



# **Progressivity and Determinants of Out-of-Pocket Health Care Financing in Zambia**

By

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## **Declaration**

No portion of the work referred to in the dissertation has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning. It is a product of my original work and it is based on Zambian data for 1998, 2004 and 2006. Other sources of information are fully acknowledged and referenced.

**Mwenge Felix**

**Signature:**.....

**Date:** 25<sup>th</sup> November 2010

# Map of Zambia



## **Dedication**

To my siblings Teba, Musenge, Bwalya, Kansoko and Mubanga, and to my mother Chilufya Ngowani, who made me a '*coat of many colours*', thank you for believing in me and for realising and making me aware that I was a unique child early in my upbringing.

To my fellow youths in Zambia with whom I share the belief that the transformation of Zambia and most of Africa will only be realised upon change of individual attitudes towards issues such as work, money, knowledge, education and spirituality, I urge you not to ever give up believing in change no matter how far fetched it may appear.

*Any culture, group of people, or civilization that forbids intellectual, as well as a psychological study of its challenges, has in itself forbidden the ability to find help, healing, and progress for the future.*

Pastor Matthew Ashimolowo

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## **Part A**

### **Study Protocol**

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## **1.0 INTRODUCTION**

Out of pocket (OOP) payments is one of the single largest sources of health care financing in Sub-Saharan Africa (McIntyre et al. 2006). In 2002, OOP expenditures constituted 51% to 90% of the private health expenditure in 14 countries and 91% to 100% in 24 African countries (Kirigia et al. 2006). In the same year, OOP constituted over 50% of the private health

expenditure in 38 countries. This clearly indicates that households make a significant contribution to health expenditure in the majority of the countries of the Region. OOP payments are in form of direct payments, which households pay at the point of use of health services. It includes spending on such things as consultation fees, investigatory tests, hospitalization and pharmaceuticals but excludes expenditure on transportation to obtain care and special nutrition (Castano et al. 2002). OOP payments are net of any insurance reimbursement. They may include co-payments for used public health services but also many other formal and informal payments, such as non-prescription drugs, private medical care payments, or "under-the-table payments" for gifts and gratitude money for health care providers (Mastilica, Bozikov 1999).

In Zambia, OOP payments are substantial, accounting for approximately 29 percent of total health expenditure in 2004 (Ministry of Health Zambia 2006). In the same year, compared to other financing sources, OOP was second only to donor funding which accounted for 38 percent, followed by Ministry of Finance with 24 percent, employers with 6 percent and other sources with 3 percent. 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 OOP payments, ranking higher than some African countries such as Swaziland, Namibia, Mauritania and Malawi.

## **1.1 PROBLEM STATEMENT**

From the time Zambia got its independence from Britain, the government had been providing free health care services for all (Ministry of Health/Republic of Zambia. 2004). However, it became increasingly difficult to sustain this system especially when in the mid 1970s the country started experiencing macroeconomic challenges. This resulted in adverse effects on health and was compounded by increased poverty, inequality and unemployment and contractions in per capita household incomes and GDP. Ultimately, the public sector's ability to finance the provision of health care services diminished over time. In the wake of these challenges, there was an emergence of liberal economic reforms in many parts of Africa, popularly known as 'Structural Adjustment Programmes' (SAPs). The main theme of these reforms among others was the removal of public subsidies and withdrawal of direct government provision of many social services including health care (McPherson 1995). Under the circumstances, the newly

elected government, supported by donors, also referred to as cooperating partners in the Zambian health literature (Ministry of Health 2005, Republic of Zambia 2006), began in the early 1990s to rationalize that, if rich countries could not afford to provide free services to their populations, poor countries like Zambia could similarly not afford to sustain their “free-for-all” health policies. Thus, in 1992, far-reaching national health reforms were initiated. A major tenet of the reforms was the cost-sharing health policy (introduced in 1993), which saw Zambia introducing user fees in all public facilities at all levels of care. Patients were now required to pay at the point of use of health services.

These health reforms were initially greeted with enthusiasm, and some positive changes were recorded in the early years of the reform implementation (Gilson et al. 2003). In years that followed however there has been a reversal of the situation causing a waning of interest in the health reforms and increased skepticism. This generated intense (and on-going) debate about the ability of the reforms to foster a number of things including better coverage, equity and ease of access to health care (Blas, Limbambala 2001, Malama et al. 2002, van der Geest et al. 2000). The subject of user fees is at the center of the health reforms and health policy debate as a key policy instrument for health care financing. A key anxiety in this regard concerns the health and socio-economic implications of user fees as a financing option, particularly given the poverty context of health in Zambia. (Masiye et al. 2008) observe that implementing user fees in a health setting with widespread poverty and poor key health indicators has been very challenging. Contrary to expectations, user fees resulted in lower utilization rates and denied more people, especially the poor, access to health care. During the same period about 22% of urban and 30% of rural patients were turned away from health facilities because they could not pay for services upfront (Kondo, McPake 2007). User fees were later abolished in April 2006.

The abolition of user fees however only covers primary health care in rural areas. Urban dwellers as well as rural people who need health care not available at primary level still have to pay OOP. Because the cost of provision of services at the higher levels is higher, OOP has remained considerably high despite the policy of user fees removal. OOP payments (World Health Organisation 2010) accounted for 71.4% of total private health expenditure in 2004. This was higher than in similar countries in the region such as Zimbabwe with 50.7%, Malawi, 35.2%, Botswana 27.8% as well as Uganda with 51%. The magnitude of OOP as a share of private

expenditure in Zambia also suggests that the level of prepayments in form of private health insurance is very low. For example, between 2002 and 2006 private prepayment plans as a percentage of private health expenditure ranged from 0.9% to 3.7% (ibid). In fact, in the 1995-98 National Health Accounts there was no component of prepayments because it was non-existent at the time (Ministry of Health/ Central Board of Health 1998). On the other hand, tax funding has remained a key health financing mechanism in the country. However, the health sector experienced shrinking budgetary allocations after the adoption of SAPs as earlier mentioned.

Given this lack of general health insurance and reduced budgets to the health sector most households, rural and urban have remained relying on out of pocket payments to finance health care. However, out of pocket payments may not be a good way of paying for care because it has never been possible for health systems around the world to demand that out of pocket are made according to ability to pay. This is because payments are mostly made at the point of use of health services without considering the payers initial income. This tend to be inequitable in the sense that both poor and rich are made to face similar health costs. But equity of financing requires that payments are made according to one's ability to pay. This is a desirable policy objective in most of the countries today. Given the nature of out of pocket payments this may be hard to achieve especially in Zambia where the majority of the population is poor. . For this reason health systems seek to reduce out of pocket payments as much as possible.

The inequitable nature of OOP payments especially in poor countries is one of the main reasons leading to user fee removal for health care in many African countries. For example the inequitable nature of OOP payments led to the abolition of user fees for health care in Uganda in 2001 (Xu et al. 2006). . Thereafter the South African, , Government in an effort to reduce the inequity of out of pocket payments and other effects introduced a policy of universal access to free primary health care by removing user fees for everyone (Wilkinson et al. 2001). This is an indication that OOP payments are inequitable and with them it may be difficult to achieve universal coverage. Countries where out of pocket payments have remained predominant tend to introduce user fee exemptions as a measure of equity. However, research has shown that user fee exemptions have not rightly beed implemented and targeted. For example,. Exemptions were implemented soon after the introduction of user fees in Zambia. However, it has been reported that like in many other countries, exemptions in Zambia were very ineffective in reaching the

target population (Masiye, Chitah & McIntyre 2010). Hence the equity objectives they were meant to achieve were not successful. In other countries out of pocket payments are replaced with alternative sources of financing such as prepayment schemes which do not require people to pay at the point of use of health services. However, prepayment schemes in Zambia are almost insignificant and where they are found they are only accessible by people of high socio-economic status who happens to be a minute proportion of the Zambian population.

## **1.2 STUDY RATIONALE**

The need for health care financing mechanisms that are progressive 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. this is an equity objective.. This is the main motivation for this study. It is envisaged that this study will provide empirical evidence on the progressivity and determinants of OOP payments. This information is important for policy making regarding health care financing.

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. An equitable health care system would be one in which payments for health care are positively related to the ability to pay. It is not still clear whether out of pocket payments are progressive and can foster equity in the financing of health care in Zambia. This study will provide an empirical assessment of OOP financing 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.

## **1.3 OBJECTIVES OF THE STUDY**

The main objective of the study is to assess the progressivity and determinants of OOP health care payments in Zambia.

### **1.3.1 Specific Objectives**

More specifically the study will seek to;

- Measure OOP health expenditure as a share of total household expenditure and compare across different socio-economic groups between 1998 and 2006.
- Determine the characteristics of households who make OOP health care payments
- Assess factors associated with the amount of OOP health care payments.
- Compare the progressivity of OOP payments in 1998, 2004 and 2006

### **1.4 Literature Review**

Out-of-pocket (OOP) health care payments refer to payments made by households at the point of receiving health services. It includes spending on alternative and/or traditional medicine but may exclude expenditure on transportation to obtain care and special nutrition as these are related to different policy levers than payments for health services (World Health Organisation 2005). OOP is usually contrasted with other forms of paying for health care such as social health insurance and general tax funding which are in form of prepayments. Health care financing in Zambia is a combination of all of these payment mechanisms.

There are important issues raised against the use of OOP payments as a means of financing health care in many countries. Major among these is that of equity. That is, whether paying OOP is progressive or not. The other important issue is that of financial risk protection. Usually it is not enough for a financing mechanism to be equitable; it should also offer financial risk protection to those using it to pay for health care. That is to say, people's living standards should not fall considerably after incurring health expenditures.

#### **1.4.1 Progressivity of OOP payments**

A financing mechanism is progressive if high-income groups contribute a higher percentage of their income than do low income groups (McIntyre et al. 2008). In other words, progressivity measures the deviation from proportionality in the relationship between health payment and ability to pay (ATP) (Yu, Whyne & Sach 2008). It reveals the extent of inequality in paying for health care services between households of unequal ATP. A health payment is progressive if it

accounts for an increasing proportion of ATP as ATP rises. A progressive system means that the individuals or households with greater ATP are paying more proportionally in financing health care. Progressivity of OOP payments can easily be determined by comparing ones level of OOP payments with their total income over a given period of time and then compare this across different socio-economic classes. It can also be measured in different other ways such as using the Kakwani index. The Kakwani index (Kakwani 1977) is one of the most common summary measures of progressivity. It is defined as twice the area between a payment concentration curve and the Lorenz curve and is calculated by taking the difference between the health payments concentration curve and the gini coefficient of ATP. A negative Kakwani index indicates regressivity; while a positive Kakwani index indicates progressivity. In the case of proportionality the index is zero.

OOP payments have been found to be progressive in some African countries. For example, in Tanzania, between 1992 and 2002 Manzi et al (2005) found that OOP increased with the level of socio-economic status, with the least poor paying 2.5 times more than the poorest. This result was attributed to the presence of user fees and incomplete implementation of exemption and waiver mechanisms. Hence making everyone to face the same health costs regardless of their ability to pay which consequently makes the system appear progressive when more payments are made by those in high socio-economic status compared to those in low socio-economic status. In 1997, O'Donnell et al (2008) also found that OOP payment was progressive in Egypt. While assessing various sources of health financing, the authors point out that OOP payment was one of the sources that contributed to the overall progressivity of the entire health financing system in Egypt. OOP was progressive compared to other sources of financing such as cigarette tax, social insurance contributions as well as private insurance premiums which had Kakwani indices of  $-0.0061$ ,  $-0.0532$  and  $-0.0011$  respectively while OOP had a Kakwani index of  $0.0644$ . This progressivity has been associated with the presence of out of pocket payments. However, the author argues that in as much as OOP was found progressive in Egypt, it was the least progressive of all the financing sources under investigation. Compared with other sources, direct personal taxes were the most progressive followed by indirect taxes with Kakwani indices of  $0.2501$  and  $0.1435$  respectively.

Outside of Africa, especially in some developing countries, OOP payments have been progressive. For example in India, Gag and Karan observe that between 1999 and 2000 poorer quintiles of the population spent a relatively lower proportion of their expenditure OOP than their rich counterparts. Reasons given are that OOP constituted the largest share of health expenditure and varied between 80-70% of health expenditure and 95% of private at the moment. There was also a weak insurance and community financing emerging at the time. The apparent progressivity was at the expense of the poor households who could not afford to pay out of pocket as much as the rich households. A similar observation was made in Malaysia by Yu et al (2008) between 1989 and 1999. The progressivity of OOP observed was as a result of the switch by the rich to private health services and the predominant reliance on subsidized public health services by the poor. Implying that, most out of pocket payments were made by those belonging to high socio-economic status. Other developing countries with progressive OOP payments for health care include Nepal and Bangladesh in 1996 and 2000 respectively. In Nepal the reasons for progressivity are that while both the rich and poor use public facilities, the rich are prescribed expensive medicines while the poor are prescribed cheap medicines. Even then, the poor cannot afford to buy the prescribed medicines. Hence most of the out of pocket payments were incurred by the rich. In Bangladesh health was financed almost exclusively from OOP and tax revenues.

#### **1.4.2 Regressivity of OOP payments**

Regressivity is the exact opposite of progressivity and can be measured and determined in a similar way. In this case, the Kakwani index will be negative.

In Africa a clear demonstration of the regressivity of OOP payments is given in Cissé et al (2007). In a study of four francophone West African countries (Ivory Coast, Guinea, Senegal and Mali) between 1998 and 1999 the authors observe that OOP payments were regressive in all of the four countries. The authors claim that this regressivity is due to the presence of user fees and cost recovery policies implemented in the early years before the study was done, making households to face similar health costs regardless of variations in their ability to pay. Similarly, Perkins et al (2009) found regressive OOP payments in Burkina Faso, Kenya and Tanzania.

Investigating OOP costs for facility-based maternity care between 2003 and 2006, the authors conclude that women in the poorest wealth quintile did not pay significantly less for maternity costs than the wealthiest women. Like in Cisse et al (2007) this regressivity of maternity costs was attributed to the presence of user fees in health facilities for each of the countries. Regressive OOP payments were also found in Ghana and South Africa between 2005 and 2006 (Ataguba et al, 2009). In Ghana, the regressivity observed was attributed to the cost-sharing policies obtaining at the time which lead to high incidence of OOP payments. Additionally, social health insurance was in its developing stages and could not provide comprehensive cover for the entire population. In South Africa regressivity of OOP payments was due to the presence of private financing which exposed poor households to the same health costs as the rich households.

In other low income countries outside of Africa evidence show that OOP is a regressive way of paying for health care. For example, in Vietnam, Thuan et al (2006) found that between 2001 and 2002 poorer households paid a larger share of their curative health expenditure compared to the rich. Reasons being that in earlier decades the government had introduced economic policies that led to increases in OOP health expenditures. This was despite varying levels of socio-economic status in the country. In Thailand, Pannarunothai and Mills (1997) observe that under-privileged families spent OOP as much as 5-6% of their household income on health care whereas other groups spent 1-2%. Reasons for the regressive OOP payments are that most low income families lacked health benefit or were without the low income card which would allow them to access subsidized health care. There was also an increase in the prevalence of user fees for the uninsured.

#### **1.4.3 Determinants of OOP payments**

In conclusion, Rubin and Koellin (1993) identify several factors or characteristics of households in the United States of America that are likely to incur OOP health care payments. Among them is household income, age and education of household head, size of the household as well as health insurance status of the household. Others are housing tenure, household assets, race and welfare status of a household. The study results showed that single headed households had the lowest OOP spending while white and high income households including those with higher

education incurred higher levels of medical expenses than lower income and non-white households. The same was true for the less educated. On the other hand, housing tenure and household welfare status were negatively related to OOP expenditure. Contrary to the expectations of the authors that ownership of insurance will lead to low OOP, the insurance parameter was positive.

## 1.5 Methods

### 1.5.1 Data Sources

This study will be based on three rounds of the *Zambian Living Conditions and Monitoring Surveys (LCMS)* – 1998, 2004, and 2006. These are nationally representative surveys conducted by the *Zambian Central Statistical Office (CSO)* as shown in Table 1. The LCMS contains information on several modules including demographic, health, education, household expenditure, household access to various amenities and facilities. They contain individual as well as household level information. Individual level data includes some relevant socio-demographic information (age, sex, education, urban/rural location etc). Relevant household level data include total household consumption, total household expenditure as well as OOP health expenditure.

**Table 1: Survey Sample Sizes and Data Collection Periods**

Survey Name	Approximate Sample Size (Households)	Date of Collection
Living Conditions Monitoring II	16,740	November-December (1998)
Living Conditions Monitoring IV	19,000	November-December (2004)
Living Conditions Monitoring V	18,000	November-December (2006)

### 1.5.2 Statistical Methods

#### a. Estimating OOP payments

Out-of-pocket (OOP) health payments refer to payments made by households at the point they receive health services. These payments are not reimbursed by any prepayment scheme. They could either be paid at a public or private facility. In this analysis, OOP payments will include costs of medicines, fees to medical personnel (e.g. Doctor / Health Assistant / Midwife / Nurse /

Dentist, etc), payments to hospital/health centre/surgery as well as fees to traditional healer. However, expenditure on health-related transportation will be excluded. This avoids imputation of transport costs for households using private means of transportation. Total OOP expenditures for each household will be adjusted by adult-equivalent household size to reflect each household member's OOP payment experience.

### **b. Measuring Socio-economic Status**

Total household expenditure will be used to estimate household socio-economic status in all the three periods considered. This is in line with the World Bank's recommendations for developing countries (Grosh, Glewwe 2000). Compared to income, there is less variability in household expenditure. Furthermore, total household expenditure will be adjusted for household size and composition using equivalised household size to obtain equivalent household expenditure. Equivalised household size will be obtained as follows:

$$eqsize = hsize^{\beta},$$

Where *eqsize* represents the number of consumption equivalents in the household and *hsize* is the actual size. The value of  $\beta$  is estimated at 0.56 from data from 59 countries using fixed effects regression (Xu et al. 2003). This value is now being used as representative value in empirical studies of this nature. Households will further be categorized into five quintiles of socio-economic status using the equivalent household expenditure. In all analyses, sample weights will be applied and the unit of analysis is the household. All analyses will be carried out using STATA™ 10 software.

### **c. Estimating Progressivity of OOP Payments.**

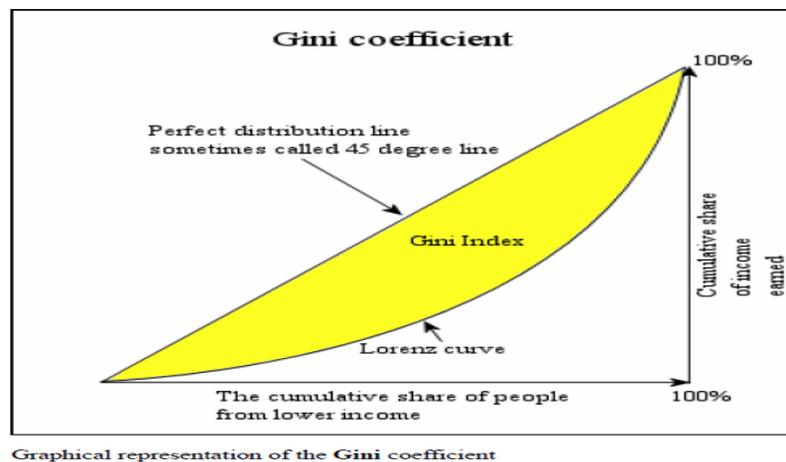
To estimate the progressivity of OOP payments the study will first estimate OOP payment as a percentage of total household expenditure. Progressivity of OOP payments will be assessed using the Kakwani Index of progressivity (Kakwani 1977). This is defined as the difference between the Gini coefficient for income (or expenditure) distribution (*G*) and the concentration index for the distribution of OOP payments (*C*). The Gini index follows a univariate distribution (i.e. solely measures income distribution (ability to pay) while the concentration index follows a bivariate distribution. For example, in this case comparing the distribution of out of pocket

payments to household ability to pay variable e.g. total household expenditure. The Gini index is the ellipse-shaped area between the Lorenz Curve (Figure 1) as a proportion of the total area under the diagonal. It is therefore equal to one minus the area under the Lorenz Curve and ranges from zero (when there is complete equality and the Lorenz Curve coincides with the diagonal) to 1 (when all income is concentrated in the hands of one person). The concentration index (C) on the other hand is defined in exactly the same way except that the concentration curve  $L(s)$  is used instead of the Lorenz curve. Both the Concentration and Gini index can be calculated by;

$$C = \left[ \frac{2}{\mu} \right] \text{cov}(y_i, R_i).$$

Where C is the concentration or Gini index,  $y_i$  is the health payments (for C) or the measure of living standards (for G) and  $R_i$  is the fractional rank of the living standards measure (i.e. expenditure.)

