FACTORS DETERMINING VOLUNTARY HEALTH INSURANCE OWNERSHIP IN ZAMBIA

by

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DECLARATION

This dissertation is my original work and has not been presented for a degree in any other university.

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APPROVAL

This dissertation of Bevan Kaunda has been approved as partial fulfillment of the requirement for the award of the Master of Arts degree in Economics by the University of Zambia

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ABSTRACT

In Zambia, the majority of people seek health care from public health facilities but evidence suggests that the poor still incur high out-of-pocket payments for health. Despite the government's efforts to provide free primary health care, health spending for secondary health care is still high, and this disproportionately affects the poor. In order to protect households from catastrophic health payments at the point of seeking care and to increase access to health services, the government intends to introduce the National Health Insurance to complement the existing voluntary health insurance. Currently, only 3.9 per cent of households have some form of health insurance in Zambia, and this is done on voluntary basis. Although several studies have been conducted in both developing and developed countries, there is limited evidence in the Zambian context on what determines health insurance ownership. This paper examines the factors that determine voluntary health insurance ownership in Zambia. Specifically, the paper establishes the socio-economic factors, demographic factors, and health status that are associated with ownership of health insurance. The study uses data from the 2014 Zambia Household Health Expenditure and Utilization Survey, which is nationally representative. We estimate a probit regression model to identify the factors associated with health insurance ownership. The results show that the level of education, employment status, region of residence, marital status, household size, and household expenditure are significantly associated with health insurance ownership in Zambia. Education, marital status and employment status were found to significantly increase the probability of owning health insurance. Moreover, study findings revealed that households that spend relatively more on goods and services were more likely to own health insurance. However, those households with relatively bigger family size and those residing in rural areas were less likely to own health insurance. The study further established that gender, age, and health status did not significantly determine health insurance ownership in Zambia. As the Zambian government introduces the national health insurance, policies that improve educational attainment and employment creation are likely to have an influence on the health insurance coverage, particularly in the context of a large informal sector.

Key words: Insurance, Voluntary Health Insurance, Zambia.

DEDICATION

This study is dedicated to my parents, Mr. Charles M. Kaunda and the late Mrs. Maureen Chongo-Kaunda (MHSRIEP).

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DEFINITION OF KEY TERMS

- **Health Insurance:** Health insurance is insurance against medical expenses and loss of earnings due to accident or illness.
- **Health Insurance Policy:** The type and amount of healthcare costs that will be covered by the health insurance provider and are specified in writing in a member contract.
- **Premium:** An amount paid periodically to the insurer by the insured for an insurance policy.
- **Catastrophic expenditure:** These are health expenditures exceeding 40 per cent of the households' non-food expenditures i.e. of total expenditures after adjusting for expenditures on food.
- **Impoverishment:** The state or process of becoming poor as a result of expenditures on healthcare.
- **Out-of-pocket payment:** Direct payment made by an individual to health care providers at the time of service use and is not reimbursed.
- **User-fee:** Charge levied at the point of use for any aspect of health services; registration fee, consultation fee, fees for drugs and medical supplies or any health service rendered.
- **Health Financing:** Function of the health system concerned with the mobilization, accumulation and allocation of money to cover the health needs of people, individually or collectively, in the health system.

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ACRONYMS

BHCP	Basic Health Care Package
CSO	Central Statistical Office
DAH	Development Assistance for Health
GGE	General Government Expenditure
GHE	General Health Expenditure
LMICs	Low and Middle Income Countries
MoH	Ministry of Health
NHI	National Health Insurance
NHSP	National Health Strategic Plan
OOP	Out-of-Pocket
SHI	Social Health Insurance
THE	Total Health Expenditure
UHC	Universal Health Coverage
USD	United States Dollar
WB	World Bank
WHO	World Health Organization
VHI	Voluntary Health Insurance
ZMW	Zambian Kwacha

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Health services cost money and someone has to pay. Even with the recent increase in external funds for health in Low-and-Middle Income Countries (LMICs), these countries still have to find almost 75 per cent of their health funding in domestic sources (WHO, 2016). The way that countries raise those funds is critical. Direct payments required when people obtain care (e.g. user charges) prevent many people from seeking care in the first place, and may result in financial catastrophe, even impoverishment, for many. Improving universal coverage requires systems that raise the bulk of funds through forms of prepayment (e.g. taxes and/or insurance), and then pool these funds to spread the financial risk of illness across the population. They require health financing systems with inbuilt incentives to ensure that these funds are used efficiently and equitably (WHO, 2010).

Voluntary Health Insurance (VHI) can be defined as a prepaid pooling arrangement that receives voluntary funds and pools them separately. The decision to obtain such coverage is not required by government but is rather a decision made by individuals, households, or private companies (Jowett and Kutzin, 2015). As such, VHI differs from a compulsory insurance mechanism (social health insurance is the most common form) under which membership and payment of contributions are made obligatory by the government (by law) for some or all of the population (OECD/Eurostat/WHO, 2011).

Because it is voluntary does not mean that VHI is always privately run. It can be provided by various types of organizations, including both commercial and not-for-profit health insurance companies, enterprises that run their own insurance arrangements for their employees, non-governmental organizations or other local entities that operate community based health insurance, and even government agencies. In some cases, however, governments do provide funding for VHI, either directly (e.g. private medical scheme coverage as a negotiated employee benefit for civil servants, as in South Africa) or indirectly by granting tax allowances (deductions or tax credits)

for the purchase of VHI. Thus, VHI can be funded from both public and private sources (Mathauer and Kutzin, 2018).

However, there has been a wave in most LMICs to adopt Social Health Insurance (SHI) initiatives. In May 2005, the World Health Assembly passed a policy resolution for the World Health Organization (WHO) whereby WHO would use SHI as the strategy for mobilizing more resources for health, pooling risk, providing more equitable access to health care for the poor, and delivering better quality health care (WHO, 2005). The WHO is encouraging its member states to move ahead with SHI and will provide technical support to help nations develop SHI. In addition to its capacity to mobilize additional funds for health care, SHI is also being touted by several international aid agencies, including the World Bank, the WHO, and the German Agency for Technical Cooperation, as a policy instrument that could help facilitate or stimulate desirable outcomes in the health sector.

There is a similarity in the factors that determine VHI and SHI. A country's level of economic development and its economic structure influence how many people can be covered and how rapidly SHI can expand toward universal coverage. Specifically, the factors that contribute positively to an enabling environment for SHI include large formal sector employment, high wages and salaries, low poverty rate, small household size, strong human resource capacities, strong administrative support, and government capacity to regulate (Hsiao and Shaw, 2007). These are similar to the factors that determine uptake of private health insurance, Mathur (2015). The success or failure of both VHI and SHI is crucially determined by a sound economy.

The major constraint arising from funds shortage in most developing countries is that the strategies and mechanisms that underpin health financing systems pose problems. In about half of African countries, 40 per cent or more of the total health expenditure constitutes of household out-of-pocket payments, which is the most regressive way of funding health care (WHO, 2016). The reliance on this payment mechanism creates financial barriers to accessing health services and puts people at the risk of impoverishment. Furthermore, the current financial flows within the health systems are creating and exacerbating inefficiencies and inequities, for example through skewed allocation of funds to urban areas and specialized care. The need to develop strong health financing

systems is thus a common objective of all countries. In LMICs, which are where the vast majority of African countries are ranked, scarcity of funds for health is an even more acute problem. The average total health expenditure in African countries stood at US$ 114 per capita in 2015, which is only a small fraction of the US$ 4908 spent on health in an average high-income country (WHO, 2016).

Additionally, the final goals of the health system as a whole as considered by the World Health Organization (WHO) are health equality, health status, responsiveness of the health system to the individual's non-medical expectation and fairness in financial contribution. Fairness in financial contribution for health occurs when healthcare expenditures of households are distributed in accordance with the ability to pay rather than the cost incurred as a result of illness. Therefore, a national health system should raise funds for healthcare in ways that ensure that people can use the needed healthcare services and are protected from impoverishment arising from having to pay for such services, (Adebayo *et al.,* 2014).

However, over the past two decades, many LMICs have found it progressively more difficult to maintain sufficient financing for healthcare. As a result, out-of-pocket (OOP) payments remain high i.e. 60 per cent to 70 per cent of health expenditure is paid by households directly (out-of-the-pocket expenditure) to healthcare providers, compared with an average of 46 per cent worldwide. These high OOP may result in catastrophic expenditure and impoverishment, forcing those households to sell their property, get into debt (Leive and Xu, 2008) or take their children out of school (Landmann and Frölich, 2013) to cover their medical costs. Each year, 6 per cent of the world's population falls into extreme poverty for health reasons.

