments in health care financing in Zambia accounts for about 14.2% of the loss in redistributive power of indirect taxes. This can be attributed mainly to the non-discriminatory nature of indirect taxes, sometimes even with the consumption patterns that prevail among households with the same incomes. For indirect taxes, the values of H and R may reflect differential consumptions levels at each income level. They may also reflect deferential consumption patterns [22] as

commodity taxes in most countries like Zambia vary to some extent across types of commodity. Findings from other countries such as Tanzania and Ghana indicate that indirect taxes were progressive. The progressivity of indirect taxes in Ghana and Tanzania were linked to the wide range of VAT exemptions on products such as agricultural goods mainly consumed by the poor and the progressivity of imports duties [15, 26].

Turning to general taxes, they induce pro rich income redistribution. The redistributive effect was estimated at -0.0039 with vertical effect accounting for 0.0037. Thus, a combination of a pro rich income redistribution attributed to direct taxes and the pro poor income redistribution associated with indirect taxes used in financing health care have resulted into a pro rich income redistributive effect for the general taxes in Zambia. In the case of Zambia, the pro poor vertical effect associated with general taxes is dominated by the sum of the horizontal and reranking effects.

Since general taxes are found to be progressive and induce a pro rich income redistributive effect in Zambia, increased reliance on them to finance health care is most likely to keep overall health care financing progressive and yet induces pro rich income redistribution. Though general taxes are progressive and pro rich in their income redistribution in Zambia, there can still be space to address them in such a way that they become more progressive and pro poor. For instance, individual components of direct taxes and indirect taxes that constitute general taxes can be examined and structuring the marginal tax rates in such a way as to discriminate between different income groups. Therefore, if other health care financing mechanisms are to be included, it is necessary that they are not pro rich in their income redistribution.

Elsewhere including Finland (in 1990), Denmark (in 1987), Switzerland (in 1992) and South Africa (in 2012) the redistributive effect of general taxes was estimated at 0.0044, 0.0024, 0.0035 and 0.0035 respectively and in all these countries the pro poor vertical effect dominates the horizontal and reranking effects [7,22]. In these countries, general taxes were pro poor in redistributing income due to a pro poor income redistribution of direct taxes which offsets the pro rich redistribution of indirect taxes [7].

Out of pocket payments are associated with increasing income inequality in the Zambian health care system. The income redistributive effect associated with out of pocket payment was estimated at -0.00006. This result is similar to those obtained from other countries such as Vietnam (in 1998) estimated at -0.0024, South Africa (in 2012) estimated at -0.0006, Ireland (in 1987) estimated at -0.0015 and the Netherlands (in 1992) estimated at -0.0005 [7,18,22]. In Zambia, although the direction of the impact is the same for out of pocket payments and direct taxes, the magnitude is not. The impact of out of pocket payments on income redistribution is greater. The non-zero values of horizontal inequity (H) and reranking (R) for out of pocket payments are mainly due to the non-discriminatory nature of such payments. The differential treatments associated with out of pocket payments in Zambia can also be attributed to the random nature of illness. In the case of South Africa, for example, the non-zero values of horizontal inequity and reranking were mainly due to the non-discriminatory nature of out of pocket payments and the stochastic nature of illness [7]

Therefore, increased dependence on out of pocket payments in the overall health care financing in Zambia will not promote equity in health care financing as it increases income inequality. Results elsewhere show that dependence on out of

pocket payments could lead to financial catastrophe or impoverishment of the population [27]. Thus, dependence on out of pocket payments for financing health care in Zambia is unlikely to lead to an improvement in the progressivity of the overall health care financing.

Overall, health care financing in Zambia has shown to induce a pro poor income redistributive effect. This result is consistent with those reported in other studies. The redistributive effect associated with overall health care financing in Zambia was estimated at 0.0004. Similarly, results elsewhere such as in France (in 1989), Italy (in 1991), Sweden (in 1990) and South Africa have generally recorded positive income redistribution effect for overall health care financing [7, 21, 22, 25]. However, in other countries such as Denmark (in 1987), Germany (in 1988), Netherlands (in 1992 and 1997), Portugal (in 1990), Switzerland (in 1992) and United States (in 1987) overall health care financing has been demonstrated to induce pro rich income redistribution [21, 22].