Figure 1: Gini Coefficient (Index)



Kakwani index of progressivity is then derived from these two indices and is twice the area between the concentration curve for OOP payments and the Lorenz curve. This is defined as:

$$K_{\pi} = C - G$$

Where  $C$  is the concentration index for health payments and  $G$  is the Gini coefficient of the ability to pay (ATP) variable (i.e. equivalent expenditure). If OOP expenses are a progressive (regressive) source of financing, the concentration curve will lie below (above) the Lorenz curve, and  $K_{\tau}$  will be positive (negative). If OOP payments are perfectly correlated with income,  $K_{\tau}$  will be zero and the financing source will be proportional. Proportionality could also arise when these curves cross each other. However, while visual inspection of concentration curves, Lorenz Curve and the line of equality may give an impression of whether there is dominance, this may not be sufficient to conclude whether or not dominance is statistically significant. It is also true to say that concentration curves are estimated from survey data, and so may display sampling variability. Therefore, it is important to provide statistical tests of dominance between the curves. To confirm dominance of concentration curves, dominance tests to see if the concentration curve dominate the Lorenz curve in each year will be carried out for all the three years under analysis using the multiple comparison approach (MCA) decision rule, with comparisons at 19 equally spaced quintile points and a 5 percent significance level (O'Donnell et al. 2008).

#### **d. Factors determining OOP payments**

Model specification

A logistic regression will be used to assess the factors determining OOP payments. The model is thus specified in general as:

$$y^* = \alpha + \sum \beta_i X_i + \varepsilon$$

Where, OOP payments (a binary outcome) is the dependent variable ( $y^*$ ). It is 1 if household OOP payments is greater than 0 ( $oop > 0$ ) and a value of 0 otherwise. Independent variables ( $X_i$ ) are defined in table 1.5.2. Additionally,  $\alpha$  is the constant and  $\beta_i$  the coefficients being estimated.

#### **e. Factors determining size of OOP payments**

Tobit model will be used to assess the factors determining the magnitude of OOP payments. This is because the dependent variable ( $oop$ ) is limited or censored. There is a sufficiently large number of OOP expenditures reported as zero. For example, only about 38% of households in all three surveys reported positive OOP payments, the rest of the observations are zeros. For such limited dependent variables the Tobit model (Tobin 1958) or sample selection models are usually

a preferred model of analysis compared to the usual OLS. The Tobit model like other sample selection models assumes a truncated or censored dependent variable and uses all observations, both those at the lower limit and those above it, to estimate independent effects.

The intuition behind a Tobit model is such that first, we have a latent model where the dependent variable, say,  $y_i^*$ , which has some independent variables and coefficients and a disturbance term that is normally distributed with a mean of zero. However, we have censoring at zero. Thus we have an observed  $y_i$  that equals  $y_i^*$  if the value of  $y_i^*$  is greater than zero, but equals zero if the value of the unobserved  $y_i^*$  is less than or equal to zero.

The Tobit model is thus represented by:

$$y_i^* = x_i' \beta + \varepsilon_i \quad \text{Assumption:} \quad \varepsilon_i \sim \text{i.i.d. } N(0, \sigma^2)$$

$$y_i = \begin{cases} y_i^* & \text{if } y_i^* > 0 \\ 0 & \text{if } y_i^* \leq 0 \end{cases}$$

Where,  $y_i^*$  is the latent dependent variable, in this case OOP payments equal to or below zero ( $y_i^* \leq 0$ ),  $y_i$  is the observed dependent variable, i.e. positive OOP payments ( $y_i > 0$ ).  $X_i$  is the vector of the independent variables, same as those in table 1.5.2.  $\beta$  is the vector of coefficients, and the  $\varepsilon_i$ 's are assumed to be independently normally distributed:  $\varepsilon_i \sim N(0; \sigma)$  (and therefore  $y_i \sim N(x_i \beta, \sigma)$ ).

The Tobit model has been applied in many similar studies. For example, in Mugisha et al. (2002) in Burkina Faso to estimate OOP expenditure on health care where information was available for independent variables (age, sex and income) but limited for the dependent variable (OOP expenditure). The Tobit model has also been applied in Taiwan to assess health expenditure for the elderly where a good number of health expenditures were unreported (Chi, Hsin 1999). Stoddard and Gray (1997) also used the Tobit model to estimate maternal smoking and medical expenditures for childhood respiratory illness where the analysis included a large number of children with no respiratory-related medical expenditures.

In this paper, the variables used in the regression analyses are presented and described in table 2

**Table 2: Variables used in regression analysis**

Variable	Variable definition and description
Dependent variable	
<i>oop</i>	Out of pocket payments (in logistic regression <i>oop</i> =1 if a household paid OOP; 0 = if not) (in Tobit regression <i>oop</i> is a continuous variable and left censored at 0)
Independent variables	
<i>hh_size</i>	Number of persons in a household
<i>Location</i>	Location of household (1=Rural; 0= Urban )
<i>age_hh</i>	Age of household head in years
<i>sex_hh</i>	Sex of household head (1=Male; 0= Female)
<i>ms_hh</i>	Marital status of household head (1=Married; 0= Not married)
<i>Work_hhead</i>	Work status of household head (1= working; 0=Not working)
<i>educ_hh</i>	Maximum number of education of household head
<i>expenditure</i>	Household socio-economic status measured by household expenditure. Quantiles are in ascending order i.e. the first quantile also represents the sub-population with the lowest household expenditure.

## 1.6 Ethics

This study will be using secondary datasets. The analysis will not at all contain information on any single individual or household in the dataset. The data set is already coded and no individual or household can be identified.

## 1.7 Logistics

Data analysis shall commence immediately upon getting the data sets. The work plan is summarized in table 3

Table 3: Study Time Line

Activity/time	January 2010	February 2010	March 2010	April 2010	May 2010	June 2010	July 2010	August 2010
Data Analysis								
Structured Literature review								
Manuscript								
Policy Brief								

### 1.8 DISSEMINATION

As per programme requirements, findings of this research will be presented in a manuscript of an article for submission to an appropriate peer reviewed journal. Additionally, an editorial/opinion piece/policy brief will be published. Research findings will also be presented at any appropriate conference(s).

### 1.9 BUDGET

The budget for the study is presented in table 4

Table 4 Study Budget

No.	Item	Description	Rate	Quantity	Amount	Total
1	Transportation	Inter-city bus fare from Mansa to Lusaka and back( visit to Central statistics)	\$160	-	\$160	\$160
		Taxi within the city	\$40	-	\$40	\$40
2	Communication	Internet e-mailing	\$100	-	\$100	\$160
		Telephone/Fax	\$60	-	\$60	

4	Stationery	Protocol \$0.1/page x 25pages	\$2.5	10 copies	\$25	\$241
		Structured Lit Review \$0.1/page x 35pages	\$3.5	10 copies	\$35	
		Manuscript \$0.1/page x 35pages	\$3.5	10 copies	\$35	
			\$2.5	10 copies	\$25	
		Policy Brief \$0.1/page x 25pages	\$6	4 copies	\$24	
		Binding of each	\$70	8 gigs	\$70	
		Data storage device	\$3	1 packet	\$3	
		Pens	\$3	1 packet	\$3	
		Pencils	\$3	2	\$6	
		Writing pad	\$15	1	\$15	
	Small Bag (safe keeping of all paper work etc)					
5	Other Costs	miscellaneous	\$60	-	\$60	\$60
6	Grand Total					\$661

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## **Part B**

### **Structured Literature Review**

## **OVERVIEW**

Low and middle income countries account for about 5.6 billion people. In these countries, more than 50% of all health-care is financed directly out of pocket (World Health Organisation 2008). This creates barriers to accessing needed health care for families that cannot afford to pay. It also exposes them to catastrophic health expenditures. Globally, out of pocket payments are responsible for pushing more than 100 million people annually into poverty. This also results in catastrophic health expenditures (Xu et al. 2007). In Sub-Saharan Africa, out of pocket (OOP) payments is one of the single largest sources of health financing, forcing households to borrow or sell their assets in their efforts to meet health care costs thereby restricting long-term economic survival (McIntyre et al. 2006, Leive, Xu 2008). With the poor and marginalized segments of society having a greater need for health care than their rich counterparts in most cases (CSDH 2008, Zere et al. 2007, Pannarunothai, Mills 1997), it means the poor will continue to bear the greatest burden of health financing especially where out of pocket payments are predominant. This may greatly restrict the poor from accessing health care.

This paper presents a detailed review of the international literature on the assessment of the progressivity and determinants of out of pocket payments and brings to light methodological differences that exist in different studies. The review identifies some important methodological limitations from various studies and how these may affect study results especially in the assessment of progressivity of out of pocket payments. The review is divided into three sections. Section one provides the detailed theoretical framework regarding health care distribution. It explores the meanings of equity (vertical and horizontal), background theories of equity in health and health care financing, and theories of distributive justice. This section also discusses the methodologies used in assessing progressivity in health care financing. Section two presents empirical studies noting the search methodology and inclusion/exclusion criteria and the results. This is followed by a conclusion and explanation of the limitations of the studies. Section three is a summary of the determinants of out of pocket payments drawn from various studies.

## **SECTION ONE: THEORETICAL REVIEW**

### **1.1 Introduction**

Hurley notes that among the various “goods” that contribute to the *ultimate end* (happiness, capabilities and functions, fulfilment of a rational life plan etc), health is often accorded special ethical significance. This is because it is necessary to achieving most intermediate and ultimate ends (Hurley 2001). Grossman (1972) made this notion clearer in his famous model. In its simplest form, the model postulates health as an economic commodity which consumers demand for two reasons; firstly, as a consumption commodity which directly enters an individual’s preference functions, i.e. as an end in itself because human beings enjoy being in a state of good health. Ill-health is a source of disutility. Secondly, as an investment commodity that determines the total amount of time available for market and nonmarket activities. Therefore, if an individual is sick they are deprived of the time to involve in activities that will enhance their lives such as going to work, going to school, visiting friends, doing physical exercises, and so on. Grossman’s model further points out that every individual is initially born with a stock of health which depreciates with time, and this stock of health can be affected by consuming market goods such as health care, housing, diet, recreation, cigarette smoking, and alcohol consumption. Although the model does not restrict the goods that enhance health to health care alone, health care has remained the main subject of focus in health economics. This is so because of the important role it plays in enhancing health even though it is not the sole determinant of health outcomes of populations. Health care is generally defined to include those goods, services and activities that the primary purpose is the maintenance or improvement of health (Hurley 2001). Because of this, Grossman described the nature of demand for health care as a ‘derived demand’, in the sense that it is not demanded and purchased for its own sake per se, but for the good health that can be derived from its consumption.

## **1.2 Distribution of Health Care**

### **1.2.1 The market as a guide in the distribution of health care**

Grossman's work is a great contribution to our understanding of a significant end (individual's health) that health care serves. This link between health care and health is important in health economics. The Commission on the Social Determinants of Health of the World Health Organization adds that, without health care, many of the opportunities for fundamental health improvement are lost (CSDH 2008). Implying that, health care presents its consumers with opportunities to improve their health and lives without which they will not be able to function properly. Reinhardt (1989) adds that health care actually represents a very broad set of goods and services that spans the entire spectrum from a purely private consumption goods (say, face surgery), to purely social goods such as immunisation that the society wishes to make available to all citizens regardless of peoples' ability to pay. Similarly, it has been pointed out that health care, whether curative or preventive, is regarded as a merit good - a commodity that ought to be available for use by everyone irrespective of ability to pay (Mwabu 1997).

However, as important as health care is, the question of how it should be distributed to afford all members of society a sufficient share to enhance their health is a subject of debate among researchers and policy makers. It is often argued that, since health care can be purchased in a market, its distribution should be left to market forces. On the contrary, while traditional microeconomic theory believes that under ideal conditions competitive markets will provide optimal allocative outcomes (Jan 1999), it has not been the case for health care. The assumption of conventional economic theory is that all things being equal, demand for goods and services will equalize with the supply of such services at a given time. When this is fulfilled economists claim that the market for such goods and services has cleared or is in equilibrium. In other words, all needs are met; everyone has gotten exactly what they needed, there is neither a shortfall nor a surplus. In terms of health care, this may mean that the amount of health care services that any given individual or group of people may require will be provided in the exact proportions as they are needed. But this is not what is usually observed in most situations regarding health care. Rather, what is usually observed is a situation where health care needs far more out-weigh health care resources. In other words, the allocation of health care resources does not seem to comply with conventional economic theory. This is because unlike ordinary

market goods, health care goods are said to have attributes that defeat the assumptions of competitive market equilibrium under which the market forces of demand and supply can flourish. There are many reasons for the failure of economic assumptions. Some of them include; information asymmetry between producers (medical professionals) and consumers (patients); imperfect agency relationships between patients and physicians; incomplete markets especially those for risk; existence of monopolies in the pharmaceutical industry as well as local monopolies held by hospitals. Also that much of health care has characteristics of a public good (Culyer 2005). These assumptions have been widely explored in most of health economics literature (Hurley 2001, Rice 2003). Because of this, it is often thought that public intervention is necessary in the distribution of health care. In line with this, if the allocation of health care was left to market forces of demand and supply, those sections of society with no effective demand due to inadequate purchasing power may be left out no matter their need for it. This may result in undesirable consequences because of the link between health care and health. Hurley (2001) argues that it is therefore a matter of justice that those in ill health receive treatment based on their need for health care, not based on market attributes such as ability-to-pay.

However, the distribution of health care cannot be said to have been just as Hurley argues. There is overwhelming evidence of health inequalities at both international and country level which result partly from unfair distribution of health care. For example, within countries there are dramatic differences in health, with the poorest having high levels of illness and premature mortality compared to their richer counterparts (CSDH 2008). These inequalities are attributed to a large extent to differences in access to and availability of health care. Reducing these inequalities and achieving justice in the distribution of health care is an important issue of health policy in many countries. However, while countries strive to do so, many of them are confronted with the question of what is actually meant by a just distribution. Many researchers have tried to provide answers to this question but it still remains a subject of debate among different scholars. Some of these debates are discussed below. They are discussed in relation to financing and distribution of health care.

## 1.2.2 Theories of distributive justice as a guide in the distribution of health care

Theories of distributive justice can serve as a guide in the distribution of various goods and services including health care. The most common of these theories, discussed in detail in the following sections, include utilitarianism, egalitarianism, libertarianism and the maximin.

### **a. Utilitarianism**

According to utilitarianism, utility is at the center of every society (Rabinowicz 2000, Metz 2003, Barry 1989, Schroth 2008). Its focus is the maximization of happiness or well-being and the minimization of unhappiness or pain. Utilitarianism in broad terms may include such things as pleasure, satisfaction, good health and being able to achieve one's goals in life (Hoedemaekers, Dekkers 2003). A just distribution is one that maximizes the aggregate utility, seen as the sum total of individual utilities (Schroth 2008). Therefore, in terms of health care financing, the need is for financing those interventions or a set of policies that will achieve the greatest health coverage and subsequent health outcomes for the greatest number of people. In this case, health care financing policies are only good so long as they maximize the total number of people to be covered in the population. However, it is important to understand whose utility is to be maximized here. For example, if it is the utility of an individual, he or she would spend all her or his money or resources on health care until they get maximum health (if this can be determined) i.e. until their marginal utility from each unit of money spent equals zero. On the other hand, if it is the government (depending on its utility function) it will spend all available resources until this is fulfilled. The bottom line is maximization of utility.

Nonetheless, utilitarianism has been criticized in many ways, including the fact that its exclusive emphasis is on maximizing the total amount of utility at the expense of any concern, including how the utility is distributed among individuals (Barry 1989, Schroth 2008). For example, take countries where private financing (private health insurance and OOP payments) is predominant. As wide as the coverage for private insurance may be, the system may care less about the initial income of payers. This is important because if low-income households pay proportionally the same as high-income earners then the system becomes inequitable. The same applies for OOP

payments. Utilitarians are often criticized for ignoring individual freedom (Olsen 1997). This is because only consequences matter.

### **b. Egalitarianism**

Egalitarianism is in two forms namely, strong egalitarianism and Rawlsian type egalitarianism (Olsen 1997). In Rawlsian egalitarianism inequalities are accepted as long as they benefit the worst-off (or there is no way of further securing the worst-off). This is the type that is widely applied in health care distribution. The basic belief is that of equality of human beings and the creation of possibilities for people to become as equal to others as possible (Veatch 1998, Tsuchiya, Dolan 2009, Rawls 1971, Williams 1988). In terms of health care financing, this may mean equality of payments or contributions based on one's resources. This is also referred to as the egalitarian principle (Wagstaff et al. 1992). Egalitarianism therefore aims at distributing access to health care according to need (Veatch 1998). Williams points out that in the egalitarian system of health care provision, equal opportunity of access for those in equal need should be the dominant ethic, and that there should be establishment of the social hierarchy of need which should not be linked to who is paying for the care. As such 'it dictates public provision' of health care (Williams 1988). Public provision may mean financing health care by taxation and/or social health insurance to cover even non-payers.

However, financing health care the egalitarian way has a number of policy implications. To begin with, tax funding and social health insurance are the most appropriate financing mechanisms under which the egalitarian ethic of contributing according to ability to pay but benefiting according to need can be applicable. It follows that those who cannot afford to pay for health care will shift their burden of financing to those who can afford it. In the case of tax funding, a country needs to have a sufficient tax base for it to generate sufficient resources to go round. This is possible if the formal sector is large enough. Because of this, financing health care the egalitarian way has been a major challenge in poor regions of the world, such as sub-Saharan Africa, with a large informal sector.

### **c. Libertarianism**

According to this ethic, individual liberty is the fundamental and only concern of any just society (Narveson 1988). In this model, nothing is as important as the right to personal freedom and private property (Barry 1989, Rawls 1971, Narveson 1988). Proponents argue that the state should not interfere when citizens claim and exert these rights. If anything, its intervention should be minimal, limited to the narrow functions of protection against force, fraud, enforcement of contracts, and so on (Nozick 1974). It follows from this that the libertarian would support a health care financing system based on the free-market principle, that is, allocation of health care should be left to the market forces of demand and supply-without state intervention. That said, willingness and ability to pay should be the dominant ethic in the liberal system of health care provision. Hoedemaekers and Dekkers (2003) add that in this society, every individual pays for his/her own individual needs, including medical needs. These are paid for directly or indirectly through private health insurance and/or OOP payments. Some view access to health care as part of the society's reward system, and, at the margin at least, people should be able to use their income and wealth to get more or better health care than their fellow citizens should they so wish (Williams 1988).

However, libertarianism has a number of inconsistencies which may raise important concerns as a way of financing health care. Since market allocation is determined by prices, private sector financing would deny health care to those without ability to pay. This is common in low and middle income countries for example where members of private insurance schemes tend to be small groups of people who belong to high socio-economic groups (Ataguba et al. 2009). For the same reason there could be a great concern for market failure which the government may need to correct for. In Africa the liberal theories became rampant in the early 1980s which revolutionized many health systems in a number of countries such as Ghana, Tanzania and Zambia to mention a few (Kondo, McPake 2007, Masiye et al. 2008, Nyonator, Kutzin 1999, McIntyre et al. 2008). The main themes of the reforms were market liberalization and privatization of economies which led to major changes in the way health care was financed. In the three countries mentioned above the reforms took the form of the involvement of the private sector in the provision and financing of health services, the removal of subsidies in health care, the introduction of cost sharing to pay for health care as well as the introduction of user fees in public health facilities. This resulted in reduced health care utilization due to lack of financial access to health care services. In Zambia,

in some instances, patients were turned away from health facilities because they could not pay for services (Kondo, McPake 2007). User fees have since been abolished in Zambia in 2006 in order to pursue more equity-oriented health financing mechanisms (Masiye et al. 2008). In other countries around the world health systems are now being called upon to adopt health financing mechanisms that do not discriminate against users of health services based on their ability to pay.

#### **d. Maximin (John Rawls)**

In his book, *A theory of Justice* Rawls (Rawls 1971) proposes two principles of justice. The first principle emphasizes equality of basic or primary rights. The second is that social and economic inequalities, if they exist, be (a) to the benefit of the least advantaged and (b) attached to positions and offices open to all. The first principle should be fulfilled if the second is to be realized. All people should have a fair share of primary goods. Hence, the maximin is about a distribution principle which maximizes well-being for those with the least. Rawls then proposes that if people were to enter into a social contract behind the veil of ignorance, that is a situation in which they were unaware of the social contingencies and the accidents of natural endowment, then they would unanimously choose to maximize the primary goods for the worst off, the reason being that each individual would not want to be the one to end up in this position.

Harsanyi (1975) is one of the many critics of Rawls' theory. He criticizes Rawls' idea of giving priority to the worst-off, noting that the difference principle requires that absolute priority is given to the interests of the worst-off individual, even under the most extreme conditions. He further observes that under this ethic, even if the individual's interests were affected only in a very minor way, and all other people in society had opposite interests of the greatest importance, his or her interests would always override anybody else's. This may find problems of applicability in health care financing, because by implication resource allocation or priority setting in terms of administering health interventions may focus on who is least advantaged or has the worst health status. However, current health policies are guided partly by cost-effectiveness assessments to determine the worth of certain health projects, and health status alone is not enough in determining health expenditure. Rawls has also been criticized for operating with a vague *distribuendum* (the object to distribute). According to Olsen, it is not

solely income, or welfare or utility, but a composition of so-called 'primary goods'; rights and justice, power and opportunities, income and welfare. In addition, he argues that health is not included as a primary good (Olsen, 1997).