In Zambia, with a view to reducing financial barriers to access particularly among the poorest sections of the population, the government abolished user fees on primary healthcare, beginning with rural areas in 2006 and extended the policy to urban areas in 2011. However, despite these measures, 10 per cent of households still suffer financial catastrophe due to OOP payments for health, and it is even higher among the poor, (Masiye *et al.,* 2016).

Moreover, following the recent call for countries to ensure universal coverage of the population with essential healthcare services, the Zambian government is in the process of implementing the National Health Insurance (NHI) and has proposed to allocate ZMW10.7 million in the 2019 national budget towards the operationalization of the scheme (MOF, 2018). Apart from increasing health insurance coverage in the country, the National Health Insurance is anticipated to increase the resource envelope for health and will complement the existing health financing mechanisms with a view to attaining universal health coverage (GRZ, 2006; MOH, 2016; MNDP, 2016; GRZ; MOF, 2014).

Among other financing mechanisms, health insurance is set up to provide financial risk protection and to mobilize resources to avert impoverishment that may arise from paying OOP for healthcare, (Adebayo *et al.,* 2014). Health insurance is also intended to reduce the financial burden of purchasing health care by pooling funds and sharing the risk of unexpected health events. Risk sharing mechanisms are particularly important in Sub-Saharan Africa where most countries dedicate insufficient resources to health care and most health needs, including medicines, are financed through OOP (Carapinha *et al.,* 2010). Health insurance is formally defined as "coverage that provides for the payments of benefits as a result of sickness or injury. It includes insurance for losses from accident, medical expense, disability, or accidental death and dismemberment" (WHO, 2018).

Following the recent call for countries to ensure universal coverage of the population with essential healthcare services, the need arose to provide health insurance to the large informal sector in LMICs. Health insurance has also the potential to increase utilization and affordability of healthcare especially among the poor and vulnerable population. Through health insurance, risks are shared and financial inputs pooled by way of contributions, for example, from salaries or taxation. However, health insurance coverage still remains very low in many LMICs, a situation which is compounded by the large informal sector workers and rural populace in these countries. Increasing access to affordable healthcare is essential for achieving the Universal Health Coverage (UHC), which aims to ensure equity of access to quality affordable healthcare for all, (Adebayo *et al.,* 2014).

Furthermore, health insurance serves two primary functions for individuals. First, insurance secures financial access to health care for individuals both for preventive services and/or treatment and palliation in the setting of disease or injury. Second, insurance evens the costs of those services, protecting against potentially devastating economic shocks that can occur as a result of care-seeking for illness especially among the poor. For these reasons, improving access to insurance coverage has recently become a goal of health policy to improve health and well-being and reduce the financial burden of disease in LMICs, (El-Sayed *et al.,* 2018).

These efforts have largely focused around the effort to achieve UHC in LMICs, which has become an important centerpiece of global health policy. A recent United Nations resolution, for example, "recognizes the responsibility of governments to urgently and significantly scale up efforts to accelerate the transition towards universal access to affordable and quality health-care services". Universal Health Coverage is one of the health goals in the new Sustainable Development Goals (Ibid).

Unlike countries such as South Africa, Namibia, Rwanda, and Nigeria where both voluntary and compulsory health insurance industries are functional (Giedion *et al.,* 2012; Spaan *et al.,* 2012), Zambia has no compulsory health insurance as a source of funding for the health sector. However, there are private health insurance firms that offer insurance to individuals and companies. This insurance cover is on voluntary basis for both the formal and informal sector though the coverage is as low as 3.9 per cent for the entire population (MOH ,2014).

1.2 Statement of the problem

Despite government's move to abolish user fees on all primary healthcare services countrywide, there is still relatively high incidence of financial catastrophe, particularly among the poor due to seeking care. Masiye *et al.,* (2016) found that 10 per cent of Zambian households still suffer financial catastrophe due to OOP payments and it is even higher among the poor. The authors found that the burden of OOP expenditure remains considerably higher among the poorest households. The study results also showed that the cost of long distances to facilities hurts the poor more because the poor are more likely to live farther away from health facilities and that some patients reported OOP payments for registration, consultation, drugs or diagnostic services, and so

on, at public primary healthcare facilities, which should be free, is a worrying phenomenon. Further, the pro-poor policy shift has not benefited the poor, who still need to pay high fees in order to access secondary health care and other OOP payments that are incurred (MOH, 2011).

The problem is further compounded as health insurance coverage among households in Zambia is very low only accounting for about 3.9 per cent of individuals out of the entire population and is offered on voluntary basis. A larger proportion of 96.1 per cent of households are without any form of insurance cover, and most of these are in the informal sector (MOH, 2014).

Due to the critical role that health insurance plays in protecting access to health care, there is need to examine the factors associated with the low coverage of ownership of health insurance among households in Zambia. The findings from the study may be useful for informing policy making that is aimed at increasing health insurance coverage to ensure that most households, especially the poor, are protected from financial consequences that comes with accessing health services.

1.3 General Objective

The main objective of this study is to examine the factors associated with voluntary health insurance ownership in Zambia

1.4 Specific Objectives

i. To determine the relationship between socio-economic factors and voluntary health insurance ownership in Zambia.

ii. To examine the relationship between demographic factors and voluntary health insurance ownership in Zambia.

iii. To establish if health status is associated with voluntary health insurance ownership in Zambia.

1.5 Research hypotheses

i. **Null**: There is no relationship between employment status and health insurance ownership in Zambia.

   Alternative: The employed are more likely to have health insurance than those that are not employed in Zambia.

ii. **Null**: Sex of individual has no relationship with health insurance ownership in Zambia.

   Alternative: Females are more likely to have health insurance ownership than male individuals in Zambia.

iii. **Null**: Education has no relationship with health insurance ownership in Zambia.

   Alternative: Individuals with formal education are more likely to have health insurance than those without any education in Zambia.

iv. **Null**: There is no relationship between health status and health insurance ownership in Zambia.

   Alternative: There is a positive relationship between health status and health insurance ownership in Zambia.

1.6 Significance of the Study

In low-and-middle income countries, health insurance is increasingly recognized as a promising tool for the financing of equitable health care. By pooling risks and resources it promises to ensure better access and provide risk protection to poor households against the cost of illness, (Preker *et al.,* 2002). Moreover, in developing countries, the cost of health care financing is one of the biggest social challenges and OOP present significant drains on household spending patterns, making health insurance one of the best social interventions. However, health financing is challenged by a number of problems such as public under-funding, high user fees and informal payments, causing the poor to be deprived of health care (Kumi-Kyereme and Amo-Adjei, 2013).

There is a dearth of literature in the Zambian context on the factors that determine health insurance ownership among households using a nationally representative survey data. Most studies in health financing have focused on analyzing the effects and association of user fees removal vis-à-vis access to health services in Zambia (Masiye and Kaonga, 2016; Masiye *et al.*, 2016; Chama-Chiliba and Koch, 2016; Hangoma *et al*., 2018; Lépine *et al.*, 2017) and health financing more broadly (Masiye *et al.*, 2005) and Chibuye (2010). Understanding the factors associated with health insurance may assist in designing of targeted health insurance messages to increase coverage as the country begins to implement the National Health Insurance in 2019. More broadly, the study will contribute to the literature on the voluntary health insurance in developing countries.

1.7 Organization of Dissertation

This dissertation is structured in six chapters. Chapter one is the introduction. Chapter two briefly discusses health financing in Zambia with focus on the major sources of health financing. Chapter three highlights some of the literature related to this study. It begins by bringing out the conceptual framework that attempts to explain why families use health services. The chapter then looks at some of the theoretical literature on health insurance and then proceeds to review empirical literature conducted by other scholars on health insurance. The section ends by summarizing the empirical literature and reviews the methods used in these studies. Chapter four focusses on the methodology and highlights the model used to undertake the study. It also discusses the source of the data used in the study and the definition of variables used. Chapter five presents the results and also discusses the results of the study in detail. Chapter six, is the final chapter and it discusses the conclusion of the study and policy recommendations.

CHAPTER TWO

A BRIEF OVERVIEW OF HEALTH FINANCING IN ZAMBIA

2.1 Healthcare Financing Country Profile

Zambia's health financing policy is based on the rights based approach that considers health as a basic human right that should not only be availed but also accessible to all. This policy presumes a Basic Health Care Package (BHCP) which defines a set of basic health care services expected to be delivered at various levels of the health care delivery system. The BHCP is assumed to be the basis of the health system with cost-effective, evidence-based and affordable long term interventions that are complemented with a functioning referral system. The underlying principles that form the basis for funding of the BHCP are effectiveness of resource allocation and resource use, access to effective care, equity in health outcomes, and the greatest impact on health status by addressing the highest occurring diseases (Chibuye ,2010).