Though the analysis undertaken in this paper attempted to extend the distributional analysis in health care financing by decomposing and measuring income redistributive effect of health care financing in Zambia, it has a few limitations. Estimates concerning out of pocket payments were based on survey data just like in other similar studies on income inequality measurement in health care; they may be subjected to recall bias.

Further, understanding equity in health care system can be better by considering both the health care financing and delivery of health services. Although, the findings in this study provide a useful and detailed picture of the income inequality variation associated with the current health care financing in Zambia, it is recommended that

future research in this area can benefit from looking at both sides of the health care system in order to provide a more comprehensive analysis of equity in health care system.

5. Conclusion

This paper provides evidence that overall, health care financing redistributes incomes from the rich to the poor in Zambia. However, this is not the case for some individual health care financing mechanisms. Financing health care through direct taxes, general taxes and out of pocket payments were shown to be progressive but pro rich in income redistribution while indirect taxes induce pro poor income redistribution. In all cases, except for total health care financing and indirect taxes the combined effect of the horizontal and reranking effects dominates the vertical effect. These findings clearly indicate that the impacts of differential treatments are equally significant and constitute inequity in health care financing in Zambia. This study has also revealed that a health care financing mechanism can be progressive and yet lead to an increase in income inequality. The findings in this paper should therefore help shape policy toward ensuring an equitable and efficient health care financing system in Zambia.

Competing interest

The author declares that they are no competing interests.

Author's contributions

Mulenga A, who conceived the idea for the study and its design, was also responsible for data analysis and preparation of the manuscript

Acknowledgement

The author is grateful to National Research Foundation (NRF) for the funding and assistance in conducting this study.

Reference

1. Bennett S, Gilson L. Health financing: designing and implementing pro poor policies. London, DFID Health System Resource Centre, www.healthsystemsresource.org accessed on 28 Feb, 2014
2. McIntyre D. What healthcare financing changes are needed to reach universal coverage in South Africa? *SAMJ: South African Medical Journal* 2012; 102(6):489-490.
3. Ministry of Health. National health report 2007-2010. Ministry of Health, Lusaka, Zambia 2010. www.moh.gov.zm, accessed on 18th May, 2014
4. World Health Organization, National Health Account Database Geneva: World Health Organisation 2010. <http://apps.who.int/nha/database/DataExplorerRegime.aspx>.
5. World Bank. Health equity and financial protection report. Zambia. Washington, D.C.: World Bank Publications 2012.
6. Central Statistical Office, Zambia Census of Population and Housing, Lusaka, Zambia 2010. www.zamstats.gov.zm/about_us/abt_publications.htm, accessed on 26/05/14
7. Ataguba, J. Distributional impact of health care finance in South Africa, Cape Town, PhD thesis, University of Cape Town 2012. http://uctscholar.uct.ac.za/PDF/92493_Ataguba_J.pdf, accessed on 27/03/2014
8. Wagstaff A. Reflections on and alternatives to WHO's fairness of financial contribution index. *Health Econ* 2002; 11(2):103-115.
9. Zhong H. Extensions to decomposition of the redistributive effect of health care finance. *Health Econ* 2009; 18(10):1176-1187.
10. McIntyre D. Health service financing for universal coverage in east and southern Africa. EQUINET Discussion Paper 95, Health Economics Unit. University of Cape Town. 2012.
11. O'Donnell O A, Wagstaff A. Analyzing health equity using household survey data: a guide to techniques and their implementation. : Washington D.C.: World Bank Publications; 2008.
12. Cissé B, Luchini S, Moatti JP. Progressivity and horizontal equity in health care finance and delivery: What about Africa? *Health Policy* 2007; 80(1):51-68.
13. Deaton A, Zaidi S. Guidelines for constructing consumption aggregates for welfare analysis. : LSMS Working Paper Number 135, Washington D. C.: World Bank Publications; 2002.
14. Ministry of Finance. Budget Speech 2010, Ministry of Finance and National Planning. Lusaka, Zambia 2010. www.mofnp.gov.zm, accessed on 13th January, 2014
15. Mtei G, Borghi J. An assessment of health care financing progressivity in Tanzania. Report on SHIELD Work Package;2. Health Economics Unit, University of Cape Town 2010.
16. Duclos J, Jalbert V, Araar A. Classical horizontal inequity and reranking: an integrating approach. : Emerald Group Publishing Limited; 2003.
17. Aronson JR, Johnson P, Lambert PJ. Redistributive effect and unequal income tax treatment. *The Economic Journal* 1994:262-270.
18. Wagstaff A, Doorslaer E. Paying for health care: quantifying fairness, catastrophe, and impoverishment, with applications to Vietnam, 1993-98. World Bank Policy Research Working Paper (2715). Washington D.C.: World Bank Publications 2001.