In response to some of the criticisms, Rawls states that the maximin criterion is not meant to be applied to small-scale situations, such as say, how a doctor should treat his patients. He further argues that the Maximin is a macro not a micro principle (Rawls 1974). Regarding health care financing, the maximin principle would be difficult to apply especially in health systems where private financing is predominant. In this case the worst-off may actually not receive any health care especially if they cannot afford it. This principle can however be applicable in a progressive tax funded system.

In summary, this section has reviewed the market as well as theories of distributive justice as means by which health care goods and services may be distributed. The review has also taken time to highlight the failed assumptions of traditional economic theory in relation to health care distribution. The pros and cons of the theories of justice under discussion have also been highlighted. Despite the highlighted shortcomings of each of the theories of distributive justice, this study still favors the Egalitarian theory. This is because in egalitarianism the main principle guiding resource distribution is equality of human beings. In terms of financing health care egalitarianism argues that an equitable health care financing system is one in which payments for health care are positively related to ability to pay (Wagstaff et al. 1992). In this theory, it is regarded as right and proper that persons who are able to pay more towards health care should do so. Progressivity studies are based on this. Progressivity studies tend to investigate how health care payments are related to ability to pay. It is desirable in most health systems that health care payments are progressive, that is, let those who have more pay more and those who have less pay less. This is what is referred to as equitable financing of health care.

### **1.3 The Meaning of Equity in Health Care Financing**

The theories of justice are no doubt instrumental in guiding the way health care resources may be distributed. Though different, each approach seems to justify what is defined as 'equitable'. In health care financing the concept of equity is widely acknowledged to be an important policy

objective (Wagstaff, van Doorslaer & Paq 1989), but it is at the same time a much-debated subject (Olsen 1997). Culyer and Wagstaff (1993) observe that while equity is accorded a relatively high profile by policy-makers, and though there is a relatively large academic literature on the subject in health care, there appears to be considerable confusion over what its meaning is (Wagstaff, van Doorslaer & Paq 1989, Wagstaff, van Doorslaer & Paq 1989, Culyer 2001, Chang 2002, Braveman, Gruskin 2003). Mooney (1983) suggests seven possible definitions of equity in the context of health care provision. These are briefly explained below:

- *Equality of expenditure per capita*; this suggests that if budgets for health care are to be allocated to different regions, they should be done pro rata with the size of each region's population.
- *Equality of inputs or resources per capita*; this implies that in allocating resources to different regions, allowance should be made for differential prices so that the resources which can be purchased with the allocated expenditure are the same per capita.
- *Equality of input for equal need*; this implies that greater resources should be allocated to populations with seemingly more health needs. This can be established by examining the population structure. For example children, elderly and pregnant women may need more health resources.
- *Equality of access for equal need*; this in allocating resources allowance should be made for the differential costs (as opposed to price) of accessing health services. For example, patients in rural areas normally have higher costs to bear in seeking health care (e.g. travelling costs) compared to those in urban areas.
- *Equality of utilization for equal need*; this argues that if individuals are facing the same level of supply of health care, their use should be the same for equal need.
- *Equality of marginal met need*; this given different regions with varying health needs, equity is reached if each region would stop treating the same specific need when each of their budgets are cut by the same amount.
- *Equality of health*; this argues that the level of health should be the same in all regions and/or social classes.

### **1.3.1 Horizontal vs. Vertical equity**

The different understandings of equity in health and health care can be classified under either horizontal equity or vertical equity. Generally, speaking horizontal equity refers to the ‘equal treatment of equals’ (Fleurbaey, and Maniquet 1997). In terms of health care utilization, horizontal equity is concerned with the extent to which, on average, persons in equal need of medical health services receive similar health services regardless of their income, wealth or any other consideration (Cisse, Luchini & Moatti 2007). In health care financing, households with the same ability to pay contribute the same amounts towards health financing to the extent. On the other hand, vertical equity is the “unequal treatment of unequals” (Langørgen 2008). When health care is the subject of discussion, vertical equity is concerned with the extent to which persons with greater medical needs are treated more favorably (Wagstaff, van Doorslaer 2000) while in health care financing it refers to the extent to which households of unequal ability to pay make appropriately dissimilar payments for health care (Cisse, Luchini & Moatti 2007). The latter is also referred to as the Rawlsian egalitarian principle in some health economics literature (Wagstaff, van Doorslaer 2001).

### **1.3.2 Implementing Equity in Health Care Financing**

The subject of equity (vertical or horizontal) and its implementation in health care financing is central to most health policy objectives around the world. McIntyre and others have suggested that if we are to adopt a human rights perspective, a key equity principle should be that people should contribute to the funding of health services according to their ability to pay (McIntyre et al. 2007). Following this assertion, a number of policy options in health care financing have been suggested. These include that financing mechanisms should be progressive (i.e. those with greater ability to pay should contribute a higher proportion of their income than those with lesser ability to pay). In addition, they suggest that financing mechanisms should provide financial protection. That is, households should not be pushed into poverty after making health payments.

In conclusion, this section has explored the various meanings of equity in health care financing. The section has also given an explanation of the two streams or types of equity, namely; horizontal and vertical equity. This study is based on the later. In terms of health care financing vertical equity is the requirement that payments are made according to one’s ability to pay. This

is the egalitarian principle on which this study is based. As is stated in the previous section, progressivity measurement investigates how health payments are related to ability to pay. Payments are progressive if those who have a greater ability to pay contribute more while those with lesser ability to pay contribute less to health financing. This is vertical equity in terms of health care financing and it is a desirable policy objective in many countries around the world.

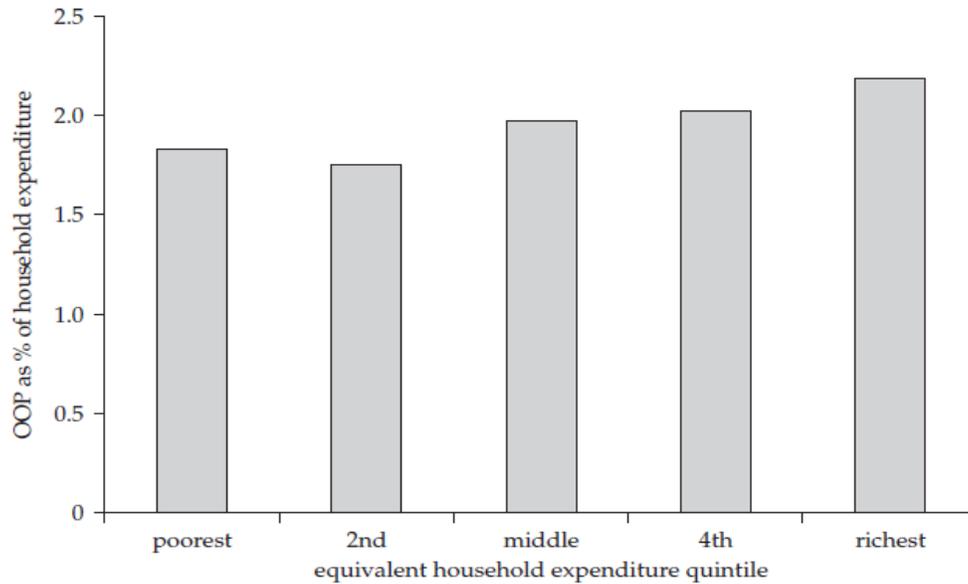
#### **1.4 Methods of Assessing Progressivity in Health Care Financing**

It has been mentioned in the previous section that for purposes of equity, health payments should be related to ability to pay. By implication, rich people should pay more as a proportion of their total income towards health care than the poor should. Smith observes that progressivity assesses how much more the rich are (or could be) paying (Smith 2010). In health care financing, progressivity measurement investigates the extent to which payments toward health care are related to ability to pay. O'Donnell et al (2008) outline two common ways of assessing whether health payments are progressive or not. This can be done by either taking the ratio of health payments to ability to pay and comparing these across varying socio-economic statuses (i.e. the direct method), or by using formal indices such as the concentration and Kakwani indices.

##### **1.4.1 Direct Method**

The progressivity of health care payments can be assessed directly by examining their share to ability to pay (ATP). The population is, for example, divided into different quintiles of socio-economic status, (usually from poorest to the richest) of a chosen living standards measure, and health payments are inspected in each quintile and comparisons are made (see figure 1 below). If health payments increase with ATP, they are progressive but regressive if health payments decrease as income increases. If health payments are proportional, the ratio will remain the same for all income quintiles. Figure 1 below shows the case of progressive OOP payments for health care in Egypt in 1997. It can be observed that OOP share in expenditure rises with the quintiles of expenditure.

Figure 1 : Assessment of the Progressivity of Out of Pocket Payments Using the Direct Method, Egypt, 1997.



Source: O'Donnell et al 2008.

#### 1.4.2 Health Payments Concentration Curves

Progressivity can also be assessed graphically through comparison of the *concentration curve* of health payments with the *Lorenz curve* of the ATP. This has been used in a number of studies (Cisse et al 2007, Mastilica & Bozikov 1999, Smith S 2009).

#### 1.4.3 The Kakwani Index

The use of summary indices such as the Kakwani to measure progressivity is derived from public finance economics, where the focus is on the relationship between various forms of taxes and income. A progressive tax schedule is one for which the average rate of taxation increases with pre-tax income (Lambert, and Hutton 1979). In health care financing, the focus is on the relationship between pre-payment income (the analogue of pre-tax income in the tax literature) and health care payments (the analogue of taxes). While there are many summary measures for progressivity, the Kakwani index (Kakwani 1977) has found wide application in health care financing. Similar to the Kakwani index is Suits index (Suits 1977) which is also based on Lorenz curve and relative concentration curve. The Kakwani index is defined as twice the area between any health care payments' concentration curve and the Lorenz curve of ATP. This can also be obtained as the difference between the concentration index of health payments and the

Gini coefficient of pre-payment income. The values of the Kakwani index range from  $-2$  to  $1$ . A negative number means that health payments are regressive while a positive number indicates that payments are progressive. If health payments are proportional, the Kakwani index will be zero. The index could also be zero if the curves were to cross and positive and negative differences between them cancel.

While this review has identified more than one method for assessing progressivity of health care payments, the use of summary indexes such as the Kakwani and Suits index is considered as the most appropriate method where this review is concerned. The same method is applied in this study. However, like in other similar studies, the Kakwani index has been used as a supplement to, and not a replacement of the more general graphical analysis (i.e. concentration curves). This is because there are some instances in which the index could be zero without necessarily implying proportionality. For example, if the curves were to cross, positive and negative differences between them will cancel giving the index a value of zero. This may make interpretations somewhat misleading. On the other hand, Graphical analysis (i.e Lorenz dominance analysis) alone fails to provide a measure of the magnitude of progressivity, which may be useful when making comparisons across time or countries. Summary indices of progressivity meet this deficiency.

## **SECTION TWO: EMPIRICAL REVIEW**

### **2.1 Introduction**

This section reviews empirical literature on progressivity and determinants of out of pocket payments from various countries. The section opens with a statement of the objectives, followed by the methods section. Results are presented in the section after the methods after which comes the discussion.

### **2.2 Review Objectives**

The purpose of this empirical review is to summarize the evidence available from the literature with regard to out of pocket payments as a means of financing health care both globally and in Africa. The main focus will be assessing the progressivity of out of pocket payments as a means

of health care financing. The review will highlight any existing gaps and make recommendation that future studies address these kinds of limitations.

## **2.3 Methods**

This review is based on a literature search for papers and abstracts providing information, on the assessment of progressivity of out of pocket payments around the world. Databases used include PubMed, Medline, Ebscohost, and sources found using Google Scholar. The search terms included the combination of the words Out of Pocket payments, health care financing, equity in health care financing, progressivity, and regressivity. While many studies involving out of pocket payments were found, only those primarily investigating the relationship between out of pocket payments and household income or a proxy of ability-to-pay (ATP) were retained. Non-English studies were excluded. The discussion within this review focuses on five aspects of progressivity measurement considered important. These are: the definition of out of pocket payments (i.e. what constitutes OOP payments), the measure of ability to pay, the type of data used and its sources, the methods used in assessing progressivity, results and implications.

## **2.4 Results**

The results of the review are presented in this section. A total of 49 studies were analyzed. These were grouped as either domestic or international. Domestic studies are defined to include all those studies conducted within Sub-Saharan Africa (Table 1) while international studies include all those conducted elsewhere (Table 2). Progressivity assessment results of the studies are presented in table 3

### **2.3.1 Composition of Out of Pocket Payments**

The definition of OOP payments varied across studies. For example, two studies in Africa - Manzi et al (2005) and Cisse, Luchini & Moatti (2007) used health related expenses such as transport while others did not. Different compositions of OOP payments could result in different incidence patterns. Another important aspect of OOP payments is expenses on traditional medicine. For countries in Sub-Saharan Africa and other developing countries, it has become common for households to opt for traditional medicine as a source of medical consultation. This too should be included in the estimation of OOP payments. For domestic studies, only the South

African and Ghanaian study included this form of expenditure (Ataguba et al. 2009). On the international front, composition of OOP payments depended on the level of development of the country. For developing countries, and countries in transition, some studies included expenditure on traditional medicine while others did not. Those that included traditional medicine include Mastilica & Bozиков (1999) for Croatia, O'Donnell et al (2008) for Hong Kong, Nepal, the Philippines, Sri Lanka, Taiwan and Thailand. There was no such expenditure for all developed countries. Some international countries also included health related expenditures such as transport and food expenses in their definitions of OOP payments. These include Arredondo & Najera (2008) in Mexico, Abu-Zaineh et al (2008) from Palestine, Thuan et al (2006) for Vietnam as well as O'Donnell et al (2008) for Nepal and Bangladesh.

### **2.3.2 Measure of Ability to Pay (ATP)**

Household expenditure was the commonest measure of ability to pay for most domestic countries except in Manzi et al (2005) where asset index was used. Internationally, nearly all developed countries used household income to measure ATP, while most developing and countries in transition used household consumption and expenditure. Studies using income include Lairson, Hindson & Hauquitz (1995) for Australia, O'Donnell et al (2008) for Japan, Wagstaff et al (1992) for Britain, Denmark, Spain, France, Portugal, Switzerland, Italy, Ireland and the United States of America. In Ireland, Smith (2010) used both income and expenditure. Some studies from countries in transition such as Mexico (Arredondo, Najera 2008), Colombia (Castano et al. 2002), Croatia, South Korea and Thailand (O'Donnell et al 2008) also used income. A study in Thailand (Pannarunothai, Mills 1997) used level of education of household head as a proxy for ATP besides income. The rest of the international studies used household consumption and expenditure, with the exception of the Vietnam study (Thuan et al, 2006) that used local leaders' classification besides expenditure.

### **2.3.3 Data and Sources of Data**

The data used and its sources are important in the assessment of progressivity of OOP payments as different sources of data are prone to different biases. Tables 1 and 2 show that, as expected, nearly all data was obtained from household surveys. The data used in most studies come from household health expenditure surveys, household living standards surveys or household income

and expenditure surveys. These surveys collect information with some variations in the questions including the recall periods, and composition of expenditures and direct payments for health care. This may result in varying results obtained. Evidence from 43 countries show that fewer items in the questionnaire give a lower estimate for average health spending compared to a questionnaire with more items (Lu et al. 2009). The same study also found that usually, a shorter recall period (one-month) appears to lead to a higher mean estimate of health spending compared to a longer recall period (11-month)

In this review, different recall periods were recorded for different studies. Perkins and others (2009) used a 24-month compared to a 1-month recall period used in Cisse et al (2007). Other domestic studies did not clearly indicate the recall period over which data was collected. For international studies, the recall periods ranged from two weeks in Mexico (Arredondo, Najera 2008) to two years in Kenya and Burkina Faso (Perkins et al 2009). While studies have different objectives which may serve as justification for the use of different recall periods, comparison of OOP payments may become difficult in this case.

#### **2.3.4 Method of Assessing Progressivity**

In assessing progressivity, majority of the studies used the Kakwani index. Others used a combination of the Kakwani index and health payments concentration curves. Others used the direct method. Based on the summary presented in tables 1 and 2, seven (7) studies used the direct method (Pannarunothai, Mills 1997, Arredondo, Najera 2008, Ruger, Kim 2007, Galbraith et al. 2005, Falkingham 2004, Hotchkiss et al. 1998, Thuan et al. 2006), five (5) used the Kakwani index of progressivity (Smith 2010, Castano et al. 2002, Yu, Whynes & Sach 2008, Abu-Zaineh et al. 2008, Lairson, Hindson & Hauquitz 1995, Mastilica, Bozikov 1999), twelve (12) mainly from Asia used both Kakwani and concentration index (O'Donnell 2008). Seven (7) studies used Kakwani index with concentration curves (Wagstaff, van Doorslaer & Paq 1989, Cisse, Luchini & Moatti 2007, Smith 2010) and eight (8), mainly from developed countries used a combination of Kakwani and Suits index (Wagstaff et al. 1992). Only 1 study from India used only concentration curves (Garg, Karan 2009). For those studies that used concentration curves to reach their conclusions, none performed dominance tests of the Lorenz and health payments concentration curves.

Table 3 shows the results, a brief conclusion and the basis for the progressivity or regressivity found in each study. OOP payments were progressive in sixteen (16) countries. Majority of these are from Asia with only one (1) country each from Europe and Africa. These are Spain and Tanzania respectively. However, the results for Tanzania changed afterwards and became regressive as shown by Ataguba et al (2009) in a later study. Furthermore, results for the Colombian study produced a mixed picture of progressive and regressive trends in OOP payments. When income was used as a measure of ATP, Kakwani indices showed a constant trend of regressive payments ( $-0.126$  in 1984, to  $-0.3498$  in 1997), but the trend moved towards progressivity ( $-0.0092$  in 1984, to  $0.0026$  in 1997) when expenses were used. In the remaining 29 countries, OOP payments were regressive. This include eight (8) countries from sub-Saharan Africa, eleven (12) from Europe, 6 from Asia, and 2 from North America (Mexico and USA). OOP payments were also regressive in Australia.

### **3.0 Discussion**

Out of pocket (OOP) payments still remain one of the single largest sources of health care financing in Sub-Saharan Africa. This review has demonstrated that this form of health financing is regressive in most countries around the world. There are various reasons for the results obtained in each country.

The review showed that results from 29 countries were regressive. These include 10 countries from sub-Saharan Africa. They are Tanzania, South Africa, Burkina Faso, Ivory Coast, Ghana, Kenya, Senegal, Guinea and Mali. All these countries have a similar health care financing background which contributed to the overall results. In all of these countries, some forms of cost sharing policies are present ((Ataguba et al. 2009, Cisse, Luchini & Moatti 2007, Perkins et al. 2009). At public facilities, user fees tended to increase the incidence of OOP payments. Where user fees were implemented side by side with fee exemptions and waiver mechanisms, most studies show that these were usually ineffective leaving the poor to face the same health payments as the rich. Some countries such as Tanzania and Ghana had some form of social health insurance but these were just in the early stages and could not cover provide comprehensive cover. OOP payments were also regressive in many international countries for

various reasons. For example, in Ireland and the Netherlands in 1987 co-payments were required because the cover was not comprehensive (Wagstaff et al. 1992). In Ireland, persons in the top 62% of the income distribution were required to pay for GP visits and prescription drugs in full, while in the Netherlands much of the expenditures associated with OOP payments were incurred by the privately insured in the upper half of the income distribution having insurance policies with substantial deductibles or excluding primary care (ibid). In Switzerland and the U.S.A (ibid), regressive payments stemmed from the fact that - with the exception of Medicaid enrollees and some privately insured in the U.S.A – co-payments are made by all irrespective of their income. In Australia, OOP payments were regressive because besides a national insurance scheme, OOP are still found in Medicare systems and these tend to be regressive (Lairson, Hindson & Hauquitz 1995). In Korea Republic, payments were not related to ability to pay for services not covered by social health insurance. Further, co-payments exist in the National Health Insurance (NHI) (Ruger, Kim 2007). In Palestine (Abu-Zaineh et al. 2008), regressive OOP payments can be attributed to the presence of government health insurance scheme covering only 30% of the population and private health insurance covering a tiny proportion of the population. OOP accounted for the largest share of health expenditure (40.5%). This implies that the larger population not covered by either form of health insurance paid OOP leading to uniform health payments across the board irrespective of differences in income of the population.