Zambia's health sector is financed through various sources. The public health system is funded mostly by public funds, local and international donors, and patient fees, which still hold in non-primary public health facilities. Although built by Church missionaries, faith-based health facilities depend heavily on the government for their operating budget and occasional financial aid from overseas donors. There is very limited health insurance in Zambia, restricted mostly to employer-based medical insurance schemes (Masiye and Kaonga, 2016).

A key feature of Zambia's health financing policy has been to allocate a significant amount of health resources to lower levels or primary care programs where health care services could be provided in a more cost effective manner than at higher levels of care. In order to attain equity, efficiency, feasibility, and financing of health care in a sustainable manner, the health financing policy has sought to ensure that revenues collected through general taxes constitute the main source of financing. Thus, the government has pledged to allocate a minimum of 15 per cent of the national budget to the health sector as enshrined in the Abuja and Maputo Declarations (MoH, 2006). However, Zambia is still way behind in meeting the 15 per cent budgetary allocation to the health sector.

The Zambian government has shown commitment to health as demonstrated through a growing health budget in absolute terms and in per capita terms. The government allocation to the health sector in nominal terms has been increasing even though the share of the health sector budget to national budget has been decreasing over the past five years. The proportion of the Ministry of Health budget to the national budget was 9.9 per cent in 2014, 9.6 per cent in 2015 and 8.3 per cent in 2016 (MoH, 2017).

Table 1 shows the composition of Total Health Expenditure (THE) in Zambia. Between 2006 and 2013, the Zambian government health expenditure as a percentage of THE increased from 38 per cent to 58 per cent. External resources contributed heavily and have remained relatively stable, accounting for 34 per cent of THE in 2013. The abolishment of user fees at the primary level of care**,** first in rural districts and later nationally between 2006 and 2012 has led to a steady decline in the share of out-of-pocket (OOP) expenditure, from 38 per cent in 2007 to 28 per cent in 2013 (WHO, 2015). Statistical evidence from the results of the national health accounts show that total health expenditure per capita increased to US$73.6 in 2012 from US$51.8 in 2010. The THE per capita has been increasing since 2010 (MOH, 2017).

Table 1: Composition of Total Health Expenditure in Zambia, 2013

Health Financing by Source	
THE per capita (USD)	$93
THE as a % of GDP	5.0%
GHE as a % of THE	58.3%
GHE as a % of GGE	12.6%
OOP as a % of THE	27.8%
DAH as a % of THE	34.2%

Source: WHO (2015)

2.2 Household Health Expenditure

Household out-of-pocket payments are the third most important financing source in Zambia. Public expenditure on healthcare stood at 11.3 per cent of total government expenditure in 2014, less than the 15 per cent target set by the 2001 Abuja Declaration (FTC, 2016). Out-of-pocket payment is relatively high at about 28 per cent of total health expenditure in 2014, which is above

the 20 per cent limit suggested by the WHO to ensure that financial catastrophe and impoverishment as a result of accessing health care become negligible (WHO, 2015).

Relative to the total health expenditure in other countries (including all health finance sources; households, government and donors), Zambia's per capita health expenditure is significantly lower than its peer lower middle income countries. Zambian households also spend double that of their counterparts in Lesotho and 2.56 times more than households in Swaziland on health care (UNICEF, 2016).

In the year 2010, 5 per cent of the Zambian population incurred catastrophic spending as a result of accessing health care. This is substantially higher than the median of 3 per cent for 17 lower-middle-income countries (WHO and WB, 2015). Chitah and Jonsson (2015) argue that these results are somewhat unexpected, given that out-of-pocket payments are progressive and relatively low as a proportion of total health expenditure. In addition, primary health care is free at rural public facilities. One possible explanation might be that the estimated proportion of out-of-pockets payments is higher than recorded. The fact that fees are charged by public hospitals and urban primary health care facilities, as well as private for-profit and non-profit facilities (which the poor might need to use where they have poor access to good quality public care) and the high levels of poverty in Zambia means that even small payments place large burdens on poor households.

While the extent of catastrophic payments indicates the relative impact of out-of-pocket payments on household welfare, the absolute impact is shown by the impoverishment effect. In Zambia, a large percentage of the population (70 per cent) lived below $1.08 per day in 2010. An extra 1.3 per cent dropped into poverty as a result of paying out of pocket when accessing health services. This translated into approximately 156,000 people or approximately 26,000 households per year falling into poverty because of out-of-pocket expenditure on health care (Chitah and Jonsson, 2015).

2.3 Health Reforms

A key feature of the health reforms in Zambia occurred in 2006 when the government abolished user fees for rural areas and extended the policy to urban areas in 2011 in order to increase access to health services (Masiye *et al.,* 2016). However, this pro-poor policy shift has not benefited the poor, who still need to pay fees before accessing health services (MoH, 2011). The abolition of user fees in rural Zambia in 2006 did not change the probability of seeking modern care or increased health care utilization, even among the poorest groups. Due to unequal medical spending between richer and poorer groups, the policy change benefited the richest, through an income transfer per medical visit of US$3.2 for them versus US$1.1 for the poorest, (Lépine *et al.,* 2017). Further, lifting of user fees at public facilities has not relieved all out of pocket spending as a large share is for drugs, consultations, and treatments at private clinics (MoH, 2011).

On the other hand, there is contrasting evidence that the abolition of user fees resulted in the increased utilization of health services. Hangoma *et al*., (2018) found that the policy increased overall use of health services in the short term and the effects were sustained in the long term. The increases were higher for individuals whose household heads were unemployed or had no or less education. The policy also led to a small shift in care seeking from private to publicly supported facilities, an effect driven primarily by individuals whose household heads were either formally employed or engaged in farming. Masiye et al., (2010) also found that utilization increased among the rural population aged at least five years by 55 per cent. Importantly, utilization increases were greatest in the districts with the highest levels of poverty and material deprivation. The study also suggested that fee removal is more effective than fragmented efforts to target exemptions to certain groups in providing protection against the financial consequences of using health services.

In order to improve health care financing and increase access to health care services, a Health Care Financing Strategy to address issues of resource mobilization, allocation, reimbursement mechanisms, resource tracking, and fund holder management has been developed and will be implemented going forward. The National Health Insurance (NHI) scheme, is one of the key strategies to be implemented, and it is aimed at increasing the resource envelope for health and enhancing Universal Health Coverage (MoH, 2017).

The vast majority of the population has no prepayment schemes, leading to high OOP payments on health care. It is important to note that there are some pre-payment arrangements in Zambia, with employer and private insurance schemes. However, it has been observed that private health insurance is not working well, due to lack of a guiding health care financing policy and inadequate market regulation (MoH, 2011). The statistics from the Zambia Household Health Expenditure Utilisation Survey (ZHHEUS) show that 16 per cent of people who consulted over their illness paid for their treatment directly, 75 per cent indicated that they did not pay for their treatment, and only 1 per cent paid using a prepayment scheme. Pre-payment schemes were reported mostly in urban areas, although they do exist in rural areas.

CHAPTER THREE

LITERATURE REVIEW

3.1 Conceptual Framework

The Behavioral Model was initially developed in the late 1960s to assist the understanding of why families use health services, to define and measure equitable access to health care, and to assist in developing policies to promote equitable access. The model of health services' use originally focused on the family as the unit of analysis, because the medical care an individual receives is most certainly a function of the demographic, social and economic characteristics of the family as a unit, (Andersen, 1968).

We expand on the Andersen model by trying to factor in the complex and multidimensional issues of insurance ownership. Jehu-Appiah *et al.*, (2011), in their study also applied the behavioral model and proposed that household decision to enroll is a function of 3 groups of factors namely: individual, scheme and health care provider factors, where each factor comprises of several variables.

Our model will focus on a single group of factors namely individual factors. Individual determinants include predisposing, enabling and need factors. In this study, predisposing factors (age, gender, education, employment status, family size, marital status) influence attitudes about insurance. Enabling factors (income, place of residence) facilitate or prevent an individual to being insured or not being insured. Self-rated health status and presence of a chronic illness are our need factors and represents the most immediate cause of health services use.

We postulate that these factors act in a certain way to determine the ownership of health insurance, which may differ across socio-economic quintiles because of the belief that factors that contribute to the vulnerability of a given population also affect insurance ownership as well as health care access and use.