19. Bilger M. Progressivity, horizontal inequality and reranking caused by health system financing: A decomposition analysis for Switzerland. *J Health Econ* 2008 12;27(6):1582-1593. DOI:<http://dx.doi.org/10.1016/j.jhealeco.2008.07.009>.
20. Urban I, Lambert PJ. Redistribution, horizontal inequity, and reranking: how to measure them properly. *Public Finance Review* 2008.
21. Wagstaff A, van Doorslaer E. Progressivity, horizontal equity and reranking in health care finance: a decomposition analysis for the Netherlands. *J Health Econ* 1997;16(5):499-516.
22. Van Doorslaer E, Wagstaff A, Van der Burg H, Christiansen T, Citoni G, Di Biase R, et al. The redistributive effect of health care finance in twelve OECD countries. *J Health Econ* 1999;18(3):291-313.
23. Hyun JK, Lim* B. Redistributive effect of Korea's income tax: equity decomposition. *Applied Economics Letters* 2005;12(3):195-198.
24. Ichoku, H. E. A distributional analysis of health care financing in developing country: A Nigerian case study applying a decomposable Gini index, Cape Town, PhD thesis, University of Cape Town; 2006.
25. O'Donnell O, Van Doorslaer E, Rannan-Eliya RP, Somanathan A, Adhikari SR, Akkazieva B, et al. Who pays for health care in Asia? *J Health Econ* 2008;27(2):460-475.
26. Akazili J, Garshong B, Aikins M, Gyapong J, McIntyre D. Progressivity of health care financing and incidence of service benefits in Ghana. *Health Policy Plan* 2012;27(suppl 1):i13-i22.
27. World Health Organization. *The world health report 2000: health systems: improving performance*. : World Health Organization; 2000.
28. Phiri, J. & Ataguba, J.E.. Inequalities in public health care delivery in Zambia. *International Journal for Equity in Health*. 2014; 13(1): .

Table 3 financing incidence analysis estimation techniques

Component	Incidence assumption	Rates*	Basic computation technique
Taxes			
Personal income tax	Legal payer	tax 0%-35% depending on income level. 0% tax for incomes below ZMK800,000 (unrebased) ⁴ .	Apply the appropriate tax rate and tax thresholds on the gross taxable income (salaries and wages received, income from business or professional practice/activities, part of dividends and interest received and/or accrued on deposits) of individuals within each households within the taxable range.
Corporate income tax	Shareholders and consumer	35%	Apportioning the total corporate tax receipt based on Zambia Revenue Authority data to households based on the tax shifting assumptions. Assumption of tax shifting includes certain percentage borne by shareholders (the LCMS collected information on those who receive dividends) and the rest by households through consumption. In this study, one tax-shifting scenario was assumed; equal (50%/50%) tax burden was shared between consumers and shareholders/capital owners.
Value added tax (VAT)	Consumer	16% on standard rated goods and services	The value added tax rate is applied to expenditure of goods and services that are standard rated excluding the zero rated and exempted goods.
Excise tax	Consumer	40% of retail price for clear beer, 125% of retail price for wine, spirits, ZMK 145/litre for opaque beer,	Apply the tax rate on the expenditure on wine, spirits, beer, cigarettes and soft drinks. For opaque beer, apply the rate per litre to the quantity of opaque beer consumed by households.