Spain, Malaysia, Nepal and Punjab are some of the countries in which OOP payments were progressive (Wagstaff et al. 1992, Yu, Whynes & Sach 2008, O'Donnell 2008). In Spain, the reasons are that the health system is largely financed by social insurance with some significant OOP and general taxes. In Malaysia, there was a switch to private health services by the rich and a predominant reliance on subsidized public health services by the poor. Hence, the poor made fewer OOP payments compared to the rich. In Nepal, both the poor and the rich use public facilities. However, public facilities tend to prescribe expensive medicines not found at public health facilities for the rich and cheap ones for the poor. But even when prescriptions are made for the poor they usually do not buy due to issues of affordability. This makes OOP payments appear progressive. In Hong Kong, the government had adopted a tax, rather than a social insurance financing mechanism. Hence, there was a substantial positive discrimination in favor

of the worse-off who could not pay for health care as much as the better-off (O'Donnell et al. 2008).

In India OOP constituted the largest share of health expenditure and varied between 70-80% of health expenditure and 95% of private health expenditure. Insurance and community financing emerging at the time were weak. The pattern of OOP payments across quintile groups was examined only in the four states of Haryana, Punjab, Uttar Pradesh and Kerala, which have very high levels of OOP expenditure (Garg, Karan 2009). OOP payments were progressive in these states. The reason given is that public spending on health is generally very low while private spending is high leaving all households, poor and rich to face similar health costs. For example, per capita private spending on health in Kerala, Haryana and Punjab was four times higher than that in Rajasthan and three times that in Bihar. OOP expenditure in Kerala was high and progressive because of higher expenditure on institutional care (mostly accessible by richer households) and on lifestyle diseases such as heart conditions (ibid).

#### **4.0 Conclusion**

This review has identified very important limitations in the assessment of progressivity of OOP payments. Firstly, the comparability of studies done in different countries is made difficult by a lack of uniformity in the definition of what should constitute OOP payments. The major issue is whether OOP payments should include health related expenses such as transport, nutrition and patient care. While these are part of the cost of illness, their computation is always a challenge given the diverse approaches households may employ to meet such needs. In terms of transport for example, it can be argued that for places where transport is readily available as may be the case for many developed countries computations can be easier. A good number of studies reviewed included such costs while others did not. In the same way it has become common for populations in developing and countries in transition to use traditional medicine as another option when seeking care. Hence, it is expected that countries of this type include health expenditures on traditional medicine. A good number of studies from developing and transition countries did not include this type of OOP expenditures making conclusions and comparisons again difficult.

Secondly, while it is recommended by the World Bank (Grosh, Glewwe 2000) for developing countries and countries in transition to use consumption and expenditure in measuring household ATP instead of income, some countries belonging to this category still used income. There are a number of reasons for this recommendation. According to the World Bank (ibid), compared to consumption and expenditure, income is a much more sensitive topic to ask people about. Respondents may have an incentive to understate their income in a survey interview, especially if they fear that the information may be used for tax purposes despite assurances to the contrary. This is due to the significant importance of self-employment income (which is easier to understate than wage income) in developing and transition countries. Secondly, respondents may genuinely not know how much income they make, especially in their self-employment activities which are common for households in developing and transition countries. There is also a general absence of written accounts for household production activities. Another reason is that respondents may not feel the need to report their most casual or infrequent income earning activities. This is worsened if certain income earning activities are dubious or illegal such as sale of prohibited drugs. It is also true that respondents do not easily reveal their receipt of transfers and other non-labor income. Only one study by Manzi et al (2005) used asset index as a proxy for ATP. This has its own advantages and disadvantages. O'Donnell et al (2008) observe that this approach has the considerable merit of requiring only data that can be easily and quickly collected in a single household interview and, although lacking somewhat in theoretical foundations, can provide a convenient way to summarize the living standards of a household. Nevertheless, the use of asset index may either over-estimate or under-estimate the living standards of a household. In the first instance, households may own the same assets over a number of years and may appear to be wealthy even when they no longer have the purchasing power to acquire the same assets in the present. In the second instance some people may not even own a single asset but may have greater purchasing power than those who have assets even if the value of those assets cannot measure to the value of the real income owned by others. Following this, it should be mentioned here that these measures of ability to pay should measure a distinct but related latent variable, that is, a long-term command over resources (O'Donnell et al, 2008).

Thirdly, most studies relied on household survey data to collect information. While this is common, some recall periods were rather too long for respondents to give accurate estimates of

OOP payments. With evidence that shorter recall period such as 1 month produce higher estimates of health spending compared to longer recall periods (Lu et al. 2009), future studies and surveys should seek to use shorter recall periods. This is better as respondents can easily remember health payments that took place in the near past; say 1 month rather than 2 years. In terms of international best practices Deaton and Zaidi (1999) state that data on purchases/expenditures of non food items are often collected for different recall periods, for example over the past 30 days, the past 3 months, or the past 12 months, depending on how frequently the items concerned are typically purchased. Following this, O'Donnell et al (2008) observes that health services that have a higher frequency of utilization, such as ambulatory care, use the recall period in the range of 2 to 4 weeks while those with a lower frequency of utilisation such as inpatient care, the recall period is typically 12 months. This is has been applied in a number of studies (Arredondo, Najera 2008, Falkingham 2004, Garg, Karan 2009)

Fourthly, the choice of method for assessing progressivity of health payments differed from country to country. This can be another cause for difficulties in making conclusions. Studies using direct methods and concentration curves alone to assess progressivity of health payments should employ summary indices to provide the extent of progressivity and regressivity. The use of concentration curves should also be accompanied with dominance tests. No single study of those using concentration curves provided for this.

In summary, this review has found that OOP payments are regressive in most of the countries reviewed. The review has also highlighted the limitations encountered in assessing progressivity of OOP payments and how this may affect comparability of findings of different studies. Future studies should take these limitations into consideration to make local and international comparisons of findings easier.

## **SECTION THREE: DETERMINANTS OF OUT OF POCKET PAYMENTS**

### **3.1 Determinants of Out of Pocket Payments**

The previous sections have demonstrated that out of pocket is a significant source of health care financing in Africa. However, not all households and indeed individuals in this part of the world may make this form of payments for health care. Research has shown that there are various

characteristics associated with households or individuals who make out of pocket payments. This is the purpose of this section. In other words, this section will analyze the characteristics of individuals or households who make out of pocket payments for health care. This information is drawn from various studies and countries including those outside of Africa and is important for policy making.

Feldstein (1988) suggests that expenditures for health care are determined by three factors: price (e.g. cost of medicines, consultation etc.), household income (i.e. ability to pay), and preference shifters, such as age and education. Main of the determinants of out of pocket payments reviewed under this section fall under these three categories. In Rubin and Koellin (1993), several factors or characteristics of households likely to incur OOP health care payments have been identified. Among them are household income, age and education of household head, size of the household as well as health insurance status of the household. Others are housing tenure, household assets, race and welfare status of a household. Most of these factors apply in most of African countries. The results for the same study also showed that single headed households had the lowest OOP spending while white and high income households including those with higher education incurred higher levels of medical expenses than lower income and non-white households. The same was true for the less educated. On the other hand, housing tenure and household welfare status were negatively related to OOP expenditure. Contrary to the expectations of the authors that ownership of insurance will lead to low OOP, the insurance parameter was positive. In another study, Hong and Kim (2000) add that the rate of increase of out of pocket health care expenses varies across demographic groups. They further note that households headed by individuals under age 25 spent less on health care, as a percentage of all expenses. On the contrary elderly households spent a higher proportion of their income for health care than the non-elderly. Rural families also devoted a larger share of their budgets to health care than did urban households. Ruger and Kim (2007) further suggest that the number of chronic conditions, insurance type, health care use, and health care facility type are also associated with out-of-pocket spending. Particularly, presence of chronic conditions, high frequent health care use, lack of insurance and use of private facility were associated with increased out of pocket spending. In Tajikistan, Habibov (2009) also note that an increase in ability to pay, being female and using specialized healthcare facilities increases the amount of

out-of-pocket expenditures. In Nigeria Onwujekwe et al (2010) adds that the better-off groups in terms of socio-economic status more than worse-off groups used OOP to pay for healthcare.

The determinants of out of pocket payments in different countries as shown in the studies reviewed are closely related. Table 4 summarizes a number of studies from different countries and the determinants of out of pocket payments in each particular study.

In Taiwan Chu et al (2005) highlights that an individual who was older, female, married, unemployed, better educated, richer, head of a larger family household, or living in the central and eastern areas was more likely to have greater household out-of-pocket medical expenditures. This shows that age, sex, marital status, employment status and level of education of an individual determines whether one is able to make out of pocket payments or not. Other factors as demonstrated by Chu et al are household size and location of household.

Table 1: Progressivity of out of pocket payments: Domestic Countries

Study, Country & year published	Country	OOP composition	ATP measure	Data sources	Recall period	Method
Manzi et al 2005	Tanzania	-Consultation fees, cost of drugs, & health related expenses (travel & supplies)	Asset index, education/occupation	1999 & 2002 household surveys	Not stated	Direct
Akazili et al 2009	Tanzania	All medical expenditure	Consumption expenditure	Tanzania Household Budget Survey, 2000/01)	Not stated	Direct
Akazili et al 2009	Ghana	All medical expenses and traditional healers, but no health related expenses	Consumption expenditure	Ghana Living Standards Survey, 2005/06),	Not stated	Direct
Akazili et al 2009	South Africa	All medical expenses and traditional healers, but no health related expense	Consumption expenditure	Income and Expenditure Survey, 2005/06)	Not stated	Direct
Perkins et al 2009	Burkina Faso	Costs of drugs and supplies, fees (bed, lab, professional fees, etc)	household expenditure/income	Population based surveys 2003/6	24 months for all delivery costs	Direct
Perkins et al 2009	Kenya	Costs of drugs and supplies, fees (bed, lab, professional fees, etc)	household expenditure/income	Population based surveys 2003 & 2006	24 months for all delivery costs	Direct
Perkins et al 2009	Tanzania	Costs of drugs and supplies, fees (bed, lab, professional fees, etc)	household expenditure/income	Population based surveys 2003 & 2006	24 months for all delivery costs	Direct
Ciss'e et al 2007	Ivory Coast	Consultations fees, medicines (including self-medication) and laboratory tests expenditures. Including	Household consumption expenditure	Primary Sampling Unit household survey	1 month for both inpatient and out patient	Kakwani index & concentration curves

Study & year	Country	Method	ATP measure	Data sources	Recall period	Method
Ciss'e et al 2007	Guinea	transport costs Consultations fees, medicines (including self-medication) and laboratory tests expenditures. Including transport costs	Household consumption expenditure	Primary Sampling Unit household survey	1 month for both inpatient and outpatient costs	Kakwani index & concentration curves
Ciss'e et al 2007	Senegal	Consultations fees, medicines (including self-medication) and laboratory tests expenditures. Including transport costs	Household consumption expenditure	Primary Sampling Unit household survey	1 month for both inpatient and outpatient costs	Kakwani index & concentration curves
Ciss'e et al 2007	Mali	Consultations fees, medicines and laboratory tests expenditures. Including transport costs	Household consumption expenditure	Primary Sampling Unit household survey	1 month for both inpatient and outpatient costs	Kakwani index & concentration curves

Table 2: Progressivity of out of pocket payments, International Countries

Arredondo & Najera 2008	Mexico	Travel costs, financial costs of care, cost of drugs and costs of laboratory tests, other	Annual household income	Mexican National health survey	2 weeks for outpatient & 1 year for inpatient	Direct method
Abu-Zaineh et al	Palestine	Doctors' consultation fees, hospitalization costs, laboratory tests, medications, and transportation costs,	Household expenditures	Palestinian Household Health Expenditure Survey 2004	1 month for both inpatient and outpatient	Kakwani index
Castano et al 2002	Colombia	Medical expenditure	Cash Income/ household expenditure	Income & expenses surveys, quality of life surveys	30 days and last 1 month for all OOP payments inpatient and outpatient	Kakwani index
Mastilica & Bozikov 1999	Croatia	Over the counter drugs, private practice, traditional medicines, gifts & gratuities	Cash income	OOP health expenditure survey 1994 Zagreb & Split (urban)	6 months for both inpatient and outpatient costs	Kakwani index
Ruger & Kim 2007	South Korea	Direct inpatient & outpatient payments to hospital & other facilities	Household income(adjusted for household composition	Korean National Health & Nutrition survey 1998	2 weeks for outpatient and 1 year for inpatient costs	Direct method
Galbraith et al	USA	Cost of medical provider visits, non-physician services, hospital inpatient stays, emergency room services, dental visits, home health care, prescription medications	Income(sum of individual household members)	Medical Expenditure Panel survey, 2001	Over a period of 2 years 6months for both inpatient and outpatient	Direct

Smith S 2009	Ireland	Doctor prescribed and non-prescribed medicines and other medical goods expenditure.	Equivalised gross income & expenditures	Household Budget Survey 1987/88, 1999/2000, 2004/05	1 year for both inpatient and outpatient costs	Concentration curve and Kakwani index
Pannarunothai' & Mills 1997	Thailand	All health expenditure	Household income & educational level of household heads	Household health interview survey,	1 year for both inpatient and outpatient costs	Direct method
Yu et al 2008	Malaysia	Expenditure on pharmaceutical products, therapeutic appliances & equipments, medical & dental services, & hospital services & treatments	Consumption and adjusted for household size	Household Expenditure Survey 1998/99	1 year for both inpatient and outpatient costs	Kakwani index
Falkingham J 2004	Tajikistan	Official payments Informal gifts (inc. money) Cost of travel to consultation Prescription medication Other medicine	Household expenditure adjusted for household size	Tajikistan Living Standard Survey,	6 months for chronic illness, 2 weeks for outpatient and 1 year for inpatients costs	Direct method
Gag and Karan 2008	India	Purchase of drugs and medicines; expenditure incurred on clinical tests. professional fees of doctors, nurses etc.; payments to hospitals and nursing homes for medical treatment; family planning appliances.	Consumption expenditure	Consumer Expenditure Survey 1999–2000	1 year for institutional care and 30 days for non-institutional care	Concentration curves
Thuan et al 2006	Vietnam	Fees (for consultations,	Total household	Household	1 month for	Direct method

		tests, x-rays, drugs and beds) as well as non-medical expenses (for travel, food and other related means	expenditure, local leaders classification	survey 2001-2002	both inpatient and outpatient	
Hotchkiss et al 1998	Nepal	Travel and consultation costs of chronic and non-chronic illnesses, injuries and birth deliveries	Total household expenditure per capita	Nepal Living Standards Survey, 1996	1 month for both inpatient and outpatient	Direct method
Lairson et al 1995	Australia	Physician consultations, both GP and specialists, and hospital outpatient and inpatient services	Income	National Health Survey,	Not clear	Kakwani index
O'Donnell et al 2005	Bangladesh	Consultation fees, hospital/clinic charges, medicines, test/investigation, transport, tips and other health service charges	Consumption	Household Income Expenditure Survey 1999-2000	1 year ,but not clearly stated if this is for inpatient or outpatient	Concentration and Kakwani index
O'Donnell et al 2005	China	Inpatient, outpatient, medicines, etc	Consumption	Sub-sample of Urban/ Rural Household Survey 2000	1 year, but not clearly stated if this is for inpatient or outpatient	Concentration and Kakwani index
O'Donnell et al 2005	Hong Kong	Outpatient, inpatient, medicines, traditional medicine, dental, medical supplies/equipment, health supplement, other health care.	Expenditure	Household Expenditure Survey 1999-2000	1 month, but not clearly stated if this is for inpatient or outpatient	Concentration and Kakwani index

O'Donnell et al 2005	Japan	Outpatient, inpatient, medicines and any co-payments.	Income	Comprehensive survey of living conditions 1998, Health care survey, 2000	1 year, but not clearly stated if this is for inpatient or outpatient	Concentration and Kakwani index
O'Donnell et al 2005	Korea Republic	Inpatient, outpatient, medicines, dental, medical supplies, tests.	Expenditure	Urban Household Survey, 2000	1 month, but not clearly stated if this is for inpatient or outpatient	Concentration and Kakwani index
O'Donnell et al 2005	Kyrgyz Republic	Inpatient, outpatient, medicines, dental, acute care.	Expenditure	Household Budget Survey , 2000/01	1 year, but not clearly stated if this is for inpatient or outpatient	Concentration and Kakwani index
O'Donnell et al 2005	Nepal	Consultation fees (modern & traditional), medicines (modern & traditional), hospital expenses, tests.	Consumption	Living Standards Survey , 1995-96	1 year, but not clearly stated if this is for inpatient or outpatient	Concentration and Kakwani index
O'Donnell et al 2005	Philippines	Fees, hospital charges and medicines (modern & traditional )	Consumption	Poverty Indicator Survey , 1999, Family Income & Expenditure Survey, 1994	1 year, but not clearly stated if this is for inpatient or outpatient	Concentration and Kakwani index
O'Donnell et al 2005	Punjab	Outpatient, inpatient and medicines	Consumption	Consumer expenditure survey 1999-	1 month, but not clearly stated if this is for	Concentration and Kakwani index

				2000	inpatient or outpatient	
O'Donnell et al 2005	Sri Lanka	Fees, hospital charges, medicines, tests, spectacles, dental, homeopathy and acupuncture, charms and others	Consumption	Consumer Finance Survey 1996-97	1 year, but not clearly stated if this is for inpatient or outpatient	Concentration and Kakwani index
O'Donnell et al 2005	Taiwan	Inpatient, outpatient, medicines, medical equipment, dental, nursing home, tests, traditional medicines, medical supplies	Expenditure	Survey of Family Income and Expenditure 2000	1 year, but not clearly stated if this is for inpatient or outpatient	Concentration and Kakwani index
O'Donnell et al 2005	Indonesia	Outpatient, inpatient & self-treatment medicines	Consumption	Socioeconomic Survey ,2001	1 month, but not clearly stated if this is for inpatient or outpatient	Concentration and Kakwani index
O'Donnell et al 2005	Thailand	Inpatient, outpatient, medicines, self-medication, traditional medicine	Consumption	Socio-economic Survey 2002	1 month, but not clearly stated if this is for inpatient or outpatient	Concentration and Kakwani index
Wagstaff, van Doorslaer, & Paci 1989	Britain	Costs of general practitioner consultations, days in hospital, and visits to hospital as an outpatient	Equivalised Pre-tax income	National Household Survey, 1981	Not stated	Concentration curve and Kakwani index
Wagstaff, van Doorslaer, & Paci 1989	Netherlands	Costs of the number of general practitioner consultations, number of specialist consultations, and	Pre-tax income	Household Expenditure Survey, 1984	Not stated	Concentration curve and Kakwani index

		number of days in hospital				
Wagstaff, van Doorslaer 1992,	Denmark	Co-payments for prescription drugs, dental care, physiotherapy	Pre-tax income	Household Expenditure Survey, 1981	Not stated	Kakwani & Suits index
Wagstaff & van Doorslaer 1992	Spain	Prescription medicines, Payments to private sector for some services available in public sector and for other services	Pre-tax income	Family budget survey 1980	Not stated	Kakwani & Suits index
Wagstaff & van Doorslaer 1992	France	Cost of physician visits, medicines and inpatient care	Pre-tax income	Family expenditure survey 1984	Not stated	Kakwani & Suits index
Wagstaff & van Doorslaer 1992	Ireland	Co-payments for inpatient and outpatient treatment, payment for GP visits & prescription medicines. co-payment for inpatient hotel facilities, and payment in full for consultant services, outpatient and primary care, and prescription medicines	Pre-tax income	Household budget survey 1987	Not stated	Kakwani & Suits index
Wagstaff & van Doorslaer 1992	Portugal	Co-payments to public sector for consultations, diagnostic tests and medicines. Direct payments to private sector by those with and without private/occupational insurance	Pre-tax income	Family income and expenditure survey 1981	Not stated	Kakwani & Suits index
Wagstaff & van Doorslaer 1992	Switzerland	Persons with basic sick fund cover face 10% coinsurance for ambulatory care and	Pre-tax income	socio-medical indicators for the population	Not stated	Kakwani & Suits index

		95% of dental care		of Switzerland, 1982		
Wagstaff & van Doorslaer 1992	Italy	Prescription drugs, Direct payments to private sector by persons with and without private insurance	Pre-tax income	Family consumption survey 1987	Not stated	Kakwani & Suits index
Wagstaff & van Doorslaer 1992	USA	Co-payments for inpatient and primary care payable by the privately insured and Medicare enrollees	Pre-tax income	National medical care utilization and expenditure survey	Not stated	Kakwani & Suits index