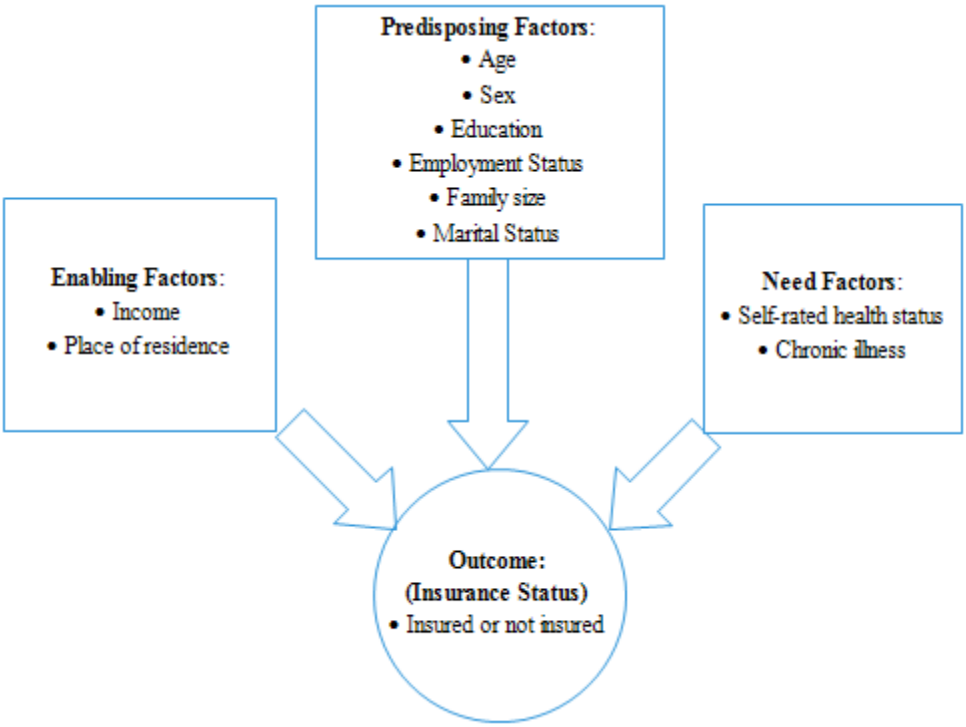

Figure 1: The Behavioral Model
Adapted from: Andersen (1995).

3.2 Theoretical Review

Much of the literature on demand for health insurance tends to subdivide between the conventional theory and the new theory for by (Nyman, 2001). Whereas the conventional theory places emphasis on the price effect of insurance with moral hazard and adverse selection as key challenges of the insurance market and hence welfare decreasing, the new theory looks at insurance as a process facilitating income transfers from those who remain healthy after subscribing to a pool of central funds, to those who become ill. Nyman (2001) suggests that health insurance is thus purchased to obtain that transfer, which is the difference between the payoff and the premium.

The theory of risks has also been applied extensively to the literature related to health insurance decision (Arrow, 1963). Under conditions of consumer rationality and risk awareness, the decision to purchase insurance is made on the basis of expected utility gain. Health insurance markets have the problems of moral hazard and adverse selection. Moral hazard is the tendency for people who

are covered by health insurance to use more health service or to be less careful about avoiding health risks than they otherwise could. Due to the problem of adverse selection in the insurance market, those people who know they have a greater chance of falling ill than the average, are the ones more likely to buy health insurance.

According to (Cutler and Zeckhauser, 1998), higher health expenditures arising out of low health status give rise to higher chances of purchasing health insurance. Further, people who are prone to cancerous infections or those with heart related illnesses (chronically sick), the elderly and the very young may be more likely to purchase health insurance as the costs they are likely to incur should they fall ill are exorbitant, and in most cases, beyond reach. Hopkins and Kidd (1996) also suggest that some individuals face greater risk vulnerability than others due to age, pre-existing health status, job profile and marital status.

The available evidence suggests that socioeconomic variables act on choice in expected ways. Those who are employed and those in executive positions are likely to purchase insurance (Butler 1999; Savage and Wright, 2003). Married respondents are more likely to take out coverage (Cameron and McCallum, 1995), though family size apparently has been of little influence on the purchase decision (Cameron and Trivedi, 1991). Age has also been found to have positive and significant impact on the probability of having insurance cover (Cameron *et al.,* 1988) and (Savage and Wright, 1999). Gender also plays an important role in the insurance decision through its effect on expected medical consumption. Sindelar (1982) notes that most of the higher demand for medical services by women may be explained by increased need during their reproductive years.

The view of the role of education in health decision-making has been well documented by Grossman (1972) and Muurinen (1982). The implication is that not only is a better educated person likely to be healthier, which would lower the probability of insurance, but he/she is likely to be better informed about the services available in the public hospital system and the benefits of joining a private health insurance fund.

3.3 Empirical Review

Several empirical studies have been conducted on factors that determine health insurance ownership at individual and household levels in the developing country context. The studies have focused on both private and social health insurance schemes. The section below presents a synthesis of the findings.

3.3.1 Socio-economic factors

Education has been found to be one determining factor for health insurance ownership. Kirigia *et al.,* (2005) using logistic regression, found that respondents with at least secondary level of education in South Africa are more likely to possess a health insurance policy than those with lower or no education. Similar studies also revealed the important role played by education through its significant association with health insurance ownership (Kimani *et al.*, 2014; Kiplagat *et al.*, 2013; Bourne *et al.*, 2010; Nketiah-Amponsah, 2009; Kidd and Hopkins, 1996). In essence, an increased stock of knowledge and awareness by educated people and also the likelihood of more income that is associated with attainment of higher education, enables the educated individuals to be able to pay required premiums and avoid catastrophic expenditure.

Masengeli *et al.,* (2017) used logistic regression and found that married patients are 10 times more likely to own a health insurance cover compared to patients who were never married. Similarly, other studies in developing countries also found that marriage is significant and positively associated with ownership of health insurance (Fofie, 2016; Trujillo, 2003; Liu and Chen, 2002; Cameron and McCallum, 1995). The argument is that marriage increases the desire for health insurance to protect children, avoid catastrophic health expenditure, and that the married are likely to have higher combined income as compared to those that are never married.

Mhere (2013) in a study in Zimbabwe, adopted a Probit model and found that the respondent's level of income is an important determinant of health insurance uptake. In the same vein, studies in South Africa, Nigeria and Taiwan also found that individuals and households with health insurance had higher monthly and annual income than those without any health insurance cover (Kirigia *et. al*., 2005; Govender *et. al*., 2014; Ibok, 2012; Liu and Chen, 2002; Masengeli *et. al*., 2017; Bhat and Jain, 2006). These results are in conformity with theory that higher incomes make

for affordability. The findings from these results suggest that respondents whose incomes are high tend to have a positive uptake of health insurance, and also that if income of the household is higher, it will have more money to buy health insurance and pay the premium. Srivastava and Zhao (2008) also found that higher household income is associated with an increased probability of purchasing private health insurance.

Several studies have found that employed individuals especially public sector workers whose jobs are secured with assured fixed income had a high probability of subscribing to insurance packages. (Mhere, 2013; Butler, 1999; Savage and Wright, 1999; Fofie 2016). The results indicate that individuals who are gainfully employed take insurance coverage more than those without any employment.

3.3.2 Demographic Factors

A study by (Liu and Chen, 2002) in Taiwan using a logistic regression found that age is a significant determinant of health insurance participation. These findings are similar to findings in other developing countries that found age to be significantly associated with having health insurance (Masengeli *et al.,* 2017; Kimani *et. al*., 2014; Mhere, 2013; Srivastava and Zhao, 2008). Cameron *et al.,* (1988) and (Savage and Wright, 2003) obtained similar results when modelling insurance decision for Australia. These results suggest that with age, people seem to develop a stronger sense of purpose for life and also that one may have acquired some wealth as they grow up.

The literature also suggests that gender is significantly associated with ownership of health insurance and that females are more likely to subscribe for health insurance than their male counterparts (Kiplagat *et al.,* 2013; Shane and Trivedi, 2012; Mhere, 2013; Kiil, 2012; Srivastava and Zhao, 2008; Liu and Chen, 2002; Kimani *et al.,* 2012). These findings indicate that males form the majority of respondents without cover, indicating that males are risk takers. Govender *et al.,* (2014) using a multinomial logistic regression, found that individuals in male-headed households were almost 2 times more likely to be insured than those in female-headed households which contradicts findings by (Liu and Chen, 2002) that male household heads are less likely to buy health insurance plans and tend to buy less insurance coverage once they are insured than female

household heads. In contrast, results by (Mathur *et al.*, 2014; Masengeli *et al.*, 2017; Makoka *et al.*, 2007) found that gender is not significantly associated with ownership of health insurance.

Other studies (Kirigia *et al.,* 2005; Liu and Chen, 2002; Amu and Dickson, 2016) found that the effect of urban/rural strata on the probability of purchasing health insurance is strongly significant. Whereas Kirigia *et. al*., (2005) and (Liu and Chen, 2002) found that individuals and households located in either cities or towns are more likely to purchase private health insurance than village households, (Amu and Dickson, 2016) found that women in the rural areas are more likely to own health insurance compared with their colleagues in urban areas. (Amu and Dickson, 2016) suggested that possible explanations to their finding could be that women in rural areas need health care services that might probably be absent from them, more than their counterparts in urban areas and that they are more likely to subscribe to health insurance so as to be able to afford health care in times of need, as they may not be able to afford out-of-pocket payments if they fall sick because of income differences between rural and urban areas.