*This applies to the taxes and are based on the 2010 assessment year

⁴ Zero percent for income below 800 000 Zambian Kwacha at the exchange rate of US\$1= ZMK 4500 (equivalent to US\$177.8) in 2010

		10% of retail price for soft drinks,	
		145% of retail price for cigarettes.	
Fuel levy	Consumer	ZMK 6898 /litre for diesel and ZMK 7573/litre for petrol.	Since fuel is consumed by households (personal or public transportation) and corporate users, estimation involved a process of generating the component attributed to public transport users, users of private transport and those attributed to users in business.
Others			Includes taxes on stamps duties, properties, airport departures and unidentified levies.
Out of pocket (OOP) payments	Payer		Comprehensive household expenditure on medicines consultations, treatments and procedures excluding transportation were summed.

APPENDICES

Appendix A:

Instructions for Authors (Applied Health Economics and Health Policy Journal)

- **Types of papers**

The word counts given below do not include the abstract, references, figure legends or table captions.

- Review Article. Word count up to 6000. Provides an authoritative, balanced, comprehensive, fully referenced and critical review of the literature.
- Current Opinion. Word count 1500 to 3000. Places an area in perspective given that it is of current international interest and a consensus has not yet been reached; therefore, the arguments presented may be controversial, but at the same time must be balanced and rational.
- Leading Article. Word count up to 3000. Provides a short, balanced overview of the current state of development of an emerging area.
- Practical Application. Word count up to 3000. Reviews and explores the practicalities of implementing/using particular economic methodologies to address healthcare decision problems. The paper should either focus on one particular method and review its advantages and disadvantages, or focus more on a particular decision problem and review the various methods that might help inform the problem.
- Systematic Review. Word count up to 10,000. Collates all empirical evidence that fits pre-specified eligibility criteria to answer a specific research question. It uses explicit, systematic methods that are selected with a view to minimizing bias, thus providing reliable findings from which conclusions can be drawn and decisions made. Please refer to Integrity of Research and Reporting below for more information on original research reporting requirements.
- Original research. This can be submitted as either a full length report, entitled an Original Research Article (word count up to 4000 plus any Electronic Supplementary Material) or a short report describing preliminary research, entitled a Short Communication (word count up to 2000 plus any Electronic

Supplementary Material). Please refer to Integrity of Research and Reporting below for more information on original research reporting requirements.

- Letter to the Editor. Word count up to 1000. Comment on an article published recently in the journal; a response to the comments would normally be sought from the authors of the original article and published in the same issue, where possible.
- Editorial/Commentary. Word count up to 1500. A brief opinion piece on a current topic of high interest.

Editorial procedure

Internal Review by Editorial Staff: The journal editor will perform an initial appraisal of each manuscript. If your paper has been peer reviewed by another journal as part of a prior submission, the journal editor will also assess any previous editorial/referee comments and how these have been dealt with as part of the appraisal process.

External Peer Review: You will be notified as to whether your paper is progressing to external review, within 1 to 2 weeks of our acknowledgement of receipt. Peer reviewer identities are kept confidential, but author identities are known to the reviewers. Peer reviewers are asked to disclose potential conflicts of interests that may affect their ability to provide an unbiased review of an article. The majority of manuscripts will require some degree of revision following peer review before they can be accepted for publication. The final decision on acceptability for publication lies with the journal editor.

Copy Editing: All accepted manuscripts are copy edited. This process addresses general publishing considerations, such as layout of tables and figures, house style and clarity of expression. Authors will receive proofs following editing for their approval and sign off. It should be noted that the responsibility for checking the technical accuracy and consistency of data within the article rests with the authors.

- **Manuscript Submission**

Manuscript Submission

Submission of a manuscript implies: that the work described has not been published before; that it is not under consideration for publication anywhere else; that its publication has been approved by all co-authors, if any, as well as by the responsible authorities – tacitly or explicitly – at the institute where the work has been carried out. The publisher will not be held legally responsible should there be any claims for compensation.

Permissions

Authors wishing to include figures, tables, or text passages that have already been published elsewhere are required to obtain permission from the copyright owner(s) for both the print and online format and to include evidence that such permission has been granted when submitting their papers. Any material received without such evidence will be assumed to originate from the authors.