Table 3: Progressivity and Basis for Progressivity for All Studies

Study & Year Published	Country	Survey Year	Results	Conclusion	Basis for Progressivity/Regressivity
Manzi et al 2005	Tanzania	1999/2002	OOP increase with socio-economic status. The least poor pay 2.5 times more than the poorest	Progressive	Presence of user fees and incomplete implementation of exemption and waiver mechanisms
Ataguba et al 2009	Tanzania	2000/01	OOP high and regressive	Regressive	Cost sharing policies- user fees leading to high incidence of OOP payments, social health insurance only in developing stages-not comprehensive
Ataguba et al 2009	Ghana	2005/06	OOP high and regressive	Regressive	Cost sharing policies- user fees leading to high incidence of OOP payments, social health insurance only in developing stages-not comprehensive
Ataguba et al 2009	South Africa	2005/06	OOP mildly regressive	Regressive	Strong presence of private financing (private medical insurance and OOP)poor exposed to the same health costs
Perkins et al 2009	Burkina Faso	2003/2006	Women in the poorest wealth quintile did not pay significantly less for maternity costs than the wealthiest women	Regressive	Cost sharing policies were in place - user fees
Perkins et al 2009	Kenya	2003/2006	Women in the poorest wealth quintile did not pay	Regressive	Cost sharing policies were in place-user fees

			significantly less for maternity costs than the wealthiest women		
Prkins et al 2009	Tanzania	2003/2006	Women in the poorest wealth quintile did not pay significantly less for maternity costs than the wealthiest women	Regressive	Cost sharing policy in place but maternity care provided free of charge
Cissé et al 2007	Ivory Coast	1998-99	Kakwani index = -0.15	Regressive	User fees and cost recovery policies introduced a year before the study
Cissé et al 2007	Guinea	1998-99	Kakwani index = -0.22	Regressive	User fees and cost recovery policies introduced a year before the study
Cissé et al 2007	Senegal	1998-99	Kakwani index = -0.52	Regressive	User fees and cost recovery policies introduced a year before the study
Cissé et al 2007	Mali	1998-99	Kakwani index = -0.08	Regressive	User fees and cost recovery policies introduced a year before the study
O'Donnell et al 2008	Egypt	1997	Kakwani index = 0.0644	Progressive	OOP(user fees) largest source of health revenue,
Arredondo & Najera 2008	Mexico		Inverse relationship of costs of transport, seeking care in private sector, with income -poor pay more for medicines	Regressive	Mexican health reform offers public insurance to all citizens. However, the uninsured poor pay more for medicines
Abu-Zaineh et al	Palestine	2004	Kakwani index = -0.0830	Regressive	Government health insurance scheme covering 30% of the population. Private health insurance covers a tiny proportion of the population. OOP accounts for 40.5% of health expenditure

Castano et al 2002	Colombia	1984/85 1994/95 1997	Kakwani indices showed a constant trend (-0.126 in 1984, to -0.3498 in 1997) when using income, but a trend towards progressivity (-0.0092 in 1984, to 0.0026 in 1997) when using expenses	Regressive/ Progressive	Presence of two social insurance schemes. One for the poor and another for the rich by 2000.
Mastilica & Bozиков 1999	Croatia	1994	Persons from the low income group paid about 6 times larger share of their income than the high income group.	Regressive	There is social health insurance but reductions in public health care resources led to introduction of Cost sharing & privatisation policies
Ruger & Kim 2007	Republic of Korea	1998	Lowest quintile spent 12.5% of total income. Highest quintile spent 2%. Low income chronically ill spent 20% of income compared to 4% by high income counterparts	Regressive	Payments not related to ability to pay for uncovered services Presence of co-payments in National Health insurance -No cap on cost-sharing rates
Galbraith et al	USA	2001	Quintile 1 pay \$119/\$1000, quintile 2, \$66.3/\$1000 compared to quintile 3, \$37.75/\$1000	Regressive	-covered services are limited(poor are under insured) -lack of dental and prescription drug coverage
Smith S 2009	Ireland	1987/88, 1999/2000, 2004/2005	Kakwani index = -0.06, -0.10 & -0.11 for 1988, 2000 & 2005 respectively	Regressive	-only card holders are eligible for free care -poor cannot afford supplementary insurance
Pannarunothai & Mills 1997	Thailand	2002	Underprivileged families spent OOP as much as 5-6% of their	Regressive	-lower income families without health benefit or

			household income on health care whereas other groups spent 1-2%		low income card -user fees for uninsured
Yu et al 2008	Malaysia	1989/99	Kakwani index = 0.1043	Progressive	switch to private health services by the rich & predominant reliance on subsidized public health services by the poor
Falkingham J 2004	Tajikistan	1999	As percentage of income, poorer patients paid relatively more for all services	Regressive	Burden of financing health care shifted from public to individuals. 60% of health expenditure is from private sources
Gag and Karan 2008	India	1999/2000	Poor quintiles spend a relatively lower proportion of their expenditure OOP than rich	Progressive	OOP constitute the largest share of health expenditure vary between 80-70% of health expenditure and 95% of private. There is a weak insurance and community financing emerging. The poor spend more on drugs than inpatient compared to the rich
Thuan et al 2006	Vietnam	2001/2002	The poor pay a larger share of their curative health expenditure compared to the rich	Regressive	The new economic policies implemented in 1986 has led to increase in OOP health expenditures (user fees)
Hotchkiss et al 1998	Nepal	1996	OOP proportion of ATP from first to last quartile is 3.2%, 4.6%, 6.7%, and 7.8%	Progressive	Both poor and rich use public facilities -public facilities prescribe expensive medicines for the

					rich and cheap ones for the poor. Also the poor cannot buy prescribed medicines
Lairson et al 1995	Australia		Kakwani index = -0.15	Regressive	Despite there being a national insurance scheme OOP are found in Medicare systems and these tend to be regressive
O'Donnell et al 2005	Bangladesh	1999/2000	Kakwani index = 0.2192	Progressive	Health is financed almost exclusively from OOP and tax revenues
O'Donnell et al 2005	China	2000	Kakwani index = -0.0168	Regressive	Combination of social insurance and out of pocket payments-insurance for state workers and low earnings workers.
O'Donnell et al 2005	Hong Kong	1999/2000	Kakwani index = 0.0113	Progressive	Adoption of a tax, rather than a social insurance, model of financing. Engage in substantial positive discrimination in favor of the worse-off
O'Donnell et al 2005	Japan	1998/2000	Kakwani index = -0.2691	Regressive	Collects more than half of health funds from social insurance-Significant social insurance systems
O'Donnell et al 2005	Korea Republic	2000	Kakwani index = 0.0124	Progressive	Collects half of its finances from direct payments-rest from social insurance
O'Donnell et al 2005	Kyrgyz Republic	2000/01	Kakwani index = -0.0520	Regressive	Health is financed almost exclusively from OOP and tax revenues- burden of finance evenly split

					between OOP taxes
O'Donnell et al 2005	Nepal	1995/96	Kakwani index = 0.0533	Progressive	Health is financed almost exclusively from OOP and tax revenues-but rely more heavily on OOP
O'Donnell et al 2005	Philippines	1994/1999	Kakwani index = 0.1391	Progressive	Modest contributions from insurance
O'Donnell et al 2005	Punjab	1999/2000	Kakwani index = 0.0461	Progressive	Health is financed almost exclusively from OOP and tax revenues- burden of finance evenly split between OOP and taxes
O'Donnell et al 2005	Sri Lanka	1996/97	Kakwani index = 0.0687	Progressive	Health is financed almost exclusively from OOP and tax revenues-burden of finance evenly split between OOP and taxes
O'Donnell et al 2005	Taiwan	2000	Kakwani index = -0.0780	Regressive	Collects more than half of health funds from social insurance-Significant social insurance systems
O'Donnell et al 2005	Indonesia	2001	Kakwani index = 0.1761	Progressive	Modest contributions from insurance
O'Donnell et al 2005	Thailand	2002	Kakwani index = 0.0907	Progressive	Private and social insurance mixed
Wagstaff, van Doorslaer, & Paci 1989	Netherlands	1987	Kakwani index = -0.059	Regressive	Rely heavily on (compulsory) social insurance contributions paid to sickness funds
Wagstaff, van Doorslaer 1992,	Denmark	1981	Kakwani index = -0.159	Regressive	Almost all private expenditures are out-of-pocket. The remainder is tax funding

Wagstaff & van Doorslaer 1992	Spain	1980	Kakwani index = 0.016	Progressive	Largely social insurance with some significant OOP and general taxes. Private insurance is minimal
Wagstaff & van Doorslaer 1992	France	1984	Kakwani index = - 0.28	Regressive	About three-quarters is social insurance, the rest are private, taxes and out of pocket
Wagstaff & van Doorslaer 1992	Ireland	1987	Kakwani index = - 0.070	Regressive	Three quarters general taxes and a mixture of social, private insurance and OOP
Wagstaff & van Doorslaer 1992	Portugal	1981	Kakwani index = -0.158	Regressive	Almost 30% of health financing was private and virtually all was out-of-pocket. This grew to 40% in 1987
Wagstaff & van Doorslaer 1992	Switzerland	1982	Kakwani index = -0.339	Regressive	Rely on out-of-pocket payments and private insurance premiums for the majority of revenues.
Wagstaff & van Doorslaer 1992	Italy	1987	Kakwani index = - 0.004	Regressive	Health financing split between general taxes and social insurance. With significant OOP
Wagstaff & van Doorslaer 1992	USA	1981	Kakwani index = -0.39	Regressive	Rely on out-of-pocket payments and private insurance premiums for the majority of revenues.
Wagstaff & van Doorslaer 1992	UK	1981	Kakwani index = -0.190	Regressive	13.5% of expenditures are private of which 64% are out-of-pocket

Table 4: Determinants of Out of Pocket Payments

Study and Year	Country	Determinants of Out of Pocket Payments
Habibov N (2009)	Tajikistan	Ability to pay, gender, using specialized care
Onwujekwe et al (2010)	Nigeria	Socio-economic status,
Ruger and Kim (2007)	Republic of Korea	Presence of illness/chronic condition, type of insurance, health care use, health facility type
Hong and Kim (2000)	U.S.A	Age of household head, location of household( rural/urban)
Rubin and Koellin (1993)	U.S.A	Insurance status, age of household head, education of household head, household size, race, welfare status of the household
Chu et al (2005)	Taiwan	Sex, sex of head, marital status, employment status, education, socio-economic status, location, household size
Hwang et al (2001)	U.S.A	Number of chronic conditions, race, sex, age, ethnicity, insurance status, poverty status
Mastilica and Chen (1998)	Croatia	Age, sex, socio-economic status
Hotchkiss et al(2005)	Albania	Insurance status, socio-economic status, type of service, type of facility
Mugisha et al (2002)	Burkina Faso	Where care was sought,

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## **Part C**

## **Journal Article**

## FORMAT OF CONTRIBUTIONS

Only articles in English are considered for publication.

Prepare your manuscript, including tables, using a word processing program and save it as a .doc, .rtf or .ps file. Use a minimum font size of 11, double-spaced and paginated throughout including references and tables, with margins of at least 2.5 cm. The text should be left justified and not hyphenated. Number pages consecutively.

Manuscripts should preferably be a maximum of 5000 words, excluding tables, figures/diagrams and references (review papers can be longer).

The title page should contain:

- Title - please keep as concise as possible and ensure it reflects the subject matter;
- Corresponding author's name, address, telephone/fax numbers and e-mail address;
- Each author's affiliation and qualifications;
- Keywords and an abbreviated running title;
- 2-4 Key Messages, detailing concisely the main points made in the paper;
- A word count of the full article.

The manuscript will generally follow through sections: Abstract (no more than 300 words), Introduction, Methods, Results, Discussion, Conclusion, References. However, it may be appropriate to combine the results and discussion sections in some papers. Tables and Figures should not be placed within the text, rather provided at the end of the paper or in separate file/s.

In the acknowledgements, all sources of funding for research must be explicitly stated, including grant numbers if appropriate. Other financial and material support, specifying the nature of the support, should be acknowledged as well.

Figures should be designed using a well-known software package for standard personal computers. If a figure has been published earlier, acknowledge the original source and submit written permission from the copyright holder to reproduce the material. Colour figures are permitted but authors will be required to pay the cost of reproduction.

All measures should be reported in SI units, followed (where necessary) by the traditional units in parentheses. There are two exceptions: blood pressure should be expressed in mmHg and haemoglobin in g/dl. For general guidance on the International System of Units, and some useful conversion factors, see 'The SI for the Health Professions' (WHO 1977). References must follow the Harvard system

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# Progressivity and determinants of out-of-pocket health care financing in Zambia

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**Objective** To assess the progressivity and determinants of out of pocket health care payments in Zambia

**Methods** Based on data from the Living Conditions Monitoring Survey (LCMS), conducted in 1998, 2004 and 2006 Kakwani index of progressivity were estimated with Lorenz and concentration curves. Dominance tests were also done to establish the statistical significance of dominance. The same data was also used to estimate factors determining incidence and magnitude of out of pocket payments using logistic and Tobit regressions respectively.

**Findings** Results show that out of pocket payments were progressive in 1998 and 2006,  $K_{\pi} = 0.0366$  and  $0.0171$  respectively while they were regressive in 2004 ( $K_{\pi} = -0.0799$ ). Living in rural area was associated with less likelihood of incurring out of pocket payments but only in 2006. Households with more members and belonging to high socio-economic categories were more likely to incur out of pocket payments and consequently larger amounts out of pocket compared to smaller households and belonging to lower socio-economic categories respectively.

**Key Words** Out of Pocket payments, Progressive, Regressive, Zambia, Health care financing.

**Word Count** 8 230 including title and in-text references

Key Messages

1. Estimates show that in absolute terms out of pocket payments in both rural and urban Zambia increased between 1998 and 2004 but dropped in 2006
2. Out of pocket payments were also progressive in 1998 and 2006 but regressive in 2004
3. Living in rural area significantly reduces both the likelihood of paying and the size of out of pocket payments in 2006

## **1.1 Introduction**

From the time Zambia got its independence from Britain, the government had been providing free health care services for all (Ministry of Health/Republic of Zambia. 2004). However, it became increasingly difficult to sustain this system especially when in the mid 1970s the country started experiencing macroeconomic challenges. This resulted in adverse effects on health and was compounded by increased poverty, inequality and unemployment and contractions in per capita household incomes and GDP. Ultimately, the public sector's ability to finance the provision of health care services diminished over time. In the wake of these challenges, there was an emergence of liberal economic reforms in many parts of Africa, popularly known as Structural Adjustment Programmes (SAPs). The main theme of these reforms among others was the removal of public subsidies and withdrawal of direct government provision of many social services including health care (McPherson 1995). Under the circumstances, the newly elected government, supported by donors, also referred

to as cooperating partners in the *Zambian health literature* (Ministry of Health 2005, Ministry of Health Zambia 2006), began in the early 1990s to rationalize that if rich countries could not afford to provide free services to their populations, poor countries like Zambia could similarly not afford to sustain their “free-for-all” health policies. Thus in 1992, far-reaching national health reforms were initiated. A major tenet of the reforms was the cost-sharing health policy (introduced in 1993), which saw Zambia introducing user fees in all public facilities at all levels of care. Patients were now required to pay at the point of use of health services.

These health reforms were initially greeted with enthusiasm, and some positive changes were recorded in the early years of the reform implementation (Gilson et al. 2003). In years that followed however there has been a reversal of the situation causing a waning of interest in the health reforms and increased skepticism. This generated intense (and on-going) debate about the ability of the reforms to foster a number of things including better coverage, equity and ease of access to health care (Blas, Limbambala 2001, Malama et al. 2002, van der Geest et al. 2000). The subject of user fees is at the center of the health reforms and health policy debate as a key policy instrument for health care financing. A key anxiety in this regard concerns the health and socio-economic implications of user fees as a financing option, particularly given the poverty context of health in Zambia. Masiye et al (2008) observe that implementing user fees in a health setting with widespread poverty and poor key health indicators has been very challenging. Contrary to expectations, user fees resulted in lower utilization rates and denied more people, especially the poor, access to health care. During the same period about 22% of urban and 30% of rural patients were turned away from health facilities because they could not pay for services upfront (Kondo, McPake 2007). User fees were later abolished in April 2006 but this was only for primary health care in rural areas.

This implies that urban residents, as well as rural residents needing care beyond the primary level need to make direct payments.

Despite these challenges Zambia's vision still remains to provide its people with equity of access to cost-effective, quality healthcare as close to the family as possible (Ministry of Health 2005). However, achieving this vision in a country where the majority people are poor as earlier pointed out is challenging especially if healthcare use is linked to one's demand instead of need. Health economists usually draw a difference between need and demand for health care (Asian Development Bank 2000). A person's need in this context is linked to a person's ability to benefit from health care, regardless of whether they are able to pay for it or not, whereas demand is specifically linked to the ability to pay, which for a poor person often is substantially less than his/her need. Because of this, it is generally accepted that for reasons of equity, individuals should contribute to health care according to their ability to pay but benefit according to their healthcare need (McIntyre 2009). In other words, those who have more resources should contribute more proportionally in paying for healthcare compared to those with fewer resources. At the same time, those with more health needs should benefit more from health services than those with fewer needs. Contributing to health care according to ability to pay is a vertical equity concept and is a major subject in many health policies. In health care financing vertical equity refers to the extent to which households of unequal ability to pay make appropriately dissimilar payments for health care (Cisse, Luchini & Moatti 2007a). If contributions to health care are proportionally related to one's ability to pay, they are said to be progressive. Hence, a progressive health care financing mechanism is one for which health payments increase proportionally with ones resources or income. This is desirable for achieving equity in the financing of health care.

The main objective of this study is to assess the progressivity and determinants of OOP health care payments in Zambia. Specifically the study seeks to measure OOP health expenditure as a share of total household expenditure and compare this across different socio-economic groups. It also attempts to determine the characteristics of households who make OOP health care payments as well as assess factors that influence the incidence and size of OOP health care payments. It also compares trends in the progressivity of OOP health care payments for the three years (1998-2006)

The rest of this paper is organized as follows. The next section presents a brief overview of progressivity of OOP payments. A section on data and methods follow thereafter. This is followed by the findings and discussion. The paper ends with conclusions and recommendations for policy interventions.

## **1.2 Overview of Progressivity of OOP payments**

In Zambia, no specific study has been done to investigate the progressivity and determinants of OOP payments. A related study by Cheelo et al (2009) to measure out of pocket health expenditures and distribution of catastrophic payments in Zambia only estimated the relationship between OOP payments and household income. In most of the studies done in Africa, OOP payments are a regressive source of financing. In sub-Saharan Africa, McIntyre et al (2005) note that health systems where a relatively large share of health care financing is attributable to OOP payments will always be regressive unless the majority of low-income people simply do not use health services when needed. They further stress that from the perspective of health service benefits, OOP payments are also inimical to equity, as benefits are distributed solely based on ability to pay rather than based on need for health care.

Building on this argument, evidence from four francophone West African capitals (Abidjan,

Bamako, Conakry and Dakar) strongly suggests a regressive pattern of OOP payments for health care, with lower income groups bearing a higher burden (Cisse, Luchini & Moatti 2007b). Results also show that regressivity varies substantially across cities: It was a lot more regressive in Bamako and Conakry, with Kakwani indices of  $-0.22$  and  $-0.52$ , respectively than in Dakar ( $-0.08$ ). In a similar analysis of OOP costs for facility based maternity care in three other African countries, Perkins et al (2009) found that the fees paid for all deliveries (normal and complicated) by women for maternity care were regressive in all three countries (Burkina Faso, Kenya and Tanzania). For example, in Tanzania, the average cost to the poorest women for all types of deliveries was US\$4.6, compared with US\$5.1 for all women. In Burkina Faso, the average cost to women in the poorest quintile was US\$7.6 compared with US\$7.9 for all women. In Kenya, women in the poorest quintile paid on average, US\$20.3 which is more than the mean cost to all women (US\$18.4).

Internationally, the progressivity of OOP payments is mixed. Rasell et al. (1994) found in the United States that out-of-pocket spending was particularly regressive with low-income families' expenditures, as a share of income, nearly 9 times the level of those of high-income families. In Thailand, Pannarunothai et al (1997) observe that underprivileged families spent about 5–6% of their incomes OOP for health care, whereas other groups spent only 1–2%. In Asia, O'Donnell (O'Donnell 2008) found that OOP payments were regressive in Taiwan and notes that the rich paid more OOP in absolute terms but less as a proportion of incomes. Similar results were obtained in Australia in a study by Lairson et al (1995). They point out that though the entire health financing system is progressive, OOP payments were regressive with a Kakwani index of  $-0.15$  compared to that of General tax ( $0.07$ ) and Medicare levy ( $0.09$ ). The progressivity of OOP payments have been recorded in some countries. For example, Yu et al (2008) report the progressivity of OOP expenditures in Malaysia in the

period 1998/9 with a Kakwani index of approximately 0.1043. Authors note that the slight progressivity observed could have resulted from the switch to private health services by the rich and the predominant reliance on subsidized public health services by the poor. In Colombia, Castano et al (2002) observed that OOP expenditures behaved differently depending on the type of survey used. They highlight that when Kakwani indices were estimated using a survey that used household cash income, the burden appeared increasingly regressive, but when a survey that used total expenses was used, the burden became slightly progressive. They further explain that this lack of a clear evolution towards a less regressive burden can be plausibly explained by arguing that OOP payments increased for all households, but their rates of increase were larger for households in the middle deciles of expenses and lower for the better off and the worse off, at least for urban households (Castano et al, 2002)

## **2.0 METHODOLOGY**

### **2.1 Data Sources**

This paper is based on three rounds of the *Zambian Living Conditions and Monitoring Surveys (LCMS)* – 1998, 2004, and 2006. These are nationally representative surveys conducted by the *Zambian Central Statistical Office (CSO)* as shown in Table 1. The LCMS contains information on several modules including demographic, health, education, household expenditure, household access to various amenities and facilities. They contain individual as well as household level information. Individual level data includes some relevant socio-demographic information (age, sex, education, urban/rural location etc). Relevant household level data include total household consumption, total household expenditure as well as out-of-pocket health expenditure. Other important details on the survey methodology are presented in appendix 15.