Household size has also been empirically found to affect the ownership of health insurance. Bhat and Jain (2006) in their study in Gujarat found that the number of children is an important determinant of health insurance. These findings are similar to those by (Kiplagat *et al.*, 2013; Kirigia *et al.*, 2005; Mhere, 2013). In the study on determinants of health insurance choice in Kenya, Kiplagat *et al.*, (2013) established that larger sized households associate more with National Social Security Fund and Mutual Fund schemes whereas smaller households associate with private schemes as larger families can afford these small contributions as opposed to paying premiums. The findings by Ibok (2005) differ from the other studies in that he found that there is a positive relationship between family size and insurance consumption.

3.3.3 Health Status

Findings by Kirigia *et al.*, (2005) suggest that the demand for health insurance is likely to be low among individuals who are in excellent, very good or good health as compared to the majority of the respondents in the sub-sample with a health insurance policy who assessed their health status as either fair or poor. Similarly, other studies found a significant and negative relationship between health status and health insurance (Mathur *et al.*, 2014; Makoka *et al.*, 2007; Srivastava and Zhao,

2008). On the other hand, (Liu and Chen, 2002) found that there was no statistically significant relationship between health status and health insurance ownership.

Theory postulates that individuals who are prone to cancerous infections or those with heart related illnesses (chronically sick) may be more likely to purchase health insurance as the costs they are likely to incur should they fall ill are exorbitant, and in most cases, beyond reach. (Levy and Melzer, 2008; Shane and Trivedi, 2012; Mhere, 2013) all found that having a chronic illness is significantly and positively associated with ownership of health insurance. (Levy and Melzer, 2008) further established that those with chronic conditions benefit the most in terms of better health outcomes from access to insurance.

Summary of Empirical Literature Review and Methods Used.

Studies by (Kirigia *et al.,* 2005; Kimani *et al.,* 2014; Liu and Chen, 2002; Masengeli, 2017; Mathur *et al.,* 2015) adopted the logistic regression model in analyzing the factors that determine individuals and households to subscribe to a health insurance policy. (Kiplagat *et al.,* 2013; Makoka *et al.,* 2007; Govender *et al.,* 2014) used multinomial logistic regression to analyze the choice of insurance type among the insurance alternatives available. Other studies by Mhere (2013) and Fofie (2016) used the probit model in their respective studies to analyze factors associated with health insurance ownership. Ibok (2012) used the linear probability model (LPM) in his analysis of the determinant factors of health insurance.

General findings from the available literature show evidence that education, employment status, household size, marital status, region of residence and income are strong predictors of ownership of health insurance. Individuals with formal education, those that are employed and those with certain income, the married are all more likely to have health insurance whereas individuals who reside in rural areas and those who come from relatively bigger household sizes are less likely to own health insurance.

Most of literature reviewed did not attempt to address the fundamental problems of sample selection bias and endogeneity that is associated with cross sectional studies. Heckman (1979) observed that the problem of sample selection bias may occur as a result of data being used for

analysis not being randomly selected, self-selection of data units being investigated, and more generally self-selection. The problem of sample selection if not addressed may result in findings being biased and not generalizable to the population. Literature proposes methods to address this problem. These include Two-stage estimation, Maximum Likelihood estimation, propensity score matching and coarsened exact matching techniques (Heckman, 1979; Blackwell *et al*., 2009; Caliendo, 2008). Endogeneity, which in a broad sense can be caused by omitted variables, or unobserved heterogeneity, can lead to inconsistent and biased estimates in the models. The use of Instrumental Variable analysis is a commonly used practice to deal with this problem, (Cameron and Trivedi, 2010).

From the literature considered in the study, caution must be taken before considering formulation of policies on insurance based on the findings from the studies that we considered. Whereas some studies such as Kirigia *et al*., (2005) used national survey data in their analysis, extending the results to represent the population picture could be misleading as these studies only used a female sample size, and other studies used small sample sizes collected from particular regions in countries where the studies were conducted. The studies did also not attempt to control for endogeneity.

As highlighted above, it is evident that there exists a gap in the available literature in developing countries and this study will attempt to fill this gap by using a nationally representative data and also attempt to control for potential endogeneity.

CHAPTER FOUR

METHODOLOGY

4.1 Methods and model specification

This study adopts a Probit model, which is well suited for use with binary dependent variables and in cases where the dependent variables are discrete rather than continuous. Similar studies by Fofie (2016) and Mhere (2013) in literature have adopted this approach.

For binary response variable Y, such as health insurance ownership, with the values 0 and 1, the Probit equation is represented as;

$$P = Pr(Y = 1/X) = \Phi(X'\beta) \quad 1.1$$

$Where$:

$Pr = probability\ of\ an\ outcome$

$\Phi = cumulative\ distribution\ function\ (CDF)\ of\ the\ normal\ distribution$

$\beta = vector\ of\ unknown\ parameters$

$X = vector\ of\ known\ regressors$

$Y = sequence\ of\ independent\ binary\ variables\ that\ take\ values\ of\ 0\ and\ 1.$

The characteristics of X are taken at average and regressed against Y to determine the influence of each of the variables on the probability of an individual or household to make a decision to participate in health insurance or not to participate. Further, similar studies on understanding determinants of health insurance by (Kirigia *et al.*, 2005; Liu and Chen, 2002; Mhere, 2013; Shane and Trivedi, 2012; Kimani *et al*., 2014; Ibok, 2014; Fofie, 2016) used income, education, age, family size, sex, marital status, nature of job, employment status, self-rated health status and chronic illness among other variables to establish their relationship with health insurance.

In this study, health insurance ownership (HIO) is presented as a function of self-rated health status, marital status, region of residence, chronic illness, household expenditure, education, age, household size, employment status, and sex. Functionally, this is denoted as:

$$HIO = f\,(Hstat;\ Rgn; Hhsize, Chron;\ Hhexp;\ Educ;\ Age;\ Age^2;\ Emp;\ Sex;\ Marstat)$$

……1.2

Where;

$\boldsymbol{HIO}$: $health\ insurance\ ownership.$

$\boldsymbol{Hstat}$: $health\ status\ of\ an\ individual.$

$\boldsymbol{Rgn}$; $region\ of\ residence.$

$\boldsymbol{Chron}$: $presence\ of\ chronic\ condition.$

$\boldsymbol{Hhexp}$: $household\ expenditure.$

$\boldsymbol{Educ}$: $level\ of\ education.$

$\boldsymbol{Age}$: $individual's\ age.$

$\boldsymbol{Age^2}$: $individual's\ age\ squared.$

$\boldsymbol{Emp}$: $employment\ status.$

$\boldsymbol{Sex}$: $sex\ of\ an\ individual.$

$\boldsymbol{Marstat}$: $Marital\ Status.$

$\boldsymbol{Hhsize}$: $Household\ size.$

With HIO as a binary dependent variable which takes the values of either 0 or 1, the probit model is represented as;

$$HIO = \beta_0 + \beta_1 hstat + \beta_2 rgn + \beta_3 chron + \beta_4 hhexp + \beta_5 educ + \beta_6 age + \beta_7 age^2 + \beta_8 emp + \beta_9 sex + \beta_{10} marstat + \beta_{11} hhsize \quad 1.3$$

To examine the effect of health status on ownership of health insurance, the study attempts to account for the potential endogeneity of the main health status variable (chronic), which is an objective measure of health status, using instrumental variable (IV) analysis. The outcome variable (health insurance) is binary, and the key endogenous dependent variable (chronic) is also binary. The analysis is done using the extended Probit model (eprobit) in STATA. The eprobit model is able to handle binary models with binary endogenous variables. Similar to (Dwyer and Mitchell, 1999), the study uses days of admission in hospital as an instrument. Analysis and interpretation of the results is on the basis of coefficients and marginal effects (MEs).

4.2 Diagnostic Tests

We performed diagnostic tests to ensure unbiased and consistent estimation of our models. Specifically, the study ensured that there was no inconsistency in estimation, the models were correctly specified, there was no heteroscedasticity, and also ensured that the models fit the data correctly.

4.2.1 Testing for validity of instrument

The study adopted the method of pairwise correlations between the endogenous regressor and the instrumental variable to test the validity of our instrument. (Cameron and Trivedi, 2010), suggest that the simplest method to use to diagnose whether the instrument is weak or not is to use pairwise correlations between any endogenous regressor and instrument. It is important to test the validity of the instrumental variable because weak instruments can lead to estimates that are even more biased. The two conditions that must be met for an instrument to be considered valid are;

1. *Instrument relevance condition*: The correlation between the instrument and the endogenous variable must not be zero. This implies that the variation in the instrument is related to the variation in the endogenous variable.
2. *Instrument exogeneity condition*: The correlation between the instrument and the error terms must be zero. This implies that that part of the variation in the endogenous variable captured by the instrument is exogenous.