Online Submission

Authors should submit their manuscripts online. Electronic submission substantially reduces the editorial processing and reviewing times and shortens overall publication times. Please follow the hyperlink “Submit online” on the right and upload all of your manuscript files following the instructions given on the screen.

For additional information on Publishing Ethics, please see “Integrity of Research and Reporting” below

- **Title page**

The title page should include:

- The name(s) of the author(s)
- A concise and informative title
- The affiliation(s) and address(es) of the author(s)
- The e-mail address, telephone and fax numbers of the corresponding author

Abstract

Please provide an abstract of 150 to 250 words. The abstract should not contain any undefined abbreviations or unspecified references.

For manuscripts reporting the results of clinical trials, the abstract should be structured as described in the CONSORT Statement (see link below). The appropriate extension to the CONSORT Statement should be referred to where relevant. For manuscripts reporting the results of a systematic review with or without a meta-analysis, the abstract should be structured as described in the PRISMA statement (see link below). For both types of manuscripts the abstract length can be increased from the 250 word limit to allow full compliance with the relevant guidelines.

Key Points for Decision Makers

A few short, stand-alone bullet points should be provided summarizing the key messages of the paper for decision makers (i.e. relevant to decision makers and using non-technical language). These should not simply be a repeat of the abstract and should summarize the key findings and implications for decision makers and not the objectives or methods.

- Text Formatting

Manuscripts should be submitted in Word.

- Use a normal, plain font (e.g., 10-point Times Roman) for text.
- Use italics for emphasis.
- Use the automatic page numbering function to number the pages.
- Do not use field functions.
- Use tab stops or other commands for indents, not the space bar.
- Use the table function, not spreadsheets, to make tables.
- Use the equation editor or Math Type for equations.
- Save your file in docx format (Word 2007 or higher) or doc format (older Word versions).

Headings

Please use the decimal system of headings with no more than three levels.

Abbreviations

Abbreviations should be defined at first mention and used consistently thereafter.

Footnotes

Footnotes can be used to give additional information, which may include the citation of a reference included in the reference list. They should not consist solely of a reference citation, and they should never include the bibliographic details of a reference. They should also not contain any figures or tables.

Footnotes to the text are numbered consecutively; those to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data). Footnotes to the title or the authors of the article are not given reference symbols. Always use footnotes instead of endnotes.

Acknowledgments

Acknowledgments of people, grants, funds, etc. should be placed in a separate section before the reference list. The names of funding organizations should be written in full.

- **References**

Citation

Reference citations in the text should be identified by numbers in square brackets. Some examples:

1. Negotiation research spans many disciplines [3].
2. This result was later contradicted by Becker and Seligman [5].
3. This effect has been widely studied [1-3, 7].

Reference list

The list of references should only include works that are cited in the text and that have been published or accepted for publication. Personal communications and unpublished works should only be mentioned in the text. Do not use footnotes or endnotes as a substitute for a reference list. The entries in the list should be numbered consecutively.

- Journal article Smith JJ. The world of science. *Am J Sci.* 1999;36:234–5.
- Article by: DOI Slifka MK, Whitton JL. Clinical implications of dysregulated cytokine production. *J Mol Med.* 2000; doi:10.1007/s001090000086
- Book: Blenkinsopp A, Paxton P. *Symptoms in the pharmacy: a guide to the management of common illness.* 3rd ed. Oxford: Blackwell Science; 1998.
- Book chapter: Wyllie AH, Kerr JFR, Currie AR. Cell death: the significance of apoptosis. In: Bourne GH, Danielli JF, Jeon KW, editors. *International review of cytology.* London: Academic; 1980. pp. 251–306.
- Online document: Doe J. Title of subordinate document. In: *The dictionary of substances and their effects.* Royal Society of Chemistry. 1999. <http://www.rsc.org/dose/title of subordinate document>. Accessed 15 Jan 1999.

- **Tables**

All tables are to be numbered using Arabic numerals.

Tables should always be cited in text in consecutive numerical order.

For each table, please supply a table caption (title) explaining the components of the table.

Identify any previously published material by giving the original source in the form of a reference at the end of the table caption.