## 2.2 Statistical Methods

### a. Estimating Out of Pocket payments

Out-of-pocket (OOP) health payments refer to payments made by households at the point they receive health services. These payments are not reimbursed by any prepayment scheme. They could either be paid at a public or private facility. In this analysis, OOP payments included costs of medicines, fees to medical personnel (e.g. Doctor / Health Assistant / Midwife / Nurse / Dentist, etc), payments to hospital/health centre/surgery as well as fees to traditional healer. However, expenditure on health-related transportation is excluded. This avoids imputation of transport costs for households using private means of transportation. Total OOP expenditures for each household were adjusted by adult-equivalent household size to reflect each household member's OOP payment experience.

### b. Measuring Socio-economic Status

Total household expenditure was used to estimate household socio-economic status in all the three periods considered. This is in line with the World Bank's recommendations for developing countries (Grosh, Glewwe 2000). Compared to income, there is less variability in household expenditure. Furthermore, total household expenditure was adjusted for household size and composition using equivalised household size to obtain equivalent household expenditure. Equivalised household size was obtained as follows:

$$eqsize = hhsiz^{\beta},$$

Where *eqsize* represents the number of consumption equivalents in the household and *hhsiz* is the actual size. The value of  $\beta$  is estimated at 0.56 from data from 59 countries using fixed effects regression (Xu et al. 2003). This value is now being used as representative

value in empirical studies of this nature. Households were further categorized into five quintiles of socio-economic status using the equivalent household expenditure. In all analyses, sample weights (aweights) were applied and the unit of analysis is the household. All analyses were carried out using STATA<sup>TM</sup> 10 software.

### **c. Estimating Progressivity of Out of Pocket Payments.**

To estimate the progressivity of OOP payments the study first estimated OOP payment as a percentage of total household expenditure. Progressivity of OOP payments was assessed using the Kakwani Index of progressivity (Kakwani 1977). This is defined as the difference between the Gini coefficient for income (or expenditure) distribution ( $G$ ) and the concentration index for the distribution of OOP payments ( $C$ ). The Gini index follows a univariate distribution (i.e. solely measures income distribution (ability to pay) while the concentration index follows a bivariate distribution. For example, in this case comparing the distribution of out of pocket payments to household ability to pay variable e.g. total household expenditure. The Gini index is the ellipse-shaped area between the Lorenz Curve (Figure 1) as a proportion of the total area under the diagonal. It is therefore equal to one minus the area under the Lorenz Curve and ranges from zero (when there is complete equality and the Lorenz Curve coincides with the diagonal) to 1 (when all income is concentrated in the hands of one person). The concentration index ( $C$ ) on the other hand is defined in exactly the same way except that the concentration curve  $L(s)$  is used instead of the Lorenz curve. Both the Concentration and Gini index can be calculated by;

$$C = \left[ \frac{2}{\mu} \right] \text{cov}(y_i, R_i).$$

Where  $C$  is the concentration or Gini index,  $y_i$  is the health payments (for  $C$ ) or the measure of living standards (for  $G$ ) and  $R_i$  is the fractional rank of the living standards measure (i.e. expenditure.)

Kakwani index of progressivity is then derived from these two indices and is twice the area between the concentration curve for OOP payments and the Lorenz curve. This is defined as:

$$K_{\pi} = C - G$$

Where  $C$  is the concentration index for health payments and  $G$  is the Gini coefficient of the ability to pay (ATP) variable (i.e. equivalent expenditure). If OOP expenses are a progressive (regressive) source of financing, the concentration curve will lie below (above) the Lorenz curve, and  $K_{\pi}$  will be positive (negative). If OOP payments are perfectly correlated with income,  $K_{\pi}$  will be zero and the financing source will be proportional. Proportionality could also arise when these curves cross each other. However, while visual inspection of concentration curves, Lorenz Curve and the line of equality may give an impression of whether there is dominance, this may not be sufficient to conclude whether or not dominance is statistically significant. It is also true to say that Concentration curves are estimated from survey data and so may display sampling variability. Therefore, it is important to provide statistical tests of dominance between the curves. To confirm dominance of concentration curves, dominance tests to see if the concentration curve dominated the Lorenz curve in each year were carried out for all the three years under analysis using the multiple comparison approach (MCA) decision rule, with comparisons at 19 equally spaced quintile points and a 5 percent significance level (O'Donnell and others, 2008).

#### **d.Factors determining Out of Pocket payments**

*Model specification*

A logistic regression was used to assess the factors determining OOP payments. The model is thus specified in general as:

$$y^* = \alpha + \sum \beta_i X_i + \varepsilon$$

Where out of pocket payments (a binary outcome) is the dependent variable ( $y^*$ ). It is 1 if household out of pocket payments is greater than 0 ( $oop > 0$ ) and a value of 0 otherwise. Independent variables ( $X_i$ ) are defined in table 3. Also  $\alpha$  is the constant and  $\beta_i$  the coefficients being estimated. The  $\beta$  coefficients have been interpreted in terms of log-odds ratios, a concept that is commonly used in biostatistics and epidemiology. Because of the particular functional form of the standard logistic distribution the odds ratio simplifies to  $P(y^*=1)/P(y^*=0) = \exp(x\beta_i)$  and therefore the coefficients can be interpreted in terms of changes in the log-odds-ratio  $\log(P(y^*=1)/P(y^*=0))$  (Jones, 2006).

#### **e. Factors determining size of Out of Pocket payments**

Tobit model is used to assess the factors determining the magnitude of OOP payments. This is because the dependent variable ( $oop$ ) is limited or censored. There is sufficiently large number of OOP expenditures reported as zero. For example, only about 40% of households in all three surveys reported positive OOP payments, the rest of the observations are zeros. For such limited dependent variables the Tobit model (Tobin 1958) or sample selection models are usually a preferred model of analysis compared to the usual OLS. The Tobit model like other sample selection models assumes a truncated or censored dependent variable and uses all observations, both those at the lower limit and those above it, to estimate independent effects.

The intuition behind a Tobit model is such that first, we have a latent model where the dependent variable, say,  $y_i^*$ , which has some independent variables and coefficients and a disturbance term that is normally distributed with a mean of zero. However, we have censoring at zero. Thus we have an observed  $y_i$  that equals  $y_i^*$  if the value of  $y_i^*$  is greater than zero, but equals zero if the value of the unobserved  $y_i^*$  is less than or equal to zero.

The Tobit model is thus represented by:

$$y_i^* = x_i' \beta + \varepsilon_i \quad \text{Assumption:} \quad \varepsilon_i \sim \text{i.i.d. } N(0, \sigma^2)$$

$$y_i = \begin{cases} y_i^* & \text{if } y_i^* > 0 \\ \mathbf{0} & \text{if } y_i^* \leq 0 \end{cases}$$

Where  $y_i^*$  is the latent dependent variable-in this case out of pocket payments equal to or below zero ( $oop \leq 0$ ),  $y_i$  is the observed dependent variable, i.e. positive out of pocket payments ( $oop > 0$ ),  $x_i$  is the vector of the independent variables, same as those in table 3.  $\beta$  is the vector of coefficients, and the  $\varepsilon_i$ 's are assumed to be independently normally distributed:  $\varepsilon_i \sim N(0; \sigma)$  (and therefore  $y_i \sim N(x_i \beta, \sigma)$ ).

The Tobit model has been applied in many similar studies. For example, in Mugisha et al (Mugisha et al. 2002) in Burkina Faso to estimate OOP expenditure on health care where information was only available for independent variables (age, sex and income) but limited for the dependent variable (OOP expenditure) . The Tobit model has also been applied in Taiwan to assess health expenditure for the elderly where a good number of health expenditures were unreported (Chi, Hsin Fall 1999). Stoddard and Gray (Stoddard, Gray 1997) also used the Tobit model to estimate maternal smoking and medical expenditures for

childhood respiratory illness where the analysis included a large number of children with no respiratory-related medical expenditures.

In this paper, the variables used in the regression analyses are presented and described in table 3.

### **3.0 RESULTS**

Results are presented in this section. Generally, there were a lot of unreported OOP expenditures especially for poorer households in all the three data sets. This should be borne in mind when interpreting results especially concerning progressivity. As shown in table 2 only about 11, 15 and 13 percent of households in the first quintile (poorest) reported paying OOP in the previous two weeks compared to 25, 23 and 24 percent of households in quintile 5 (richest) for 1998, 2004 and 2006 respectively. Table 2 also shows that on average, households in the lowest socio-economic group spent the least OOP.

Table 4 shows the mean OOP payments per adult equivalents by household characteristics in each year. Mean OOP per adult equivalent refers to the amount of OOP payments that each person in a given household spent on average after adjusting for household size and composition. The amount of OOP payments reported per household characteristic is in absolute terms and reported in Zambian Kwacha<sup>1</sup>. From table 4 it can be seen that on average, households in rural areas spent less OOP compared to households in urban areas for all three analyses. This was expected as households in rural areas may not afford to pay OOP. Absolute amount spent OOP was however largest in 2004 compared to the other two years for both rural and urban areas. This increase in OOP especially between 2004 and 2006 can be attributed to the abolition of user fees by government in early 2006. Similarly, households

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<sup>1</sup> exchange rates for 1998, 2004 and 2006 are K2388, K4772 and 3602 per US\$1 respectively

with married and male heads spent more OOP compared to households with unmarried and female heads respectively. When the age of the household head is considered, households headed by individuals who are younger than 25 years spent the least OOP in all three years. The largest OOP expenditure was spent by households whose head is aged between 34 and 45 years in 1998 and 54-65 years in 2004 while households headed by an individual aged above 64 years spent the largest amount OOP in 2006. Households headed by a working head (wage employment or doing some business/self-employed) spent more OOP than households headed by a non-working household head. This is normal as non-working heads may not be able to afford random OOP payments. This distribution was consistent for all the three analyses. OOP expenditures also varied according to levels of education of household heads. There was an increasing trend in OOP expenditures as the level of education increased for all years under analysis. This is expected as the level of education is attributed to ones earning capacity, all things being equal. Usually more years of education are attributed to higher income earnings. Households where the head had primary education spent the least OOP while households where the head had higher education i.e. post secondary education had the largest OOP expenditure. There was no household head without any formal education. In terms of socio-economic status, as expected, quintile 1 (i.e. the poorest) spent the least OOP compared to all other quintiles in all the years while households in quintile 5 spent the most. The analysis also estimated the amount of equivalent OOP payments made in each category of socio-economic status as a proportion of equivalent household expenditure. From table 5 it can be seen that OOP payments as a proportion of total household expenditure increased with household expenditure consistently for the 1998 analysis.

Intuitively, it can be observed that OOP payments were progressive in 1998. However, it is difficult to draw a similar conclusion for the 2004 and 2006 analyses given the inconsistent

relationship between equivalent OOP payments and equivalent household expenditure observed for the two years. Whereas OOP payments as a proportion of household expenditure increased consistently with income in 1998, the picture is different for the other two years making it difficult to conclude on the progressivity of payments. In such cases, the Kakwani index is used to draw a conclusion.

The results presented in table 5 confirm that OOP payments were generally progressive in 1998 ( $K_{\pi} = 0.03656$ ) and in 2006 ( $K_{\pi} = 0.0171$ ) while they were regressive in 2004 ( $K_{\pi} = 0.0799$ ). A visual sense of the progressiveness and regressiveness of OOP payments for all analyses can further be seen in figures 2, 3 and 4. In figure 2 and 4 the concentration curve -  $L(s)$  lies below or outside Lorenz curve -  $L(x)$  suggesting that OOP payments were progressive in 1998 and 2006. On the contrary, the  $L(s)$  for 2004 lies above or inside the  $L(x)$  especially for the lower levels of socio-economic status implying that OOP payment were regressive in 2004.

Dominance test results presented in table 6 compare the cumulative shares of equivalent expenditure with the cumulative shares of equivalent OOP payments. It can be observed that the Lorenz curve significantly dominates the OOP payments concentration curve at all quintile points presented in the 1998 and 2006 analyses. However, in 2004 the Lorenz curve is significantly dominated for the first and second 20% of the population. As can be seen from table 6 the difference between the Lorenz curve and concentration curve for the last two quintiles of 2004 is not significant at the 10% level of significance.

The results of the Logistic and Tobit regression presented in table 7 shows that the overall models are highly significant as well as most of the variables. Larger households were significantly more likely to incur OOP expenditure in all three analyses. On the other hand,

rural households are less likely to incur OOP payments compared to urban households in all the years but this is only significant in 2006. This implies that the location of a household was not associated with OOP spending in 1998 and 2004. Households headed by older heads were less likely to incur OOP payments but this is not significant in 2006. The odds of OOP spending also tend to reduce significantly for households headed by males compared to households headed by females. In all analyses, households with a married head were more likely to spend OOP compared to households headed by unmarried heads. Increasing the number of years of education of the household head significantly reduces the odds of spending OOP in all the years. This is despite the belief that households headed by more educated heads may also earn higher incomes given the positive relationship between income and education and hence be in a better position to meet OOP payments. All results were not significant for work status of the household head. Lastly as expected, belonging to a higher socio-economic group significantly increases the odds of OOP spending. This was significant at 1% level of significance for all three years.

Comparing results of logistic and Tobit regressions it can be seen that increasing the number of people in a household does not only increase the likelihood of spending OOP but also significantly increases the magnitude spent OOP. This is consistent for all analyses.

Similarly, households headed by a male spend less OOP compared to households headed by a female head for all years under analysis. Location of a household had no effect on the size of household OOP in 2004 and 2006 except in 1998. In 1998 rural households were likely to spend less OOP compared to urban households at a significant level of 5%. Age of a household head had no effect on the size of OOP payments by a household. Furthermore, belonging to a higher socio-economic status does not only increase the likelihood of spending OOP as observed by significant results in table 7 but also increases the magnitude households

spent OOP. This can be seen by significant results (1% level of significance) obtained in the Tobit regression. Results are not significant in 1998 and 2004 on the effect of different levels of education on household OOP payments. However, taking primary education as a reference category, households headed by a head with secondary and higher education were likely to spend less OOP. This is contrary to expectations and descriptive statistics. Work status of the household head was significantly associated with lower amounts of household OOP payments in 2006. Results were not significant for the other years.

#### **4.0 Discussion**

Out of pocket payments remain one of the single largest sources of health care financing in Zambia and the rest of sub-Saharan Africa. This paper examines the progressivity and determinants of OOP payments in Zambia. The Kakwani index of progressivity was used to assess progressivity on data drawn from the 1998, 2004 and 2006 living conditions monitoring survey. These data were also used to assess factors affecting OOP payments using regression based analysis.

The empirical results reveal many important things. Notably, in absolute terms, OOP payments generally increased from 1998 to 2004 and dropped in 2006. Dwelling in a rural area compared to an urban area was significantly associated with a lower likelihood of spending OOP but only in 2006 and not in the other two years. Results were significant for 2006 at the 1% level of significance and not significant for the other two years. These findings are not mere coincidence but seem to point to one thing and it seems safe to make the following conclusion. In April 2006, about 8 months prior to the 2006 survey the government of Zambia, after much debate and deliberations abolished user fees for primary health care in all public facilities in rural areas. Households in rural areas were to obtain

primary health care services without paying. This may offer an explanation for the observed results. It could be true that after user fees were abolished paying OOP reduced in rural areas compared to urban areas. What makes this explanation even more valid are the results of the study by Masiye et al (2010) undertaken 15 months after the user fee abolition policy was implemented. The findings in this study are that user fee removal was accompanied by increased utilisation of health care services. Based on this, it is likely that removal of user fees for primary health care in rural areas reduced the payment of OOP payments allowing more people to access health care services especially in rural Zambia.

Evidence on the role of OOP payments in creating barriers to access to health care has been documented in a number of countries. In Tanzania, Manzi et al (2005) found that OOP payments did not only place an inequitable financial burden on poor families but also negatively affected utilisation. In Mexico Arredondo and Najera pointed out that high OOP payments in Mexico tended to create a barrier to access to health care. This clearly indicates that OOP payments actually hinder health care use and that user fee removal is one way they can be reduced.

The study also found progressive out of pocket payments in 1998 and 2006. However, it should be mentioned in the strongest of terms that this result should be treated cautiously. The reason for this is that there were so many unreported OOP payments especially by the poor households as earlier demonstrated. It has also been observed from descriptive statistics that more OOP payments were made by households of high socio-economic status compared to households of low socio-economic status. Low OOP payments among the poorest are due to the fact that they do not use health care services because they cannot afford to pay. To this effect, it could be true that the apparent progressivity observed in the two years is at the expense of the poor households who did not make as much OOP payments as the richer

households. McIntyre et al (2005) have also observed this phenomenon for many sub-Saharan African countries where OOP payments are predominant.

Overall, descriptive statistics also show more OOP payments in urban areas compared to rural areas. This may be because the urban population are more educated and have more income and economic power and are hence more able to spend OOP than the rural population. Results also show that the likelihood of spending OOP rises with household size. This also applies to the size of OOP payments. This finding is consistent with similar studies. For example, O'Donnell (2008) found that larger households in Bangladesh and Thailand were more likely to spend OOP and thus were more susceptible to catastrophic health expenditures. It has also empirically been established that generally the likelihood of households spending OOP as well as the size of payments significantly increased with household income. Naturally, richer households may be more able to afford OOP payments compared to poorer households who usually have to choose between making health payments and spending on other household basic needs. This finding is also consistent with other international studies (Leive & Xu, 2008). Results further show that the likelihood of spending OOP reduced significantly if the household head was male and older. However, it increased for households with a married head. The same effect was observed in terms of the size of OOP payments, except for the actor of age which was not significant for all the analyses, implying that age of a household head did not affect the amount spent OOP. These results are also consistent with those found by Chu et al (2005) in Taiwan.

However, the study was not without limitations. To begin with, the living conditions monitoring survey, like all household surveys, is prone to respondent errors and recall biases. This may affect the findings by either over-estimating or under-estimating of some important variables. For example, survey data on OOP payments are potentially subject to both recall bias and small sample bias due to the infrequency with which some health care payments are

made. This problem is compounded by the fact that the survey only collects health expenditures made in the month prior to the survey. Given the seasonality of illness and consequential health payments, a one month recall period may lead to eventual biases. The study used the household as a unit of analysis. This is a limitation in the sense that creation of household-level variables does not account for some of the complexities of the diversity in families. However, this was important to create a clearer analysis.

Secondly, the use of the summary index to determine progressivity of health payments also tends to be problematic and un-interpretable in situations where curves cross. However, this has been checked by testing for the dominance of Lorenz and concentration curves.

Thirdly, the operational definition of OOP payments did not include transport costs and other health related expenditures such as food and patient care. While it is understood that the computation of these aspects of costs is challenging due to lack of uniformity in transport forms and forms of patient care, it is also possible that if these components were included either the progressivity or regressivity observed may be more pronounced or be offset. For example, take two patients, one poor and the other rich (in terms of their income) who visit a health facility. If they each pay the same amount i.e. a fixed sum for a health service, we say this is regressive because their initial incomes are not related to the payments made.

Nevertheless, if the poorer patient did not incur any transport costs while the richer patient did, the regressivity observed may be offset by the additional cost of transport spent by the richer patient. On the other hand, if on top of this regressive payment the poorer patient spent more money on transport while the richer patient did not, the regressivity will even be more pronounced. In this regard, future studies should find ways of computing transport costs and include them in the analysis of progressivity of health payments.

Lastly, when interpreting progressivity results for this particular study it should be borne in mind that in all three analyses there were a sufficiently large number of zero OOP payments. This imply that payments appear progressive only because a larger portion of households, especially poor ones, did not use health services and consequently could not make any health payments at all.

## **5.0 CONCLUSION**

Based on the results of this analysis, OOP was progressive in the two years (1998 and 2006) and regressive in 2004. However, the apparent progressivity in the two years is due to the fact that richer households made more out of pocket payments than poor households. This is evidence from Table 2. It can be concluded that the progressivity of OOP in Zambia is at the expense of the poor who could not afford to pay for health care. The study also asserts that the reduction in OOP payments observed between 2004 and 2006 is attributable to the abolition of user fees for rural primary health care in early 2006. This has been validated by another study which found increased health care utilization after abolition of user fees at rural primary health care facilities in the year 2006 (Masiye et al. 2008). In view of the foregoing findings, there is need to cushion households from making out of pocket payments as this may be regressive. Additionally, out-of-pocket payments may be progressive when the poor do not make payments as they cannot afford care. This has been demonstrated in this study. To mitigate these, alternative health financing mechanisms that are more progressive, guarantee access to care by all, and do not require health care users to pay at the point of use of health services should be introduced and promoted. This will reduce the incidence and the amount spent out of pocket by households. Furthermore, there is a need to pursue more

equitable health care financing mechanisms in Zambia which are truly progressive as opposed to OOP payments.