4.2.2 Model specification (percentage correctly specified)

To measure goodness of fit of the Probit model based on classification, the study adopted the percentage of correctly specified observations. It is important to know how well the model fits the data because a badly misspecified model may lead to erroneous inferences.

4.2.3 Model specification (The Wald Test)

A necessary condition for consistency is correct model specification or, in some leading cases, correct specification of key components of the model, most notably the conditional mean. The Wald statistic was also adopted to ensure that the models were correctly specified. The Wald test is the most common approach that is used to deciding the adequacy of a model that fits the richer

model and determines whether the data supports the need for a richer model. In some cases, we may add additional regressors to the model and test whether they have a zero coefficient.

4.2.4 Heteroscedasticity

The study decided to test for the presence of heteroscedasticity as it may result in standard errors of the estimates being biased and therefore limiting the use the usual *t*-statistics or *F*-statistics for drawing inferences. Heteroscedasticity arises most often with cross-sectional data and it occurs when the variance of the error terms differs across observations. The study adopted the Huber-White standard errors to control for potential heteroscedasticity in the models used in the study.

4.3 Data and definition of variables

4.3.1 Data description and sources

This study uses data from the Zambia Household Health Expenditure and Utilization Survey (ZHHEUS) that was conducted in 2014. The main purpose of the survey was to provide current evidence on household health seeking behavior, utilization and expenditure on health care. The ZHHEUS was intended to fill the evidence gap and simultaneously complement other existing studies such as the Zambia Demographic and Health Surveys (ZDHS) and the Living Conditions and Monitoring Surveys (LCMS). ZHHEUS covered topics focusing on the health status of the population, the prevalence of chronic diseases and health care need, disease pattern in adults, new born babies and children, factors behind current epidemiological distribution, health care utilization, perceived quality of care, extent of household expenditure on health, extent of impoverishment of health expenditure, coverage of private health insurance and willingness to pay for social health insurance. The ZHHEUS is nationally representative covering all ten provinces of Zambia. Using the 2010 Population Census Frame, the survey used a two-stage stratified cluster sampling design. Out of a targeted sample of 12,000 households, 11,927 were successfully interviewed representing a 99.4 per cent response rate. The definition of variables and expected signs of the variables are presented in Table 2.

Table 2: Definition of variables

Variable Name	Definition of Variable	Expected Sign
Health insurance	1 = if the respondent has health insurance; 0 otherwise	
Health rating	1 = if self-rated health status is bad; 0 otherwise	+
Region	1 = if the respondent is resident in a rural area; 0 otherwise	-
Chronic illness	1 = if the respondent has any chronic condition; 0 otherwise	+
Household expenditure	Total household monthly expenditure in Zambian kwacha.	+
Education	Respondents level of education; our base category is at most primary level of education.	+
Age	Respondent's age in years	-
Household size	The total number of individuals in a household.	-
Employment status	1 = if respondent is in employment; 0 otherwise	+
Sex	1 = if respondent is male; 0 otherwise.	-
Marital Status	1 = if respondent is married; 0 otherwise	+

CHAPTER FIVE

RESULTS AND DISCUSSION

5.1 Results

The descriptive results in Table 3 show that 3.9 per cent of individuals reported to own some form of voluntary health insurance. The average age of the respondents was 22 years. Of the total number of individuals in the sample, 48.9 per cent were male and 46.4 per cent of individuals reported that they were married. 58.4 per cent of the respondents resided in rural areas while the average number of people per household was 6 individuals.

Individuals who reported their self-rated health status as bad and those who reported having a chronic illness were 12.9 per cent and 11.3 per cent respectively. The average household monthly income was reported to be ZMW115.3 and average household monthly expenditure was ZMW1327.7. A further 41.7 per cent of the respondents in the sample reported to have some form of employment. 60.2 per cent of the respondents reported that they had attained at most primary level of education while 33.4 per cent had attained secondary level of education. Only 6.3 per cent of the total respondents reported that they had tertially education. The average number of days an individual was admitted in hospital was 0.042 days.

Table 3: Descriptive Statistics

Variable	Mean	Standard deviation
Insurance Status	0.039	0.195
Demographic Variables		
Age of respondent in years	21.863	17.858
Male	0.489	0.500
Married	0.464	0.497
Rural	0.584	0.493
Household size	6.311	2.816
Health Related Variables		
Health Status (Rated as bad)	0.129	0.335
Chronic illness (If present)	0.113	0.317
Days of admission	0.042	0.275

Socio-economic Variables		
Household monthly expenditure (zmw)	1327.673	2618.435
Household monthly income (zmw)	115.260	540.565
Employment status	0.417	0.493
Pre-school/Primary (educ1)	0.602	0.489
Secondary/Vocational (educ2)	0.334	0.472
College/University (educ3)	0.063	0.244

Table 4 shows the results obtained from the standard probit model, without accounting for the potential endogeneity of the objective measure of health status. The results show that age and sex of an individual, self-rated health status and presence of chronic condition are not significantly associated with ownership of health insurance.

The results further indicate that individuals with secondary and tertiary levels of education are 2.2 per cent and 5.3 per cent more likely to have health insurance respectively, as compared to those with at most primary level of education. Employed individuals are 1.1 per cent more likely to have health insurance than those that are not employed. The bigger the size of the household, the less likely that the household has health insurance as compared to relatively smaller households. As the number of household members' increases by 1, the chances that that household will have health insurance reduces by 0.2 per cent.

Married individuals are also more likely to have health insurance than those that are not married and as an individual changes status from not being married to being married, he/she is 2.5 per cent more likely to have health insurance. The results also reveal that as a household increases expenditure by ZMW1, they are 2.5 per cent more likely to have health insurance. For individuals who reside in rural areas, the results show that they are less likely to have health insurance. Individuals in rural areas are 3.4 per cent less likely to have health insurance as compared to those that reside in urban areas .

Table 4: Results of the probit model without accounting for the endogeneity of the health status variable (chronic).

Variable	**probit**					
	Coefficients	**S.E**	**P > |z|**	**Marginal Effects**	**S.E**	**P > |z|**
age	-0.010	0.006	0.119	-0.001	0.000	0.120
age squared	0.000	0.000	0.306	5.35e-06	5.22e-06	0.306
maledum	-0.047	0.033	0.157	-0.003	0.002	0.157
educ2	0.325***	0.047	0.000	0.022***	0.003	0.000
educ3	0.780***	0.056	0.000	0.053***	0.004	0.000
employ	0.160***	0.038	0.000	0.011***	0.002	0.000
badhrating	-0.008	0.054	0.888	-0.001	0.004	0.888
chronic	0.064	0.045	0.152	0.004	0.003	0.152
hhsize	-0.035***	0.006	0.000	-0.002***	0.000	0.000
married	0.376***	0.039	0.000	0.025***	0.001	0.000
rural	-0.505***	0.044	0.000	-0.034***	0.003	0.000
lhhexp	0.366***	0.019	0.000	0.025***	0.001	0.000
Number of obs. 29,115						
Wald Chi2(12) 1588.50						
Log likelihood -3721.150						
Pseudo R2 0.265						

Note: ** represents significance at the 10% level, *** represents significance at the 5% level.*

Results from the extended probit model in Table 5 also confirm that individuals with at least secondary level of education are significantly associated with ownership of health insurance. Individuals with secondary education and those with tertiary education are more likely to have health insurance than those with at most primary level of education, respectively. Employed individuals are more likely to have health insurance than those that are not employed.

Interestingly, the results also reveal that age of an individual and presence of a chronic condition are significant. Individuals who reported having a chronic condition are more likely to have health insurance than those without any chronic condition. Young individuals are less likely to have health insurance than relatively older individuals. Individuals from relatively bigger household sizes and those who reside in rural areas are less likely to have health insurance compared to those from relatively smaller household sizes and those from urban areas, respectively.

Additionally, the results further indicate that married individuals are more likely to have health insurance than those that are not married. For households whose household monthly expenditure is relatively higher, they are more likely to have health insurance than those whose household monthly expenditure is lower. Sex of an individual and self-rated health status have no significant bearing on ownership of health insurance.

The results in Table 5 further show correlation estimates that tell us about the endogeneity in our model. The estimate of the error correlation between the error from the endogenous equation and the error from the outcome equation is about -0.206 and is significant at 10%. This implies that we reject the null hypothesis that there is no endogenous covariate. The value is negative; we therefore conclude that unobserved factors that reduce the likelihood of having a chronic illness tend to occur with unobserved factors that reduce the chances of having health insurance.