Footnotes to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data) and included beneath the table body.

Accessibility

In order to give people of all abilities and disabilities access to the content of your supplementary files, please make sure that

- The manuscript contains a descriptive caption for each supplementary material
- Video files do not contain anything that flashes more than three times per second (so that users prone to seizures caused by such effects are not put at risk)
- **After Acceptance**

Upon acceptance of your article you will receive a link to the special Author Query Application at Springer's web page where you can sign the Copyright Transfer Statement online and indicate whether you wish to order Open Choice and offprints.

Once the Author Query Application has been completed, your article will be processed and you will receive the proofs.

Open Choice

In addition to the normal publication process (whereby an article is submitted to the journal and access to that article is granted to customers who have purchased a subscription), Springer now provides an alternative publishing option: Springer Open Choice. A Springer Open Choice article receives all the benefits of a regular subscription-based article, but in addition is made available publicly through Springer's online platform SpringerLink.

- [Springer Open Choice](#)

Copyright transfer

Authors will be asked to transfer copyright of the article to the Publisher (or grant the Publisher exclusive publication and dissemination rights). This will ensure the widest possible protection and dissemination of information under copyright laws.

Open Choice articles do not require transfer of copyright as the copyright remains with the author. In opting for open access, the author(s) agree to publish the article under the Creative Commons Attribution License..

Offprints

Offprints can be ordered by the corresponding author.

Color illustrations

Publication of color illustrations is free of charge.

Proof reading

The purpose of the proof is to check for typesetting or conversion errors and the completeness and accuracy of the text, tables and figures. Substantial changes in content, e.g., new results, corrected values, title and authorship, are not allowed without the approval of the Editor.

After online publication, further changes can only be made in the form of an Erratum, which will be hyperlinked to the article.

Online First

The article will be published online after receipt of the corrected proofs. This is the official first publication citable with the DOI. After release of the printed version, the paper can also be cited by issue and page numbers.

- Scientific style
 - Please always use internationally accepted signs and symbols for units (SI units).
 - Nomenclature: Insofar as possible, authors should use systematic names similar to those used by Chemical Abstract Service or IUPAC.
 - Genus and species names should be in italics.
 - Generic names of drugs and pesticides are preferred; if trade names are used, the generic name should be given at first mention.
 - Please use the standard mathematical notation for formulae, symbols, etc.:

Italic for single letters that denote mathematical constants, variables, and unknown quantities

Roman/upright for numerals, operators, and punctuation, and commonly defined functions or abbreviations, e.g., cos, det, e or exp, lim, log, max, min, sin, tan, d (for derivative)

Bold for vectors, tensors, and matrices.

- Integrity of research and reporting

Ethical standards

Manuscripts submitted for publication must contain a statement to the effect that all human and animal studies have been approved by the appropriate ethics committee and have

therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

It should also be stated clearly in the text that all persons gave their informed consent prior to their inclusion in the study. Details that might disclose the identity of the subjects under study should be omitted.

These statements should be added in a separate section before the reference list. If these statements are not applicable, authors should state: The manuscript does not contain clinical studies or patient data.

The editors reserve the right to reject manuscripts that do not comply with the above-mentioned requirements. The author will be held responsible for false statements or failure to fulfill the above-mentioned requirements

Conflict of interest

Authors must indicate whether or not they have a financial relationship with the organization that sponsored the research. They should also state that they have full control of all primary data and that they agree to allow the journal to review their data if requested.

Therefore the manuscript must be accompanied by the “Conflict of Interest Disclosure Form”. To download this form, please follow the hyperlink on the right.

Duplicate Publication and Duplicate Submission

Manuscripts are considered with the understanding that they have not been published previously and are not under consideration by another publication. Copies of possibly duplicative materials (i.e. those containing substantially similar content or using the same or similar data) that have been previously published or are being considered elsewhere must be provided at the time of manuscript submission. Submitted or published manuscripts that are found to be duplicated in any substantive way will be addressed in accordance with the guidelines of the Committee on Publication Ethics (see link below).

www.publicationethics.org

The journal will, however, consider republication of a paper previously published in a language other than English, or simultaneous publication of a paper in multiple journals with different audiences, if the specific circumstances warrant this action. This will be done with full and prominent disclosure of the original source and with any necessary permission. The journal does not consider posting of protocols and results in clinical trial registries to be prior

publication. Press releases of studies presented at scientific meetings are also not considered prior publication and will not compromise an author's ability to write up a full study provided the release does not disclose results beyond those presented in the meeting abstract or poster.