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List of Figures and Tables for the journal article

Table 1: Household Socio-demographic characteristics of the Three LCM Surveys

Survey Year	1998	2004	2006
Approximate Sample Size	16,740	19,000	18,000
Age of Household Head :Mean (SD)	41.4 (14)	41.6 (14)	41.6 (14)
Household Size: Mean (SD)	7.1 (4.0)	6.6 (3.1)	6.4 (2.8)
Female Headed Households n %	3753	4,290	4,223

	22.5	22.1	22.7
Married Household Head n %	12,097 72.4	14,001 72.5	13,275 71.5
Years of Education of Head: Mean (SD)	8.0 (3.3)	8.1 (3.4)	8.2 (3.4)
Working Household Heads n %	8,125 49.0	10,497 54.8	8,829 47.5
Rural Households n %	8,452 51.0	10,402 53.8	9,122 49.0

Table 2 Proportion of Households Reporting Illness, paying OOP and Average OOP paid in the last 2 weeks by Socio-economic status

	% Reporting illness/injury			% Reporting Paying OOP			Mean paid OOP(Kwacha)		
	1998	2004	2006	1998	2004	2006	1998	2004	2006
Socio-economic Status									
Quintile 1	19	19	22	11	15	13	445	3860	1078
Quintile 2	22	19	20	18	18	20	1165	3959	2989
Quintile 3	20	21	20	21	21	20	2475	4859	4568
Quintile 4	20	21	20	25	22	23	4671	9402	7693
Quintile 5	20	20	18	25	23	24	1235	27287	2679
Total	100	100	100	100	100	100	4219	9873	8623

Table 3: Variables used in regression analysis

Variable	Variable definition and description
<b>Dependent variable</b>	
<i>oop</i>	Out of pocket payments (in logistic regression <i>oop</i> =1 if a household paid OOP; 0 = if not) (in tobit regression <i>oop</i> is a continuous variable and left censored at 0)
<b>Independent variables</b>	
<i>hh_size</i>	Number of persons in a household
<i>Location</i>	Location of household (1=Rural; 0= Urban )
<i>age_hh</i>	Age of household head in years
<i>sex_hh</i>	Sex of household head (1=Male; 0= Female)
<i>ms_hh</i>	Marital status of household head (1=Married; 0= Not married)

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<i>Work_hhead</i>	Work status of household head (1= working; 0=Not working)
<i>educ_hh</i>	Maximum number of education of household head
<i>expenditure</i>	Household socio-economic status measured by household expenditure. Quantiles are in ascending order i.e. the first quantile also represents the sub-population with the lowest household expenditure.

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Table 4: Mean OOP payments per adult equivalents by household characteristics in Zambian Kwacha

Household Characteristics	1998	2004	2006
Location of household			
<i>Rural</i>	755	1, 842	1, 762
<i>Urban</i>	2, 321	6, 173	5, 763
Marital status of household head			
<i>Married</i>	1, 330	3, 582	3, 172
<i>Not married</i>	1, 261	3, 405	3, 136
Sex of household Head			
<i>Male</i>	1, 403	3, 617	3, 269
<i>Female</i>	1, 005	3, 233	2, 794
Age of household head			
<25	837	1, 796	1, 680
24-35	1, 364	3, 289	3, 082
34-45	1, 464	3, 732	3, 405
44-55	1, 211	4, 180	3, 281
54-65	1, 335	4, 778	3, 074
>64	1, 244	2, 397	3, 624
Occupation of household Head			
<i>Working/business</i>	2, 091	5, 450	5, 155
<i>Not working</i>	785	2, 086	1, 958
Education of household Head			
<i>Primary</i>	880	2, 079	1, 982
<i>Secondary</i>	1, 809	4, 123	3, 620
<i>Higher</i>	3, 499	11, 963	10, 259
Household expenditure quintiles			
<i>Quintile 1</i>	156	1, 393	383
<i>Quintile 2</i>	411	1, 272	964
<i>Quintile 3</i>	794	1, 647	1, 597
<i>Quintile 4</i>	1, 467	3, 287	2, 704
<i>Quintile 5</i>	4, 170	9, 727	9, 915

Table 5: Equivalent out of pocket payments by household equivalent expenditure quintiles

Years	Expenditure quintiles	Equivalent household OOP payments	Equivalent household expenditure	Equivalent OOP payments % of equivalent expenditure
1998	Quintile 1	156	13,934	1.14
	Quintile 2	411	31,953	1.28
	Quintile 3	794	53,436	1.47
	Quintile 4	1,467	86,633	1.66
	Quintile 5	4,170	239,736	1.75
	Total	1,399	85,122	1.46
	Gini index		0.51998	
	Concentration index	0.55654		
	Kakwani Index	0.03656		
2004	Quintile 1	1,393	31,506	1.63
	Quintile 2	1,272	88,351	1.43
	Quintile 3	1,647	142,567	1.14
	Quintile 4	3,287	229,951	1.47
	Quintile 5	9,727	586,466	1.83
	Total	3,465	215,731	1.50
	Gini index		0.52633	
	Concentration index	0.44646		
	Kakwani Index	-0.0799		
2006	Quintile 1	383	34,672	1.21
	Quintile 2	964	72,682	1.31
	Quintile 3	1,597	121,650	1.30
	Quintile 4	2,704	211,996	1.27
	Quintile 5	9,915	676,883	1.50
	Total	3,112	223,543	1.31
	Gini index		0.5294	
	Concentration index	0.5465		
	Kakwani Index	0.0171		

Table 6 Dominance tests of Lorenz Curve against OOP concentration curve, 1998-2006

Year/quintiles	Cum. Shares of expenditure	Cum. Shares of OOP payments	Diff from exp share (p-values)
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1998			
q20	3.28%	2.24%	0.000
q40	10.82%	8.15%	0.000
q60	23.40%	19.85%	0.000
q80	43.72%	40.43%	0.000
2004			
q20	2.92%	8.03%	0.000
q40	11.10%	15.38%	0.000
q60	24.31%	24.89%	0.4601
q80	45.63%	43.56%	0.1749
2006			
q20	3.10%	2.46%	0.0000
q40	9.60%	8.66%	0.0033
q60	20.49%	18.92%	0.0083
q80	39.46%	36.30%	0.0022

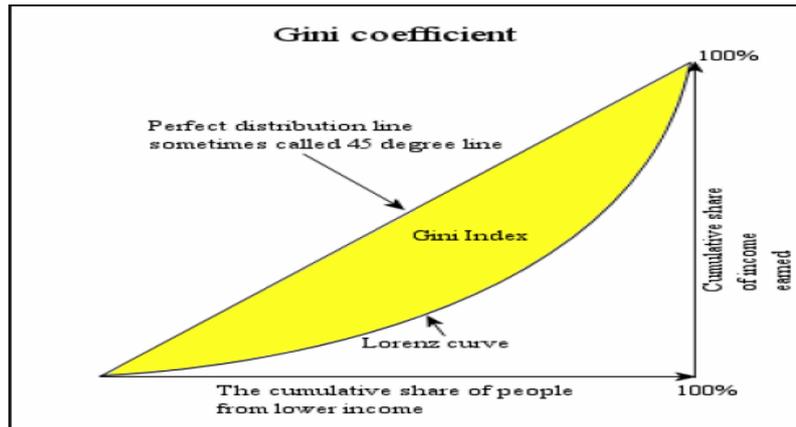
Table 7: Logistic and Tobit Regression for the determinants and size of OOP payments<sup>1</sup>

<i>Variables</i>	Odds of spending OOP/Size of OOP		
	1998	2004	2006
<i>hhsiz</i>	1.07*** 1543***	1.08*** 4602***	1.08*** 6133***
<i>location_hhold</i>	0.96 -1613	0.98 -4440	0.87*** -4668
<i>age_hhead</i>	0.94*** -2	0.96*** 415	0.98 1894
<i>sex_hhead</i>	0.80*** -3298**	0.81*** -15715***	0.82*** -16950**
<i>marital status_hhead</i>	1.35*** 4811***	1.35*** 20134***	1.44*** 32851***
<i>education_hhead</i>	0.98*** -47	0.90*** 627	0.95*** -2274***
<i>working_hhead</i>	1.07 470	0.98 655	0.95 -11038**
<i>expenditure quintiles</i>	1.32*** 7642***	1.20*** 14129***	1.32*** 29228***
<i>constant</i>	-58162***	-151248***	- 251830***
<i>n</i>	14 033	16 763	16 331
<i>Prob&gt;F</i>	0.0000	0.0000	0.0000
***Significant at 1% **Significant at 5% *Significant at 10% Dependent variable: OOP (binary for logistic regression and continuous			

for Tobit regression)

1 First row shows logistic regression results and the second row represents tobit regression results.

Figure 1 Gini Coefficient (Index)



Graphical representation of the Gini coefficient

Figure 2 Lorenz and OOP Payments Concentration Curves, Zambia 1998.

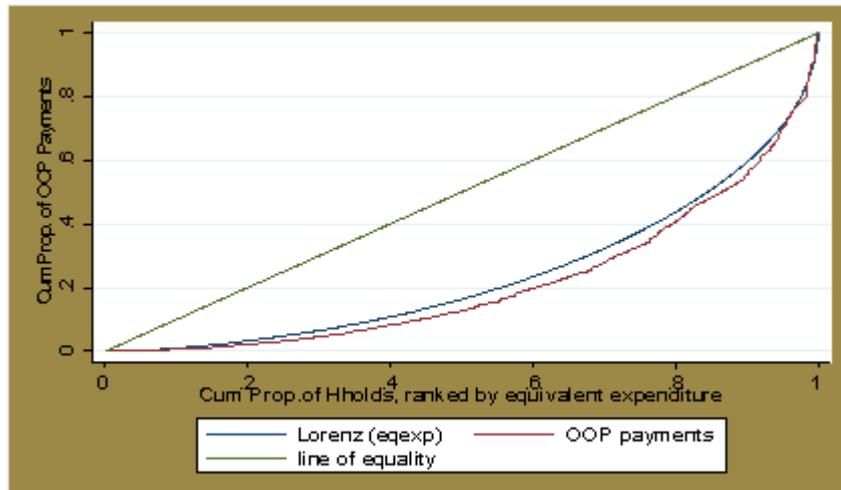


Figure3 Lorenz and OOP payments concentration curves, Zambia 2004

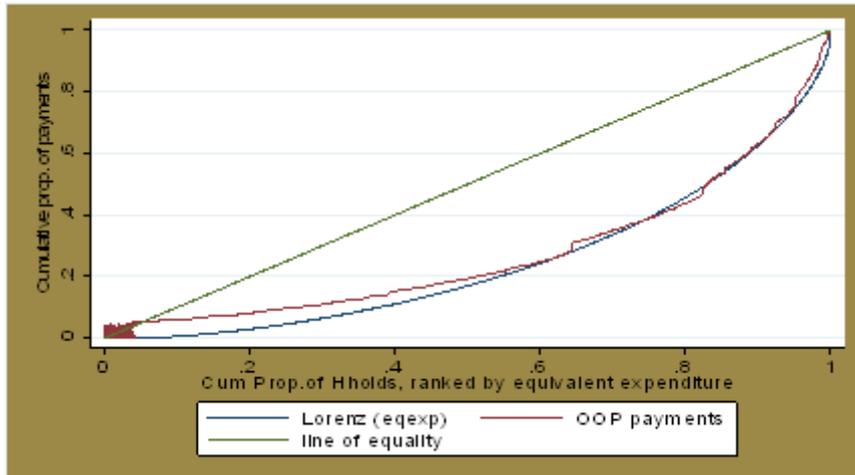
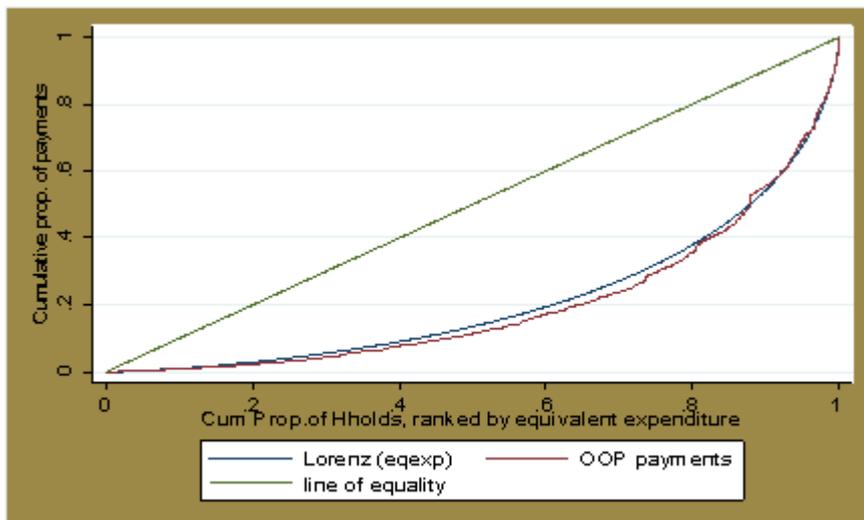


Figure 4 Lorenz and OOP payments concentration curves, Zambia 2006



## **Part D**

## **Appendices**

### **Appendix 1: Acknowledgements**

I am grateful to my supervisor, John E. Ataguba for introducing me to the Tobit model, for the help, discussions and comments rendered throughout the study and for helping me gain confidence in the use of STATA. My data analysis skills have greatly improved. My heartfelt appreciation also goes to Di McIntyre, the South African 'Health and Wealth' research chair and to the Health Economics Unit for sponsoring my programme. Di McIntyre also inspired me to undertake a study related to health care financing which I have come to greatly enjoy. I also wish to acknowledge all my health economics lecturers for teaching me to apply my knowledge of economics to health care, particularly, my Economic Evaluation lecturers, Dr Susan Clearly and Dr Edina Sinanovic for making me understand, among many other things, that gut feeling and educated guesses are not the best in making decisions in health care; Sheetal Shilal and Okore Okorafor, for presenting health econometrics in such a simplified and understandable way; and Prof Lucy Gilson, for introducing me to the policy triangle and its application in health policy processes. I also thank the other lecturers who have imparted the knowledge that I have gained.

Furthermore, I would like to acknowledge the University of Zambia, department of economics for furnishing me with relevant information on current issues in health care financing in the Zambian health sector, particularly, Mr Caesar Cheelo, Dr Felix Masiye, Mr Dale Mudenda and Prof Manenga Ndulo. I also acknowledge the occasional guidance that I have personally received from my first year undergraduate economics lecturer, Mr Mulenga Wake. His help has been instrumental to the direction of my career. Similarly, I acknowledge

the Director of Central Statistics Office, Ms Elfridah Chuulu for giving me consent to use the Living Conditions and Monitoring Survey data for this study.

Very importantly, I express my warm gratitude to my best friend Ng'andwe Kambafwile, who was actually the first person to hint to me that it was not too early for me to pursue a postgraduate qualification while I was still in my final year of undergraduate. I owe her many thanks. Not forgetting the help and support of Dr Henry Kambafwile, and his wife Judith, and children, Kalaba, Chabu and Songwe for helping me settle quickly in Cape Town. This was not easy being my first time living outside Zambia. This helped me concentrate fully on my studies.

Above all I thank the Lord God Almighty who enabled each of us to do what we could.

## Appendix 2: Contributions

The work contained in this thesis is the work of Mwenge Felix (the student) with the help of John E. Ataguba (the supervisor). The student was responsible for the writing of the study proposal, data collection, data analysis, literature search and the final write up. At each of these stages, the supervisor provided guidance in the form of discussions and comments on important aspects of the work.

## Appendix 3a: Logistic regression for the determinants of incidence of out of pocket payments in Zambia-1998

```
logistic oopl hysize Location Age_Hhead Sex_Hhead Marital_Hhead Educ_Hhead Work_Hhead
quintiles
```

```
Logistic regression                               Number of obs   =    14032
                                                    LR chi2(8)      =    652.93
                                                    Prob > chi2     =    0.0000
Log likelihood = -9041.8047                       Pseudo R2      =    0.0348
```

	oopl	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]
hysize		1.071191	.0066837	11.02	0.000	1.058171 1.084371
Location		.9633319	.0437196	-0.82	0.410	.8813435 1.052947
Age_Hhead		.9425047	.0148642	-3.75	0.000	.9138171 .972093
Sex_Hhead		.7951229	.0506916	-3.60	0.000	.7017258 .9009508
Marital_Hhead		1.353367	.0813591	5.03	0.000	1.202942 1.522603
Educ_Hhead		.9182486	.0287529	-2.72	0.006	.8635884 .9763685
Work_Hhead		1.061812	.0494671	1.29	0.198	.9691532 1.16333
quintiles		1.315058	.0199331	18.07	0.000	1.276565 1.354713

## Appendix 3b: Tobit regression for the determinants of size of out of pocket payments in Zambia-1998

```
Tobit oop hysize Location Age_Hhead Sex_Hhead Marital_Hhead Educ_Hhead Work_Hhead quintiles,
ll
```



```

-----
Obs. summary:      9964 left-censored observations at oop<=0
                  6799 uncensored observations
                  0 right-censored observations

```

### Appendix 5a: Logistic regression for the determinants of incidence of out of pocket payments in Zambia-2006

```

logistic oop1 hysize Location Age_Hhead Sex_Hhead Marital_Hhead Educ_Hhead Work_Hhead
quintiles

```

```

Logistic regression                               Number of obs   =    16361
                                                  LR chi2(8)       =    544.93
                                                  Prob > chi2      =    0.0000
Log likelihood = -9857.5123                    Pseudo R2        =    0.0269

```

	oop1	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]	
hysize		1.081312	.0074278	11.38	0.000	1.066852	1.095969
Location		1.150841	.0517491	3.12	0.002	1.053756	1.256871
Age_Hhead		.9789542	.0143139	-1.45	0.146	.9512976	1.007415
Sex_Hhead		.8170794	.0524633	-3.15	0.002	.7204604	.9266558
Marital_Hh~d		1.437437	.0876894	5.95	0.000	1.275447	1.620002
Educ_Hhead		.9513594	.0060372	-7.86	0.000	.9396	.9632659
Work_Hhead		.9522092	.0429907	-1.08	0.278	.8715694	1.04031
quintiles		1.339289	.0222379	17.59	0.000	1.296405	1.383592

### Appendix 5b: Tobit regression for the determinants of size of out of pocket payments in Zambia-2006

```

tobit oop hysize Location Age_Hhead Sex_Hhead Marital_Hhead Educ_Hhead Work_Hhead quintiles,11

```

```

Tobit regression                               Number of obs   =    16361
                                                  LR chi2(8)       =    478.73
                                                  Prob > chi2      =    0.0000
Log likelihood = -73150.836                    Pseudo R2        =    0.0033

```

	oop	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
hysize		6133.419	721.2095	8.50	0.000	4719.77	7547.068
Location		4668.667	4760.454	0.98	0.327	-4662.342	13999.68
Age_Hhead		1894.945	1543.821	1.23	0.220	-1131.112	4921.002
Sex_Hhead		-16950.01	6801.257	-2.49	0.013	-30281.22	-3618.807
Marital_Hh~d		32851.01	6441.556	5.10	0.000	20224.85	45477.16
Educ_Hhead		-2274.555	669.6352	-3.40	0.001	-3587.113	-961.9974
Work_Hhead		-11037.87	4758.863	-2.32	0.020	-20365.76	-1709.984
quintiles		29228.31	1762.011	16.59	0.000	25774.58	32682.05
_cons		-261167.8	10386.85	-25.14	0.000	-281527.2	-240808.4
/sigma		182532	1871.402			178863.9	186200.2

```

-----
Obs. summary:      11288 left-censored observations at oop<=0
                  5073 uncensored observations
                  0 right-censored observations