Table 5: Results of the extended probit model accounting for the endogeneity of chronic variable

Variable	**eprobit**		
	Coefficients	**Standard Errors**	**P > |z|**
age	-0.014***	0.007	0.042
age squared	0.000	0.000	0.278
maledum	-0.024	0.035	0.502
educ2	0.323***	0.046	0.000
educ3	0.778***	0.056	0.000
employ	0.161***	0.037	0.000
badhrating	-0.161	0.054	0.882
chronic	0.438***	0.217	0.044
hhsize	-0.034***	0.006	0.000
married	0.383***	0.039	0.000
rural	-0.502***	0.044	0.000
lhhexp	0.360***	0.019	0.000
corr(e.chronic, e.insur)	-0.206*	0.115	0.073
Number of obs. 29,115			
Wald chi2(12) 1634.46			
Log likelihood. -15401.993			

Note: ** represents significance at the 10% level, *** represents significance at the 5% level.*

5.2 Results of the Diagnostic Tests

5.2.1 Instrumental Variable Validity

Results from Table 6 for the pairwise correlation between the endogenous variable (chronic) and the instrument reveal a positive and significant correlation at the 5% level of significance. In this study, chronic is an endogenous variable that represents presence of a chronic condition in an individual.

Table 6: Pairwise correlation between chronic and instrument

	Chronic	Days of admission
chronic	1.000	
Days of admission	0.048***	1.000

Note: *** *represents significance at the 5% level.*

Results from Table 7 for the pairwise correlation between the dependent variable (insurance status) and the instrument reveal a positive and significant correlation at the 5% level of significance.

Table 7: Pairwise correlation between insurance status and instrument

	Insurance status	Days of admission
Insurance status	1.000	
Days of admission	0.382***	1.000

Note: *** *represents significance at the 5% level.*

The observed correlation between the instrumental variable with health status and health insurance can be attributed to a number of factors. Studies conducted by (Galenkamp *et al*., 2016; Ali and Woldie, 2010) to assess the relationship between health status and days of admission in hospital revealed that increased prevalence of chronic diseases, functional limitations, polypharmacy, and communicable diseases accounted for part of the observed increase in acute admissions and medical admissions. Other studies that found a strong relationship between health status and admission include (Marszalek and De Villiers, 2006) and Hussein (1997). We argue that those with health insurance may have a high tendency to visit hospitals when faced with acute health

conditions knowing that they will pay little or nothing towards medical expenses. Studies by (Englum et al., 2016; Weissman and Epstein, 1989; Hadley et al., 1991) all support our argument attributing the findings to the difference in ability to pay for medical expenses between the insured and the uninsured.

From the pairwise correlations obtained in Table 6 and Table 7, it can be concluded that days of admission is not a good instrument as it correlated with both the endogenous variable and the dependent variable. According to (Cameron and Trivedi, 2010), two conditions have to be met for an instrument to qualify as a good instrument;

1. *Relevance*: The instrument must be highly correlated with the endogenous variable.
2. *Exogeneity*: The instrument must not be correlated with the error term.

From literature and empirical evidence, weak and invalid instruments have been found to produce estimates that are inconsistent and biased (Cameron and Trivedi, 2010) and Wooldridge (2010). Having identified that our instrument is weak and may potentially produce biased estimates, interpretation of results and conclusions will be based on the models without the instrument.

5.2.2 Model specification (percentage correctly specified)

The results obtained revealed that the percentage of correctly specified values in our model is about 95.86 per cent. The high value obtained indicates that most observations in our model are correctly specified and therefore the model can be relied upon to produce consistent estimates.

5.2.3 Model specification (The Wald Test)

The low probability value of 0.000 of the Wald statistic indicates that the models used in the study cannot be improved by dropping any of the variables and the variables are therefore jointly significant. The null hypothesis that the coefficients are simultaneously equal to zero in our models is rejected. This result also implies that the models can produce consistent estimates.

5.2.4 Heteroscedasticity

The use the vce (robust) option, produced standard errors that are valid even if the models are heteroscedastic. According to (Cameron and Trivedi, 2010), for cross-sectional data, this is the standard approach. Therefore, the estimates in our model control for bias and inconsistency by using this approach.

Given that the instrument is invalid, we proceed to discuss the results from the probit models without the instrument, and acknowledge the limitation of the study that the results only capture the factors associated with ownership of voluntary insurance and no causal effects of health status on health insurance ownership is obtained.

5.3 Discussion

This section discusses the findings of the study based on the probit models without the instrument. The results indicate that education is highly associated with ownership of health insurance. Our findings are similar to those by (Kimani *et al.,* 2014; Nketiah-Amponsah, 2009; Bourne and Kerr-Campbell, 2010; Kiplagat *et al.,* 2013). These studies all report that individuals with at least formal education are more likely to have health insurance. The results suggest that as individuals continue to gain more education, they become more knowledgeable such that they also tend to understand the importance of having health insurance and avoid catastrophic health expenditures in an event of illness.

The study results also show that employment is a significant predictor of ownership of health insurance in Zambia. These findings are supported by similar results in studies conducted by Mhere (2013) and Fofie (2016). In her study, Fofie (2016) found that individuals, especially those who work in the public sector whose jobs are secured assuring them of fixed income, which they can plan well with, have a high probability of subscribing to an insurance package. Our descriptive statistics in Table 3 show that nearly 42 per cent of Zambians have some form of employment and literature further reveal that over 80 per cent of the jobs are in the informal sector. However, employed individuals with insurance schemes are mostly those in formal sector jobs whose

insurance cover is mostly employer based schemes. Policies aimed at attaining Universal Health Coverage need to find ways to ensure that workers in the informal sector contribute to the National Health Insurance Fund that is currently being set up, so that they may be financially protected from health shocks.

Our results further reveal that married individuals are more likely to have health insurance as compared to their counterparts that are not married. These findings are as expected because married individuals are believed to have the need to protect their families, are more concerned about high health expenditures, and they also tend to have more combined income with their partners and therefore can afford to pay for insurance. Several authors in developing countries have found similar results that being married is a significant determinant of owning health insurance and that married individuals are more likely to subscribe to insurance policies of any kind (Masengeli *et al.,* 2017; Trujillo ,2003; Liu and Chen; 2002).

Descriptive statistics in Table 3 also show that on average, the number of individuals per household (household size) is about 6 people, which is considered a larger household size according to (UN, 2017). The results obtained indicate that household size is negatively associated with health insurance ownership. Our results may be attributed to the competing financial needs within larger households against low average household income of ZMW115.5, which is assumed constant across all households. Our findings are supported by results found in similar studies (Kirigia *et al.,* 2005; Kimani *et al.,* 2014; Ibok ,2014; Mhere, 2013). The authors show that there is a negative relationship between ownership of health insurance and household size. These findings are attributed to the large payments that growing families may have to make towards health insurance premiums and that any increase in household size, holding income constant, reduces the per capita income. However, (Liu and Chen, 2002) and Kiplagat *et al.,* (2013) found that an increase in household size increases the likelihood of having health insurance because of the anticipated increase in the need for medical services as compared to smaller families and in order to reduce the risk of potential medical loss.

Being resident in a rural area is negatively associated with ownership of health insurance. The results suggest that individuals who reside in rural areas are 3.4 per cent less likely to have health

insurance as compared to those in urban areas. These findings may be attributed to non-existence of private health insurance companies in rural areas as compared to urban areas where most affluent individuals are based. Our findings are consistent with studies by Kirigia *et al., (*2005) and (Liu and Chen, 2002) who both found that individuals who reside in rural areas are less likely to have health insurance than their urban counterparts due to the economic wellbeing of the later and that those in urban areas have more extensive knowledge diffusion about the importance of health insurance to avoid financial catastrophe. Contrary to our findings, (Amu and Dickson, 2016) found that women in rural areas are more likely to have health insurance than their urban counterparts. The authors argue that women in rural areas need health care services that might probably be absent from them and they may not be able to afford out-of-pocket payments if they fall sick because of income differences between rural and urban areas.

Additionally, our study findings also showed that household expenditure, which we used to proxy household income, has a significant and positive relationship with ownership of health insurance. Households with relatively higher monthly expenditure on goods and services are also likely to have additional resources to spend on health insurance purchase. These findings may be attributed to the ability of such households to allocate part of their expenditure towards health needs in order to remain healthy. Our findings are consistent with other studies, which show that income is a significant and positive determinant of health insurance (Kirigia *et al.,* 2005; Govender *et al.,* 2014; Ibok, 2012; Mhere, 2013; Liu and Chen, 2002; Masengeli *et al.,* 2017).