Plagiarism

Plagiarism is the use of others' published and unpublished ideas or words (or other intellectual property) without attribution or permission, and presenting them as new and original rather than derived from an existing source. Plagiarism is scientific misconduct and will be addressed as such following the Committee on Publication Ethics guidelines (see link below).

www.publicationethic.org

POLICY BRIEF

Financing health care and its impact on income inequality in Zambia

Key messages

- Total health care financing in Zambia contributes to a reduction in income inequality by benefiting the poor
- Richer Zambians devote more share of their income to financing health care compared to the poor.
- Financing health care overall can be described as relatively fair to the poorer Zambians.
- Direct out-of-pocket payments remain unfair to poorer Zambians. As such they should not form a major share of total health care financing.

Introduction

Globally, many countries are interested in ensuring an equitable health care financing system that gives their population access to health services when needed. Even at that, many African countries still do not have equitable health systems. In Zambia income inequality and poverty are high among the population. Despite the recent turnaround in the economy as shown by improvements in incomes, the majority of Zambians continue to live in poverty.

Currently, Zambia is considering a major health systems reform toward a universal health system that will improve access and affordability of needed health services. Scientific evidence is needed in order to design such an equitable system. One area where evidence is needed in Zambia is an assessment of how health care financing affects income inequality. An equitable situation occurs when a health financing system reduces inequality in income and households or individuals contribute to financing health care according to their ability to pay.

Effect of paying for health care on income inequality

Paying for health care can redistribute income in favour of the poor or rich. In Zambia direct taxes in form of personal income tax and corporate income tax contribute to an increase in income inequality. Unlike direct taxes, financing health care through indirect taxes in form of value added tax, fuel levy and excise taxes reduce income inequality. Financing health care through general taxes in form of direct taxes and

indirect taxes in Zambia were also found to increase income inequality; the increase in income inequality resulting from direct taxes offsets the decrease in income inequality arising from indirect taxes.

Like general taxes, out of pocket payments were found to increase income inequality. Therefore, increased dependence on out of pocket payments in the overall health care financing in Zambia will not promote equity in health care financing as it is generally associated with adverse effects. Elsewhere, results show that dependence on out of pocket payments could cause hardship or push households into poverty or further into it, if they are already poor.

Overall health care financing contributes to a reduction in income inequality in Zambia. Hence, health care financing system in Zambia favours the poor relative to the rich. However, this is not the case for some individual sources of health care financing like out of pocket payments.

Policy recommendations

Based on the findings of this study, policy makers may wish to consider the current overall structure of paying for health care in Zambia. As far as policy recommendations are concerned, the findings reported in this study while offering detailed analysis of the prevailing income inequality, there is need to reconsider some of the current individual sources of health care financing that contribute to an increase in income inequality in Zambia; namely, direct taxes and out of pocket payments.

Given that financing health care through general taxes increases income inequality in Zambia, there can still be space to design them in such a way that they favour the poor relative to the rich. This can be done by examining individual components of direct taxes and indirect taxes that constitute general taxes and structuring the marginal tax rates in such a way as to discriminate favourable between different income groups.

Since direct taxes increase income inequality in Zambia, there may be room to improve them. This can be done by increasing the number of income tax thresholds than what is currently in existence. With more categories, one can discriminate, more favourably, between the rich and the poor.

If other health care financing mechanisms are to be included in addition to general taxes, it is necessary that they do not contribute to an increase in income inequality. For Zambia, such potential policy measure is the introduction of a mandatory prepayment arrangement, especially, a social health insurance scheme that would provide financial risk protection and enable universal health coverage.

For out of pocket payments, increased dependence on them in Zambia should be avoided as it increases income inequality. Generally, such payments are regarded as unfair.