```

## Appendix 6: construction of household expenditure variables

<i>Variable</i>	<i>Description</i>	<i>Original variable</i>
<i>hid</i>	<i>Household id</i>	
<i>weight</i>	<i>Weight variable for exploration</i>	
<i>oop_drug</i>	<i>OOP on medicines</i>	<i>expmedsn</i>
<i>oop_fee</i>	<i>OOP on consultations</i>	<i>expdocfe</i>
<i>oop_trad</i>	<i>OOP on traditional healers</i>	<i>exptradi</i>
<i>oop_inp</i>	<i>OOP on hospitalization</i>	<i>exphsptl</i>
<i>oop</i>	<i>Total household OOP</i>	
<i>exp</i>	<i>Total household expenditure</i>	
<i>eqoop_eqexp</i>	<i>Proportion of OOP to total expenditure</i>	<i>oop, exp</i>
<i>eqsize</i>	<i>Equivalized household size</i>	<i>hhsiz</i>
<i>eqexp</i>	<i>Equivalized household expenditure</i>	<i>exp, eqsize</i>
<i>eqoop</i>	<i>Equivalized household OOP</i>	<i>oop, eqsize</i>
<i>quintile</i>	<i>Equivalized expenditure quintile</i>	<i>eqexp</i>
<i>rank</i>	<i>Cum. Prop. Hholds</i>	<i>eqexp</i>
<i>oop_cc</i>	<i>OOP concentration curve</i>	<i>eqoop</i>
<i>Lorenz</i>	<i>Lorenz curve</i>	<i>eqexp</i>

```

rename expmedsn oop_drug
rename expmdocfe oop_fee
rename exptradi oop_trad
rename exphsptl oop_inp
egen oop_new = rsum(oop_drug oop_fee oop_trad oop_inp)
egen oop=sum(oop_new),by(hid)...//generates household level OOP variable//
gen eqsize = hhsiz^0.56
gen eqoop = oop/eqsize
gen eqexp_new = exp/eqsize
egen eqexp=sum(eqexp_new),by(hid)..//generates household level exp variable//
gen eqoop_eqexp = eqoop/eqexp
xtile quintile = eqexp [aw=weight], nq(5)

//generating rank, Lorenz and concentration curves variables//
glcurve eqexp [aw=weight], glvar(Lorenz) pvar(rank) lorenz nograph
label variable Lorenz "Lorenz curve"
label variable rank "Cum. Prop. Hholds."
glcurve eqoop [aw=weight], gl(oop_cc) sortvar(eqexp) lorenz nograph
label variable oop_cc "OOP payments"

```

## Appendix 7: Household socio-demographic variables

<i>Variable</i>	<i>Description</i>	<i>Original variable</i>
-----------------	--------------------	--------------------------

<i>Age_Hhead</i>	Age of household head	<i>age</i>
<i>Sex_Hhead</i>	Sex of household head	<i>sex</i>
<i>Marital_Hhead</i>	Marital status of household head	<i>Marital status</i>
<i>Location</i>	Location of household	<i>rururb</i>
<i>Educ_Hhead</i>	Education of household head	<i>education</i>
<i>Work_Hhead</i>	Work status of household head	<i>occupation</i>

```
gen age_Hhead= age if pid==1
gen sex_Hhead= sex if pid==1
gen educ_Hhead= education if pid==1
gen marital_Hhead= marital status if pid==1
gen work_Hhead= occupation if pid==1
```

```
//categorical variable for age of household head//
replace age_Hhead=1 if age_Hhead < 25
replace age_Hhead =2 if age_Hhead > 24 & age_Hhead < 35
replace age_Hhead =3 if age_Hhead > 34 & age_Hhead < 45
replace age_Hhead =4 if age_Hhead > 44 & age_Hhead < 55
replace age_Hhead =5 if age_Hhead > 54 & age_Hhead < 65
replace age_Hhead =6 if age_Hhead > 64 & age_Hhead < 100
```

```
//categorical variable for education of household head//
replace educ_Hhead=1 if educ_Hhead ==0
replace educ_Hhead =2 if educ_Hhead > 0 & educ_Hhead < 8
replace educ_Hhead =3 if educ_Hhead > 7 & educ_Hhead < 13
replace educ_Hhead =4 if educ_Hhead > 12 & educ_Hhead < 19
```

Appendix 8: Estimating mean household equivalent OOP payments per household characteristic

```
tabstat eqoop [aw=weight], by(Age_Hhead) stats(co mean sum)
tabstat eqoop [aw=weight], by(Sex_Hhead) stats(co mean sum)
tabstat eqoop [aw=weight], by(Marital_Hhead) stats(co mean sum)
tabstat eqoop [aw=weight], by(Location) stats(co mean sum)
tabstat eqoop [aw=weight], by(Educ_Hhead) stats(co mean sum)
tabstat eqoop [aw=weight], by(Work_Hhead) stats(co mean sum)
tabstat eqoop [aw=weight], by(quintile) stats(co mean sum)
```

Appendix 9: Estimating mean equivalent household expenditure and mean equivalent OOP expenditure proportion of mean equivalent household expenditure per quintile

```
tabstat eqexp [aw=weight], by(quintile) stats(co mean sum)
tabstat eqoop_eqexp [aw=weight], by(quintile) stats(co mean sum)
```

Appendix 10: Estimating Lorenz and OOP concentration curves

```

glcurve eqexp [aw=weight], lorenz plot(line oop_cc rank, legend(label(2 "OOP payments"))) ||
//line rank rank, legend(label(3 "line of equality"))) //
yti(Cumulative prop. of payments) xti("Cum Prop.of Hholds, ranked by equivalent
expenditure")

```

#### Appendix 11: Estimating OOP concentration index

```

egen raw_rank=rank(eqexp), unique
sort raw_rank
quietly sum weight
gen wi=weight/r(sum)
gen cusum=sum(wi)
gen wj=cusum[_n-1]
replace wj=0 if wj==.
gen rank1=wj+0.5*wi

```

```

qui sum oop_cc [aw=weight]
scalar mean=r(mean)
cor oop_cc rank1 [aw=weight], c
sca c=(2/mean)*r(cov_12)
sca list c

```

#### Appendix 12: estimating Gini coefficient

```

qui sum Lorenz [aw=weight]
scalar mean=r(mean)
cor Lorenz rank1 [aw=weight], c
sca c=(2/mean)*r(cov_12)
sca list c

```

#### Appendix 13: testing for dominance of Lorenz and OOP concentration index

```

dominance eqoop [aw=weig], shares(quintiles) sort(eqexp)

```

#### Appendix 14: estimating determinants of incidence and size of OOP payments

```

logistic oop hhsz location age_Hhead sex_Hhead ms_hh educ_Hhead work_Hhead
quintiles

```

```

tobit oop_1 hhsz location age_Hhead sex_Hhead ms_hh educ_Hhead work_Hhead
quintiles, ll

```

Appendix 15: Background and Sample design methodology of the Living Conditions Monitoring Survey (Central Statistical Office, 2006)

---

### **Survey Background**

The Structural Adjustment Programme (SAP) that the government of Zambia had implemented since 1991 has had some successes and shortcomings. Some components of the programme such as privatisation have been implemented at record pace. Others such as liberalization of agricultural marketing have not completely taken root. It is generally acknowledged that which ever is the case, a substantial segment of the population is still adversely affected by the cost of reforming the Zambian economy. It is from this realisation that the Zambian government and it's cooperating partners decided to put in place a monitoring and evaluation mechanism in 1991, which was implemented through the conduct of the Social Dimensions of Adjustment Surveys (SDAs).

The Living Conditions Monitoring Surveys (LCMS) evolved from the Social Dimensions of Adjustment Priority surveys conducted in 1991 (PSI) and 1993 (PSII), by the Central Statistical Office. So far, four Living Conditions Monitoring Surveys have been conducted.

These are: -

- (i) The Living Conditions Monitoring Survey I of 1996
- (ii) The Living Conditions Monitoring Survey II of 1998
- (iii) The Living Conditions Monitoring Survey III of 2002/2003, and
- (iv) The Living Conditions Monitoring Survey IV of 2004

### **Objectives of the LCMSIV Survey**

Since 1991, the country has been utilizing cross-sectional sample data to monitor the well-being of the Zambian population, as was the case with the 1996 and 1998 LCMS surveys. However, in 2002/2003 a different methodology was employed to collect and analyse data. The survey was designed to collect data for a period of 12 months, to take into account seasonal effects.

The Living Conditions Monitoring Survey IV (LCMSIV) was intended to highlight and monitor the living conditions of the Zambian society. The survey included a set of priority indicators on poverty and living conditions that could easily be compared to previous surveys such as the 1998 LCMS(II)

The main objective of the Living Conditions Monitoring Survey IV (LCMSIV) is to provide the basis for comparison of poverty estimates derived from cross-sectional survey data. In addition, the survey provides a basis on which to: -

- Monitor the impact of government policies and donor support on the well being of the Zambian population.
- Monitor poverty and its distribution in Zambia.
  
- Provide various users with a set of reliable indicators against which to monitor development.
  
- Identify vulnerable groups in society and enhance targeting in policy implementation.

For the purpose of computing indicators to meet the stated objectives, the LCMSIV questionnaire included the following topics:-

- Demography and migration
- Household Amenities and Housing Conditions
- Orphan hood
- Health
- Education
- Economic Activities
- Income
- Household Assets
- Household Access to facilities
- Self-assessed poverty and household coping strategies, and
- Agricultural production

### Sample Design and Coverage

The Living Conditions Monitoring Survey IV had a nationwide coverage on a sample basis. It covered both rural and urban areas in all the nine provinces. The survey was designed to provide data for each and every district in Zambia. A sample size of about 1048 SEAs and approximately 20,000 households was drawn.

### Sample Stratification and Allocation

The sampling frame used for LCMSIV survey was developed from the 2000 Census of Population and Housing. The country is administratively demarcated into 9 provinces, which are further divided into 72 districts. The districts are further subdivided into 155 constituencies, which are also divided into wards. Wards consists of Census Supervisory Areas (CSA), which are further subdivided into Standard Enumeration areas (SEAs). For the purposes of this survey, SEAs constituted the ultimate Primary Sampling Units (PSUs).

In order to have equal precision in the estimates in all the districts and at the same time take into account variation in the sizes of the district, the survey adopted the Square Root sample allocation method, (Lesli Kish, 1987). This approach offers a better compromise between equal and proportional allocation methods in terms of reliability of both combined and separate estimates. The allocation of the sample points (PSUs) to rural and urban strata was almost proportional.

### Sample Selection

The LCMSIV survey employed a two-stage stratified cluster sample design whereby during the first stage, 1048 SEAs were selected with Probability Proportional to Estimated Size (PPES). The size measure was taken from the frame developed from the 2000 Census of Population and Housing. During the second stage, households were systematically selected from an enumeration area listing. The survey was designed to provide reliable estimates at district, provincial, rural/urban and national levels.

### Selection of Standard Enumeration Areas (SEAs)

The SEAs in each stratum were selected as follows:

- (i) Calculating the sampling interval (I) of the stratum.

$$I = \frac{\sum_i M_i}{a}$$

Where:

$\sum_i M_i$  = is the total stratum size

$a$  = is the number of SEAs allocated to the stratum

- (ii) Calculate the cumulated size of the cluster (SEA)
- (i) Calculate the sampling numbers  $R, R+I, R+2I, \dots, R+(A-1)I$ , where  $R$  is the random start number between 1 and  $I$ .
- (iv) Comparing each sampling number with the cumulated sizes

The first SEA with a cumulated size that was greater or equal to the random number was selected. The subsequent selection of SEAs was achieved by comparing the sampling numbers to the cumulated sizes of SEAs.

#### Selection of Households

The LCMSIV survey commenced by listing all the households in the selected SEAs. In the case of rural SEAs, households were stratified and listed according to their agricultural activity status. Therefore, there were four explicit strata created in each rural SEA namely, the Small Scale Stratum (SSS), the Medium Scale Stratum (MSS), the Large Scale Stratum (LSS) and the Non-agricultural Stratum (NAS). For the purposes of the LCMSIV survey, about 7, 5 and 3 households were supposed to be selected from the SSS, MSS and NAS, respectively. The large scale households were selected on a 100 percent basis. The urban SEAs were implicitly stratified into low cost, medium cost and high cost areas according to CSO's and local authority classification of residential areas.

About 15 and 25 households were sampled from rural and urban SEAs, respectively. However, the number of rural households selected in some cases exceeded the desired sample size of 15 households depending on the availability of large scale farming households.

The selection of households from various strata was preceded by assigning fully responding households sampling serial numbers. The circular systematic sampling method was used to select households. The method assumes that households are arranged in a circle (G. Kalton, 1983) and the following relationship applies:

$$\text{Let } N = nk,$$

Where:

$N$  = Total number of households assigned sampling serial numbers in a stratum

$n$  = Total desired sample size to be drawn from a stratum in an SEA

$k$  = The sampling interval in a given SEA calculated as  $k=N/n$ .

## Data Collection

Data collection was done by way of personal interviews using a structured questionnaire. The questionnaire was designed to collect information on the various aspects of the living conditions of the households.

## Estimation Procedure

### Sample weights

Due to the disproportionate allocation of the sample points to various strata, sampling weights are required to correct for differential representation of the sample at national and sub-national levels. The weights of the sample are in this case equal to the inverse of the product of the two selection probabilities employed.

Therefore, the probability of selecting an SEA was calculated as follows:

$$P_{hi}^1 = \frac{a_h M_{hi}}{\sum_i M_{hi}}$$

Where:

$P_{hi}^1$  = the first selection probability of SEAs

$a_h$  = The number of SEAs selected in stratum h

$M_{hi}$  = The size (in terms of the population count) of the ith SEA in stratum h

$\sum_i M_{hi}$  = The total size of the stratum h

The selection probability of the household was calculated as follows:

$$P_{hi}^2 = \frac{n_{hi}}{N_{hi}}$$

Where:

$P_{hi}^2$  = the second selection probability of households

$n_{hi}$  = the number of households selected from the i<sup>th</sup> SEA of h stratum

$N_{hi}$  = Total number of households listed in a SEA

Therefore, the SEA specific sample weight was calculated as follows:

$$W_i = \frac{1}{P_{hi}^1 \times P_{hi}^2}$$

$W_i$  is called the PPS sample weight. In the case of rural SEAs which have more than one stratum, the first selection probability is multiplied with separate stratum specific second

selection probabilities. Therefore, the number of weights in each rural SEA depends on the number of strata available.

#### Estimation Process

In order to correct for differential representation, all estimates generated from the LCMSIV survey data are weighted expressions. Therefore, if  $y_{hij}$  is an observation on variable Y for the  $j^{\text{th}}$  household in the  $i^{\text{th}}$  SEA of the  $h^{\text{th}}$  stratum, then the estimated total for the  $h^{\text{th}}$  stratum is expressed as follows:

$$Y_{hT} = \sum_{i=1}^{a_h} w_{hi} \sum_{j=1}^{n_h} y_{hij}$$

Where:

$Y_{hT}$  = the estimated total for the  $h^{\text{th}}$  stratum

$i = 1$  to  $a_h$ : the number of selected clusters in the stratum

$j = 1$  to  $n_h$ : the number of sample households in the stratum

The national estimate is obtained using the following estimator:

$$Y_T = \sum_{k=1}^{72} Y_{kT}$$

Where:

$Y_T$  = the national total estimate

$k = 1$  to  $72$ : the total number of strata (i.e. 72 districts).

#### Data Processing and Analysis

The data from the LCMSIV survey was processed and analysed using the CSPRO and the Statistical Analysis System (SAS) softwares respectively. Data entry was done from all the provincial offices with 100 percent verification, whilst data cleaning and analysis was undertaken at CSO's headquarters.

## **Part E**

## **Policy Brief**

---

# **Progressivity and determinants of out-of-pocket health financing in Zambia**

By

Felix Mwenge

*Executive Summary*

*The cost sharing policies that were implemented in the health sector in Zambia at the onset of the 1990s left health care seekers throughout the country looking in their pockets for money to pay for health services at the point of use. With the continued collapse of the Zambian economy two decades prior to the new policy which resulted into massive unemployment, declining per capita incomes and increased household poverty, one wonders if paying for health care in this way can favor the poor populations and promote the objective of equity in health care financing so desired in many health systems around the world.*

## **INTRODUCTION**

Out of pocket payments is one of the single largest sources of health care financing in Zambia and the rest of sub-Saharan Africa. Paying for health care in this way involves direct payments at the point of use of health services. However, out of pocket payments may be inequitable in the sense that health seekers pay the same amount regardless of having different initial incomes or total resources. Ideally, health care financing mechanisms should recognize that people differ in their ability to pay. Hence, health care payments should be progressive. Progressive means that those who have more resources should contribute proportionally more to health care financing while those with fewer resources should contribute proportionally less. The main purpose of this research was to find out whether out of pocket payments are related to the total amount of resources one has in Zambia. When this is the case health payments are termed as progressive. It also tries to assess the characteristics of households who make out of pocket payments and how these payments are distributed among households between the years 1998 and 2006.

## **RESULTS**

One important aspect of this study is the findings concerning the difference in the prevalence of out of pocket payments between rural and urban families in Zambia. Table 1 shows the average amounts paid out of pocket per person in rural and urban households for the years 1998, 2004 and 2006.

Table 1: Average amounts paid out of pocket for health care per person by location of household in Zambian Kwacha<sup>2</sup>

Location	1998	2004	2006
----------	------	------	------

<sup>2</sup> exchange rates for 1998, 2004 and 2006 are K2388, K4772 and 3602 per US\$1 respectively

Rural	755	1, 842	1, 762
Urban	2, 321	6, 173	5, 763
All Zambia	1,322	3,532	3,157

It can be seen that on average, households in rural areas spent less out of pocket compared to households in urban areas for all three years. This is because some households in rural areas may not have used health services as they may be unable to afford payments. The absolute amount spent OOP was however largest in 2004 compared to the other two years for both rural and urban areas. This decrease in out of pocket payments especially between 2004 and 2006 can be attributed to the abolition of user fees by government in early 2006 in all primary health facilities. This is an important finding of the study which suggests that removing user fees from health facilities is one way of reducing out of pocket payments.

Table 2: Proportion of households paying OOP and Average amounts paid out of pocket for health care per person by socio-economic group

	% Reporting Paying OOP			Mean paid OOP(Kwacha <sup>1</sup> )		
	1998	2004	2006	1998	2004	2006
<b>Socio-economic group</b>						
Poorest 20% of the population	11	15	13	156	1, 393	383
Second Poorest 20%	18	18	20	411	1, 272	964
Middle 20%	21	21	20	794	1, 647	1, 597
Second richest 20%	25	22	23	1, 467	3, 287	2, 704
Richest 20% of the population	25	23	24	4, 170	9, 727	9, 915
All Zambia	100	100	100	1, 399	3, 465	3, 112

The study also found that richer households paid more out of pocket compared to poorer households as shown in table 2. It also shows that in all the years, individuals from the poorest 20% of the population spent the least amount out of pocket while those from richest 20% of the population spent the greatest amounts. This is usually the case as richer

households tend to be able to afford to pay out of pocket compared to their poorer counterparts.

Another important aspect of the findings of this study is the relationship between out of pocket payments and total household expenditure. It is generally accepted by health economists that higher income groups pay more of their income than lower income groups. If health payments are distributed in this way i.e. higher-income groups contribute a larger percentage of their income to financing health care than lower-income groups, they are said to be progressive. If the opposite is true, that is, higher-income groups contribute a smaller percentage of their income than lower-income groups, the system is called regressive. A good example of progressive contributions in Zambia is 'pay as you earn' (PAYE) which increases with the more money an individual earns. OOP payments should ideally follow this pattern for them to be considered equitable.

The study also identified characteristics of households or individuals in Zambia who are likely to pay out of pocket payments. Among them is household income (i.e. ability to pay). In other words, income or the amount of resources a person has determines whether he/she can afford to pay out of pocket for health care. The study also found that most Zambians with high income can afford to pay out of pocket compared with those with low income. Those who lived in rural Zambia in 2006 were less likely to pay out of pocket than those who lived in urban areas. This is obviously due to the abolition of user fees for primary health care in rural areas of Zambia in 2006. Additionally, if a family is large such a household is more likely to spend out of pocket than if the family is small. In 1998 and 2004 households headed by older persons were less likely to incur OOP payments compared to those headed by younger persons.

## **CONCLUSION**

In conclusion, out of pocket payments in 1998 and 2004 were apparently related to ones total resources in Zambia. This is desirable and is required for a health financing system to be termed as equitable. It implies that well to do families contributed to health care based on how much they had and the same was true for the poor regardless of how much health care they each needed. However, this relationship only appears so because well to do families in Zambia are the ones who made the most out of pocket payments for health care in the two

years. This is demonstrated in Table 2. Meaning that health payments could not be related to households' total resources had the poor households made as much health payments as did the rich. This happens because the majorities of the people in Zambia are poor and do not use health services because they cannot afford to pay out of pocket. Hence the observed relationship can be said to be so at the expense of the poor. The study also observed a reduction in OOP payments between 2004 and 2006. This was attributed to the abolition of user fees for rural primary health care in early 2006. At the same rural households were likely to pay less out of pocket compared to urban households. This is mainly because it is common in rural areas for people to self treat or seek alternative sources of care because they cannot afford to pay at health facilities. In view of the foregoing findings, there is need to find alternative ways of paying for care in Zambia where payments will be truly related to ones resources whether or not the poor have participated in paying for care. It is also important that families in Zambia are cushioned from making out of pocket payments as this may not be related to ones resources which is unfair especially for the poor. Alternative health financing mechanisms that guarantee access to care by all, and do not require health care users to pay at the point of use of health services should also be introduced and promoted in Zambia. This will reduce the total amount of money families spend out of pocket. The study also showed that out of pocket payments reduced after abolition of user fees in primary facilities in the rural areas in 2006. This indicates that fee removal can be an effective way of reducing out of pocket spending for families and hence it should be recommended.