Furthermore, whereas the results from the standard probit show no significant relationship between age and health insurance ownership, results from the extended probit model reveal a significant and negative relationship with age. Our descriptive statistics shows that the average age of the respondents was 22 years of age. This age group is intuitively young people without income and therefore cannot afford health insurance, and the results are similar to the existing literature in developing countries (Kimani *et al.,* 2014; Mhere, 2013; Liu and Chen, 2002; Masengeli *et al.,* 2017). These studies found that the likelihood of health insurance ownership tends to rise with increase in age. Possible explanations for this outcome are attributed to better financial security with increase in age, which in turn increases the ability to purchase health insurance policies and that age comes with a sense of responsibility as well as getting more knowledgeable. The positive

connection between aging and health insurance purchasing has also been attributed to biological degeneration in health, which makes older people appreciate the need to make extra investments in health, with health insurance being one principal focus.

Our results further reveal that gender is not significantly associated with ownership of health insurance. These results indicate similar findings to other studies (Mathur *et al.,* 2014; Masengeli *et al.,* 2017; Makoka *et al.,* 2007). Contrary to our findings, some studies found that males are less likely to have health insurance than females (Mhere, 2014; Kiplagat *et al.,* 2013; Kiil, 2012; Srivastava and Zhao, 2008; Liu and Chen, 2002; Kimani *et al.,* 2012). These results are attributed to the higher demand for medical services among women during their reproductive years according to Sindelar (1982), and that males are more risk takers.

Health status of an individual is a potential predictor of health insurance ownership. The study considered two health status variables; self-rated health status and presence of chronic condition which is a more objective measure of health status. Our findings indicate that self-rated health status does not significantly affect ownership of health insurance. These findings are consistent with earlier findings by (Liu and Chen, 2002). On the contrary, other studies found a significant and negative relationship between self-rated health status and health insurance (Kirigia *et al.,* 2005; Makoka *et al.,* 2007; Srivastava and Zhao, 2008). Whereas results from the probit model further reveal that chronic is not significantly associated with ownership of health insurance, results from the extended probit model reveal a significant and positive relationship with ownership of health insurance, consistent with findings by (Levy and Melzer, 2008; Shane and Trivedi, 2012; Mhere, 2013). The studies attributed their findings to the chances of those with chronic conditions having to make exorbitant payments towards healthcare expenditure and prefer to trade such possibilities with a stream of affordable healthcare premiums through health insurance. Levy and Melzer (2008) further established that those with chronic conditions benefit the most in terms of better health outcomes from access to insurance.

From the theory of risks by Arrow (1969), health insurance markets have the problems of moral hazard and adverse selection. This implies that individuals with certain attributes are more likely to have health insurance and this may result in biased estimates as other important characteristics

may be omitted that are crucial in determining health insurance ownership. The result of biased estimates due to omitted variables may also be partly explained by theoretical framework used in the study by Andersen (1968) where we have assumed that health insurance is only determined by individual factors. There are a variety of other factors that can explain the determination of health insurance but that is beyond the scope of this study.

This study focused on understanding the factors that determine health insurance ownership in Zambia using cross-sectional survey data. The specific analysis aimed at understanding the causal effect of health status on ownership of health insurance could not be undertaken as no valid instrument could be found from the dataset. Efforts to use external sources of data such as ward level poverty estimates generated by the World Bank as an instrument for health status, as provided in literature, were not successful as the instrument was determined to be invalid. Due to lack of a valid instrument, the endogeneity problem arising from health status could not be controlled. As such, the study findings need to be interpreted as correlations rather than causal effects.

As in most cross sectional studies, there is an eminent problem of sample selection bias. According to Heckman (1979), sample selection bias may arise in practice for two reasons. First, there may be self-selection by the individuals or data units being investigated. Second, sample selection decisions by analysts or data processors operate in much the same fashion as self-selection. Data may also be non-randomly selected because of decisions taken by data analysts. Using the wages and earnings example, Heckman (1979) argued that wages of migrants do not, in general, afford a reliable estimate of what non-migrants would have earned had they migrated. The earnings of manpower trainees do not estimate the earnings that non-trainees would have earned had they opted to become trainees. In each of these examples, wage or earnings functions estimated on selected samples do not, in general, estimate population (i.e., random sample) wage functions. Comparisons of the wages of migrants with the wages of non-migrants (or trainee earnings with non-trainee earnings, etc.) result in a biased estimate of the effect of a random "treatment" of migration, and manpower training.

Whereas the study recognizes problem of sample selection bias as explained by Heckman (1979), it did not take into account the selection bias especially for those who are in employment. Due to

the non-randomness of the data used in this study, it is expected that those with certain attributes are more likely to participate in health insurance. For example, all those in employment are expected to participate in health insurance. The estimated effect of employment on health insurance cannot be a reliable estimate to determine the effect of the same category of individuals on health insurance had they been unemployed. As a result of this limitation, the study proposes that future studies should take into account the problem of sample selection bias so that findings may be generalizable to the general population.

CHAPTER SIX

CONCLUSION AND POLICY RECOMMENDATIONS

6.1 Conclusion

This study was guided by three specific objectives. To determine the relationship between socio-economic factors and health insurance ownership in Zambia, to examine the relationship between demographic factors and health insurance ownership in Zambia, and to establish if health status is associated with ownership of health insurance in Zambia. Using data from the 2014 Zambia Household Health and Expenditure Survey, probit regression was used to analyze the factors that determine health insurance ownership in Zambia.

Descriptive statistics revealed that only 3.9 per cent of Zambians have some form of health insurance. The results show that the level of education, employment status, region of residence, marital status, household size, and household expenditure are significantly associated with health insurance ownership in Zambia. Individuals that are educated, the married and those that are in employment were found to own health insurance. Moreover, study findings reveal that households that spend relatively more on goods and services were found to own health insurance. However, those households with relatively bigger family size and those residing in rural areas are less likely to have health insurance. The study further established that gender, age, and health status are not strong predictors of health insurance ownership in Zambia.

6.2 Policy Recommendations

From the findings that education is significantly associated with health insurance, it is recommended that the government continues to come up and implement policies that will make access to quality education easy and affordable for all. This may be done through the continued construction of education facilities especially in rural areas where access to schools is limited and also to increase the annual budgetary allocation to the education sector. The study further recommends that the government should continue to come up and implement policies that may accelerate creation of more decent employment opportunities for the citizenry as being in employment empowers one to have health insurance. Moreover, even as the government plans to

implement the National Health Insurance that will be mandatory and will in the first phase cover formal sector workers, there is need for the government to create a conducive environment for informal sector workers who are in the majority to enable them to thrive. This may enable more of the informal sector workers to be able to subscribe to health insurance and consequently increase coverage. From the findings that households with relatively high expenditure on goods and services are more likely to own health insurance, the study recommends that government should consider possibly adjusting the tax exempt bracket upwards as this will ensure that employees in the formal sector have more disposable income that may also be spent on subscribing to health insurance schemes.

Based on the findings that region of residence is significantly associated with ownership of health insurance and that rural residents are less likely to have health insurance; the study recommends that government should consider empowering rural residents through developmental projects that may create employment opportunities. Government should also consider increasing efforts to narrow income inequality gap between rural and urban areas. Another policy option the study recommends would be to encourage formation of community insurance schemes that have proven to be successful in other countries, to target individuals in the rural and informal sector. However, such schemes are not without their challenges and future research needs to be undertaken to understand the feasibility and viability of such schemes in Zambia

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APPENDIX

Table 8 shows the results of instrumental variable analysis using the eprobit model. The study also applied instrumental variable analysis to deal with the endogeneity of our main health status variable (chronic). Whereas the study recognizes that days of admission is not a valid instrument in this study, the results obtained after instrumenting tend to be fairly consistent with the results from the other models. This result show the importance of undertaking the tests to check the validity of instruments as suggested by (Cameroon and Trivedi, 2006). Other instruments proposed in literature by (Dwyer and Mitchell, 1999) and (Harris and Remler, 1998) that the study attempted to use are distance to the facility and number of children. The two instruments were also found not to be good instruments. The study further attempted to use poverty headcount as an instrument to control for endogeneity but the variable could not meet the criteria of a good instrument.

Table 8: Results of the extended probit model accounting for the endogeneity of chronic variable with instrumental variable (days admitted in hospital)

Variable	**eprobit**		
	Coefficients	**Standard Errors**	**P > |z|**
age	-0.014***	0.007	0.033
age squared	0.000	0.000	0.275
maledum	-0.020	0.034	0.553
educ2	0.322***	0.046	0.000
educ3	0.776***	0.056	0.000
employ	0.161***	0.037	0.000
badhrating	-0.014	0.054	0.796
chronic	0.493***	0.162	0.002
hhsize	-0.034***	0.006	0.000
married	0.383***	0.039	0.000
rural	-0.501***	0.044	0.000
lhhexp	0.359***	0.019	0.000
corr(e.chronic, e.insur)	-0.238***	0.084	0.005
Number of obs. 29,115			
Wald chi2(12) 1647.06			
Log likelihood. -15273.36			

Note: ** represents significance at the 10% level, *** represents significance at the 5% level.*